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# PROSUMER BEHAVIOR AND THE ASSESSMENT OF THE LEVEL OF SUSTAINABLE DEVELOPMENT OF HOUSEHOLDS IN THE CONTEXT OF THE COVID-19 PANDEMIC IN POLAND

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**ABSTRACT:** The aim of the article is to assess the sustainability of households and present the issue of sustainable development in the context of consumer behaviour in Poland on the basis of our own surveys. The research was carried out in July 2022 on a sample of 1112 respondents with a diagnostic survey using the CAWI survey technique. During the research, various types of prosumer activities of households were defined, but also their consumer behaviour was assessed in terms of its positive impact on sustainable development. On the basis of selected variables describing the consumer behaviour of households, three indices of the measurement of sustainable development of households were built – a general index and two component indices. Then, the results were analysed for correlations between variables describing household characteristics and indices describing their level of presumption. Statistical, descriptive and comparative methods were used. The study shows that the surveyed households are highly sustainable. The level of sustainable development of the surveyed households is positively correlated with the level of presumption.

**KEYWORDS:** presumption, COVID-19, sustainable development, consumer behaviour, household

## Introduction

One of the objectives of European environmental policy is sustainable production and consumption (European Commission, 2011). Sustainable Consumption and Production occupy an important place in the so-called green economy, i.e. socio-economic development that more effectively implements the goals of sustainable development. It is not only the production of food (agriculture, food processing) that has a large impact on the environment. Households, too, through their choice of food products, diet and habits, influence their surroundings, the amount of energy consumed and the amount of food wasted (Luterek, 2017). Households should be the basis for building decision-making models that will focus on achieving ecological, social and economic goals within the framework of sustainable development (Kondraszuk, 2016). Figure 1 shows the relationship between sustainable production and consumption and the three pillars (social, economic and environmental) of sustainable development.



**Figure 1.** The relationship of sustainable production and consumption with the three pillars (social, economic and environmental) of sustainable development

According to the fourth issue of the Polish edition of the EY future Consumer Index survey, 37% of respondents declare that their interest in sustainable development products increased during the pandemic. More than half of consumers declared that they take sustainability into account when shopping and one in three Polish consumers claimed that they put the planet's welfare first, which is 12% more than the global average. This trend may intensify in the future – 35%

of respondents declared that they would increase their commitment to buying sustainable products (EY Polska, 2021).

Due to consumers' growing interest in sustainable development, it was decided to assess the level of sustainability of households in Poland using a synthetic index built for the purpose of this study.

Among academics and business practitioners, there is a discussion on many delimitations and typologies of indicators of durable and sustainable development (Bell & Morse, 2000; Śleszyński, 1997). The multifaceted nature of sustainable development makes it difficult to construct a synthetic index that would allow for a comprehensive assessment of how far an enterprise is advanced in this type of development. Therefore, different levels of analysis require the use of separate indicators. Some indicators can be recommended in the context of international and national comparisons, others will work at the level of regions and local government units, and still others will be adequate for measurements at the microeconomic level, i.e. household.

In the presented form, this article has many important practical and theoretical implications from the perspective of the development of measures of sustainable development at the level of a single household. The article consists of the following sections: introduction, an overview of the literature, methodology, results of the research, discussion and conclusions.

## An overview of the literature

Households are the basic units of the sphere of consumption, which, with the means, material resources, time and work of their members, finance the purchase of goods and services, produce objects of consumption and services, and organise the processes of consumption. On the other hand, the scope, nature and manner of their functioning largely determine the extent to which the needs of members of households are met (Zalega, 2007).

In the household, there are five groups of activities according to the type of needs (Zalega, 2007):

- related to housing, residential installations, furniture, equipment and own means of transport (purchase, maintenance, cleaning, heating, lighting), and also with a home or allotment garden, garage, etc.,
- dedicated to the care of clothing (purchase, maintenance, cleaning, laundry, ironing, repair, sewing new things, reconditioning, etc.),
- related to food (purchase, preparation of meals and drinks with the whole technological process, washing dishes, removing waste, making food stocks, storing products, etc.),
- resulting from the functions of care and upbringing (caring for and attending to children, the sick, the elderly),
- organisational and managerial (anticipation of activities, organisation of the household economy, management of finances and resource goods, budget-

ing, keeping household accounts, realisation of commodity expenditure and fees for services, coordination of household members' domestic work, control of activity and its effects, etc.).

In a typical household, economic and social functions are carried out. Economic functions result from participation in economic processes in two dimensions: local and global. Within the economic function of a household, two main functions can be distinguished: consumer and production. The consumption function is directly related to the organisation of consumption, while the production function is aimed at providing the household with the means necessary for the realisation of consumption. The second key group of functions that the household performs are social functions. Within this group, reproductive and upbringing functions are distinguished. The social character of a household is related to the fact that the basic social cell is the family.

The implementation of the concept of sustainable development at the household level means that the household is an active participant in economic processes whose decisions and actions have economic, social and environmental effects. The most important activities of households that are significant for the environment include (Ryszawska-Grzeszczak, 2011):

- buying goods and services (refraining from buying, buying less, consciously buying environmentally friendly products, buying excessively, overconsumption),
- production of household goods for own needs, self-supply,
- natural production, home preparation of purchased products,
- consumption (at home, away from home, in single and multi-person households),
- post-consumption activities (cleaning, waste sorting, garbage disposal).

The analysis of individual phases of household activity allows us to look for activities that may have a positive impact on the environment at each stage. The nature of this impact depends on the size of the household, place of residence, and income. All factors can be taken into account when designing sustainable consumption policy tools. With reference to household functions, examples of behaviour supporting the idea of sustainable consumption can be provided (Table 1).

Actions undertaken within the social function of the household through sustainable development economics were compared in three functions: education, upbringing, and health (health protection). The actions taken confirm the emerging trend in societies, which consists of taking an interest in the quality of life, but not only measured by material well-being, the amount of possessions, and the amount of consumption. Households are now making decisions on the basis of an increasing amount of information on environmental devastation, including through excessive consumption. Their awareness and sense of shared responsibility are growing. They know that their physical and mental health and the health of their children and grandchildren depend on the quality of the environ-

ment, the quality of air, water, soil and food. There is a growing awareness of global consumption inequality. What is less and less accepted is economic growth that, through increasing production, provides goods, things, and commodities and thus, through their consumption, is supposed to ensure prosperity and happiness, and in fact, it worsens the quality of life. The idea of maximising satisfaction, benefits and contentment, which is crucial for consumers' decisions, is now taking on a completely different meaning (Ryszawska-Grzeszczak, 2011).

**Table 1.** Household activities within the framework of sustainable development

Types of functions	Types of activities	Economics of Sustainable Development
Economic function in the household	Buying	Limiting purchases, buying green products, replacing products with services (product-service system), for example, renting, sharing, buying local, durable products
	Production	Growing your own food, self-supply, natural production, preparing meals at home, processing food, repairing and renovating
	Consumption	Reducing consumption, less but better quality, consuming whole, unrefined products, reducing food waste, using public transport, saving energy and water
	Post-consumption activities	Cleaning, sorting waste and removing other effects of consumption, repeated reuse of goods
Social function in the household	Educational	Providing information about the pressure of consumption of specific products on the environment, shaping the ecological awareness of family members, showing the links between the economy, people and the environment (greater decision-making capacity)
	Upbringing	Showing the ethical aspects of consumption, personal responsibility and fairness within and outside the generations, creating environmentally friendly habits, promoting sensible and sustainable consumption, focusing on quality of life (maximizing satisfaction and happiness)
	Health protection	Sustainable consumption, limiting consumption, choosing green products that promote the environment and support human health

Source: Ryszawska-Grzeszczak, 2011, p. 106.

## Research methods

The aim of the article is to assess the sustainability of households and present the issue of sustainable development in the context of consumer behaviour in Poland on the basis of our own surveys. Direct research was conducted in order to identify selected elements of consumer behaviour related to sustainable development and prosumer behaviour. The research was carried out from 26 to 29 July 2022 with the method of a diagnostic survey using the CAWI technique (Computer Assisted Web Interview) as part of scientific activity No. 2021/05/X/

HS4/00643 “Prosumer behaviour related to household management during the COVID-19 pandemic” as part of the MINIATURA 5 competition organised by the National Science Center. The research was carried out among 1112 adult respondents selected in a non-random manner – quota selection (according to the criteria of age, sex, place of residence and education). The analysis of the obtained data was carried out on measures of descriptive statistics using the Statistica 13.3 program. The alpha level = 0.05 was assumed for the results obtained. The indicators used in the study were created using the agglomeration and k-means neighbours method due to the nominal nature of measuring detailed areas. The selection of two methods independently indicated similar conclusions regarding the areas that constitute the indicators. The analysis used the Spearman rank correlation coefficient and Mann-Whitney U difference test supported by the Glass effect size index (rg). The choice of non-parametric techniques was due to the lack of equivalence of the compared group and the lack of a normal distribution in the tested variables. The organisation of empirical research is presented in Figure 2.

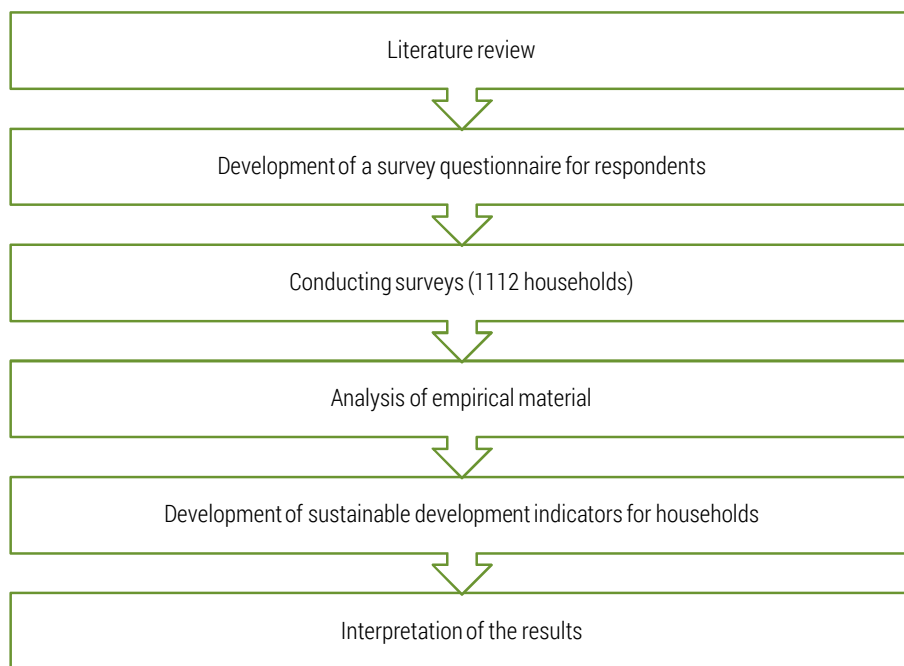


Figure 2. Organisation of research

In the analysed test sample, women (52%) and men (48%) were almost equally represented. In the test sample, the largest group were respondents over the age of 65 years. Their number was 250 people, making up 22% of the total test sample. The least numerous groups in the study were those aged 18-24 – 8% of the tested sample (Table 2).

**Table 2.** Summary of sociodemographic variables in the study sample

Variable	Value	<i>n</i>	%
Sex	Male	537	48.29
	Female	575	51.71
Place of residence	Village	401	36.06
	City with up to 20,000 inhabitants	245	22.03
	City from 20,001 to 99,999 inhabitants	158	14.21
	City from 100,000 to 499,999 inhabitants	155	13.94
	A city of 500,000 inhabitants	153	13.76
Age	18-24	86	7.73
	25-34	183	16.46
	35-44	226	20.32
	45-54	176	15.83
	55-64	198	17.81
	65+	243	21.85
Education	Primary education	36	3.24
	Secondary school education	21	1.89
	Vocational education	287	25.81
	High school education	410	36.87
	Higher education	358	32.19
Income	up to PLN 1,000	120	10.79
	from PLN 1,001 to PLN 2,000	340	30.58
	from PLN 2,001 to PLN 5,000	563	50.63
	from PLN 5,001 to PLN 8,000	71	6.38
	Over PLN 8,000	18	1.62

Note. N = 1112.

To build a synthetic index assessing the level of sustainable development of households, the following variables describing consumer behaviour of households were selected:

- $x_1$  – Limiting meat consumption,
- $x_2$  – Buying planet friendly products,
- $x_3$  – Use of renewable energy,
- $x_4$  – Zero food waste,

- $x_5$  – Buying second-hand things,
- $x_6$  – DIY,
- $x_7$  – Tailoring alterations,
- $x_8$  – Water saving,
- $x_9$  – Energy saving,
- $x_{10}$  – Repair of things and equipment,
- $x_{11}$  – Waste segregation,
- $x_{12}$  – Limiting the use of disposable bags,
- $x_{13}$  – Using energy-saving light bulbs and appliances.

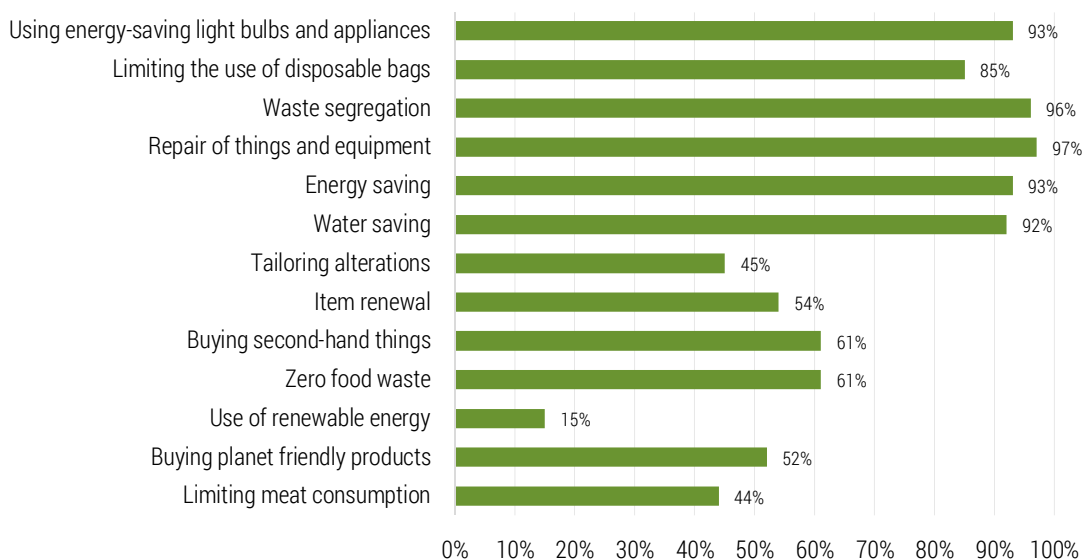


Figure 3. Percentage of activities performed as part of sustainable household behaviour

Based on the literature review, only those activities that have a positive effect on the development of the planet were selected. Respondents in the survey declared which of the consumer behaviours are carried out in their households (Figure 3). More than 90% of the respondents declare that they manage water and energy efficiently, segregate waste, limit the use of disposable bags, use energy-saving bulbs and appliance devices, and undertake repairs of things and equipment. Only 15% of the respondents declare that they use renewable energy sources for home or water heating.

## Results of the research

The assessment of the level of sustainable development of households began with the assessment of the variables presented in Figure 3 using the agglomeration method, for which a dendrogram is shown in Figure 4.



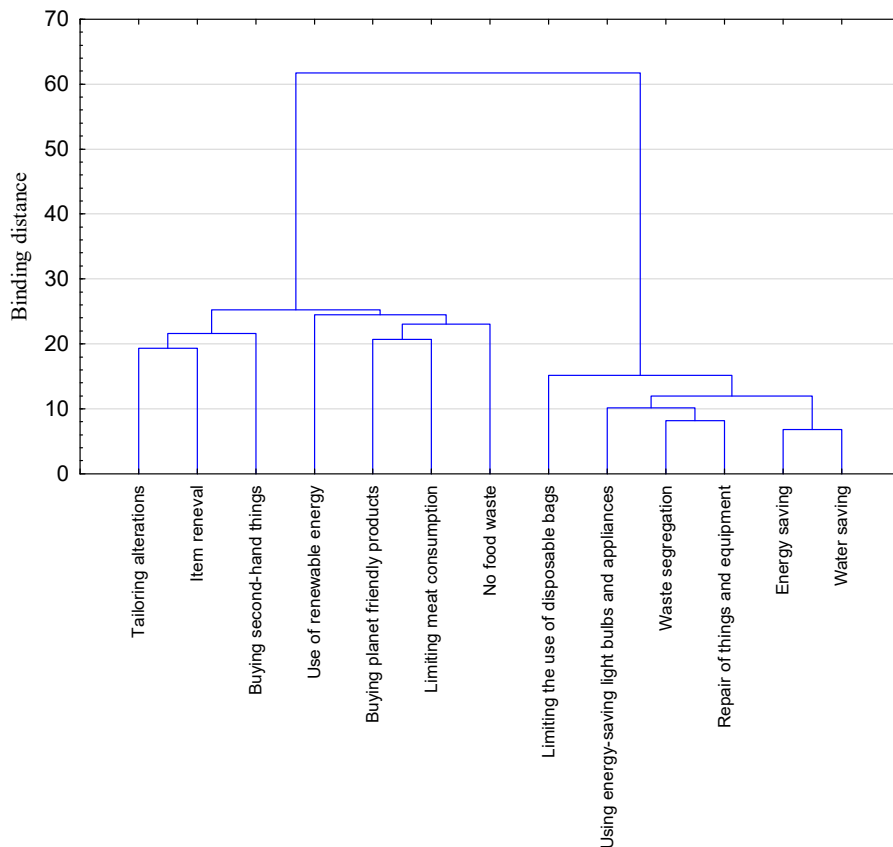


Figure 4. Summary of agglomeration analysis of sustainable development area

Figure 4 shows that the variables describing the consumer behaviour of households are clearly arranged in two bundles (two scales). It can also be noticed that questions concerning tailoring alterations, refurbishing and buying second-hand items together create an interesting structure, and in the future, it is worth increasing the number of questions in this area and building a separate scale (future intentions). In order to confirm the two-factor structure of the sustainability indices, the K-means neighbour method was additionally used.

The analysis confirmed previous indications. Both the agglomeration method and the k-means method indicated the same structure of sustainable development areas, allowing two indices to be distinguished:  $S_1$  – economical use of resources and  $s_2$  – reducing environmental degradation. The relationship between  $s_1$  and  $s_2$  was found to be moderate and positive ( $r_s = 0.35$ ;  $p < 0.001$ ). As the result of the first sustainability index increases, the result of the second index also increases. On the basis of the average of indices  $s_1$  and  $s_2$ , the household sustainability total index ( $s_j$ ) was created, which correlates positively and

very strongly with the reducing environmental degradation index ( $r_s = 0.92$ ;  $p < 0.001$ ) and positively and strongly with the economical use of resources index ( $r_s = 0.65$ ;  $p < 0.001$ ).

**Table 3.** Summary of k-means-neighborhood analysis of sustainable development area

Head areas	Detailed area	Distances from the focus center
Economical use of resources	Water saving	0.18
	Energy saving	0.18
	Repair of things and equipment	0.17
	Waste segregation	0.19
	Limiting the use of disposable bags	0.28
	Using energy-saving light bulbs and appliances	0.21
Reducing environmental degradation	Limiting meat consumption	0.47
	Buying planet friendly products	0.44
	Use of renewable energy	0.42
	Zero food waste	0.48
	Buying second-hand things	0.44
	Item renewal	0.42
	Tailoring alterations	0.40

Note. Analysis was performed in group  $N = 1112$ .

Analysis with the Wilcoxon test showed that the economical use of resources index ( $M_{rank} = 1.98$ ;  $Me = 1.00$ ) compared to the reducing environmental degradation index ( $M_{rank} = 1.02$ ;  $Me = 0.49$ ) significantly higher scores were achieved,  $z = 28.424$ ;  $p < 0.001$ ,  $r_c = 0.86$ . The size of the effect is very large.

In the next stage of the analysis, the correlation of household sustainability indices with the variables, place of residence, income, number of children under 14 years of age, and number of members in the household was assessed. Table 4 shows a summary of the Spearman correlation analysis of the sustainability indices with selected variables describing the socio-economic characteristics of households.

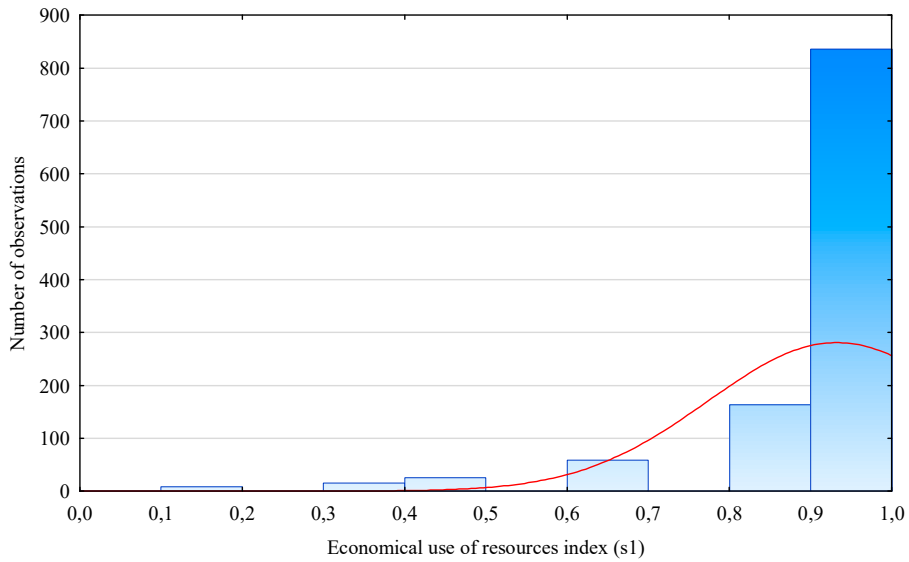


Figure 5. Histogram for economical use of resources index (s<sub>1</sub>)

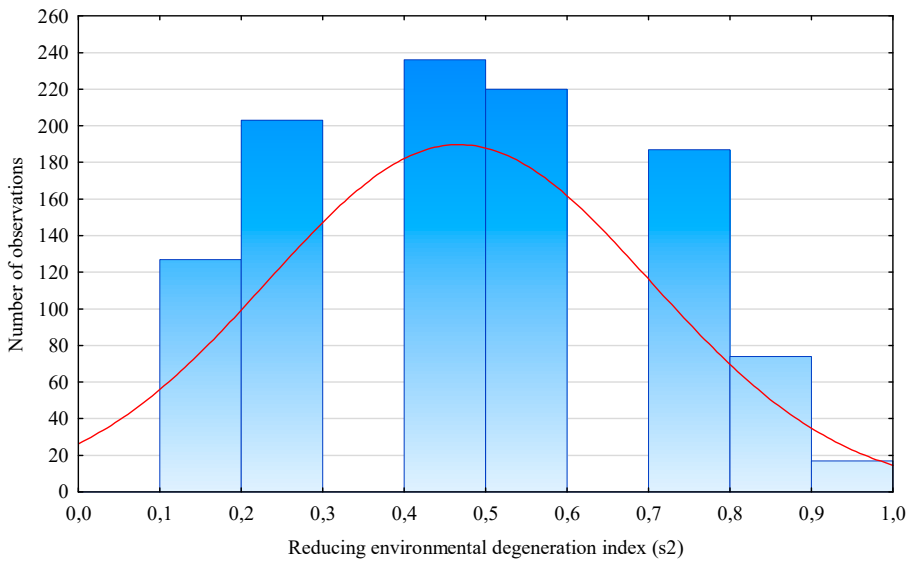


Figure 6. Histogram for reducing environmental degeneration index (s<sub>2</sub>)

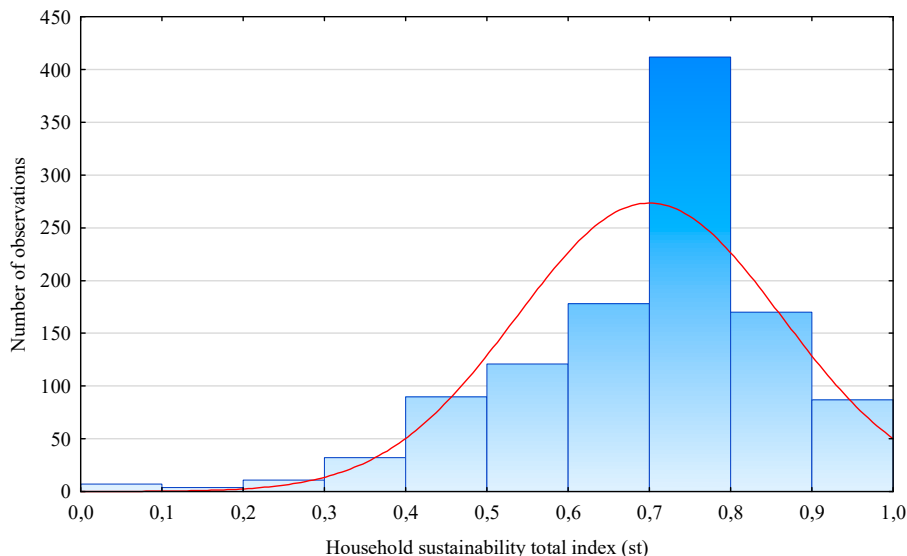


Figure 7. Histogram for household sustainability total index ( $s_t$ )

Table 4. Summary of Spearman coefficient correlation analysis between sustainable development with farm-related variables

Sustainable development	Place of residence		Income		Number of 14 year old children		Number of house members	
	$r_s$	$p$	$r_s$	$p$	$r_s$	$p$	$r_s$	$p$
Economical use of resources index ( $s_1$ )	-0.04	0.172	-0.01	0.847	-0.03	0.289	<b>-0.06</b>	<b>0.047</b>
Reducing environmental degeneration index ( $s_2$ )	<b>-0.06</b>	<b>0.047</b>	-0.01	0.682	-0.01	0.798	0.01	0.693
Household sustainability total index ( $s_t$ )	-0.06	0.057	-0.01	0.758	-0.02	0.477	-0.02	0.547

Note. Analysis was performed in group N = 1112;  $r_s$  – Spearman’s coefficient,  $p$  – significance.

The analysis showed that the household sustainability total index ( $s_t$ ) did not correlate significantly with the place of residence, income or number of people or children living in the household. Significant correlations can be seen only between the place of residence and the reducing environmental degradation index and between the number of household members and the economical use of resources index. All correlations are weak or very weak.

**Table 5.** Summary of Spearman coefficient correlation analysis between sustainable development with age and education

Sustainability index	Age		Education	
	$r_s$	$p$	$r_s$	$p$
Economical use of resources index ( $s_1$ )	0.24	<0.001	0.11	<0.001
Reducing environmental degeneration index ( $s_2$ )	0.14	<0.001	0.10	0.001
Household sustainability total index ( $s_t$ )	0.20	<0.001	0.12	<0.001

Note. Analysis was performed in group N = 1112;  $r_s$  – Spearman's coefficient,  $p$  – significance.

The results presented in Table 5 show that the household sustainability total index ( $s_t$ ) correlated significantly with the age and education variables. These relationships were positive and weak. With an increase in age and with an increase in the level of education, the level of sustainable development of households increased (general score and detailed indices). We note that age correlated slightly more with household sustainability indices than education. Interestingly, age appears to correlate more strongly with the economical use of resources index ( $s_1$ ) than the reducing environmental degeneration index ( $s_2$ ).

Correlation analysis was also carried out for variables describing the subjective assessment of the living and material situation of households with sustainable development indices (Table 6).

**Table 6.** Summary of Spearman coefficient correlation analysis between sustainable development with self-evaluate of life and material situation

Sustainability index	Life situation		Material situation	
	$r_s$	$p$	$r_s$	$p$
Economical use of resources index ( $s_1$ )	-0.02	0.577	-0.03	0.349
Reducing environmental degeneration index ( $s_2$ )	0.01	0.649	-0.01	0.858
Household sustainability total index ( $s_t$ )	0.00	0.985	-0.02	0.486

Note. Analysis was performed in group N = 1112;  $r_s$  – Spearman's coefficient,  $p$  – significance.

The analysis showed that the subjective assessment of the living situation, as well as the assessment of the financial situation of households, did not show a significant relationship with the indices of sustainable development. There is no significant relationship between the level of sustainable development of households and the number of hectares (Table 7).

**Table 7.** Summary of Spearman coefficient correlation analysis between sustainable development with the number of hectares

Sustainability index	Number of hectares	
	$r_s$	$p$
Economical use of resources index ( $s_1$ )	-0.03	0.708
Reducing environmental degeneration index ( $s_2$ )	0.02	0.750
Household sustainability total index ( $s_t$ )	0.01	0.922

Note. Analysis was performed in group N = 200;  $r_s$  – Spearman’s coefficient,  $p$  – significance.

The areas of the subsequent analysis were the variables: sex, having an allotment garden, household debt and self-supply of food. Due to the two-category nature of the variables, the results of the analysis using the Mann-Whitney U test are presented in one tabular set (Table 8).

**Table 8.** Summary of Mann-Whitney’s test of difference sustainable development between tested variables

Sustainability index	Gender							
	Women N = 575		Men N = 537		U	p	$r_g$	
	$M_{rang}$	Me	$M_{rang}$	Me				
Economical use of resources	576.19	1.00	535.42	1.00	143065.500	0.034	0.07	
Reducing environmental degeneration	602.52	0.57	507.22	0.43	127926.000	<0.001	0.17	
household sustainability total index ( $s_t$ )	603.68	0.71	505.98	0.71	127256.500	<0.001	0.18	
Sustainability index	Owning a family allotment garden							
	No N = 848		Yes N = 264		U	p	$r_g$	
	$M_{rang}$	Me	$M_{rang}$	Me				
Economical use of resources	555.99	1.00	558.15	1.00	111499.500	0.924	0.00	
Reducing environmental degeneration	536.75	0.43	619.95	0.57	95184.500	<0.001	0.15	
household sustainability total index ( $s_t$ )	541.13	0.71	605.86	0.71	98904.000	0.004	0.12	
Sustainability index	Indebtedness							
	No N = 815		Yes N = 267		U	p	$r_g$	
	$M_{rang}$	Me	$M_{rang}$	Me				

Economical use of resources	539.97	1.00	546.17	1.00	107555.500	0.778	0.01
Reducing environmental degeneration	543.20	0.43	536.32	0.43	107419.500	0.755	0.01
household sustainability total index ( $s_t$ )	542.25	0.71	539.21	0.71	108191.500	0.890	0.01
Sustainability index	Self-supplied food						
	No $N = 345$		Yes $N = 767$		$U$	$p$	$r_g$
	$M_{rang}$	$Me$	$M_{rang}$	$Me$			
Economical use of resources index ( $s_1$ )	495.44	1.00	583.96	1.00	<b>111242.500</b>	<b>&lt;0.001</b>	<b>0.16</b>
Reducing environmental degeneration index ( $s_2$ )	457.00	0.43	601.26	0.43	<b>97978.500</b>	<b>&lt;0.001</b>	<b>0.26</b>
Household sustainability total index ( $s_t$ )	446.48	0.64	605.99	0.71	<b>94350.000</b>	<b>&lt;0.001</b>	<b>0.29</b>

$N$  – number of observations,  $M_{rank}$  – rank mean,  $Me$  – median,  $U$  – Mann-Whitney's test,  $p$  – significance,  $r_g$  – the size of the effect.

The analysis showed that women, compared to men, were characterised by significantly higher household sustainability total index ( $s_t$ ) as well as detailed indices. The magnitude of these effects is low; however, it can be noted that the effect is stronger for the reducing environmental degeneration index ( $s_2$ ) than for the economical use of resources index ( $s_1$ ).

People with allotment houses were found to have significantly higher scores for reducing the environmental degeneration index ( $s_2$ ), while for the economic use of resources index ( $s_1$ ), the differences were not statistically significant. The effect sizes for  $s_t$  and  $s_2$  were small. Household debt did not significantly differentiate the level of household sustainable development.

The results of the analysis for the variable self-food supply showed that people who declare the use of self-food supply achieved significantly higher results on the household sustainability total index ( $s_t$ ) as well as detailed indices. The size of the effect is small. It is worth noting, however, that the effect is stronger for  $s_2$  than for  $s_1$ .

The final area of the analysis was the correlation between the level of sustainable development of households and the number of prosumer behaviours during the COVID-19 pandemic. A summary of this analysis using the Spearman correlation coefficient is shown in Table 9.

The results showed that correlations between the indices of sustainable development areas and the areas of prosumer behaviour during the COVID-19 pandemic are statistically significant, positive and weak. The household sustainability total index ( $s_t$ ) correlates in a similar way with food production and processing areas as well as with advanced housework. The areas of simple housework and male work correlate with the total score to a clearly lesser degree. There is also a tendency toward weaker correlations with the economical use of

resources index ( $s_1$ ) compared to the reducing environmental degeneration index ( $s_2$ ) with areas of prosumer behaviour. In the area of food production and advanced housework, as well as the total presumption index, correlations are slightly stronger for the  $s_2$  area reducing environmental degeneration index than for  $s_1$ . Interestingly, in other areas, such as food processing and simple housework, there are also slight differences in the correlations between the areas of sustainable development. All of the correlations are positive and weak, which means that as the level of sustainable development for the household sustainability total index ( $s_t$ ) and detailed indices increases, the results of prosumer behaviour during the COVID-19 pandemic increased.

**Table 9.** Summary of Spearman coefficient correlation analysis between sustainable development with prosumer behaviour during the COVID-19 pandemic

Sustainability index	Prosumer behavior during the COVID-19 pandemic					
	Food production	Food processing	Simple housework	Advanced housework	Male work	Total presumption index
	$r_s$	$r_s$	$r_s$	$r_s$	$r_s$	$r_s$
Economical use of resources index ( $s_1$ )	0.10**	0.17***	0.10**	0.12***	0.07*	0.14***
Reducing environmental degeneration index ( $s_2$ )	0.20***	0.21***	0.10**	0.19***	0.11***	0.21***
Household sustainability total index ( $s_t$ )	0.19***	0.23***	0.11***	0.20***	0.11***	0.22***

Note. Analysis were performed in group N = 1112;  $r_s$  – Spearman's coefficient; \* –  $p < 0.05$ ; \*\* –  $p < 0.01$ ; \*\*\* –  $p < 0.001$ .

## Discussion/Limitation and Future Research

The analyses presented in the article show that the surveyed households in Poland are highly sustainable. By assessing the two specific areas for which sustainability assessments have been carried out, we can conclude that consumers are more concerned with resource efficiency than with reducing environmental degradation. In the study, an attempt was made to construct synthetic measures for assessing the level of sustainable development. In the literature, the research problem concerning the sustainable development of households and its measurement appears only in the aspect of selected areas. There is a lack of synthetic measures or measures that cover at least three areas of sustainable development: environmental, economic and social aspects. The most common research concerns the topic of sustainable household consumption in relation to sustainable



development in general (Utzig, 2018; Łuczka, 2016). More detailed research focuses only on food consumption and food waste in terms of sustainable development. In Poland, such research was conducted by Śmiechowska (2016), Siedlecka and Kuszneruk (2018), Rejman et al. (2015), but this topic is also discussed by researchers around the world: Aschemann-Witzel et al. (2015), Baig et al. (2019), Melikoglu et al. (2013), Ananno et al. (2021). Researchers have even analysed the financial situation of households in relation to their degree of sustainability (Wołoszyn & Głowicka-Wołoszyn, 2015; Murawska, 2014), but these did not apply any comparative measures.

The issue of consumer behaviour in relation to individually selected types of consumer practices affecting sustainable development appears in many studies. The ecological behaviour of consumers in the context of sustainable development has been taken into account in research by, inter alia, Kryk (2013), Mańkowska-Wróbel (2015), Klimczyk-Bryk (2000), Matel (2016). The use of plastic packaging by consumers has been studied by van Oosterhout et al. (2023) and Kautish et al. (2022), inter alia.

The use of renewable sources by households in Poland appears in the research of Graczyk (2016), Siedlecka and Grąszko (2017), Zalega (2016), Ropuszyńska-Surma and Węglarz (2017), Biadacz and Wysłocka (2014), Ropuszyńska-Surma and Węglarz (2018), Piekut and Valentukevičienė (2019), Gorka (1990).

Foreign research on the use of renewable energy sources in households in different countries of the world shows the diversity of energy sources and the prospects for access to clean and modern energy in India (Sharma & Dash, 2022), China (Huang et al., 2020), Ethiopia (Guta, 2020), France (Roth et al., 2020), Bangladesh (Baul et al., 2018), Ireland (Singlitico et al., 2020) and many other examples.

Another indicator assessing the level of sustainability is meat consumption per person (Mroczek et al., 2019). Intensive pig farming technologies adversely affect the environment and sustainable development, constituting a source of water, soil and air pollution on a national and global scale (Mroczek, 2015). Perceptions of the challenges faced by animal meat production vary from country to country in different geographical regions depending on social, economic, cultural and eating habits. Research on reducing meat consumption in the context of consumer behaviour has been conducted by, inter alia, Kemper et al. (2023), Liu et al. (2023), Ueland et al. (2022), and Bimbo (2023).

The novelty of the research presented in this article, and at the same time filling a gap in the research, is a synthetic approach to assessing the level of sustainable development of households, in which various forms of consumer activity are taken into account. Plans for future research will concern the analysis of indicators of sustainable development in three dimensions: economic, social and environmental-spatial. In order to comprehensively address the issues of sustainable development, indicators should be divided into three basic groups of

functional indicators of pressure: causes, threats, and stress; status/quality indicators; response indicators, i.e. preventive actions.

## Conclusions

For the purpose of assessing the level of sustainable development of households, the household sustainability total index and two sub-indices were developed:  $s_1$  – economic use of resources index,  $s_2$  – reducing environmental degeneration index. The measures are grouped according to the areas with the greatest environmental impact. The problem of indicative measurement in relation to the characteristics of sustainable households is extremely difficult, as the issue is extremely complex. The phenomenon of household sustainability is assessed using various indicators of three orders: environmental, social and economic. Sustainability indicators are a diagnostic and information tool. From a practical point of view, we should strive to construct the most appropriate measures for assessing the level of sustainable development of households as units at the microeconomic level because it is the everyday decisions made at the household level that, on a macro-scale make up the total picture of national income and its breakdown into consumption and accumulation of funds. Indicators of the level of sustainable development of households present the actual state of play and are an important source of information to assess the effectiveness of decisions made by societies, institutions, and organisations. From the scientific point of view, the article is a valuable source of knowledge about the behaviour of households in the field of sustainable development; it shows measures for assessing the level of sustainability but also provides a premise for further research and construction of further measures.

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Paulina TRĘBSKA

## ZACHOWANIA PROSUMENCKIE A OCENA POZIOMU ZRÓWNOWAŻONEGO ROZWOJU GOSPODARSTW DOMOWYCH W KONTEKŚCIE PANDEMII COVID-19 W POLSCE

**STRESZCZENIE:** Celem artykułu jest ocena zrównoważenia gospodarstw domowych oraz przedstawienie problematyki zrównoważonego rozwoju w kontekście zachowań konsumenckich w Polsce na podstawie własnych badań ankietowych. Badania zostały zrealizowane w lipcu 2022 roku na próbie 1112 respondentów metodą sondażu diagnostycznego z zastosowaniem techniki ankietowej CAWI. W trakcie badań zdefiniowano różnego rodzaju aktywności prosumenckie gospodarstw domowych, ale także oceniono ich zachowania konsumenckie pod kątem pozytywnego oddziaływania na zrównoważony rozwój. Na podstawie wybranych zmiennych opisujących zachowania konsumenckie gospodarstw domowych zbudowano trzy indeksy pomiaru zrównoważonego rozwoju gospodarstw domowych – indeks ogólny oraz dwa indeksy składowe. Następnie otrzymane wyniki poddano analizie korelacji ze zmiennymi opisującymi cechy gospodarstw domowych oraz indeksami opisującymi ich poziom prosumpcji. Wykorzystano metody statystyczne, opisowe i porównawcze. Z badań wynika, że badane gospodarstwa domowe są zrównoważone w wysokim stopniu. Poziom zrównoważonego rozwoju badanych gospodarstw domowych jest dodatnio skorelowany z poziomem prosumpcji.

**SŁOWA KLUCZOWE:** prosumpcja, COVID-19, zrównoważony rozwój, zachowanie konsumenta, gospodarstwo domowe