

SUSTAINABLE CONSUMPTION AND WASTE MANAGEMENT

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Abstract. The Just Transition Mechanism, the European Green Deal Investment Plan (EGDIP) and the European industrial strategy highlight the main priorities and lines of action that will affect the course towards sustainable development, its adaptation to the transformation of EU into a new, more sustainable economy – a climate neutral, competitive environment through developing the circular economy. The goal of the study is to assess the public opinion based on an analysis of data on the views of inhabitants of Latvia on pollution, grime or other environmental problems based on the European Union statistics on income and living conditions (EU-SILC). The research methods used to achieve the goal were the analysis of scientific publications and previous research and analysis of views of inhabitants of Latvia on pollution, grime or other environmental problems. For evaluation analysis, time-series analysis and cross-tabulations of evaluation by regions, by territories and by household size were used. For testing the differences of inhabitant evaluations, the chi-square test was used. The results of the analysis show that there are not significant differences in views on pollution, grime or other environmental problems in Latvia's regions, in territories and by the household size. The results of the study could be useful to industries and situations and can serve as the basis for decision-making for pollution reduction and other researchers' empirical efforts in this field.

Keywords: circular economy, consumption, sustainable development, waste management.

Introduction

Moving towards sustainable consumption, the implementation of circular economy principles in Latvia is integral, based on several regulatory frameworks. For example, the National Waste Management Plan for Latvia for 2021 to 2028 covers and contributes to the lines of action set out under the priorities *Quality Living Environment and Regional Development* of the National Development Plan 2021-2027. The measures of the plan towards these directions contribute to attaining the globally important sustainability goals for 2030, i.e. ensure sustainable consumption and production patterns (Goal 12), conserve and sustainably use the oceans, seas and marine resources for sustainable development (Goal 14) etc. In order to promote the development of a more sustainable consumer behaviour pattern and consumer awareness, the public information and education measures need to include the involvement of waste generators in the reduction of waste creation, correct waste management, and raising awareness of prevention of waste creation etc. The waste generators' understanding of the problems and potential consequences, and willingness and motivation to get involved in waste sorting may contribute to attaining the sustainability goals [1-4]. Therefore, the study was not only carried out by analysis of views of inhabitants of Latvia on pollution, grime or other environmental problems and their cross-tabulations by regions, by territories and by household size, but based on the monographic method analyses of scientific publications and previous research. The goal of the study is to assess the public opinion based on a scientific literature review and an analysis of data on the views of inhabitants of Latvia on pollution, grime or other environmental problems based on the European Union statistics on income and living conditions (EU-SILC).

The article deals with the issues related to UN Sustainable Development Goals (SDG) [5], especially – SDG 12: Responsible Consumption and Production.

Materials and methods

The European Green Course, or Europe as the first climate-neutral continent by 2050, determines several activities in the direction of observing the principles of the circular economy. For example, the Circular Economy Action Plan highlights the way for a cleaner and more competitive Europe, but the European Climate Pact is bringing people together to build more sustainable Europe for all. People, organisations, businesses, and cities can get involved in the pact by making a pledge to take real action [6-8] and influencing their lives.

The article focuses on household waste actuality, assuming that a lower amount of waste dumped is better for the environment due to less pollution of the land and greater amount of land available to the ecosystem for other purposes (farming, animal habitat, etc.) [9].

The goals of the state waste management plan for 2013-2020 have not been achieved. The Ministry of Environmental Protection and Regional Development (VARAM) has prepared a draft law for amendments to the Waste Management Law, providing several proposals. Among them, to determine the procedures for the establishment of regional waste management centres, introduce the extended producer responsibility system, etc. At present, waste management regions are defined by the Cabinet regulations No.337 [10].

Richer countries tend to have a higher volume of waste per capita. For affluent economies, post-consumer food waste accounts for the greatest overall losses. However, more affluent countries also have a more advanced waste management system [11-12]. Tourism too contributes to the increase in the volume of waste. Globally, the volume of waste is expected to increase by up to 70% till 2050, which is down to a number of factors, including people's consumption habits and housekeeping [13]. There is also a tendency for the volume of waste to increase in Latvia, but the more affluent countries, compared to the situation in Latvia, recycle the generated waste more efficiently and do not promote its disposal.

In recent years, according to the data of the Central Statistics Bureau, the population in Latvia is decreasing (the tendency to decrease is slower in the regions), but the volume of household waste - in households, trade, in the process of providing services, as a result of industrial activity or elsewhere - is increasing. The number of inhabitants decreased by 198 848 in the period from the beginning of 2011 to the beginning of 2022, but the amount of generated waste increased by 365 120 tons from 2011 to 2021 [14-15]. In addition, it should be taken into account that not all residents are involved in the waste collection system, so there is a lack of data on how much waste is generated by this part of the population (Central Statistics Bureau of Republic of Latvia IRS010; VIG040). Pollution aspects are on investigations and conclusions by academic researchers [16-20] for better solutions in different fields.

Municipal waste accounts for only about 10% of total waste generated when compared with the data reported according to the Waste Statistics Regulation. However, it has a very high political profile because of its complex character, due to its composition, its distribution among many sources of waste and its link to consumption patterns. 530 kg of municipal waste per capita were generated in EU in 2021 [21]. For example, the research in the field of textile and food waste shows that despite the significant declarative environmental awareness of people for sustainable behaviour, the share of these decreases with exposure to actual behaviour. There are differences in people's knowledge and purchasing decisions related to lack of consistency in information. Targeted information dissemination, education, and other practical social impact methods can improve people's understanding and awareness, resulting in appropriate changes in practice [22-23]. Information provision and greater attention both from consumers and service providers could be a significant input, especially to food waste reduction in the public catering service sector [24]. Consumers give little attention to information provided on the label for sustainable food consumption and environmental protection and have little knowledge of environmental problems [25]. Waste sources related to individual non-readily changeable behaviours over-packaging, unclear sorting rules and insufficient supporting measures are mentioned as the negative aspects hindering knowledge and competence in sorting [26-27]. To promote public understanding, it must be promoting a unified system in regions and territories. For example, a system of colours and symbols for waste containers can be used in all municipalities for easily understandable and discernible coherence.

The study analysis the views of inhabitants of Latvia on pollution, grime or other environmental problems and their cross-tabulations by regions, by territories and by household size. Waste generators are not only companies as part of the economic system, but also households as final consumers and in many cases also plaintiffs for reduction of industrial and traffic waste to ensure cleaner environment for their living. Mainly, household waste consists of kitchen waste, used packaging (paper, cardboard, wood, bioplastic, plastic, glass, metal), fabrics, household items (furniture, dishes, etc.), construction debris.

Research results and discussion

Over the last decade, while the population of Latvia has shrunk, the volume of household waste has grown. However, the proportion of people who identify problems of the pollution created by households is decreasing. Figure 1 represents the share on pollution, grime and/or other environmental problems in the area (%) in Latvia, in urban areas and cities [28]. The data indicate that the proportion of households

who identify environment-related problems decreases annually on average by 1.34 percent points in urban territories, on average by 0.91 percent points annually in rural territories and on average by 1.21 percent points annually in Latvia.

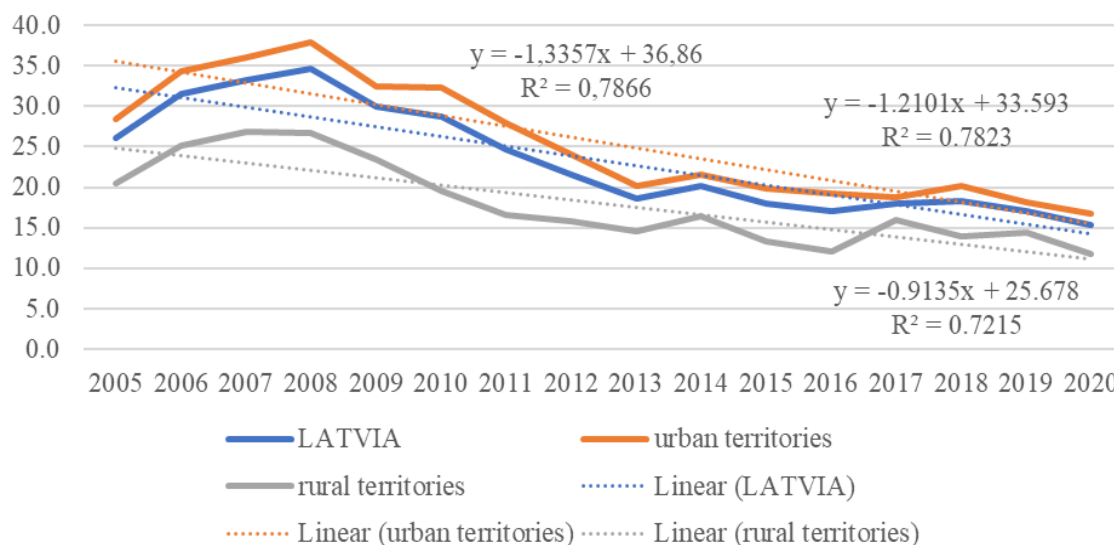


Fig. 1. Timeseries of share on pollution, grime and/or other environmental problems in the area (%) in Latvia, in urban areas and cities and respective trends (authors’ construction and calculations based on OSP database data MAA010)

The data indicate that there is statistically significant reduction of population in Latvia who consider pollution, grime and/or other environmental problems – the share of such population is decreasing in average by 1.21 percent points annually, more in urban areas – in average by 1.34 percent points annually, in rural areas – in average by 0.91 percent points annually.

To evaluate the views of inhabitants of Latvia on pollution, grime, or other environmental problems in Latvia’s regions, by territories and by household size, the European Union statistics on income and living conditions were used for statistical analysis (EU-SILC) – calculations results are included in Table 1.

Table 1

Distribution of evaluation on pollution, grime or other environmental problems in Latvia, 2021

Evaluation	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	1110	18.5	18.5	18.5
No	4904	81.5	81.5	100.0
Total	6014	100.0	100.0	-

As the results of the survey indicate that 81,5% of inhabitants in Latvia consider that pollution, grime, or environmental pollution is not a problem in Latvia. The results of this analysis by regions are included in Table 2.

Table 2

Distribution of evaluation by regions on pollution, grime or other environmental problems in Latvia in 2021

Evaluation	LATVIA’S STATISTICAL REGIONS						Total
	Rīga	Pierīga	Vidzeme	Kurzeme	Zemgale	Latgale	
Yes	428	79	87	227	152	137	1110
No	1485	780	492	700	705	742	4904
Total	1913	859	579	927	857	879	6014

The results of the analysis by regions in Latvia do not differ statistically significantly by regions (sig.0.000). The results of the analysis with chi-square tests of distribution of evaluation by regions are included in Table 3.

Table 3

Chi-Square tests on distribution of evaluation by regions in Latvia in 2021

Chi-Square tests	Value	df	Asymp. Sig. (2-sided)
Pearson chi-Square	100.477 ^a	5	0.000
Likelihood ratio	107.157	5	0.000
Linear-by-linear association	3.365	1	0.067
No of valid cases	6014	-	-

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 106.87.

Distribution of evaluation by territories on pollution, grime or other environmental problems in Latvia in 2021 is included in Table 4.

Table 4

Distribution of evaluation by territories on pollution, grime or other environmental problems in Latvia in 2021

Evaluation	Territory		Total
	Urban	Rural	
Yes	815	295	1110
No	3347	1557	4904
Total	4162	1852	6014

The results of the analysis by territories in Latvia do not differ statistically significantly by regions (sig.0.001). – see data included in Table 5.

Table 5

Chi-Square Tests on distribution of evaluation by territories in Latvia in 2021

Chi-Square tests	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson chi-Square	11.365 ^a	1	0.001	-	-
Continuity correction ^b	11.124	1	0.001	-	-
Likelihood ratio	11.612	1	0.001	-	-
Fisher's exact test	-	-	-	0.001	0.000
Linear-by-linear association	11.363	1	0.001	-	-
No of valid cases	6014	-	-	-	-

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 341.82.

b. Computed only for a 2x2 table

The results were also alike for analysis by the household size. The results of the analysis show that there are not significant differences in views on pollution, grime, or other environmental problems in Latvia's regions, in territories and by household size. The views of the population indicate a lack of understanding of the problem.

The results indicate that inhabitants' in Latvia view on pollution, grime and/or other environmental problems in Latvia is reducing starting in 2005 and the results do not differ statistically significantly by regions and by territories in Latvia, alike the results are by the household size. Inhabitants' views are very important as more and more active they require cleaner environment also for municipalities and industries to reduce air pollution and ensure cleaner environment.

Conclusions

1. The care for clean environment is getting more and more attention by the governments in many countries and a very important initiator and demander of cleaner environment is the inhabitants in the country willing to live in clean and not polluted environment.
2. The population in Latvia is decreasing, but the volume of waste in households, trade, in the process of providing services, as a result of industrial activity or elsewhere is increasing.
3. The results of the analysis show that there are not significant differences in views on pollution, grime, or other environmental problems by inhabitants in Latvia's regions, in territories and by household size – the pollution is considered as no problem.
4. The enterprises can raise population awareness of the waste problems through their activities, by implementing a measurement system in their operations. The results of sustainable entrepreneurship can help attract investors.

Author contributions

Conceptualization, D.S.; methodology, B.S. and S.B.; statistical data analysis, B.S., writing – original draft preparation, S.B. and B.S.; writing – review and editing, D.S. All authors have read and agreed to the published version of the manuscript.

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