

Waste management, environmental impact & health in Greece

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Abstract- This research aimed to determine the application level of waste management, due to their effects on the environment & health, in Greece. An investigation was carried out at national, local and European level, both legislative and applicative level, regarding the effects on public health and the environment. It analyzes European and Greek legislations and compares the adoption of those strategies aimed at conserving natural resources, ensuring the health and promoting the well-being of citizens, while ensuring environmental protection. A mixed method approach was used, the research combines qualitative analysis with European and Greek legislation for waste management and quantitative analysis with questionnaires for waste management policy in Greece. It examines cases of adequacy and compliance of the current European legislations in Greece.

Index Terms: Waste Management, Public Health, Environmental impact, legislation, sustainable implementation, Greece.

I. INTRODUCTION

By the term waste, although there are many definitions, we mean substances or objects that have ceased to serve the purpose for which they were originally manufactured and, therefore, their owner wishes or is obliged to get rid of them. The definition of waste and the analysis of its meaning are based on how it is disposed of.[1] However, the key step in waste management is to minimize its production.[2]

Pollution has an inverse relationship with per capita income, that is, as per capita income increases, so do pollution levels. The increase in the level of per capita income is of course not the only cause of environmental degradation. Other factors that contribute to environmental degradation are the opening of trade, the development of the financial sector, the increase in public spending, foreign investment and institutional quality factors set by state governments.[3] The use of waste is hindered, since when something is defined as "waste", the recoverable material is seen more as a potential pollutant than a potential raw material.[4] When a material is labeled "waste", it will be treated as such. The unintended consequence of such labeling is that useful materials may end up being considered waste.

According to world literature, the toxicity of the individual substances of the various categories of waste is considered a cause of carcinogenesis, based on studies in animals and humans exposed to high levels of such substances.[5]

There have been many extensive studies and detailed epidemiology reviews, in hundreds of regions, investigating the effects of waste toxicity on human and animal health.[6] [7] [8] [9]

Epidemiological studies worldwide show a correlation between exposure to particulates present in waste and their negative health effects, such as increased mortality or emergency admission to hospitals, particularly of patients with cardiovascular and respiratory problems [10] [11], while the effects appear to be more severe in vulnerable groups such as children, the elderly or people with chronic conditions such as asthma or pre-existing cardiovascular disease [12]. There is no doubt that, given the diversity of substances that fall into waste, there is a great risk of air, soil and water contamination and of course the risk of exposure of people and animals to them, with effects on their health.[13]

The correct waste management is an important priority in the context of the environmental policy of the European Union.

II. STATEMENT OF THE PROBLEM

Waste management is subject to the legislative competence of national parliaments. The legislation of the member states of the European Union is significantly influenced by EU regulations, which derive from its primary objective according to which, all its member states must, by harmonizing their legislation in a single Community action, achieve the same standards in waste management.

The Union's environmental policy is beginning to set high goals for its protection. It is based on the principles of preventive action, remediation of environmental disasters, as well as principle "polluter pays". [14] [15]

Waste management in Europe presents complex trade-offs between many proposals, economic instruments and regulatory frameworks. These shifts lead to many environmental, economic, social and regulatory impacts on waste management practices, which complicate the analysis of a regional policy. [16]

The highest percentages of achieving the objectives of the E.U. when it comes to waste, and especially on the subject of landfills, Denmark, the Netherlands and Belgium collect it.

On the contrary, according to the E.U., Greece has the lowest percentages of achieving the objectives of waste management (Fig. 1).

Population growth, economic prosperity and rapid urbanization of society have significantly increased the rate of waste generation in developing countries. [17] The local government, which is usually responsible for waste management in cities, faces many problems such as the lack of organization, financial resources, the complexity of the legislation and the system [18].

It thus becomes clear that member states of the EU, despite the fact that following the same legislative framework, there is poor compliance with what is defined in the European policy and the national framework for waste management.

III. METHOD ANALYSIS

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A mixed method approach was used, the research combines qualitative analysis with European and Greek courts and parliaments and quantitative analysis with questionnaires.

A. qualitative analysis:

The diagram of Figure 1 saw significant differences observed among the EU Member States regarding the use they made of these various treatment methods. For instance, some Member States had very high recycling rates (Italy, Belgium, Slovakia and Latvia), in others landfill is the prevailing treatment category (Romania, Bulgaria, Finland, Sweden and Greece).

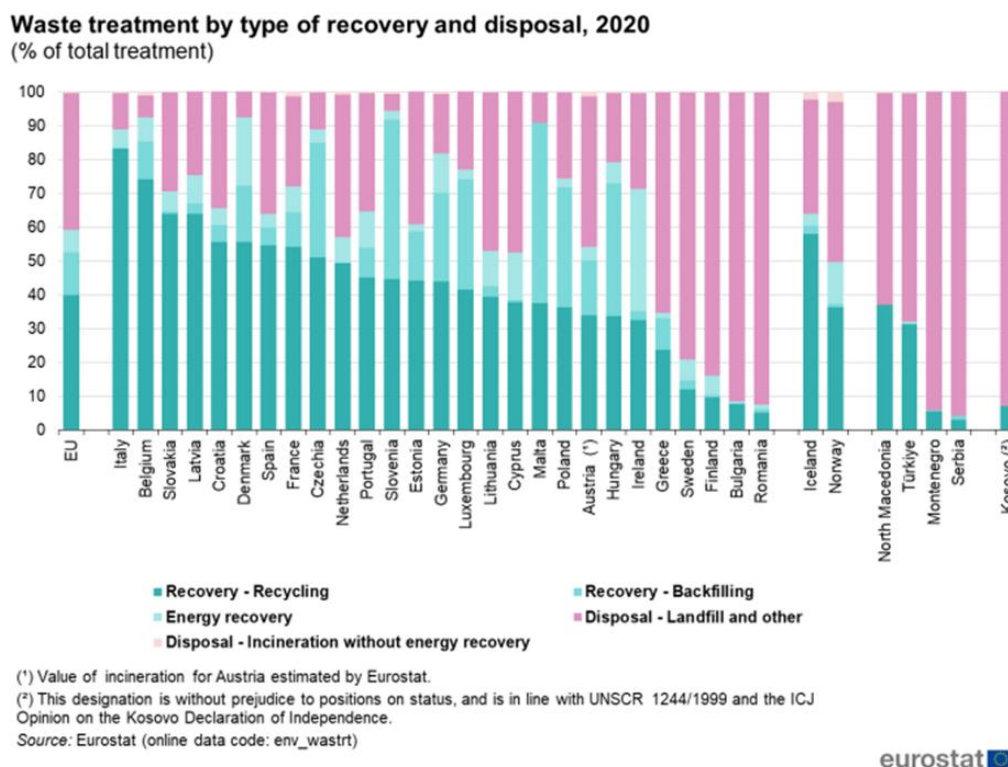


Figure1. Source: European Environment Agency, 2020.

B. quantitative analysis:

Questionnaire is a quantitative method of scientific research, on the basis of which the researcher can collect data and information in order to investigate the subject matter of his research [19].

For the needs of the research and given the effort to investigate the effectiveness of the measures taken by the Local Government Organizations (Municipalities and Regions) to prevent pollution and the general degradation of the environment from waste, it is important to examine various variables with the questionnaire method, which was chosen as the most suitable for gathering measurable results and drawing safe conclusions.

Therefore, a questionnaire was drawn up, addressed to Service Managers whose object is the waste management of Municipalities and Regions, consisting of twenty-four (24) questions and one hundred and fifty-four (154) questionnaires were collected from the three hundred and forty-five (345) Municipalities and Regions of the country, while their anonymity and non-identification was fully ensured. After collecting the data, the data from the questionnaires were processed with the program "Qualtrics XM".

In reference to the average waste production per inhabitant (kgr) during the first half of 2023 within the Municipalities and Regions served by the respondents, 60.3% answered that they are four hundred kilograms or more (≥ 400), while to the question "To what extent have you taken measures to prevent pollution and the general degradation of the environment in the Municipality or Region you serve" 69.7% of them answered qualifying grade. 75.3% of the respondents answered that the management of solid waste in such a way as to save raw materials and reuse them whenever possible is done in moderate grade, while 96.8% answered that there have been efforts to raise awareness and encourage the active participation of citizens through the implementation of management actions near the source of waste production within the administrative boundaries of the Local Government Organizations they serve. In fact, 68.9% of the respondents answered that the means used for the above-mentioned efforts were information brochures and announcements and 68.8% consider that these means yielded to a moderate degree.

In Figure 2, it becomes clear that the vast majority of Local Government Organizations, 96.8% of them, have made efforts to raise awareness among their citizens with the lion's share of the use of information brochures/announcements (at a rate of 68.9%) and conferences/events (at a rate of 25.7%) (Fig. 2).

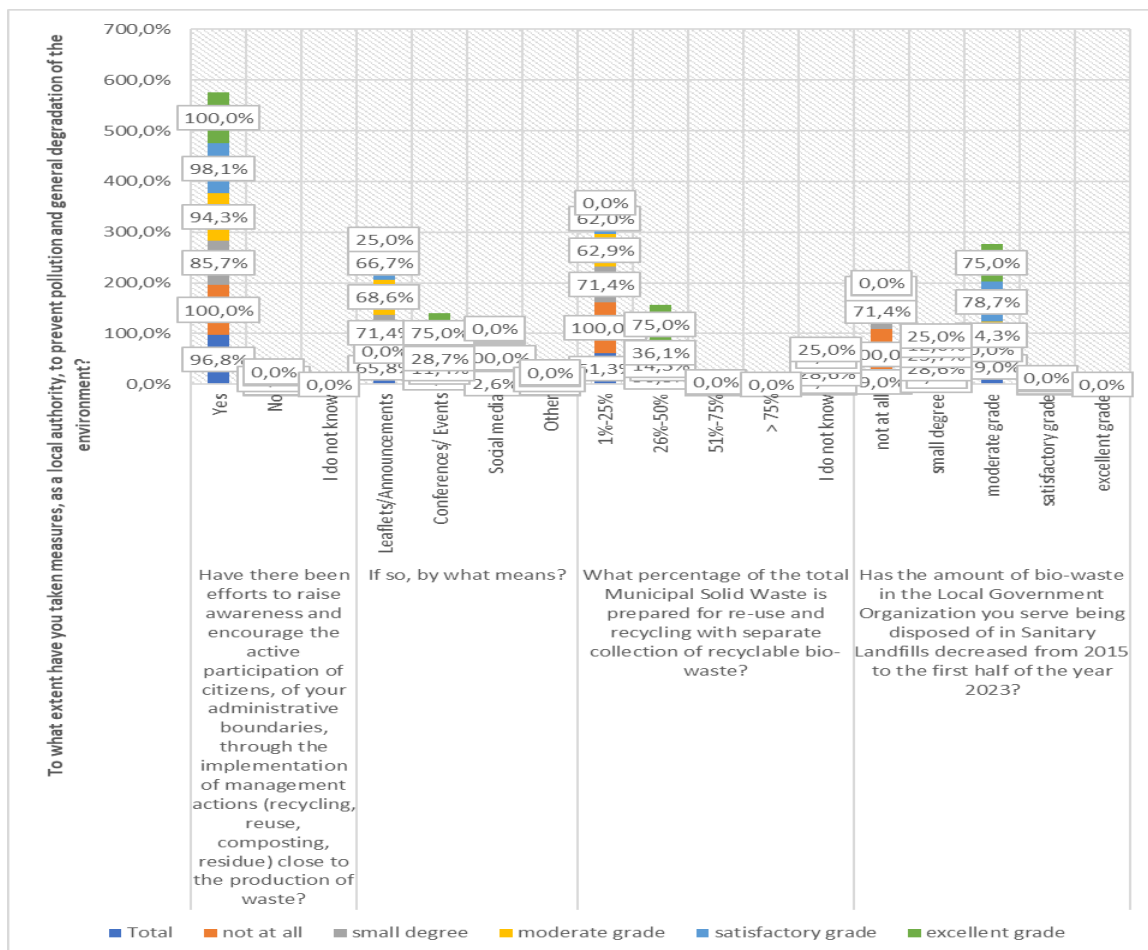


Figure 2. Lack of compliance with the degree of measures that have been taken, as local authority, to prevent pollution and general degradation of the environment compared with effort to raise awareness and encourage the active participation of citizens, your administrative boundaries, through the implementation of management actions, the percentage of the total MSW applied preparation for reuse and recycling with separate collection of recyclable bio-waste & the amount of biowaste of the local authority you serve that is available in landfills has decreased from 2015 until the first half of the year 2023. (Source: Questionnaire survey by the author, 2023)

50% of the Local Government Organizations that took pollution prevention measures to an excellent extent managed to increase the amount of collection of recyclable materials with an emphasis on packaging materials and Waste Electrical and Electronic Equipment in moderate grade and 25% of them to a satisfactory degree (Fig. 3).

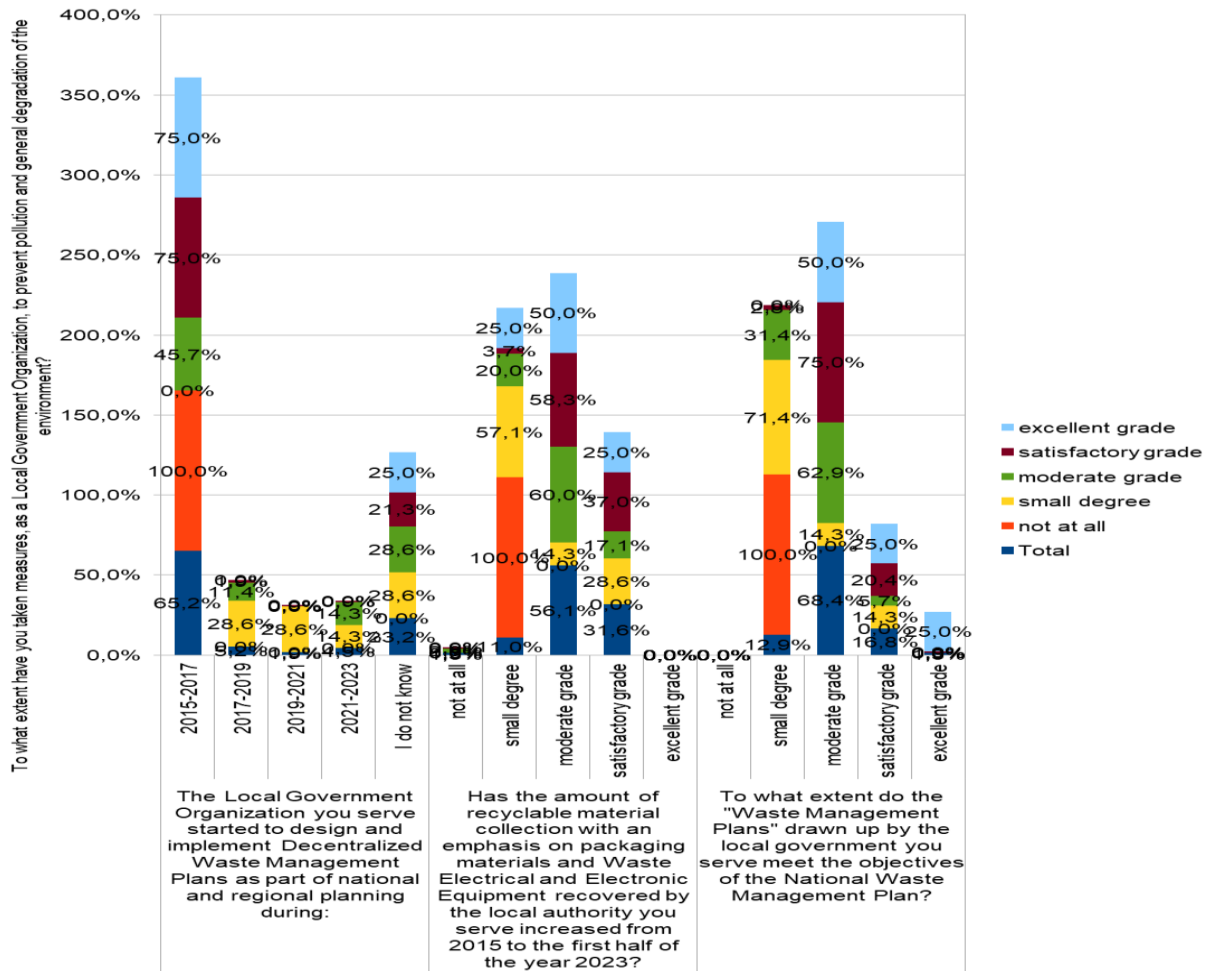


Figure 3. Lack of compliance with the degree of taking measures, as local authority, to prevent pollution and general degradation of the environment with the period when local authority began to design and implement Decentralized Waste Management Plans in the context of national and regional planning during, the amount of collection of recyclable materials with an emphasis on packaging materials and (WEEE) recovered by the local authority you serve has increased from 2015 until the first half of the year 2023 & the degree of satisfaction of the objectives of the Waste Management Plans prepared by the local authority you serve. (Source: Questionnaire survey by the author, 2023)

Finally, 59.4% of the interviewed heads of local governments considered the existing legislation sufficiently satisfactory while 69% of respondents answered that the legislation is applicable to moderate grade (figure 4).

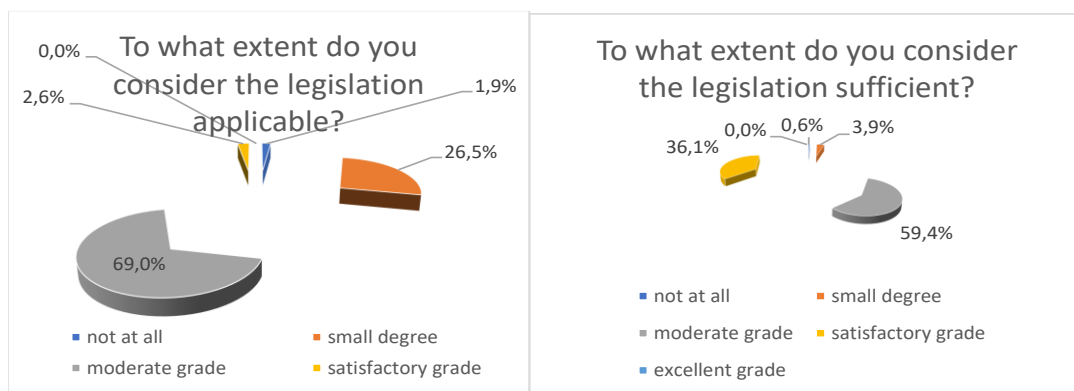


Figure 4. To what extent do you consider the legislation applicable (left). To what extent do you consider the legislation sufficient (right) (Source: Questionnaire survey by the author, 2023)

IV. CONCLUSION-DISCUSSION

From the above, it can be concluded that the waste management system implemented by the local government organizations has neither the desired nor the expected results. The local governments must put more effort into the efficient implementation and further improvement of the decentralized waste management plans that they have drawn up. It is considered appropriate for the local government organizations to intervene by submitting proposals so that the provisions that run through the national waste management legislation become more complete and more applicable.

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