THE CONTRIBUTION OF LOCAL GOVERNMENT ORGANIZATIONS AND CITIZENS TO THE ACHIEVEMENT OF THE 12TH SDG IN GREECE

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Abstract
One of today's most pressing global challenges is ensuring sustainable production and consumption patterns, as outlined in Sustainable Development Goal 12 (SDG 12) of the United Nations 2030 Agenda. Waste generation—from food and construction waste to plastics and electronic equipment—is closely linked to unsustainable consumption models, posing significant environmental, social, and economic risks. This paper investigates the implementation of SDG 12 in the Greek context, with particular emphasis on waste and refuse management policies.

Adopting a qualitative policy analysis approach, the study explores legislative frameworks, strategic planning, and funding mechanisms at the European, national, and local levels. Special focus is placed on the role of local government organizations (LGOs) in operationalizing national strategies, citizen engagement, and behavioural practices that support sustainable waste management.

The study identifies challenges and progress in achieving waste reduction, reuse, and recycling targets from official EU documentation, national legislation, and policy instruments. Comparative insights are also offered regarding best practices from other European Union member states.

The findings underline the importance of a multi-level governance model integrating top-down regulatory action with bottom-up civic participation. The paper concludes by proposing targeted policy recommendations and individual actions to enhance Greece's alignment with SDG 12 and support the broader transition toward a circular economy.

Keywords*: SDG 12, Greece, waste management, circular economy, local governance, citizen participation*

Introduction

The present study focuses on waste and refuse management, one of the 17 Sustainable Development Goals (SDGs) adopted on 25 September 2015 during the 70th General Assembly of the United Nations and established by the United Nations (UN).

Regarding the subject of this work, it is important to note that more than 7 billion of us produce waste daily. Astonishingly, half of this waste is not collected, treated, or safely disposed of, creating a global waste crisis. Generating massive volumes of municipal solid waste (MSW) and its mismanagement creates serious environmental problems with social, political, and economic implications. Developing integrated waste management systems is imperative to reduce the impact on the environment, human health, and the economy.

More specifically, waste management in the European Union is a key sector in transitioning to a circular economy and consolidating overarching goals such as secure access to resources, social well-being, economic development, and environmental protection. Furthermore, the rapidly growing waste management industry enables the use of waste as a resource and the recovery of raw materials. At the same time, the health and environmental impacts of waste management must also be considered (European Commission, 2015).

Before delving deeper, it is essential to briefly highlight some of the major concerns surrounding waste management to fully understand why it constitutes such a critical issue in our time.

Firstly, globally, we produce vast quantities of waste: food and garden waste, construction and demolition debris, mining waste, industrial waste, liquid waste, old televisions, cars, batteries, plastic bags, paper, sanitary waste, old clothes and furniture, and the list goes on. The quantity of waste we generate is closely tied to our consumption and production patterns. The overwhelming number of products entering the market is a further challenge. Demographic changes—such as the rise in single-person households—also impact the volume of waste produced (e.g., goods are increasingly packaged in smaller units).

At the same time, it is widely known that poor waste management contributes to climate change and air pollution and directly affects many ecosystems and species. Some ecosystems, such as marine and coastal areas, can be severely affected by inadequate waste management and illegal or "irresponsible" individual littering. Marine litter is increasingly concerning—not only for aesthetic reasons: entanglement and ingestion are serious threats to many marine species.

Waste also indirectly impacts the environment, as any material not recycled or recovered represents a loss of raw materials and other inputs used throughout the value chain—in the production, transport, and consumption phases. The environmental impacts across the life cycle of a product are significantly greater than those solely linked to waste management (EEA Signals 2014 – *Well-being and the environment. Waste: a problem or a resource?*, 2021).

Moreover, illegal activities such as dumping, burning, and exporting play a role, though it is difficult to estimate their full extent or impact accurately. In general, directly or indirectly, waste affects our health and well-being in numerous ways.

Therefore, it is reasonably clear that the SDGs cannot be achieved unless waste management is treated as a priority. Failed economic models treat resources as infinite, and current consumption patterns encourage the perception of their endless availability. We must recognize that we cannot continue with a growing and increasingly urbanized global population without sorting and managing waste appropriately.

The goal of this study is to present the long-term strategic planning of waste management through legislative and administrative measures, infrastructure projects, and funding initiatives by the European Union and to investigate, as thoroughly as possible, the

implementation of the proposals and projects of the National Waste Management Plan (NWMP) for the management of Municipal Solid Waste (MSW) by the Regional Authorities.

Accordingly, the main themes of this paper include a comprehensive description of the relevant SDG, an analysis of the current situation, EU policies, actions, and funding instruments; Greece's national policies and projects, and the role of Local Government Organizations (LGOs) in ineffective waste management. Finally, the paper attempts to present concise proposals for individual actions that can contribute to achieving this goal.

Chapter 1: Description of SDG 12 (Responsible Consumption and Production): Waste and Refuse Management

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. This paper focuses on Goal 12, which concerns the "promotion of sustainable consumption and production patterns (SCP)," and more specifically, on the target related to environmentally sound waste and refuse management.

According to the United Nations Regional Information Centre (UNRIC), the sub-targets of this goal include:

- By 2030, per capita global food waste will be halved at the retail and consumer levels, and food losses along production and supply chains, including post-harvest losses, will be reduced.
- By 2020, achieve environmentally sound management of chemicals and all wastes throughout their life cycle, per agreed international frameworks, and significantly reduce their release into the air, water, and soil to minimize adverse impacts on human health and the environment.
- By 2030, substantially reducing waste generation through prevention, reduction, recycling, and reuse. (*Goal 12 – Responsible Consumption and Production*, https://unric.org/el/στοχοσ-12-υπευθυνη-καταναλωση-και-παρα/)

First, let us clarify the waste terminology and its types and classifications.A fundamental legislative text for the definition of waste is Directive 2008/98/EC of the European Parliament, which states: *"Waste means any substance or object which the holder discards or intends or is required to discard."*

As for waste classification, many scholars group waste into various categories with different characteristics. Based on their physical state, waste can be classified into three main types:

- Liquid
- Solid
- Gaseous (Amasoumo & Baird, 2016)

Liquid waste refers to solid residues dissolved in a liquid medium (water or some organic solvent) and constitutes one of the main sources of environmental pollution today. Major sources include domestic, municipal, and industrial waste. (*modernanalytics.gr, Chemical and Microbiological Analyses › Waste*)

Solid waste includes urban refuse, industrial waste (e.g., packaging remnants, empty barrels, cardboard, plastic wrappings), construction and demolition debris, petroleum-based waste, agricultural and livestock waste, mining and excavation waste (from both land and sea), sludge from urban wastewater treatment and industrial processes, hospital waste, tyres, and scrap materials.

(*modernanalytics.gr, Chemical and Microbiological Analyses › Waste*)

Gaseous waste (or aerosols) includes urban aerosols and gaseous by-products from processing, typically consisting of fine particulate matter or misted liquid substances (e.g., solvents, acids) with high volatility. (*modernanalytics.gr, Chemical and Microbiological Analyses › Waste*)

Additionally, the **waste producer** is defined as any person whose activities generate waste (the original producer) or any person involved in pre-processing, mixing, or other operations that alter the nature or composition of the waste. The **waste holder** is either the producer or the natural/legal person possessing the waste.

Waste management itself is also defined in various ways. Solid waste management refers to handling waste in a manner that is safe for both the environment and the public, and it is inherently interdisciplinary, incorporating theory and practice from economics and public administration (Tchobanoglous et al., 1993). The main objectives of waste management are to protect human health and the environment and to conserve resources (Brunner & Fellner, 2007).

Directive 2008/98/EC states, *"Waste management means the collection, transport, recovery and disposal of waste, including the supervision of such operations and the after-care of disposal sites."*

To support stakeholders in waste management regarding the complex issue of waste definition and classification, the European Commission has published a guidance list. This **European Waste Catalogue (EWC)** (see Appendix) classifies waste by its origin and its risk to human health and the environment (Wild et al., 2013).

The EWC is divided into 20 chapters, corresponding to 20 broad activity categories. Each category is further subdivided, specifying production activities and identifying specific types of waste.

Furthermore, the catalogue categorizes waste based on the risk it poses:

- **Inert waste**: Waste that does not undergo significant physical, chemical, or biological changes.
- **Hazardous waste**: Waste containing explosive, infectious, flammable, corrosive, or toxic substances or those causing mutagenesis, carcinogenesis, teratogenesis, irritation, or other reactions. These are marked with an asterisk (*) in the EWC.
- **Non-hazardous waste**: Waste that contains no hazardous characteristics and poses no harm to health or the environment.

At a European level, the **main principles of waste policy** include:

- The principle of health and environmental protection.
- The waste hierarchy principle.
- The proximity principle (disposal close to the point of generation).
- The producer responsibility principle.
- The life-cycle principle.
- The precautionary and remediation principles. (Amasoumo & Baird, 2016)

The **fundamental goals** of waste management are:

1. Waste prevention,
2. Recovery (recycling and secondary raw material or energy production),
3. Safe disposal of non-recoverable waste.

Finally, a key policy tool is the **waste hierarchy**, which evaluates actions from most to least favourable regarding resource and energy use. It aims to maximize the practical benefits of products and minimize waste generation. Proper application of the waste hierarchy can contribute to reduced greenhouse gas emissions, less pollution, energy savings, conservation of resources, job creation, and green innovation (*Wikipedia, Waste hierarchy*).

Chapter 2: Description of the Current Situation – Problems

Given the rapid urbanization and growing global population, annual waste generation worldwide is projected to reach **3.4 billion tonnes** within the next 30 years, up from **2.01 billion tonnes** in 2016.

According to the study *Material-Efficient Utilization of Waste Oils—Biodegradability and Other Chemical Properties of Vegetable Recycling Oils* (2012), high-income countries, although comprising only 16% of the global population, generate over one-third (34%) of the world's waste. In addition, the East Asia and Pacific region is responsible for nearly one-quarter (23%) of total waste. It is also projected that by 2050, waste generation in Sub-Saharan Africa will triple, while in South Asia, it will double. (*THE WORLD BANK Website, 2018*)

Simultaneously, waste management and disposal practices have significant environmental implications. For instance, landfilling occupies land resources and may pollute the air, water, and soil depending on construction quality, while incineration can lead to atmospheric emissions. Landfills, which are considered the final option in the waste hierarchy, release methane—a highly potent greenhouse gas linked to climate change. Methane is formed by microorganisms acting on biodegradable waste such as food scraps, paper, and yard waste. Once waste is collected, it is transported and processed, releasing carbon dioxide—the most prevalent greenhouse gas—as well as other air pollutants, including particulate matter. Based on the volume, composition, and treatment methods of waste, it is estimated that **1.6 billion tonnes of CO_2-equivalent emissions** were generated globally in 2016 from waste treatment and disposal—approximately **5% of total global emissions**.

As **Laura Tuck**, former Vice President for Sustainable Development at the World Bank, aptly stated:

"Poor waste management harms human health and the local environment, contributing to the climate challenge. Unfortunately, the poorest in society are often the most adversely affected by inadequate waste management. However, it does not have to be this way. Our resources must be used and reused continually so they do not end up in landfills."

Solid waste management is critical to developing sustainable, healthy, inclusive cities and communities. Nevertheless, it remains overlooked, particularly in low-income countries. While over one-third of waste is recovered through recycling and composting in high-income nations, **only 4%** of waste is recycled in low-income countries.

Supporting countries in making strategic decisions regarding financing, policy, and planning of Solid Waste Management (SWM) systems is critical. Key solutions include:

- **Providing funding** to countries most in need—especially those experiencing rapid development—for implementing state-of-the-art waste management systems.
- **Supporting large waste-producing regions** in reducing plastic and marine litter through comprehensive waste reduction and recycling programs.
- **Food waste is reduced through consumer education, organic waste management, and coordinated** programs.

Since 2000, the World Bank has committed **over $4.7 billion** to more than **340 solid waste management projects** across the globe. (*THE WORLD BANK Website, 2018*)

Consequently, the overarching aim of waste management policies—particularly those of the European Union, which are a focal point of this paper—is to mitigate waste's environmental and health impacts and improve resource efficiency. The long-term objective is to **reduce waste generation** and, when unavoidable, to promote waste as a **resource**, achieving **higher levels of recycling** and ensuring **safe final disposal**.

Chapter 3: Policies and Actions – European Union Funding for Waste and Waste Management

In 2015, the European Commission adopted the **Circular Economy Action Plan**, establishing a long-term strategic framework to promote **waste prevention**, increase **recycling and reuse**, and reduce **landfilling and incineration**. The plan outlines specific measures to assist businesses, citizens, and public authorities in benefiting from the transition to a greener and more resilient economy.

The circular economy seeks to "close the loop" of product life cycles by maintaining the value of resources within the economy for as long as possible, thus promoting more efficient use of raw materials, products, and waste. It contributes directly to achieving the European Union's environmental and climate objectives while fostering local and regional development. Waste prevention, eco-design, and similar practices contribute to cost savings, increased business turnover, and job creation—particularly in the sectors of **reuse, refurbishment, repair, and product innovation**. The circular economy is also one of the 12 themes of the **Urban Agenda for the EU**, through which cities collaborate with the European Commission, Member States, and stakeholders to address waste, resource efficiency, and the sharing economy.

The **EU Cohesion Policy** is the cornerstone of circular economy implementation. The 2014–2020 investment framework allocated substantial resources to **waste management**, **resource efficiency**, and **low-carbon investments**. Investment data can be accessed through the European Commission's **Open Data Platform** and are often complemented by private funding and other EU instruments such as **Horizon 2020**, **LIFE**, and **COSME**. (*European Union Website, Cohesion Policy Support for the Circular Economy*)

EU investments are tailored to local needs and opportunities and have supported:

- Greater recycling capacity,
- Improved waste management systems,
- Resource and energy efficiency,
- Strengthening of the bio-economy,
- Innovative product design solutions,
- New business models, and
- Creation of green jobs.

During 2014–2020, the EU allocated approximately **€4.3 billion** to actions focused on waste prevention, reuse, and recycling. In less-developed regions, investments targeted critical infrastructure for waste treatment, resulting in an **additional 4.5 million tonnes/year of recycling capacity**. Furthermore, **€1.5 billion** was invested in green production and resource-efficient processes for **Small and Medium-sized Enterprises (SMEs)**. The circular economy package also promotes **water reuse**—many EU regions already recycle treated wastewater for park irrigation, street cleaning, or groundwater replenishment.

In May 2018, new legislative targets on recycling and landfilling were adopted. Specifically, **Directive 2018/851** of the European Parliament set ambitious targets for the **reuse and recycling of municipal waste—at least 55% by weight by 2025** and **65% by 2035**. Additionally, the share of municipal waste going to landfills will be reduced to **10% by 2035**.
(*European Commission, 2018a & 2018b*)

In March 2020, the European Commission proposed a new **Circular Economy Action Plan** aligned with the EU's goal of **climate neutrality by 2050** under the **European Green Deal**. This updated plan focuses on waste prevention and management and aims to strengthen EU leadership in green innovation and competitiveness at the global level. (*European Parliament Website, Circular Economy Transition Plan*)

On **9 February 2021**, the European Parliament called for **stricter recycling regulations** and **legally binding targets** on material use and consumption, noting that limited resources and climate challenges necessitate a shift from the "take-make-dispose" model to a **climate-neutral, environmentally sustainable, and fully circular economy** free from toxic pollutants by 2050. (*European Parliament Website, Circular Economy Transition Plan*)

Cohesion policy, however, extends beyond funding mechanisms. It offers a **comprehensive policy framework** for integrated regional development, emphasizing each region's unique strengths in implementing circular economy principles. It closely cooperates with local stakeholders, supporting regional authorities in building capacity and driving sustainable transformation.*A summary of the EU's legislative framework on waste management is provided in the Appendix.*

Project Example – Slovenia

With support from EU funds, Slovenia has achieved remarkable progress in waste recycling. In particular, the citizens of **Ljubljana** now benefit from a more sustainable waste management system. Since joining the EU, the Slovenian capital has enhanced **separate waste collection**, **increased recycling rates**, and **reduced landfill waste by 59%**. Investments also prioritized **waste prevention** and **reuse initiatives**. Ljubljana currently produces **41% less waste per capita** than the EU average and has **abandoned plans to construct two incinerators** originally scheduled.

A central element of this transformation is the **Ljubljana Regional Waste Management Centre**, an EU-funded project that initially served **17 municipalities** and later expanded to **37**, rendering additional waste treatment facilities unnecessary. (*European Union Website, Cohesion Policy Support for the Circular Economy*)

Chapter 4: Greece's Policies and Projects for Achieving the Waste Management Goal

Greece's newly emerging environmental policy sector is currently undergoing a transitional phase, focusing on addressing long-standing challenges across several thematic areas, including waste management, wastewater, environmental permitting, and renewable energy. The country has recently developed key strategies in circular economy, climate change adaptation, and biodiversity. These are supported—among other initiatives—through the **EU's LIFE Programme**, particularly via three integrated projects with a total budget exceeding **€47 million**, expected to leverage an additional **€1.5 billion** in complementary funding over the coming years.

Nevertheless, Greece continues to face long-term challenges in several environmental sectors. Identifying investment needs for green technologies and sustainable solutions and ensuring sufficient funding will be essential to achieving the country's climate and energy goals and shaping a new development model. While EU funding has already contributed to building a greener economy in Greece, further investment is required—especially in **energy and transport infrastructure**—to promote sustainable development. In 2019, new initiatives were launched to address environmental and energy challenges, including investment plans focused on **efficient waste management** and **clean energy** to boost the competitiveness of the renewable energy sector.

The first attempt to establish a **national waste management strategy** at both national and regional levels occurred in **1997** with **Joint Ministerial Decision (JMD) 113944/97 (Official Gazette B' 1016/1997)**. This was later supplemented by **Ministerial Decision 14312/1302/00 (Official Gazette B' 723/2000)** and replaced by **JMD 50910/727/2003 (Official Gazette B' 1909/2003)** in order to ensure full compliance with **EU Directive**

91/156/EEC. JMD 50910/727/2003 established the guidelines, measures, and procedures required to mitigate the negative environmental impacts of waste through improved management.

Additionally, the **National Waste Management Plan (NWMP)** defines Greece's overarching waste policy and serves as the strategic framework for developing Regional Waste Management Plans (RWMPs), which cover the entire national territory.

The NWMP outlines national strategy, objectives, and quantitative/qualitative targets for managing various waste streams. It also specifies the policy axes and necessary actions in alignment with Greek and European legislation. The NWMP is prepared by the **Ministry of Environment and Energy** and approved by the **Council of Ministers**, ensuring political commitment and a unified national approach to waste management. (*Ministry of Environment & Energy Website, Solid Waste Management*)

The central goal of the NWMP is to promote environmental and public health protection by developing strategic policies and action plans. In pursuit of this objective—and ultimately of the legal requirement to transition toward a circular and sustainable economy—two core actions are emphasized:

1. **Waste prevention and reduction**, and
2. **Reduced use of natural resources**, with improved efficiency in their utilization.

Regarding waste, the plan sets an ambitious target: to reduce **landfilling of Municipal Solid Waste (MSW)** to less than **10% by 2030**.

The NWMP is aligned with Greece's **National Energy and Climate Plan (NECP)**, ensuring a coherent approach to securing **long-term competitiveness**, promoting **sustainable economic growth**, and supporting **job creation** in the context of the EU's 2050 climate neutrality goal.
(*Official Government Gazette, Approval of the National Waste Management Plan – FEK A' 185*)

The latest NWMP (2020–2030) introduces ambitious targets aligned with EU legislation and the **Circular Economy Package**, particularly concerning **source separation**, **recycling**, and **reuse**. It aims to achieve:

- **At least 55% preparation for reuse and recycling of MSW by weight by 2025** and
- **60% by 2030**,
- Limiting **landfilling to 10%** of generated MSW by 2030.

To reach these goals, the NWMP outlines concrete measures and responsible stakeholders. It particularly emphasizes:

- Expansion of **separate waste stream** collection,
- Promotion of **source separation**,
- Implementation of the "**Pay-As-You-Throw**" principle,
- Upgrading and reinforcing **Material Recovery Facilities (MRFs)**. (*Ministry of Environment & Energy Website, Solid Waste Management*)

Furthermore, the plan includes **public awareness and outreach campaigns**, which are critical for achieving these targets. It also introduces a series of **legislative measures** aimed at:

- Waste prevention,
- Enhanced recycling, and
- Improving overall waste management in line with the strategic directions of the NWMP.

Chapter 5: Policies and Actions of Local Government Organizations (LGOs) for Achieving the Waste Management Goal

In Greece, local Government Organizations (LGOs) are public legal entities established within specific territorial jurisdictions that administrate local affairs. Their governing bodies

are elected through universal suffrage by the local electorate. Implicit in the term is both a **geographical and demographic definition**, as each LGO has a defined area, headquarters, and population. According to the current administrative structure of Greece, every point in the country (except for Mount Athos) falls under the jurisdiction of a **primary-level LGO** (municipality) and a **secondary-level LGO** (region). (*Wikipedia, Local Government Organizations*)

The current administrative division of the country is detailed in **Official Gazette B' 1327/17.4.2019**, under the title: *"Primary and Secondary Local Government Organizations of the Country, in accordance with Law 3852/2010, as amended."* Ministerial Decision **28549/2019** provides an exhaustive list of all municipalities and regions, as established by Articles 1 and 3 of Law **3852/2010**.

Regarding the responsibilities of municipalities, **Article 75 of Law 3463/2006** specifies that they are responsible for the **cleanliness of public spaces**, **waste collection and management**, **construction and maintenance of sewage and biological treatment systems**, and the **implementation of preventative and corrective measures** to protect waste disposal sites, including fire safety compliance.

Furthermore, under **Article 228 of Law 4555/2018**, primary-level LGOs (municipalities) are assigned the following waste management responsibilities:

- Developing and implementing **Local Waste Management Plans (LWMPs)** and waste reduction/prevention programs;
- Establishing separate collection systems for at least **four recyclable waste streams**: glass, paper, plastics, and metals;
- Organizing a separate collection of **biowaste**, particularly from restaurants, households, large producers, and green waste from parks and gardens;
- Collecting and transporting **residual mixed municipal waste** and **source-separated recyclable materials** to suitable recycling, recovery, or disposal facilities following the respective **Regional Waste Management Plans (RWMPs)**;
- **Eradicating illegal waste disposal sites** and restoring existing **Uncontrolled Waste Disposal Areas (UWDA)**;
- Conducting **citizen awareness and outreach campaigns** within the municipal boundaries and encouraging actions aligned with circular economy principles;
- Registering all relevant data in the **Integrated Waste Management Information System**, developed by the General Secretariat for Waste Coordination and Management of the Ministry of the Interior, for monitoring project implementation and target achievement.

(*Article 228, Law 4555/2018*)

One notable initiative, "**Open Municipality – Active Citizens**," includes proposals for promoting **recycling and source separation** at the municipal level. (*Theofilopoulos G., Open Municipality – Active Citizens, Recycling & Source Separation: Our Proposals*)

In parallel, each region's **RWMP** constitutes a comprehensive framework for managing all waste streams generated within its boundaries. It sets forth general management guidelines in alignment with the national NWMP and Articles 22 (Management Plans) and 23 (Waste Prevention Programs). The RWMP proposes appropriate measures that promote, in a hierarchical and integrated manner:

a) Prevention,
b) Reuse,
b) Recycling,
d) Other forms of recovery (e.g., energy recovery), and
c) Safe final disposal.

The RWMP's policy pillars are centred on:

- **Preserving the public character** of waste management to protect public health and the environment under a sustainable development framework for the benefit of society;
- **Integrated planning** for all waste streams in the Attica Region at both regional and local levels, consistent with the National Waste Prevention Strategy;
- Ensuring **high-level protection of the environment and public health**, with adequate and appropriate infrastructure for collection, recovery, and disposal;
- Promoting **resource-efficient practices** for the benefit of society in an equitable manner;
- Strengthening the implementation of **Extended Producer Responsibility (EPR)** mechanisms;
- Enhancing the **quality of municipal waste management services** provided to citizens and businesses;
- Fostering **public engagement and participation** in waste-related initiatives;
- **Rationalizing service costs** and encouraging environmentally and economically sustainable investments. (*Special Inter-Municipal Association of the Attica Region, 2021*)

Part II – Chapter 6: Proposals for Individual Actions to Achieve the Waste and Refuse Management Goal

Achieving sustainable waste management is not solely the responsibility of governments and institutions—it also depends heavily on the **daily behaviour of individuals**. The following actions, though simple, can significantly contribute to minimizing waste generation and promoting circular practices at the household and community levels.

Composting

Though often perceived as an advanced environmental practice, **composting** is a simple and highly effective method to divert food waste from landfills. Approximately **25% of household waste** could be removed from the waste stream and converted into nutrient-rich compost. While composting may require a certain commitment, the return on investment is tangible: within **3 to 12 months**, households can produce natural fertilizer for their gardens or plants.

Responsible Recycling

Recycling standards differ across regions. Familiarizing oneself with **local recycling guidelines** is crucial to avoiding common mistakes—such as recycling contaminated materials (e.g., greasy pizza boxes), which may result in entire loads being sent to landfills. Effective recycling begins with understanding **what is and is not recyclable** in each local context.

Waste Auditing

Awareness begins with self-observation. By monitoring one's daily waste output—**maintaining a record for a day or week**—individuals can identify opportunities to **replace disposable items with reusable alternatives**. This habit can gradually evolve into a **personal goal** to reduce single-use consumption and embrace more sustainable practices.

Sustainable Purchasing Habits

Households can reduce waste by purchasing products with **minimal or recyclable packaging**. Not all plastics are created equal: the **number within the recycling triangle symbol** indicates the recyclability of each item. In general:

- **PETE (1)** and **HDPE (2)** are **highly recyclable**.
- **PVC (3)**, **LDPE (4)**, **PP (5)**, and **PS (6)** are **less or not recyclable**.
- **Type 7 (Other)** is **generally non-recyclable**.

Choosing products with packaging types 1 or 2 can ensure greater compatibility with local recycling systems.

Reducing Kitchen Disposables

Convenient items like plastic wrap, aluminium foil, paper towels, and zip-lock bags generate a significant volume of kitchen waste. Alternatives like parchment paper, reusable silicone baking sheets, and washable cloth napkins can reduce disposable usage and waste production.

Buying and Donating Second-Hand Items

Second-hand goods, especially clothing, are valuable to a sustainable consumption model. Purchasing or donating used clothing extends product life cycles and reduces textile waste. Initiatives like **Fabric Republic** offer structured systems for managing surplus clothing in line with **EU Directive 2008/98/EC**, contributing to developing a **European recycling society**. Moreover, buying second-hand supports **local charities** encourages **conscious consumption**, and promotes **cost savings**.

Supporting Local Farmers and Bulk Markets

Shopping at **local farmer's markets** helps reduce packaging waste while supporting **regional agricultural producers**. These products often require less refrigeration and transportation, contributing to lower environmental impact.

Avoiding Plastic Bags

Every hour, **200,000 plastic bags** end up in landfills. Investing in **fabric or reusable shopping bags** is a simple yet highly effective way to reduce plastic waste and its long-term environmental footprint.

Reducing Bottled Water Use

An estimated **60 million plastic water bottles** are discarded daily worldwide. The use of **reusable water bottles** offers an environmentally sound and cost-effective alternative.

Limiting Paper Use

In today's digital age, **paperless billing** is increasingly common. Many businesses offer incentives for choosing electronic communication. Reducing paper consumption—whether through digital receipts, notes, or subscriptions—can significantly contribute to reducing household waste.

Conclusions

It is evident that **sustainable waste and refuse management** constitutes a central pillar of the broader effort to transition toward a **circular and climate-resilient economy**, both at the European and national levels. The challenges are multifaceted—environmental, social, economic, and institutional—and call for coordinated actions across all levels of governance.

The legislative framework and funding mechanisms have been significantly reinforced at the European Union level through successive **Circular Economy Action Plans**, legally binding **recycling targets**, and a wide range of **cohesion policy instruments**. These measures aim to reduce environmental burdens, enhance resource efficiency, and generate green jobs through innovation, investment, and systemic change.

In **Greece**, significant progress has been made in aligning national strategies with European directives. The formulation and implementation of the **National Waste Management Plan (NWMP)** and the corresponding **Regional Plans** reflect a growing institutional commitment to modernize infrastructure, adopt new technologies, and promote best waste prevention, reuse, and recycling practices.

The role of **Local Government Organizations (LGOs)** is also pivotal. Municipalities and regional authorities serve as the operational backbone for implementing waste management policies, with responsibilities ranging from separate collection and recycling schemes to citizen awareness campaigns and digital monitoring systems. Their capacity to integrate local knowledge with national priorities enhances the effectiveness and inclusiveness of waste policy interventions.

However, technical solutions alone are not sufficient. The transition to sustainable waste management requires a **cultural shift**—a reconfiguration of values, habits, and consumption models. This underscores the critical role of **citizen participation**, **individual behavioural change**, and **community engagement** in complementing institutional efforts.

In this context, small-scale individual actions—such as composting, responsible recycling, sustainable purchasing, and reduction of single-use plastics—can collectively generate significant environmental benefits. Furthermore, promoting second-hand use, reducing food waste, and embracing minimal packaging practices contribute to a societal model in which **waste is no longer a by-product but a resource** to be reintegrated into the economic cycle.

In conclusion, achieving **Sustainable Development Goal 12** in waste and consumption is an **ongoing process** that requires strategic planning, regulatory coherence, robust infrastructure, informed policy-making, and an empowered and environmentally literate citizenry. Sustainability ambitions can only be translated into tangible outcomes for future generations through a holistic, multi-level, and participatory approach.

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