

# BELARUSIAN-GEORGIAN EXPERT REVIEW:



**Review of biodegradable municipal waste management practices and their contribution to localization of SGD 12 “Ensure sustainable consumption and production patterns” in Belarus and Georgia**

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The Review includes materials and proposals, provided by other Belarusian experts.

Belarusian-Georgian Expert Review focuses on the assessment the current situation with biodegradable municipal waste (BMW) management practices in Belarus and Georgia and analysis the existed experience in this field for its future implementation in the Dusheti municipality, Georgia. Conclusions and recommendations about the perspectives for the development of a BMW management and strengthening its contribution to the localization of the SDGs.

Conclusions and recommendations of the Review are addressed to the policy-makers, municipal and community leaders, eco-oriented businesses and NGOs in Georgia and Belarus as well as in other Eastern European countries.

**Belarusian-Georgian Expert Review: Biodegradable municipal waste management practices and their contribution to localization of SDG 12 “Ensure sustainable consumption and production patterns” in Belarus and Georgia/** Alina Bushmovich, Nino Rostomashvili, Ketevan Jibladze, Tatsiana Astraukh, Mikheil Kurdadze. – Dortmund-Tbilisi. 2023. - 71 page. – URL: <https://ibb-d.org/>

# CONTENT

<b>List of Abbreviations.....</b>	<b>4</b>
<b>Introduction .....</b>	<b>5</b>
<b>I. Methodology .....</b>	<b>7</b>
<b>II. MW management profile of Georgia .....</b>	<b>10</b>
a. Basic information about the country.....	10
b. Description of the situation with MW management including BMW ...	11
c. Key national stakeholders and their role.....	14
d. Plans for the development of the MW management system including BMW.....	16
<b>III. Local context .....</b>	<b>23</b>
a. Basic information of Dusheti municipality.....	23
b. Description of the situation with MW management including BMW....	24
c. Key stakeholders, their role and awareness of the problem .....	26
d. Key problems with MW management.....	27
e. Plans for the development of the MW management system .....	28
<b>IV. Assessment of the contribution of BMW management to the localization of the SDG 12 in Georgia .....</b>	<b>30</b>
<b>V. Case studies GE/BY .....</b>	<b>34</b>
a. Case studies from Belarus .....	34
b. Small-scale initiatives and communication on waste management in Georgia.....	56
<b>VI. Conclusions .....</b>	<b>62</b>
<b>VII. Recommendations .....</b>	<b>64</b>
<b>VIII. Proposed projects for implementation at the municipal level. ....</b>	<b>67</b>
<b>Attachment 1. Questionnaire on biodegradable waste.....</b>	<b>68</b>

# LIST OF ABBREVIATIONS

<b>AA</b>	Association Agreement
<b>BMW</b>	Biodegradable municipal waste
<b>EIA</b>	Environmental Impact Assessment
<b>EPR</b>	Extended Producer Responsibility
<b>MBT</b>	Mechanical biological treatment
<b>MEPA</b>	Ministry of Environment Protection and Agriculture
<b>MW</b>	Municipal waste
<b>MWM</b>	Municipal Waste Management
<b>MWMP</b>	Municipal Waste Management Plan
<b>MEPA</b>	Ministry of Environment Protection and Agriculture
<b>MSW</b>	Municipal Solid Waste
<b>SDG</b>	Sustainable development goal

# INTRODUCTION

The objective of the Review is to present the current situation with biodegradable municipal waste (BMW) management practices in Belarus and Georgia and their contribution to the localization of sustainable development goal (SDG) 12, and elaborate recommendations for further development of BMW management for the SDG 12 localization in the municipal level.

BMW includes kitchen, garden and park waste, paper and other similar kinds of waste , which are a source of gas emissions and wastewater from landfills.

SDG 12 “Ensure sustainable consumption and production patterns” claims for substantial reduction of waste generation through prevention, reduction, recycling and reuse by 2030 and to ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

BMW constitutes the main part of municipal waste (MW) and has a big potential for SDG12 localization from a waste reduction perspective. Current policies and practices, aimed at minimization of waste, are based on the development of a circular economy. The circular economy is an economic system that is based on expanding the life cycle of products. It does so through reusing, recycling, repairing and renovating existing products as much as possible. It is called “circular-based waste management”.

The information about the existing situation with the management of municipal waste in general and in particular BMW in Belarus and Georgia was collected through internet sources such as statistical data, strategic and policy papers in the area of municipal waste management, official publications of the relevant state authorities, publications of other projects and initiatives. Information in a pilot municipality Dusheti was collected by interviewing the

key stakeholders (Dusheti municipality, waste collecting company LTD Amenity Service, regional NGO Green Movement of Georgia, Dusheti School #1, a local administration in Bazaleti village, etc). A selected range of case studies with advanced practices in Belarus and Georgia were examined and described.

Based on analyses of the existing situation, there were prepared conclusions about the perspectives (priorities) for the development of BMW management and strengthening its contribution to the localization of the SDG 12 and recommendations for the development of BMW management for the SDG 12 localization at the municipal level.

In order to support Dusheti municipality to implement recommendations and to enhance its work on localization of SDG12, two concept notes were prepared.

The Review was prepared by an international team of experts from Belarus and Georgia which includes: Ms. Alina Bushmovich, Team leader/ Belarus national expert on waste; Ms. Nino Rostomashvili, Georgian national coordinator; Ms. Ketevan Jibladze, Georgian national expert on waste; Ms. Tatsiana Astraukh, Belarus stakeholder engagement expert and Mr. Mikheil Kurdadze, Georgian communication expert. The work of the team was supported by financial assistance from GIZ (Germany), expert support and administrative assistance from LAG 21 and IBB Dortmund (Germany).

Our team expresses its sincere gratitude to Ms. Manana Narimanidze, Mayor of Dusheti Municipality for her kind invitation to work in the municipality, providing assistance and time devoted to meeting with our team.

We also express our gratitude to all people from Dusheti Municipality who kindly provided us with an opportunity to meet them and discuss the situation with municipal waste management: Dusheti Municipality, Dusheti Municipality Cleaning and Improvement Service, local NGO sector, private sector representatives in Dusheti.

# I. METHODOLOGY

## **COLLECTION OF INFORMATION FOR THE BASELINE REVIEW OF THE SITUATION WITH BMW IN THE COUNTRY (CHAPTER II OF THE REVIEW)**

Scope and type of information to be collected:

- information about BMW (generation, collection, recycling, treatment/disposal)
- information about MW in general (generation, quantity, collection, recycling treatment/disposal)
- strategic and policy papers with plans related to BMW
- key national stakeholders and their role in municipal waste/ BMW management
- information about initiatives and projects related to BMW

Methods of the information collection: a study of internet sources (statistical data, scientific research, strategic and policy papers, etc., web pages of organizations and public institutions and other open sources of information).

## **COLLECTION OF THE INFORMATION FOR LOCAL CONTEXT (DUSHETI MUNICIPALITY, CHAPTER III OF THE REVIEW)**

Scope and type of information to be collected:

- basic information about Dusheti municipality (population, location, average salary, key industry if any)
- information about BMW (generation, collection, recycling, treatment/disposal) in Dusheti municipality
- information about MW in general (generation, quantity, collection, recycling treatment/disposal) in Dusheti municipality

- municipal plan on MW management including management of BMW
- key municipal stakeholders and their role in municipal waste/ BMW management (municipality, service provider, waste generators)
- information about initiatives and projects related to BMW
- problems related to MW management including BMW
- engagement of NGOs, schools, farmers, households and other stakeholders.

Methods of the information collection: a study of internet sources (statistical data, municipal plan on waste management, interviews with the key stakeholders. For evaluating awareness and engagement of stakeholders a special questionnaire on biodegradable waste shall be used (attachment 1 to the Review).

## **ASSESSMENT OF THE CONTRIBUTION OF BMW MANAGEMENT TO THE LOCALIZATION OF THE SDG 12 (CHAPTER IV)**

First of all, the assessment will be made by comparison of the achievement of SDG 12 national or international indicators related to MW management at the national and municipal levels.

**Goal 12** “Ensure sustainable consumption and production patterns” includes eight targets, two of which are directly related to waste management. These are:

**12.3** By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

**12.5** By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

The following indicators showing achievement of that targets are determined at the international level:

**12.3.1.** a) Food Loss Index and b) Food Waste Index

**12.5.1.** National level of waste recycling, the weight of recycled materials in tons

The corresponding national indicators in Georgia (if any) and their value in 2021 in Georgia and Belarus.

**Moreover, the framework conditions for the achievement of SDG 12 tasks and indicators will be considered. These framework conditions include:**

- availability of the relevant plans and targets at the municipal and country level
- functioning institutional framework (regulator, service provider)
- availability of resources (national/international) implementation of the plans
- possibility for international cooperation (cooperation programs opened for Georgia)



- conditions for the engagement of NGOs, businesses and other stakeholders
- stakeholder awareness and engagement.

## **STUDY OF BEST AVAILABLE PRACTICES IN BELARUS AND GEORGIA RELATED TO BMW (CHAPTER V)**

Selected cases with the best available practices which could be recommended for further replication will be studied and described.

I. A list of case studies from Belarus:

- Festival of Worm for promotion of vermicomposting
- Citizen Initiative of City Composting of organic waste
- Production of organic fertilizers by organic farmer
- Introduction of home composting in Mosty district
- Promotion of composting practices at schools
- A composting facility in Brest city.
- ‘PISCHA’ - a Food Bank in Belarus.

II. Small-scale initiatives and communication on waste management in Georgia

## **CONCLUSIONS ABOUT THE PERSPECTIVES (PRIORITIES) FOR THE DEVELOPMENT OF BMW MANAGEMENT AND STRENGTHENING ITS CONTRIBUTION TO THE LOCALIZATION OF THE SDGS AND RECOMMENDATIONS FOR THE DEVELOPMENT OF BMW MANAGEMENT FOR THE SDGS LOCALIZATION AT THE MUNICIPAL LEVEL (CHAPTERS VI AND VII)**

Conclusions and recommendations will be developed based on the results of the assessment.

# II. MW MANAGEMENT PROFILE OF GEORGIA

## A) BASIC INFORMATION ABOUT THE COUNTRY

The overall approach to waste management in Georgia has evolved over the years, and currently, the country is implementing a modern and sustainable waste management system that focuses on reducing, reusing, and recycling waste.

The waste management system in Georgia is decentralized, with responsibility for waste management shared between the central government and local municipalities. The central government sets the policy framework and provides financial and technical support to local municipalities, while local municipalities are responsible for the collection, transportation, and disposal of waste in their respective jurisdictions.

At the national level, the Ministry of Environmental Protection and Agriculture is responsible for developing waste management policies and regulations. The ministry also provides technical support and financial assistance to local municipalities for waste management activities.

At the local level, waste management is the responsibility of municipalities, which are responsible for collecting waste from households, commercial establishments, and public areas. The municipalities are also responsible for transporting the waste to designated waste disposal sites, which can be either landfill sites or waste-to-energy facilities.

In recent years, the Georgian government has introduced several initiatives to promote sustainable waste management practices. These include the introduction of waste separation and recycling programs in major cities, the development of waste-to-energy facilities, and the establishment of a legal framework for waste management. The government is also promoting public awareness campaigns to encourage citizens to reduce, reuse, and recycle waste.

Despite this, the scale of waste recycling in Georgia is still not significant, there are improvements to be done for the private sector engagement in waste management activities.

To enhance how all types of waste are managed throughout Georgia, a Law – the “Waste Management Code” was enacted in 2015. The Code seeks to create a legal and regulatory framework that supports waste prevention and reuse, as well as environmentally sound waste management processes including collection, transport, recovery (recycling, composting, etc.) and disposal.

## **B) DESCRIPTION OF THE SITUATION WITH MW MANAGEMENT INCLUDING BMW**

The Law of Georgia “Waste Management Code” was adopted on December 26, 2014, and came into force on January 1, 2015. The newly adopted Code is in line with the EU-Georgia Association Agreement (AA) and based on provisions of the following EU directives:

- Directive 2008/98/EC on waste
- Directive 1999/31/EC on the landfill of waste as amended by Regulation (EC) 1882/2003

Annex XVI of the EU-Georgia Association Agreement (EUAA) foresees not a complete harmonization but rather an alignment with the Directive. In this regard, only certain **provisions of the EU Directive** will apply:

1. Adoption of national legislation and designation of competent authority/ies;
2. Establishment of a system to ensure that operators draw up waste management plans; identification and classification of waste facilities (Articles 4 and 9 and Annex III, first indent)

The purpose of this Code is to provide for the legal conditions for the implementation of measures aiming at the **prevention of the generation of waste** and increased re-use, environmentally-sound treatment of waste (including recycling and extraction of secondary raw materials, energy recovery from waste, as well as safe disposal) through:

- preventing and reducing the adverse impacts of the generation of waste;
- introducing effective mechanisms of waste management;
- reducing damage caused by resource use and improving the efficiency of such use.



This Code applies to all types of waste, **except** for:

- Radioactive waste;
- Gaseous effluents emitted into the atmosphere;
- Land (in situ) including un-excavated contaminated soil and buildings permanently connected with land;
- Uncontaminated soil, naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for construction in its natural state;
- Wastewater, pollution of water bodies (including the Black Sea) with wastewater and/or waste;
- Decommissioned explosives;
- Feces matters/manure and other non-hazardous materials of a natural origin used in farming or forestry;
- Mining waste, i.e. waste resulting from the prospecting, extraction, processing and storage of mineral resources and the working of quarries;
- Decommissioned chemicals of military purposes;
- Non-contaminated sludge excavated in the course of exploitation and rehabilitation measures of land reclamation systems, which are subject to disposal on the sale lines of the system.

The Code does not regulate waste generated from extractive industries (mining waste). Mining waste is supposed to be regulated by the Law on Mineral Resources. However, the Code is not complete and does not fully correspond to the AA requirements. Mining waste poses a high risk to the environment and human health and, therefore, is to be regulated based on the relevant EU Directive.

This Code provides the following **basic principles**: Waste management shall be carried out by the following principles:

- Precaution means that to avoid the threat or danger to the environment deriving from waste, measures shall be taken even if full scientific certainty is not available;
- Polluter pays means that the producer or holder of waste shall cover the costs of waste management;
- Proximity means that the treatment of waste shall be undertaken in the nearest appropriate waste treatment facility, taking into consideration environmental and economic efficiency;

- Self-sufficiency means that an integrated and satisfactory network of facilities for waste disposal and recovery of municipal waste is established and operated.

This Code stipulates the principle of “**Polluter pays**” and introduces the extended producer responsibility, meaning that the manufacturer of a product, which after its use becomes specific waste, and who places this product on the market, should design the product in a way that ensures:

- Reduction of their negative environmental impacts and the generation of waste during manufacturing and subsequent use of products;
- Recovery and disposal of the waste from these products.

The Code describes the **general requirements** for waste management:

1. Waste, depending on its type, properties and composition, shall be collected, transported and treated in a manner not impeding its further recovery.
2. Waste shall be collected, transported and treated in a manner, which excludes, to the maximum capacity possible, pollution of the environment and risks for human health.
3. In case of waste pollution caused by waste transport activities, the waste transporter shall be responsible for taking clean-up measures.
4. The producer and holder of waste is obliged to treat their waste on their own or hand it over for collection, transport and treatment to people entitled to carry out such operations following this Code and legislation of Georgia.
5. Where waste has been submitted for recovery or disposal, the original producer’s and/ or holder’s responsibility shall remain until recovery or disposal is completed.
6. People who collect and transport waste shall hand it over for treatment to appropriate facilities, holding the relevant permit or registration.
7. Transporters of hazardous waste require an allowance certificate for waste transporting vehicles before they carry out hazardous waste transport activities. A driver of a waste-transporting vehicle shall have the allowance certificate with him when transporting hazardous waste.
8. The burning of waste outside permitted incinerators shall be prohibited.

The Law “Waste Management Code” leads to new **waste management initiatives** intended to:

- Optimize and expand the coverage of formal municipal collection services;
- Implement new landfills designed and constructed to display international standards;
- Significantly increase the rate of recovery through formal municipal recycling and composting programs.

The Code defines a number of waste streams in its definitions and Waste as such is defined as follows: **“waste”** means any substance or object which the holder discards or intends or is required to discard. It also defines biodegradable waste streams: **“biodegradable waste”** means waste that may undergo anaerobic or aerobic decomposition, including food/feed waste, garden/park waste, and paper and cardboard.

## C) KEY NATIONAL STAKEHOLDERS AND THEIR ROLE

Presently, waste management (including municipal waste management) in Georgia is the responsibility of different government levels. The Ministry of Environment Protection and Agriculture (MEPA) is responsible for the development and implementation of a unified national policy on waste management. To accomplish this, the MEPA has developed a national strategy and action plan on waste management, as well as a strategy for biodegradable municipal waste management. The MEPA issues environmental permits connected to waste-related activities and is responsible for state supervision of waste management. The MEPA also addresses issues related to the management of hazardous and other specific waste streams. Local governments are responsible for municipal waste collection and transportation services as well as cleaning streets, parks and other public spaces within their local jurisdictions.

Currently, future construction and operation of waste transfer stations, and landfill activities, including the construction, operation and closure of municipal waste landfills is the responsibility of the Ministry of Regional Development and Infrastructure. The exception to this national responsibility is the Adjara Autonomous Republic and the city of Tbilisi (Capital), where local governments are responsible for both the waste collection/transportation and landfill construction/operation.



**In addition to the aforementioned, The Ministry of Internally Displaced Persons from the Occupied Territories, Labor, Health and Social Affairs of Georgia, in cooperation with the Ministry of Environment Protection and Agriculture, regulates and controls healthcare waste management.**

Activities and industrial facilities that have the potential for significant adverse impacts on the environment are subject to an environmental permitting

and mandatory Environmental Impact Assessment (EIA) process for their activities. The EIA process, among other aspects, must include waste management issues, this leads to the requirement for effective waste management as a component of the industry's permit conditions. All industrial activities, related to waste disposal or treatment, are subject to environmental permitting through the existing legal framework.

On a municipal level, local governments (that are responsible for municipal waste collection and transport) must develop comprehensive Municipal Waste Management (MWM) plans that aim to improve their waste-related functions. The waste management plan must be based on the **waste management hierarchy** and the principles stipulated by Article 5 of the Waste Management Code. These plans should cover a 5-year planning timeframe and correspond to the national waste management strategy and action plan which are currently under development. The municipal plans must also correlate to other national waste management initiatives for specific waste streams including, at least, persistent organic pollutants, mercury, healthcare waste, animal waste, and asbestos.

"Waste Management Code" also states that the MWM plans must define how the level of **recycling and recovery** will be significantly increased through formal programs developed by the municipalities. This may include regional initiatives aimed at achieving a more effective economy of scale for the recovery process. (The Code stipulates that adjacent municipalities can develop common MWM systems and also can collectively develop a common MWM plan if warranted).

**The Municipal Waste Management Plan shall contain the following:**

- ✧ Information on the existing system for the collection of waste from the population;
- ✧ Data on the types and the amounts of non-hazardous waste collected, recovered and disposed of;
- ✧ Data on the types and the amounts of hazardous waste from the population collected, recovered and disposed of;
- ✧ Location of the waste treatment facilities;
- ✧ Planned measures to be taken for the establishment of separate collection and recovery of municipal waste, including biodegradable waste and packaging waste;
- ✧ The planned construction of new waste treatment facilities;
- ✧ Programmed to raise awareness of the public on waste management issues;
- ✧ Implemented and planned measures for cooperation with other municipalities in the field of waste management;
- ✧ The way and timeframe in which proposed measures shall be implemented, responsible people, estimated costs and sources of financing for their implementation.

★ The Code also introduces that the waste management plans of the companies, legal and natural persons, that produce more than 200 tonnes of non-hazardous waste or 1 000 tonnes of inert waste or any amount of hazardous waste annually, shall prepare a company waste management plan, which contains the following:

★ Information about the waste generated (origin, types of waste according to the list of waste, composition, quantity);

★ Measures to be taken for the prevention of waste generation and its recovery, especially in the case of hazardous waste;

★ A description of the applied method for separation of the waste generated, in particular of hazardous waste from the other waste;

★ Methods and conditions for the temporary storage of waste;

★ Waste processing methods applied and/or information about the person to whom the waste is handed over for further processing

The Code describes the rule for implementation of **state supervision and control** for littering the environment with municipal waste and **administrative offence**.

Following the Code, a series of **by-laws** on waste classification, registration, collection, transportation, pre-treatment and temporary storage of hazardous waste have been developed.

## D. PLANS FOR THE DEVELOPMENT OF THE MW MANAGEMENT SYSTEM INCLUDING BMW

As per the requirement of the Waste Management Code of Georgia, National Waste Management Strategy 2016-2030 and National Waste Management Action Plan have been developed. The purpose of the strategy is to determine the country's waste management policy and set national targets for a 15-year period. The National Waste Management Strategy plays a key role in achieving resource-efficient and sustainable waste management - through gradual convergence with the European Waste Management policy and legislation. To achieve the objectives of the strategy, a national waste management action plan has been developed.



**The Waste Management Strategy complies with the Waste Management Code that sets out the Waste Management Hierarchy:**

- Prevention
- Preparation for re-use
- Recycling
- Other recovery, including energy recovery
- Disposal



**Moreover, the Strategy complies with the Principles of Waste Management introduced by the Waste Management Code:**

**a) Precaution** means that to avoid the threat or danger to the environment deriving from waste, measures shall be taken even if full scientific certainty is not available;

**b) Polluter pays** means that the producer or holder of waste shall cover the costs of waste management;

**c) Proximity** means that the treatment of waste shall be undertaken in the nearest appropriate waste processing facility, taking into consideration environmental and economic efficiency;

**d) Self-sufficiency** means that an integrated and satisfactory network of facilities for waste disposal and recovery of municipal waste is established and operated.

**The Strategy is in harmony with key EU Environmental Management principles:**

- **Sustainable development** (Sixth Community Environment Action Programme) – use of natural resources without destroying or harming them and in a manner that does not restrict the possibilities for their use by future generations
- **Waste prevention principle** (Directive 2008/98/EC on waste) – reduction of the quantity and/or hazardousness of the generated waste
- **Best Available Technology** (Directive 2008/98/EC on waste) – in establishing recovery or disposal facilities the use of best available technologies shall be taken into account
- **Extended Producer's Responsibility** (Directive 2008/98/EC on waste) – producers and importers of specific products are responsible for the waste that remains after those products have been used, as well as the subsequent management of the waste and financial responsibility for such activities
- **Integrated waste management** (Sixth Community Environment Action Programme) – integrated management combines all other principles of the waste management policy and guarantees interaction and optimal combination of the different methods and approaches to achieve economically and environmentally effective waste management.

**The Strategy is also in line with two international key principles:**

- The UNECE principle on Access to information and Public Participation (Aarhus Convention)
- The UNEP Green Economy Initiative - Towards a Green Economy - Pathways to Sustainable Development and Poverty Eradication - promoting the development of a green economy, which ensures sustainable development and avoids degradation of the environment.

The National Waste Management Action Plan covers a period of 5 years and is an integral part of NWMS. The action plan identifies the measures to be taken for the implementation of the highest level in the waste management hierarchy calculated for the respective medium-term periods. In total, two action plans have been developed. The second National Waste Management Action Plan covers the period of 2022-2026.

**The objectives, targets, and actions are assembled in the following thirteen sections:**

1. Legislation
2. Waste Planning
3. Waste Collection and Transport
4. Landfills
5. Prevention and Treatment (Reuse, Recycling, and Recovery)
6. Cost recovery
7. Extended Producers Responsibility (EPR)
8. Waste Data and Information Management System
9. Capacity Development and Awareness Raising
10. Hazardous Waste Management
11. Plastic Waste Management
12. Biodegradable Waste Management
13. Construction and Demolition Waste Management



**The activities in the action plan are grouped according to the 13 general objectives of the strategy. Activities are designed considering the challenges accumulated in the waste management sector.**

Achieving objectives and targets set by strategy and action plan is quite costly. The main source of funding the Action Plan is the **waste management tariff** to be paid by legal and physical people for the waste management services, according to the law of Georgia on local fees and Polluter pays principle, meaning that the producer or holder of waste, shall cover the costs of waste management. Besides the state budget, foreign investment and donor support are envisaged to ensure proper implementation of the planned activities.

One of the significant goals of the National Waste Management Strategy, within its capabilities, is to provide waste prevention, reuse, recycling and/or

recovery. In this regard, realistic, but at the same time ambitious indicators of waste reuse, recycling and recovery have been determined and must be reached at the required level.

Table 1. The minimal indicators of paper, glass, metal and plastic waste recycling to be reached at the national level in Georgia

Type of waste	2026	2030
Paper	50%	80%
Glass	50%	80%
Metal	80%	90%
Plastic	50%	80%

The Waste Management Code requires municipalities to perform the function of municipal **waste collection and transportation**, as well as to implement waste recovery programs. Since 2019, the Code sets the municipalities under an obligation to implement waste separation practices. **But by 2026, they have to establish a waste separation system in immediate proximity to paper, plastic, glass and metal waste sources. So, the country's local authorities and the whole society will face new significant challenges soon.**

As it relates to the **12th objective** of the **Waste Management Strategy of Georgia**, currently there is no arranged system of collection and processing of biodegradable waste in Georgia. Biodegradable waste is disposed of in landfills and constitutes more than half of municipal waste. Biodegradable waste includes kitchen, garden and park waste, paper and other similar kinds of waste, which are a source of gas emissions and wastewater from landfills. Regarding the management of biodegradable waste, the country is committed to preparing and implementing measures aimed at reducing the amount of biodegradable waste disposed of in landfills, to develop legislative initiatives and other practical programs that ensure the perfection of the biodegradable waste management system in the country. Biodegradable waste collection and processing is partially carried out in the form of separate initiatives (projects). Composting enterprises are arranged in the city of Tbilisi, the city of Kutaisi and in the municipalities of Marneuli, whose capacities are small. **It is necessary to create and introduce modern biodegradable waste management systems in the country.**

The key challenges in the field of biodegradable waste management call for:

- Creation and implementation of modern biodegradable waste management systems in the country
- Introduction of biodegradable waste collection, composting and energy recovery

These challenges are addressed in the Waste Management Action Plan for the years 2022-2026 and go as follows:

<b>Objective 12</b>			<b>Creation and Implementation of Biodegradable Waste Collection and Treatment Systems</b>		
Targets			Indicator		
Target 12.1	Introduction of biodegradable waste composting practice		Reduced amount of landfilled biodegradable waste		
Target 12.2	Promotion of biodegradable waste conversion into energy		The amount of biodegradable waste processed for energy conversion		

**Target 12.1. Introduction of biodegradable waste composting practice**

	<b>Action</b>	<b>Implementation Deadline</b>	<b>Action Results Indicator</b>	<b>Responsible Institution(s)</b>	<b>Partner Institution(s)</b>	<b>Budget</b>	<b>Source of Finance</b>
12.1.1	Evaluation of the current situation of biodegradable waste generation, collection and composting at the national level and identification of needs	2024 IV quarter	Developed evaluation report	Ministry of Environmental Protection and Agriculture	Municipalities	350 000 Euro	Donor assistance
12.1.2	Implementation of demonstration projects for collection and composting of biodegradable waste	2025 IV quarter	At least one pilot project is implemented to facilitate the introduction of composting practices	Municipalities	Ministry of Environmental Protection and Agriculture	2 500 000 Euro	Donor assistance
12.1.3	Facilitate the introduction and piloting of composting practices on farms and domestic farms	2026 IV quarter	At least one pilot project is implemented to facilitate the introduction of composting practices	Ministry of Environmental Protection and Agriculture	Municipalities	400 000 Euro	Donor assistance
12.1.4	Strengthening the capacity of biodegradable waste for private and public sector	2024 IV quarter	Conducted at least 3 training sessions A guidance document has been developed At least 1 study tour	Ministry of Environmental Protection and Agriculture	Municipalities Private Sector	300 000 Euro	Donor assistance

Target 12.2. Promotion of biodegradable waste conversion into energy							
12.2.1	Assessment of needs for conversion of biodegradable waste into energy	2025 IV quarter	Needs assessment report developed on the conversion of biodegradable waste into energy	Ministry of Environmental Protection and Agriculture	Municipalities	200 000 Euro	Donor assistance
12.2.2	Conduction of a pre-feasibility study for biodegradable waste mechanical-biological treatment (MBT)	2023 IV quarter	Developed a research report for at least one region	Ministry of Regional Development and Infrastructure/ Solid Waste Management Company	Ministry of Environmental Protection and Agriculture	200 000 Euro	Donor assistance
12.2.3	Construction of MBT-waste mechanical-biological treatment facility	2025 IV quarter	Arranged MBT-waste mechanical-biological treatment facility	Adjara Waste Management Company	Ministry of Environmental Protection and Agriculture	20 000 000 Euro	International financial institutions (EBRD)
12.2.4	Conduction of awareness-raising campaign on biodegradable waste conversion into energy	2024 IV quarter	At least three awareness-raising campaigns conducted on biodegradable waste conversion into energy	Ministry of Environmental Protection and Agriculture	Municipalities	200 000 Euro	Donor assistance

## APPROACH TO FOOD WASTE REDUCTION

Georgia is in the process of introducing a new law, which aims to reduce food waste and provide tax benefits to businesses that donate leftover food to charity. The law "On reducing food losses and food waste and food donation" was developed in cooperation with the European Union and the United Nations Food and Agriculture Organization. It has already passed the first reading in Parliament, and while some changes may be made, its authors believe that it will be innovative in the region.

The law's primary goal is to reduce the large amount of food waste that ends up in landfills in Georgia. Studies have shown that in 2019 alone, 261 tons of food were thrown away, which is a significant amount per capita. The law will not only reduce waste but also provide leftover food to people living below the poverty line.

The law will benefit both the private sector and charitable organizations. Businesses that donate leftover food will receive tax benefits, such as a reduced amount required for declaration submission to the tax agency. This will help reduce the cost of waste disposal, which is a significant expense for many businesses.

In addition, charitable organizations will be able to receive food donations and provide them to those in need. The law will be completely voluntary, and businesses will be able to participate at their own will. The law is set to be fully implemented on January 1, 2025, and amendments will be made to the Waste Management Code, Georgian Tax Code, and Food, Animal Feed Safety, Veterinary and Plant Protection Code.

The authors of the law have consulted with businesses, including restaurateurs and the HoReCa sector, and have found a willingness to participate in the program. Overall, the law is an important step toward reducing food waste and promoting social responsibility among businesses in Georgia.

# III. LOCAL CONTEXT

## A) BASIC INFORMATION OF DUSHETI MUNICIPALITY

Dusheti municipality is located in eastern Georgia and is part of the Mtskheta-Mtianeti regional administration. The total area of the municipality is 2981.5 km<sup>2</sup> and the population is 26200 people. Dusheti municipality is bordered by Kazbegi municipality and the territories of the Russian Federation in the north, Tianeti municipality in the east, Akhagori municipality in the west, and Mtskheta municipality in the south. The distance between the administrative center and Tbilisi is 54 km.

The municipality is geographically characterized by mountainous terrain. Its mountainous territory is located in the alpine and subalpine zone; therefore, the cold season lasts almost 8 months. The average annual temperature is about 11 C°, the possible maximum is 39 C°, and the possible minimum is -30 C°. A large part of the territory is occupied by brown and grey forest soils.

The hydrographic network is dense and is represented by rivers, lakes, glaciers and groundwater. There are mountains, foothills and bar rivers. There are also quite a few lakes in area, most of which are small. The main river network is formed by four Aragvi rivers (Mtiuleti-Gudamakri and Pshav-Khevsureti), the most important of which is the Mtiuleti Aragvi. In the municipality of Dusheti, the rivers of the northern slope of the main ridge are worth noting: Arghun and Asa. Among lakes located in Dusheti municipality, Bazaleti and Abudelauri lakes are the most important. The Zhinvali reservoir is built

on the Aragvi river, the surface area of which is 11.5 km<sup>2</sup>, and the volume is 520 million m<sup>3</sup>. **There are mainly 3 types of weather in the territory of Dusheti municipality:**

- Moderately humid weather, with moderately cold winters and long warm summers;
- Humid weather, with cold winters and short cool summers;
- Humid mountain air with permanent snow and glaciers.

The municipality consists of one city, two townships and 288 villages, which are united in 18 administrative units of self-government. There are 291 settlements in Dusheti municipality, which have been given the status of high-mountainous villages, and accordingly, the population of these villages will benefit provided by the strategy. Population and labour resources According to the data from 2022, 26,200 people live in Dusheti municipality. From 2006 to the present, it is characterized by a tendency of population decrease (24%), which is due to various reasons. The percentage of similar indicators is even higher in mountainous and highland areas, where migration and depopulation processes have been irreversible in the last few decades. Due to the general problems of the region, it is noticeable that the population is decreasing. **The decrease in population occurs both as a result of natural decline and as a result of migration, which is determined by following reasons:**

- Hard and low-income traditional manual labour
- Lack of jobs and low wages
- The severity of household conditions
- Low level of social and cultural services.



**While the municipality faces these challenges, the local administration, alongside international organizations, is working on improving all aspects of life in Dusheti.**

## **B) DESCRIPTION OF THE SITUATION WITH MW MANAGEMENT INCLUDING BMW**

The responsibility for the management of waste generated in the territory of Dusheti municipality lies with the local government, which is responsible for performing specific functions of waste management. In particular, we are



talking about municipal waste collection and transportation services, and cleaning of streets, parks and other public places within the administrative territory. "Dusheti Municipality Cleaning and Improvement Service" ensures the collection and removal of waste emerged on the territory of the municipality to the landfill on the balance sheet of "Georgian Solid Waste Management Company" LTD. The waste collection service is provided to the population by both container and bell systems.



**Waste collection and removal services are provided to 91 settlements of the municipality (one city, two townships, and 88 villages - a total of 18,282 people). Waste collection and removal services are provided to 90% of commercial facilities in the municipality. The list of populated points and the existing routes are given in the form of a table, in which direction and with what intensity waste is removed from the populated areas.**

Dusheti has developed a municipal waste management strategy, which focuses on the provision of effective waste collection and transportation services (including both residents and commercial facilities and enterprises with a sufficient number of containers, waste removal with a sufficient frequency) delivery to the population, commercial facilities and existing enterprises in the whole municipality.

The MWMP covers the period between 2023 and 2027 and its main goal is to implement activities to reduce the municipal biodegradable waste disposal in landfills (wide implementation of composting practices).

Additionally, the MWMP has the objectives of conducting trainings on the subject of composting with locals and municipality representatives (at least 2-3 trainings); arranging demonstration/pilot composting sites on the territory of educational institutions and/or farmers; setting up a community composting area for the villages that show the most interest in the initiative (with the involvement of an expert to ensure that there is a sufficient amount of organic waste).

#### **Other specific figures laid out in the MWMP are as follows:**

- Achieving minimum indicators of waste collection:
  - ▷ Municipal waste 95% by December 31, 2026;
  - ▷ Hazardous municipal waste 80% by December 31, 2026;
  - ▷ Implementation of activities to promote the reduction of municipal biodegradable waste disposal at landfills (broad introduction of composting practices in the territory of the municipality);
  - ▷ Establishing a separation system at the source of paper and plastic production by December 31, 2023-2024;
- Achieving the following minimum rates of paper plastic recycling:
  - ▷ Paper 50% by December 31, 2026, 80% by 2030
  - ▷ Plastic 50% December 31, 2026; 80% by 2030
- Strengthening the capabilities of the municipality's employees in terms of implementing an effective waste management system;

- Effective proceedings in cases of environmental pollution with municipal waste provided for by the Waste Management Code, active development of the penal sanctions system;
- Development and implementation of a system for fully removing waste management costs from the population in Dusheti municipality by 2024;
- Raising the awareness of the municipality's population on waste management issues, preparing them for the implementation of separate waste collection practices

There are 1,001 units of 1.1 m<sup>3</sup> garbage cans located throughout the municipality, and they are emptied daily, at least twice a day during the summer. In the settlements included in the municipality, waste collection is carried out using containers and a call system twice or once a week. "Cleaning and beautification service of Dusheti municipality" cleans parks located near schools, cultural centres and administrative buildings. Streets are being cleaned every day in the territory of Dusheti, Zhinvali township and Pasanauri township.

**The municipality does not have waste collection service delivery maps.** There are no sealed waste collection routes, they are verbally agreed with the truck drivers. Dusheti Municipality is responsible for the purchase and maintenance of the vehicles that are used in the process of waste collection and removal. The municipality does not have its workshop for the maintenance and repair of these vehicles. As a rule, for this purpose tenders are announced and relevant company(s) are hired; When it comes to small-scale repair activities, one-time contracts are concluded with the relevant company.

## C) KEY STAKEHOLDERS, THEIR ROLE AND AWARENESS OF THE PROBLEM

The Dusheti municipality self-governing community and the municipality's supervision service are responsible for the implementation of the waste management plan of the Dusheti municipality. The collection and disposal of waste generated on the territory of the municipality at the landfill on the balance sheet of "Georgian Solid Waste Management Company" LLC in Dusheti is provided by JSC "Cleaning and Beautification service of Dusheti Municipality", whose 100% of shares is owned by Dusheti Municipality.

Accurate data on the types of waste and their amount generated in Dusheti municipality is not available, because the amount of generated solid household waste is not recorded. The volume of waste can be only determined

by the amount of waste deposited in landfills. Thus, it becomes challenging to address the existing issues in the municipality. **The separate collection remains one of the main priorities of the MWMP, which largely relies on the creation of sorting lines and recycling facilities in the country** (as it is envisioned that Dusheti will be serviced by a larger, regional landfill that will utilize modern technology for waste processing).

## D) KEY PROBLEMS WITH MW MANAGEMENT

One of the major issues in Dusheti is the lack of a separate **collection of biodegradable waste**. Biodegradable waste, which includes food waste, garden waste, and other organic materials, can be composted or converted into energy through anaerobic digestion. However, most of the biodegradable waste in Dusheti is mixed with other waste types and sent to landfill sites, where it decomposes and emits greenhouse gases.

**Low awareness of biodegradable waste processing and separate collection** is a significant obstacle to improving waste management in Dusheti. Many residents are unaware of the benefits of separating biodegradable waste and the negative impacts of sending it to landfill sites. Additionally, there is a lack of information and education on how to compost and recycle biodegradable waste at home.

To address this issue, there is a need for increased public awareness campaigns and education programs on biodegradable waste processing and separate collection. The municipality could organize community events, workshops, and training programs to educate residents on the importance of separating biodegradable waste and how to do it properly. The municipality could also collaborate with local schools to include waste management education in the curriculum.

Another approach is to provide various kinds of motivation for residents who separate biodegradable waste from other waste types. **The municipality could introduce a separate collection system for biodegradable waste and offer discounts on waste collection fees to households that participate.** This would encourage residents to separate their waste and increase awareness of the benefits of biodegradable waste processing.

## E) PLANS FOR THE DEVELOPMENT OF THE MW MANAGEMENT SYSTEM

Based on the current situation with waste management in Dusheti municipality and European examples of waste management systems, MWMP outlines future opportunities and scenarios. Municipalities are obliged to separate waste from 2019, but due to several reasons, it was not possible to implement separate waste collection. One of the main reasons was Covid-19. It should be also taken into account that it is necessary to find a common solution to this issue, improve household waste management services and separate collection of waste types (plastic, paper, glass).

In the future, a system will be used for the separate collection of waste in the territory of the municipality, when a suitable container for each type of waste (paper, plastic, glass) will be placed in public spaces. Residents will sort the waste themselves and place it in the appropriate container. First of all, it is necessary to determine the source that will receive the separated secondary waste and recycle it. It is essential to facilitate the gradual introduction of waste separation practices. Emphasis should be placed on streams (paper, plastic and glass waste) that were separated during the waste composition study.

In the first stage, the introduction of separate collection practices will take place. Firstly, the introduction will happen in Dusheti (near big shopping buildings and schools), a village of Zhinvali, a village in the area bordering the Ananuri church and in Pasaauri township, near the administrative building. In a later stage, the expansion of these areas to the rest of the populated points is planned.



**The municipality needs to negotiate with the companies that are interested in the disposal of sorted waste. For this, the municipality must allocate a storage facility for the storage of the collected waste, where the company will install waste pretreatment equipment. The price and waste purchase procedures should be negotiated in advance.**

**Dusheti Municipality plans to ensure the implementation of the following measures:**

1. Create maps showing the routes and placement of waste collection containers and based on this, optimize waste collection routes to make this process as cost-effective as possible;

2. Add containers and ensure waste collection with a container system in all villages;
3. Separate collection of municipal wastes in stages. It is important to start this in the centres of densely populated administrative settlements;
4. Dusheti municipality plans to purchase 500 1100-litre containers for separation in 2022-2026;
5. It is important to update the equipment used in the waste collection process
6. Purchase of two new compactor machines for 2022-2026.
7. Technical repair of the truck owned by the municipality, which is necessary for the removal of separated waste.
8. Improvement works of the necessary building structure for the placement of separated waste.
9. Purchase of equipment and special clothes necessary for separation.

Due to the fact that during the research on the composition of waste, the leading place was occupied by organic waste, it is important to promote the introduction of composting practices in the municipality. Taking into account the cost efficiency, it is recommended to arrange composting sites for common use by several farmers.

# IV. ASSESSMENT OF THE CONTRIBUTION OF BMW MANAGEMENT TO THE LOCALIZATION OF THE SDG 12 IN GEORGIA

## A) OVERVIEW OF GEORGIA MOVING TOWARDS MEETING SDG 12

A comparison of the achievement of SDG 12 national indicators related to MW management in Belarus and Georgia is presented below.

Table 1: national indicators and their values on SDG 12 targets 12.3. and 12.5.

Belarus		Georgia		
National indicator	Indicator value for the country, 2021	National indicator	Indicator value for the country, 2021	Indicator value for Dusheti municipality, 2021
12.3.1. a) Food Loss Index and b) Food Waste Index	No value	Not Available	Not Available	Not Available
12.5.1.1. Share of use of solid municipal waste in the total volume of generation of solid municipal waste	32%	Not Available	Not Available	Not Available

### Comments:

- target 12.3.1: there is no data on the achievement of the target either in Belarus or in Georgia.
- target 12.5.1: BMW may constitute up to 50 % of MW which means that the recycling of BMW can make significant input to achievement of the target 12.5. The ideal situation would be 100% recycling of MW. The value of the indicator in Belarus that has been achieved gradually is 32% for 2022. However, it is still low if compared to the level of EU countries. The value of the achievement of the indicator in Georgia is not available.



**In Georgia, there are currently no available indicators for measuring progress towards SDG 12 on either the national or local levels. This lack of indicators means that it is difficult to track progress toward achieving SDG 12, which can hinder the country's ability to meet this goal by 2030.**

The development of indicators for measuring progress towards SDG 12 in Georgia is currently under implementation, but the document outlining these indicators has not yet been made available. Without these indicators, it is impossible to assess the effectiveness of policies and programs designed to promote sustainable consumption and production patterns. Furthermore, the lack of indicators can lead to a lack of accountability for the implementation of these policies and programs, making it difficult to ensure that there is progress toward SDG 12.

Sustainable consumption and production patterns are vital for promoting sustainable development and reducing environmental degradation. By improving resource efficiency, reducing waste, and promoting sustainable practices, countries can create a more sustainable future for everybody. However, without clear indicators to measure progress, it is difficult to identify areas for improvement and ensure that policies and programs are effective in achieving their goals. Therefore, Georgia must develop and implement indicators for measuring progress towards SDG 12 as soon as possible.

The lack of available indicators for measuring progress towards SDG 12 in Georgia is a significant challenge that must be addressed. The development of indicators is currently in progress, but until they are made available, it will be difficult to track progress and ensure that policies and programs are effective in promoting sustainable consumption and production patterns. By prioritizing the development and implementation of these indicators, Georgia can take a significant step towards achieving SDG 12 and creating a more sustainable future for all.

## **B) FRAMEWORK CONDITIONS FOR THE ACHIEVEMENT OF SDG 12 TASKS AND INDICATORS IN GEORGIA.**

Over the last decades, the country has taken significant achievements towards responsible production and consumption as outlined in Sustainable Development Goal 12. This has involved a comprehensive reform of all environmental policies, including those related to water resource management, forestry, air quality, and waste management systems. In 2016, as part of this reform process, Georgia adopted a national strategy and action plan for waste management that established key policy directions and targets for the country. Specifically, the plan aims to increase the recycling rates for plastic, glass, paper, and metals to 80% and 90%, respectively, by 2030.

In an effort to minimize the negative environmental impacts of single-use plastics, Georgia has also banned the production and sale of non-degradable plastic bags in April 2019. Additionally, the country has made a move to close illegal and unsafe landfills, thus since 2013 the state-owned waste management company has closed down 23 such sites and rehabilitated 31.

Looking beyond traditional waste management practices, Georgia is now moving towards the circular economy model, which involves the introduction of extended producer responsibility (EPR) policies across various sectors of the economy. While the country's waste management code and national action plan for waste management have already included provisions for EPR implementation, further steps were taken to introduce such schemes across the economy.

Manufacturers and legal entities who place products onto the market are responsible to ensure the reduction of the negative environmental impacts that may follow the production and use of the products and their waste recovery or disposal. Extended Producer Responsibility is a new concept for Georgia and its introduction requires a relevant legal framework and proper awareness of the public and private sector.

There is a functioning institutional framework in the area of waste management which differentiates between the following functions: policy maker (Parliament of Georgia), planner and regulator (Ministry of Environment Protection and Agriculture), service provider (JSC "Cleaning and Beautification service of Dusheti Municipality) and financial role (Municipality).

- Availability of resources (national/international) implementation of the plans:
  - ▷ There is a shortage of national resources for the implementation of the plans. The financial sources identified in the Waste Man-



agement Action Plan for activities on the management of biodegradable waste are donor assistance. However, there are good possibilities for international cooperation (cooperation programs opened for Georgia).

- Possibility for international cooperation (cooperation programs opened for Georgia)
  - ▷ There are favourable conditions for cooperation with international donors and financial institutions. Such donors as EU Delegation, GIZ, GEF, etc. are active in the country,
- Conditions for engagement of NGOs, businesses and other stakeholders
  - ▷ In general, the conditions for engagement of NGOs and other stakeholders are favourable. There are examples of projects and initiatives in the area of waste management with the engagement of different stakeholders on both local and national levels.
- Stakeholder awareness and engagement
  - ▷ In general, the awareness of key stakeholders on the separate collection of waste and composting of organic waste is quite low.

# V. CASE STUDIES GE/BY

## A) CASE STUDIES FROM BELARUS

### CASE STUDY 1: PILOT INTRODUCTION OF BIODEGRADABLE WASTE COMPOSTING IN MOSTY DISTRICT OF GRODNO OBLAST (BELARUS)

Mosty district is located in the western part of the Grodno region. The district includes 6 village councils, 154 settlements, where 27 031 people live (2021). The rural population in Mosty is equal to 15 197 individuals.

The pilot introduction of biodegradable waste composting was fulfilled in the framework of the EU/UNDP project "Promoting the development of a comprehensive framework for international cooperation in the field of environmental protection in the Republic of Belarus" in 2012-2014 years.

There were two main directions of work for handling biodegradable waste in Mosty city and its district. One direction is the prevention of biodegradable

waste generation in private households and the other – is the introduction of a separate collection and composting system.

## **PREVENTION OF BIODEGRADABLE WASTE GENERATION IN PRIVATE RESIDENTIAL AREAS**

For the collection and composting of biodegradable waste in private residential areas (private houses), 920 biocomposites with a volume of 600 Liters were purchased and transferred to households (Fig. 1). The practice of using

*Figure 1: Biocomposter for individual households, 600 Liters*



biocomposites is innovative not only for Belarus but also for European countries. It is now widely implemented in Lithuania, Latvia, and Estonia. The use of a bio-composter allows composting waste on the site, thereby reducing the amount of waste directed for landfilling.

Compared with the traditional compost heap, a biocomposter has a more convenient system for loading material for processing, ventilation holes and bottom doors for unloading the finished compost. Loading material for composting is carried out gradually. The ratio of heat and moisture is also important for the course of biodegradation processes. Properly installed, the composter does not emit an unpleasant odor and requires minimal maintenance (watering the material in dry weather, mixing once a month - it is important to provide fresh air for aerobic composting).

Compost is formed 5-6 weeks after the beginning of the process. Composters can be also used in winter, only the decomposition rate will be several times lower, and in addition to waste, it is necessary to have a substrate in the form of dry leaves or dry grass residues to regulate humidity.

A leaflet on how to use a biocomposter was prepared and provided to households along with signing the agreements on the provision of bio composters.

As a result of the monitoring and conversations with residents, it was found that the container is filled 2-3 times during the spring-autumn period, i.e. 1.2-1.8 m<sup>3</sup> from one personal plot. Thus, 1104-1656 m<sup>3</sup> of green waste per year was not taken to the landfill. According to the data from a random inspection of trucks that collect waste in areas of individual development, the amount of biodegradable waste has decreased by an average of 20-25%. The production of compost, which is used by the owners in private backyards as a fertilizer, averages about 200 kg of compost per container (Fig.2, 3).

Users of biocomposters give positive feedback about the use of this equipment. During the summer period of 2013, residents who received composters in the autumn 2012 got the first compost and applied it as fertilizer. In autumn, the composters were filled mainly with leaves and grass. In rare cases, the composter was used for kitchen waste, which is due to the insignificant generation among residents and the use of the generated waste mainly for feeding domestic animals.

Figure 2 and 3: Stages of obtaining compost from biodegradable waste: initial (left) and final (right)



## **INTRODUCTION OF A SEPARATE COLLECTION AND COMPOSTING SYSTEM OF BIODEGRADABLE WASTE**

Due to the large green areas in Mosty city during the spring and autumn seasons, an immense amount of biodegradable waste is generated in the public areas. The problem is especially acute in the spring and autumn seasons when a lot of work is being done to maintain territories. Until 2013, this waste was completely disposed of at the municipal landfill.

In 2013, a site for composting biodegradable waste in heaps was organized by the housing and communal services at the municipal landfill. For its maintenance, special equipment was purchased: a tractor with a bucket loader (dozer) for loading and unloading operations, a trailed turner for turning compost heaps, and a bucket screening for finalizing compost to a level that allows it to be used to cover layers of waste at a landfill or for biological reclamation territory. There was also a mobile shredder for wood and plant waste that was purchased. Branches from seasonal pruning of trees are chopped and

*Figure 4: Dozer for landfill management and biodegradable waste composting*



*Figure 5: Compost turner*



*Figure 6: Bucket Screening Crusher for Compost*



*Figure 7: Mobile crusher (chopper) for wood and plant waste*



taken to the composting site, leaves and plant residues from cleaning flower beds are also taken there. Shredded plant residues can also be used at the site for soil mulching and landscaping.

To collect food waste from multi-story residential buildings, containers for collecting biodegradable food waste were installed at 9 container sites as an experiment (Figure 8, 9).

As monitoring of the composition of waste entering the biowaste container showed, residents of multi-story buildings could not sort out biodegradable waste. Containers at the sites were mostly filled with ordinary mixed waste. The main challenge for the residents was to arrange the collection of organic

*Figure 8: Special containers for collecting biodegradable waste from multi-story buildings*



*Figure 9: Waste collection site with a container for collecting biodegradable waste*



waste in their apartments. Positive results in many European countries have been obtained only after the distribution of special small-closed containers to residents for direct use in the kitchen and subsequent removal to a large container. Such a measure was not undertaken in Mosty, and this initiative failed. The containers for biowaste were removed from container sites and the experiment stopped.

**Lessons learned:** It was the first attempt in Belarus to create a system for handling biodegradable waste. 1) The experience with the use of biocomposters in private houses can be considered a positive one. It is a sustainable solution for managing green and food waste produced in private houses which allows to significantly cut the amount of waste directed to landfilling. 2) Centralised composting of green waste from common places allows not only cutting the amount of waste going to landfilling but also producing compost for city landscaping. 3) Separate collection of organic waste from multi-story buildings ought to be supported not only with awareness raising how to sort organic waste but direct engagement in this activity by the provision of special containers suitable for apartment kitchens.

*Source of information: an interview with the representative of Mosty Housing and Utility Company, presentation materials from the workshops*

## CASE STUDY 2:

# ENGAGEMENT OF POPULATION IN PREVENTION AND ELIMINATION OF ILLEGAL DUMPS IN PUHOVICHY DISTRICT MINSK OBLAST

Puhovichy district is located in the southern-eastern part of the Minsk region. The district includes 6 village councils, 154 settlements, where 69 001 people live (2021). The urban population of the district is equal to 29 096 people with 20 592 people living in the district center Marjina Gorka. The rural population is equal to 39 905 people<sup>1</sup>.

The activities presented in this case study were fulfilled in the framework of the EU project "Strengthening Waste Management Services for the Rural Population of Puhovichy Rayon, Minsk Oblast" in 2016-2018 years.

The situation with municipal waste management in 2014-2015 in the Puhovichy district was the following: the majority of villages were only receiving a monthly collection service, at best-case scenario, while some villages were receiving no coverage. It was happening due to a lack of resources and low awareness amongst the rural population regarding the signing of waste collection agreements. Systems for the transfer, recycling and disposal of solid waste were unsatisfactory from the environmental, economic and financial points of view. Hazardous wastes produced by the district's population were not collected properly. In the first decade of 2000, around 70 so-called "mini-landfills" were created in the Puhovichy district for disposing of the wastes produced from the villages, but those had been gradually closed and no alternatives were provided. According to a social survey, 63% of citizens living in private houses were burning waste in their courtyards (thereby endangering their health), and 52% of citizens living in private houses did not have waste containers. Although around 50% of the waste produced from rural households was green waste, thus there was little or no composting. Illegal waste dumping was a serious problem.

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<sup>1</sup> [National Statistical Committee of the Republic of Belarus](#)



## COMBATING WITH ILLEGAL WASTE DUMPING

To combat illegal waste dumping special equipment was purchased and transferred to Puhovichy municipal housing and utility company (Unitary Enterprise "Zhilteposervice"). This equipment included 2 video cameras, a bulldozer (Fig.1), a crushing bucket (Fig.2) for bulky waste and a line for pressing PET bottles. The equipment was used for the liquidation of illegal waste dumps.

Figure 1: bulldozer



Figure 2: crushing bucket



To minimize illegal waste dumps, civil society was involved in monitoring illegal waste disposal by working in partnership with Puhovichy's local administration.

To monitor illegal waste dumps on the territory of Puhovichy District a social network page was established [https://vk.com/pukhavichy\\_waste](https://vk.com/pukhavichy_waste). The page was functioning as a platform where people could report waste dumps to Puhovichy's local administration. The key role in addressing this problem from the part of local administration was playing Puhovichy District Inspectorate of Natural Resources and Environmental Protection. The elimination of dumps was done by a municipal housing and utility company of the Puhovichy district.

There were 65 waste dumps reported and eliminated: 37 in 2017 and 28 in 2018. At the end of the project, the page had 200 followers. However, it shall be mentioned that citizens' engagement in monitoring via social networks could be only sustained if local authorities are addressing citizens' concerns. If they keep silent and illegal dumps are not liquidated, people will stop using the platform.

## **PROMOTION OF BIODEGRADABLE WASTE COMPOSTING AMONG THE LOCAL POPULATION**

To demonstrate composting practices to the local population seven schools in Puhovichy district were equipped with composters for organic and green waste. The composters were built and installed at schools by the Unitary Enterprise "Zhilteposervice".(Fig.1).

There were special trainings arranged to improve the knowledge of the key target groups on approaches to managing green wastes, namely owners of private houses and schools in rural areas. The trainings took place at schools that shared their experience on the arrangement of the process of composting organic waste as well as maintaining the territory of educational institution in line with environmental principles (for example, State Institution of Education "Ananichskiy learning – pedagogical complex children garden-secondary school", State Institution of Education "Maryinogorskaia Gimnasium") (Fig.2 Training). Participants were provided with brochures on composting waste (Fig. 3). Posters on composting were placed at schools, public places, and local trains (Fig. 4). To motivate schools to participate in the process there were several contests with prizes for winners arranged. Composting organic waste allows schools not only to manage their waste but also get a valuable fertilizer that they can use for landscaping territory and growing plants.



Figure 1: Composter



Figure 2: Training



Figure 3: Brochure on composting



Figure 4: Poster on composting



**Lessons learned:** 1) A waste collection company shall have sufficient capacities to manage illegal dumps. To minimize illegal waste dumps, civil society could be engaged in monitoring illegal waste disposal. 2) Schools could play a significant role in the dissemination of sustainable practices on waste management, namely composting organic waste among the local population. Composting organic waste allows schools to not only manage their waste but also get valuable fertilizer which they can use for landscaping territory and growing plants.

Source of information: <http://ecoproject.by>

## CASE STUDY 3:

# THE USAGE AND PROMOTION OF VERMICOMPOSTING IN THE Klichev DISTRICT OF MOGILEV OBLAST (BELARUS)

Vermicomposting is the process of obtaining organic fertilizer with the help of earthworms from biodegradable waste. Earthworms are placed on the substrate which in most cases consists of manure mixed in various proportions with other organic waste. Among biodegradable waste which can be added to the compost are old grass, leaves, twigs, and food waste. This method represents not only a way of reducing biodegradable waste placed in landfills, but also allows farmers to decrease their expenses on fertilizers and even earn.

*Figure 1. Example of vermicompost production in Belarus.*

Source of the photo: [ecoidea.me](http://ecoidea.me)



### 3.1. PRODUCTION OF VERMICOMPOSTING

Vermicomposting is widely used by farmers in Belarus to treat biodegradable waste and produce organic fertilizers. Some farmers have turned vermicomposting into a separate source of income, so they produce liquid humic fertilizers which contain all the nutrients that plants need, are safe for the environment and quickly "revitalize" plants. Experience has shown that they allow crops to ripen earlier, increasing their quantity and quality. One of the most vivid examples of vermicompost production and turning it into a business is a farm "Constanta Art" located in the Klichev district of Mogilev oblast.

The owner of the farm Victor Artemiev started its initiative by purchasing 1 kilogram of earthworms. He has always used organic products as food for the worms: weeds, haulm, potato peels, chicken manure mixed with straw,

and fallen leaves. The technology is simple: a layer of substrate with worms is covered with a layer of feed, which is added as it is processed. The worms rise for the next portion of food, leaving at the bottom a product of their life activity - biohumus. When the box is full, another box is placed on it, with a grid instead of the bottom: the worms rise higher, and the organic fertilizer, ready for use, remains in the bottom box. In this case, the worms themselves multiply quite intensively. Over the first winter, Victor obtained 15 kilograms of them.

*Figure 2. Production of vermicompost at "Constanta Art" farm, Belarus*



One kilogram of worm processes 1,5 kilos of biodegradable waste and produces the same amount of humus. The fertilizers obtained from worms are used directly on the farm. The territory of the farm spreads to four hectares where such crops as cucumber, garlic and onions are grown. Today a farm produces more fertilizers than they need and a surplus is proposed for sale in the neighbourhood.

The case of the farm shows the effectiveness of biodegradable waste treatment with the help of vermicomposting. As stated by the farm owner Victor Artemiev, from one ton of onion-seed it's possible to get up to 400 kg of green onion feathers for sale. At the same time, one ton of waste consisting of half-decayed bulbs, roots, and husks, is formed from the production of this scale. The problem is easily solved by feeding onion remnants to worms. Moreover, leaves from the city of Klichev are also transported to the farm and processed by the worms.

In terms of business, the usage of organic fertilizers allows to minimize the costs of crops growing. For example, produced humus is used as soil for greenhouses, which saves from \$ 1000 to \$ 3000 a year. Also, \$ 200 – 400 are saved from the refusal of disposal of plant waste services. This amount includes the order of special transport for the removal of waste and payment for its placement on specially designated sites. Another \$ 3000 a farm does



not spend on mineral fertilizers. Instead of mineral fertilizers, the farm uses biohumus diluted in water: the solution is prepared in special containers, with undecomposed debris removed from the surfaces and sand left at the bottom. The same solution is used to treat plant leaves against various diseases.

### **3.2 PROMOTION OF THE VERICOMPOSTING**

The farm “Constanta Art” is actively engaged in the popularisation of vermicomposting in the Klichev district. Among the activities can be mentioned cooperation with schools and media, participation in international projects, tours to the farm and even conducting the festival “Day of the Worm”.

The owner of the farm Victor Artemiev closely works with schools and invites them for free excursions where he explains the whole process of vermicom-

*Figure 3. Tour around the farm for pupils of the local school*



posting and usage of it for crops' growing. Students often come from rural territories, whose families have their own small plots of land. Some of them directly use the knowledge received at the farm and start composting biodegradable waste at their homes. At the farm, it's possible to purchase not only fertilizers but also worms. Although, the motivation to use vermicomposting lies not in the reduction of biodegradable waste, but in cost savings for fertilizers and increasing a harvest.

To attract more attention to the vermicomposting and organic waste treatment, the farm proposed an initiative of conducting the local festival "Day of the Worm". The goal of the festival is to explain the benefits of vermicomposting to different target audiences: from pupils to rural populations and farmers. Local authorities and businesses also support and visit the festival. The activities of the festival include the big clean-up by pupils including green waste, lectures on composting and organic farming, presentations of educational stands about environmental projects by students of agricultural colleges and schools and a small market of local goods and food.

Figure 4. Festival "Day of the Worm"



In 2017, the farm also became a partner of the "Vermicontainer to Every House" program to participate in the main competition of local initiatives in the framework of the EU/UNDP international technical assistance project "Promotion of local development in the Republic of Belarus". As a partner, the farm provided 100 kilograms of breeding stock of red Californian worms for School №2 of the city of Klichev and the population. At the school territory, 10 vermicontainers filled with organic waste and populated with red Californian worms were installed. In addition, more than 150 containers were given to households of interested residents in Klichev. Most of the project participants, who received free containers and substrate with worms, are now actively using organic fertilizers in their gardens.

Thanks to the farm initiatives, the awareness of the district population about biodegradable waste and its ways of treatment is considerably high and residents actively use vermicomposting at their homes.

## CASE STUDY 4:

# PRODUCTION OF ENERGY FROM FOOD WASTE AT BREST WASTE PROCESSING PLANT (BELARUS)

Brest is a city in the southwest of Belarus, the administrative center of the Brest region and the Brest district. As of January 1, 2021, the population of the city was 340 318 people.

Brest waste processing plant (BMPZ) is the first enterprise in Belarus that processes food waste into energy. Its main clients are legal entities that generate this waste in the course of their work: retail chains, catering points, plants and factories that produce food products.

Previously, such organics were buried at landfills, but when in 2012 BMPZ launched a line for its processing, legal entities had the opportunity to turn their "out-of-date food products" into energy - this is more sustainable in terms of waste management.

The plant receives food "raw materials" for processing not only from legal entities but also from ordinary Brest residents. The contents of the garbage containers of the townspeople are sent to the same enterprise, where the waste is sorted, recyclables are mechanically selected from them, and, separately, food waste. They make up about 30% of the total waste of citizens. For example, in 2015 the company produced 1.66 million cubic meters of biogas from organic waste.



**By burning biogas, the plant fully provides itself with electricity and heat. And this takes only a quarter of the amount of energy received. The rest is sold to the network of RUE "Brestenergo" as "green" energy.**

For the processing of food waste at the plant there are two special facilities - fermenters. These are huge sealed cylinders where raw materials are loaded, which are fermented in them and then methane is released.

Further, the gas is purified from sulfur in the gas scrubber. The filter material of this apparatus is inhabited by microorganisms consuming sulfur for their vital activity. At the next stage, moisture is separated from the biogas in the condensate shaft. Then the biogas accumulated in the reservoir passes through coal filters and finally enters the mini-thermal power plant (there are three of them on the territory of the plant), which burns it, turning it into energy. For a year, 11 thousand megawatt-hours of electricity are obtained in this way.

Figure 1: Fermenters, BMPZ



Figure 3: Mini-thermal power plant #2, BMPZ



Figure 2: Gasolders, BMPZ



There is no waste from processing food into energy. Even the mass that remains from food waste after the release of biogas - digested sludge - can be used as a fertilizer. However, there is a problem using digested sludge from BMPZ as they contain a lot of pollutants (glass, metal items, batteries, etc.) if raw materials come from mixed municipal waste.

To get good quality fertilizers it is necessary to get organic waste collected separately. In this regard there was an experiment done in Brest: at one of the container sites, in addition to standard bins for glass, paper and plastic, containers for several more types of waste, including biological ones were placed. The result - in three months, 5.28 cubic meters of food waste were collected at this site, that is, 22 full containers of 240 Liters each. The experiment showed that collecting organic waste separately is possible.

BMPZ is now preparing for the installation of containers for a separate collection of biowaste in some quarters of Brest city. There is a plan to install special containers of 240 Liters in some districts with private houses and in housing cooperatives having good management. Therefore, a special awareness-raising campaign will be organized for citizens.

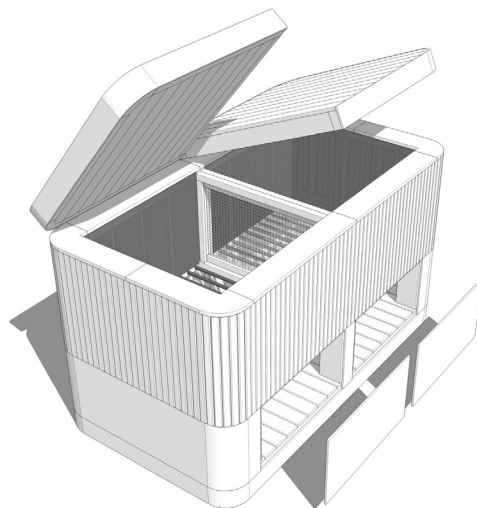
**Lessons learned:** Recycling food waste with the use of fermentation technology producing biogas allows people to significantly reduce the amount of landfilled waste as well as to get “green” energy and fertilizers. It is important to get organic waste for fermentation without any pollutants which could be achieved by separate collection of organic waste from the population.

*Source of information: <https://bmpz.by/edinstvennyj-v-strane-kak-brestskij-zavod-prevrashhaet-produkty-iz-magazinov-i-restoranov-v-energiyu/>; <https://bmpz.by/>; interview with a representative of BMPZ*

## CASE STUDY 5:

# PILOT INSTALLATION AND USAGE OF VERMICOMPOSTER IN MINSK (BELARUS)

The initiative “Ezhy Vezha” has started as a pilot project for the installation of a city vermicomposter. It started with the idea of eco-volunteers that participated in the “Social Weekend” contest and received support. The project aims at the popularisation of vermicomposting and encouraging the population to install vermicomposters at their homes and treat organic waste in sustainable ways.



Vermicomposter was custom designed and constructed for placing around 10 kilos of worms. Size of the composter is 1720×760×1300 mm. It was placed in the popular hub with cafes in Minsk to involve them in composting food waste. The team of “Ezhy Vezha” established a system of worms’ feeding: only



authorized food donors can bring food waste and put it in a container. This rule was necessary to guarantee the safety of the worm population and the successful completion of the experiment because some of the waste can be dangerous to ringworms.

**Initiative has allowed the team to accomplish two tasks:**

1. Make the composters integrate into the urban landscapes. Essentially, organic waste is not garbage, but a precious resource.
2. Show the city residents that organic waste decomposition can be effective and without odor.

*Opening of vermicomposter in Minsk*



The essential element of the experiment was conducting educational events and lectures about vermicomposting. The “Ezhy Vezha” team travelled all around Belarus with seminars to popularise vermicomposting. The great result was achieved in Korma, a small town in the Gomel district. After the seminar few institutions including schools purchased vermicomposters.

In November 2021, “Ezhy Vezha” decided to stop their activities in Minsk because of the difficult political situation in the country. They announced an open call for organizations or institutions to adopt the vermicomposter. As a result, it was placed at the editorial office of the local newspaper in Korma, Gomel region, which shares the territory with the school and kindergarten. Therefore, children will also be able to take care of it. Korma has also set up a separate space for the training center, where they organize excursions for children and introduce them to vermicomposting.

Sources: [http://dbaju.by/ru/2021-06-25-prajekt\\_vermikampostyng](http://dbaju.by/ru/2021-06-25-prajekt_vermikampostyng)  
[http://dbaju.by/ru/2021-06-16-ezhy-vezha\\_zapusk-2](http://dbaju.by/ru/2021-06-16-ezhy-vezha_zapusk-2)

## CASE STUDY 6:

# FOOD BANK “PISCHA”: FROM PILOT INITIATIVE TO A FULL-SCALE PROJECT

The main idea of the food bank is the redistribution of food that is formed in the trade organizations and producers for reasons not related to food unsuitability such as damaged packaging, non-commodity appearance, and inability to sell. Food is distributed to people in need.

The objective of the food bank is to prevent the spoiling of good food by redistributing it to socially unprotected categories of the population (homeless people, families with more than two children, the elderly, orphanages and other social institutions).

The food bank “PISCHA” in Belarus was mainly inspired by the German food bank “Tafel”. One of Germany's largest volunteer-based organizations, Tafel is supported primarily by private donations, with a small number of initiatives receiving official funding. Only donated food and other bare essentials of life are distributed by the Tafel food banks. There are no extra purchases made. Donations from private sector donors and sponsors cover the costs of each food bank's rent, transportation, and administration.

Over 940 nonprofit Tafel locations work in Germany. More than 1.6 million people receive food assistance from Tafel food banks across the nation, and about 500,000 of those people are children and youth. The Tafel network has around 60,000 volunteers. The regional Tafel food banks offer a variety of work models. Some of them only distribute food. Others donate hot meals, and clothing, or provide social work and counselling.



According to various estimates, without taking into account the shadow disposal of expired products, legal entities in Belarus throw away about 50 thousand tons of expired food. One wholesale fruit and vegetable warehouse

can throw away up to 450 tons of spoiled fruit and vegetables per month. Food products and leftovers were illegally dumped in the landfill. The legal method of disposal - transferring to specialized organizations for biogas production, land reclamation, and composting - was more expensive.

The food bank in Minsk started from a pilot initiative at the end of 2018. One of the food stores donated small packs of food before the expiration date. Project participants came to pick up the products from the hypermarket when the food was ready. These products were test samples of products that marketers used to study the demand. These were unopened pieces of food from various food segments: groceries, cereals, bakery products, sausages and cheeses, canned foods, and beverages. Previously, they were sent for recycling. Working in this format, it was possible to distribute one or two carts every two months.

Later, cooperation with Social Service Centres was established to reach socially vulnerable families and distribute food to them. One more initiative that was tested – leftover food was collected from people and redistributed. Any person in need could come and take a set of groceries for themselves. For this purpose, it was necessary to present documents confirming one's membership in a socially vulnerable group (certificate of disability, certificate of having many children). Though, this required a lot of human and other resources, thus this practice was stopped soon.

**The pilot initiative allowed people to gather experience for future food bank “PISCHA”. Its accomplishment was done according to the following steps:**

1. Legal consulting about the possibility of the existence of a food bank in terms of tax and sanitary legislation. In this matter, Belarus has limited opportunities to legally transfer food, only within the framework of Ordinance No. 300, "On providing donation (Sponsorship) assistance". This means that a food bank “PISCHA” can work only with organizations whose purpose is to provide social assistance to low-income citizens (such a purpose must be contained in the charter of a non-profit organization that is a recipient of aid).
2. Elaboration of a set of documents for transferring food. When providing sponsorship aid, it is necessary to sign an agreement, which specifies the purpose and procedure for the recipient of aid. The transfer of goods is carried out by writing out the bill of lading, which serves as the basis for writing off the goods from the sponsor and crediting it at the recipient's warehouse. When accepting goods, the recipient must check the quality, quantity and assortment of goods for compliance with the list in the contract and with respect to their shelf life. For the food bank “PISCHA” the essential point for consideration in work was the norms of consumer protection or sanitary and epidemiological norms for organizations selling food products that do not apply to the transfer of sponsorship. Some other documents need to be elaborated and collected.
3. Search for organisations-sponsors that are ready to transfer food on regularly. The food bank “PISCHA” faced problems at this stage because the retail network and producers had no motivation to formally transfer food for donations because this did not exempt them from tax obligations.

Existing disposal schemes in Belarus are currently financially more profitable. It is easier to cooperate on this matter with international retail networks that already have experience in donating food, as was advised by Tafel consultants (Germany). Thus, “PISCHA” signed a contract with “PepsiCo” company.

4. Transfer of food to social organizations and people in need. “PISCHA” re-distributed more than 3 tons of child puree, 4726 packs of juice and other goods. At this stage, the food bank needs to already have treaties with organizations-recipients of goods.

**The work of the food bank “PISCHA” has allowed to prepare recommendations for its successful functioning:**

- the launch of a food bank is essential to start with an assessment of the current situation:
  - ▷ Data on food leftover and what can be distributed to people in need;
  - ▷ Legal ways to transfer food;
  - ▷ Organizations-recipients willing to accept food;
  - ▷ Partners willing to donate food;
  - ▷ Categories of products that are possible to distribute due to technical reasons: for example, without refrigerators, it is impossible to accept perishable or frozen foods, processed food, etc.
  - ▷ Scheme of logistics for different types of food and scale of the batch;
- have a team for a food bank and volunteers for helping in loading, unloading and shipment of products at the rate of one person per 100 kg of food.
- for large batches of products, it’s better to organize a direct transfer from the sponsoring organization to the recipient organization or have a room for storage followed by the distribution of products.



**Apart from food distribution, a food bank “PISCHA” was engaged in raising awareness among the population about ways of reducing food leftovers and waste by launching information campaigns on social media and giving lectures to the general public.**

Besides the food bank, in some cities of Belarus, there is a movement of food sharing when people voluntarily unite into groups on social media and post messages about food, they are ready to give away. This movement has been successfully functioning for more than 10 years.

**TREATMENT OF BIODEGRADABLE WASTE IN BELARUS: ATTITUDE OF HOUSEHOLDS AND FARMERS**

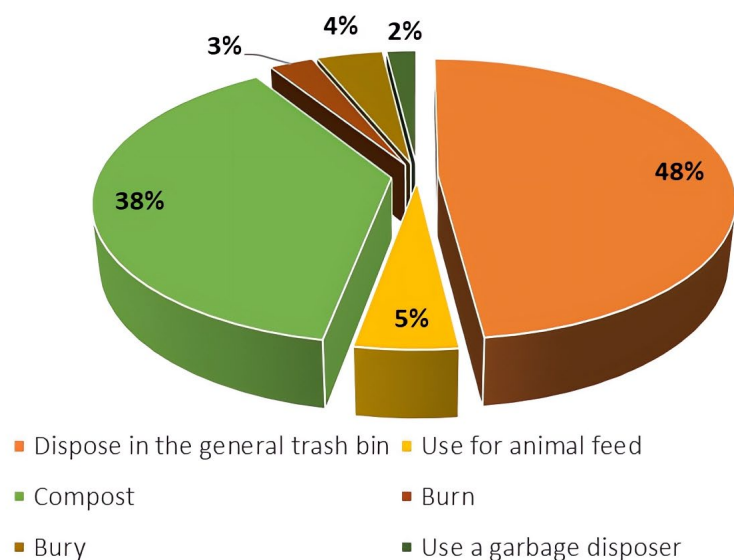
Awareness of the Belarussian population about the possibilities of biodegradable waste treatment remains low in general, but considerably high among

farmers and village residents. For city citizens main obstacles are related to the lack of an organized and approachable system for biodegradable waste collection in the city districts and limited information about alternatives that can be used for biodegradable waste treatment.

In April 2023, a survey about biodegradable waste treatment was conducted among the population which included such audiences as small and large-scale farmers and households in the cities and countryside. In total, 209 answers were received that helped to assess the attitude of households and farmers towards biodegradable waste, as well as to analyse the usage of composting practices.

97% of respondents generate food waste which includes plate leftovers, spoiled food, peels, and seeds from fruits and vegetables. Green waste such as leaves and crop residues produce 44%, mostly farmers and village residents. 32% of respondents also have waste from wood: twigs, shavings, toothpicks and even sushi sticks. Animal manure produces 11,5 % of responders, mostly farmers.

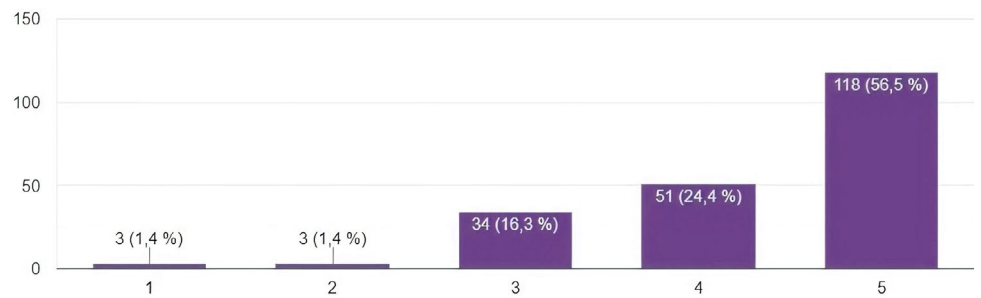
Figure 1. What do you do with the biodegradable waste you produce? (survey data)



87,7% of responders don't use any special equipment for composting and 12,3% compost with the help of vermifarms and containers designated for microorganisms.

More than 80% of responders stated that it's important for them to implement sustainable organic waste management practices

Figure 2. Responders' assessment of the importance of BWM (scale from 1 to 5)



## 1. EXPERIENCE OF CITY RESIDENTS IN BIODEGRADABLE WASTE TREATMENT

Most city residents throw food waste into the general trash bin with the belief that this is the only way to do it. As there is no system for collection and recycling in Belarus, city residents have limited alternatives for organic waste and need to be very motivated to implement them.

The most common way to handle organic waste for those who do not want to throw them in the general trash is collection and drying at home and taking organic waste to the summer houses for making compost. Organic waste is commonly placed on the top of a container with air-regulating holes. The organic composting material degrades and becomes compacted slowly as it gets down into the container, with the final ready compost collected from the bottom of the container. Households use the ready compost in their garden as a fertilizer.

Treatment of biodegradable waste is also possible within the cities and towns. Responders of the survey indicated three methods used for processing food waste on a daily basis:

### 1) Vermicomposter

Vermicomposting allows decomposing food waste directly at home, even in the apartment.

Containers for vermicomposting can be purchased or self-made. For a self-made container, it essentially needs to be non-transparent and must consist of two sections: the upper part where substrate and worms are placed and the bottom part for the collection of fertilizer. For air circulation, the upper part needs to have small holes up to 1-2 mm.

In an upper part of a container, a substrate is placed, which is often made from dry leaves, waste paper, sawdust, wipes, paper, egg trays, boxes or lowland turf. A substrate is needed to maintain stable conditions in the composter, to hold moisture and ensure air exchange. Californian or manure worms are added directly to the substrate. One kilo of worms can process up to 0,5 kilos of organic waste.

Among the inconveniences, responders stated that one average-size vermicomposter cannot handle the amount of organic waste generated at home and, partly, it is wasted in a general trash bin. Although, worms can process only certain kinds of organic waste: leftovers and peels of vegetables, fruits and berries, greens, leaves, paper, coffee grounds and tea brew. It's forbidden to feed worms with meat or fish leftovers, aromatic herbs, garlic, orange peels and some other products.



**In the capital city of Belarus, Minsk, there are also some initiatives for the collection and treatment of organic waste. Some of the responders indicated that they often gave their organic waste to the farmer, which he used in his vermiculture.**

In cities, organic waste containers are installed in private sectors. For example, in the city of Baranovichi, residents of the private sector can sign a contract with a waste collection company for the installation of a container (size 0,24 м3) for biodegradable waste.

## **2) Garbage disposer**

Disposer is a special device that is connected to the flush hole in the sink on one side, and on the other side - to the sewage collector. By its structure, the disposer is a chamber with a rotating disk inside. The food waste is flushed into the sink opening, falls on the rotating disc, under the influence of centrifugal force is thrown to the walls on which the special grates are located. Under pressure, the waste is shredded to a size that allows it to pass through the holes located on the edges of the disc. Then, together with the water, the resulting mixture is discharged into the sewage system. There are no knives in the dispenser, so the device is considered safe.

In Belarus, the usage of garbage disposal units is not widespread, though two responders of the conducted survey use them. Even though disposal can be seen as a solution for food waste minimization, the effectiveness highly depends on the state of city wastewater treatment plants. For example, in Minsk their condition is poor and if many people start using disposal without renovation of the wastewater treatment plant, it could cause serious problems.

When installing a disposal at home, it is better to contact the authorized institution to clarify the possibility of its usage and check national and regional legislation. In Belarus, this issue is not regulated by law.

## **3) Bokashi composting**

One more way that is used both by households and farmers is composting with the help of microorganisms, for example, bokashi. Preparations containing microorganisms are added to food and waste in a container. The microorganisms then recycle the contents into effective pure organic fertilizer. Waste fermented in 7 to 10 days can be used immediately as fertilizer, mixed with parts of soil.

## **2. EXPERIENCE OF FARMERS IN BIODEGRADABLE WASTE TREATMENT**

Overall, 18 farmers participated in the survey and all of them use composting at their farms. Commonly, farmers utilize the technology of compost pits without using any special equipment. Compost in the pit should be turned over regularly and can be applied in a year.

The method of “layers” was highly appreciated by Belarusian farmers. It involves stacking different types of biodegradable waste in layers: sawdust from under animals, grass, clay, cardboard, shredded branches, horse manure, leaves, shredded straw, turf and food waste. Some farmers combine in compost 1/3 of green and household waste, 2/3 of straw and dry waste including sawdust, small twigs, and pruning of ornamental plants.

## **B) SMALL-SCALE INITIATIVES AND COMMUNICATION ON WASTE MANAGEMENT IN GEORGIA**

Despite the growing awareness of the benefits of composting biodegradable municipal waste, there are currently no wide-scale initiatives in place. Instead, the responsibility largely falls on small-scale initiatives proposed by local NGOs as part of larger-scale projects. However, the country is taking steps to improve its waste management sector and align it with EU regulations. It's planned to introduce new approaches to biodegradable municipal waste, which could lead to more sustainable and efficient waste management practices in the future. These efforts may help to promote a shift towards more environmentally-friendly waste management practices and encourage wider adoption of composting initiatives.

### **COMPOSTING IN GEORGIA**

Composting is considered a best practice for managing biodegradable waste in Georgia due to its cost-effectiveness and environmental benefits. By diverting organic waste from landfills, composting reduces the amount of methane gas emitted during the decomposition process, which is a potent greenhouse gas that contributes to climate change. Additionally, composting can improve soil quality and reduce the need for chemical fertilizers, which can have negative impacts on human health and the environment.



Despite the numerous individual initiatives promoting composting through both small and large-scale projects, Georgia has yet to adopt a unified approach to municipal or regional composting practices. The lack of a coordinated approach limits the scalability and impact of composting initiatives in the country and hinders their potential to reduce waste and mitigate environmental impacts.



**To address this issue, the government has introduced goals that manage composting, although it is needed to issue incentives that encourage composting practices and support their implementation at the municipal and regional levels. Such measures could include providing funding for composting infrastructure and educational campaigns to raise awareness about the benefits of composting. Additionally, the government could promote the development of public-private partnerships that leverage the expertise and resources of both sectors to scale up composting initiatives.**

Composting is a promising solution for managing biodegradable waste in Georgia, but the lack of a coordinated approach to composting practices limits their impact and scalability. To discover the full potential of composting, the government should take a more active role in promoting and supporting composting practices on a municipal and regional level and encourage public-private partnerships to develop innovative solutions to this pressing environmental issue.

## **VERMICOMPOSTING IN GEORGIA**

Vermicomposting, a process that uses earthworms to convert organic waste into nutrient-rich soil amendments, is a relatively new practice in Georgia. Despite the limited adoption of this technology, successful examples can be found in the country. Among such examples can be mentioned Macro Prime, a company that specializes in producing bio hummus from manure through



a complex vermicomposting operation. The company offers a range of fertilizers in solid, liquid, and powder forms, which have gained popularity due to their effectiveness and environmental benefits.

*Pictured: Variety of products produced in the facility, including liquid, hard and powdered fertilizer*



However, the success of Macro Prime and other vermicomposting initiatives in Georgia is hindered by various challenges. The inconsistent supply of manure is a significant issue, as it directly affects the production of biohumus. The lack of a steady supply of manure results in dwindling production, making it difficult for businesses to meet demand. Additionally, factors outside the producer's control can further impact production. For instance, the manure may contain anti-parasitic medications, which can harm the earthworms and affect the quality of the compost. The pH levels of water used in the vermicomposting process can also affect the outcome, as optimal pH levels are necessary for the growth and health of earthworms.

These challenges facing vermicomposting businesses in Georgia can be solved through various strategies. For instance, businesses can explore alternative sources of organic waste, such as food waste, to supplement the supply of manure. The use of organic waste can also help address the issue of inconsistent manure quality, as it is less likely to be contaminated with medications or other harmful substances. Additionally, businesses can implement measures to control water pH levels and maintain optimal conditions for earthworm growth, such as using specialized filters or pH monitoring equipment.

While vermicomposting is a promising technology for sustainable waste management in Georgia, there are significant challenges facing businesses in this field. Addressing these challenges will require a combination of innovative solutions, such as alternative waste sources, and the adoption of best practices to ensure optimal conditions for vermicomposting, which are related to higher costs than initiatives focusing on simple composters.



These campaigns can also provide information on the benefits of adopting sustainable waste management practices such as composting, recycling, and waste reduction. In addition, communication can facilitate dialogue between the public and private sectors, leading to collaboration and joint efforts to address waste management issues. Effective communication can enable stakeholders to share knowledge and resources, identify and resolve issues, and build trust and commitment.

Moreover, communication can encourage behaviour change by providing incentives and rewards for adopting sustainable waste management practices. For instance, governments can offer tax incentives or subsidies to companies that adopt environmentally-friendly waste management practices or provide public recognition for businesses that reduce their waste footprint. Communication can serve as a means of monitoring and evaluation, allowing stakeholders to track progress, identify challenges, and adjust strategies as needed. Regular communication and feedback mechanisms can help ensure that waste management initiatives are effective and sustainable.

## **METHODOLOGY**

**To raise awareness of biodegradable municipal waste throughout Georgia, several effective communication strategies have been used successfully:**

- Use of personalized messaging that is specific to each region and community to make people feel like they are part of the solution.
- Use clear and simple language in Georgian to ensure that everyone can understand the message.
- Use of visual support such as infographics, videos, and images that are culturally relevant to the people in each region to help them visualize the problem and the solution. This can make the message more engaging and memorable.
- Use of social media platforms that are popular on a local level in each region, to reach a broader audience. Use hashtags in Georgian to make the message more visible and shareable.
- Engagement of the local community in each region by organizing events such as clean-up campaigns or workshops on waste management to help people understand the problem and the solution better and create a sense of ownership.

Several effective communication campaigns have been conducted in Georgia, utilizing the methodology described above. While not focusing only on biodegradable waste, the public perception of the communication has been overwhelmingly positive.

## **EXAMPLES**

To achieve a higher understanding of sustainable management of waste (including different streams, which fall under EPR), various communication materials were produced, including infographics, fact sheets, educational movies/videos, publications, etc.



# VI. CONCLUSIONS

1. At present the waste management practices of Dusheti municipality are far from being sustainable. Municipal waste is collected and landfilled at the municipal landfill. There is no system for collecting recyclables.
2. Waste collection and removal services are provided to 91 settlements of the municipality (one city, two townships, 88 villages - a total of 18,282 people) as well as to 90% of commercial facilities in the municipality.
3. There is no organized system of collection and treatment of biodegradable waste neither in Dusheti municipality nor in Georgia. Biodegradable waste is disposed of in landfills and constitutes more than half of municipal waste. Biodegradable waste includes kitchen, garden and park waste, paper and other similar wastes, which are a source of gas emissions and wastewater from landfills.
4. There are examples of separate initiatives (projects) for biodegradable waste collection and processing. Composting enterprises are arranged in the city of Tbilisi, the city of Kutaisi and in the municipalities of Marneuli, whose capacities are small. It is necessary to create and introduce modern biodegradable waste management systems in the country.
5. The awareness of key stakeholders on the separate collection of waste and composting of organic waste is very low and needs to be handled.

6. Target 12.3.1: there is no data on the achievement of the target. There is no data on the generation and recycling of food waste. Food waste composes a significant part of municipal waste and there are good examples of actions, such as the establishment of a food bank to reduce generation of food waste with active involvement of the food production industry. It is efficient not only from an environmental point of view but also socially responsible as it generates sources of cheap food for people in need.
7. Target 12.5.1: there is no information on the achievement of the indicator of the target in Georgia.
8. There is a comprehensive strategic framework on waste management adopted in Georgia which consists of the Waste Management Code of Georgia, the National Waste Management Strategy 2016-2030 and the National Waste Management Action Plan. Regarding the management of biodegradable waste, the country is committed to preparing and implementing measures aimed at reducing the amount of biodegradable waste disposed of in landfills, to develop legislative initiatives and other practical programs that ensure the perfection of the biodegradable waste management system in the country.
9. In Dusheti municipality a municipal waste management plan was developed and waste management priorities were identified among which was the introduction of separate collection of municipal waste in 2024. It is also planned to start composting biodegradable waste in households and some villages. Targets at municipal and country level.
10. There is a functioning institutional framework that differentiates between the following functions: policy maker (Parliament of Georgia), planner and regulator (Ministry of Environment Protection and Agriculture), service provider (JSC "Cleaning and beautification service of Dusheti Municipality) and financial role (Municipality),
11. There is a shortage of national resources for the implementation of the plans. The financial sources identified in the Waste Management Action Plan for activities on the management of biodegradable waste are donor assistance. However, there are good opportunities for international cooperation (cooperation programs opened for Georgia).

# VII. RECOMMENDATIONS

12. To assess the amount of biodegradable waste generated in the municipality. Assessing the amounts is the first step and relies on waste composition analysis and “surveys on the ground”. Composition analysis requires setting up a team, choosing a paved and ventilated location with adequate lighting, setting the time period and the sampling criteria: seasonality, type of housing, and socioeconomic class, among other steps. As a rule, biodegradable waste includes a mixture of both cooked and raw leftovers from households, restaurants, hotels and shopping malls; leaves, branches and grasses from the maintenance of squares and gardens; fruits and vegetables leftovers from markets.
13. To select options for the management of biodegradable waste. The first thought of a destination for organic waste will probably be an engineered landfill because it is considered an environmentally safe facility. However, it is important to point out that landfills are the third anthropogenic source of methane, and the decomposition of one tonne of organic waste in the landfill, results in the following emissions: landfills without collection of landfill gas - 47 kg CH<sub>4</sub>/tonne, with collection - 33 kg CH<sub>4</sub>/tonne<sup>2</sup>.

## **Other technologies with more valuable treatment:**

- **Composting** – a biological process that converts municipal organic waste into a valuable solid organic fertilizer that complies with legal compost standards. Emission of methane - 3 kg CH<sub>4</sub>/tonne.
- **Anaerobic Digestion** – decomposition of biodegradable materials under controlled anaerobic conditions. Aims to recover a “biogas” suitable for being further exploited for renewable electrical power generation and heating requirements for the treatment facility. Emission of methane - 2,3 kg CH<sub>4</sub>/tonne.
- **Mechanical biological treatment (MBT)** - integration of a wide range of techniques for processing MSW, including the recovery of dry recycla-

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<sup>2</sup>Roadmap for recycling of organic waste. Climate&CleanAir Coalition, 2016



<sup>3</sup> [Solid Waste Emissions Estimation Tool \(SWEET\)](#)



bles within the mixed amount. The biological treatment phase of MBT can be either aerobic, with a compost-like product, or anaerobic with biogas production. Low Tech (Capex): 13 kg CH<sub>4</sub>/tonne, High Tech (Capex): 9 kg CH<sub>4</sub>/tonne, High Tech with Anaerobic Digestion: 3 kg CH<sub>4</sub>/tonne.

There are special tools available to calculate CO<sub>2</sub> emissions from different waste management options. One example is Solid Waste Emissions Estimation Tool (SWEET) | Municipal Solid Waste Knowledge Platform (ccacoalition.org)<sup>3</sup> can support the city in estimating the emissions from the MSW sector and comparing the emissions reduction benefits of different waste management scenarios, with graphics and tables.

Starting from the basics can be the key to overall success in the long term. Managing a recycling or treatment process for organic waste can be more complex than assumed during the planning phase. Hence, a low-investment solution, relying on more labour-force may be the right option to start.

14. Most technologies for organic waste treatment are scalable, so it is possible to start by promoting home and community composting initiatives, which do not need costly infrastructure or facilities and rely mainly on the capacity to involve local communities and good technical support from educating, starting and tutoring the initiative. This “simple” approach works better in small communities and areas with limited availability of gardens or green spaces. Moreover, they enhance public acceptance of larger and more “industrial-scale” plants.
15. When diverting organic waste from disposal towards recycling, the importance of a clean “feedstock” becomes evident. Impurities affect the functioning of machinery at composting and anaerobic digestion facilities and raise the cost for disposing of rejects; they also reduce the amount of recycled outputs (i.e. compost and/ or biogas) and thus the revenues of the facility.
16. Awareness raising and engagement of civil society and population. Communication and awareness initiatives are generally more effective than local decision-makers may think.
  - ▷ Home-composting, separate collection of organic waste, among other intensive sorting schemes for other recyclables are running effectively in a large range of settlements and cities, worldwide. Involving the local community in recycling and separate collection gains benefits that go beyond environmental performances: reinforcing the sense of community, creating better living conditions in neighbourhoods, and thus reducing the footprint of human civilization on the global and local environment.
  - ▷ Promotions of sustainable consumption habits within the population such as the Zero Waste approach shall not be underestimated. This is the most efficient waste management option which shall be actively promoted among the society.
17. The following effective communication strategies on biodegradable waste could be recommended to apply in Georgia: personalized messaging, clear and simple language, visual support, social media and com-

munity engagement by organizing such events as clean-up campaigns or workshops on waste management.

18. Enhance the capacities of key stakeholders to manage biodegradable waste sustainably. Such stakeholders as waste collection companies, farmers and households living in private houses shall be trained on how to compost biodegradable waste. The knowledge of other technologies such as anaerobic digestion and MBT, their advantages and disadvantages are also important, especially for providers of waste collection services and farmers.
19. Representatives of the food industry shall be addressed with the issue of food waste reduction and informed about modern sustainable solutions for food waste reduction (for example, food banks, mobile app “Too Good to go”, etc.).
20. Assessment of financial needs and capabilities. Implementing recycling or treatment facilities for organic waste needs money as well as paying a gate fee for a public and/or privately-owned plant. Assess the current municipal budget for MSW management and evaluate if there is a need to raise revenues i to fulfil the demands for the improvements. A waste tax or fee is the basic instrument of every public service, and MSW management cannot be an exception. Define the current expenditure (for example in \$/person/month) and compare it to that of successful initiatives/municipalities or with other costs of living in the city, such as water, sewage, electricity, cable TV or public transportation.

# **VIII. PROPOSED PROJECTS FOR IMPLEMENTATION AT THE MUNICIPAL LEVEL**

1. Support for Dusheti municipality in establishing a system of sustainable management of biodegradable waste (attachment 2).
2. Reduction of food waste generation by planning and piloting sustainable solutions with the engagement of food system stakeholders (attachment 3).

# ATTACHMENT 1

## QUESTIONNAIRE ON BIODEGRADABLE WASTE

**What type of biodegradable waste is produced on your farm?**

- a. Food waste
- b. Green waste (leaves, grass, etc.)
- c. Animal manure
- d. Other (please specify)

**How do you currently dispose of the biodegradable waste produced on your farm?**

- a. Composting
- b. Landfilling
- c. Incineration
- d. Open dumping
- e. Other (please specify)

**How frequently do you dispose of biodegradable waste on your farm?**

- a. Daily
- b. Weekly
- c. Monthly
- d. Other (please specify)

**Do you use any specialized equipment for biodegradable waste management on your farm?**

- a. Yes
- b. No
- c. Not applicable

**How do you ensure that the biodegradable waste is properly managed and does not harm the environment?**

- a. Properly covering the waste to prevent odor
- b. Regularly turning waste to improve decomposition
- c. Controlling the moisture levels
- d. Other (please specify): \_\_\_\_\_

**Would you be interested in using alternative methods for biodegradable waste management, such as vermiculture or anaerobic digestion?**

- a. Yes
- b. No
- c. Need more information

**How important is it for you to implement sustainable practices for biodegradable waste management on your farm?**

- a. Very important
- b. Somewhat important
- c. Not important

**In your opinion, what changes to the current policy on biodegradable waste management would be most beneficial to farmers?**

- a. Increased funding for alternative waste management methods
- b. Implementation of strict regulations on waste disposal
- c. Technical assistance and training programs
- d. Other (please specify)

**Do you believe that the government should provide financial incentives for farmers who adopt sustainable biodegradable waste management practices?**

- a. Yes
- b. No
- c. Undecided

**How do you think the government can effectively enforce the regulations on biodegradable waste management for farmers?**

- a. Regular inspections and penalties for non-compliance
- b. Education and outreach programs
- c. Public-private partnerships
- d. Other (please specify)

**In your opinion, should there be a minimum standard for biodegradable waste management on farms, and if so, what should it entail?**

- a. Proper composting practices
- b. Minimizing the use of harmful chemicals
- c. Reducing waste generation
- d. Other (please specify)

**How do you think the government can involve farmers in the policy-making process for biodegradable waste management?**

- a. Consultation and feedback opportunities
- b. Representation in decision-making bodies
- c. Implementation of farmer-led initiatives
- d. Other (please specify)

