SOLID WASTE MANAGEMENT SYSTEM IN THE MUNICIPALITY OF CRIULENI: SITUATION ANALYSIS AND DEVELOPMENT SOLUTIONS

This document was produced within the project “Building a functional and sustainable waste management system in municipality of Criuleni” implemented by Caritas Slovakia and Caritas Czech Republic in Moldova with the financial support of SlovakAid.

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Acronyms and abbreviations

P.A.	Public Association
LPA	Local Public Authority
LC	Local Council
MSW	Municipal Solid Waste
GEF	Global Environment Facility
WG	Working Group
M.C.	Municipal Company
CP	Collection point
WMR	Waste Management Region
EU	European Union

1. Introduction

This document presents the analysis of the current municipal solid waste management system within the administrative boundaries of Criuleni town and proposes options to improve this system. This paper is necessary for development and implementation of the document for local planning in the sector: "*Solid waste management strategy in the town of Criuleni, for the period of 2022 - 2026*".

This document was developed within the project "*Building a functional and sustainable waste management system in the municipality of Criuleni*". This project is implemented by Caritas Slovakia and Caritas Czech Republic and is financially supported by the Slovak Agency for International Development Cooperation, SlovakAid.

The development of this document was determined by the need to increase the coverage and efficiency of the sanitation services by LPA Criuleni, and in particular the extent of solid waste recovery and reduction of quantities that require removal in accordance with the strategic objectives established at local, regional and national level, and was based on the following principles:

- Waste generation prevention (lifestyle, that involves generating less waste);
- Efficient solid waste collection system for the population of the territorial administrative unit;
- Recycling, reuse and treatment (recovery);
- Removal (storage) in safe conditions for the environment and human health.

The scope of the document is to analyse the current problems and propose options to improve the municipal solid waste management system in the town of Criuleni in accordance with national, regional and local legal and strategic framework. This process requires active participation of population, improvement of technical and municipal infrastructures and institutional organization.

The options for improving the municipal solid waste management system were developed in a participatory manner. Local councillors, representatives of public institutions in the community, entrepreneurs, the civil society, people in the community took part in this process.

2. Study development methodology

Analysis of the current municipal solid waste management system within the administrative boundaries of Criuleni town and proposing options for improving this system are based on participatory planning, which allows stakeholders to identify problems and ways to improve the system. This is done by setting investment priorities, taking into account the needs of the population regarding solid waste management and environmental protection.

Identification of the solid waste management system development in the town of Criuleni was made together with the development of the strategic document for the development of the given sector at territorial administrative unit level. During October-December 2021, the Solid Waste Management Strategy will be developed in the town of Criuleni for the period of 2022 - 2026. At the beginning of 2022, the strategy document is to be approved by the Criuleni Local Council.

The first step in planning activities to improve the solid waste management system by Criuleni LPA was to conduct the analysis of the current situation on how to manage waste in the territorial administrative unit (current infrastructure, storage sites, quantities of waste generated, etc.) and of the problems faced by the population in the process of solid waste management. The legal, institutional and strategic frameworks at district, regional and national level were also analysed.

The activity on the development of this document started on August 6, 2021, together with the contracting of the Czech consulting company GEOtest, a.s. On September 29, the Criuleni Local Council approved the local decision on the creation of the Working Group for the elaboration of the Solid Waste Management Strategy in the town of Criuleni for the period of 2022 - 2026. This working group includes members from Criuleni Local Council, of the local waste management operator (M.C. Comunservice), and of civil society.

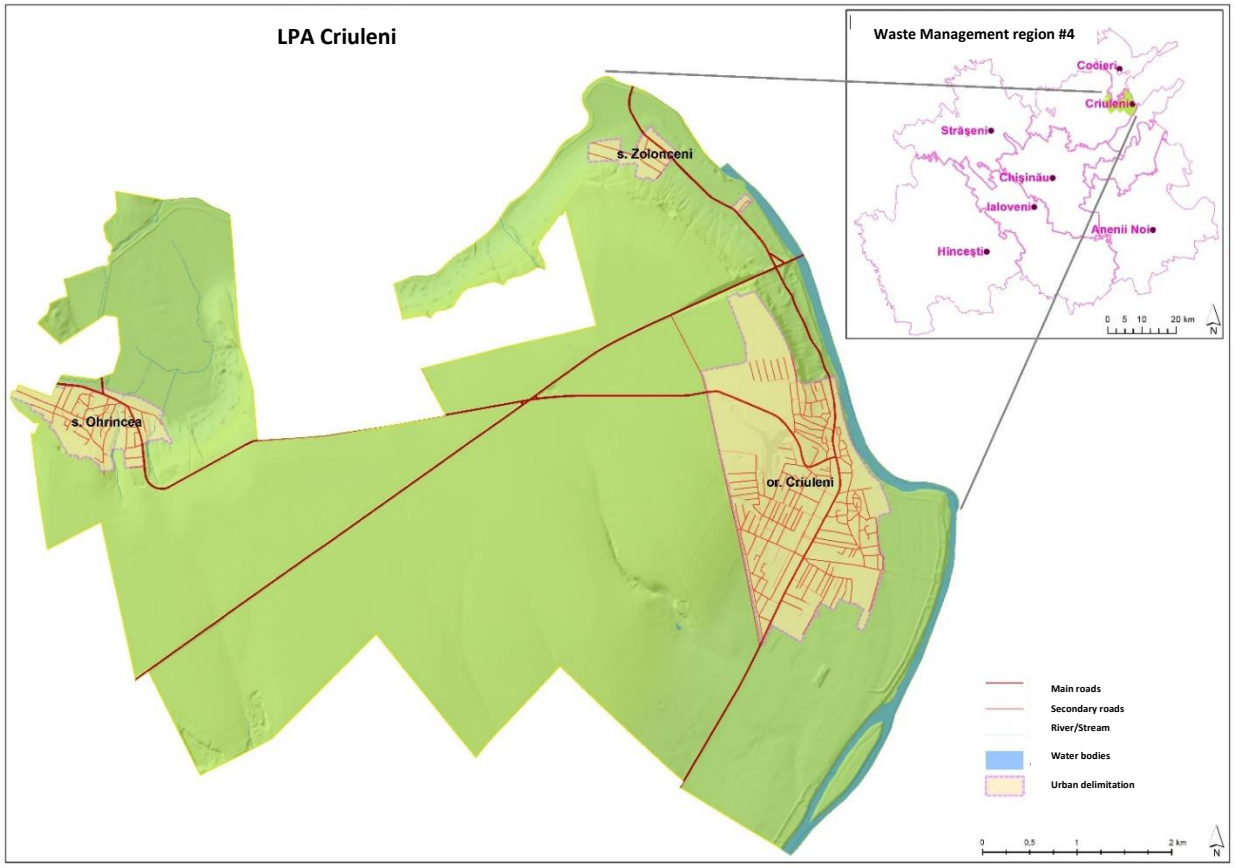
In order to develop options for creating an efficient municipal solid waste management system at the local level, several meetings were organized with the representatives of the Working Group. Different solutions for creating an efficient solid waste management system throughout the administrative territory of the town of Criuleni were discussed during these meetings. The proposals of the working group members were taken into account in the process of identifying ways to develop the municipal solid waste management system.

3. Current situation in the waste management sector

3.1. General data on the community and on demographic trends

The town of Criuleni is the regional centre of the district with the same name, located at a distance of about 40 km from the city of Chisinau. According to the national solid waste management strategy, the town of Criuleni is a part of the Waste Management Region No. 4 (Fig. 3-1). The administrative boundaries of the town of Criuleni include the town itself and two villages - Ohrincea and Zolonceni. The administrative area of the town of Criuleni is about 43.3 km^2, the area of the localities constitutes about 5.26 km^2. The road infrastructure of the localities includes 51 km of roads, of which 21 km of the asphalt and concrete roads, and 30 km of the gravel roads.

Figure 3-1: The Administrative map of the town of Criuleni



The population of the town of Criuleni lives mostly in private houses. There is a number of multi-storey blocks of flats in the residential area of the town of Criuleni. Within the administrative boundaries of the town of Criuleni there are 3,972 households, of which in the locality of Criuleni - 3,596, in the locality of Ohrincea - 296, in the locality of Zolonceni - 80.

According to the 2014 census, the town of Criuleni has 6,708 inhabitants (Table 3-1), with women making up almost 52 percent. The age group of the population between 18 and 64 years is 69.6%, and the age groups under 18 and over 64 years make up respectively 20.0% and 10.4%.

Table 3-1: Population present in the town of Criuleni (2014 census)

Total population	Women	Men	aged 0-17	18-64	65+
6,708	3,480	3,228	1,342	4,667	699
	51.88%	48.12%	20.01%	69.57%	10.42%

Source: Statistica.md

Taking into account the built-up area of localities (5.26 km^2), the average population density in the localities is 1,275 inhabitants/km^2. Within the administrative area of 43.3 km^2 the town of Criuleni has about 155 inhabitants/km^2. The average household in the locality consists of 2 people.

Comparing the population census data from 2004 and 2014, we observe that from 2004 to 2014 the population of the town of Criuleni decreased annually by about 1.96% (Tab. 3-2). If we extrapolate this decrease in population, then the current population in the town of Criuleni (year 2021) is 5,840 inhabitants, which is expected to decrease to 5,290 inhabitants by the year 2026 (Tab. 3-2).

Table 3-2: Estimated population data for the town of Criuleni

Administrative unit	Population (actual data)		Annual population fluctuation (2004-2014)	Population (projection)	
	2004 Census	2014 Census		2021	2026
the town of Criuleni	8,342	6,708	-1.96%	5,840	5,290

Source: statistica.md

According to the data of the Criuleni City Hal, 229 people benefit from social assistance. In the commune there are 408 people with disabilities, 7 families with 4 or more children (comprising about 50 people), 40 single-parent families (comprising about 80 people), 1,420 pensioners. 54 unemployed people are officially registered in the commune.

In the town of Criuleni there are 16 public institutions, which are shown in Table 3-3.

Table 3-3: Public institutions in the town of Criuleni

Name of the institution	Number
City Hall	1
Kindergartens	2
Schools	4
Library	1
Health Centre	1
Hospital	1
Post Office	1
Pharmacies	5
Total:	**16**

Source: Criuleni City Hall

There are 137 economic entities, including 76 shops, 14 catering establishments, 4 barber shops in the town of Criuleni. In addition, 320 peasant households operate on the administrative territory.

3.2. Solid waste generation and composition

LPA of the town of Criuleni is responsible for the management of municipal solid waste, that mainly comprises of household waste generated by the population, public institutions and economic entities.

By definition, municipal waste is waste from households and from commercial, industrial and administrative activities. In general, this includes: household waste from households; household-like waste from commercial, industrial and administrative activities; green waste from park and garden care; street waste from street cleaning; waste from markets; bulky waste (e.g., furniture, repair waste, etc.). Municipal waste also includes the following streams of special waste: hazardous household waste (e.g., pesticides); electrical and electronic waste; old batteries and accumulators.

Other wastes that are generated in large quantities in rural households are wastes from

agricultural activities, such as manure and crop residues. It is also necessary to develop certain actions for the management of this waste.

3.2.1. Generation of municipal solid waste

To estimate the amount of municipal solid waste generated in the town of Criuleni the following indicators were used: household waste generation in households - 0.7 kg/inhabitant per day; household-like waste generation (by commercial, industrial and administrative activities) - 25% of total household waste; green waste generation (care of gardens and parks) - 0.05 kg/inhabitant per day; bulky waste generation - 20% of total household and household-like waste; generation of street and market waste - 8% of total household waste. These indicators are used in feasibility studies developed for certain waste management regions in the Republic of Moldova.

Using the waste generation indicators described above, Tab. 3-4 shows the amount of municipal solid waste generated in the town of Criuleni for the years 2021-2026. Thus, at the moment (2021) the total amount of municipal solid waste is estimated at about 2,500 tons. The amount of waste given is estimated to decrease slightly over the next 5 years, associated with the population decrease projections shown in Tab. 3.2 above.

Depending on the economic development in the region, the amount of waste may fluctuate slightly, but it is clear that the solid waste management system for the coming years should have a management capacity of about 2,500 tons of waste per year.

Table 3-4: Generation of municipal solid waste in the town of Criuleni, years 2021-2026

Nr.	Waste category	Tons per year:					
		2021	2022	2023	2024	2025	2026
1.	Household waste	1.492	1.463	1.434	1.406	1.379	1.352
2.	Household-like waste	373	366	359	352	345	338
3.	Green waste (gardens and parks)	107	104	102	100	98	97
4.	Bulky waste	373	366	359	352	345	338
5.	Street and market waste	119	117	115	112	110	108
	Total:	**2.464**	**2.416**	**2.369**	**2.322**	**2.277**	**2.232**

From the above data (Tab. 3-4) it appears that one household (with an average of 2 members) in the town of Criuleni generates about 511 kg of household waste per year, which is 42.6 kg per month or 10.6 kg per week.

Tab. 3-4 describes the municipal waste to be collected and transported to the storage facility. At the same time, many households in the administrative boundaries of the town of Criuleni generate significant amounts of agricultural waste (especially manure). Significant amounts of animal manure are generated in households that raise animals in the yard. Knowing the number and species of animals present in the households of the town of Criuleni, one can estimate the amount of manure generated. Thus, taking into account the approximate amount generated by different animal species (namely cattle, pigs, sheep/goats, horses/mules/donkeys, poultry), it is estimated that annually in the town of Criuleni livestock generates about 1,800 tons (or 2,348 m^3) of manure, which is quite a large amount compared to the waste to be collected. This waste should not end up in the storage facility, although a visual analysis of the composition of the waste present at the garbage dumps of the Criuleni town and the Ohrincea village shows a significant amount of manure waste stored there. Special activities need to be carried out to significantly reduce the amount of this waste kept at the storage facility. This waste must be converted into fertiliser/compost and included in the agricultural circuit.

In addition to manure waste, significant amounts of other agricultural waste, such as crop residues from agricultural crops, also are accumulated in some households. Solutions must also be provided for other types of agricultural waste generated in households.

3.2.2. Composition of solid waste

In order to assess the composition of household waste generated in the town of Criuleni, the basic parameters on the morphological structure of waste were used. These parameters are described in the feasibility studies developed for certain waste management regions of the Republic of Moldova.

Parameters used to characterize the composition of household and household-like waste in the town of Criuleni, including the estimated amounts generated for the year 2021, are described below (Tab. 3-5). Thus, it can be noted that the main recyclable waste (plastic, paper/cardboard, glass, metals) constitutes about 608 tons annually or 33% of the total composition of household and household-like waste generated in households and as a result of the activity of institutions and economic entities in the town of Criuleni. Some of the recyclable waste is currently collected. This reduces the amount of such waste removed at the storage facility and reduces its environmental impact.

Table 3-5: Estimation of the composition of household and household-like waste generated in the town of Criuleni (year 2021)

Waste fraction	Household waste (%)	Household-like waste (%)	Household waste (tons)	Household-like waste (tons)	Total: (tons)
Plastic	10%	20%	149	75	**224**
Paper and cardboard	5%	40%	75	149	**224**
Glass (bottles and jars)	4%	10%	60	37	**97**
Metal	3%	5%	45	19	**63**
Textile	3%	8%	45	30	**75**
Organic	55%	7%	821	26	**847**
Other waste	20%	10%	298	37	**336**
Total:	**100%**	**100%**	**1,492**	**373**	**1,865**

3.3. Organization and provision of the sanitation service

3.3.1. Institutional organization in the provision of sanitation service

The municipal company Comunservice Criuleni manages the water supply and sewerage service in the town of Criuleni and offers sanitation services. Sanitation activities include: removal of solid (non-recyclable) waste from the population, institutions and economic entities; management/maintenance of the storage facility; sanitation activities on the territory of the town.

Recyclable waste is collected by the company Salubris Group SRL, based in the village of Porumbeni. This company has a collaboration agreement with LPA Criuleni. This agreement was signed on 1 April 2021 and is valid until the end of 2021. The company Salubris Group SRL collects (once a week) recyclable waste (plastic, cardboard, glass) free of charge, covering its collection costs from the price obtained from recyclable materials.

The staff of M.C. Comunservice Criuleni, directly involved in solid waste management, has 11 employees, including: garbage truck drivers - 2; tractor drivers - 2; porters - 6; foreman (organization of field activities) - 1 (0.5 working hours). The administrative staff partially involved (0.5 working time) includes: director - 1; customer acquisition service manager - 1; controllers - 3; chief accountant - 1; accountant - 2.

The waste removal service is provided to the population on the basis of a service contract signed by a head of a household with the M.C. Comunservice Criuleni. Rate approved by the Criuleni City Council is paid for this service. The rate for the waste removal service is 10 lei per month for the people, living in the private sector (private houses) and 7 lei per month for people, living in the communal sector (residential blocks). The cost/rate of the waste removal service is paid by the beneficiaries according to the invoice sent monthly by M.C. Comunservice Criuleni.

Also M.C. Comunservice Criuleni has service contracts (removal of household-like waste) with public institutions and economic entities. The rate is 120 lei per m^3 of removed waste. Also M.C. Comunservice Criuleni provides on request waste removal services by a tractor with trailer, but it does not execute many requests because of lack of equipment that may be involved in these additional works. The rate for solid waste collection and transport services on request is 257 lei for a trailer (4 m^3).

The rules for maintaining and ensuring cleanliness in the territory administered by the City Hall of Criuleni were approved by the Decision of the Criuleni City Council no. 5/8 of 29.08.2021.

3.3.2. Sanitation service coverage

Currently (October 2021), there are 1,998 service contracts (waste removal) with individuals living in the town of Criuleni and Zolonceni village. This service is not provided in Ohrincea village. According to these data, it can be estimated that only 70 percent of households have a contract with the M.C. Comunservice Criuleni for organized waste removal. Other households either transport the waste to the nearby storage facility on their own or use the existing service (collection points with containers) without paying for the service.

From the information above it appears that in 2021 only 70% of the population of the town of Criuleni, representing a number of about 2,920 out of a total of 5,840 inhabitants of the administrative unit, are connected to organized waste removal services.

Out of a total of about 140 economic/legal entities, 84 (60% of the total) have a solid waste removal service contract.

According to statistical data (statistica.md), in 2020 7,000 m^3 (or 2,310 tons) of municipal waste was collected, 4,200 m^3 (1,260 tons) from the population and 2,100 m^3 (630 tons) from institutions and economic entities. From the visual analysis of waste at garbage dumps and waste containers at collection points, it is important to mention that the waste collected includes a significant amount of agricultural waste. Due to this, it is difficult to determine exactly what percentage of municipal solid waste is collected.

According to estimated data, Salubris Group SRL per month collects about 5 tons of recyclables (1.33 tons of cardboard/paper, 2.33 tons of plastic, 1.33 tons of glass), which is 60 tons per year (16 tons of cardboard/paper, 28 tons of plastic, 16 tons of glass). Compared to the data in Tab. 3-5, it is estimated that currently about 10% of the recyclable waste generated (608 tons/year) are recovered.

3.3.3. Organization of solid waste collection, infrastructure/equipment used

Organized waste collection is done on the streets directly from households in sectors with private houses and from collection points (platforms with containers) which are dispensed in the central areas of localities in the town of Criuleni. The distribution of these collection points (CPs) within the administrative boundaries of the town of Criuleni is shown on the map in Fig. 3-2. The distribution of CPs on each locality is presented in annexes 1-3. Examples of CPs for non-recyclable and recyclable waste collection are shown in Figures 3-3 and 3-4. Each collection point is described in Annex 4.

Out of the total of 43 collection points (CPs), 3 CPs have no containers, 24 CPs have containers only for recyclables (4 m^3 mesh box or 1,100 litres yellow plastic container for plastic packaging and metal containers; 1,100 litres blue plastic container for cardboard and paper; 240 litres green plastic container for bottles/glass containers), 10 CPs have only containers for non-recyclable waste (700 litres metal containers), 6 CPs have both containers for recyclable and non-recyclable waste.

It is important to note that recycling CPs should not necessarily have all types of recycling containers. Thus, at the 30 CPs for the collection of recyclables there are: 9 mesh boxes of

about 4 m^3 and 20 1,100 litres yellow plastic containers for plastic packaging and metal containers; 9 1,100 litres blue plastic containers for cardboard and paper; 21 240 litres green plastic containers for glass bottles/containers. CPs for non-recyclable waste collection may have one or more containers. There are 38 700 litres metal containers at the 16 CPs where non-recyclable waste is collected, that is about 2 containers per collection point on average.

Figure 3-2: Map with the distribution of waste collection points and the location of garbage dumps, town of Criuleni

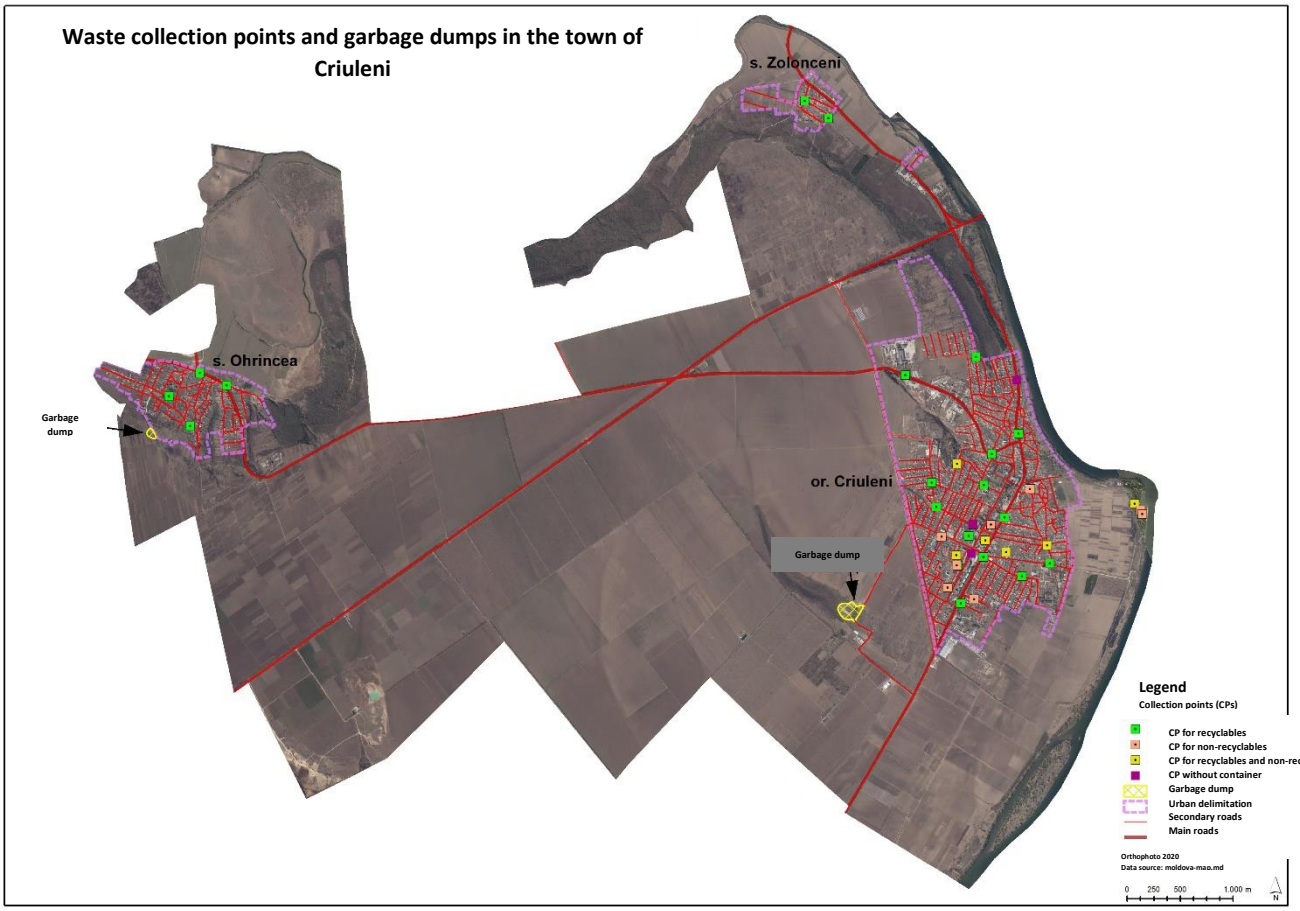


Figure 3-3: Examples of collection points for non-recyclable waste, town of Criuleni

Figure 3-4: Examples of collection points for recyclable waste, town of Criuleni

The problems observed at the waste collection points are related to: garbage around the containers due to non-timely collection of waste; presence of green and agricultural waste that should not be placed there; the metal containers are old and many of them are damaged; not all types of containers for recyclables collected are on each CP (see Figure 3-3, Figure 3-4, Appendix 4).

M.C. Comunservice Criuleni collects non-recyclable waste only from the town of Criuleni and Zolonceni village. Ohrincea village has no organised non-recyclable waste collection service.

M.C. Comunservice Criuleni collects non-recyclable waste from the CPs 3 times a week or more often. Salubris Group SRL collects recyclable waste from the CPs once a week.

In the territories with private houses in the town of Criuleni M.C. Comunservice Criuleni collects solid waste from households once a week (Figure 3-5). Households place waste packed in bags (or other containers) on the street on the day of collection, and workers load this waste into a GAZ truck with an open trailer. On certain streets with difficult access (where the GAZ truck cannot go) collection is done by tractor with a trailer.

Usually there are three workers involved in the removal of this waste: the driver of the truck/tractor, and two workers who load the waste into the trailer of the truck or tractor.

Figure 3-5: Garbage bags at the gates for waste collection from the gate

The equipment used by M.C. Comunservice Criuleni for waste collection is shown in Figure 3-6.

Figure 3-6: Equipment used for waste removal

GAZ garbage truck, 10 m^3

MAZ garbage truck, 13 m^3

GAZ truck with open trailer, approx. 10 m^3

Tractor with trailer, approx. 4 m^3

A GAZ compactor garbage truck with a capacity of about 10 m^3 is used for the collection of non-recyclable waste from the collection points. The vehicle has a side loading system, which can load 700 litres metal containers. A GAZ truck with open trailer (with a capacity of about 10m^3) is used to collect waste bags on the streets from households in the private sector (from private houses). Both the garbage truck and the truck with open trailer are very

worn (over 15 years old), and malfunction very often. When they malfunction, the tractor with a trailer is also used to collect non-recyclable waste from collection points with metal containers and from private sector households.

Recently, a MAZ compactor garbage truck with a capacity of about 13 m^3 was purchased. The vehicle is equipped with a rear loading system for standard containers (with a capacity of 1,100, 360, 240, 120 litres). This garbage truck cannot load 700 litres metal containers, and it is not currently in use.

The tractor with a trailer (capacity of about 4 m^3) is also used on private sector streets where the GAZ truck cannot go. The tractor is old but functional.

M.C. Comunservice Criuleni also owns certain equipment that can be used in sanitation activities when needed (see Figure 3-7).

Figure 3-7: Additional equipment used for sanitation activities

Tractor

Tractor trailer (1 axle)

Excavator

Tractor trailer (2 axles)

With regard to waste collection, the following observations can be made: the roads in some residential areas are narrow and damaged, being difficult to access by truck, and some are accessible only by tractor; the branches of multiple trees near the roads hinder the movement of the transport used for waste collection; the equipment currently used for waste collection and evaluation is outdated, requiring frequent and costly repairs.

The collection of recyclable waste from the collection points is done once a week by the private company Salubris Group SRL, which uses a compactor truck with a capacity of 12 m^3. Often people place non-recyclable waste in containers for recyclable one, making it difficult to recover recyclable materials. Due to the lack of containers for cardboard at many collection points, a lot of cardboard is placed under the open sky and is often affected by rain.

3.3.4. Waste removal (storage)

Within the administrative limits of the town of Criuleni there are two unauthorized garbage dumps used for waste storage (see the map in Fig. 3-2). (According to the data on the storage facilities on geoportal.md, the garbage dump near the town of Criuleni is marked as authorized.) Garbage dump 1 is located northeast of the town of Criuleni. It has an area of almost 3 ha and is about 1 km away from the residential sector. Garbage dump 2 is located North-East of Ohrincea, with an area of 0.5 ha, located at a distance of only 200 m from residential houses. Images from these garbage dumps are shown in Figure 3-8.

Figure 3-8: Garbage dumps within the administrative boundaries of the town of Criuleni

Garbage dump, the town of Criuleni (orthophoto, 2020)

Waste stored at the garbage dump, the town of Criuleni

Garbage dump, the village of Ohrincea (orthofoto, 2020)

Waste stored at the garbage dump, the village of Ohrincea

The garbage dump near the town of Criuleni is used by M.C. Comunservice Criuleni and the population of the Criuleni town and Zoloceni village for the storage of the generated waste. The access road (about 1 km) to the garbage dump is a dirt one, which is difficult to access, especially in rainy weather.

Due to the lack of organized non-recyclable waste collection service in Ohrincea village, the garbage dump near the locality is used by the population of Ohrincea village for individual storage of generated waste. The access road (about 200 m) to the garbage dump is a dirt and gravel one.

These garbage dumps are sites where the waste is placed without being covered with soil. From time to time the waste is moved with a bulldozer to make room for other waste. The storage of waste at these garbage dumps does not meet environmental standards. Fires often occur at these garbage dumps.

3.4. Expenditures and revenues from waste management activities

All works on waste management within the administrative boundaries of the town of Criuleni are made by M.C. Comunservice Criuleni. Given that M.C. Comunservice Criuleni provides water supply, sewerage, and other services, the annual financial data of the company do not allow us to determine exactly what are the expenditures only for municipal solid waste management services. In this context the direct costs of personnel, fuel, equipment maintenance and infrastructure maintenance related to these activities were identified in order to calculate the annual costs for municipal solid waste management activities. At the same time, for this calculation, half of the administrative costs were labelled to the activities of municipal solid waste management, considering that the other half belongs to the activities of water supply and sewerage. Thus, the annual expenditures for municipal solid waste management activities are described in Tab. 3-6.

Table 3-6: Municipal solid waste management expenditures, M.C. Comunservice Criuleni

#	Expenditures type	MDL\year	%
1	Administration and accounting staff expenditures (0.5 salary for 6 people)	249,195	20
2	Personnel expenditures in the field (1.0 salary for 10 people: 4 truck/tractor drivers, 6 porters)	618,056	49
3	Fuels and lubricants	251,400	20
4	Equipment maintenance	75,000	6
5	Infrastructure maintenance (storage facility, office, etc.)	60,300	5
	Total:	**1,253,951**	**100**

According to the data from Tab. 3-6, the total expenditures for municipal solid waste management are about 1.25 million lei, of which 40% are expenditures for the personnel directly involved in the waste collection and removal activities (truck/tractor drivers and porters), 20% - fuels and lubricants, 11% - maintenance of equipment and infrastructure, 20% - expenditures for administrative staff and accounting.

It is important to note that the maintenance expenditures of the equipment involved in waste management are not sufficient. Not enough resources are allocated to the care of the storage facility either. No expenditures are made for depreciation/replacement of obsolete equipment.

Considering that annually about 1,175 tons of household waste from population and of household-like waste from legal entities are removed, currently the cost per ton of removed waste is 1,069 lei.

Revenues from contracts for waste removal services for individuals (approx. 2,000 contracts) and legal entities (84 contracts) accumulated in 2019-2020 consisted of 424,327 MDL, including 189,447 MDL from individuals and 234,880 MDL from legal entities. This revenue covers only 34% of expenditure.

According to the above analysis, it appears that rates, especially those for the population, are not sufficient to cover solid municipal waste management expenditures. To cover the total expenditures of the current solid municipal waste management system, the rate for population (at the current level of contracting) must be 23 lei/person/month, and the rate for legal entities must be 280 lei for 1 m^3 of removed waste.

3.5. The waste management sector financing

Financing of the waste management sector in the town of Criuleni is done directly by LPA. The City Hall's budget supports current activities related to the arrangement and assumption of the territory, as well as the maintenance of the storage facility. These works are carried out through the M.C. Comunservice Criuleni.

The provision of waste removal services to individuals and legal entities is carried out by M.C. Comunservice Criuleni according to the rates. According to data presented by M.C. Comunservice Criuleni in 2019-2020, the revenues from legal entities for these services amounted to 234,880 lei, and from individuals - 189,447 lei.

A project on waste management "Partners for a Clean Environment - II" was funded by GEF (Global Environmental Facility) under the Small Grants Program 2020-2021. The total value of the project is 2.018 million lei, of which GEF offered 865,000 lei, and 1,153 million lei were accumulated from other sources. The project is implemented by Public Association "Everybody Contributes to Changes" (AO FCSP) in partnership with Criuleni City Hall. Under this project, 11 platforms with waste containers will be refurbished/reconstructed, containers for the platforms will be procured and separate collection will be promoted.

In 2021, funding of about 3.5 million lei (2.15 million for infrastructure) was obtained from SlovakAid for the project "Optimization of the Waste Management System in the town of Criuleni". The project is implemented by Caritas Slovakia and Caritas Czech Republic.

3.6. Sectoral planning

According to Article 14 of the Law on Local Public Administration 436/2006, local councils of level 1 can approve studies, projections and programmes of socio-economic development and other planning documents.

In October 2021, the Criuleni City Council initiated the process of developing the solid waste management strategy in the town of Criuleni for the period 2022 - 2026. This document will set the directions for the development of the municipal solid waste management sector within the administrative boundaries of the town of Criuleni.

4. Improving the MSW management system

4.1. Context of MSW planning

According to the Waste Management Strategy of the Republic of Moldova for the years 2013-2027, the town of Criuleni is part of the Waste Management Region 4 (WMR 4). WMR 4 encompasses all localities of Criuleni, Dubasari, Nisporeni, Ialoveni, Hincesti, Anenii Noi and mun. Chisinau. For these territories a regional storage facility and several waste transfer stations are to be built. The feasibility study for the integrated waste system in WMR 4 has not been finalised, which makes it impossible to determine the specific locations of the regional storage facility and waste transfer stations. The storage facility will be built close to mun. Chisinau, probably next to the current storage facility in Tintareni, Anenii Noi district. Transfer station for the town of Criuleni will most likely be located close to the M21 central road, at the entrance to the town of Criuleni.

In perspective, once the regional infrastructure for waste storage, transfer and transport is built, the waste collected in the town of Criuleni will be transported to the transfer station near the town, from where, later, it will be transported to the regional storage facility in WMR 4, closer to mun. Chisinau. All garbage dumps in the town of Criuleni must be closed and eradicated after the regional waste management infrastructure is put into operation.

Solid waste management system for the town of Criuleni should take into account the organization of waste management as organized in WMR 4, setting up the local waste collection infrastructure to operate in this form until the regional waste management infrastructure is put into operation.

4.2. Solid waste management

As described above, in the town of Criuleni is generated about 1,800 tons of solid waste (see Tab. 3-4) to be managed. This amount of solid waste will determine the capacity of the improved solid waste management system in the town of Criuleni.

Of the total of about 2,500 tons of solid waste, 61% is household waste generated in households, 15% is household-like waste generated by institutions and the commercial sector, and the remaining 20% is other solid waste, such as bulky waste, green waste from parks, street and market waste, etc.

A household (with an average of 2 members) from the town of Criuleni generates about 511 kg of household waste per year, which is 42.6 kg per month or 10.6 kg per week.

In addition to the municipal solid waste described above (about 2,500 tons) that needs to be collected and transported to the storage facility, the households of the town of Criuleni also generate significant amounts of agricultural waste (especially manure) that requires attention. Depending on the number of animals present in the households, it is estimated that annually within the administrative boundaries of the town of Criuleni are generated about 1,800 tons of manure, which is a significant amount compared to the waste to be collected. There are also other agricultural wastes that are generated in households but the amount of these cannot be estimated exactly.

Agricultural waste from households should not be placed at the storage facility. Though, currently, much of this waste is being placed by local population at the storage facility. Special activities are needed to significantly reduce the amount of this waste kept at storage facilities.

4.3. Existing equipment and infrastructure that can be used

The equipment and infrastructure that can continue to be used for the municipal solid waste management system is shown in Table 4-1. Old equipment, which has exceeded its operating life and is to be scrapped, is not included here.

Table 4-1: Existing equipment and infrastructure for MSW management, the town of Criuleni

#	Equipment	Units
1	Collection points (platforms with containers)	42
2	4m^3 mesh box, recyclable (plastic, metal)	9
3	1.1m^3 yellow plastic container, recyclable (plastic, metal)	20
4	1.1m^3 blue plastic container, recyclable (cardboard/paper)	9
5	0.24m^3 green plastic container, recyclable (glass)	21
6	13m^3 MAZ compactor truck (recently purchased by LPA)	1
7	Tractor with trailer (2 axles)	1
8	Tractor with trailer (1 axle)	1
9	Excavator with front loader	1
10	Premises M.C. Comunservice Criuleni (office, garages, etc.)	1
11	Storage facility, the town of Criuleni	1

4.4. MSW management options

Taking into account the current MSW management system within the administrative boundaries of the town of Criuleni, including the perspective of regional development in the sector, we can highlight 2 basic achievements regarding the improvement of the MSW management system in the town of Criuleni. The first option is a qualitative improvement of the existing system, without making significant changes. The other option is a reorganization of the existing system, which requires major changes to the way recyclables are collected, sorted and recovered. Table 4-2 and Table 4-3 describe the basic components of these two options respectively.

Table 4-2: Option 1 of the improved MSW management system, the town of Criuleni

Element of the system	Way of organizing	Equipment, processes	Actions required
Collection of residual (non-recyclable) waste	• Collection 3-4 times a week from CPs (with new 1.1m^3 euro-containers) for areas with multi-storey buildings. • Weekly collection from streets (individual bags placed at the gate on collection day) for areas with private houses.	• New MAZ compactor garbage truck (13m^3) for accessible streets. • New compactor garbage truck (5-7m^3) for narrower but accessible streets. • Tractor with trailer (4m^3) for hard-to-access streets.	• Procurement of 5-7m^3 compactor garbage truck. • Renovation of 7 CPs (GEF, SlovakAid). • Renovation of 4 CPs (LPA Criuleni). • Procurement of new 1.1m^3 euro-containers and their installation at the CPs instead of 0.7m^3 metal containers. • Delivery of 0.7 m^3 metal containers to scrap. • Setting up of time, type of garbage truck, and route for collecting waste from the CPs. • Establishing waste collection schedules in residential areas with private houses. Establishing the streets (routes) where the garbage truck and tractor with a trailer will collect waste. • Meetings in the residential areas with private houses on the waste collection schedule and terms. • Training programmes for M.C. Comunservice Criuleni staff on the organization of the non-recyclable waste collection system.
Collection of recyclable waste	• Weekly collection from CPs with containers for recyclables: box (4m^3) or yellow container (1.1 m^3) - plastic, metal; blue container (1.1m^3) - cardboard/paper;	• Compactor garbage truck (approx. 12m^3) used by the recycler (Salubris Group SRL or other company). • The recycler (Salubris Group SRL or another company) covers its	• Additional containers for recyclables at the CPs. • Establishing a contract/memorandum with the recycler (Salubris Group SRL or other company) that collects recyclables from the CPs. It must establish the conditions for collecting recyclables, the obligations of LPA Criuleni, the

	green container (0.24m^3) - glass.	collection costs from the revenues obtained from the sale of the recovered materials.	obligations of Recycler, the equipment used for collection, the time and route of collection from the CPs. • Meetings with the population by residential areas to promote separate collection of waste. • Production and distribution to all households (3,970 units) of LPA Criuleni of the information sheet on waste collection conditions.
Sorting of recyclable waste	• Detailed sorting of recyclables and recovery of recyclable materials is carried out by the recycler (Salubris Group SRL or other company).	• Detailed sorting of recyclables at recycler sorting facilities (Salubris Group SRL or another company).	• Establish a way for the Recycler to monitor and report the quantities of recyclables collected and recyclables recovered and recycled. The information given is necessary to measure the degree of recovery of recyclables and to develop the actions needed to improve the collection system.
Composting	• Promoting composting in households by organizing practical workshops for 20 selected beneficiaries.	• Use of 20 household composting facilities. • Households with composting facilities will serve as an example for other interested households to take up and carry out composting in a similar way on their own.	• Editing/publishing a practical guide on how to organise decentralized composting in households. • Meetings with the population by residential areas to promote composting in households. • Development and distribution of an information sheet for households to promote the organization of composting in households.
Storage/removal of non-recyclable waste	• Garbage storage facility near the town of Criuleni.	• Using the local storage facility near the town of Criuleni. • Arranging the access and entrance to the storage facility. • Regular covering of the stored waste with soil.	• Improving the access road to the storage facility near the town of Criuleni. • Arrangement of the entrance to the storage facility. • Division of the storage facility into separate sites for storage of different categories of municipal solid waste (household, organic, construction). • Develop a schedule for regular covering of the stored waste with soil. • Training programmes for M.C. Comunservice Criuleni staff on storage facility maintenance. • Establishing payment for the storage of waste transferred to the storage facility by individuals.

Table 4-3: Option 2 of the improved municipal solid waste management system, the town of Criuleni

Element of the system	Way of organizing	Equipment, processes	Actions required
Collection of residual (non-recyclable) waste	• Collection 3-4 times a week from CPs (with new 1.1m^3 euro-containers) for areas with multi-storey buildings. • Weekly collection from streets (individual bags placed at the gate on collection day) for areas with private houses. Each household will be able to place a bag of non-recyclable waste per	• New MAZ compactor garbage truck (13m^3) for accessible streets. • New compactor garbage truck (5-7m^3) for narrower but accessible streets. • Tractor with trailer (4m^3) for hard-to-access streets.	• Procurement of 5-7m^3 compactor garbage truck. • Renovation of 7 CPs (GEF, SlovakAid). • Renovation of 4 CPs (LPA Criuleni). • Procurement of new 1.1m^3 euro-containers and their installation at the CPs instead of 0.7m^3 metal containers. • Delivery of 0.7 m^3 metal containers to scrap. • Setting up of time, type of garbage truck, and route for collecting waste from the CPs. • Establishing waste collection schedules in residential areas with private houses. Establishing the streets (routes) where

	family member for which the fee is paid. Additional bags will be charged extra.		the garbage truck and tractor with a trailer will collect waste. • Meetings in the residential areas with private houses on the waste collection schedule and terms. • Training programmes for M.C. Comunservice Criuleni on the organization of the non-recyclable waste collection system.
Collection of recyclable waste	• Weekly collection from CPs with containers for recyclables: box (4m^3) or yellow container (1.1 m^3) - plastic, metal; blue container (1.1m^3) - cardboard/paper; green container (0.24m^3) - glass. • Collection once in 2 weeks from the street (individual transparent bags placed at the gate on the day of collection) for areas with private houses. Plastic recyclables, metal cans, cardboard/paper but no glass bottles will be placed in bags. The glass bottles will be placed at the CPs having containers for them. Households can place an unlimited number of bags with recyclable waste at the gate at no extra charge. • Transportation of recyclables collected at the place of manual sorting and baling organized at the facilities of M.C. Comunservice Criuleni.	• New MAZ compactor garbage truck (13m^3) for accessible streets. • New compactor garbage truck (5-7m^3) for narrower but accessible streets. • Tractor with trailer (4m^3) for hard-to-access streets. • Use of transparent plastic bags for households where paper/cardboard, plastic, metal (cans/containers) will be placed together. Glass is not placed in bags but is brought at the CPs.	• Additional containers for recyclables at the CPs. • Meetings with the population by residential areas to promote separate collection of waste. • Production and distribution to all households (3,970 units) of LPA Criuleni of the information sheet on waste collection conditions. • Training programmes for M.C. Comunservice Criuleni staff on the organization of the recyclable waste collection system.
Sorting of recyclable waste	• Sorting of recyclables at the place of manual sorting and baling, organized at the facilities of M.C. Comunservice Criuleni. • Baling recyclable materials by categories and selling them to recyclers. • Glass (glass bottles/containers) will be placed in metal container, which will be picked up by recyclers when filled.	• Location for manual sorting and baling of recyclables organized at the facilities of M.C. Comunservice Criuleni. • Sorting and baling of recyclable materials by the following categories: cardboard, paper, transparent PET, coloured PET, polyethylene, other foils, steel cans/containers, aluminium cans/containers. • The collected glass (glass shards of different colours) is	• Procurement of 2 8m^3 metal containers for storing shards of glass. • Procurement of baler for cardboard, paper, plastic. • Procurement of manual forklift for handling bales of recyclables. • Procurement of 10 containers of 1.1 m3 for placing different categories of recyclables at the sorting site. • Organization of a sorting and baling site at the facility of M.C. Comunservice Criuleni. • Training programmes for M.C. Comunservice Criuleni staff on the sorting and baling of recyclable materials. • Establish a way of monitoring and reporting the amounts of recyclables collected and recyclables baled and sold/traded to recyclers. The information given is necessary to measure the

		placed in an 8m^3 metal container.	degree of recovery of recyclables and to develop the actions needed to improve the collection system.
Composting	• Promoting composting in households by organizing practical workshops for 20 selected beneficiaries.	• Use of 20 household composting facilities. • Households with composting facilities will serve as an example for other interested households to take up and carry out composting in a similar way on their own.	• Editing/publishing a practical guide on how to organise decentralized composting in households. • Meetings with the population by residential areas to promote composting in households. • Development and distribution of an information sheet for households to promote the organization of composting in households.
Storage/removal of non-recyclable waste	• Garbage storage facility near the town of Criuleni.	• Using the local storage facility near the town of Criuleni. • Arranging the access and entrance to the storage facility. • Regular covering of the stored waste with soil.	• Improving the access road to the storage facility near the town of Criuleni. • Arrangement of the entrance to the storage facility. • Division of the storage facility into separate sites for storage of different categories of municipal solid waste (household, organic, construction). • Develop a schedule for regular covering of the stored waste with soil. • Training programmes for M.C. Comunservice Criuleni staff on storage facility maintenance. • Establishing payment for the storage of waste transferred to the storage facility by individuals.

Unlike Option 1, Option 2 establishes full control of the M.C. Comunservice Criuleni for the collection of recyclable and non-recyclable waste. M.C. Comunservice Criuleni is to take control of the collection of recyclable waste from the private operator Salubris Group SRL, with the expiration of the agreement between LPA Criuleni and Salubris Group SRL at the end of 2021. This option includes additional actions to collect recyclables in transparent bags from residential areas with private houses (the same streets where non-recyclable/residual waste is collected in bags) and to arrange a place for manual sorting and baling of recyclables at the facilities of the municipal company. This will allow better control over the process of collecting recyclables and increase the recovery of recyclable materials from municipal solid waste generated in the town of Criuleni. The recyclable materials recovered at the sorting and baling site will be sold directly to the recyclers, and the revenues will be used to support the system of selective collection of municipal solid waste. Advantages and disadvantages of options to improve MSW management in the town of Criuleni are presented in Tab. 4-4.

Table 4-4: Option 1 of the improved MSW management system, the town of Criuleni

Option	Advantages	Disadvantages
Option 1	• It is simple to implement because the MSW management system does not require changes but qualitative adjustments. • It does not require new staff capabilities to implement the planned activities.	• The LPA has no control over the process of collecting recyclables. • There is a risk that the provider Salubris Group SRL will interrupt the collection of recyclable waste from the CPs. This would require significant efforts from the LPA to find urgent solutions for the collection of recyclables. • The collection of recyclables is only done at the CPs, without coverage of the private sector households (private houses).
Option 2	• Increasing the degree of recyclables recovery with the implementation of their collection both from the CPs and from the private sector households (private houses).	• It requires more effort in carrying out the planned activities, as the MSW management system needs some larger changes.

	• Full control over the collection of non-recyclable and recyclable waste. • Possibility of selling recyclable materials directly to recyclers at a competitive price. • Recyclers (e.g., ABS) are willing to provide training and equipment to the service provider or LPA to increase efficiency in recovering recyclable materials.	• Additional staff (about 3 employees) is needed to collect and sort recyclables. • Additional training is needed for employees of the MSW management service.

If we make an analysis of the advantages and disadvantages of options for improving MSW management in the town of Criuleni (Tab. 4-4), Option 2 has the most significant advantages. It is proposed to implement Option 2. At the same time, the LPA can implement Option 1 if it wishes to do so, but it must take steps to firmly contract the collection of recyclables from the CPs.

Discussing strategic planning in the MSW management sector in the town of Criuleni at the meeting of 5.11.2021, the Working Group decided to implement Option 2.

4.5. Costs of MSW management options

The necessary equipment, including associated costs and sources of funding, for the MSW management system are presented for Option 1 in Table 4-5, and for Option 2 - in Table 4-6.

Table 4-5: Option 1 - equipment required to be procured, associated costs, funding sources

#	Equipment	Units	Cost/unit, MDL	Budget, thousands MDL	Sources of funding
1	Repair/arrangement of collection points (platforms)	7	78,533	550	GEF, SlovakAid
2	Repair/arrangement of collection points (platforms)	4	78,533	314	LPA Criuleni
3	1.1m^3 galvanized steel container, non-recyclable/residual waste (for CPs, including spare)	25+25	7,400	370	GEF, SlovakAid
4	1.1m^3 yellow container, recyclable plastic/metal (for CPs, including spare)	15+20	4,000	140	GEF, SlovakAid
5	1.1m^3 blue plastic container, recyclable cardboard/paper (for CPs, including spare)	10+25	4,000	140	GEF, SlovakAid
6	0.24m^3 green plastic container, recyclable glass (for CPs, including spare)	30	840	25	SlovakAid
7	13m^3 compactor garbage truck (purchased in Oct. 2021)	1	1,200,000	1,200	LPA Criuleni
8	5-7 m^3 garbage truck	1	980,000	980	SlovakAid
9	Composting facilities in households	20	1,200	24	SlovakAid
10	Employee protective equipment	20	4,000	80	SlovakAid
	Total:			**3,823**	
	GEF contribution			**632**	
	LPA Criuleni contribution			**1,514**	
	SlovakAid contribution			**1,677**	

Table 4-6: Option 2 - equipment required to be procured, associated costs, funding sources

#	Equipment	Units	Cost/unit, MDL	Budget, thousands MDL	Sources of funding
1	Repair/arrangement of collection points (platforms)	7	78,533	550	GEF, SlovakAid
2	Repair/arrangement of collection points (platforms)	4	78,533	314	LPA Criuleni
3	1.1m^3 galvanized steel container, non-recyclable/residual waste (for CPs, including spare)	25+25	7,400	370	GEF, SlovakAid
4	1.1m^3 yellow container, recyclable plastic/metal (for CPs, including spare)	15+20	4,000	140	GEF, SlovakAid
5	1.1m^3 blue plastic container, recyclable cardboard/paper (for CPs, including spare)	10+25	4,000	140	GEF, SlovakAid
6	0.24m^3 green plastic container, recyclable glass (for CPs, including spare)	30	840	25	SlovakAid
7	10m^3 compactor garbage truck (purchased in Oct. 2021)	1	1,200,000	1,200	LPA

8	5-7 m^3 garbage truck	1	980,000	980	SlovakAid
9	Composting facilities in households	20	1,200	24	SlovakAid
10	Employee protective equipment	20	4,000	80	SlovakAid
11	8m^3 metal container, recyclable glass storage	2	50,000	100	SlovakAid
12	1.1m^3 yellow plastic container, recyclable sorted	10	4,000	40	SlovakAid
13	Baler for recyclables (paper, cardboard, plastic)	1	90,000	90	SlovakAid
14	Manual forklift to manipulate bales of recyclables	1	15,000	15	SlovakAid
15	Arrangement of sorting site for recyclables (construction materials)	1	70,000	70	SlovakAid
	Total:			**4,138**	
	GEF contribution			**632**	
	LPA Criuleni contribution			**1.514**	
	SlovakAid contribution			**1.992**	

According to the components of the improved MSW, the total budget for Option 1 is 3,823 thousand lei (188,300 EUR) and for Option 2 - 4,138 thousand lei (203,900 EUR). For Option 1, the contribution of LPA Criuleni, GEF and SlovakAid is respectively 1,514 thousand lei (74,600 EUR), 632 thousand lei (31,100 EUR) and 1,677 thousand lei (82,600 EUR). For Option 2, the contribution of LPA Criuleni, GEF and SlovakAid is respectively 1,514 thousand lei (74,600 EUR), 632 thousand lei (31,100 EUR) and 1,992 thousand lei (98,200 EUR).

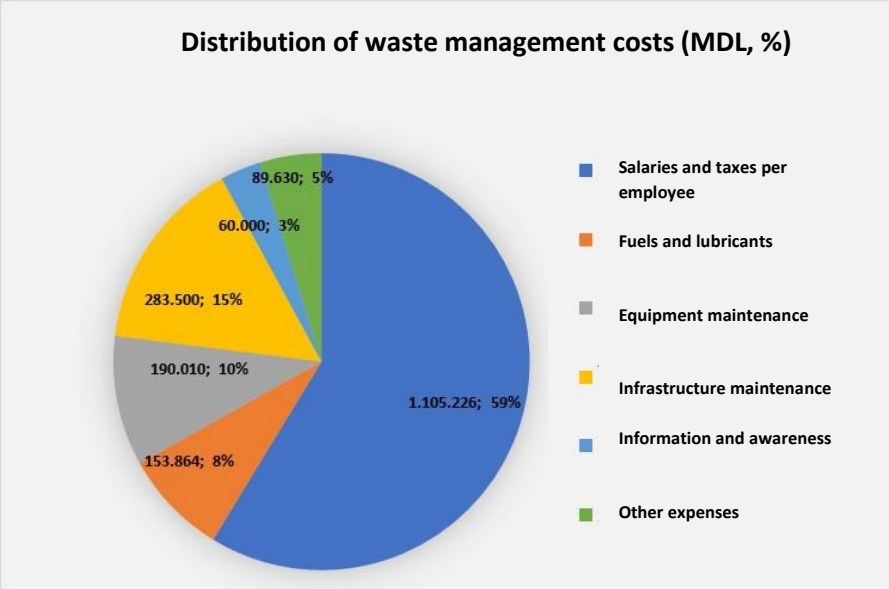
4.6. Costs and fees of the improved MSW management service

Taking into account that the Working Group (for strategic planning in the MSW management sector in Criuleni) decided to implement Option 2, here will be presented the costs of the improved service according to the given option. Detailed costs regarding the MSW management within the administrative boundaries of the town of Criuleni is shown in Annex 5. The graph in Fig. 4-1 shows the distribution of these costs.

As can be seen in Annex 5 and Fig. 4-1, the costs of solid waste management (generated by the population, institutions and economic entities) under the improved system (described by Option 2) make up about 1.9 mil for the year 2022. The main costs are attributed to salaries (including all related taxes) - 59%, equipment maintenance - 10%, infrastructure maintenance (storage facility, waste sorting site, office, etc.) - 15%, fuels and lubricants - 8%.

It is important to note that the maintenance costs of the equipment involved in waste management are set at the minimum necessary and the costs of depreciation/replacement of the equipment used are not foreseen. This is due to the fact that the given solid waste management system is planned to operate for only 5 years. It is estimated that after this period the regional MSW management system will be operational and all MSW management activities in the town of Criuleni will be taken over by this regional system.

Fig. 4-1. Distribution of solid waste management costs, the town of Criuleni



For the year 2022 an additional income of about 224,000 lei is estimated from the recyclables recovery activities.

It is estimated that in 2022 will be managed about 1,609 tons of solid waste generated by individuals and legal entities. The cost per ton of waste managed is 1,031 lei.

Under the improved MSW, rates, especially for the population, require an essential increase to cover the costs of the system. The rate calculated for the population should be 22 lei/person/month and the rate for the legal entities should be 206 lei for 1 m^3 of removed waste.

For the population it is recommended to stepwise increase the rate from the current (10 and 7 lei/person/month). In 2-3 years it should reach the calculated rate of 22 lei/person/month.

It is important to mention that it will be limited the number of bags of household waste (non-recyclable) that can be placed at the gate on the collection day for the population in the private sector (private houses) that will benefit from the household waste collection service. Thus, on the collection day a maximum of one bag with non-recyclable waste (50-100 litres) could be placed for each member of the family for who the rate is paid. To place more bags of non-recyclable waste, these households have to pay extra according to the rate. At the same time, on collection day an unlimited number of bags of recyclable waste (plastic, metal, cardboard, but without glass) can be placed.

Under the improved sanitation service, economic entities and institutions have to pay according to graded rates, depending on the service received, and the amount and quality of waste generated. Thus, it is proposed that every economic entity and institution within the administrative boundaries of the town of Criuleni should pay for a collection of waste from the container in use. Thus, the collection of a 1,100 litres container with non-recyclable waste will cost 227 lei, and the collection of a 240 or 120 litres container will cost 50 and 25 lei respectively. At the same time, the collection of recyclable waste from legal entities will be done for free to stimulate the sorting and recycling of waste.

Under these conditions, as an example, a store that uses 120 litre containers (separately for non-recyclable and recyclable waste) can have a contract with M.C. Comunservice Criuleni for waste collection 4 times a month. For this service, this store will pay a fee of 100 lei per month (25 lei x 4 = 100 lei) for the collection of non-recyclable waste. Collection of recyclable waste at this store will be free of charge.

The removal of solid waste on request by a tractor with trailer, from households, economic entities and institutions, will be done according to a fixed rate of 500 lei per trailer. This rate will increase about 2 times compared to the similar current rate (257 lei per trailer).

Under the conditions of the improved waste management system, it is necessary to charge a storage facility rate to those who bring their waste to the storage facility. According to the calculations, this rate should be: 20 lei per 1 m^3 of household waste and 51 lei per 1 m^3 of construction/demolition or agricultural/organic waste. Those who will bring their waste to the storage facility will have to unload the given waste at the defined for it place. At the same time, recyclable waste brought separately to the sorting place at M.C. Comunservice Criuleni will not be charged.

EXECUTIVE SUMMARY

The document is elaborated in the context of the strategic planning of the municipal solid waste management sector within the administrative boundaries of the town of Criuleni, with the support of the project "*Management system optimization in the administrative-territorial unit Criuleni*". This project is implemented by Caritas Slovakia and Caritas Czech Republic and financially supported by the Slovak Agency for International Development Cooperation, SlovakAid.

According to the national solid waste management strategy, the town of Criuleni is a part of the Waste Management Region No. 4. There are about 6,000 inhabitants the administrative boundaries of the town of Criuleni (which includes the town of Criuleni and two villages - Ohrincea and Zolonceni). According to the calculations, about 2,500 tons of municipal waste are annually generated in the town of Criuleni. 608 tons of them are recyclable waste.

The municipal company Comunservice Criuleni manages the water supply and sewerage service in the town of Criuleni, and also offers sanitation services. Sanitation activities include: removal of solid (non-recyclable) waste from the population, institutions and economic entities; management/maintenance of the storage facility; sanitation activities on the territory of the town. Recyclable waste is collected by the company Salubris Group SRL, based in the village of Porumbeni. The company has a cooperation agreement with LPA Criuleni, valid until the end of 2021. The company Salubris Group SRL collects (once a week) recyclable waste (plastic, cardboard, glass) free of charge, covering its collection costs from the price obtained from recyclable materials.

The waste removal service is provided to the population on a service contract basis. The rate for the waste removal service is 10 lei per month for the people, living in the private sector (private houses) and 7 lei per month for people, living in the communal sector (residential blocks). The rate for waste removal (household-like waste) from institutions and economic entities is 120 lei per m^3 of removed waste.

Currently, there are about 2,000 service contracts with the population, covering about 70% of households. Out of a total of about 140 economic/legal entities, 84 (60% of the total) have a solid waste removal service contract.

Organized waste collection is done on the streets directly from households in sectors with private houses and from collection points (platforms with containers) in sectors with residential blocks.

Out of the total of 40 collection points (CPs) used, 24 CPs have containers for recyclables only, 10 CPs have containers for non-recyclable waste only, 6 CPs have both containers for recyclable and non-recyclable waste. Recyclable CPs do not necessarily have all types of containers (1,100 and 240 litres plastic containers) for collected recyclables. CPs for non-recyclable waste collection may have one or more 700 litres metal containers.

The problems observed at the waste collection points are related to: garbage around the containers due to non-timely collection of waste; the presence of green and agricultural waste that should not be placed there; the metal containers for non-recyclable waste are old and many of them are damaged; not all types of containers for recyclables collected are on every CP.

M.C. Comunservice Criuleni collects non-recyclable waste only from the town of Criuleni and Zolonceni village. Ohrincea village has no organised non-recyclable waste collection service.

M.C. Comunservice Criuleni collects non-recyclable waste from the CPs 3 times a week or more often. Salubris Group SRL collects recyclable waste from the CPs once a week.

In the territories with private houses in the town of Criuleni M.C. Comunservice Criuleni collects solid waste from households once a week. Households place waste packed in bags (or other containers) on the street on the collection day, and workers load this waste into a garbage

truck. On certain streets with difficult access (where the garbage truck cannot go) collection is done by tractor with a trailer. Usually there are three workers involved in the removal of this waste: the driver of the truck/tractor, and two workers who load the waste into the trailer of the truck or tractor.

The main equipment used for waste collection is a GAZ compactor garbage truck (capacity about 10 m^3), a GAZ truck with an open trailer (capacity about 10 m^3) which are very old (more than 15 years) and often malfunction. When these vehicles malfunction, tractor with a trailer is used for waste collection. The tractor is old but functional. Recently, a MAZ compactor garbage truck with a capacity of about 13 m^3 was purchased. The vehicle is equipped with a rear loading system for standard containers. This garbage truck cannot load 700 litres metal containers, and it is not currently in use.

With regard to waste collection, the following observations can be made: the roads in some residential sectors are narrow and damaged; the branches of multiple trees near the roads hinder the movement of equipment used for waste collection; the equipment currently used for waste collection and evaluation is outdated, requiring frequent and costly repairs; often people place non-recyclable waste into containers for recyclables; due to the lack of containers for cardboard at many collection points, significant amounts of cardboard are left under the open sky, and often affected by rain.

Within the administrative boundaries of the town of Criuleni there are two garbage dumps used for waste storage. Garbage dump 1 is located in the North-East of the town of Criuleni. It has an area of almost 3 ha and is about 1 km away from the residential sector. Garbage dump 2 is located North-East of Ohrincea, with an area of 0.5 ha, located at a distance of only 200 m from residential houses. These garbage dumps are sites where the waste is placed without being covered with soil. From time to time the waste is moved with a bulldozer to make room for other waste. The storage of waste at these garbage dumps does not meet environmental standards. Fires often occur at these garbage dumps.

Currently, the total expenditures for municipal solid waste management are about 1.25 million lei, of which 40% are expenditures for the staff directly involved in the waste collection and removal activities (truck/tractor drivers and porters), 20% - fuels and lubricants, 11% - maintenance of equipment and infrastructure, 20% - expenditures for administrative staff and accounting.

Considering that annually about 1,175 tons of household waste from population and of household-like waste from legal entities are removed, currently the cost per ton of removed waste is 1,069 lei.

Revenues from contracts for waste removal services for individuals (approx. 2,000 contracts) and legal entities (84 contracts) accumulated in 2019-2020 consisted of 424,327 MDL, including 189,447 MDL from individuals and 234,880 MDL from legal entities. This revenue covers only 34% of expenditure.

Current rates are not sufficient to cover the expenditures of municipal solid waste management. To cover the total expenditures of the current solid municipal waste management system, the rate for population (at the current level of contracting) must be 23 lei/person/month, and the rate for legal entities must be 280 lei for 1 m^3 of removed waste.

Taking into account the current municipal solid waste management system within the administrative boundaries of the town of Criuleni, including the perspective of regional development in the sector, we can highlight 2 basic achievements regarding the improvement of the MSW management system in the town of Criuleni. Option 1 is a qualitative improvement of the existing system, without making significant changes. Option 2 is a reorganization of the existing system, which requires major changes to the way recyclables are collected, sorted and recovered.

Taking into account that Option 2 has the most significant advantages, during the discussions at the meeting of 5.11.2021 for strategic planning in the sector of MSW management in the town of Criuleni, the Working Group decided to implement this option. According to the components of the improved MSW management system, the total budget for Option 2 is 4,138 thousand lei (203,900 EUR), of which 1,514 thousand lei (74,600 EUR), 632 thousand lei (31,100 EUR) and 1,992 thousand lei (98,200 EUR) are respectively the contributions of LPA Criuleni, GEF and SlovakAid.

The costs of solid waste management (generated by the population, institutions and economic entities) under the improved system (as described by Option 2) amount to about 1.9 million in the year 2022. The cost per ton of managed waste is 1,031 lei.

For the year 2022 an additional income of about 224,000 lei is estimated from the recyclables recovery activities.

Under the improved MSW, rates, especially for the population, require an essential increase to cover the costs of the system. The rate calculated for the population should be 22 lei/person/month and the rate for the legal entities should be 206 lei for 1 m^3 of removed waste.

For the population it is recommended to stepwise increase the rate from the current (10 and 7 lei/person/month). In 2-3 years it should reach the calculated rate of 22 lei/person/month.

It is important to mention that it will be limited the number of bags of household waste (non-recyclable) that can be placed at the gate on the collection day for the population in the private sector (private houses) that will benefit from the household waste collection service. Thus, on the collection day a maximum of one bag with non-recyclable waste (50-100 litres) could be placed for each member of the family for who the rate is paid. To place more bags of non-recyclable waste, these households have to pay extra according to the rate. At the same time, on collection day an unlimited number of bags of recyclable waste (plastic, metal, cardboard, but without glass) can be placed.

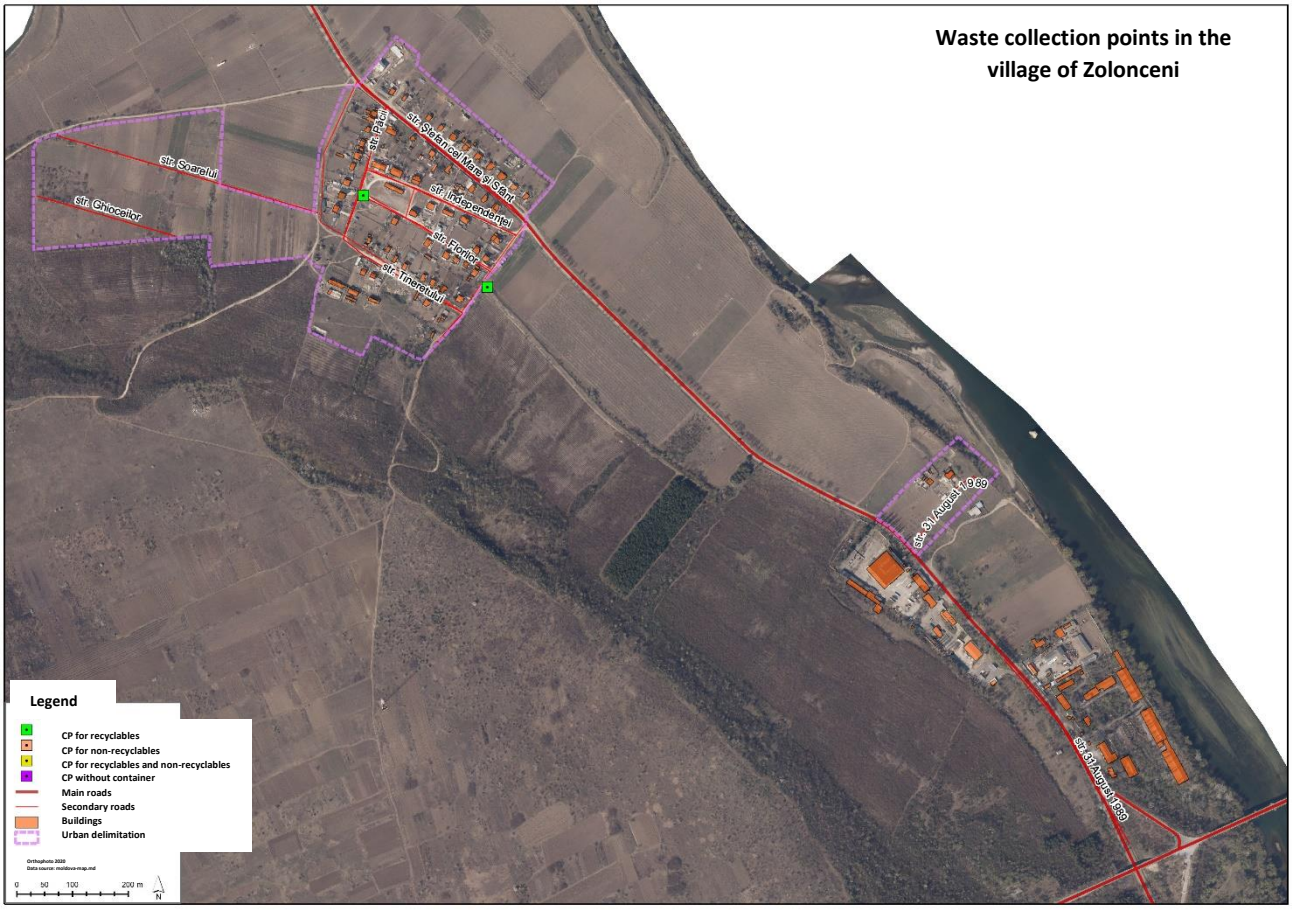
Under the improved sanitation service, economic entities and institutions have to pay according to graded rates, depending on the service received, and the amount and quality of waste generated. Thus, it is proposed that every economic entity and institution within the administrative boundaries of the town of Criuleni should pay for a collection of waste from the container in use. Thus, the collection of a 1,100 litres container with non-recyclable waste will cost 227 lei, and the collection of a 240 or 120 litres container will cost 50 and 25 lei respectively. At the same time, the collection of recyclable waste from legal entities will be done for free to stimulate the sorting and recycling of waste.

Under the conditions of the improved waste management system, it is necessary to charge a storage facility rate to those who bring their waste to the storage facility. According to the calculations, this rate should be: 20 lei per 1 m^3 of household waste and 51 lei per 1 m^3 of construction/demolition or agricultural/organic waste. Those who will bring their waste to the storage facility will have to unload the given waste at the defined for it place. At the same time, recyclable waste brought separately to the sorting place at M.C. Comunservice Criuleni will not be charged.

Annex 1: Map of the waste collection points distribution in the town of Criuleni

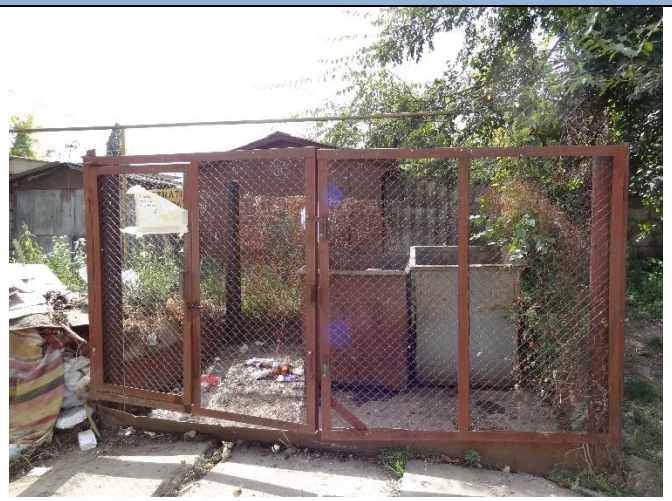
Annex 2: Map of the waste collection points distribution in Ohrincea village, the town of Criuleni

Annex 3: Map of the waste collection points distribution in Zolonceni village, the town of Criuleni



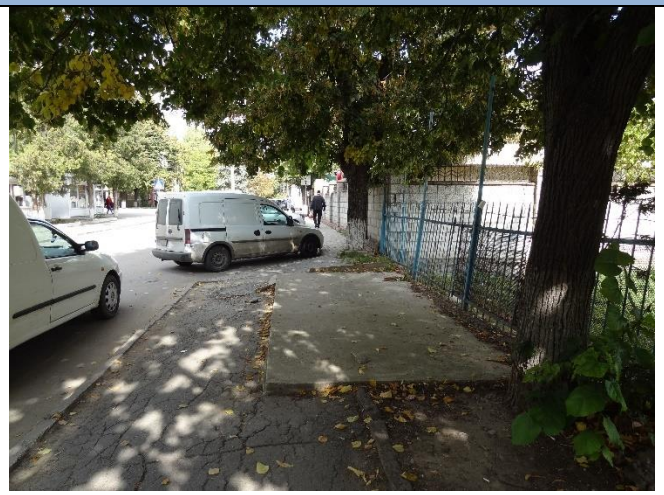
Annex 4: Collection points in the administrative boundaries of the town of Criuleni

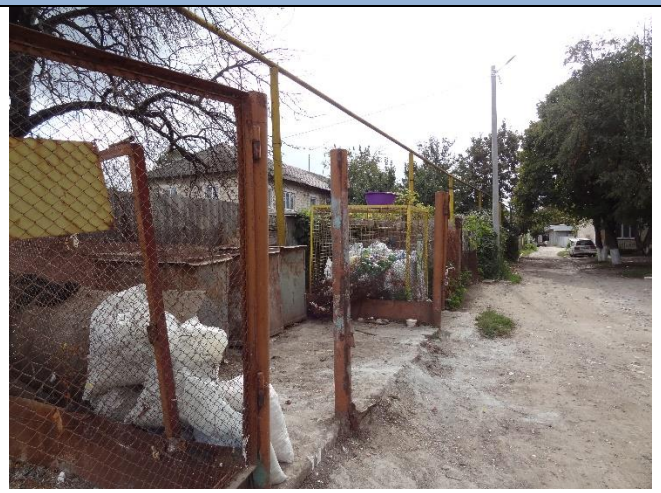
Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
1	47,21051	29,161483	C1	Nr 115 31 August 1989 Str., the town of Criuleni	0	0	1	1	0	
2	47,207163	29,158803	C2	Nr 147 31 August 1989 Str., the town of Criuleni	0	1	0	0	0	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
3	47,203595	29,157586	C3	between Nr 1 and Nr 6 Industriala Str., the town of Criuleni	2	0	0	0	0	
4	47,203245	29,155949	C4	Nr 183 31 August 1989 Str., the town of Criuleni	0	0	1	0	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
5	47,204574	29,154384	C5	Nr 28 Biruintei Blvd, the town of Criuleni	0	1	0	1	1	
6	47,204607	29,154327	C6	Nr 28 Biruintei Blvd, the town of Criuleni	4	0	0	0	0	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
7	47,206434	29,155597	C7	Nr 20/1, Biruintei Blvd, the town of Criuleni	0	1	0	1	1	
8	47,206469	29,155476	C8	Nr 20/1, Biruintei Blvd, the town of Criuleni	3	0	0	0	0	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
9	47,207495	29,157314	C9	Nr 18 Biruintei Blvd, the town of Criuleni	0	0	0	0	0	
10	47,208612	29,159046	C10	Nr 29b Biruinta Blvd, the town of Criuleni	0	0	1	1	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
11	47,208568	29,159071	C11	Nr 29b Biruinta Blvd, the town of Criuleni	3	1	0	0	0	
12	47,209914	29,159798	C12	Nr 19 Biruintei Blvd and Nr 118 31 August 1989 Str., the town of Criuleni	2	0	0	0	0	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
13	47,209000	29,156913	C13	Nr 50 Stefan cel Mare si Sfint Str., the town of Criuleni	4	0	0	0	0	
14	47,208968	29,157009	C14	Nr 50 Stefan cel Mare si Sfint Str., the town of Criuleni	0	1	0	1	1	

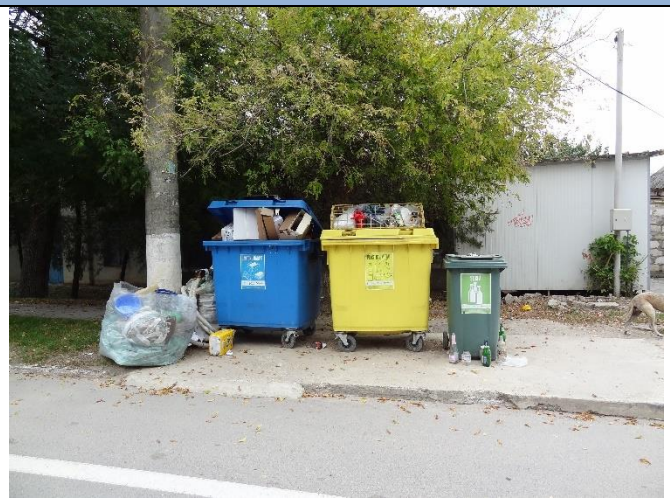
Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
15	47,207342	29,155443	C15	Nr 27 Stefan cel Mare si Sfint Str., the town of Criuleni	3	1	0	1	1	
16	47,208931	29,153668	C16	Pacii Str., and Stefan cel Mare si Sfint Str. intersection, the town of Criuleni	0	1	0	1	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
17	47,208921	29,153618	C17	Pacii Str., and Stefan cel Mare si Sfint Str. intersection, the town of Criuleni	3	0	0	0	0	
18	47,213505	29,152498	C18	Stefan Neaga Str., and Stepelor Str. intersection, the town of Criuleni	0	0	1	0	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
19	47,211465	29,152999	C19	Igor Sevciuc Str., and Oleg Kosevoi Str. intersection, the town of Criuleni	0	0	1	0	0	
20	47,209917	29,15756	C20	Igor Sevciuc Str., and Iurbarcas Str. intersection, the town of Criuleni	2	0	0	0	0	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
21	47,209942	29,157553	C21	Igor Sevciuc Str., and Iurbarcas Str. intersection, the town of Criuleni	0	0	0	0	0	
22	47,213263	29,158959	C22	Nr 3/1 Alexandru Donici Str., the town of Criuleni	0	0	1	0	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
23	47,215897	29,159981	C23	Nr 25B Orhei Str., the town of Criuleni	0	0	1	0	1	
24	47,224117	29,158136	C24	Nr 50 Mihail Frunze Str., the town of Criuleni	0	0	1	0	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
25	47,217581	29,163318	C25	Nr 47/1 31 August 1989 Str., the town of Criuleni	0	0	1	1	1	
26	47,211533	29,177695	C26	Road to the beach on the Nistru river, the town of Criuleni	1	1	0	0	0	

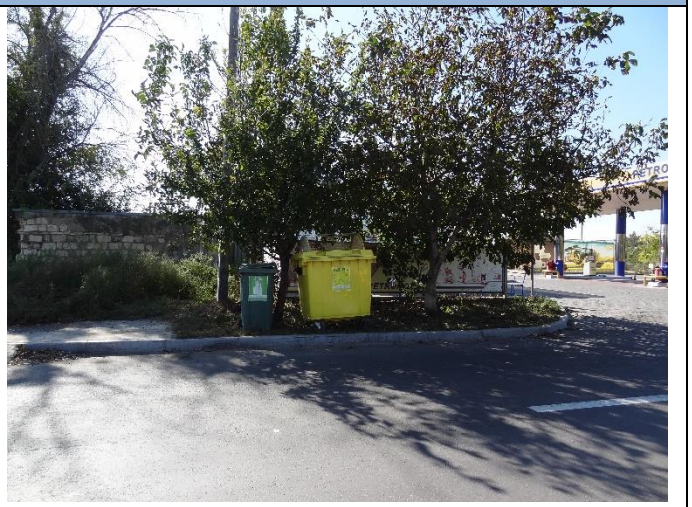
Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
27	47,211009	29,178468	C27	Nistru river beach, the town of Criuleni	1	0	0	0	0	
28	47,210686	29,178652	C28	Nistru river beach, the town of Criuleni	1	0	0	0	0	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
29	47,212898	29,164778	C29	Nr 13 Alexandru cel Bun Str., the town of Criuleni	0	1	0	0	1	
30	47,212889	29,164686	C30	Nr 13 Alexandru cel Bun Str., the town of Criuleni	4	0	0	0	0	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
31	47,208096	29,166773	C31	Alexandru cel Bun Str., and Serghei Lazo Str., intersection, the town of Criuleni	1	0	0	0	1	
32	47,206557	29,167091	C32	Stefan cel Mare Str., and Alexandru cel Bun Str. intersection, the town of Criuleni	0	0	1	1	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
33	47,207563	29,161629	C33	Nr 40 Stefan cel Mare si Sfint Str., the town of Criuleni	2	1	0	0	0	
34	47,215094	29,155653	C34	Nr 133 31 August 1986 Str. (bus station), the town of Criuleni	2	0	1	0	0	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
35	47,205504	29,163603	C35	Nr 1 Stefan cel Mare si Sfint Str., the town of Criuleni	0	0	1	0	1	
36	47,22215	29,163157	C36	Nr 7 31 August 1989 Str., the town of Criuleni	0	0	0	0	0	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
39	47,222633	29,149336	C39	Nr 61 Orhei Str., the town of Criuleni	0	0	1	0	1	
37	47,245979	29,137121	Z37	Nr 2 Florilor Str., Zolonceni village	0	0	1	0	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
38	47,244484	29,140044	Z38	Nr 22 Florilor Str., Zolonceni village	0	0	1	0	0	
40	47,222302	29,064775	O40	Nr 2 Valea Rautului Str., the village of Ohrincea	0	0	1	0	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
41	47,223369	29,061454	O41	Nr 27 Calea Basarabiei Str., the village of Ohrincea	0	0	1	0	1	
42	47,221406	29,057607	O42	Nr 5 Stefan cel Mare Str., the village of Ohrincea	0	0	1	0	1	

Nr	Lat	Long	ID	CP address	NC*	BP*	CP*	CC*	CG*	Photo
43	47,218876	29,060182	O43	Nr 5 Sfinta Treime Str., the village of Ohrincea	0	0	1	0	0	

* NC - non-recyclable waste containers (0.7 m^3); BP - box for plastic recyclables (3 m^3); CP - container for plastic recyclables (1.1 m^3); CC - container for paper/cardboard recyclables (1.1 m^3); CG - container for glass recyclables (0.24 m^3).

Annex 5: Calculation of costs and rates of the improved waste management system

	units	2022	2023	2024	2025	2026
Population: (population dynamics: - 1.96% per year)		**5.726**	**5.614**	**5.504**	**5.396**	**5.290**
Household size:	persons	2	2	2	2	2
Waste generation	**tons/year**	**1.829**	**1.793**	**1.758**	**1.723**	**1.689**
Household waste	tons/year	1.463	1.434	1.406	1.379	1.352
Household-like waste	tons/year	366	359	352	345	338
Recyclable waste:						
Plastic:	tons/year	219	215	211	207	203
Metal:	tons/year	62	61	60	59	57
Cardboard/paper:	tons/year	219	215	211	207	203
Glass:	tons/year	95	93	91	90	88
Composted biodegradable waste (in households):	tons/year	**40**	**79**	**116**	**136**	**149**
Share of composted organic waste in households:	%	5%	10%	15%	18%	20%
Collection of waste:						
Coverage by the waste collection service		100%	100%	100%	100%	100%
Total waste collected:	tons/year	**1.609**	**1.578**	**1.547**	**1.517**	**1.487**
Recyclables collection share:						
Plastic	%	15%	20%	25%	27%	30%
Metal	%	15%	20%	25%	27%	30%
Cardboard/paper	%	15%	20%	25%	27%	30%
Glass	%	15%	20%	25%	27%	30%
Quantity of recyclables collected:		**89**	**117**	**143**	**152**	**165**
Plastic	tons/year	33	43	53	56	61
Metal	tons/year	9	12	15	16	17
Cardboard/paper	tons/year	33	43	53	56	61
Glass	tons/year	14	19	23	24	26
Non-recyclable waste collected:	tons/year	**1.520**	**1.461**	**1.404**	**1.365**	**1.322**
Operating costs:						
Gross Salary Level:						
Annual salary growth rate	%	5%	5%	5%	5%	5%
Director	lei/month	8.663	9.096	9.550	10.028	10.529
Chief accountant	lei/month	7.796	8.186	8.595	9.025	9.476
Accountant	lei/month	5.198	5.457	5.730	6.017	6.318
Cashier	lei/month	4.071	4.274	4.488	4.713	4.948
Customer acquisition service manager	lei/month	5.977	6.275	6.589	6.919	7.265
Foreman	lei/month	3.465	3.638	3.820	4.011	4.212
Driver	lei/month	5.544	5.821	6.112	6.418	6.739
Tractor driver	lei/month	4.960	5.208	5.469	5.742	6.029
Porter (waste loading, sorting of recyclable waste)	lei/month	3.767	3.956	4.154	4.361	4.579
Porter (sorting/baling of recyclable waste)	lei/month	3.767	3.956	4.154	4.361	4.579
Mechanic	lei/month	5.544	5.821	6.112	6.418	6.739
Taxes per employee:	**%**	**24%**	**24%**	**24%**	**24%**	**24%**
Expenditures by type of employee:						
Director	lei/month	10.742	11.279	11.843	12.435	13.056

Chief accountant	lei/month	9.667	10.151	10.658	11.191	11.751
Accountant	lei/month	6.445	6.767	7.106	7.461	7.834
Cashier	lei/month	5.048	5.300	5.565	5.844	6.136
Customer acquisition service manager	lei/month	7.411	7.782	8.171	8.579	9.008
Foreman	lei/month	4.297	4.511	4.737	4.974	5.223
Driver	lei/month	6.875	7.218	7.579	7.958	8.356
Tractor driver	lei/month	6.151	6.458	6.781	7.120	7.476
Porter (waste loading, sorting of recyclable waste)	lei/month	4.672	4.905	5.150	5.408	5.678
Porter (sorting/baling of recyclable waste)	lei/month	4.672	4.905	5.150	5.408	5.678
Mechanic	lei/month	6.875	7.218	7.579	7.958	8.356
Employee units:						
Director	units	0,5	0,5	0,5	0,5	0,5
Chief accountant	units	0,5	0,5	0,5	0,5	0,5
Accountant	units	0,5	0,5	0,5	0,5	0,5
Cashier	units	0,5	0,5	0,5	0,5	0,5
Customer acquisition service manager	units	0,5	0,5	0,5	0,5	0,5
Foreman	units	0,5	0,5	0,5	0,5	0,5
Driver	units	2,0	2,0	2,0	2,0	2,0
Tractor driver	units	2,0	2,0	2,0	2,0	2,0
Porter (waste loading, sorting of recyclable waste)	units	6,0	6,0	6,0	6,0	6,0
Porter (sorting/baling of recyclable waste)	units	2,0	2,0	2,0	2,0	2,0
Mechanic	units	1,0	1,0	1,0	1,0	1,0
Expenditure on wages and taxes on employees:	**lei/year**	**1.105.226**	**1.160.487**	**1.218.512**	**1.279.437**	**1.343.409**
Administration and accounting	lei/year	261.655	274.738	288.475	302.899	318.043
Other employees	lei/year	843.571	885.750	930.037	976.539	1.025.366
Fuel expenses:						
Diesel price	lei/litre	18,67	18,67	18,67	18,67	18,67
13m3 compactor garbage truck consumption	litres/month	240	240	240	240	240
5-7m3 compactor garbage truck consumption	litres/month	240	240	240	240	240
Tractor diesel consumption	litres/month	120	120	120	120	120
Other technique diesel consumption	litres/month	0	0	0	0	0
Diesel consumed	**litres/year**	**7.200**	**7.200**	**7.200**	**7.200**	**7.200**
Diesel expenditures	**lei/year**	**134.424**	**134.424**	**134.424**	**134.424**	**134.424**
Oil expenses:						
Oil price	lei/litre	54,00	54,00	54,00	54,00	54,00
Oil consumption (5% of diesel consumption)	litres/year	360	360	360	360	360
Oil expenses:	**lei/year**	**19.440**	**19.440**	**19.440**	**19.440**	**19.440**
Equipment maintenance:	**lei/year**	**190.010**	**190.010**	**190.010**	**190.010**	**190.010**
13m3 compactor garbage truck, 5% per year of purchase value	lei/year	60.000	60.000	60.000	60.000	60.000
5-7m3 compactor garbage truck, 5% per year of purchase value	lei/year	49.000	49.000	49.000	49.000	49.000
Tractor with trailer, 35,000 MDL per year	lei/year	35.000	35.000	35.000	35.000	35.000
Containers, 5% per year of purchase value	lei/year	40.760	40.760	40.760	40.760	40.760
Baler for recyclable waste, 5% per year of purchase value	lei/year	4.500	4.500	4.500	4.500	4.500
Manual forklift to manipulate bales of recyclables, 5% per year of purchase value	lei/year	750	750	750	750	750
Infrastructure maintenance costs:	**lei/year**	**283.500**	**283.500**	**283.500**	**283.500**	**283.500**

Office maintenance	lei/year	30.300	30.300	30.300	30.300	30.300
Storage facility maintenance	lei/year	163.200	163.200	163.200	163.200	163.200
Recyclables sorting site maintenance	lei/year	60.000	60.000	60.000	60.000	60.000
Materials, recyclables sorting site	lei/year	30.000	30.000	30.000	30.000	30.000
Information and awareness costs:	**lei/year**	**60.000**	**60.000**	**60.000**	**60.000**	**60.000**
Operating expenses, sub-total:	**lei/year**	**1.792.600**	**1.847.861**	**1.905.886**	**1.966.811**	**2.030.783**
Other expenses (5% of operating expenses):	**lei/year**	**89.630**	**92.393**	**95.294**	**98.341**	**101.539**
Equipment depreciation/renewal costs:	**lei/year**	**0**	**0**	**0**	**0**	**0**
13m3 compactor garbage truck	lei/year	0	0	0	0	0
5-7m3 compactor garbage truck	lei/year	0	0	0	0	0
Tractor with trailer	lei/year	0	0	0	0	0
Containers	lei/year	0	0	0	0	0
Baler for recyclable waste	lei/year	0	0	0	0	0
Manual forklift to manipulate bales of recyclables	lei/year	0	0	0	0	0
Summary of operating expenses:	**lei/year**	**1.882.230**	**1.940.255**	**2.001.180**	**2.065.152**	**2.132.322**
Salaries and taxes per employee	lei/year	1.105.226	1.160.487	1.218.512	1.279.437	1.343.409
Fuels and lubricants	lei/year	153.864	153.864	153.864	153.864	153.864
Equipment maintenance	lei/year	190.010	190.010	190.010	190.010	190.010
Infrastructure maintenance	lei/year	283.500	283.500	283.500	283.500	283.500
Information and awareness	lei/year	60.000	60.000	60.000	60.000	60.000
Other expenses	lei/year	89.630	92.393	95.294	98.341	101.539
Depreciation/renewal of equipment	lei/year	0	0	0	0	0
Recyclables selling revenue:	**lei/year**	**223.618**	**292.326**	**358.248**	**379.316**	**413.183**
Plastic (4,000 lei per ton)	lei/ton	131.669	172.125	210.941	223.346	243.287
Metal (4,000 lei per ton)	lei/ton	37.306	48.769	59.767	63.281	68.931
Cardboard/paper (1,400 lei per ton)	lei/ton	46.084	60.244	73.829	78.171	85.150
Glass (600 lei per ton)	lei/ton	8.559	11.188	13.711	14.517	15.814
Cost per ton of waste managed:	**lei/ton**	**1.031**	**1.044**	**1.062**	**1.112**	**1.156**
Calculation of rates for the population:						
Waste generated by a person	tons/year	0,256	0,256	0,256	0,256	0,256
Waste generated by a household	tons/year	0,511	0,511	0,511	0,511	0,511
Rate for a person per month	**lei/month**	**22**	**22**	**23**	**24**	**25**
Rate for a household (2 members) per month	**lei/month**	**44**	**44**	**45**	**47**	**49**
Rate calculation - legal entities:						
Rate - household waste removal	lei/m3	206	209	212	222	231
Rate - household waste removal, 1.1m3 container	lei/1.1 m3	227	230	234	245	254
Rate - household waste removal, container 240 litres	lei/240 litres	49	50	51	53	56
Rate - household waste removal, container 120 litres	lei/120 litres	25	25	25	27	28
Calculation of rates - individual waste storage:						
Storage facility waste management costs	**lei/ton/year**	101	103	106	108	110
Rate - individual storage of household waste	**lei/m3**	20	21	21	22	22
Rate - individual storage of construction/agricultural waste	**lei/m3**	51	52	53	54	55

Notes:

Density of household and household-like waste = 0.2 tons/m^3

Density of construction and demolition waste = 0.5 tons/m^3

Agricultural/organic waste density = 0.5 tons/m^3