NALAS

Network of Associations
of Local Authorities
of South-East Europe

Benchmarking on Solid Waste Management in South-east Europe, 2014

REPORT

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Benchmarking on Solid Waste Management in South-east Europe

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THE REPORT IN BRIEF:

The countries of South East Europe (SEE) included in this Report do not have an established system of data collection or indicator processing , although data collection and Solid Waste Management (SWM) Information System are legally regulated. There are some data available at the national level as part of the national statistics or reporting on environmental status and reporting to the European Environmental Agency (EEA). However, most of the indicators are based on estimated figures.

- The quality of data related to Municipal Solid Waste Management is questionable and creates management difficulties to utilities, municipalities, and other relevant national authorities.

- National statistical offices in any of the countries do not provide figures on waste composition. Serbia is the only country that has regulated its obligation to establish waste quantity and composition as well as a common methodology. In the municipalities of other Western Balkan countries, the same methodology is applied as part of a pilot project.

- The indicator on solid waste generation at the national level in most of the countries (except Romania) is below the EU 28 average, which was 1,2 kg/day per capita for 2014. This indicator is closely related to the national Gross Domestic Product (GDP) level. Turkey, Montenegro and Romania, countries with the highest GDP among the ones observed, have waste generation between 1.1 and 1.5 kg/day per capita.

- Waste is mainly disposed on landfills. Recycling and material recovery including composting and energy recovery is rarely implemented. Waste recovered through recycling does not exceed 10%.

- Composting is present only in Romania. These countries have large rural areas, with low SWM service coverage, so home composting which could be applied at minor costs has strong potential. It can contribute to the reduction of biodegradable waste in landfills.

- Minor Mechanical-Biological Treatment (MBT) options are present in Bosnia and Herzegovina and Turkey. Municipal Solid Waste (MSW) treated in thermal plants is present in Turkey. Power plant waste requires continuous delivery of significant waste quantities, which cannot be realized in most of the countries.

- Despite the SWM advances in the European Union during past decades, the SEE region is still suffering from unsustainable waste management practices including open dumping, etc.

- At the municipal level, data on solid waste are not collected regularly. Municipal utilities providing solid waste collection and processing services do not have reliable and accurate data regarding the quantity and composition of household waste produced by the residents. In most cases, the composition of waste is estimated and cannot be taken into account for decision-making purposes at the local level. Several of the pilot municipalities lack data on MSW generation, service coverage and recycling rates.

- The MSW service coverage in the rural areas of selected municipalities is not satisfactory. The MSW service coverage is not below 80 % in urban areas. In most cases, urban areas are significantly smaller then rural areas.

- Garden and other biodegradable waste which has high recovery potential makes up 25-70% of most of the MSW. In most cases it is disposed in municipal landfills.

- The amount of paper and cardboard generated in most of the municipalities observed is not significant, so the feasibility of developing a comprehensive public system for collection, transport and recycling of such components is questionable. The same can apply to plastics. However, the presence of waste pickers and small recycling enterprises proves that waste recovery has economic potential and is interesting for small companies.

INTRODUCTION 1

This Report presents the results of the solid waste management benchmarking exercise for the countries in South East Europe (SEE), performed by the members of the Solid Waste and Water Management Task Force within the Network of Associations of Local Authorities in South-East Europe (NALAS).

The aim of this exercise was to identify and analyse quantitative and qualitative SWM indicators, covering SWM aspects such as waste generation, service coverage, extent to which municipal solid waste is recovered/recycled, efficiency in relation to landfilling targets, etc.

1.1 Introduction to benchmarking on SWM in SEE

Benchmarking is a common practice and sensible exercise to establish baselines, define best practices and identify improvement opportunities. Benchmarking should be established at national, local and SWM public utility levels. National benchmarking indicators show the baseline situation at the national level and will allow regional comparison and measurement of country's achievements of towards the set of international targets, such as the EU SWM targets set out in the Directive 2008/98/EC on waste (Waste Framework Directive). The EU's Waste Directives are binding targets for the EU Member States and countries on the way to EU accession in the region of SEE.

The national set of benchmarking indicators describes the average situation at the national level, while, in practice, the value of these indicators varies from one municipality to another, within the same country. In municipalities with different economic status, population and rural-urban area ratios, the amount and composition of waste is different. Since local authorities are responsible for SWM, there is a legitimate reason to establish benchmarking at the local municipal level, as well. Local authorities often face limited funds for the development of SWM municipal infrastructure, while local SWM public utilities are faced with reduced income from the provision of their services. Benchmarking at the municipal level will provide information for decision-making on priorities for the limited funds available for service improvements, and enable the monitoring of changes over time.

In addition, internationally consistent indicators, which enable the comparison of municipalities' performance irrespective of their income level, are useful in various contexts, including for example, the development of cooperation efforts aiming at better protection of public health and the environment, increased resource recovery, and better urban governance[1].

[1] D.C. Wilson et al./Comparative Analyses of SWM in 20 Cities, Waste Management & Research, 2012, 30(3), 237-25.)

Establishment of NALAS Solid Waste Management Benchmarking will help NALAS Members – local government associations in the countries of SEE region to gain an independent perspective of how well the SWM is performed compared to other countries and municipalities. It clearly identifies specific areas of opportunity, prioritizes improvement opportunities, sets performance expectations and monitors change at the level of SEE region. Ultimately, it is about managing solid waste in a socially, environmentally and financially responsible manner.

1.2 Research methodology

Benchmarking of solid waste management was conducted in 10 SEE countries[2] included in NALAS network. It was focused on the lowest level of sub-sovereign government, meaning democratically-elected municipal or communal governments. For this purpose, 11 pilot municipalities with population between 35,000 and 125,000 were selected and included into the benchmarking study.

Table 1: Pilot municipalities included in the benchmarking study

COUNTRY	CITY/MUNICIPALITY	POPULATION
Albania	Lezha	107,873
Bosnia and Herzegovina	Prijedor	97,588
	Cazin	69,411
Bulgaria	Gabrovo	60,772
Montenegro	Bijelo Polje	46,051
Kosovo[3]	Ferizaj- Uroševac	108,610
Macedonia	Kumanovo	108,048
Serbia	Pančevo	122,252
Turkey	Uzunköprü	64,312
Romania	Targovište	89,000
Moldova	Soldanesti	37,774

The study was carried out with active participation and support provided by the members of NALAS Task Force on Solid Waste and Water Management (SWWM), as well as NALAS Knowledge Managers from Local Government Associations of the respective countries.

In order to allow benchmarking of performance, regional comparison and monitoring developments over time, a set of indicators for integrated sustainable waste management at both national and municipal levels were identified[4].

Table 2: List of SWM indicators at national and local levels

NATIONAL LEVEL INDICATORS	LOCAL LEVEL INDICATORS
Indicator no.1: Total population	**Indicator no.1:** Population number
Indicator no.2: Country income level	**Indicator no.2:** Urban/rural ratio
Indicator no.3: Municipal Solid Waste (MSW) generation per capita	**Indicator no.3:** Urban area population
Indicator no.4: Waste treatment indicator	**Indicator no.4:** Rural area population
Indicator no.5: Recycling rate	**Indicator no.5:** MSW generation per capita
	Indicator no.6: Waste composition
	Indicator no.7: Population covered by MSW collection service
	Indicator no.8: Population covered by MSW collection service in urban areas
	Indicator no.9: Population covered by MSW collection service in rural areas
	Indicator no.10: Population covered by packaging waste collection service
	Indicator no.11: Recycling rate

2 Since Slovenia has no representative in NALAS Task Force, it is not included in the local level benchmarking. Indicators provided at the national level for Slovenia are found in the reference reports and information provided by Slovenian authorities.

3 "This designation is without prejudice to positions on status, and is in line with UNSC 1244 and the ICJ Opinion on the Kosovo declaration of independence."

4 In the process of identification of indicators, the following references were taken into consideration: D. Willson at all/ Benchmark Indicators for Integrated & Sustainable Waste Management (ISWM), UNEP Integrated SWM Scorebord, FOFAS/Benchmarking Analyses and Policy Priorities in Ireland, BALKWASTE/Study regarding development of the Indicators.

The selected indicators combine waste data (quantity and composition) and service provision level (collection, treatment, disposal and recycling), which allows comparison at the regional level.

Besides the name of the Indicator, measurement unit, its rationale, the way of calculation and measurement method, a definition for each indicator was developed (Table 3).

Table 3: Definition of local level indicators[5]

INDICATOR	DEFINITION
Urban/rural ratio	Share of urban surface and/or rural surface (%) in relation to the local community total surface. A community is defined as rural if its population density is below 150 inhabitants per square km (OECD[5]).
MSW generation per capita	The indicator presents municipal waste generation, expressed in kg per person. Municipal waste refers to the waste collected by or on behalf of municipalities. The main part originates from households, but waste from commerce and trade, office buildings, institutions and small businesses is also included.
Waste composition	Share of specific MSW components (%) (glass, metal, organic material, paper, plastic etc.)
Population covered by MSW collection service	Share of population covered by the collection system (%). This includes households covered by door-to door collection and households covered by a container collection system.
Population covered by MSW collection service in urban area/rural area	Share of population covered by the collection system in urban/rural area (%). This includes households covered by door-to door collection and households covered by a container collection system.
Population covered by packaging waste collection service	Share of population covered by a packaging waste collection system (%). These data are available either in the utility company or in the local community. In many countries, there is regulation in place that sets standards for the number of inhabitants per/packaging waste container. If there is no such regulation, take the following criteria into account: a separate bin storage location is within 30m (horizontal distance) from the front door of the individual flat or building. Calculate the number of households and inhabitants living within a radius of 30 m.
Recycling rate	Proportionate value (%) that reflects the proportion of materials recycled or recovered from the recyclable waste available
Waste treatment	Proportionate value (%) that reflects the proportion of materials treated from the total waste generated: % of MSW landfilled % of MSW disposed at illegal open dumps % of MSW biological treatment % of MSW treated by MBT % of MSW treated by a thermal plant % of MSW recovered by recycling

5 OECD Regions at a Glance 2011

Two questionnaires (Table 4) were also developed and used to collect the necessary data for each of the indicators.

Table 4: Research method applied for specific research aspects

RESEARCH ASPECT	RESEARCH METHOD
The degree to which laws and/or other legal instruments are in place and implemented at both national and municipal levels to enable Solid Waste Management.	**Questionnaire for Institutional and Legal Framework on SWM** The Questionnaire is focused on, but not limited to: ◢ institutional responsibilities for SWM, and data collection and reporting on SWM indicators, ◢ legal framework that regulates SWM, ◢ data collection and reporting at national and EU levels (reporting to EEA). Necessary data for the Questionnaire were collected by the members of NALAS TF on SWWM through consultations with national authorities using the structures of Local Government Associations.
Benchmarks of pilot municipalities' performance and comparative analysis of the current status of municipal solid waste management.	**Questionnaire for Solid Waste Management Indicators** The Questionnaire is focused on both local and national levels, including two categories of indicators: Local and National Level Indicators. NALAS Task Force members contacted both national and local authorities in order to collect data for the calculation of indicators.

Overview of Local Governments in South-East Europe[6]

2

Table 5 presents the number and type of sub-sovereign governments where NALAS members included in the benchmarking operate.

Bosnia and Herzegovina (BiH) has four levels of government. The state of BiH; i) two entities, Republic of Srpska (RS of BIH) and the Federation of Bosnia and Herzegovina (FBiH of BiH) as well as ii) Brcko District; iii) cantons in FBiH (BiH); and iv) municipalities in both entities. In FBiH (BiH), cantons provide most public services and the entity government is relatively small.

Table 5: Levels, Type and Numbers of Sub-Sovereign Governments, NALAS 2015[7]

NALAS MEMBER		Levels of Sub-Sovereign Government	TYPES OF SUB-SOVEREIGN GOVERNMENT	# of 1st Tier
1. Albania	AAM	2	Counties; Municipalities	61
2. Bosnia and Herzegovina		3	Entities; Cantons; Municipalities	143
FBiH	SOGFBIH	2	Cantons; Municipalities (Neighbourhood Units)	80
RS	ALVRS	1	Municipalities (Neighbourhood Units)	63
3. Bulgaria	NAMRB	1	Municipalities/Communes(Neighbourhood Units)	265
4. Kosovo	AKM	1	Municipalities (Neighbourhood Units)	38
5. Macedonia	ZELS	1	Municipalities (Neighbourhood Units)	81
6. Moldova	CALM	2	Autonomous Province Raions/Regions; Municipalities/Communes	898
7. Montenegro	UoM	1	Municipalities	21
8. Romania	FALR, ACoR	2	Counties; Municipalities/Communes	3181
9. Serbia	STCM	2	Autonomous Provinces; Municipalities (Neighbourhood Units)	145
10. Turkey	MMU	4	Special Provincial Administrations; Metropolitan Municipalities; District Municipalities; Communes	2854

6 Data presented in Chapter 2 "General Overview of Local Governments in South-East Europe„ are presented and elaborated in the Report on Fiscal Decentralization Indicators for South-East Europe, NALAS 2006-2014.

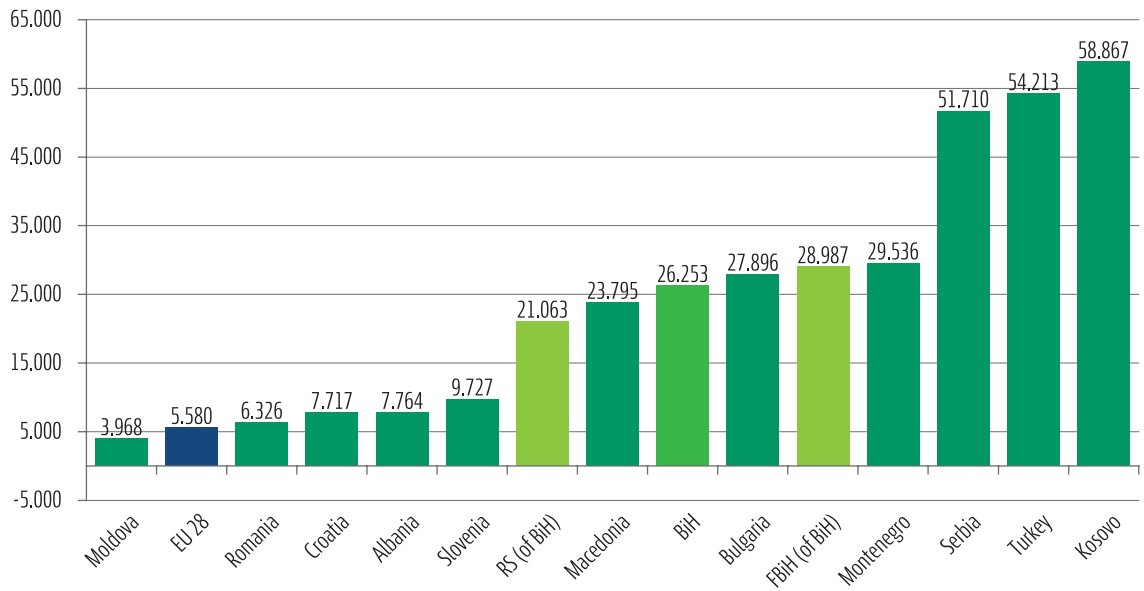
7 Report on Fiscal Decentralization Indicators for South-East Europe, NALAS 2015

Albania has county levels of government (qarks) with a very limited role. **Moldova** has two levels of sub-sovereign government, "raions"/regions and communes/municipalities (as well as the Autonomous Province of Gaugazia). Raion heads are indirectly elected by raion councils and operate under strong central influence. They also exercise significant control over the budgets of municipalities and communes. This blurs the distinction between the 1st and 2nd-tier governments in Moldova, as well as the distinction between local governments and territorial arms of the national government. **Romania** has two levels of sub-sovereign government, communes and cities on the one hand, and judets on the other. **Serbia** has two levels of sub-sovereign governance, the Autonomous Province of Vojvodina and municipalities. **Turkey** has four levels of sub-sovereign government. Three of them – communes, district municipalities and metropolitan municipalities— can be considered as the 1st tier of local governments. But they have different rights and responsibilities. Turkey also has 51 democratically-elected Special Provincial Administrations (SPAs). They function alongside the territorial arms of national government in most of Turkey's regions and deliver some public services, particularly in rural areas. There are no SPAs where metropolitan municipalities are present. Turkey also has 30 metropolitan municipalities.

Macedonia, Montenegro, Kosovo and Bulgaria have a single tier local government system in place.

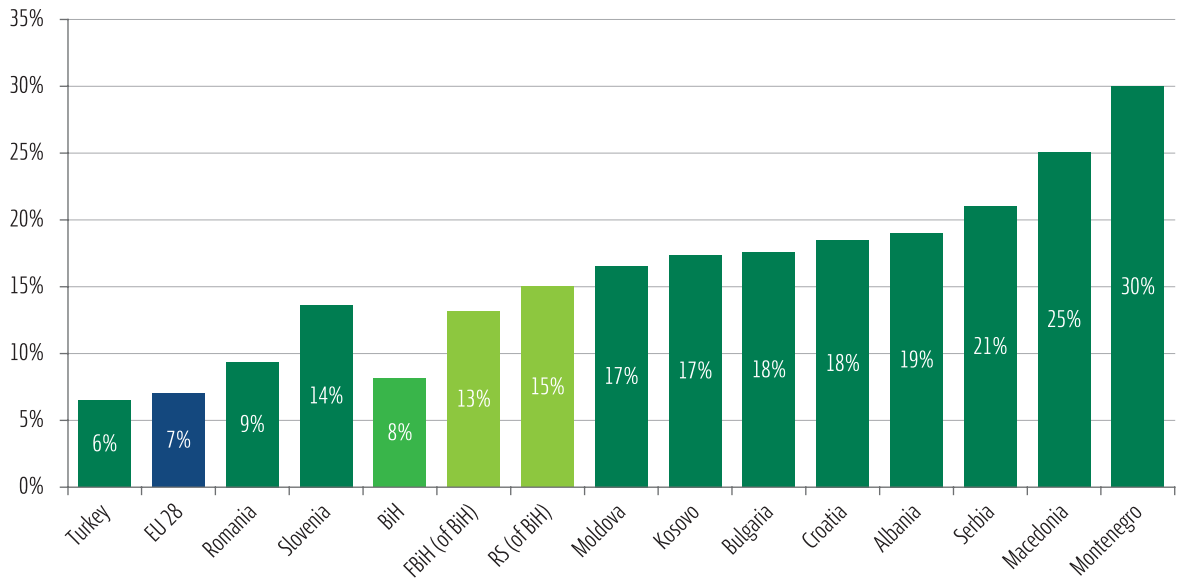
There is considerable variation in the average size of the 1st tier of local governments across South-East Europe. Moldova has the smallest 1st tier of local governments. They average less than 4,000 inhabitants. Municipalities in Romania are also relatively small, averaging less than 10,000 inhabitants (Chart 1).

Chart 1 Average population of 1st Tier Local Governments, Report on Fiscal Decentralization Indicators for South-East Europe, NALAS 2006-2014.



But on the whole, the average size of local governments in the region is larger than the average for the EU as a whole. BiH, Bulgaria, Macedonia, Montenegro, Albania, Serbia, Turkey and Kosovo all have municipalities with average populations greater than 20,000. One reason for the relatively large size of municipalities in these countries is the high share of people living in capital cities (Chart 2).

Chart 2 Percentage of population living in the capital city, NALAS 2015



3 Country Reviews of Solid Waste Management

3.1 Albania

The Ministry of Environment, Forests and Water Administration has the responsibility of drafting policies and legislation on waste management, based on the Law no. 10463/2011 "on integrated waste management" and Decision of the Council of Ministers (DCM) no. 945/2013 "defining the state responsibility of the Ministry of Environment". Other collaborating authorities in this field are the Ministry of Public Works, Transport and Telecommunication, the Ministry of Health, the Ministry of Economy, Trade and Energy, and the Ministry of Agriculture, Food and Consumer Protection.

Inspection and control are under the competence of the State Inspectorate of Environment, Forestry and Water based on DCM no. 47/2014.

The National Agency on Environment is responsible for the Municipal Solid Waste Management (MSWM) Information System, data collection, waste statistics and reporting (DCM no.46 dated 29.01.2014, DCM no. 687 dated 29.07.2015). Other levels involved in data collection are:

1. Municipalities
2. Regions (Qarks)
3. Line ministries (Ministry of Agriculture, Ministry of Health, Ministry of Infrastructure/Transport, and Ministry responsible for the industry).

Municipal solid waste management in Albania is at a low level, but there has been improvement of the situation through the implementation of the National Waste Strategy and National Waste Management Plan 2010-2025.[8] The National Waste Strategy sets the target of recycling/composting at 25 % of MSW by 2015 and by 2020, it aims at increasing recycling/composting to 55 % of the MSW generated.

According to the figures provided by NALAS TFM from Albania (Table 6), waste recovered by recycling amounts to 10%.

Still, most of the MSW is disposed in landfills, which unfortunately account for 60 % on illegal open dumps.

[8] Municipal waste management in Albania, EEA, Prepared by Arta Kodra, Agency of Environment and Forestry, NRC for Waste, Albania and Leonidas Milios, ETC/SCP November 2013

Table 6: National waste indicators, Albania

Indicator Number	Indicator	Unit	Albania	Source of data
1	Total population	Number	2,893,005	http://www.instat.gov.al/
2	Country income level	$	4,564.4	http://data.worldbank.org/
3	MSW generation per capita	kg per day	0.6	National Strategy on SWM
4a	MSW landfilled	%	30	www.mjedisi.gov.al Ministry of Environment
4b	MSW in illegal open dumps	%	60	Ministry of Environment
4c	Waste recovered by recycling	%	10	Ministry of Environment
4d	MSW biological treatment	%	0	Strategic Plan of the City
4e	MSW treated on MBT	%	0	
4f	MSW treated in thermal plants	%	0	
5	Recycling rate	%	33	National Strategy of SWM

3.2 Bosnia and Herzegovina

Municipal solid waste management in Bosnia and Herzegovina is still facing numerous problems regarding waste collection and treatment. However, there has been slight improvement of the situation through the implementation of the World Bank's (WB) Second Solid Waste Management Program, which started in 2008. According to the recent WB Report[9] (October, 2015) the Project made some positive progress over last May 2015. However, the overall progress of Project implementation continues to be substantially behind its scheduled targets, with disbursement slowing down and only 44% being disbursed five months before Project closing. Therefore, overall Implementation progress rating remains moderately unsatisfactory.

Development and implementation of the national waste management policy is not at the national, but at the entity level and Brčko District (BD) level. Responsible institutions are the Federal Ministry of Environment and Tourism, the Ministry of Physical Planning and Civil Engineering and Ecology of the Republic of Srpska (hereinafter referred to as "Entity environmental ministries") and Department for Physical Planning and Proprietary Affairs of Brčko District. This is regulated by entity laws on waste management (Official Gazette of RS 111/13, Official Gazette of FBiH 33/03, 72/09 and Official Gazette of BD 72/09, 25/04, 1/05, 19/07, 2/08 and 9/09).

Data collection on MSW is generally not well structured in the country. There are several levels of data collection which are neither interconnected, nor systematically used for reporting purposes. According to the Law on Waste of the Republic of Srpska, the competent authority for waste management data collection and waste data reg-

[9] Implementation Status & Results Report, World Bank, Second Solid Waste Management (P107998),0ctober 2015

ister is the Fond for Environmental Protection and Energy Efficiency of RS. The Rulebook on methodology for waste data collection and waste data register was adopted recently (Official Gazette of RS no. 71/15). The Federal and District of Brčko laws on waste management do not regulate neither waste data collection, nor waste data register. The Waste Information System is not regulated by any of them.

The Federal Fund for Environment and the Fond for Environment of the Republic of Srpska are collecting data from cantons, municipalities, public and private communal enterprises and landfill sites about the solid waste management system, including data on waste generation and types of waste. These data are used for the purpose of understanding the real situation concerning waste management in both entities. Entity statistics agencies collect data on solid waste collected and disposed for statistical purposes.

Inspection and control are performed at several administrative levels in FBiH, RS and BD. In the Federation of BiH, inspection is performed at both federal and cantonal levels by the Federal Directorate for Inspection Affairs and Cantonal Directorates for Inspection Affairs, respectively. In the Republic of Srpska, inspection is performed at both republic and municipal levels by the Directorate for Inspection Affairs of the Republic of Srpska and the municipal communal police, respectively. In Brčko District, inspection is performed at the District level by the Inspection Department. All these administrative bodies have inspectors for environmental affairs that deal with waste management issues.

Communal waste collection and services are organized at the municipal level. Only the waste management in the Canton of Sarajevo is organized at the cantonal level.

Table 7: National waste indicators, Bosnia and Herzegovina

Indicator Number	Indicator	Unit	Bosnia and Herzegovina	Source of data
1	Total population	Number	3,827,343	Agency for Statistics B&H
2	Country income level	$	4780.00	Agency for Statistics B&H
3	MSW generation per capita	kg per day	0.8	Agency for Statistics B&H
4a	MSW landfilled	%	70.1	Agency for Statistics B&H, corrected figure
4b	MSW in illegal open dumps	%	24.3	Calculated
4c	Waste recovered by recycling	%	5.3	Calculated based on the data given by the Agency for Statistics B&H, First release: Environment, Public Transportation and Municipal Waste Disposal , No. 1, Year VI, 20.11.2015
4d	MSW biological treatment	%	0.0	-
4e	MSW treated on MBT	%	0.3	Calculated on the basis of plant capacities
4f	MSW treated in thermal plants	%	0.0	-
5	Recycling rate	%	14	Calculated based on indicators 3, 4c and the assumption that 25% of the total waste is recyclable

Waste recovered by recycling is much below the target of 20% recycling of municipal waste set by the Federal Strategy for Environment. Most of the waste is disposed in landfills, unfortunately cca 25 % is disposed in illegal open dumps. Small proportion is treated in Mechanical-Biological Treatment (MBT) plants installed in Tuzla and Konjic Municipalities.

3.3 Bulgaria

Bulgaria is in the process of establishing a system of 55 regional facilities for treatment of household waste. The greatest barrier to change is the underdeveloped nature of current waste treatment facilities. Separate collection of waste streams is still in its infancy. Notwithstanding this obstacle, recycling is considered to be a top priority in terms of increased investment[10].

The Ministry of Environment and Water (MOEW) is responsible for the development and implementation of the national waste management policy, including drafting and enforcement of legislation, strategies, programmes, as well as regulation of activities in both public and private sectors. The Ministry performs some of these activities through the Executive Environmental Agency (ExEA) and the network of regional competent authorities, Regional Inspectorates of Environment and Water (RIEW), which control the implementation of waste management legislation.

The Bulgarian Waste Management Act adopted in 2003 sets the responsibilities and obligations of the state and local authorities in regard to the organization, authorization, financing, supervision and control of waste management activities. The Waste Management Act, adopted in July 2012, introduced the EU Waste Framework Directive into the Bulgarian legislation, regulating the obligations of municipalities and the state for waste recycling.

In accordance with the Waste Management Act, "SG", No. 86/30.09/2003 and Ordinance No. 9/28.09/2004 on the procedure and patterns of submitting information on waste related activities and the procedure of keeping a public register on issued permits, registration documents, and closed down sites and activities, data collection on MSW indicators, and the MSWM Information System is a responsibility of ExEA, while waste statistics is a responsibility of the National Statistical Institute (NSI). ExEA in cooperation with NSI prepares national reports on SWM. Municipalities are responsible to collect waste data and submit them to the NSI. NSI collects information on the number of landfills, where municipal waste is collected by systems for organized collection, also information on the quantities generated, collected and landfilled, municipal and construction waste, size and capacity of landfills, number of settlements served and the share of the population served. The quantity of generated municipal waste is reported to Eurostat annually.

The data used for 2014 are obtained both from the regular statistical survey on municipal waste, and the National Waste Information System of the Executive Environmental Agency.

According to the National Statistical Institute, in 2014[11], the total municipal waste generated was estimated at 3,193 thousand tons. According to official statistics, 2 895 thousand tons of municipal waste were landfilled in 2014. Waste directly transmitted for recycling in 2014 was 298 thousand tons. Waste transmitted to facilities for secondary treatment amounted to 1 598 thousand tons, cca 639 tonnes were incinerated. Generated packaging waste amounted to 380,682 tones.

For the purpose of preparation of this Benchmarking Report, national indicators were calculated based on the figures provided in official statistics. In most of the calculations, the basic figure is the waste generated, and it is

10 Waste Management in Central and Eastern Europe, C.M.S. 2013

11 Environmental Statistics—Annual data for 2014, Press release

taken at 3,193 thousand tons, as officially reported. SW generation per capita is 442 kilograms of the collected municipal waste per capita for 2014. With the same number of population, this gives 1.2 kg per capita collected waste. The quantity of municipal waste collected is assessed by means of direct measurement, and in cases of lack of weighing equipment— on the basis of transport documents.

Although not all indicators are available, it is clear that progress has been made on waste recovery. With assistance of ICMA (International City/County Management Association), 19 municipalities introduced a pilot composting program, established one or more composting sites. The compost generated is mostly for use in farming.[12]

Since June 2011, Bulgaria has been significantly improving its waste treatment infrastructure. In July 2011, the European Commission approved the first phase of Sofia's much needed municipal waste project. This phase involves the construction of a landfill and two composting plants. Further, the existing municipal waste separation facility in Suhodol is to be improved and two pilot waste separation schemes are to be set up in the areas of Ovcha Kupel and Kremikovtsi. In 2012, Sofia's heating utility, Sofia CHP, signed a contract for technical assistance in relation to a combined heat and power generation plant on the site of one of its existing heating plants[13].

Table 8: National waste indicators, Bulgaria

Indicator Number	Indicator	Unit	Bulgaria	Source of data
1	Total population	Number	7191325	National Statistical Institute (2014)
2	Country income level	$	5900	
3	MSW generation per capita	kg per day	1.2	National Statistical Institute, annual data for 2014, Press release
4a	MSW landfilled	%	90.7	National Statistical Institute, annual data for 2014, Press release
4b	MSW in illegal open dumps	%	2.0	National Statistical Institute, annual data for 2014, Press release
4c	Waste recovered by recycling	%	7.3	National Statistical Institute, annual data for 2014, Press release
4d	MSW biological treatment	%	n/a	-
4e	MSW treated in MBT	%	n/a	-
4f	MSW treated in thermal plants	%	n/a	-
5	Recycling rate	%	10,00	Calculated based on official statistics

12 Composting in Bulgaria for Waste Reduction, ICMA International

13 Waste Management in Central and Eastern Europe, C.M.S. 2013

3.4 Kosovo

The Republic of Kosovo is undergoing an intensive phase of design and revision of its legislation on waste management based on the EU guidelines and regulations. The Republic of Kosovo Strategy on Waste Management was adopted in 2012 for a period of 10 years. The legal basis for the Strategy is the Law on Waste No. 04/L-060. The mandate of the Ministry of Environment and Spatial Planning is defined by UNMIK Regulation No. 2002/5 and 2005/15 and it is responsible for policy development, permit issuance, coordination and supervision, and implementation of international conventions. In order to do such a thing, the Ministry has set up 7 Departments, 2 Institutes and the Environmental Protection Agency. The Kosovo Agency for Environmental Protection has three divisions:

- Directorate of Environmental Information System,
- Directorate of Environmental Monitoring and
- Directorate of Designing Reports, Plans and Environmental Programs

The Kosovo Environmental Protection Agency was established on the basis of the Law on Environmental Protection No. 50/2009. The Directorate of Environment, Sector for Air, Noise and Waste which is part of Kosovo Environmental Protection Agency, is responsible for developing a data base and information system for waste management and reporting on the waste management situation. Municipal governments are responsible for developing local waste management plans, preparation of annual waste management reports submitted to the Ministry and regulation, implementation and organization of waste management in their territory.

Table 9: National waste indicators, Kosovo

Indicator Number	Indicator	Unit	Kosovo	Source of data
1	Total population	Number	1800000	Kosovo Statistical Office
2	Country income level	$	4000.00	World Bank 2014
3	MSW generation per capita	kg per day	0,9	Kosovo Statistical Office
4a	MSW landfilled	%	90	Ministry for Environment
4b	MSW in illegal open dumps	%	0	-
4c	Waste recovered by recycling	%	9	Ministry for Environment
4d	MSW biological treatment	%	1	Ministry for Environment
4e	MSW treated in MBT	%	0	-
4f	MSW treated in thermal plants	%	0	-
5	Recycling rate	%	n/a	.

Waste recovered by recycling is 9%, and most of the waste, i.e., 90% is disposed in landfills. However, illegal dumping is not officially reported. The organisation "Open Data Kosovo" and UNDP/SDC (under the SAEK project) have launched the Illegal Dumps data visualization platform. The initiative is a result of data collected by 30 young volunteers of the local Gjakova community (in Kosovo) who reported a total of 686 illegal dumping sites. [14]

3.5 Macedonia

Waste management in Macedonia was recently recognised as an issue of concern and a concentrated effort was put forward in order to mitigate its adverse impacts on the environment and society. In previous years, waste management relied exclusively on dumping and landfilling of MSW.[15]

The Law on Waste Management, which was adopted in 2004, constitutes a cover regulation act and provides general rules that apply to the main issues regarding non-hazardous and hazardous waste and special waste streams. Tasks and responsibilities in the area of waste management are in practice split among several institutions in the country, where the dominant role is played by the Ministry of Environment and Physical Planning (MoEPP) and municipalities. Competent authorities for inspection and other enforcement tasks are generally the State Inspection for Environment (MoEPP) and the Council of Inspections as an independent body (it is on a central level). Competent authorities for inspections on a local level are municipality inspection departments. Municipalities are responsible for organising the collection, transportation and disposal of municipal waste; deciding on the location of waste management facilities; issuing local waste management regulations; financing and supervising of dump/landfill closures and termination of waste management facilities.

The core policy documents for waste management at the national level are the National Waste Management Strategy for the period 2008-2020 (Official Gazette no. 39/08) and the National Waste Management Plan for the period 2009-2015 (Official Gazette no. 77/09). One of the main strategic objectives of the SWM Strategy is to establish a data collection/information system on the sources, nature, quantities and fate of waste streams, as well as on the facilities for material/energy recovery and final waste disposal and assurance of the public access required.[16] The Macedonian Environmental Information Centre (MEIC) is a department within the Ministry of Environment and Physical Planning. The main function of MEIC is to provide relevant and properly processed (systematized and standardized), comprehensive, precise, transparent and easily accessible information on the situation, quality and trends in all environment segments (water, air, noise, waste). Macedonia has been cooperating with the EEA since 1997. The Ministry has cooperated with ETCs (Air and Climate Change, Water, Biological Diversity, Resource and Waste Management, Land Use and Spatial Information, ITTAG), and prepared assessment reports and SOER.[17]

14 http://opendatakosovo.org/app/illegal-dumps/

15 Municipal waste management in the former Yugoslav Republic of Macedonia 2013, Environmental Information Centre/Ministry of Environment and Physical Planning of the former Yugoslav Republic of Macedonia, in cooperation with the (ETC/SCP), managed by Copenhagen Resource Institute (CRI), on behalf of the European Environment Agency (EEA).

16 Strategy for Waste Management of the Republic of Macedonia (2008 - 2020)

17 Workshop on Electronic Information Tools to Support the Workshop Implementation of the Aarhus Convention in SEE , Setting up an eSetting e—environmental information system, Svetlana Gjorgjeva, Macedonian Environmental Information Center, November 2010 Macedonia

Table 10: National waste indicators, Macedonia (2011)

Indicator Number	Indicator	Unit	Macedonia	Source of data
1	Total population	Number	2,107,000	Macedonian Statistical Office
2	Country income level	$	4,838	World Bank 2014
3	MSW generation per capita	kg per day	1.0	EEA Report
4a	MSW landfilled	%	99.7	EEA Report
4b	MSW in illegal open dumps	%	0.0	EEA Report
4c	Waste recovered by recycling	%	0.3	EEA Report
4d	MSW biological treatment	%	0.0	EEA Report
4e	MSW treated on MBT	%	0.0	EEA Report
4f	MSW treated on thermal plant	%	0.0	EEA Report
5	Recycling rate	%	12	

According to the EEA Report [18]on Municipal Waste Management in the Republic of Macedonia, the dominant method in managing municipal and other non-hazardous waste is disposal in legal landfills that corresponds to 99.74 % of the total amount of municipal solid waste generated in 2012. The remaining 0.26 % of MSW was recycled or composted. In 2012, the share of recycled packaging was 12% of the total packaging placed on the market[19]. Illegal dumping is not officially reported, although more than 300 sites were registered within the actions of the organisation Let's do it Macedonia[20].

3.6 Moldova

The situation in the solid waste management system is characterized by existing but underdeveloped SWM services in towns and bigger villages, lack of equipment for waste collection and transportation, increasing quantity of waste, lack of capacities for waste disposal, no organized recycling system at the moment, and low level of public awareness about waste management.[21]

The National SWM Strategy of the Republic of Moldova (2013-2027) is calling for both legal and institutional restructuring and creation of an integrated system of technical and environmental regulation in the field of selective waste collection for recycling, recovery, waste disposal and storage. Based on this Strategy, the Government of Moldova undertakes to develop a new legal and institutional framework on waste management regulation under the EU legislation, which would be economi-

18 Municipal waste management in the former Yugoslav Republic of Macedonia, EEA 2013

19 http://www.eea.europa.eu/soer-2015/countries/the-former-yugoslav-republic-of-macedonia

20 http://ajdemakedonija.mk/en/wastemap

21 Improvement of solid municipal waste management in the Republic of Moldova, Osteuropaverein der deutschen Wirtschaft , September 2014

cally efficient and would take into account human health and the environment. Currently the Law on Production and Household Waste, no. 1347-XIII, 1997 regulates municipal SWM.

According to the National SWM Strategy, the collection and processing of information related to the types and amounts of waste are performed under the standards of the former USSR, without being adjusted to the European classification requirements. The current waste management statistical system only partially reflects the situation of household waste management, while the information on the flows of specific hazardous waste such as waste oil, end of life motor vehicles, waste tires, accumulators and batteries, waste electrical and electronic equipment, as well as household waste, is unreliable. Even though some waste processing enterprises do exist in the Republic of Moldova, the information on the volume of recycled waste is not under statistical monitoring. The National Statistical Bureau of Moldova is responsible for data collection and statistics.

Local governments are responsible for the organization of waste collection and disposal systems. The National SWM Strategy aims to establish integrated regional waste management by establishing eight regions. The European Investment Bank will support a project that concerns the implementation of solid waste sector projects throughout Moldova, supporting the implementation of the 2013 Waste Management Strategy of the Republic of Moldova.

According to the National Waste Management Strategy of Moldova and the research of the International Bank, along with the increase in the level of population income the rate of waste generation per capita increases as well, which is usually 0.3-0.4 kg/capita/day in rural areas and 0.9 kg/capita/day or higher in urban areas. Currently, the most widely used method of household waste treatment is storing waste on the ground, which is often a major source of soil and groundwater pollution.

Table 11: National waste indicators, Moldova

Indicator Number	Indicator	Unit	Moldova	Source of data
1	Total population	Number	3559500	Moldova Statistical Bureau
2	Country income level	$	4753.55	World Bank 2014
3	MSW generation per capita	kg per day	0.65	Waste Management Strategy, 2013
4a	MSW landfilled	%	0	
4b	MSW in illegal open dumps	%	100	Waste Management Strategy, 2013
4c	Waste recovered by recycling	%	0	
4d	MSW biological treatment	%	0	
4e	MSW treated on MBT	%	0	
4f	MSW treated on thermal plant	%	0	
5	Recycling rate	%	0	

3.7 Montenegro

By the adoption of the Special Law on Waste in 2011 (Official Gazette of Montenegro 64/11) and the respective set of by-laws (27 by-laws adopted until 2013 and 4 more remaining in accordance with the Law), the Parliament of Montenegro has established a solid legal framework for the national waste management system. Since Montenegro is an EU candidate country, this set of regulations is continually amended through an ongoing process of harmonization with the EU Acquis.

The current institutional waste management framework in Montenegro assigns the main responsibilities in the area of waste management to the central (Ministry of Sustainable Development and Tourism) and local level (23 municipalities) and delegated specific responsibilities to the Agencies, other Ministries and the State Inspectorate (according to their mandate).

According to the Law on Statistics, the Agency for Statistics of Montenegro MONSTAT is responsible for collection of all the data needed for statistical purposes. The Agency decides which data will be collected in the annual Statistics Program. Currently, there are still double statistics regarding waste issues, since EPA is also collecting data and reporting to the Ministries and Government. Waste management indicators are found among the data collected by the Agency. The current National Waste Management Plan recognizes several constrains to successful implementation. Those related to the monitoring and reporting are: i) Public Utility data recording is scarce and reporting schemes are fragmented; ii) Double, even triple data collection at the local level leads to confusion; iii) Data inconsistence (comparison at the source – Year Books). The Law on Environment regulates the establishment of an environmental information system. The waste management system is an integral part of the environmental information system.

Table 12: National waste indicators, Montenegro

Indicator Number	Indicator	Unit	Montenegro	Source of data
1	Total population	Number	620029	MONSTAT
2	Country income level	$	7130.00	MONSTAT
3	MSW generation per capita	kg per day	1.08	NWMP
4a	MSW landfilled	%	86.6	NWMP
4b	MSW in illegal open dumps	%	11	NWMP
4c	Waste recovered by recycling	%	0.8	NWMP
4d	MSW biological treatment	%	0	NWMP
4e	MSW treated in MBT	%	0	NWMP
4f	MSW treated in thermal plants	%	0	NWMP
5	Recycling rate	%	4.7	NWMP

*NWMP- National Waste Management Plan

The recycling rate is much below the target of 50% recycling of municipal waste set by the National Waste Management Strategy for the year 2020. An additional target of 60% in the year 2025 was chosen.

Most of the waste is disposed in landfills, unfortunately, there is still 11 % in illegal open dumps.

3.8 Romania

The first National Waste Management Strategy in Romania was developed for the period 2003-2013 following the transposition of the EU legislation in the area of waste management and according to the provisions of the Emergency Government Ordinance no.78/2000 on waste regime. The National Waste Management Plan was also developed in 2004 in order to take the actions necessary to reach the objectives of the Strategy. In order to increase the efficient implementation of the National Waste Management Plan, Regional Waste Management Plans for the eight Romanian Regions were issued in 2006.

The Ministry of Environment and Climate Change is the competent authority for coordination of the implementation of the Waste Framework Directive (WFD) and resulting Romanian legislation. The Law regarding waste regulatory framework ('Law 211/2011') entered into force on 28 November 2011 and transposed the WFD into the national legislation.

The responsibility for the collection and management of municipal solid waste belongs to municipalities. Local authorities are involved in the practical implications of setting up systems for separate collections, processing, storing, etc., as well as the coordination of activities in the field of pre collection and organization of waste recycling.

The Romanian Environment Protection Agency is responsible for collection of waste data, national reporting and reporting to the EEA. This is regulated by the Law 51/2006 regarding public utility services. Data collection on MSW indicators and waste statistics is regulated by a set of laws: i) Law 211/2011 regarding waste regulation, ii) Law 51/2006 regarding public utility services, iii) Law 101/2006 regarding city sanitation, iv) HG 856/2002 regarding waste management.

Table 13: National waste indicators, Romania

Indicator Number	Indicator	Unit	Romania	Source of data
1	Total population	Number	19550000	Romanian Statistical Office
2	Country income level	$	6195.00	World Bank 2014
3	MSW generation per capita	kg per day	1.5	Romanian Statistical Office, 2011
4a	MSW landfilled	%	85.0	Romanian Statistical Office, 2011
4b	MSW in illegal open dumps	%	5.0	Romanian Statistical Office. 2011
4c	Waste recovered by recycling	%	7.0	Romanian Statistical Office, 2011
4d	MSW biological treatment	%	3.0	Romanian Statistical Office, 2011
4e	MSW treated in MBT	%	0.0	
4f	MSW treated in thermal plants	%	0.0	
5	Recycling rate	%	29	Calculation based on waste composition and 4c

The existing biological treatment facilities are treating mainly green waste from parks and gardens and a small part of household organics. Additionally, one composting facility in Region 3 South and one composting facility in Region 2 South-East are under construction. The capacity of the composting plant Composting Plant for the Organic Fraction of Solid Waste in Piatra Neamt is 12,000 t/year of organic fraction (biodegradable), with available space for a possible future extension of 5,000 t/year. This relates to the collected biodegradable organic fraction of the MSW.

3.9 Serbia

According to the International Solid Waste Association (ISWA) State of the Nation Report from 2012, waste management in Serbia was based only on collection and waste disposal at not strictly sanitary landfills, but often in small open dumps. In order to change the existing practice, the main goals of waste management in Serbia are the increase in selection and separation of recyclables, especially of packaging waste, and disposal of the remaining waste at sanitary (regional) landfills[22].

The Ministry of Agriculture and Environmental Protection is in charge of the development of a national waste policy. The Ministry in charge of the environment usually drafts the waste related laws which are then sent to the Parliament through the Government for adoption. The Waste Strategy is drafted by the Ministry in charge of the environment and adopted by the Government. The Minister in charge of the environment adopts by-laws (regulations, rulebooks, forms etc.), while local authorities (Local Councils) adopt local ordinances accordingly. Law enforcement is divided between central, provincial and local levels, as well as inspection and control.

[22] ISWA, State of the Nation Report, Landfilling Practices and Regulation in Serbia 2012

The Serbian Environmental Protection Agency (SEPA) is in charge of data collection on waste quantities and recyclables, data processing and communication and information to the EEA. General data on service coverage is collected and processed by the State Statistical Office. By the Serbian regulation, there are 9 waste indicators. Each of them is divided in sub-indicators. SEPA official website search on waste indicators shows no results. Data collection on MSW indicators is regulated by a set of laws and regulations:

- Law on Waste Management ("Official Gazette of RS", no. 36/09 and 88/10); Article 75
- Law on Packaging and Packaging Waste ("Official Gazette" No. 36/09);
- Law on Ratification of the Basel Convention on Transboundary
- Movements of Hazardous Wastes and Their Disposal ("Official Gazette of FRY—International Treaties ", No. 2/99);
- Ordinance on the methodology for the preparation of national and local registry of pollution sources, as well as the methodology for species, ways and terms of data collection ("Official Gazette" No. 91/10);
- Ordinance on the form of daily records and annual reporting on waste with instructions for its completion ("Official Gazette" No. 95/10);
- Regulation on categories, testing and classification of waste ("RS Official Gazette", No. 56/10);

The Serbian Environmental Protection Agency (SEPA) collects data on air emissions, water emissions and waste. The collected data are entered into the database, thus forming the environmental information system of the Republic of Serbia. The environmental information system, monitoring and reporting at the national level are regulated by the Law amendmending the Law on Environmental Protection ("Official Gazette", No.

72/2009); Articles 69, 73 and 74. The Statistical Office of RS reports on waste generation and population served. However, the figures are outdated and reefer to 2008. Reporting to the EEA is regulated by the Law on Ministries ("Official gazette of RS", No. 44/2014, 14/2015, 54/2015) Article 5.

Serbia currently recycles 7% to 8% of its communal waste such as glass, wood, paper, plastic and metal. Serbia has 3582 identified landfills, 165 of which are municipality landfills, 5 are sanitary landfills and the rest are illegal dumping sites[23]. It is estimated that 20% of the waste generated is disposed in the illegal dumps. There are 5 more regional sanitary landfills under construction, as well as closure and sanitation and/or recultivation of some municipality landfills.

3.10 Turkey

According to the 2010 National Report of Turkey to the 18th session of the Commission for Sustainable Development, the implementation of waste management by municipalities and metropolitan municipalities in Turkey has not reached its optimal status at all. While the collection and transportation of waste is performed at a great scale, most of the solid waste in the country is still not disposed in accordance with laws and regulations[24].

In Turkey, the primary legislation consisting of laws is constituted in the Turkish Parliament and executed by the Turkish Government, whereas the secondary legislation consisting of regulations, communiqués and circulars is constituted and executed by the corresponding Ministry in charge. The secondary legislation on waste management is defined and executed by the Ministry of Environment and Urbanization (MoEU).The secondary legislation is mainly

Table 14: National waste indicators, Serbia

Indicator Number	Indicator	Unit	Serbia	Source of data
1	Total population	Number	7186862	Serbian Statistical Office
2	Country income level	$	5820.00	World Bank 2014
3	MSW generation per capita	kg per day	0.9	Serbian Statistical Office
4a	MSW landfilled	%	65.0	
4b	MSW in illegal open dumps	%	20.0	SEPA Env. Report for 2013
4c	Waste recovered by recycling	%	15.0	Estimation
4d	MSW biological treatment	%	0.0	-
4e	MSW treated in MBT	%	0.0	-
4f	MSW treated in thermal plants	%	0.0	-
5	Recycling rate	%	34	Calculated on the basis of waste composition and 4c

[23] Opportunities & Barriers Of Recycling in Balkan Countries: the cases of Greece and Serbia, ISWA 2012

[24] http://www.un.org/esa/dsd/dsd_aofw_ni/ni_pdfs/NationalReports/turkey/Full_text.pdf

adapted to the corresponding EU Directives and is in line with the "EU Integrated Environmental Approximation Strategy for Turkey (2007-2023)". The following set of primary legislation regulates waste management:

- Law on Environment No. 2872
- Renewable Energy Law No. 534
- Municipality Law No. 5393
- Metropolitan Municipality Law No. 5216

According to the Metropolitan Municipality Law (10.7.2004 - 5216) and the Municipality Law (3.7.2005— 5393), the sole responsibility for municipal waste management falls on municipalities. They are responsible for providing all services regarding collection, transportation, separation, recycling, disposal and storage of solid wastes, or for appointing others to provide these services (ETC/SCP, 2009). Nevertheless, while fulfilling their duties of collecting and transporting solid waste to a great extent, they do not show the required level of activity and attention in solid municipal waste management.

Municipalities, rural directorates of the Ministry and also the Environment and Urbanisation Ministry have a role in MSW data collection. The Environment and Urbanisation Ministry is responsible for management of the MSWM Information System. Data are transferred to the Turkish Statistical Institution TURKSTAT, which publishes an Annual Report on waste statistics. The Ministry prepares both national reports and reports for the EEA.

According to the 2014 TURKSTAT data, 58.14 % of the municipal waste generated is sent to sanitary landfills and 32.44 % is dumped in municipality dumpsites. 0.41 % of the MSW was reported as composted in 6 composting facilities and 0.02 % is treated in 32 co-incineration plants.

Table 15: National waste indicators, Turkey

Indicator Number	Indicator	Unit	Turkey	Source of data
1	Total population	Number	78041053	TurkStat 2014
2	Country income level	$	10389.7	TurkStat
3	MSW generation per capita	kg per day	1.12	TurkStat 2014
4a	MSW landfilled	%	58.14	TurkStat 2014
4b	MSW in illegal open dumps	%	32.44	TurkStat 2014
4c	Waste recovered by recycling	%	5.77	TurkStat 2014
4d	MSW biological treatment	%	0.41	TurkStat 2014
4e	MSW treated in MBT	%	0	TurkStat 2014
4f	MSW treated in thermal plants	%	0.02	TurkStat 2014
5	Recycling rate	%	n/a	TurkStat 2014

3.11 Benchmarking of national level indicators on SWM

Overview of the national level legal framework, institutional responsibilities and data collection on SWM

Countries in the region of South East Europe have a limited experience in Solid Waste Management Benchmarking. There are some data available at the national level as part of national statistics or as part of reporting on the environment status and reporting to the European Environmental Agency (EEA). These countries have not established a system of data collection or indicator processing of , although data collection and SWM information system are legally regulated (Table 16).

Municipal waste data are not collected regularly. Municipal utilities providing solid waste collection and processing services in SEE do not have reliable and accurate data on the quantity and composition of household waste produced by residents. Figures are often estimated by municipal communal enterprises. Therefore, solid waste data should be considered with a degree of caution because of data collection methodologies and completeness. The poor quality of information available precludes them from organizing their operations adequately and reporting properly to municipalities and national level authorities, leads to poor planning and monitoring, and impedes the actual implementation of the European Union (EU) standards and targets set by the EU Waste Management Directives. The quality of data on household waste is a challenge for utilities rendering the services, municipalities to which most of the related competencies have been transferred, and for supervisory and other national authorities in charge of designing policies and monitoring their implementation at the national level.

Table 16: Overview of the situation with legal framework, institutional responsibilities and levels involved in data collection

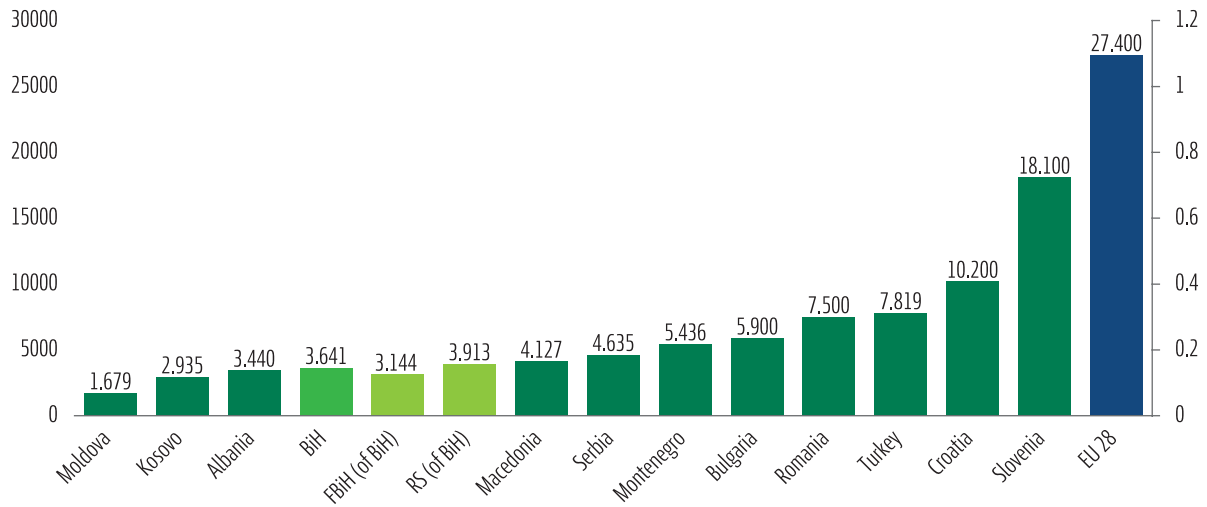
Country	MSWM information system/legally regulated	Institution responsible	Other levels involved in data collection are:	Reporting to EEA
Albania	Yes/yes	Environment Protection Agency	Municipalities, regions, line ministries	yes
Kosovo	Yes/yes	Environment Protection Agency	Municipalities	no
Moldova	No	Statistical Office	Municipalities	no
Bosnia and Herzegovina	No (Entity the Republic of Srpska- yes, entity the Federation of Bosnia and Herzegovina- only private waste operators)	Environment Protection Agencies and Statistical Offices	Municipalities, regions, line ministries, waste management companies	no
Macedonia	Yes /Yes (no secondary legislation)	Macedonian Environmental Information Centre (MEIC) (belongs to the Ministry)	Municipalities	yes
Serbia	Yes/yes	Environment Protection Agency and Statistical Office	Municipalities, waste producers, Ministry, operator of the treatment facility	no
Bulgaria	Yes/yes	Environment Protection Agency and Statistical Office	Municipalities	yes
Romania	Yes/yes	Environment Protection Agency		yes
Montenegro	Yes/Yes	Environment Protection Agency and Statistical Office	Municipalities	
Croatia	Yes/yes	Environment Protection Agency		yes
Turkey	Yes/yes	Environment and Urbanisation Ministry, Statistical Office	Municipalities, Ministry 's Rural Directorates of and also Environment and Urbanisation Ministry	yes

Benchmarking of SWM national level indicators

When comparing the GDP per capita, countries in the region are in a very similar economic situation, except for Turkey that has a GDP almost double then the rest of the countries observed with 7,819 EUR per capita, followed by Romania with 7,500 EUR, while six countries have less than 5000 EUR per capita.

For a purpose of understanding potential correlation of the GDP and generation of SWM, we add values of GDP and SWM generation for 7 more countries and EU 28.

Chart 3 GDP per capita for all countries of the group, in EURO

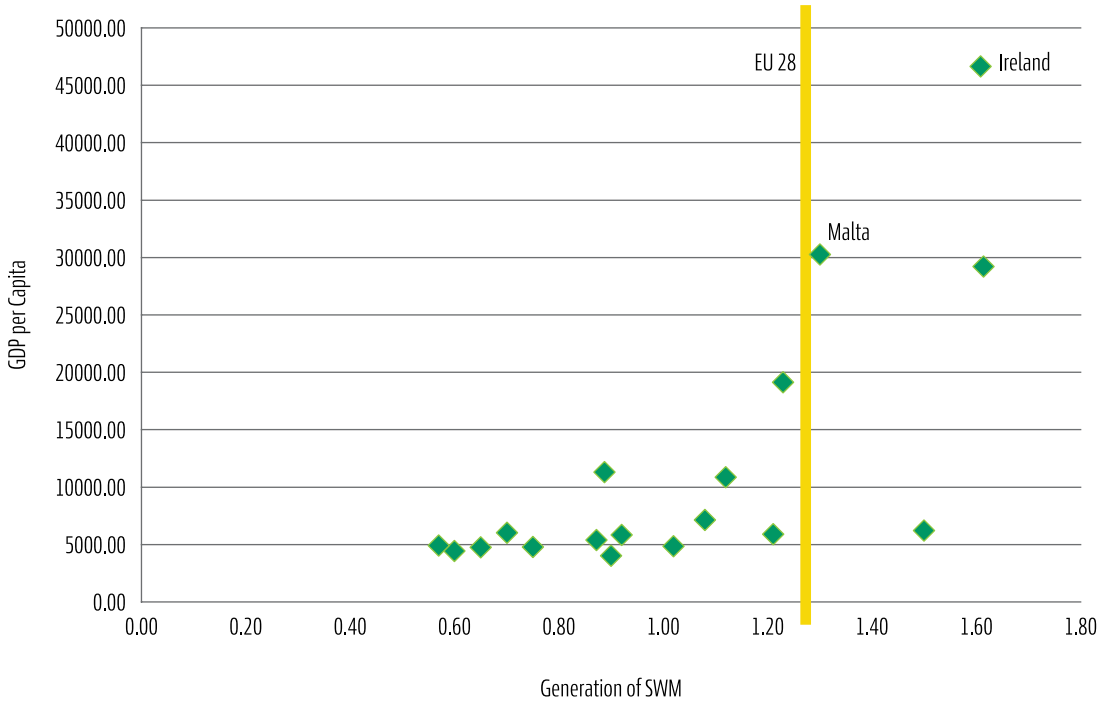


Source: Fiscal Decentralization Indicators for South-East Europe: 2006—2014

Table 17: SWM Generation and GDP per capita of 7 additional countries and EU 28

	Slovenia	Ireland	Poland	Malta	EU 28	Morocco	Georgia	Egypt
SWM Generation	1.23	1.61	0.89	1.61	1.3	0.57	0.87	0.70
GDP Per capita	19110.5	46633.2	11304.6	29200.0	30240.0	4910.0	5390.0	6000.0

Chart 4 Correlation of Generation of SWM (kg per capita) and GDP in $ per capita



For GDP per capita below 10,000 $, SWM generation is in the range of 0.6- 1.2 kg. Its significant increase does not automatically mean a significant increase in SWM generation. Malta and Ireland with 3 and 4 times bigger GDP have 1.6 kg of waste generated per capita. However, for decision-making processes and selection of best suitable SWM scenarios, we need to also know the total of waste generated annually. A small amount of waste generated within a country will limit the application of a high capacity and complex waste recovery or waste treatment infrastructure.

Besides Turkey and Romania, all other countries have a very small annual generation, i.e. less than 5,000,000 t/year (Chart 5).

Besides the total number of population which is higher in comparison to other countries, Romania and Turkey, together with Bulgaria, have a significantly higher generation of waste per capita per day (Chart 6).

Chart 5 Correlation of population number and amount of waste generated, in t/year

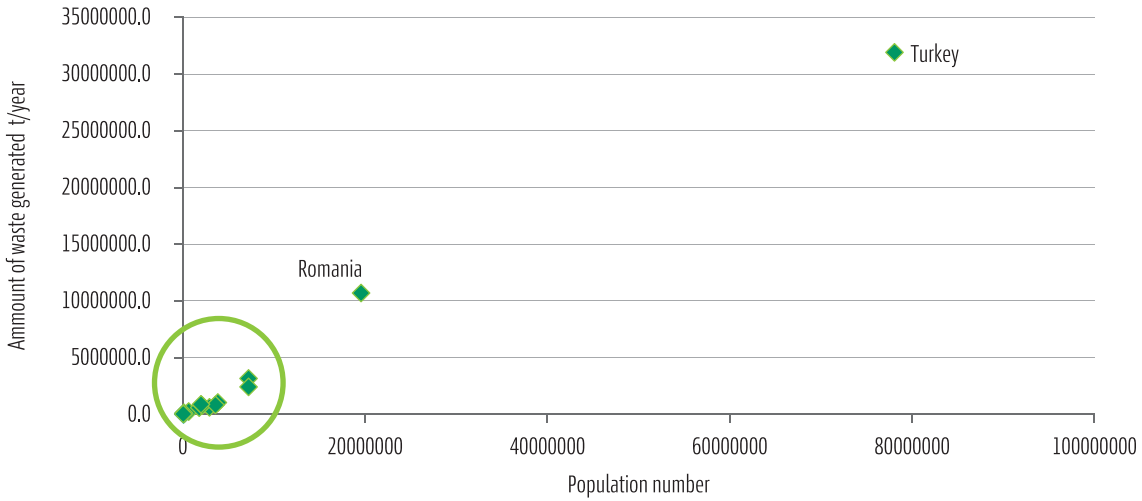
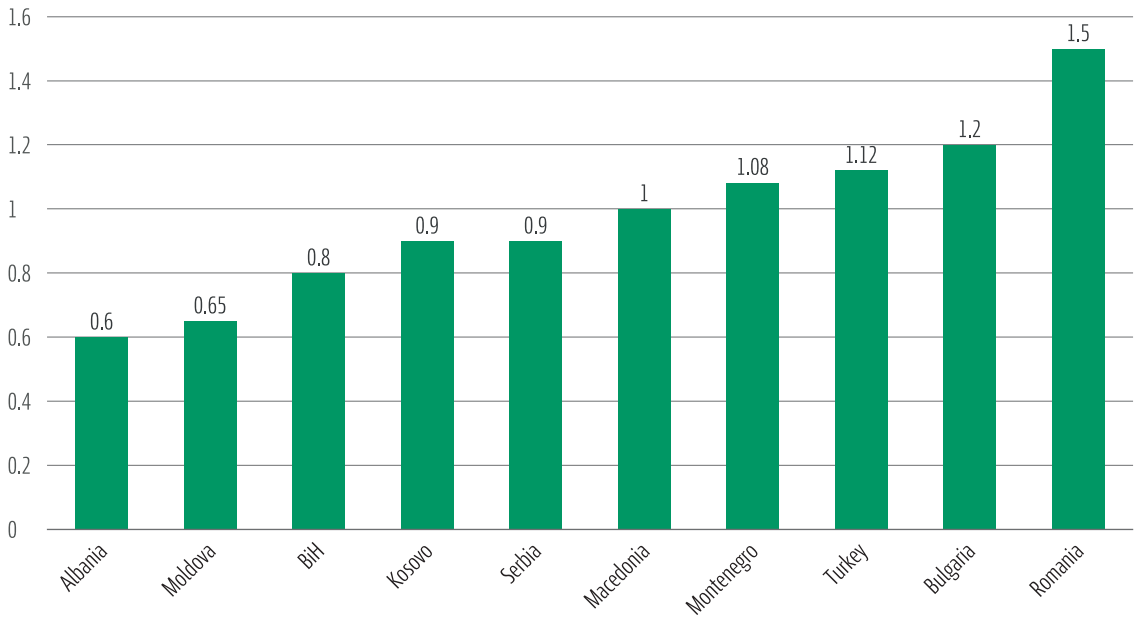


Chart 6 MSW generation per capita, in kg/day



The most preferable option for most of the countries is still the disposal either in sanitary and controlled municipal landfills or in illegal dump sites (Chart 7). Most of the countries have close to 90% or more waste disposed in landfills compared to EU-28 that in 2012 had almost half (48.3 %) of the waste landfilled. Albania reported that almost 60% of its waste generated is disposed in open dump sites. Illegal dumping is not officially reported in Kosovo and Macedonia, although a number of projects are dealing with clean-up actions in both countries.

Chart 7 MSW landfilled vs. MSW illegally dumped

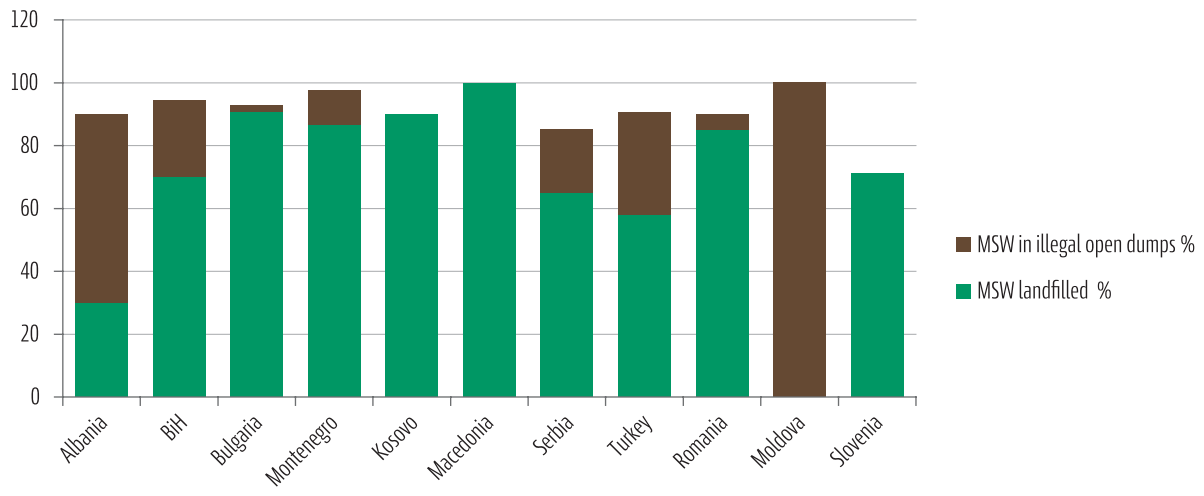
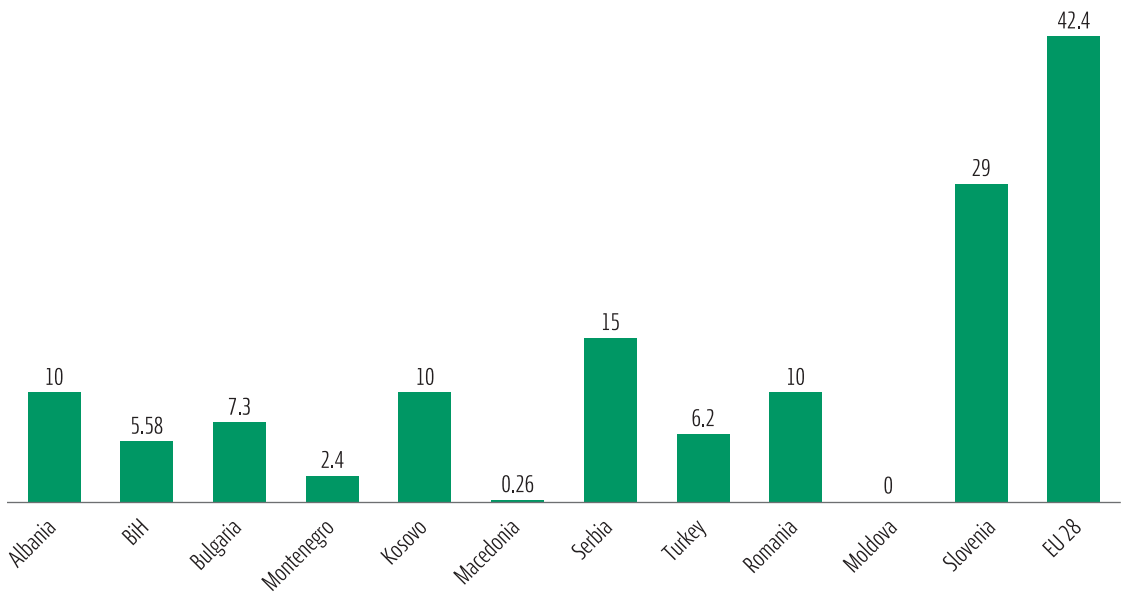


Chart 8 Waste recovery per country, %



Waste recovery presented (Chart 8) is equal to the sum of values of indicators 4c— Waste recovered by recycling and 4d—MSW biological treatment (Table 7) i.e. recycling, biological treatment, MBT and thermal treatment. Waste recovery does not exist in Moldova, while other countries reported 0.26 % (Macedonia) to 15 % (Serbia).

The value of this indicator is not comparable with the value presented for EU 28, as the value of 36.4 % relates to the share of the waste treated in the EU-28 in 2012, while the indicator 4c-4d relates to the waste generated. It is the same with 6.0 % of the waste treated in the EU-28 that is sent for incineration. Bulgaria introduced pilot composting in 19 municipalities resulting in 30% of the generated waste being composted. In 6 composting plants, Turkey treats 0.41% of its waste generated. Bulgaria recovers energy from 20% of its waste generated, in the Sofia combined heat and power generation plant. Turkey recovers 0.02 % in 32 co-incineration plants. MBT is present in Bosnia and Herzegovina.

4 Municipality Reviews of Solid Waste Management

4.1 Municipality Lezha (Albania)

A total of 107,873 population lives in the Municipality of Lezha, out of which 38.6 % is in its urban area. Its urban area is about 100 km2, which represents 50% of its total territory. MSW generation per capita is 0.7 kg/day.

The population covered with MSW services in urban areas is 92.8%, while in rural areas it is much lower, i.e. 44.3%. The recycling rate is significant and estimated at 28%. This is a result of two Projects "Development of a Waste Management Plan and Construction of a Separation and Recycling Center in the Municipality of Lezha" and "Participatory Plastic Cleaning-up and Waste Management in Lezha Municipality".

Chart 9 Proportion of population in rural and urban areas, Lezha (Albania)

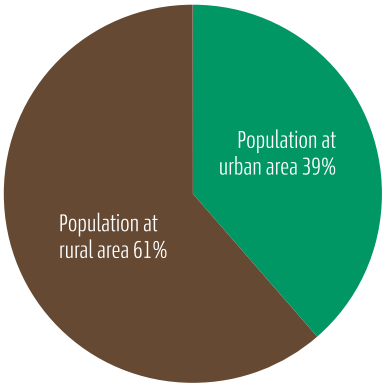
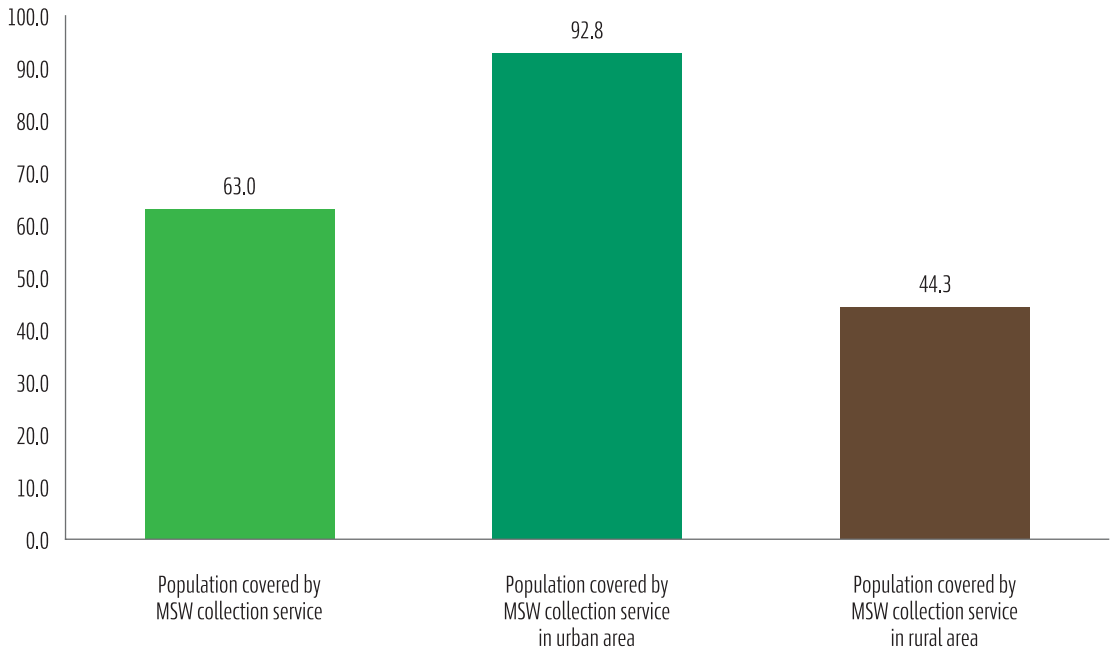
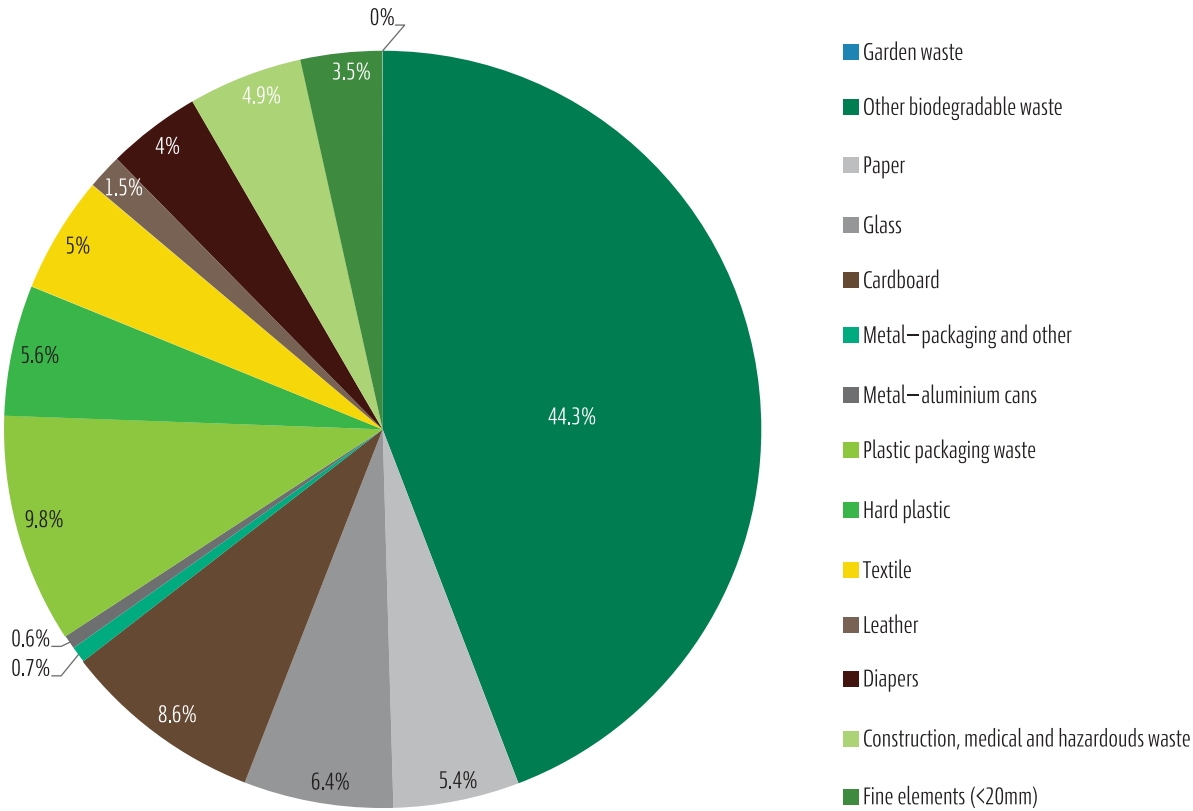


Chart 10 MSW service level, Lezha (Albania)



Waste is composed mainly of biodegradable garden waste – 44.3%, while there is plastic packaging waste in the amount of 10% and cardboard in the amount of 9%.

Chart 11 MSW Composition, Lezha (Albania)



4.2 Municipality of Prijedor (Bosnia and Herzegovina)

A total of 97,588 population lives in the Municipality of Prijedor, out of which 53 % are in its urban area. Its urban area is about 14.3 % of the 834 km2 of its total territory. The population covered with MSW services in the urban area is 88 %, while in the rural area, it is much lower, i.e. 28%.

MSW generation is 1.6 kg/day per capita from households and 9.73 kg/day from commercial sources.

Chart 12 Proportion of population in both rural and urban areas, Prijedor (Bosnia and Herzegovina)

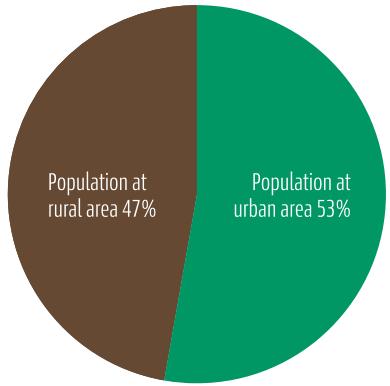
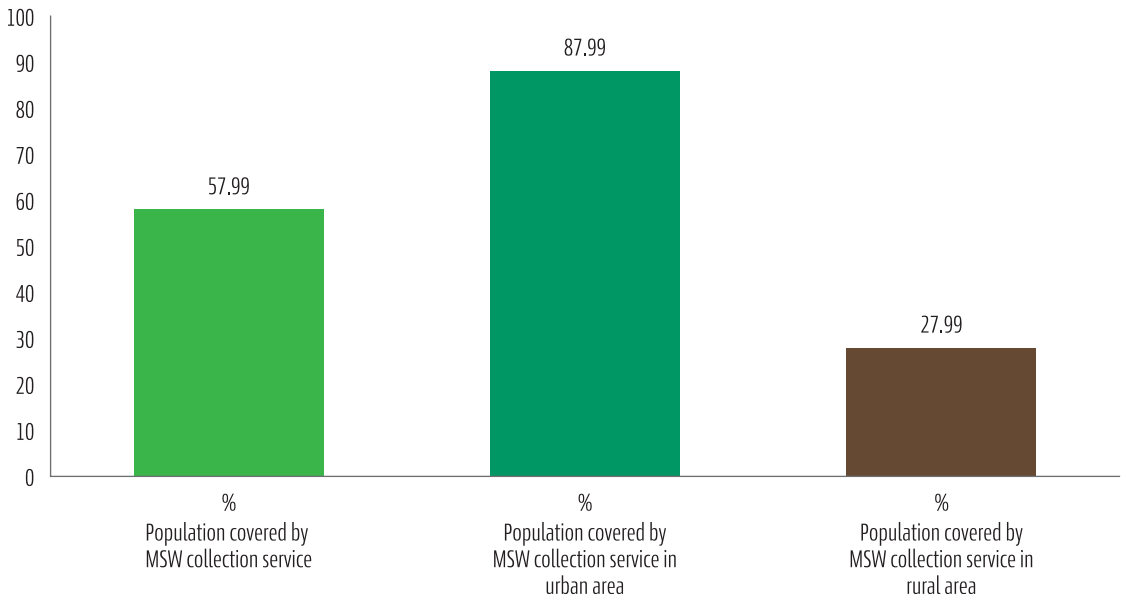
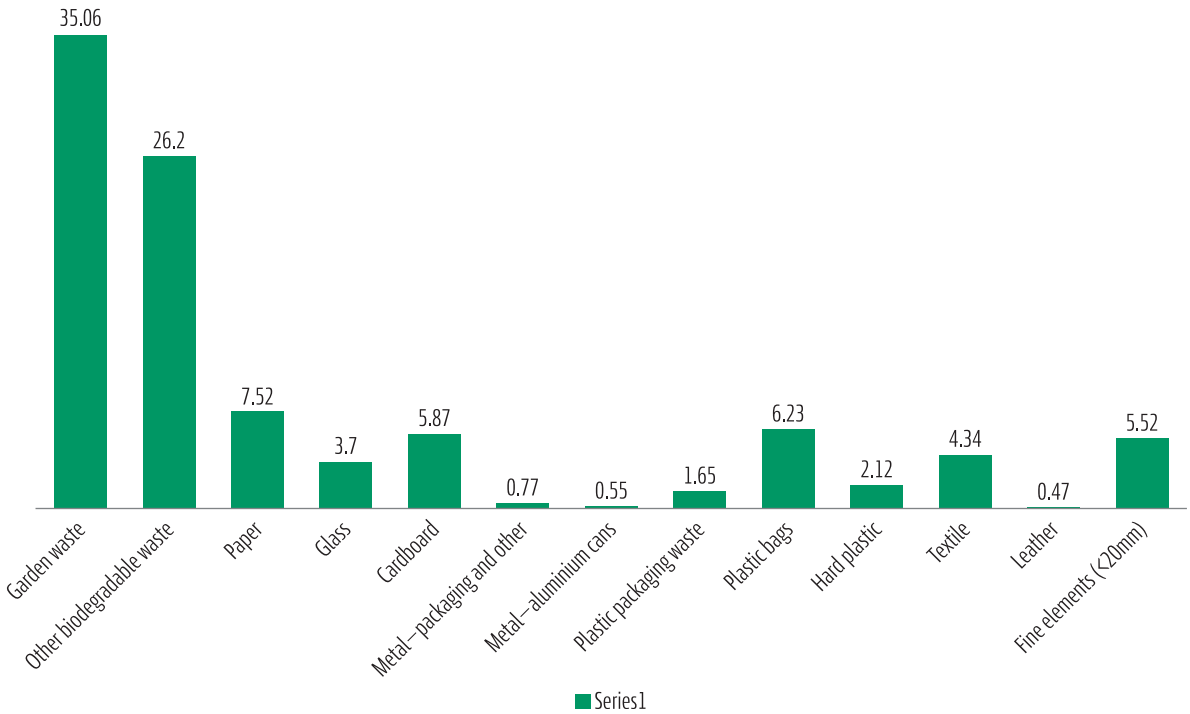


Chart 13 MSW service level, Prijedor (Bosnia and Herzegovina)



The waste is composed mostly of biodegradable waste – 61.3%, while paper accounts for about 8%. There is a significant share of plastic bags – 6.3% and aluminium cans—7.9%. Approximately 44 % of the population is covered by the packaging waste collection service. However, the recycling rate in Prijedor is still low, only 2.8%.

Chart 14 MSW Composition in %, Prijedor (Bosnia and Herzegovina)



4.3 Municipality of Cazin (Bosnia and Herzegovina)

The Municipality of Cazin has a total surface area of 356 km2. The surface of its urbanized area is not available. A total of 69,411 inhabitants live in Cazin Municipality, while only 17,750 live in its urban area. MSW generation is 0.42 kg/day per capita.

The population covered with MSW services in the urban area is 100 %, while the rural area has lower results, i.e. 77%, while the packaging waste collection service is not provided at all. Therefore, the recycling rate in Cazin is 0%.

Chart 15 Proportion of population in rural and urban areas, Cazin (Bosnia and Herzegovina)

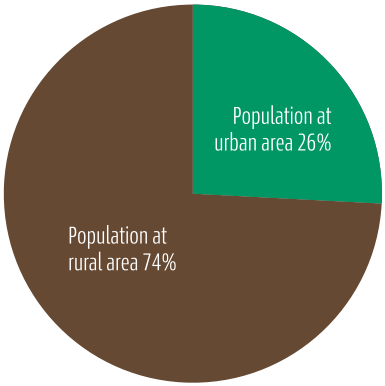
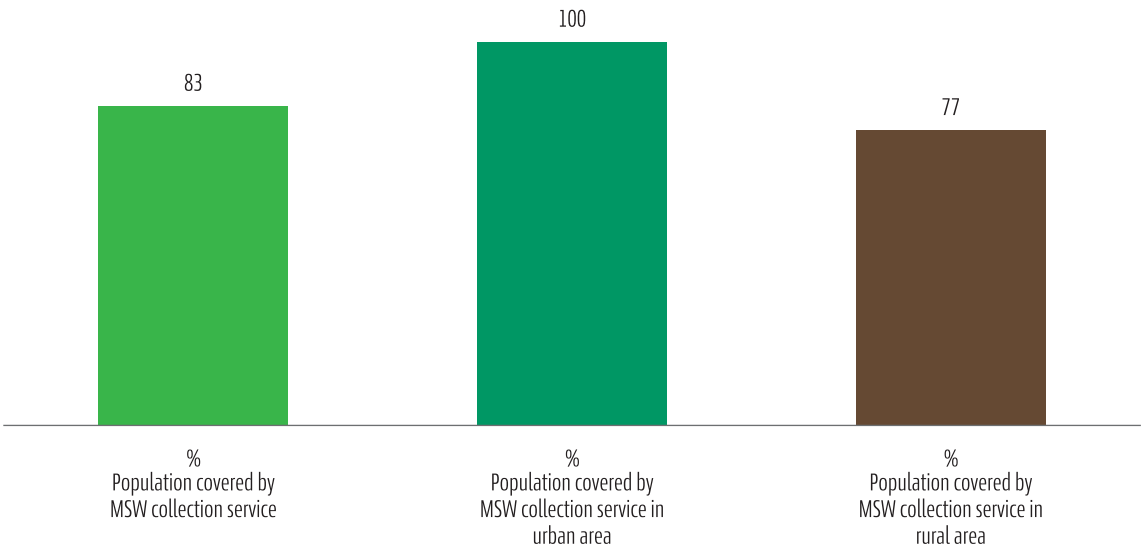
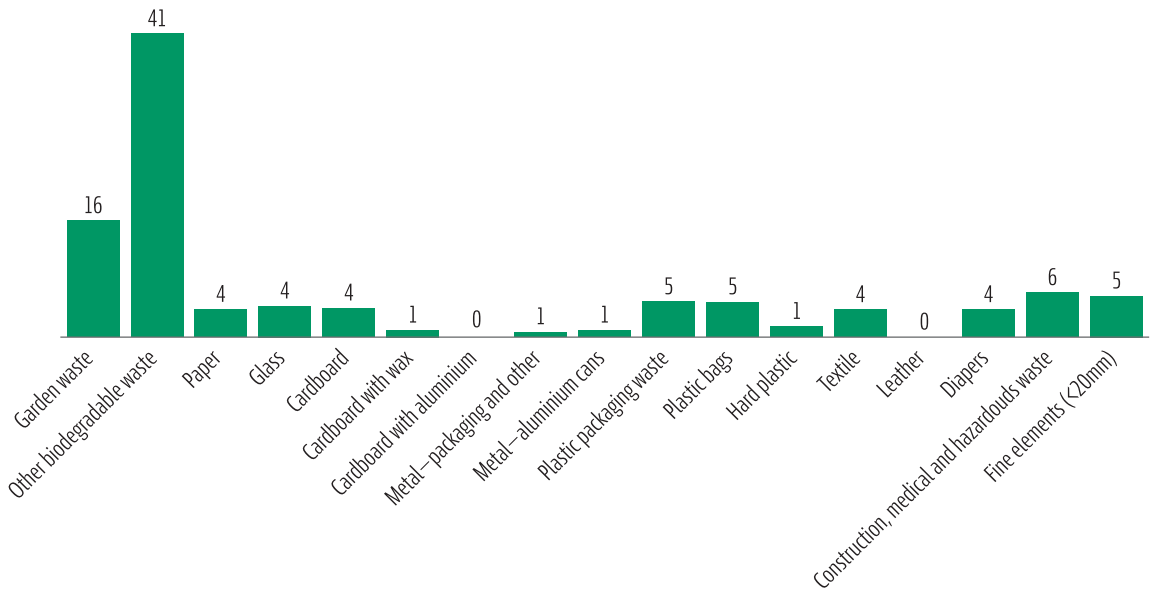


Chart 16 MSW service level, Cazin (Bosnia and Herzegovina)



The share of biodegradable and garden waste is significant, i.e. 57% in total. Paper, cardboard and glass account for about 4%, while the share of metals, diapers and leather is less than about 4%. There is a significant proportion of construction waste mixed with medical and hazardous waste.

Chart 17 MSW Composition, Cazin (Bosnia and Herzegovina)



4.4 Municipality of Gabrovo (Bulgaria)

A total of 60,772 population lives in the Municipality of Gabrovo, out of which 92 % are in its urban area. Its urban area accounts for about 42 % of its total territory (555580 km2). Information about MSW generation is not available.

The population covered with MSW services in urban and rural areas is 99 %. According to the data provided by NALAS TFM, approximately 99 % of the population is covered by the packaging waste collection service. However, the recycling rate in Gabrovo is still low and only 6.8%.

Chart 18 Proportion of population in rural and urban areas, Gabrovo (Bulgaria)

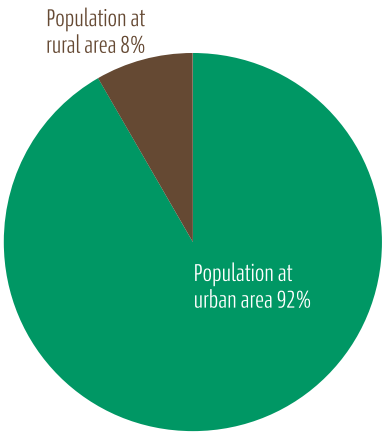
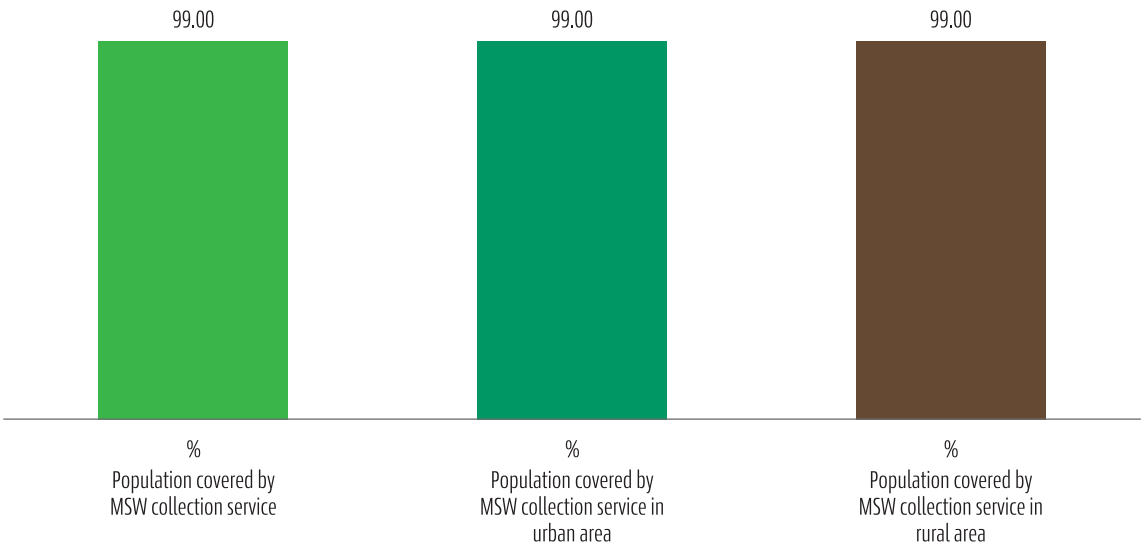
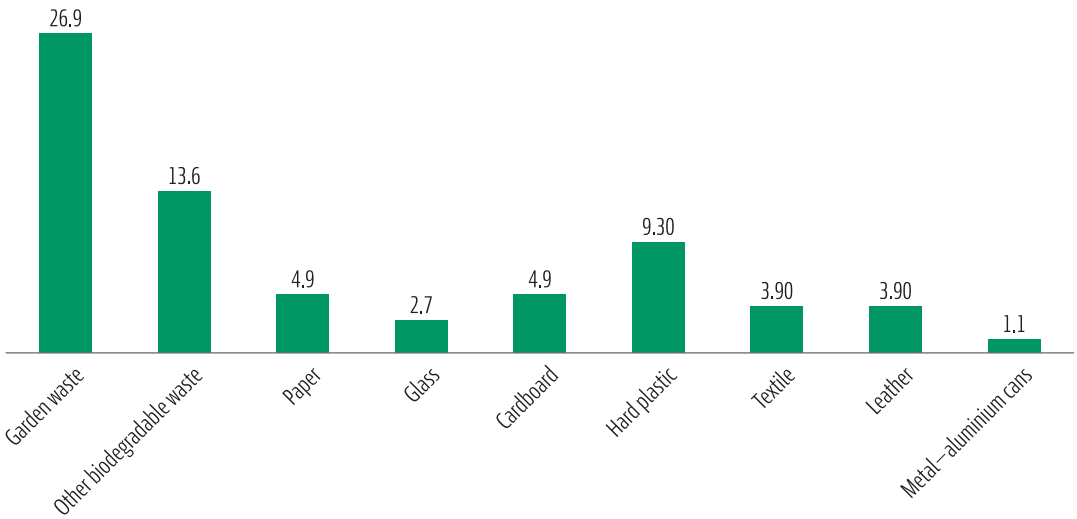


Chart 19 MSW service level, Gabrovo (Bulgaria)



The waste is composed mostly of biodegradable waste— 40%, while hard plastic accounts for about 9%. There is a significant proportion of plastic bags – 6.3%, and aluminium cans – 7.9%. Other components like paper, glass, textile and leather are in the range between 2.5 and 5%.

Chart 20 MSW composition, Gabrovo (Bulgaria)



4.5 Municipality of Bijelo Polje (Montenegro)

A total of 46,051 population lives in the Municipality of Bijelo Polje, out of which 67 % is in its urban area. The urban area accounts for about 29.8 % of the 924 km2 total territory. The population covered with MSW services in the urban area is 100 %, while in the rural area it is much lower, i.e. 8%.

MSW generation per capita is 0.95 kg/ day.

Chart 21 Proportion of population in both rural and urban areas, Bijelo Polje (Montenegro)

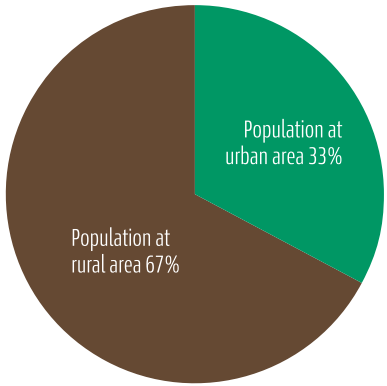
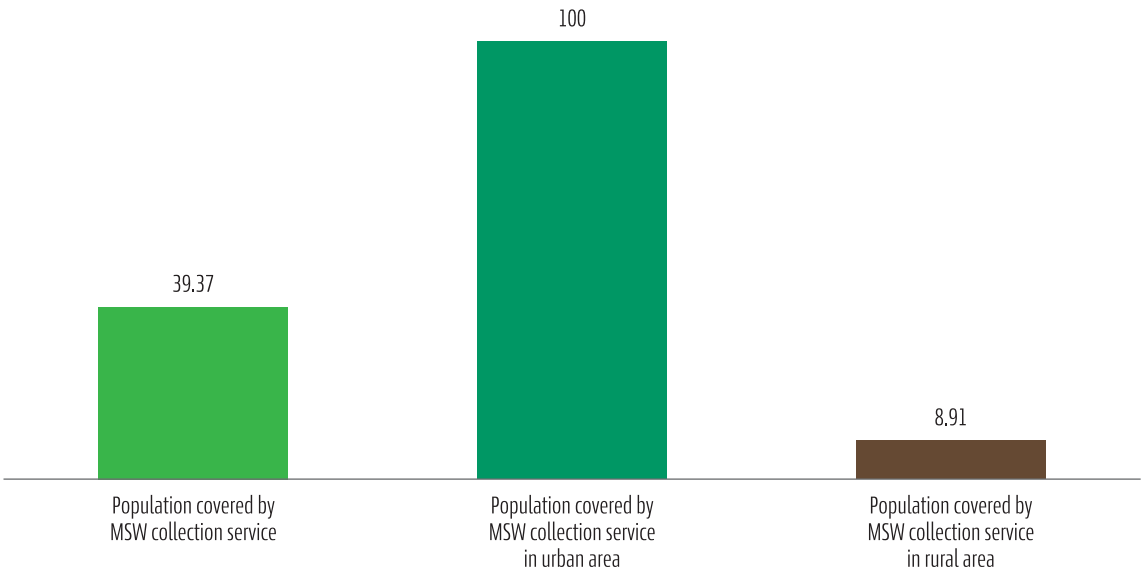
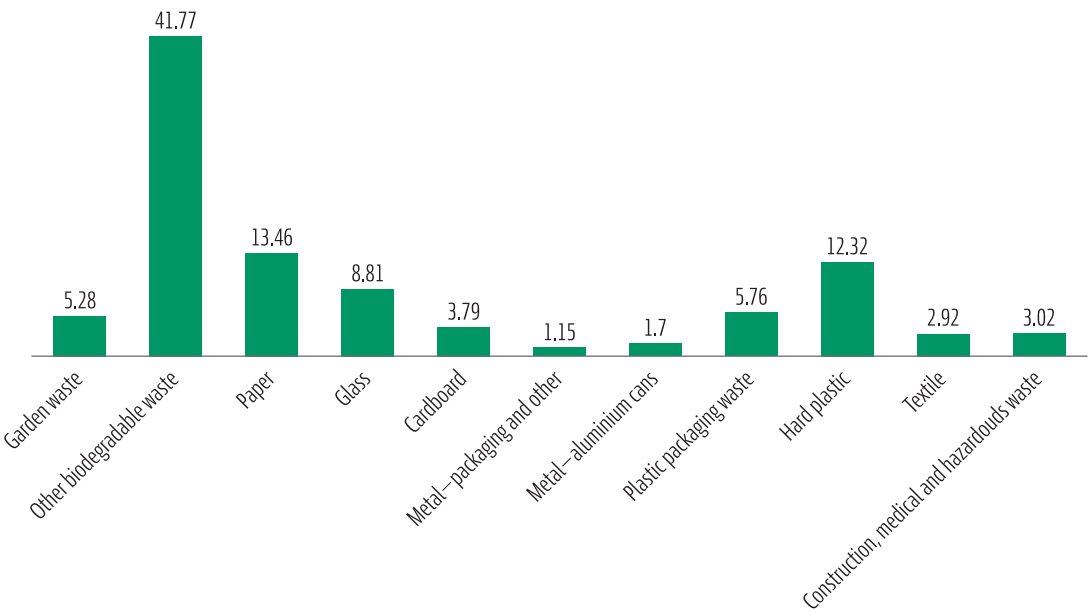


Chart 22 MSW service level, Bijelo Polje (Montenegro)



There is no information about the recycling rate and coverage by recycling services. The waste is composed mostly of biodegradable waste—47%, while paper is about 13.5%, and glass is 8.8%. There is a significant proportion of hard plastic—12.3%. The data provided are obtained from the national institutions being typical for the region (north Montenegro). No data are available from the Municipality, since they do not provide services for separate waste collection or any kind of recycling.

Chart 23 MSW composition, Bijelo Polje (Montenegro)



4.6 Municipality Ferizaj-Uroševac (Kosovo)

Total of 108.610 population lives in municipality Ferizaj-Uroševac, out of which 45 % in urban area. Urban area is about 45 % of 315 km2 of the total territory. Population covered with MSW services in urban area is 80 % while in rural areas is 63%.

MSW generation per capita is 0,56 kg/day.

Chart 24 Proportion of population in both rural and urban areas, Ferizaj-Uroševac (Kosovo)

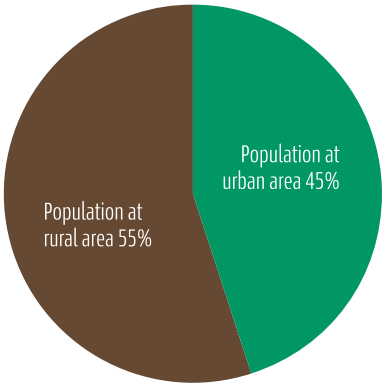
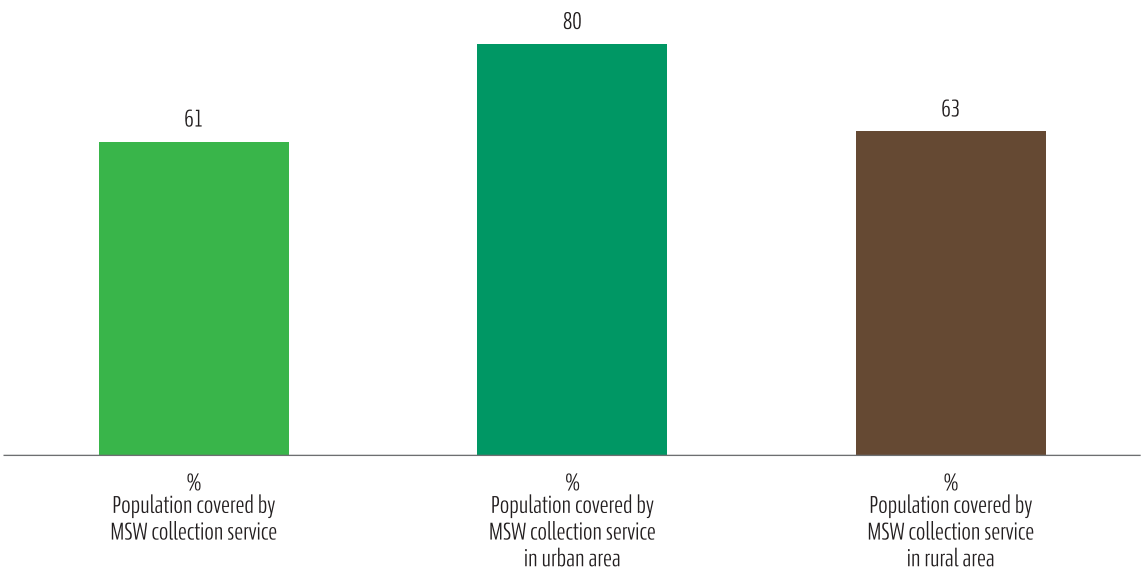


Chart 25 MSW service level, Ferizaj-Uroševac (Kosovo)



There is no information about the recycling rate and coverage by recycling services in the Municipality of Ferizaj-Uroševac. The communal enterprise estimated 15 % of paper in the composition of waste, while the share of other recyclable components is reported as zero. The rest of the 85 % is biodegradable waste. Having in mind that some proportion of glass, plastics, metals and other type of waste is reasonably expected, this can be taken as a very rough estimation.

4.7 Municipality of Kumanovo (Macedonia)

A total of 108,048 population lives in the Municipality of Kumanovo, out of which 72 % is in its urban area. Its total surface area is 509.5 km2. The population covered with MSW services in the urban area is 100 %, while in the rural area it is extremely low—4%.

The figure on the population covered by packaging waste collection services and the recycling rate is not available. The figure on MSW generation is not available.

Chart 26 Proportion of population in both rural and urban areas, Kumanovo (Macedonia)

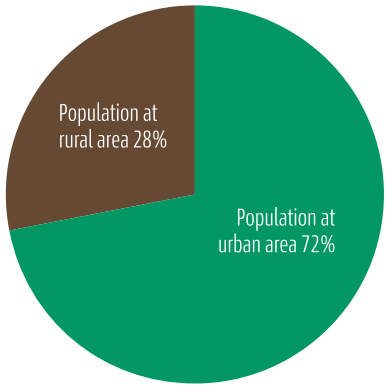
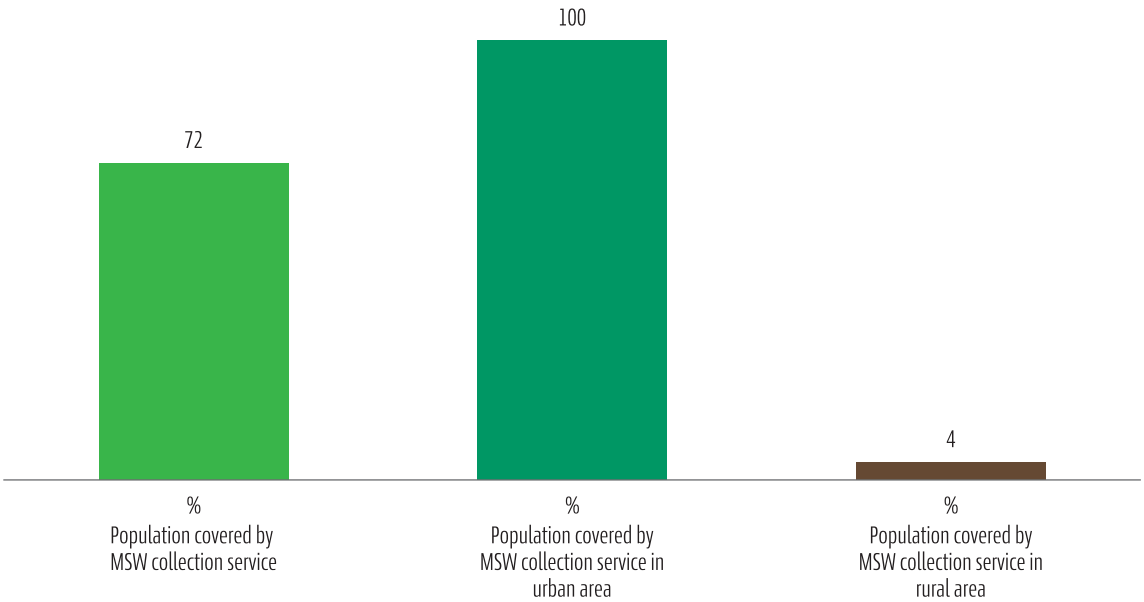
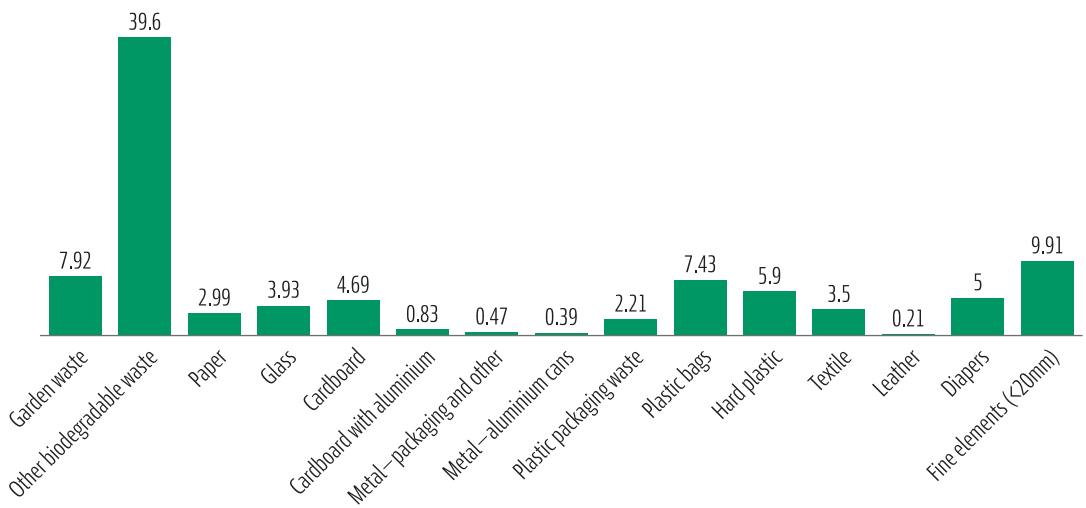


Chart 27 MSW service level, Kumanovo (Macedonia)



The waste is composed mostly of biodegradable waste – 47.5%. There is a significant proportion of plastic bags – 7.5%.

Chart 28 MSW composition, Kumanovo (Macedonia)



4.8 Municipality of Pančevo (Serbia)

A total of 122,252 population lives in the Municipality of Pančevo, out of which 73 % is in its urban area. The urban area accounts for about 19.3 % of the 756 km2 of the total territory.

MSW generation per capita is 0.57 kg/day per capita.

The population covered by MSW collection services in the urban area is 100%, while this indicator for the rural area is 96.8%.

Chart 29 Proportion of population in both rural and urban areas, Pančevo (Serbia)

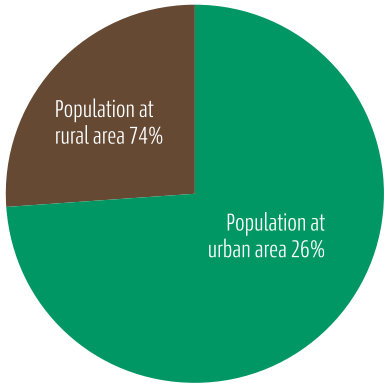
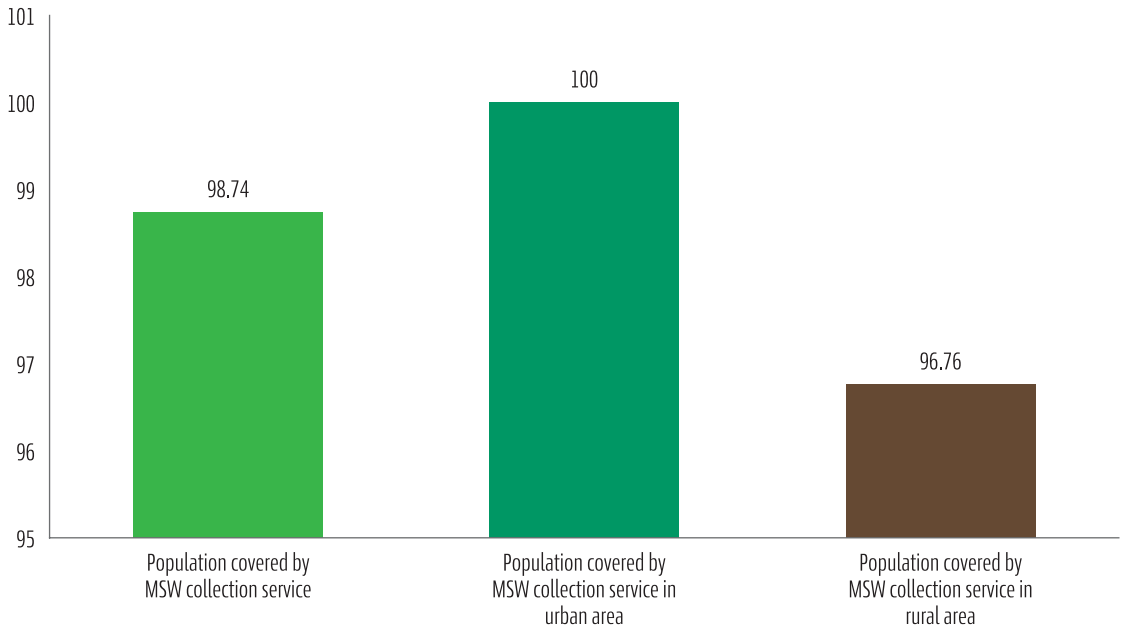
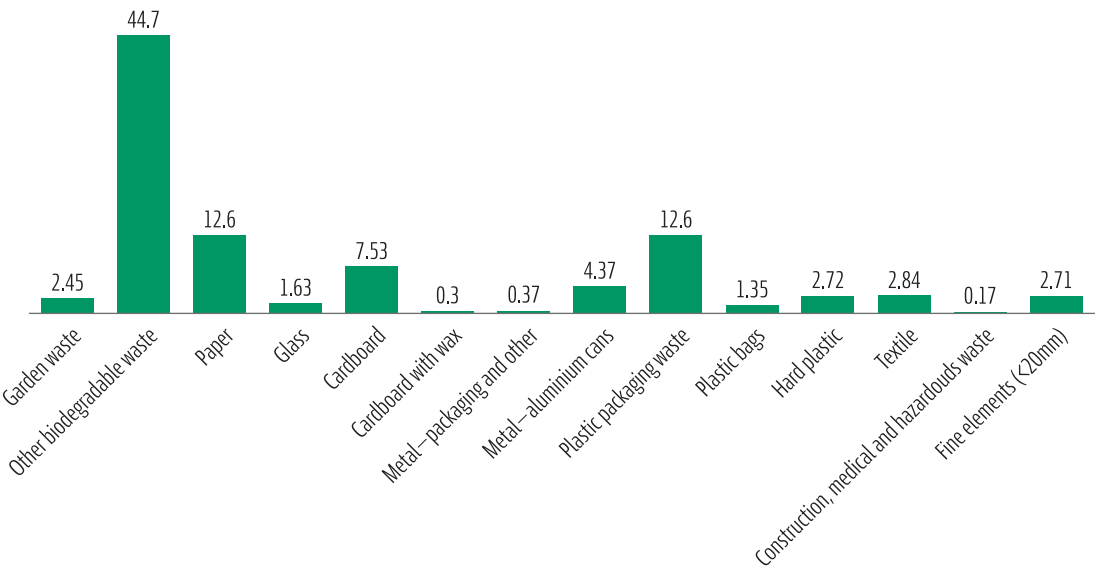


Chart 30 MSW service level, Pančevo (Serbia)



The figure on the coverage by packaging waste collection services is not provided, but the recycling rate in Pančevo is about 6.5%. The waste is composed mostly of biodegradable waste— 47%, while paper and plastic packaging waste is about 12.6%, each. There is a significant proportion of plastic begs – 6.3%, and aluminium cans—7.9%.

Chart 31 MSW composition, Pančevo (Serbia)



4.9 Municipality of Uzunköprü (Turkey)

A total of 64,322 population lives in the Municipality of Uzunköprü, out of which 63 % is in its urban area. The urban area is about 16 % of the 1,212 km2 of the total territory.

MSW generation per capita is 1.5 kg/day.

The population covered with MSW services in both rural and urban areas is 100 %.

Approximately 62 % of the population is covered by packaging waste collection services. The recycling rate in Uzunköprü is significant—37%.

Chart 32 Proportion of population in both rural and urban areas, Uzunköprü (Turkey)

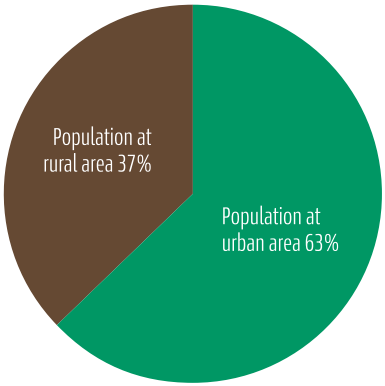
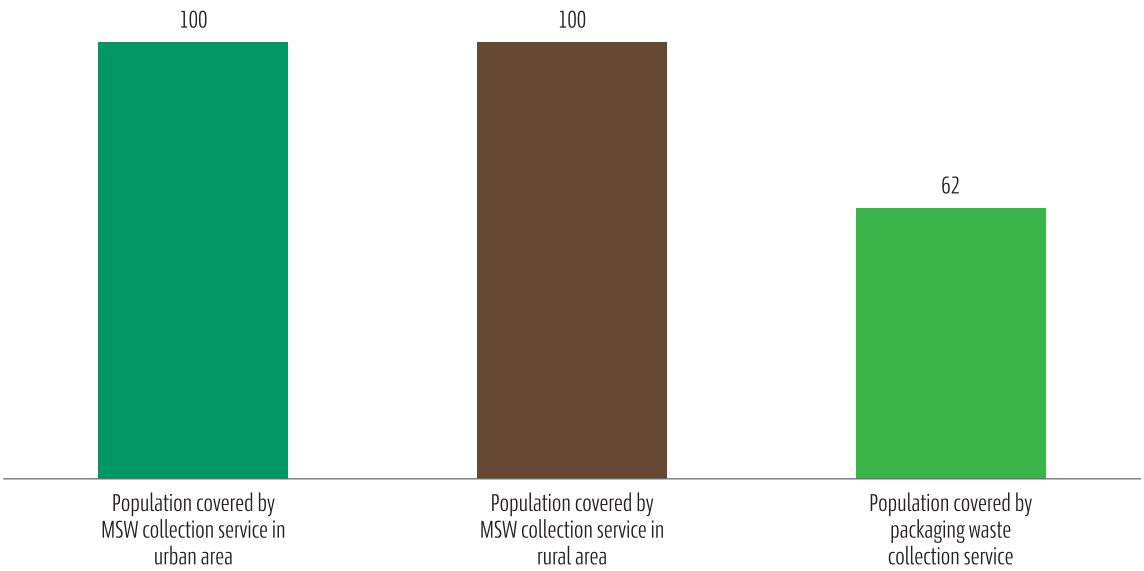
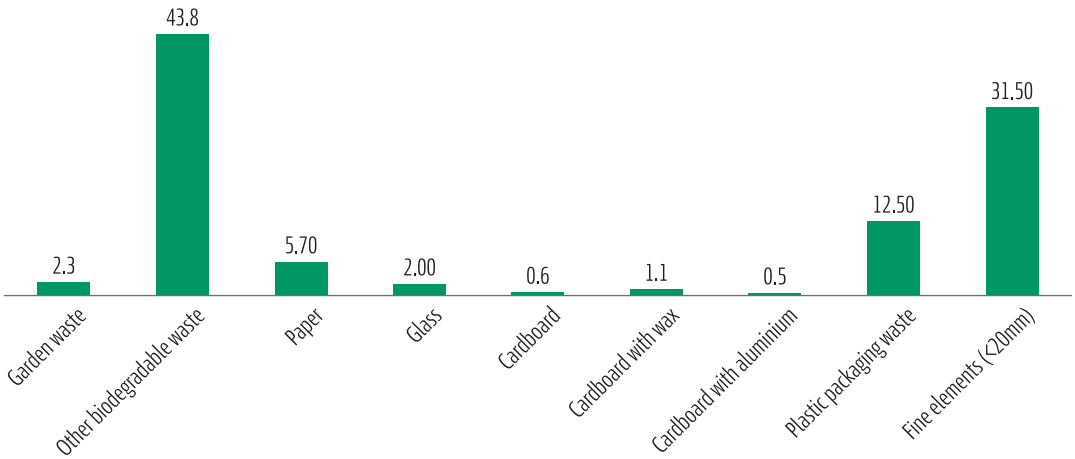


Chart 33 MSW service level, Uzunköprü (Turkey)



The waste is composed mostly of biodegradable waste – 46.1%, while paper accounts for about 6%. There is a significant proportion of plastic packaging waste – 12.5%.

Chart 34 MSW composition, Uzunköprü (Turkey)



4.10 Municipality of Târgoviște (Romania)

A total of 89,000 population lives in the Municipality of Târgoviște, out of which 90 % is in its urban area. The urban area is about 84.4 % of the 769 km2 of the total territory. The population covered with MSW services in both urban and rural areas is 100 %.

MSW generation per capita is 1.5 kg/day.

Approximately 17 % of the population is covered by packaging waste collection services. However, the recycling rate in Târgoviște is not presented. The waste is composed mostly of biodegradable waste— 50%, where there is an equal proportion of paper, textile and leather (5%).

Chart 35 Proportion of population in both rural and urban areas, Târgoviște (Romania)

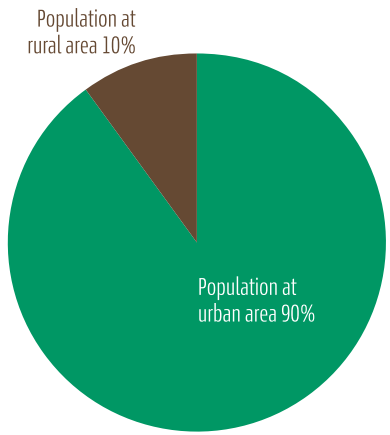
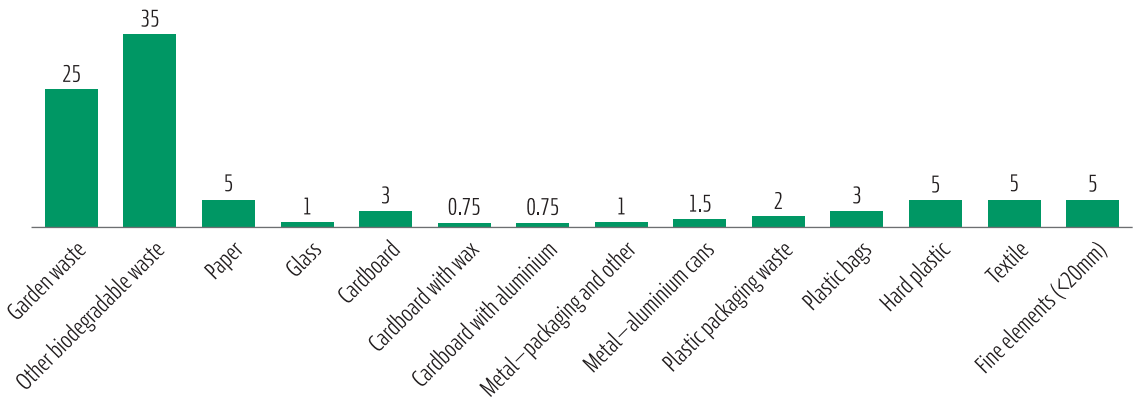


Chart 36 MSW composition, Târgoviște (Romania)

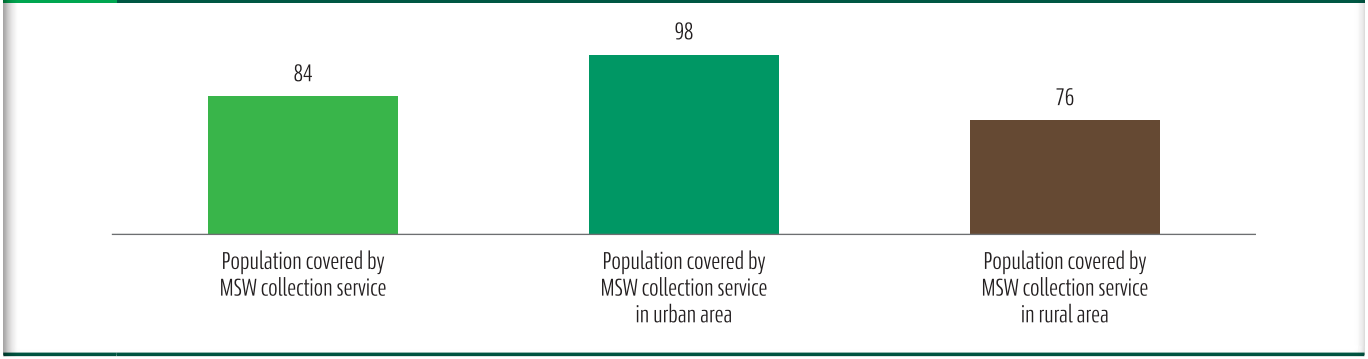


4.11 Municipality of Soldanesti (Moldova)

According to the data presented in the Feasibility Study for the Inter-municipal Solid Waste Management Center in Soldanesti[25], a total of 37,774 population lives in Soldanesti Municipality. The population covered with MSW services in the urban area is 98 %, while in the rural area it is much lower—76%.

MSW generation per capita is 0.71 kg/day.

Chart 37 MSW service level, Soldanesti, Moldova



According to the data presented in the Study, the biggest proportion of waste composition is reported as "residuals". Residuals are divided into "mixed organic and inorganic" and "inert" (Figure 2-4 from the Study). Since the classification of waste composition is not the same as the one used in the methodology for benchmarking purposes, it is difficult to take these results for regional comparison. There is some presence of plastic bags (9%), glass (3.6%) and paper (5.6%).

Table 18: MSW composition, Soldanesti, Moldova24

	Other biodegradable waste (%)	Other biodegradable waste (%)	Other biodegradable waste (%)
Residuals	81.1	82.3	81.7
Paper	5.6	5	5.3
Glass	3.5	3.7	3.6
Metal - packaging and other	0.7	0.6	0.65
Plastic bags	9.1	8.4	8.75

The Study reports that 98 % of the population is covered by packaging waste collection services, organized in 53 platforms. Each platform has 7 containers for different type of waste in the urban area, and 4 containers in the rural area. However, the recycling rate in Soldanesti is not presented.

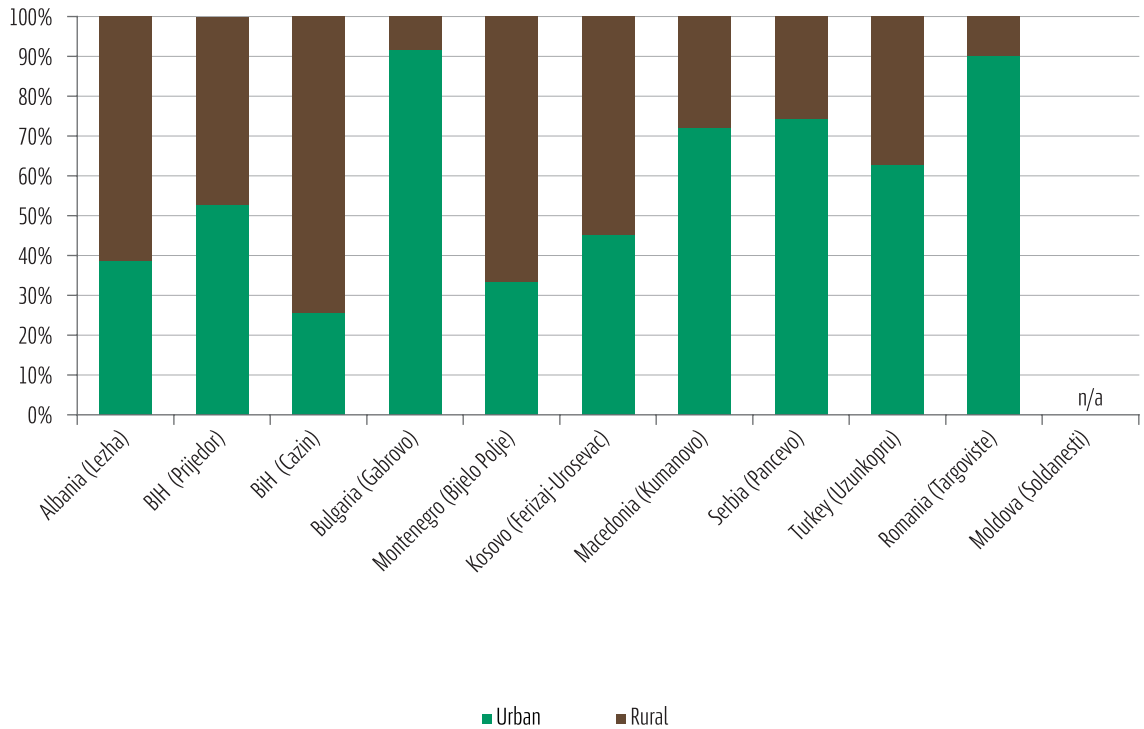
25 The Feasibility Study has been prepared within the program "Modernization of Local Public Services in the Republic of Moldova" GIZ .

4.12 Benchmarking of local level indicators on SWM

The benchmarked municipalities have populations between 35,000 and 125,000.

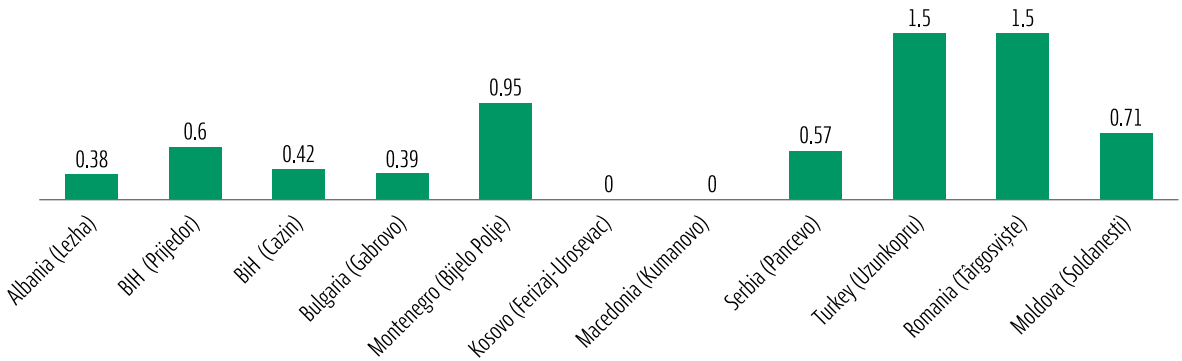
The majority of the population in Gabrovo and Târgoviște, Kumanovo and Pancevo lives in the urban area of the municipality, while in Cazin and Bijelo Polje, and even in Lezha, the majority of the population lives in the rural area. Prijedor and Ferizaj/Uroševac have balanced urban and rural populations (Chart 38). The figures on the ratio between the number of populations living in rural and urban areas for the Municipality of Soldanesti (Moldova) were not available.

Chart 38 Ratio between the number of populations living in rural and urban areas



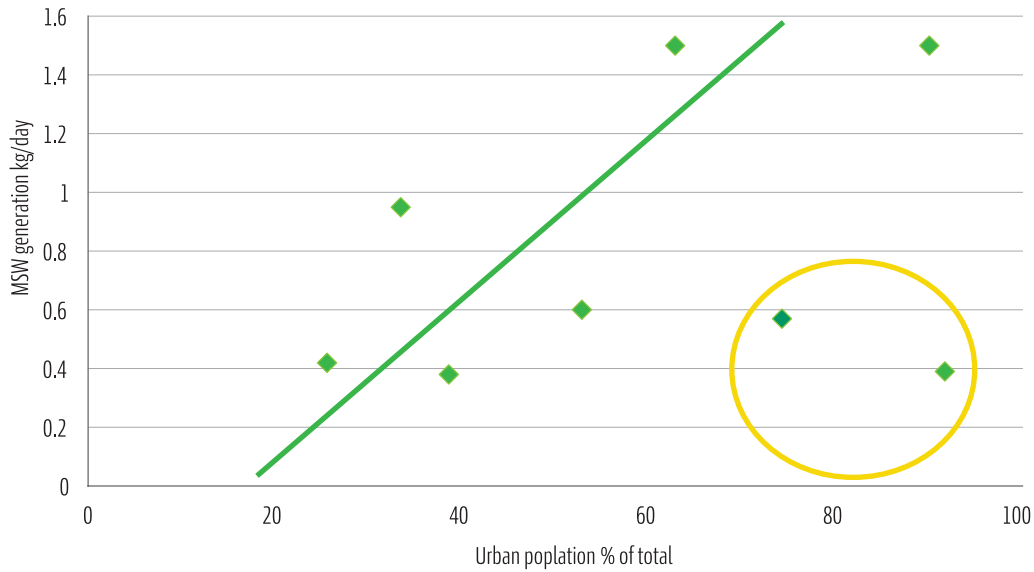
Figures on MSW generation for the Municipalities of Ferizaj/Uroševac (Kosovo) and Kumanovo (Macedonia) were not available (Chart 39). As for the national level, Turkey and Romania reported high SW generation (1.5). We assumed that some correlation must exist between the % of urban population and MSW generation per capita (Chart 40). However, based on the data available for the 8 municipalities, this correlation cannot be established.

Chart 39 MSW generation (kg/person/day)



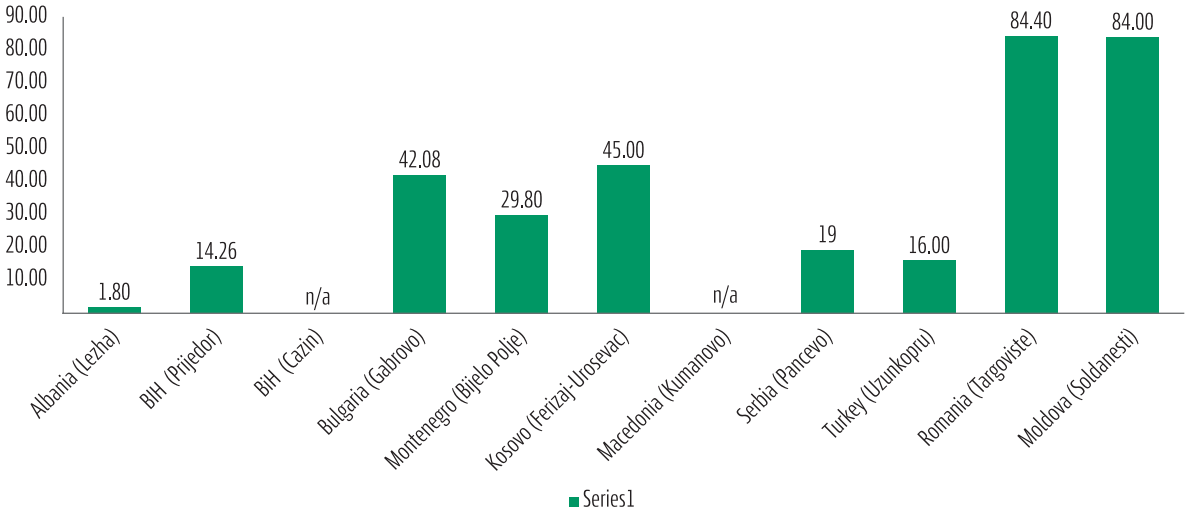
The Municipality of Gabrovo (Bulgaria) reported only 0.4 kg/day for even 91.7% of its urban population, while Târgoviște in Romania for almost the same number of urban population (90%) reported 1.5 kg/day. Pančevo (Serbia) reported 0.57 with 74.3 % of urban population.

Chart 40 Correlation between urban population and MSW generation per capita



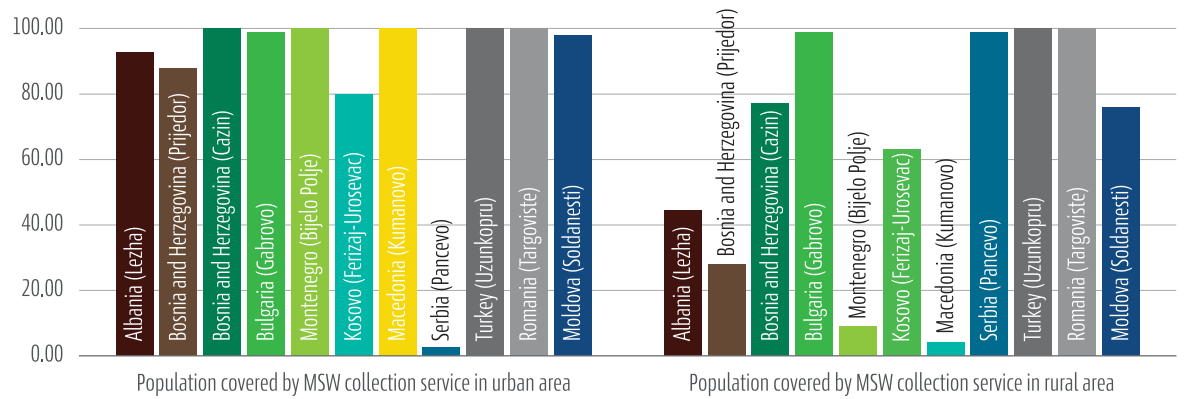
The MSW service coverage is not below 80 % in urban areas (Chart 41). However, the urban territory is significantly smaller then the rural territory, except in Târgoviște and Soldanesti (Chart 38). The urban ratios for Kumanovo and Cazin were not available.

Chart 41 Urban area ratio



The MSW service coverage in rural areas is not satisfactory, except in Târgoviște and Uzunkopru. Bijelo Polje, Kumanovo, Prijedor and Lezha have a very low coverage in their rural areas and a significant number of population living in their rural areas. In these circumstances, municipalities often suffer from the problem of illegal dumping. In the case of Lezha, 98.2 % is a rural area where 61.4% of the population lives, and the coverage is only 44.2 %. This gives a number of 8.8 thousand tonnes of not collected waste that ends up in illegal dumps in rural areas. The same can apply to other rural areas with low coverage.

Chart 42 Population covered by MSW collection service



Reported figures for the population covered by packaging waste collection services in Prijedor and Gabrovo are very high, while at the same time, the recycling rate is below 10% (Table 19).

Table 19: Recycling rate and population covered by packaging waste collection service

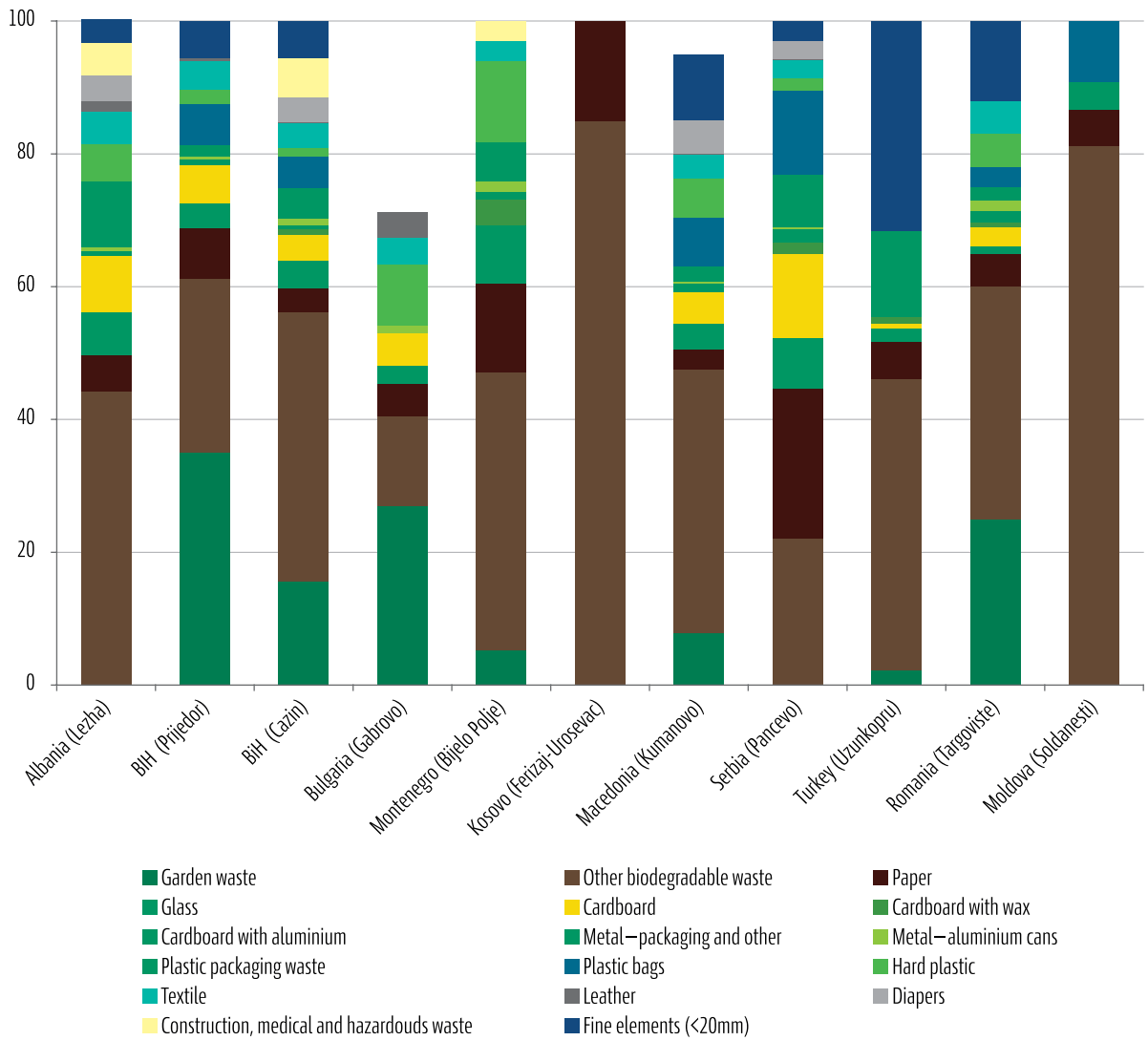
	Population covered by packaging waste collection service	Recycling rate
Albania (Lezha)	6.03	28
B&H (Prijedor)	43.86	2.78
B&H (Cazin)	0	
Bulgaria (Gabrovo)	99	8.86
Montenegro (Bijelo Polje)	0	0
Kosovo (Ferizaj-Urosevac)	N/A	N/A
Macedonia (Kumanovo)	N/A	N/A
Serbia (Pancevo)	N/A	1.4
Turkey (Uzunkopru)	62	37
Romania (Târgoviște)	17	
Moldova (Soldanesti)	84	30

The recycling rate and coverage was not available for Ferizaj/Uroševac and Kumanovo. However, according to the USAID Report[26], there is a significant plastic recycling industry in Kosovo and the majority of companies are in the largest cities of Kosovo: Ferizaj/Uroševac, Pristina, Shtimje/Štimje, Lipjan/Lipljane, Prizren, Podujevë/Podujevo, etc. The total number of companies in these cities is 15, out of which 7 are situated in Ferizaj/Uroševac. Ferizaj/Uroševac is included in the pilot recycling program, as well.

26 Kosovo Plastic Recycling Activity, USAID October 2009

Garden waste and other biodegradable waste makes up the most of MSW, from 22% in Pančevo (Serbia) to 85% in Ferizaj/Uroševac (Kosovo). The figures reported for Kosovo have to be taken with reservation as they did not report any other component beside paper and biodegradable waste (Chart 43). In spite of the high potential for its recovery in all cases, it is disposed in municipal landfills.

Chart 43 Waste composition in 10 pilot municipalities



The Municipality of Pančevo (Serbia) reported the highest amount of paper and cardboard, 37%, out of which paper is 23%. Other countries reported 6-17% of paper and cardboard in total (Chart 44). Taking into account the waste generation in the selected municipalities, we got Cazin, Gabrovo and Soldanesti with below 1000 t/year, Prijedor, Bijelo polje and Uzunkopru with aprox. 3000 t/year and Târgoviște with about 4000 t/year. Only Pančevo reported approximately 10000 t/year. Generally, in all municipalities, the amount of paper and cardboard generated is not significant (Chart 45).

Chart 44 Proportion of paper and cardboard in the composition of waste in selected municipalities, %

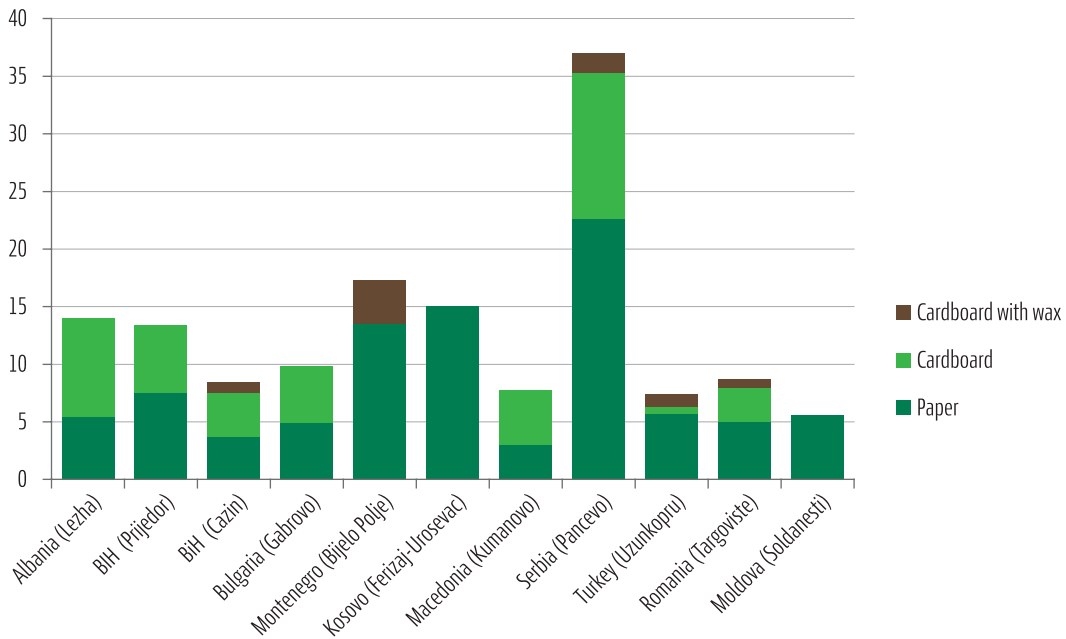
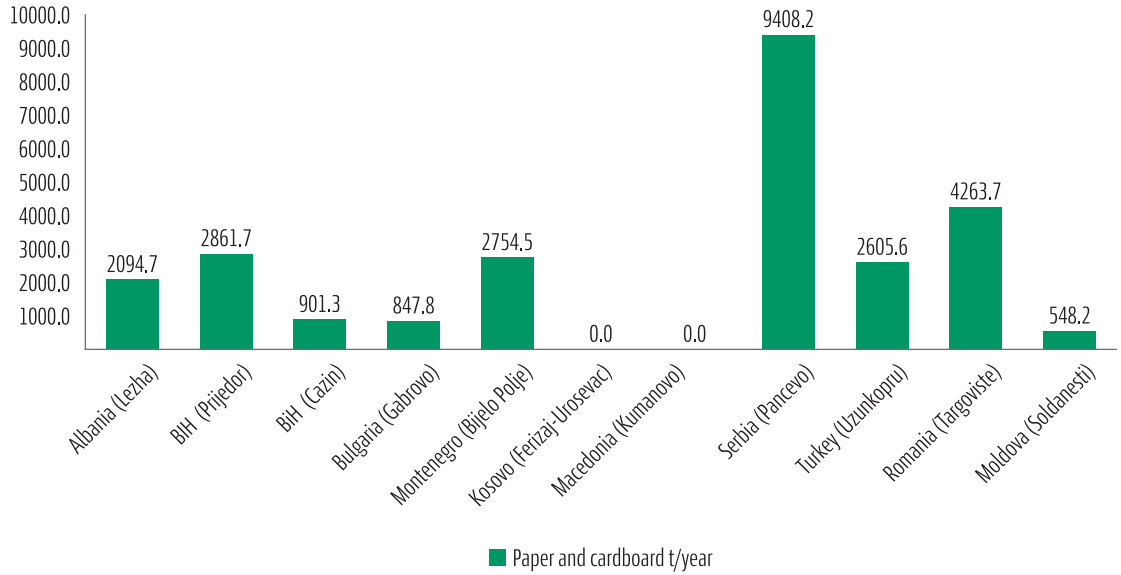


Chart 45 Amount of paper and cardboard in the composition of waste in selected municipalities, t/year



5 PARTNER ORGANISATIONS

Implemented by:

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Network of Associations of Local Authorities of South East Europe


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