Interreg - IPA CBC
Bulgaria – Serbia

Project CB007.1.31.304 "Prevention and mitigation of man-made cross border disasters in the region Vidin-Zaječar"

Impact of illegal landfills in the City of Zajecar

This study has been developed throughout the project „Prevention and mitigation of man-made cross border disasters in the region Vidin-Zaječar" co-financed from Interreg IPA CBC Bulgaria Serbia Programme.

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1 City of Zajecar

Zajecar is a municipality and the administrative centre of the Zajecar District in eastern Serbia. According to the 2011 census, the city administrative area has a population of 59,461 inhabitants. City is also the largest place in eastern Serbia. The general info is presented in the Table 1.

Table 1. General info on City of Zajecar

	Area, km²	Number of settlements	Population, estimated on 30.06.2017.		Cadastre municipalities	Registered local communities	Local offices
			Total	1 km²			
City of Zajecar	1069	42	55205	52	41	46	39

Source: Statistical office of Republic of Serbia

1.1 Population

According to the official statistical data, the number of inhabitants is decreasing in the two past decades (Table 2).

Table 2. Estimated population of City of Zajecar in the period 1991 - 2017

Municipality/City	1991	20111)	2012	2013	2014	2015	2016	2017
Zajecar	*71139*	*59578*	*58856*	*58183*	*57457*	*56714*	*55987*	*55205*

Source: Statistical office of Republic of Serbia

It can be seen from the official statistics that the number of inhabitants is decreasing in rural area while it is increasing in urban area (Zajecar as settlement).

There are 42 settlements in Municipality of Zajecar: city of Zaječar (38.165 inhabitants) and 41 rural settlements (21.296): Borovac (114), Brusnik (315), Velika Jasikova (819), Veliki Izvor (2.399), Veliki Jasenovac (287), Vražogrnac (1.096), Vratarnica (457), Vrbica (205), Gamzigrad (683), Glogovica (387), Gornja Bela Reka (122), Gradskovo (504), Grlište (697), Grljan (2.379), Dubočane (365), Zagrađe (167), Zvezdan (1.602), Jelašnica (100), Klenovac (172), Koprivnica (420), Lasovo (245), Lenovac (147), Leskovac (80), Lubnica (808), Mala Jasikova (235), Mali Izvor (372), Mali Jasenovac (232), Marinovac (209), Metriš (273), Nikoličevo (715), Planinica (205), Prlita (90), Rgotina (1.452), Salaš (688), Selačka (208), Tabakovac (170), Trnovac (391), Halovo (707), Čokonjar (143), Šipikovo (383), Šljivar (253). Source of data is Statistical office of Republic of Serbia (Census 2011).

Settlements that are located on the border with Bulgaria are: Mali Jasenovac, Sipikovo, Halovo, Prlita, Vratarnica, Veliki Izvor, Gradskovo and Mali Izvor.

1.2 Territory

Zajecar is located in central part of Timok region and it is including Zajecar basin, east part of Crna reka and north part of Knjazevac basin and south part of Negotin region. Territory of the municipality is bordered by mountain Deli Jovan on north, Old mountain on east and south-east that is also state border with Bulgaria and on south and south-west with Lasovac mountain that is a branch of Tupuznica mountain and on west with Jezevica mountain and branches of Veliki Krs.

Location of Zajecar in Serbia is presented on the following figure.

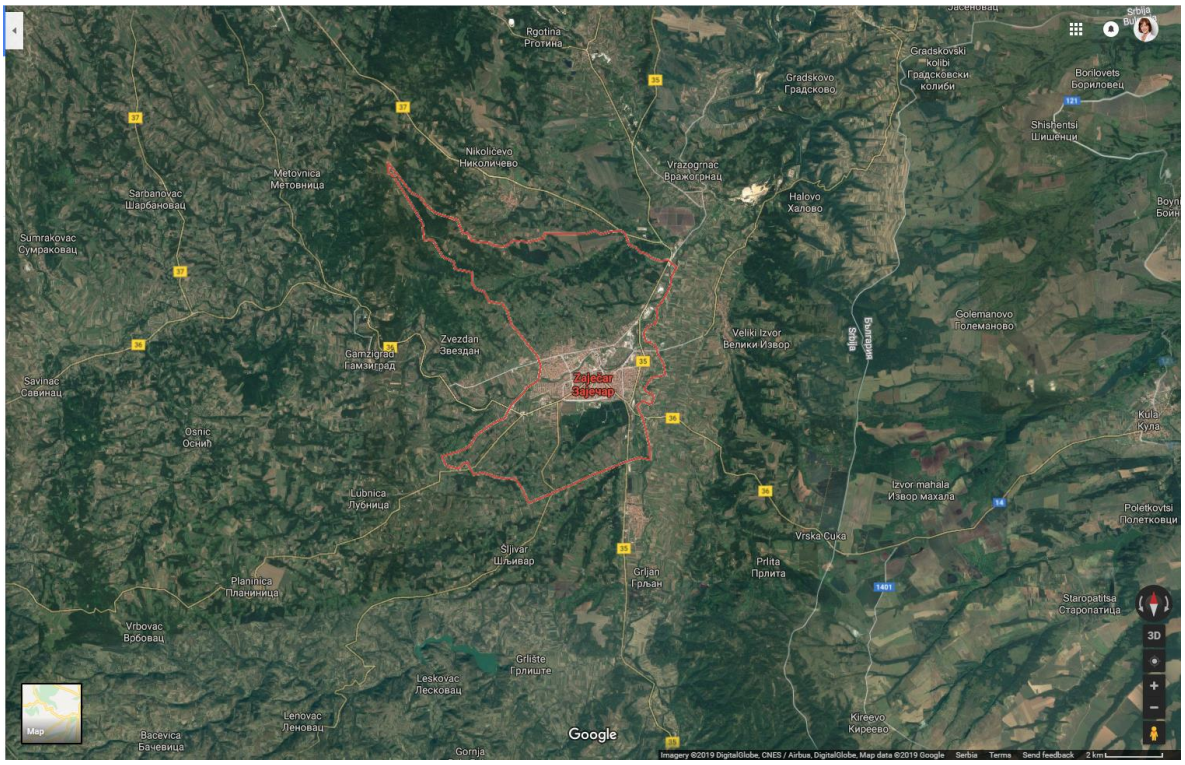


Figure 1. Location of Zajecar

Municipality is taking 1069 km^2 in area, out of which 63,7% os arable land (data for 2011, Statistical office of Republic of Serbia).

Zajecar is located in continental climatic area with moderate continental climate. Sumer months are very warm and daily temperatures can reach up to 40^{o}C, while the nights are in average chilly. Winters are mainly mild and with not a lot of precipitation but in some periods the temperature can go even to – 15^{o}C.

Winds similar to kossava are present in Zajecar basin that is belonging to Crni, Beli and Veliki Timok Rivers and whose length is 20 km. The wind is mainly north-eastern while occasionally the wind is blowing from Carpathians and Old mountain. Winds are most frequent in spring and autumn time. It is hailing rarely. Total precipitation is in average 560 mm through a year.

Rivers the Black and White Timok cross Zajecar and then at Vrazogrnac are connected in the River of Veliki Timok. These three rivers form the basin that is a base of hydrographic network of this region. In addition to them, the territory of the municipality is crossed by smaller rivers such as Lubnicka Reka, Lenovačka Reka, Gornja Bela Reka, Lasovačka Reka, and others. The water level

of all these rivers is the highest in spring, and the lowest in the summer months. The Timok river system has an exceptional significance for this region, whose fertile valley is extremely suitable for agriculture. On the territory of Zajecar there are no natural lakes, but there are three artificial (accumulating) lakes: Grliško, Rgotsko and Lake Sovinac.

The River Great Timok (Veliki Timok) is very important from transboundary point of view as some 15 km before it confluents into the Danube as its right tributary, the Timok becomes a border river, passing next to the Bulgarian town of Bregovo and the Bulgarian village of Baley.

In Zajecar, there are two known thermo-mineral sources: Gamzigradska Spa, which is also Spa, and Nikolicevo, an unregulated source. In this region dominated by deciduous forests, distributed on the slopes, divides Jovan, Stara Planina and Tuzla. The park of the forest of Kraljevica is known, which represents the "lungs of the city" of Zajecar. The territory is extremely rich in diverse wildlife.

The geographical, administrative, economic, political and cultural centre of the Zajecar district and the Timok region is the city of Zajecar. Three Roman emperors were born in the Zajecar district. Felix Romuliana is located in Gamzigrad, one of the world's most famous archaeological sites. It is the palace of the Roman Emperor Gaius Galerius Valerius Maxmimianus, from the late third and early fourth centuries of the new era, rich in jewellery, mosaics, coins, tools, weapons and other objects from that period. On the hill near the fortress is a sacral complex where the Emperor Galerius and his mother Romula are buried.

Figure 2. The remains of Felix Romuliana

2 Waste management in Zajecar

2.1 Local waste policy

The decision on the communal order on the territory of the city of Zajecar ("Official Gazette of the City of Zajecar", No. 15/14, 22/14 - other Decision and 38/14, 34/2017, 36/2017, 20/2018 and 24/2018), prescribes the general conditions for arranging the city and settlements on the territory of the city of Zajecar. Maintenance within the meaning of this Decision implies the maintenance of cleanliness: the maintenance of streets, squares, public lighting facilities, markets and other public areas, maintenance of parks, green and recreational areas, cleaning of public surfaces and drainage of atmospheric waters, the provision of chimney sweeping services and disinfection in facilities. Collecting, transport and disposing of waste from residential, commercial

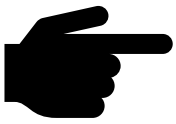
and other facilities is performed by a public utility company, other enterprise or entrepreneur entrusted with the performance of this utility activity in accordance with the procedure established by the City Decision (hereinafter: an authorized company or an entrepreneur).

Public utility and housing company "Zaječar" Zaječar performs activities of maintaining cleanliness on public surfaces, washing of asphalt, concrete, paved and other surfaces for public purposes, collecting and disposing of municipal waste from these areas, maintenance and discharge of waste containers on public surfaces.
An authorized company or entrepreneur is obliged to collect, transport and dispose of waste from residential, business and office premises at least 3 times a month without the possibility of denial of service. Denial of service is solely due to the risk of outbreaks of epidemics and infectious diseases. Municipal waste in the sense of this Decision includes waste from residential, commercial and workspaces, waste from the yard and around buildings.

Wastes from industrial and handicraft activities such as soil, gravel, boiler shutters, plastic containers, construction and waste materials do not belong to the municipal waste. These waste streams are collected, transported and disposed by an authorized company or entrepreneur, at the request of the owner or user of the facility.

It is forbidden:

- to collect, transport and dispose waste from the slaughter industry, animal corpses and infectious waste, as well as their incineration, destruction or burial by the owner or user of the facility,
- to put/pour embers, water or other liquids, as well as waste from slaughterhouses, animal carcasses and infectious waste into waste containers,
- to dispose waste by waste containers
- to move waste containers from a certain location,
- to place containers on the sidewalks.
- to take PET packaging from mesh containers unless it is authorized company or entity
- to put other municipal waste in mesh PET containers
- taking waste from the waste containers unless it is a authorized company/entity.



There are no measures foreseen by the local waste policy regarding the illegal dumping. **A person can be fined if the green areas in his/her ownership are not maintained in prescribed manner.**

2.2 Waste management practice

The waste management system in Zajecar is based on waste collecting, transporting and landfilling. In this regard, city of Zajecar is no different than other municipalities in Serbia, where landfilling is still the predominant method.

Public utility company JKSP Zajecar currently operates with 15 containers of 5m^3, 983 containers of 1,1m^3, around 10 bins of 120 l and 78 containers of 3,8 m^3. Also, plastic bags are used for waste collection (100 pieces). This company owns 4 skip loader trucks, 11 waste trucks, and 3 tip trucks.

The company is collecting waste from 55.730 inhabitants, so the waste collection service is provided for 94% of population. Waste is being collected from Zajecar, and settlements: Grlište, Grljan, Veliki Izvor, Zvezdan, Vražogrnac, Rgotina, Lubnica, Gamzigrad and Gamzigradska banja.

The waste is mainly being collected by public utility company. According to presented data, only 6% of inhabitants are not included in organised waste collection service.

2.3 Composition of household waste

Composition of waste was determined during the development of Regional waste management plan for city of Zajecar and municipalities of grad Boljevac, Bor, Kladovo, Majdanpek, Negotin and Knjazevac. The objective of this activity was to determine the amount of waste generated per capita and composition of household waste. It was done by measurement and analysis of certain collected waste quantities in November 2015 and April 2016.

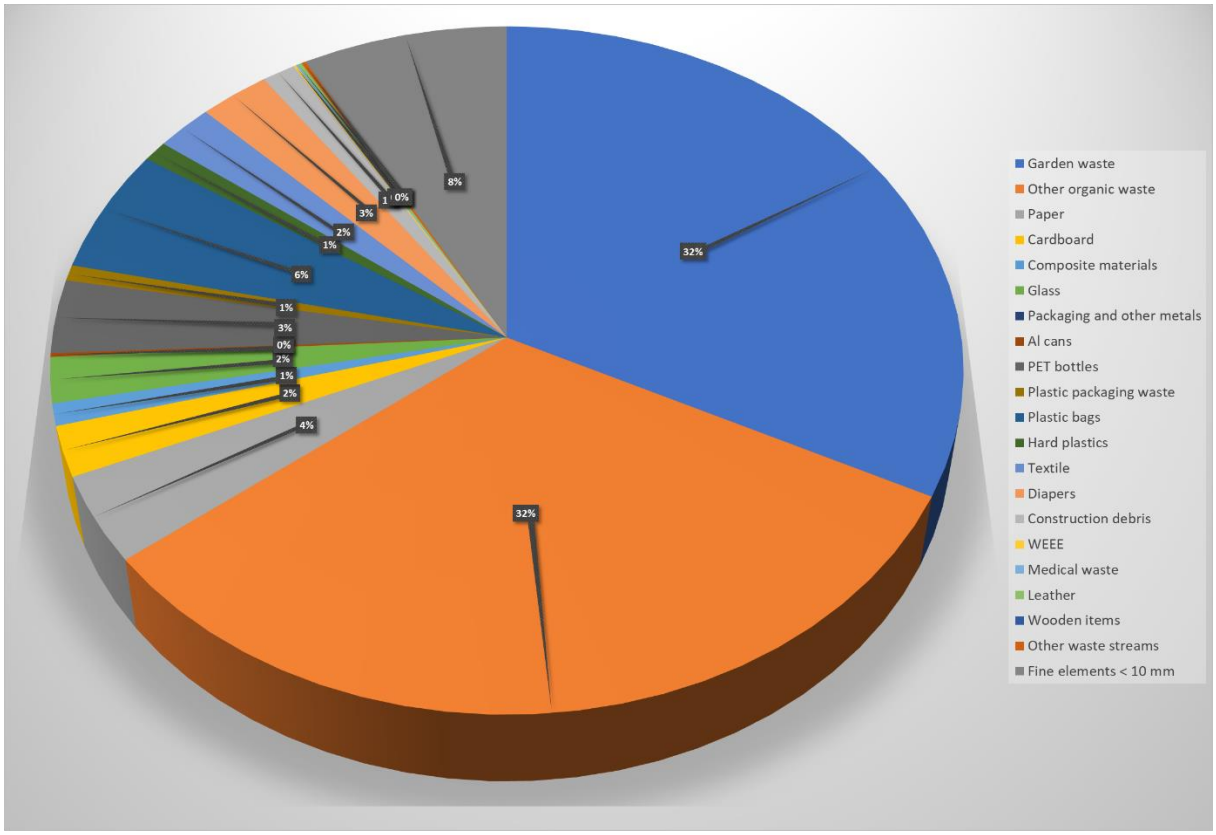


Figure 3. Composition of household waste

It can be clearly seen from the figure above that the major waste types present in household waste are biodegradable waste (organic waste and garden waste) and fine elements (< 10 mm). Fine elements are probably due to the disposal of ash in containers as there is no district heating in the city and it is mainly rural region.

The predominate part of household waste is biodegradable. The main environmental threat from biodegradable waste is the production of methane from such waste decomposing in landfill.

2.4 Illegal landfills

According to the Regional waste management plan for City of Zajecar and municipalities Boljevac, Bor, Kladovo, Majdanpek, Negotin, and Knjaževac (FTN, June 2018) there are fifty-three illegal landfills/dumpsites in City of Zajecar.

The locations of the illegal landfills are presented on the following figure.

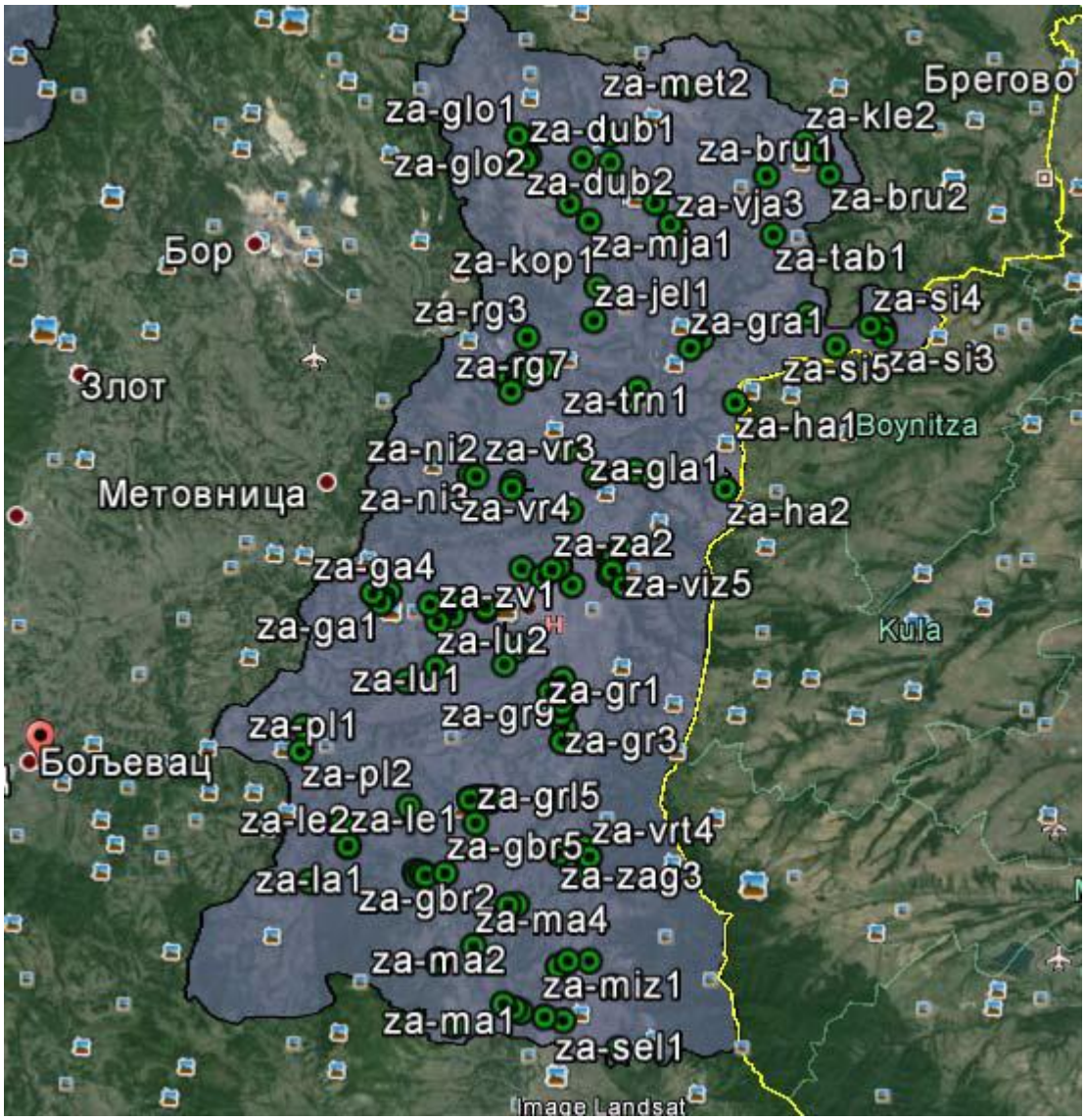


Figure 4. Locations of illegal dumpsites

The characteristics of each location is done in the following chapter.

Household and packaging wastes are present in all illegal waste landfills. These unregulated dumpsites pose risk to environment and human health due to its closeness to water bodies and/or settlements. One dumpsite (Halovo) has a potential risk of transboundary impact if the amount rises significantly. Animal carcasses has only been noted on one dumpsite.

3 Risk Assessment and main findings

All the illegal sites have been initially screened. The initial screening process allows for the prioritisation of sites into high, moderate and low risk so that resources can be allocated to the investigation of the higher risk sites.

It has to be noted, that this initial screening was done only as a desk study and no additional surveys have been carried out. Therefore, this Report has its limitations due to:

- Obsolete data on waste quantities and type of waste disposed
- No detailed assessment of local geology and hydrogeology
- It cannot propose any specific remediation measures.

The risk screening has been done using the criteria in the following Table. The sites have been classified as high, medium and low risk. The principle was that if there are two criteria met then it would be high risk, if one medium risk or if the site is not close to sensitive receptors than it would be screened as low risk.

Table 3. Risk screening criteria

	High	Medium	Low
Water bodies	< 100 m	100 – 250 m	> 250 m
Settlements	< 100 m	100 – 250 m	> 250 m
Protected area	< 50 m	50 – 250 m	> 250 m
Disposed volumes	< 20,000 m^3		> 20,000 m^3
Closeness of border	< 1 km	1 – 5 km	> 5 km

Additional attention is drawn to landfills that are located in border settlements (namely: Mali Jaenovac, Sipikovo, Halovo, Prlita, Vratarnica, Veliki Izvor, Gradskovo and Mali Izvor). These sites at the moment are not identified as high risk but if there are no measures taken they can pose a potential source of transboundary impacts.

Fifty-three illegal landfills/dumpsites have been identified during the project of mapping illegal dumpsites in Serbia and during development of Regional waste management plan[1]. The table below is presenting the available data from Environmental Protection Agency of Republic of Serbia (http://www.sepa.gov.rs/index.php?menu=207&id=1006&akcija=showExternal) and data presented in the Plan. It shall be taken with benefit of doubt as presented facts are rather obsolete and they need updating in terms of type of waste being disposed at the locations and if the dumpsites have not been cleared yet.

Household and packaging wastes are present in all illegal waste landfills. These unregulated dumpsites pose risk to environment and human health due to its closeness to water bodies and/or settlements. One dumpsite (Halovo) has a potential risk of transboundary impact if the amount rises significantly. Animal carcasses has only been noted on one dumpsite.

[1] FTN, Regional waste management plan for city of Zaječar and municipalities Boljevac, Bor, Kladovo, Majdanpek, Negotin, and Knjaževac, June 2018

Table 4. Risk screening of illegal dumpsites in Zajecar

No.	Location	Risk	Population	Area	Volume	Notes	Waste types
Catchment area of accumulation for water supply "Grlište"							
1.	Settlement Leskovac – Stajkov vrh	M	80	2100 m^2	~80 m^3,	It is very close to water stream (100 m). Local impact on water quality due to migration of heavy metals.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris
2.	Settlement Lenovac	M	147	2000 m^2	~90 m^3	It is very close to water stream (100 m). Local impact on water quality due to migration of heavy metals.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris
3.	Settlement Lasovo	L	245	4000 m^2	~90 m^3	Local impact on soil quality due to migration of heavy metals.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
4.	Settlement Gornja Bela Reka	M	122	2000 m^2	~90 m^3	Local impact on water quality due to closeness of water stream (100 m)	- Household waste - Packaging waste - Agricultural waste - Construction debris - Garden waste
5.	Settlement Zagradje	M	167	400 m^2	~30 m^3	Local impact on population as it is close to settlement (100 m).	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste - Waste from wood and wood cuttings

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6.	Settlement Marinovac	L	209	400 m^2	~50 m^3	Not close to the border. Low impact due to rather small volume. Visual impact as settlement is 300 m distant.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste - Waste from wood and wood cuttings
7.	Settlement Stubal	L	70	150 m^2	~30 m^3	Low impact due to rather small volume.	- Household waste - Packaging waste - Agricultural waste
Protected archaeological area Romuliana							
8.	Settlement Gamzigrad	H	683	2000 m^2	~350 m^3	Low impact as it is not close to water stream or settlement. It is mostly biodegradable waste.	- Household waste - Packaging waste - Agricultural waste - Construction debris - Garden waste
9.	Settlement Zvezdan	H	1602	4000 m^2	~650 m^3	Low impact as it is not close to water stream or settlement. It is mostly biodegradable waste.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
10.	Zajecar, Zvedanski put close to substation	L	600	500 m^2	~50 m^3	Low impact as it is not close to water stream or settlement.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
Nature Park Old Mountain							
11.	**Settlement Mali Izvor**	L	455	1000 m^2	~100 m^3	Low impact as it is not close to water stream or settlement. Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste

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							- Construction debris - Garden waste - Waste from wood and wood cuttings
12.	Settlement Selacka – Pavlova	L	208	6000 m^2	~180 m^3	Low impact as it seems it is large area covered by thin layer of waste. Light waste can be air borne.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste - Waste from wood and wood cuttings
13.	**Settlement Vratarnica – local community dumpsite**	L	457	3000 m^2	~200 m^3	Low impact as it seems it is large area covered by thin layer of waste. Light waste can be air borne. Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste - Waste from wood and wood cuttings
14.	**Settlement Vratarnica**	M	457	5000 m^2	~90 m^3	Low impact as it seems it is large area covered by thin layer of waste. But waste is disposed in the riverbed and it pollutes water to a large degree. Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Packaging waste - Agricultural waste - Construction debris - Garden waste - Waste from wood and wood cuttings
Suburban area, population more than 1000							
15.	Zajecar – Izvorski put	L	765	200 m^2	~15 m^3	Low impact due to small volume and amount of waste. It seems that packaging waste is predominant.	- Household waste - Packaging waste - Agricultural waste - Construction debris
16.	**Zajecar – Mali Stupanj**	L	1200	300 m^2	~40 m^3	Low impact due to small volume and amount of waste. Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Metal scrap and parts of household appliances - Packaging waste

							- Agricultural waste - Construction debris - Garden waste
17.	Zajecar, settlements Kotlujevac and Podliv	M	20000	1000 m^2	~50 m^3	Low impact due to small volume and amount of waste. Visual impact as the settlement is very close. Risk of water pollution due to possibility of migration of pollutants into the river body.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris
18.	Zajecar, park Kraljevica	L	38165	500 m^2	~50 m^3	Low impact due to small volume and amount of waste. Not close to settlement or water body.	- Household waste - Packaging waste - Construction debris
19.	Zajecar, Lubnicko brdo	L	840	500 m^2	~85 m^3	Low impact due to small volume and amount of waste. Not close to settlement or water body.	- Household waste - Packaging waste - Agriculture waste - Construction debris - Garden waste
20.	Zajecar, Nikolicevsko brdo	L	38165	500 m^2	~75 m^3	Low impact due to small volume and amount of waste. Not close to settlement or water body.	- Household waste - Packaging waste - Agriculture waste - Construction debris
21.	Settlement Grljan - Topoljak	L	2379	6000 m^2	~285 m^3	Low impact due to distance from water body (200 m) and settlement (1000 m).	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Construction debris - Garden waste
22.	Settlement Grljan, close to Timok	M	2379	800 m^2	~100 m^3	Potential impact on water quality as the site is close to the River Timok. Visual impact for settlement close by.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Construction debris - Garden waste
23.	Settlement Grljan, Avramicki potok	L	2379	300 m^2	~50 m^3	Low impact due to distance from water body (200 m) and settlement (1000 m).	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Construction debris

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							- Garden waste
24.	**Settlement Veliki Izvor**	H	2399	7500 m^2	~600 m^3	Significant impact as it is next to water body. End-of use vehicles present on site as used tyres. Risk to spreading diseases as there are disposed animal carcasses. Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Metal scrap and parts of household appliances - End-of-life vehicles - Packaging waste - Agricultural waste - Construction debris - Animal carcasses - Used tyres - Garden waste - Sludges
25.	Settlement Vraznogrnac, towards Rgotina	L	1096	1500 m^2	~200 m^3	Low impact as it is not close to any sensitive receptors. Less than 5 km to border.	- Household waste - Packaging waste - Construction debris
26.	Settlement Vraznogrnac, local community dumpsite	L	1096	4000 m^2	~400 m^3	No data on sensitive receptors in vicinity.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris
27.	Settlement Rgotina, local community dumpsite	L	1452	9000 m^2	~600 m^3	Low impact as it is not close to any sensitive receptors. Not close to the border.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
28.	Settlement Rgotina,	H	1452	500 m^2	~80 m^3	Close to the River (100 m) and in the settlement.	- Household waste - Packaging waste - Agricultural waste
Settlements with 500 – 1000 inhabitants							
29.	Settlement Salas, gorge	M	688	600 m^2	~650 m^3	Medium impact as it is very close to water body (20 m).	- Household waste - Packaging waste - Agricultural waste - Construction debris - Garden waste

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30.	Settlement Salas, towards Glogovica	L	688	500 m^2	~80 m^3	Low impact as it is located 200 m away from water body and 1000 m from settlement.	- Household waste - Packaging waste - Agricultural waste - Construction debris - Garden waste
31.	Settlement Velika Jasikova, in the field	L	819	7500 m^2	~65 m^3	Low impact as it is located 200 m away from water body and 300 m from settlement.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
32.	Settlement Velika Jasikova, on the village outskirts	L	819	1800 m^2	~130 m^3	Low impact as it is located 200 m away from water body and 300 m from settlement.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
33.	**Settlement Halovo, Baciste**	L	707	1000 m^2	~300 m^3	Medium impact as it is located close to a water body (2 m). Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Packaging waste - Agricultural waste - Construction debris
34.	**Settlement Gradskovo, towards the River Timok**	L	504	10000 m^2	~300 m^3	Medium impact due to closeness to settlement. Large area covered by waste. Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
35.	Settlement Nikolicevo	M	715	6000 m^2	~500 m^3	Medium impact as it is close to a water body (100 m).	- Household waste - Packaging waste - Agricultural waste - Construction debris - Garden waste
Settlements with less than 500 inhabitants							

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36.	Settlement Koprivnica	L	425	1800 m^2	~80 m^3	Not close to the border. Low impact as there are no close sensitive receptors.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris
37.	Settlement Glogovica	L	387	750 m^2	~70 m^3	Low impact as there are no close sensitive receptors.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris
38.	**Settlement Sipikovo**	L	383	600 m^2	~40 m^3	Low impact as there are no close sensitive receptors. Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Packaging waste - Agricultural waste - Construction debris - Garden waste
39.	Settlement Dubocane	M	365	1000 m^2	~100 m^3	Medium to high risk as it is close to a water stream (100 m) and to a water supply source (150 m).	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
40.	**Settlement Brusnik**	M	315	3000 m^2	~100 m^3	Medium to high risk as it is close to a water stream (100 m). It is located in the border settlement.	- Household waste - Packaging waste - Agricultural waste - Construction debris - Garden waste
41.	Settlement Trnavac	L	391	750 m^2	~80 m^3	Low impact as there are no close sensitive receptors.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris
42.	Settlement Veliki Jasenovac	L	287	3600 m^2	~200 m^3	Low impact as there are no close sensitive receptors.	- Household waste - Metal scrap and parts of household appliances

							- Packaging waste - Agricultural waste - Construction debris - Garden waste
43.	Settlement Metris	M	273	250 m^2	~40 m^3	Medium impact due to the closeness to settlement (30 m) and it is located by a water body.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
44.	Settlement Sljivar	L	253	3000 m^2	~140 m^3	Low impact as there are no close sensitive receptors.	- Household waste - Packaging waste - Agricultural waste - Construction debris - Garden waste
45.	Settlement Mala Jasikova	L	235	1500 m^2	~70 m^3	Local impact on water quality as the water stream is 150 m away.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
46.	**Settlement Mali Jasenovac – Stubik**	L	232	4000 m^2	~80 m^3	Medium impact as it close to a settlement (150 m). Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris
47.	Settlement Planinica	L	205	1000 m^2	~80 m^3	Low impact as there are no close sensitive receptors.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
48.	Settlement Vrbica	L	205	1500 m^2	~50 m^3	Local impact on water quality as in is located in river bed.	- Household waste

							- Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste - Waste from wood and wood cuttings
49.	Settlement Klenovac	L	172	1500 m^2	~50 m^3	Low impact as there are no close sensitive receptors.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
50.	Settlement Tabakovac	L	170	1200 m^2	~50 m^3	Low impact as there are no close sensitive receptors.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste
51.	Settlement Cokonjar	L	143	1200 m^2	~70 m^3	Local impact on water quality as the water stream is 100 m away. .	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris
52.	Settlement Borovac	M	114	300 m^2	~80 m^3	Medium impact as it is located in the settlement.	- Household waste - Metal scrap and parts of household appliances - Packaging waste - Agricultural waste - Construction debris - Garden waste - Waste from wood and wood cuttings

53.	**Settlement Prlita**	L	90	1000 m^2	~50 m^3	Low impact as there are no close sensitive receptors. Potentially high risk of transboundary impact as it is located in border settlement.	- Household waste - Packaging waste - Agricultural waste

It can be noted that only 8% of illegal dumpsites present high risk to environment out of which one has potential risk for transboundary impact. The site in settlement Veliki Izvor has been found as if high risk due to closeness of water body and type of waste being disposed (animal carcasses, etc.). But it needs to be emphasized that the available data for this one was from 2005 while for the others data was available from 2009.

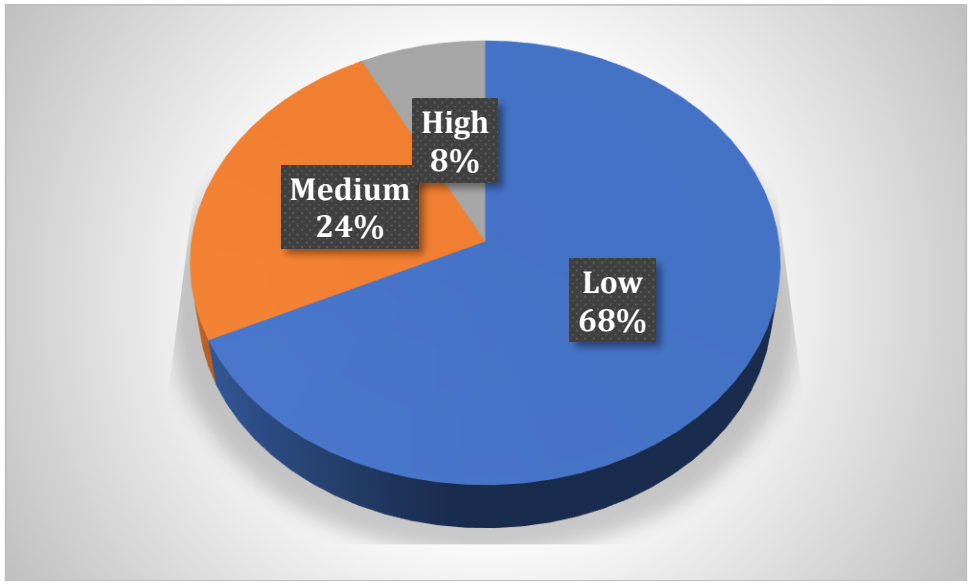


Figure 5. Percentage of screened landfills

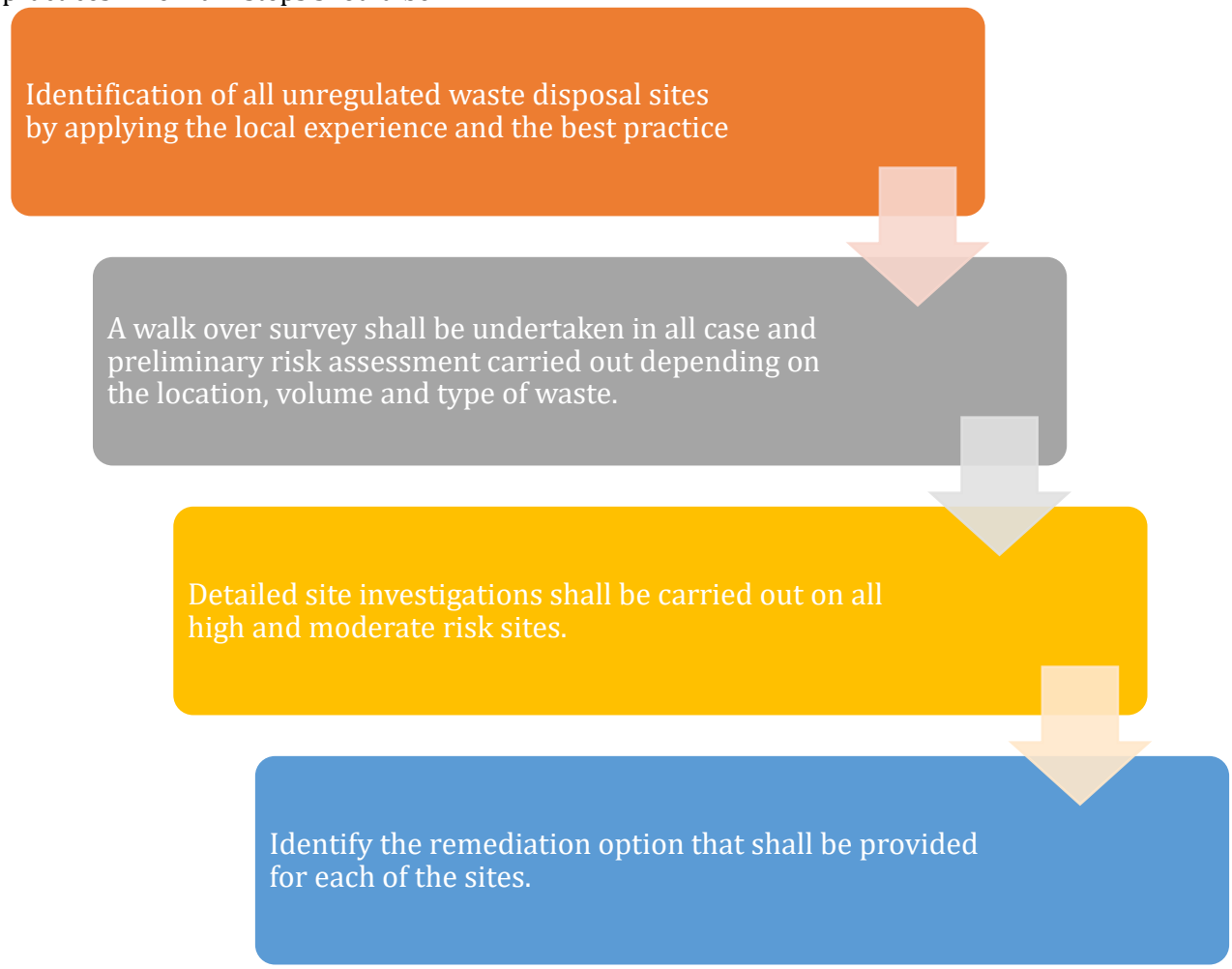
This study has been developed throughout the project „Prevention and mitigation of man-made cross border disasters in the region Vidin-Zaječar“ co-financed from Interreg IPA CBC Bulgaria Serbia Programme.

4 Conclusions and future steps

The principal aim in dealing with illegal waste activity should be to secure the protection of the environment and human health. Therefore, the primary obligation of a local authority when illegal waste activity is discovered is to ensure that the waste is recovered or disposed of, in the shortest practicable time, without endangering the environment or human health and without using processes and methods which could harm the environment and in particular without:

- risk to human or animal health, water, air, soil or plant life;
- causing a nuisance through noise or odours;
- adversely affecting the countryside, or places of special interest.

Local authority shall identify all unregulated waste disposal sites/landfills by applying the best practices. The main steps should be:



The local authority shall seek to have the cost of the risk assessment borne by the person(s) responsible for the illegal activity including, where appropriate, pursuit of the amount concerned as a simple contract debt in a court of competent jurisdiction.

The following sites shall at all times be remediated:

- Lands proximate to existing or planned residential development or educational facilities, in which case remediation shall require the removal, in the shortest practicable time, of all waste except only where it is shown that an alternative solution provides greater protection to the environment and the health of the local population;
- Wetlands;

- Natural Heritage Areas, Candidate Special Areas of Conservation or Special Protection Areas;
- Places of special interest such as high amenity areas.

In all of these cases, prior to embarking on the risk assessment process, it is to be assumed that the waste shall be removed from the site except only where it can be shown that an alternative solution provides greater protection to the environment and the health of the local population. The remediation plan for these sites should therefore centre on the removal of waste from the site and the manner in which this is to be done. In almost all such cases, the majority of waste is likely to be required to be removed and the only circumstance where waste can remain on the site is where it can be clearly demonstrated that this will lead to greater protection of the environment or enhancement of the environment and greater protection of the health of the local population.

Specific recommendations for city of Zajecar to address the following issues in its waste management practice and local waste policy:

- Promote sustainable biodegradable waste management by promoting household composting
- Promote separate collection of biodegradable waste and support the composting facility at regional landfill (when constructed)
- Provide separate containers for ash collection
- Promote separation at source for packaging waste
- Set containers on the main roads
- Set bins on the places of interests
- Set the location for disposal of construction debris.

Poor waste management - ranging from non-existing collection systems to ineffective disposal - causes air pollution, water and soil contamination. Open and unsanitary landfills contribute to contamination of drinking water and can cause infection and transmit diseases. The dispersal of debris pollutes ecosystems and dangerous substances from electronic waste or industrial garbage puts a strain on the health of dwellers and the environment. Poor solid waste management can cause blockage to storm water and sewage networks that can lead to waterlogging and flooding.