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ENVIRONMENTALLY FRIENDLY WASTE MANAGEMENT IN THE REPUBLIC OF SRPSKA

Summary: *Waste products are generated as a result of human daily activities and represent a loss of matter and energy. The increased production of waste materials is associated with economic growth and increased consumption. Waste materials and the way they are managed cause emissions to water, air and soil, which may affect human health and the environment. The magnitude of this impact depends on the quantitative and qualitative characteristics of waste materials and the way they are treated. In order to reduce the negative impact on the environment, society should ensure adequate collection, transportation and final disposal of waste materials. The main purpose of waste management is to provide the waste removal from the settlements in order to ensure hygienic living conditions. The provision of services has been the main objective of waste management since the end of the nineteenth century in many developing countries, while in Europe modern sanitary facilities were introduced. Today, waste management meets the high hygienic standards, which is why the public does not see the need for these services, except in emergency situations. In parallel with the increase of production and consumption, the role of waste management as a “filter” between human activities and the environment is growing. This results in the development of safe and reliable technology such as modern gatherer systems, incinerators and sanitary landfills. The aim of this paper is to examine and analyze the waste management in the Republic of Srpska in 2015, including the collection, transport and disposal of waste as one of the biggest environmental problems. The problems of infrastructure, costs, organization, quality of service, concern for environmental protection and public involvement in solving these problems are analyzed and discussed as well.*

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INTRODUCTION

Waste products are generated in the process of natural biological production, production and consumption. Waste products are unnecessary, damaging or interfering. According to the place of formation, waste materials can be industrial, communal and household. According to the method of handling, waste materials can be divided into:

- those that can be used in the production in which they arise or in other manufacturing processes or to be processed into secondary raw materials
- waste products disposed in landfills in its original forms
- waste materials that must be processed by special procedures to become harmless to the environment during the depositing.

One part of waste are organic waste materials, ie. waste leftovers from processing and consumption of food, as well as so-called. green waste (leaves, grass, etc.). The most important feature of green waste is that it rots quickly and easily breaks down with the spread of malodours. Of special epidemiological importance are organic waste materials which occur as a result of physiological secretions of humans and animals, containing a number of microorganisms, including pathogens. Waste materials from households and industry can be harmful and attract birds, rodents and insects. Some non-organic wastes from industry, including household, can be harmful and toxic and their unhygienic disposal are the risk of contamination of soil, groundwater and surface water.

Therefore, the waste matter should be collected on the site, transported and disposed of or exploited in an environmentally friendly manner to avoid environmental contamination. Today there are several ways of waste disposal, which are applied and improved with more or less success. These are: uncontrolled disposal - filling, controlled disposal - filling, incineration with energy use, separation of useful components - recycling, bio-fermentation, rapid composting and pyrolysis (Kristoforović-Ilic 2002, 118). With the current way of waste disposal, which must be oriented towards

defined objectives, it is important to begin with a consensus on the objectives. In particular, if there are some options of waste disposal for a specific region, it is necessary to have common goals as a common denominator. Waste materials and the ways in which waste products are treated differ significantly between countries depending on their history, culture and geographical location.

Since almost all municipal waste is deposited in developing countries, it is important that landfills maintain reasonable technical standards, including the collection of leachate and landfill gas management. The landfill is a site for final disposal of waste. It is the oldest and most applied method of disposing of waste. As landfill use natural depressions, land unsuitable for other purposes, artificial cavities, quarries, mines and the like. Landfills are commonly used for municipal waste. Only the waste that cannot be used is put in landfills is in rural households, while in the city all waste is deposited there, industrial included. A particular problem is the disposal of hazardous waste. The existing ordinance stipulates the conditions for the collection, transportation and disposal (Official Gazette of the Republic of Srpska, number 111/13). Still, in most of the major cities in our country there are no special landfills or facilities for storage of special waste. Thus, often, a special waste is kept inappropriately, ie. in dangerous way or it is buried the municipal landfill without any prior treatment. However, illegal landfills and inadequate disposal sites still remain a problem for the health of the population. In most cases waste disposal represents the only form of waste disposal. In many cases, deposition is performed in places not provided for them, the so-called. illegal dumps. The waste disposal in illegal dumps is done in the absence of any protective measures against environmental pollution. Determining the number and the main characteristics of the existing landfills in the region is of great importance for the further rehabilitation of such landfills that pose a threat to the environment. The disposal of waste in landfills should be the last resort in the waste management process. However, due to significantly lower prices than for most other options, disposing is the most popular method, while other methods of treatment are rarely used. The proper disposal of waste includes the implementation of a series of technical and technological measures to minimize the negative impact of waste on the environment (Gyarmati, 2008).

Bearing all this in mind, the aim of this paper is to examine and analyze the waste management in the Republic of Srpska in 2015, including the collection, transport and disposal of waste as one of the biggest environmental problems. The problems of infrastructure, costs, organization, quality of service, concern for environmental protection and public involvement in solving these problems are all analyzed. Based on the research subject in the paper, the null hypothesis is checked. The null hypothesis is that the production of municipal waste in the Republic of Srpska is disposed in an environmentally friendly manner. The environmentally friendly ways of waste management include the protection of the environment and protection of public health, protection of natural resources and sustainable use of natural resources.

1. MATERIAL AND METHODS

In order to better manage waste in the Republic of Srpska, the area is divided into eight regions: Banja Luka, Prijedor, Doboј, region of Mrkonjić Grad, Bijeljina, Zvornik, Sarajevo-Romanija and East Herzegovina (Pešević, 2009). Banja Luka region consists of the city of Banja Luka and Gradiska Municipality, Srbac, Laktasi, Prnjavor, Celinac, Kotor Varos and Knezevo. Prijedor region consists of the municipalities of Krupa on the river Una, Novi Grad, Kostajnica, Kozarska Dubica Ostra Luka and Prijedor. Doboј region is located in the central part of the Republic of Srpska, which includes eight municipalities: Doboј, Derventa, Teslic, Brod, Peter, Modrica, Samac and Vukosavlje. Region Mrkonjić Grad population represents the smallest region for the disposal of municipal waste in the Republic of Srpska. Bijeljina region has five municipalities: Bijeljina, Ugljevik, Lopare, Pelagićevo and Donji Zabar. Zvornik region consists of eight municipalities of Zvornik, Milici, Vlasenica, Han Pijesak, Srebrenica, Bratunac, Šekovići and Osmaci. Sarajevo-Romanija region represents the largest surface region for waste management in the Republic of Srpska. It comprises 12 municipalities of Sokolac, Rogatica, Visegrad, Rudo, Cajnice, Foca, Kalinovik, Pale, East Novo Sarajevo, East Ilidza, Trnovo and Novo Gorazde. Region Eastern Herzegovina is the southernmost region of the Republic of Srpska. The region consists of seven municipalities:

Trebinje, Bileća, Ljubinje, Gacko and Berkovići and East Mostar. The production of waste with daily human activities are increasing and today are among the biggest environmental problems. As a way of support for the environment protection and care for human health, these issues in 2015 are tracked. Thus, the ways of disposing of waste materials in the Republic of Srpska are analyzed in all eight regions in order to establish the level of the infrastructure, organization, quality of service.

2. RESULTS AND DISCUSSION

Banja Luka region represents the most populous region in the Republic of Srpska with 447,347 inhabitants, which covers a total of 4,730.45 square kilometers (Institute of Statistics RS). In Banja Luka region there are no active local landfills, but all municipal waste is transported and disposed of at a regional landfill Ramići. The system of regionalization came to life in the Banja Luka region, but there are problems because most utility companies entered the process unprepared, with inadequate equipment and the lack of the necessary infrastructure, which resulted in enormous costs of transport and disposal of the waste. The exception is the municipality of Gradiska, which built a transfer station and reduced the extra costs. In addition, in the municipality of Gradiska, Srbac, Celinac and Kotor Varos, there are some landfills that are no longer in use, with a total volume of 376, 500 m³ of waste and they are only partially sanitized. Regional Landfill Ramići is located in the northwestern part of Banja Luka, in Crkvina in the village Ramići, on the left side of the main road (M4) Banja Luka - Prijedor (Kalamanda, Vujcic, Delic-Jovic 2015, 282). The landfill is managed by public company "DEP-OT" from Banja Luka, which was established in 2003 with the aim of rehabilitation of existing and construction of a sanitary landfill. The company was founded by the city of Banja Luka and the municipality of Banja Luka region: Gradiska, Prnjavor, Laktasi, Srbac, Kotor Varos, Celinac and Knezevo. At the landfill in Ramići the conditions of waste disposal are considerably improved, the landfill is fenced and there are disposal checks. The supporting structures for the working staff are built. There are the scales for waste and there is a visual inspection of the waste brought. The leachate is collected and treated and the system for collecting landfill gas is currently under construction.



Image 1. The waste scales at the entrance to the landfill. Image 2. The landfill Ramići is properly fenced (The author during the research)

Based on data from the Institute of Statistics of the Republic of Srpska, in the Prijedor region there are 167,533 inhabitants in the area of 2,180.15 km². There, the waste management is carried out by four utilities. The collection of municipal waste in the municipalities of Ostra Luka and Krupa on the Una are done by the commercial utilities from Novi Grad and Prijedor. In the Prijedor region 25,822 households are covered by regular municipal waste removal services, which accounts for about 60%. The separation of the waste at the source is not present in the region, but utilities from Prijedor, Kozarska Dubica and Novi Grad carry out selective collection and separation of paper and packaging waste within their companies. Apart from the municipal waste, the utility companies in the Prijedor region dispose the waste materials from industry. Municipal waste is collected from 2,419 enterprises. The waste disposal in the Prijedor region is performed at three local municipal landfills, “Suca” in Novi Grad, “Kurevo” in the municipality of Prijedor and “Palija park” in the area of Kostajnica. The landfill „ Suca “in Novi Grad has an area of 2.7 ha, located 5 km from the settlement and it is unregulated. The residents of the village Suca complain about malodors and dirt from the landfill near their homes and the impact of leachate on the flow of the nearby stream and the river Sana. The waste materials collected in the municipalities of Novi Grad and Krupa on the Una are deposited on this landfill. The landfill “Kure-

vo” started in 1984 in Ljeskare near Prijedor as a municipal landfill. The landfill capacity is about 1,000,000 m³ and enables the disposal of waste for the next twenty years. The landfill is fenced, has a guard service and machinery to work at the landfill. The construction of a modern recycling facilities with the possibility of using waste in energy production is planned. At this landfill the waste is disposed by the following municipalities Prijedor, Kozarska Dubica, Ostra Luka, Kostajnica and Krupa on the river Una. The landfill “Palija park” is located 5 km from Kostajnica. The existing waste disposal area at this landfill has an area of approximately 5, 500 m². The landfill is fenced, drainage channels are made, the watercourse that is occasionally active is piped, the access road is relocated and electricity is brought to the landfill. Prijedor-ska region has a lot of environmental problems due to the existence of „ wild “landfills that have been identified at 35 sites with a capacity of 44 938 m³ and the new ones are appearing.

Doboj region is located in the central part of the Republic of Srpska with the area of 3091.34 sq km and 252, 201 inhabitants in the eight municipalities of Doboj, Derventa, Teslic, Brod, Petrovo, Modrica, Samac and Vukosavlje. The services of waste management in the Doboj region are performed by the municipal utilities. In the rural areas municipal waste collection services are not provided. However, due to the unprofitability of waste collection from remote areas, utility companies have not taken into account the fact that the lack of municipal services from such locations can produce higher costs in the future when the remediation of illegal dumps or renewal of the soil and groundwater. The municipal waste from urban areas in the municipalities of Doboj, Teslic, Derventa, Modrica, Samac is collected on a daily basis according to the established routes. In the suburbs and local communities municipal waste is collected once a week or once or twice a month. The number of households covered by regular municipal waste collection service in the Doboj region is 22,829, which is about 45% coverage. In the Doboj region there is selective collection of municipal waste, but in Doboj and Derventa there are recycling centers where waste is sorted and placed on the market for secondary raw materials. Depositing waste in the Doboj region utilities are performed at the landfill „ Karabegovac “, which is located in the city of Doboj and the landfill managed by KP” Progress “. The basic construction work has been done on the landfill to improve the landfill and create stability, reduce the possibility of

fire or sinking of the landfill body and ensure the continued dumping of waste in the correct manner.

Mrkonjić Grad region with its 38,810 inhabitants, represents the smallest population region for the disposal of municipal waste in the Republic of Srpska. On an area of 2075.54 sq km 7 local governments are located: Mrkonjić Grad, Sipovo, Jezero, Kupres, Ribnik, East Drvar and Petrovac. The last five local governments are mostly of rural character, which is reflected in the municipal waste management system. In the municipalities of Jezero, Ribnik and Petrovac municipal services are provided by utility companies of their own municipalities, while in municipalities of East Drvar and Kupres there is no organized collection of municipal waste. In the Mrkonjić Grad region indiscriminate municipal waste is collected from households, business and industry, while there is no the collection of secondary raw materials. The waste disposal in the region Mrkonjić Grad is done on the local municipal landfills and can be categorized as disordered. The landfill „Podovi” in the territory of Mrkonjić Grad does not meet even basic environmental standards. At the landfill the waste is disposed uncontrollably (household and catering establishments, dead animals, construction waste, sawdust, etc.) This is a major environmental problem. The disposal of waste into landfill in the municipality of Šipovo started in 1983. The landfill site is in direct contact with the environment. It is non-insulated, there is no fence or other important elements. The landfill is located in the area of the mountain Lisina at an altitude of 1,244 meters. It is 5 km from the river Pliva and 7 km from the city center. It poses a constant threat and a source of contamination of drinking water for the population Sipovo and Mrkonjić Grad, which are supplied with drinking water from the slopes of Lisa. To date, this unregulated dump has seen approximately 35,000 tonnes of waste.

According to the regional division of waste management in the Republic of Srpska, Bijeljina region has 5 municipalities: Bijeljina, Ugljevik, Lopare, Pelagićevo and Donji Zabar on the surface of 1360.73 square kilometers, with a population of 149,187. The municipal waste in Bijeljina region are regularly collected from 18,547 households. In the region of Bijeljina municipal waste is disposed of in sanitary landfill “Brijesnica”, which is located in the western part of the municipality of Bijeljina and is about 2 km from the outskirts of town (east side) and about 1.5 km from the nearest village from northwest

and west sides. The landfill area “Brijesnica” is 220,755.78 m² and spread in the direction of the northwest - southeast. In the northern part of the site there is an old city dumpsite with the area of 4,400 m² and waste is still disposed there. The capacity for compacting waste at a regional sanitary landfill “Brijesnica” is about 200 tonnes per day. This landfill is managed by public company “Eko-Dep” Bijeljina, established in 2005. The landfill “Brijesnica” is built in 2010 and put into operation with the aim of rehabilitation of the existing and construction of new sanitary. It continuously monitors the landfill with all the parameters in accordance with the applicable legislation on waste dumps. Currently, the first phase of construction is finished and it included the construction of two out of the four hot cells, as well as the construction of other buildings and the purchase of specialized equipment and machines (bulldozer, dump truck and a tractor with various attachments). The first phase has been fully completed in accordance with European Union directives that regulate the field of environmental protection and waste management. In the hot cell for disposal of municipal waste protective insulating materials are installed that guarantee the protection of the groundwater, together with the system to collect leachate, biogas collection system and internal roads for the purposes of the landfill.



Image 3. Brijesnica landfill (The author during the research)

The entire surface of the landfill is fenced, there is an entry-exit zone with digital scales (capacity of 60 t) and a plant for cleaning and disinfection of the wheels and the lower pedestal vehicles before leaving the landfill. „Wild“ landfills are not a common sight in the Bijeljina region. The landfills in Bijeljina region are at 13 locations with the total volume of 122,925 m³.

With an area of 2,339.11 square kilometers, Zvornik region has 142,861 inhabitants. Zvornik region consists of the municipalities of Zvornik, Milici, Vlasenica, Han Pijesak, Srebrenica, Bratunac, Šekovići and Osmaci. The municipal waste Management in the Zvornik region is performed by utility companies whose majority owners are the municipalities. The activities of utility companies are different. In the municipalities of Zvornik, Han Pijesak, Milici, Osmaci, Sekovici and Srebrenica, in addition to collection services, transportation and disposal of waste, their primary activities are the distribution of drinking water and maintenance of the sewerage network. Zvornik region generally has the same problems with waste disposal as the other parts of the Republic of Srpska. The local landfills are mostly on inadequate locations, unbounded (except in Zvornik), not covered with inert material and with the unsolved problem of leachate. The municipal landfill in Zvornik, where the daily incineration of waste takes place, is located in the industrial zone of Karakaj, on the bank of the Drina river, which makes it very risky to the environment in this area. The transport and disposal of waste from the municipality Sekovici is carried out on a temporary landfill „Mali Lug“, located 4 km from the center of the village and it occupies an area of 0.85 ha. The site of the landfill is very unfavorable, since it is situated between the local road R-455 Sekovici and watercourses Drinjaca. KP „Cleanliness“ from Vlasenica dispose of waste at the temporary town landfill located in the local community Simići, the total area of 4 hectares. Each year, about 3. 690 tons of non-selective waste is disposed in the landfill. For the disposal of waste in the municipality of Milici an unregulated landfill is used. It is located on the site of a bauxite mine where exploitation of ore is not done. There is a serious problem of waste disposal in the winter due to poor transport infrastructure leading to the landfill. Currently, the construction of regional sanitary landfill „Crni vrh“ in the border part of municipalities Osmaci and Zvornik, with annual capacity of 41,500 tons is under way. „Wild“ landfills in the Zvornik re-

gion are located in several locations: Zvornik, Bratunac, Milici, Srebrenica and Vlasenica. In the municipality of Zvornik „wild“ landfills are located in the area of the village farm Tršić and Karakaj.

Sarajevo-Romanija region of 5084.83 sq km, is the largest surface region for waste management in the Republic of Srpska. This region consists of 12 municipalities of Sokolac, Rogatica, Visegrad, Rudo, Cajnice, Foca, Kalinovik, Pale, East Novo Sarajevo, East Ilidza, Trnovo and Novo Gorazde. It is inhabited by 151,883 residents. The municipal waste management in the Sarajevo-Romanija region is performed by 11 utility companies that are mainly owned by the municipality to which they belong. KP “Work” based in East New Sarajevo performs waste disposal for urban municipalities Novo, Sarajevo East, Eastern Ilidžaji and Trnovo. The primary activity of utility companies is the collection, transportation and disposal of waste. The municipal waste disposal in all municipalities of the Sarajevo-Romanija region is carried out in urban areas, where some municipalities include suburban local communities. In relation to the total population in this region, only 37% of the produced waste is collected and disposed in an organized manner. The organized waste collection in all municipalities includes wastes from several sources: households, stand up (non-commercial sources), waste from commercial sources (commercial type), waste whose composition does not significantly differ from municipal waste and does not have the characteristics of hazardous waste, medical waste (both harmless and hazardous waste) as well as the waste generated as a product of the work utilities, waste from street cleaning, landscaping, etc.

Region Eastern Herzegovina is the southernmost region of the Republic of Srpska, the total area of 3,753.79 square kilometers. It is inhabited by 78,528 people. The region consists of the municipalities of Trebinje, Bileca, Ljubinje, Gacko and Berkovići and East Mostar. In all the municipalities of Eastern Herzegovina region there is currently only one option to manage utility, industrial and hazardous waste (medical, industrial and other hazardous waste) - the disposal in local technically unequipped landfills. The municipal waste collection is performed by the utility companies majority-owned by the municipalities in which they operate. The exception is the municipality of East Mostar, which has organized municipal waste disposal and where KP “Komus” from Nevesinje is engaged.

All municipalities Eastern Herzegovina region have problems with „wild“ landfills in rural parts of its territory. In Bileća, at several locations in the city, there „ wild “landfills used to dispose of waste and residues from processing stone.

In the Republic of Srpska collecting and transporting waste is carried out by fifty-three companies. Some municipalities do not have waste disposal companies, but they engage companies from neighboring municipalities. Activities of utility companies are varied and numerous. The primary activities of most of the companies are the collection, transportation and disposal of municipal waste in landfills. Organized collection of selective municipal waste in the Republic of Srpska does not exist and is not in use. Urban parts of the municipality and the suburban areas are very well organized in the system of waste collection, despite the lack of modern vehicles for waste collection and insufficient capacity of the skips, as well as problems with financing. However, problems are highly expressed in the lack of service in rural parts of the municipality, which is the result of inadequate infrastructure facilities, accessibility, organization and insufficient funding. On this basis one can say that the coverage of waste collection services is insufficient. According to available data, in the Republic of Srpska, the rate of waste collection is 67.6%. In the Republic of Srpska organized waste disposal is done in three ways: regional landfills, local municipal landfills and illegal dumps. The regional sanitary landfill are sanitary, health and environmentally friendly way of disposing of waste. However, sanitary landfills are very expensive facilities with limited capacities to accept waste. To date, the Republic of Srpska constructed, adapted and put into operation two regional sanitary landfills in Ramići near Banja Luka and in Brijesnica near Bijeljina. These expensive and important objects should be treated rationally. The goal is to last as long as possible. To achieve it, it is necessary to develop a system of separate collection and utilization of waste (reuse, recycling, composting, etc.) Sanitary landfills are far safer for the environment and the best possible solution.

Local municipal landfills are landfills in eight regions in the Republic of Srpska with no constructed regional landfill. The Republic of Srpska has 41 local municipal landfill waste. The management of landfills is the responsibility of municipalities, transferred to the local utility companies. Utility

companies perform waste disposal in landfills, pay for the costs of deposits and carry out the maintenance and the restoration of landfills. However, due to the difficult economic situation, the lack of the necessary machinery and the lack of involvement of certain utility companies, local landfills are in very poor condition and generally do not meet the basic criteria of environmentally sound landfills. Most sites are on the inadequate and ecologically unacceptable locations with negative environmental impacts. Thus, some landfills are located close to populated areas, flood-prone and river areas. With increased amounts of rainfall, waste ends up in nearby streams and rivers. Very little has been done to prevent ground water, which is collected within the catchment area surrounding hills, penetrate the waste. In addition to problems with the water, fires are frequent in landfills. Besides the danger that fire poses to neighboring areas, including the damage of forest fires, flue gases generated by burning waste materials contain toxic mixtures harmful to health. Because of the open disposal of waste not being processed and compaction of waste, there is a justified concern for the health and safety risks due to the potential spread of disease and infection due to the approach of possible laptop infestation (flies, rodents, birds, etc.). From a total of 41 local landfills, 49% were completely unregulated or landfills where there is no building-technical equipment or the control of waste disposal. In nine municipalities of the Republic of Srpska there are regulated local partially rehabilitated landfills that have basic control measures. These landfills are located in Trebinje, Gacko, Foca, Pale, Doboj, Teslic, Mrkonjic Grad, Prijedor and Kostajnica. The third and most common way in which people of the Republic of Srpska dispose waste are „wild“ landfills. „Wild“ dumps are illegal landfills that take up little space and contain limited amounts of waste, most commonly formed directly by the road, near a settlement. Quite often the waste material is deposited along the river bed or in abandoned excavations of stone and gravel as well as on land that is privately owned. People often dispose of waste in unauthorized areas in order to avoid payment of fees or effort needed to properly put it on sanitary landfills or recycling centers. The materials at locations of illegal dumps are usually old tires, appliances containing freon, batteries, construction waste (drywall, roofing, lumber, brick, concrete, etc.), abandoned vehicles, auto parts, home appliances, furniture, outdoor waste, household

waste, medical waste, etc. „, Wild “landfills reduce the quality of life, have negative impact on flora and fauna, present a danger to humans, especially children, are becoming places for breeding of rodents, insects and other pests, damage the land and destroy the habitat of wildlife, pollute surface and ground water. To solve these problems, one of the most important tasks is to change habits and behavior as well as to educate the population.

CONCLUSION

Based on the data on the constant growth and production of waste, increasing environmental and health problems caused by inappropriate waste handling, on reducing the capacity for waste disposal, as well as on various legislative and political conditions in the Republic of Srpska the following conclusion can be made:

The current situation of quantity, type and composition of waste in the Republic of Srpska is very difficult to accurately determine. The main reason is the lack of data on the qualitative and quantitative analyses of waste, precisely the lack of records of the quantities, the characteristics and composition.

In the Republic of Srpska there is no selective separation of certain types of waste. Thus, waste is a mixture of household and commercial waste, waste from markets and local industrial enterprises. Therefore, it is difficult to determine the composition of waste for each municipality in the Republic of Srpska due to the wide differences in the level of living standards between different communities and between urban and rural areas.

Collection and transportation of waste is one of the most important links in the waste management system. In the Republic of Srpska municipal waste disposal is the responsibility of local governments, in accordance with decisions on waste management and other activities in which the level of service and manner of pricing are defined.

Urban and suburban areas have very well organized systems of waste collection, despite the lack of modern waste collection vehicles.

Selective waste collection and recycling in the Republic of Srpska are in an embryonic stage, but significant improvement of municipal services are noticeable. However, the waste is still largely deposited directly into landfill without any treatment after collecting.

There are a number of initiatives within utility companies for waste sorting and recycling. Secondary raw materials are primarily classified: paper, plastic (PET bottles and plastic film) and metal, which are then sold to companies for recycling and dispose of waste. Significant initiatives in the area of recycling were observed by private enterprises which have recognized the business opportunities .

The most acceptable option for waste management in the Republic of Srpska, utilities and industrial, medical and hazardous waste is landfilling. The majority of landfills are in inappropriate locations or technically unequipped. Most sites are located on the inadequate and ecologically unacceptable locations where there are negative environmental impacts.

The disposal of waste in the Republic of Srpska is done on the regional sanitary landfills (Banja Luka and Bijeljina), local municipal landfills and illegal dumps.

This reserach disproved the null hypothesis stating that the production of municipal waste in the Republic of Srpska is disposed of in an environmentally sound manner.

Successful waste management begins with prevention of waste generation. One of the biggest problems of policy for environmental protection in the Republic of Srpska is inadequate and underdeveloped waste management. This situation is primarily the result of the attitude of society towards waste, the lack of education and understanding of important issues of sustainable system of waste management as well as the lack of understanding of the positive effects of this process.

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