

Solid waste management in Republic of Serbia

Proposal for the Improvement in the Central Serbia



Dragan Marinković

Member of managing board

Republic of Serbia Environmental Protection Fund,
Republic of Serbia

1 Urban Sector Review

1.1 Basic General Data of the Republic of Serbia

- Geography and Administration



Location: Serbia is situated in the South-East Europe, north-central area of Balkan Peninsula, Serbia borders **Hungary** on the north, **Romania** on the northeast, **Bulgaria** on the east, the Former Yugoslav **Republic of Macedonia** on the southeast, **Albania** on the south, **Montenegro** on the southwest, **Bosnia-Herzegovina** on the west and **Croatia** on the northwest. Serbia is **landlocked**, although access to the **Adriatic** is available through neighbouring **Montenegro**, and the **Danube River** provides shipping access to inland **Europe** and the **Black Sea**.

Capital: Belgrade lies in the core location of Balkan Peninsula. It stands in the confluence of the Danube and Sava rivers.

Brief History: From 6th century to 7th century, some Slavs had immigrated to the Balkan Peninsula. After 9th century, a country Serbia was formed and joined the Yugoslavia after the World War One. After the World War Two, it became one of the six republic countries of the Federal Socialist Republic of Yugoslavia. In 1990, the original Yugoslavia started to collapse, and then Serbia and Montenegro constituted the Federal

Dragan Marinković

Republic of Yugoslavia in the next year. However, the latter Yugoslavia was renamed Serbia and Montenegro on February 4, 2003. The Republic of Montenegro declared independence on June 3, 2006, so the National Assembly of Serbia On 5 June 2006, declared the "Republic of Serbia" to be the legal successor to the "State Union of Serbia and Montenegro." Serbia and Montenegro became separate nations.

Serbia's head of state is the president, directly elected by the public. The current President of Serbia is Boris Tadić, leader of the center-left Democratic Party (DS). He came in at the election on June, 2004 and won a reappointment on February, 2008. Serbia's parliament consists of 250 members directly elected by the public. Head of government is the prime minister, who is selected by the parliament. Serbia is divided into 24 districts plus the City of Belgrade. The districts and the City of Belgrade are further divided into municipalities. Serbia has 2 autonomous provinces: Vojvodina with (7 districts, 46 municipalities) and Kosovo and Metohija. Kosovo has declared independence but is still presently under the administration of the United Nations Interim Administration Mission in Kosovo (according to Resolution 1244); international negotiations began in 2006 to determine its final status; Kosovo declared its independence on 17 February 2008, which Belgrade opposes.

The part of Serbia that is neither in Kosovo nor in Vojvodina is called Central Serbia. Central Serbia is not an administrative division, unlike the two autonomous provinces, and it has no regional government of its own.

Local governments in Serbia's communes have assemblies directly elected by the public. Head of local governments is the president, who is selected by the local Assembly. These communes are roughly 150 square miles (400 square km) in area, with an average population of 45,000. Urban communes have larger populations, many containing more than 100,000 inhabitants. General operations of the communes are to provide services to citizens and to collect taxes.

Housing is a perennial problem, particularly for young people in urban areas. Most city dwellers live in small apartments in high-rise buildings. Although communes bear responsibility for housing construction, much of the new housing stock has been built by enterprises. Most villagers build and own their homes.

The civil strife in the 1990s left some two-thirds of the population impoverished and hundreds of thousands homeless. Assistance from the West only partially resolved the problem of housing, feeding, clothing, and providing medical care for a significant proportion of the population.

Demography and Health

Population estimate is 9,516,000¹. Serbia is populated mostly by Serbs. The northern province of Vojvodina is the most developed part of the country. Vojvodina is one of the most ethnically diverse territories in Europe, with more than 25 different national communities.

Table 1: Ethnic composition of Serbia (excluding Kosovo) in 2002

Serbs	Hungarians	Bosniaks	Roma	Yugoslavs	other
82.8%	4%	1.8%	1.45%	1.1%	9.8%

2002 Statistical office of the republic of Serbia

Population profile

In mid-2003, Serbia had about 9,5 million people, of which about 52% of them lived in urban areas, which is below the Eur-B+C average rate. The percentage of the population 0–14 years old fell from about 23% in 1990 to 16% of the population by 2002. The percentage is below the Eur-B+C average. The percentage of Serbia's population over 65 years old is above the Eur-B+C average. By 2030, an estimated 19% of Serbia's population will be 65 years old and older. The birth rate in Serbia was below the Eur-B+C average rate in 2002. Also, natural population growth was negative. Life expectancy in the Republic of Serbia, for the period 2001-2003, overall, and for males and females respectively, exhibits a slight rising trend-71 years (men), 76 years (women). Population growth rate is -3.5%. Population by age – average 40.2 years, (39.0 years for men, 41,5 years for women).

Religions (2002 population census): Orthodox 85%, Roman Catholic 5.5%, Muslim 3%, Protestant 1%, other 5.5%.

Languages: Serbian 88%, Hungarian 3.8%, Bosnian 2%, Albanian 1%, others 5%.

Health

Birth rate decline in Serbia: decline in the number of live births (from 78,101 to 70,997), that is, decline in the rate of live births per 1000 population from 10.4 in 2002 to 9.6 per thousand in 2006.

- Natural increase rate per 1000 population for the period under observation fell from -3.3 in 2002 to -4.3 in 2006.
- Vital index, live births per 1000 deaths, was constantly decreasing, from 76.0 in 2002 to 69.0 in 2006.
- Number of deaths in Serbia has been on the rise since the eighties. The number of deaths in the period under observation is 102,785 in 2002 and 102,884 in 2006,

¹ Includes 2007 population estimate for Kosovo equalling 2,114,000 (2002 Statistical office of the republic of Serbia)

so the mortality rate rose from 13.7 in 2002 to 13.9 deaths per 1000 population in 2006.

- Infant mortality rate in Serbia shows a long term decrease. In the period under observation, this rate declined from 10.1 in 2002 to 7.4 in 2006. The most common causes of infant death are certain conditions originating in the prenatal period with 61.71% of infant deaths.

Specific mortality, i.e. the most common causes of death registered, by ICD-10 disease groups, are:

Table 2: Most common causes of death registered

	Men (%)	Women (%)	Average (%)
Diseases of the circulatory system	51.96	62.77	57.27
Neoplasm	22.33	17.52	19.97
Symptoms, signs and abnormal clinical and laboratory findings	4.88	4.67	4.78
Diseases of the respiratory system	4.48	2.80	3.66
Injury, poisoning and certain other consequences of external causes	5.30	2.17	3.76

Serbian Institute for Health Protection. "Dr Milan Jovanovic Batut"

Economy

Serbia has an economy based mostly on various services, industry and agriculture. In the late 1980s, at the beginning of the process of economic transition, its position was favourable, but it was gravely impacted by UN economic sanctions 1992-1995, the damage to infrastructure and industry during the NATO air strikes in 1999, as well as having problems from losing the markets of ex-Yugoslavia and the SEV. Main economic problems include high unemployment (20.0% in 2005) and inflation.

After the ousting of former Federal Yugoslav President Slobodan Milosevic in October 2000, the country experienced faster economic growth (the amount of economic growth in 2006 was 6.3%, and has been preparing for membership in the European Union, its most important trading partner. Serbia suffers from high export deficit and considerable debt. The country expects some major economic impulses and high growth rates in the following years.

While economic growth in Serbia continues at a healthy clip, this indicator alone may be misleading. Serbia is still far behind its neighbors, with GDP still only 65% of the level in 1989; production volumes have reached only 45% of that recorded when Serbia was part of the Yugoslav economy. Sectors such as textiles, motor vehicles, and electronic equipment have never recovered from the depression of the 1990s.

Solid Waste Management in Republic of Serbia

Natural resources: Coal, petroleum, natural gas, antimony, copper, lead, zinc, timber, Agriculture: 12% of GDP, Industry: 20% of GDP, Services: 68% of GDP, Trade (2006 est.): *Exports*-\$6.4 billion.

Table 3: Gross domestic product

Statistic	
Gross domestic product 2007	7,1% real growth
(GDP) total,	mill. EUR 29124.5
(GDP) - per capita	EUR 3945
(GNI) - total,	mill. EU 23350.6
(GNI) - total,	mill USD 29278.5

Source: Statistical Office of the Republic of Serbia, 2007

1.2 Urban Facts and Figures related to solid waste management

A short review of waste management system in Serbia

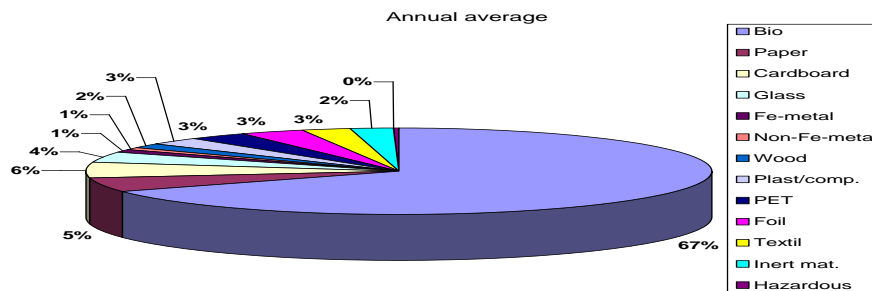
Waste volume

Waste volume in the Republic of Serbia is hard to estimate. The main reason is a lack of information on waste qualitative and quantitative analysis.

As indicated by the data collected for 160 municipalities from Central Serbia and Vojvodina, (data from Kosovo unavailable) it may be estimated that communal companies collect waste from 60-70 % of population, i.e. 5 million inhabitants. Waste produced by 2,5 million inhabitants is not included in the collection system. Such waste is disposed of without control, to illegal disposal sites in villages, or by rivers, and incinerated without any control. Average communal waste mass in the Republic of Serbia is estimated to 0,80 kg/cap./day, a little less than in the Central and east European countries.

- There are no reliable data about waste structure in the Serbia. Only a few cities made the analysis of waste. One of them is Kragujevac.
- Average Waste composition obtained during the two assessments (summer and winter period) in the city of Kragujevac for the year 2005/2006 is shown on the chart below.
- Recently, an increase in volume of plastic waste has been noticed because of large quantity of PET packages (beer and juice)
- Packaging waste is classified as household and commercial waste. Though there are no official data on packaging waste volume, it is estimated that it covers 40% i.e.550.000 tons/year

Table 4: Average waste composition in the city of Kragujevac²



- Packaging waste is classified as household and commercial waste. Though there are no official data on packaging waste volume, it is estimated that it covers 40% i.e. 550.000 tons/year
- There are no reliable data on the quantity of used batteries,
- There are no reliable data on the quantity of old tires, as well as of unusable vehicles located mostly in registered junks.
- Collected data on oil quantities containing PCB show that there are about 200 tons of similar oils in Serbian power plant systems, still in use. Certain volume of waste polluted by PCB oils was produced during the NATO bombing in 1999, due to PCB leaking from the bombed transformer stations.
- There are no reliable data on waste produced by electric and electronic instruments, since this category of waste is not specifically classified.
- There are no reliable data on hazardous waste volume generated in industry.
- Total annual medical waste volume in all health institutions in Serbia is estimated to 70.000 tons, i.e. 1, 8 kg/bed of medical waste/day, of which 9.600 tons are hazardous waste.

Communal waste in Serbia is mostly collected by Public communal enterprises, founded by municipalities. The collected waste is mostly directly transported to usually inadequate disposal sites (dumps), where it is deposited without any previous treatment. In spite of an option of composting (large percent of organic waste), it is not done.

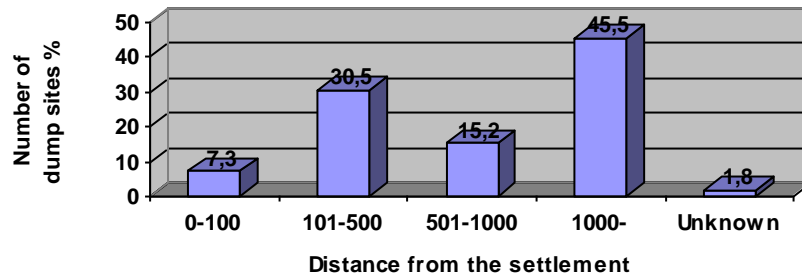
Officially, there are 164 disposal sites of communal waste in the Republic of Serbia, not counting a large number of illegal waste dumps in rural areas. Municipalities in many cases clean these waste dumps, but they are usually re-created on the same locations. However, it is not often (except for the City of Belgrade) that two municipalities use the same communal disposal site.

² Public communal enterprise "Cistoca", Kragujevac, GTZ, Project "Communal waste analysis in City of Kragujevac", 2006

Solid Waste Management in Republic of Serbia

Age some disposal sites varies from 5 new, which are open during the year 2005., to a landfill in the municipality of Backa Palanka, which is the function of 1956 year. Of the total number of disposal sites 12 (7.3%) is located less than 100 m from the settlements.

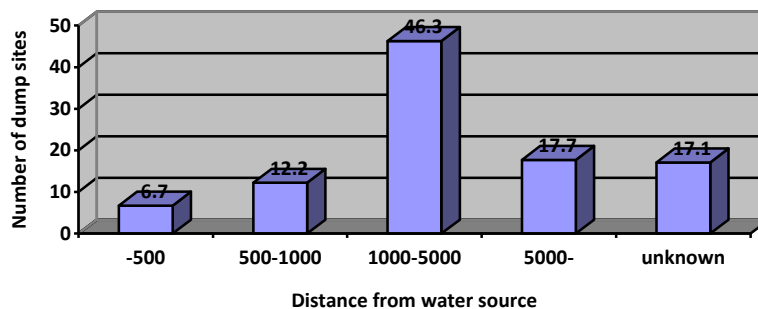
Graph 1: Distances the landfills from the settlement³



Collected data on the distances the landfills from surface water showed devastating picture. 25 (15.2%) landfill is located less than 50 m from the coast, rivers, streams, lakes or reservoirs. Of that number 14 is practically the landfill is located on the banks of the river or its carcass. It should be noted that 32 (20%) municipalities are not submitted information about these distances.

Information about the distance the landfills from water sources are in the graph below At the distance of less than 500 m from the zone of water supply is 11 (6.7%) landfills, and another 28 (12.2%) of the distance of less than 1000 m.

Graph 2: Distances the landfills from the water source⁴



The project management of medical waste in Serbia, which finance the European Union, will begin this year. The 78 health centres in Serbia will receive the device for

³ Serbian Environmental Protection Agency

⁴ Serbian Environmental Protection Agency

sterilization of medical waste in the project of the European Agency for Reconstruction and the Ministry of Health of Serbia. With the devices for sterilization of medical waste, which will be prepared the way for the postponement of the city public dumps, health care facilities in Serbia and get a vehicle for driving the waste to landfills.

1.3 Policy

Regulations on waste management and laws

- There are numerous laws and regulations regarding waste management, in the Republic of Serbia.
- The Law on Environmental Protection (off. Jour. RS No.135/04)
- The Law on the basis principles of environmental protection (off. Jour. SRY, No. 24/98)
- The Law on the Handling of Waste (off. Jour. RS No. 25/1996). This law regulates waste management, the waste collection, transport, storage, treatment and disposal.
- Regulations on documentation submitted in the procedure for granting waste import, export and transit permits (off. Jour. SRY, No 69/99)
- Regulation on handling of hazardous waste products (off. Jour. RS No. 12/95)
- Regulation on conditions of secondary raw materials classification, package and storage (off. Jour. of RS No 59/01)
- Regulations on the criteria for determining location and disposition of waste disposal site (off. Jour. of RS, No 54/92)
- Local self-government on the local level, has its own Decisions on communal order
- Under preparation are the changes and amendments to laws concerning environmental protection, and new Waste Law as well as Laws on packaging and packaging waste.

1.4 Actors and their Roles

Institutional responsibilities for waste management

The responsibility of the Government and the National Parliament is to establish legal framework for the sustainable waste management, economic instruments for the waste, management implementation and public awareness raising, initiation of dialogue between the interested parties, in order to establish waste management partnerships.

The Ministry

- Develops and suggests the waste management strategy to the Serbian Government;
- Prepares regulations and technical standards;
- Issue licenses required by law and keeps adequate registers;

Solid Waste Management in Republic of Serbia

- Coordinates waste management activities significant for the Republic, and follow up activities to see their progress.
- Adopts waste management plans on the level of several municipalities; coordinates activities regarding international agreements and regulations and decrees;
- Issue permits for waste import, export and transit;
- Organizes informational system on waste on the territory of the Republic.

Local self-governing office

Through its authorized agencies:

- Develops and suggests the waste management local plan;
- Organizes, provides, manages and carries out communal waste management on its territory;
- Manages procedure of service payment regarding communal waste management;
- Gives opinion on issuing license permits in accordance with the regulations;
- Takes part in decision-making in regard to treatment plant building and final hazardous waste disposal
- Carries out other activities regulated by special laws.
- Two or more municipalities may jointly organize and carry out waste management, if it is in their mutual interest.

On the local level, cities and municipalities have their own Decisions on communal order, managing, providing, organizing and carrying out communal waste on the cities and municipalities territory.

Waste management in Serbia is inadequate and is a threat to human health and the environment. In practice, there are great problems for the municipalities to agree on forming a joint region for waste management. The national authorities do not have means to force them to unite because it is contrary to the Law on local self-government where each municipality has the opportunity to decide with whom they will merge. To encourage them to join, the Fund for environmental protection provides grants to finance rehabilitation and construction of new regional landfills. Big problem is the lack of local and regional plans and strategy of waste management.

Waste volume

In the last few years with economic development, changes in composition and quantity of waste are noticed. Reduction of share volume of organic waste is also detected.

Waste collection

Communal waste is in Serbia collected by Public communal enterprises, founded by municipalities. They collect waste in an organized way from about 70% of the territories. Communal waste collection in urban zones is well organized, despite the lack of modern waste-collecting vehicles, and inadequate number of trash containers, -Rural zones are left out from the waste collection cycle, resulting in local dumps in many villages, sited at

inadequate locations (river valleys, near houses and farms). This is a widespread phenomenon.

Public companies usually have surplus employees in administration, and are quite ineffective. In the last few years the process of privatization of these companies has begun and forming of private or public private companies (PP). After the transformation of public companies the service were improved, and waste collection extended to the rural parts.

The collected waste is *mostly* directly transported to inadequate disposal sites, where it is just thrown away, where it is neither covered nor pressed with earth regularly, and without minimal measures of health protection for population or the environment.

Prices for collection of household waste are not appropriate, and are formed so that the social peace is maintained. Local municipalities help local public utility companies by subsidies which in turn resulted in inadequate waste management. In addition, the landfills are owned by the cities and Waste companies do not pay the levies for waste disposal.

Waste treatment

There is no single waste-incinerating device in Serbia. A few years ago began to use old tires as an alternative fuel in two cement-factories. Communal waste recycling is not organized by municipalities. In the last few years in some municipalities started the process of collecting paper and PET packaging. Recycling of paper waste, plastic and metal is organized also through private organizations and collectors. The problem is the impossibility to sell of collected raw materials by the appropriate prices

Hazardous waste treatment centers are non-existent on the territory of the Republic of Serbia. There are mostly small, individual installations, usually designed for the generator's purposes.

Disposal sites

Collected waste is mostly deposited to the disposal site on the municipal territory. Many disposal sites are dangerous to health of neighboring population and environment. With a few exceptions, these disposal sites are badly managed. Urgent training of administrative and other staff working on disposal sites is needed

The present disposal sites may be classified from the category of the newly built sites satisfying most of the requests of the Directive on disposal sites, to the category of small, official disposal sites, not satisfying even minimal environmental measures. There is no evidence on rural disposal sites and local dumps.

2 Organisation

Fund for Environmental Protection



Fund for Environmental Protection has been brought in force by Environmental Protection Law (Official Gazette of Republic of Serbia No. 135/04), and started its' operations on May 25, 2005.

Objectives

Financing and preparation of development and implementation of programs, projects and other activities in the field of protection, sustainable use, protection and improvement of the environment, as well as in the energy efficiency field and renewable energy sources.

Scope of Work

The fund is in charge of financing of development and implementation of programs, projects and other activities in the field of environmental protection, energy efficiency field and renewable energy sources, particularly:

- Expertise of providing, management and use of funds
- Intermediation related to international and local funding of environmental protection and energy efficiency
- Keeping database of programs, projects and other activities in the field of environmental protection and energy efficiency, as well of necessary available finances for their funding
- Incentives, establishing and carrying out the co-operation with international and domestic financial institutions and other legal and physical entities in favour of financing environmental protection and energy efficiency, all in accordance with The National Program and other strategic plans and programs, and contracted international contracts.

3 Urban Problem

In light of the previous facts, the following problems in waste management system could be noticed:

- Organized communal solid waste collection covers about 60-70 % population
- Rural areas are not covered by organized waste collection
- Sole method of communal waste treatment is depositing to sites

- There is no organized separate collecting and recycling of packages, and other communal waste, except in a few cities in Serbia.
- There are no plants for hazardous waste storage and treatment, and its problem in Serbia is big
- There is no system for collection of household hazardous waste
- There is no system for unusable cars, and other specific waste categories
- There are no plants for biodegradable waste treatment
- Present disposal sites mostly do not satisfy EU requirements and standards
- Poor Corporation between municipalities in the planning and implementation phase
- Communal solid waste collection taxes do not cover all expenses
- There are no data on total number of hazardous waste generators
- There are no data on total number of generators of waste, which may be used as secondary raw material
- At this moment here is no regular hazardous waste storage according to regulations, because temporary disposal is done mostly inside of the factory zone and often in an inadequate way
- There is no efficient horizontal and vertical administrative and professional organization, completely legal framework or economic measures in regard to waste management
- There is no organize education of population on waste, its maintenance and recycling obligation
- Bad existing law regulation
- Non-application or inconsistency application of pineal regulation
- There is no local communal police

However, the biggest problem regarding communal waste management is its disposal, with the following urgent problem

The other urgent problems:

- Closed landfills are not recultivated and have no recultivation projects
- Most of them doesn't have environmental impact assessment and urbane, building or operating permits
- Most of present disposal sites are full and planned for closing (existing for more than 20 years)
- There is no adequate mechanical equipment at present sites
- Bio-chemical and industrial waste is of en disposed of at disposal sites, though it is illegal
- There is no environmental monitoring
- There is no special disposal site in Serbia, or regular site of hazardous waste, while temporary disposal is mostly done inside the company zone, most of en in an inadequate manner.
- Illegal local dumps are huge problem in maintaining cleanliness, and in most settlements are formed in neglected places.

4 Proposal for Change and Improvement

In order to solve the above mentioned problems it is necessary to take the following actions:

4.1.1 Institutional and organizational measures

- Establishment of cooperation and responsibility among more neighbouring municipalities for the purpose of planning in the field of waste management on the inter-municipal level;
- Incorporation of EU and national standards and targets into long-term contracts on waste management;
- Establishment of independent professional organization (association or chamber) for all participants in waste management;
- Advanced introduction of Environmental Management System (ISO and EMAS schemes) and ECO-marking

4.1.2 Economic measures

- Increase fees for illegal waste handling;
- Commence restructuring of public communal enterprises regarding their direct connection to founders, divide them into organizational and technical units, and free them of secondary activities, and make corporations;
- Start with concessions to private and mixed enterprises, first of all for waste collection and disposal;
- Sectoral liberalization, introduce competition, and users' right to choose the best service;
- Privatize activities connected to waste management, wherever justified.

4.1.3 The most important technical / operative measures

- Develop a Local and Regional waste management plans in accordance with the Directive 75/442/EEC on Waste (General Directive);
- To build a new regional sanitary landfills in accordance with the Directive 99/31/EC on Landfills;
- Introducing separate collection and recycling of dangerous household waste, oils, batteries etc;
- Increasing the number of inhabitants included in waste management system (80%);
- Develop the capacities for treatment of storage of medical waste;
- Sanitation and re-cultivation of the existing damp sites;
- Develop a plan for animal waste management;
- Establishment of independent professional organization (association or chamber) for all participants in waste management;

- Increase the rate of reuse of packaged waste (glass, paper, card board, metal and plastic) to 25% until 2015;

4.2 The production of Local and Regional Plans for Waste Management

Project description

In order to solve urban problems, it is required to draw up the plans on urban, special and dangerous waste.

- The Plans should face the possibilities for the development of a system for waste collection, transportation and dumping, and should also define the institutional system of management.
- It should also consider the need for the institutional and legislative capacity building, education and public awareness raising.
- Identification of economic and financial mechanisms is a conditional for sustainability and advancement of waste management.
- Preliminary, the project foresees recognition and an analysis of the existing situation, through the integration and the correlation of historical data with the ones surveyed and through the work already done by the Agency for Environment.
- It will be necessary to plan the projects on a period of ten years, with the definition of schemes and models of specific rules, of characteristic of technical, environmental and economic compatibility for different territories that have been chosen.
- The plans will be completed with the individuation of model where it will be defined a planning simulation and a project of financial and economic sustainability.

4.2.1 The production of the Waste Management Local Plan for the city of

Kragujevac

The first step in the development of a Local Plan for Waste Management, for that the municipality should be establishing a technical group which would coordinate and monitor its development.

This group would perform the following tasks:

- Gathering/evaluating the existing data and strategies regarding production and waste management
- This activity would asses all existing data on waste generation, present practise, needs, politics and strategies.
- It will also identify insufficiency in information/data and specify the Project assignment for any other study (as a part of a Local Plan).
- These activities will identify defects and specify the Project assignment for any later study in that sense.

Solid Waste Management in Republic of Serbia

The second step should be a Study data collection of missing information

- Previous activities identify defects in the existing data whiles this activity will represent a study or a group of small studies/analyses aiming to overcome those defects.
- This will result in sufficient data for the preparation of draft plan.
- The result will be reports with necessary information and data.

The third step will be the reparation of a draft plan for waste management. This activity will assess the existing data, collect additional data and prepare the Draft Local plan version. The draft plan would be followed by consultations or debates.

The fourth step should be consultations and debates in between relevant group that could collaborate with the Waste Management Plan

- Consultations with the interest groups will include a workshop where a draft Local Plan for waste is going to be disseminated and a campaign for enhancing public awareness.
- This activity is important as it has to insure the interest groups participation in this plan and acceptance.
- The result will be a report on the consultations/debates process and achieved results.

The fifth step will include the development of a Information System for Waste Management

- In order to successfully monitor the plan, a reliable data collection system is needed as well as their storage and usage.
- That is why the integrated information system for solid waste management is recommended.
- It is recommended to develop an integrated information system for waste management which will represent a primary tool for regulative application and system control as well as monitoring the use of Local Plan for waste. The final result of this activity will be a operational integrated Information system for waste management.

The fifth step will be the conclusion of the Local Plan for Waste Management

- This activity examines the results of consultations/debates processes and finalizes the Local Plan for waste management.
- The Local plan should be adopted by the City assembly and the Ministry of Environment and Spatial Planning for approval.

4.2.2 Development of the Regional Plan of Waste Management for the region of Sumadija in accordance with the Directive 75/442/EEC on Waste (EU General Directive).

This activity refers to the realisation of the idea for establishing region for waste management, suggested by the Waste Management National Strategy for Serbia.

The activities would develop by the following methodology:

Establishing a Regions for Waste Management

- The final result of these activities will be a Memorandum of cooperation between local municipalities for waste management.
- It is suggested that the every Region is founded by the Technical work group for waste management.
- The group will be responsible for the development of the integrated waste management in the regions.
- Another important roll of this group will be increasing public awareness.

Preparation of Project assignment for the Plan study

- The group will prepare the project assignment for the Plan study.
- The result of this activity will be a Project assignment.

Carrying out a Plan study

- The next step will be the implementation of the Plan study.
- The study will identify the optimum system for collection, transport, treatment and disposal.
- The aim would be to collect at least 80% of municipal solid waste generated in the region.
- The Studies must also asses the generated quantities of commercial, industrial and dangerous waste (including medical waste) in the region and give suggestions for their management.
- These plan studies should also identify how reuse, restoring and recycling will be promoted/carried out in the region.
- The result of this study will be a report with recommendations for the content of Regional Integrated waste management plan.

Preparation of the Draft version of the Regional Integrated waste management plan

- The draft version of the integrated regional waste management plans will be based on the results of the plan study.
- This activity will include the consultations with interest groups about the plan content, combined with the program for enhancing public awareness.
- This will insure proper plan functioning and later it will provide public agreement and understanding the need for regionalisation, which in turn should decrease public resistance regarding landfills.

The preparation of the Project assignment of the Feasibility Study for the provision of regional infrastructure

- This activity will prepare the Project assignment for the feasibility studies on infrastructural requirements for waste management including transfer stations, recycling facilities, collection points for waste oils, batteries etc.
- The result will be a project assignment for the feasibility study.

Solid Waste Management in Republic of Serbia

Feasibility study for the development of Waste Management System Plan

- This activity implements the feasibility study with respect to project assignment prepared in previous phase.
- The result will be a report on the Feasibility study.

-The preparation of the final draft version of the Regional Waste Management Plan

- The draft final version of the integrated plan for waste management will be based on the feasibility study report.
- The plan will provide detailed suggestions for new infrastructure including the regional sanitary landfill

Consultations with the interest groups about the Feasibility study and enhancement of public awareness

- This activity consists of consultations with interest groups on final draft of integrated plan for waste management and future activities for increasing public awareness.
- The result will be a report on the results of consultations.

Finalisation of the Regional Plan for Waste Management

- This activity finalises the Regional integrated waste management plan based on the results of consultations.
- The finalisation includes the approval of regional municipalities.

Delivering the Regional plan to the Ministry

Finally, the regional plan is handed over to the Ministry of Environment and Spatial Planning for approval.

Main conclusions

Through the production of Local and Regional Plans for Waste Management not only environmental problems will be solved, but quality of life of the habitants will be improved; besides dangerous threats to health of neighboring population will be eliminated.

5 Personal Action Plan

Action Plan / short-term during the year 2009 (November 12, 2008)

The production of the Waste Management Local Plan for the city of Kragujevac

Action/Activity	Timeline (Year/Month /Day)	Responsibilities Who Will Do It?
Establishing a Technical group	2009/01/01	Local government
Gathering/evaluating the existing data and strategies regarding production and waste management	2009/02/28	Technical group
Study for missing data collection	2009/04/31	Technical group
Preparation of the Draft plan for waste management	2009/10/15	Technical group
Consultations/debates of interest groups on Waste Management Plan	2009/11/15	Technical group interest groups, public
The development of the Information System for Waste Management	2009/09	Local administration
Finalization of the Local Plan for Waste Management	2009/12/31	Technical group City assembly The Ministry of Environment and Spatial Planning

Action Plan /long-term for the next five years (November 12, 2008)

The production of the Regional Plan for Waste Management of the region of Sumadija

Action/Activity	Timeline (Year/Month /Day)	Responsibilities Who Will Do It?
Establishing a Regions for Waste Management	2009/03/31	Local governments
Establishing a Technical group	2009/04/30	Local governments
Preparation of Project assignment for the Plan study	2009/05/31	Technical group
Carrying out a Plan study	/200911/31	Technical group

Solid Waste Management in Republic of Serbia

Preparation of the Draft version of the Regional Integrated waste management plans	2010/01/31	Technical group
The preparation of the Project assignment of the Feasibility Study for the provision of regional infrastructure	2010/03/31	Technical group
Feasibility study for the development of Waste Management System Plans	2010/06/30	Technical group
-The preparation of the final draft version of the Regional Waste Management Plan	2010/11/30	Technical group
Consultations with the interest groups about the Feasibility study and enhancement of public awareness	2011/2011/01	Technical group interest groups, public
Finalization of the Regional Plan for Waste Management	2011/03/31	Technical group City assembly
Delivering the Regional plan to the Ministry.	2011/30/31	Local administrations

References

Ministry for Protection of Natural Resources and Environment
2003 Serbia and Montenegro Environmental Sector Report, Beograd.

Government of the Republic of Serbia, Ministry for Protection of Natural Resources and Environment, 2003 The national waste management strategy- including the program of harmonization with the EU, Beograd. ISBN: 86-84163-16-8

Government of the Republic of Serbia, Ministry for Protection of Natural Resources and Environment, 2003 Serbia and Montenegro Country Environmental Analysis, Beograd

Government of the Republic of Serbia, Ministry for Protection of Natural Resources and Environment; World Bank, 2002 Serbia and Montenegro Environmental Sector Review, Beograd.

Government of the Republic of Serbia, Ministry for Protection of Natural Resources and Environment 2003 The national environment protection program-proposal, Beograd

Statistical Office of the Republic of Serbia, 2002 Statistical yearbook, Beograd, ISBN 86-84433-02-5

Dragan Marinković

Web site World Health Organization, 2008 World health statistics ISBN 978 92 4 156359 8 (NLM classification: WA 900.1), ISBN 978 92 4 0682740 (electronic version)

The Official Site of the Serbian Government: www.srbija.sr.gov.yu

The Ministry of Foreign Affairs of the Republic of Serbia: www.mfa.gov.yu

Statistical Office of the Republic of Serbia: <http://webrzs.statserb.sr.gov.yu>

Petnica Science Center - Serbia : www.psc.ac.yu