

MINISTRY OF ENVIRONMENT OF THE REPUBLIC OF MOLDOVA



**NATIONAL WASTE MANAGEMENT STRATEGY
OF THE REPUBLIC OF MOLDOVA
(2013-2027)**

Chisinau, 2013

CONTENTS

INTRODUCTION	- 3 -
I. CURRENT SITUATION	- 6 -
1. NATIONAL LEGAL FRAMEWORK	- 6 -
2. REGULATORY FRAMEWORK FOR INTERNATIONAL CONVENTIONS IMPLEMENTATION	- 6 -
<i>Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal</i>	<i>- 6 -</i>
<i>Stockholm Convention on Persistent Organic Pollutants</i>	<i>- 6 -</i>
II. DEVELOPMENT AND WASTE MANAGEMENT	- 7 -
3. SOCIAL AND ECONOMIC SITUATION	- 7 -
4. WASTE MANAGEMENT IN THE REPUBLIC OF MOLDOVA: ASSESSMENT AND ANALYSIS OF THE CURRENT SITUATION	- 8 -
<i>Existing Practices of Solid Municipal Waste Management</i>	<i>- 8 -</i>
<i>Industrial and Hazardous Waste</i>	<i>- 11 -</i>
<i>Construction and Demolition Waste</i>	<i>- 13 -</i>
<i>Medical Waste</i>	<i>- 13 -</i>
<i>Other Flows of Hazardous Municipal Waste</i>	<i>- 13 -</i>
5. FORECAST IN WASTE PRODUCTION	- 15 -
<i>Trends in the Production of Solid Municipal Waste</i>	<i>- 15 -</i>
<i>Trends in the Production of Industrial and Hazardous Waste</i>	<i>- 16 -</i>
<i>Trends in the Generation of Construction and Demolition Waste</i>	<i>- 18 -</i>
<i>Trends in the Generation of Medical Waste</i>	<i>- 18 -</i>
<i>Trends in the Production of Hazardous Municipal and Industrial Waste</i>	<i>- 19 -</i>
6. WASTE MANAGEMENT ISSUES	- 20 -
7. SWOT ANALYSIS	- 21 -
III. GENERAL AND SPECIFIC STRATEGIC PRINCIPLES AND OBJECTIVES	- 23 -
8. WASTE MANAGEMENT PRINCIPLES	- 23 -
9. VISION, PURPOSE AND OBJECTIVES OF THE STRATEGY	- 24 -
IV. ACTION DIRECTIONS	- 28 -
10. IMPLEMENTATION MEASURES	- 28 -
11. ESTIMATION OF IMPACT AND IMPLEMENTATION COST	- 31 -
12. EXPECTED RESULTS AND PROGRESS INDICATORS	- 32 -
13. IMPLEMENTATION STAGES	- 33 -
V. MONITORING, EVALUATION AND REPORTING MECHANISM	- 34 -

NATIONAL WASTE MANAGEMENT STRATEGY OF THE REPUBLIC OF MOLDOVA (2013-2027)

INTRODUCTION

The Moldova Government policy on waste management is consists in the develop of infrastructure and services necessary to adequately protect the environment at global, national and local levels from effects associated with the management of waste generated by citizens, enterprises and institutions.

The Government will establish the legal and institutional framework to support the gradual correspondence of our waste management practices to the European Union ones. Through some international, national and local partnerships we will encourage and attract the investment required to enable sustainable development of the sector, in line with priority needs and in a pace accessible to the society.

The improper waste management over the recent years has been affecting the local communities, threatening the environment and contributing to global emissions of greenhouse gases. In the context of economic growth of the volume and diversity of waste generated, waste management and recycling is a local, national and international priority.

This Strategy aims to develop infrastructure and services necessary to properly protect the environment and human health, develop legal and institutional framework required to support the gradual correspondence of domestic waste management practices to the European Union ones through international, national and local partnerships attracting investments needed for sustainable development of the sector according to the priority needs and in a pace accessible to the society.

The development of the National Waste Management Strategy (NWMS) aims at creating the necessary framework for the development and implementation in an integrated and efficient system in social, economic and environmental terms.

The sustainable development in waste management refers to ensuring that the waste they

generate are managed in a controlled manner to limit short-term environmental impacts caused by their disposal, and in medium and long term to be socially acceptable and economically feasible. The waste management hierarchy is a simplified conceptual framework that acts as a guide to the most desirable waste management options, based on the prioritization of waste management options to maximize their durability as follows:

- a) *Prevention*: prevention of waste production in the superior part of the hierarchy is the most wanted option. Prevention means a slow-down and inversion of the increasing rate of waste and the hazardous qualities of the produced waste;
- b) *Reuse and recycling*. These techniques refer to the usage of waste as secondary type raw materials, either without additional processing (reuse) or with subsequent processing (recycling),
- c) *Recovery*: This technique refers to the extraction of the value onwards (including the energy) from the produced waste. The recovery includes the utilization of the fuel fraction of waste as an alternative fuel in the production of electrical and thermal energy.
- d) *Disposal*: This technique is based on the burning in waste storage facilities of waste components which can not already be sent for reuse, recycling and recovery and are thought to reduce considerably the emissions in the environment.

The provisions of the NSWM shall be applied to all the types of waste, as they are classified according to the EU Directives as follows:

- a) municipal and assimilable waste: consist of all the waste materials that are produced in the urban and rural areas, in households, institutions, commercial units and services (household waste), waste that is collected from streets, public spaces, parks, green spaces, the waste derived from constructions and demolitions, from the clay obtained after municipal wastewater treatment;
- b) production waste: consist of all the waste derived from industrial activities; it is represented by production hazardous waste and production non-hazardous waste, where one or several criteria for hazard waste are met, provided for in the regulatory waste classification framework;
- c) waste derived from medical activities: consist of the waste derived from hospitals, clinics, medical cabinets, which may be divided into two categories: hazardous medical waste, which may be contagious, sharp and keen, anatomic and pathological organs, the waste produced by the units of contagious diseases. etc., except those which have been mentioned above, that form the category of assimilable municipal waste.

The awareness and public participation is critical to perform and support waste management at national and regional levels. Despite the increasing complexity of waste issues and changes in waste treatment systems, all the waste management strategies necessarily require the involvement of households, businesses and civil society in a broad public consultation to reach strategic goals. The civil society slogan "only together we can have a clean environment" is a boost for collaboration and development of public awareness on environmental protection.

Moreover, the support of the international partners, including the European Commission, the International Financial Institutions and the Development Agencies, is vital for the realization of the development rhythm which is necessary for the approximation of European waste management practices.

The main objectives of the EU waste policy are to prevent waste generation and to promote its reuse, recycling and recovery in terms of environmental protection. Waste is becoming increasingly perceived as a source of valuable raw materials for industry, with approaches such as energy reuse, recycling and recovery, packaging waste regulation is applied, end of life motor vehicles, waste electrical and electronic equipment, biodegradable waste and waste tires. The European policy focuses mainly on the separation of biodegradable waste from deposits, recycling and recovery are increasing, it helps preventing environmental pollution and emissions of greenhouse gases.

Based on this Strategy, the Moldovan Government undertakes to develop a new legal and institutional framework on waste management regulation under the EU legislation, including for the regulation of different flows of waste and operations of waste recycling, recovery and disposal, the creation of an efficient and progressive, institutional and administrative system of waste management, the monitoring, implementation and observance of the law on environment; however, the most difficult aspect would be attracting investors.

The implementation of the NSWMM is a priority for the period of 2013 – 2027, being evaluated periodically in line with the technological progress requirements and economic, social and environment conditions.

I. CURRENT SITUATION

1. National Legal Framework

Waste management in Moldova remains a difficult and unsolved issue "both in terms of organization and legislation". Although environmental protection is governed by 35 legal acts and more than 50 Government Decisions, legal aspects of waste management are far from being satisfactory, requiring both the legal and institutional restructuring and creation of an integrated system of technical and environmental regulation in the field of selective collection for recycling, recovery, waste disposal and storage.

Currently the legal framework regulating the waste management issues includes:

- a) Law on environment protection, no.1515-XII of 16 June 1993;
- b) Law on the ecological survey and estimation of impact on the environment, no.851-XIII of 29 May 1996 ;
- c) Law on natural resources, no.1102-XIII of 6 February 1997;
- d) Law on the charges for environment pollution, no. 1540-XIII of 25 February 1998;
- e) Law on production and household waste, no. 1347-XIII of 09 October 1997;
- f) Law on the regime of hazardous products and substances, no.1236-XIII of 3 July 1997;
- g) Law no. 40-XV of 19 February 2004 on the ratification of the Stockholm Convention on Persistent Organic Pollutants;
- h) Government Decision no. 1296 of 20 November 2008 on the procedure of charging environmental payments for import of goods in the process of use, causes environmental pollution and for plastic and / or tetra-pack packages of import goods.

2. Regulatory Framework for International Conventions Implementation

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

At the national level, the provisions of Basel Convention have been transferred through Government Decision no. 637 of 27 May 2003, which approved the Rule on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, by settling in this way the mechanism of implementation of the Basel Convention provisions aimed to ensure the observance of prescriptions on ecological security within the waste export, conveyance and disposal processes.

Stockholm Convention on Persistent Organic Pollutants

At national level, the provisions of the Convention were partially covered by the Republic of Moldova Government Decision no. 1155 of 20 October 2004 on the approval of the National Strategy on the Decrease and Elimination of Persistent Organic Pollutants (POPs) and the National Plan on the Implementation of Stockholm Convention, destroying about a third of the stocks of pesticides contaminated with POPs (1293 tones), while 18,660 old electrical condensers, with the total weight of 934 tones, which contained PCB, were eliminated.

The issue of reducing the POPs, which is accumulated as a secondary product as a result of unpremeditated activities of different industries (PCDD/PCDF, HCB and PCB) became a priority for the period of 2010 – 2015.

II. DEVELOPMENT AND WASTE MANAGEMENT

3. Social and Economic Situation

The quality of life is and should be an essential component in social and economic development of each country. Moldova's economy has gone through two distinct periods, the first period, 1992-1999, was characterized by decreasing GDP with 58.7% and since 2001 there has been a moderate annual growth of the GDP of 6.1% - 7.8%, the increase in the cumulative growth of the GDP during the period of recovery (2000-2006) making up 50.7%.

Most urban areas, including the largest and most prosperous, experienced a significant depopulation specific to the trend of declining population in the country. While all the urban areas were hit by the industry collapse, the towns dependent on one or two industrial enterprises faced extremely difficult situations and only in few cases the decline was overcome. The underdevelopment of towns as urban centers is an opportunity for regional policy, being seen as a gradual economic revitalization perspective for Moldova. This criterion will also be taken into consideration when developing waste generation forecasts.

Currently the situation of the rural population, mainly in small villages is poor, with few economic prospects and difficult access to relevant public services, including sanitation of territories, waste collection and storage. Although remittances are a significant part of the income of rural communities, it is clear that most of the remittances from citizens working abroad are used for consumption. Therefore the issue of waste management in rural areas is even more acute in the absence of sanitation services.

The issue of territorial development differences is specific for countries in transition to a market economy. Addressing this problem started in European countries in the 1950s to counter the imbalance existing in the territorial development. A more equitable distribution of development across the region could be achieved through an integrated effort of districts within a region. This will result in strong regional development efforts and will make the region more attractive to potential investors due to a clear strategic regional planning vision.

Currently, in Moldova, the districts and municipalities are the main units of regional development policy planning due to a higher concentration of human resources and administration at district level. According to the Law on Regional Development of the Republic of Moldova no. 438-XVI of 28 December 2006 it is proposed not to limit the development within the districts, but to promote the regional development initiatives. The development areas are administrative and territorial units with legal personality and which provides the framework for planning, implementation and evaluation of the regional development. Since the first element of the regional development process is planning for the first time for our country of three of the six developing regions - North, Central and South regions have Regional Development Strategies for the years 2010-2016.

Thus, although there are significant discrepancies between the levels of development of different regions, it is important for the development of integrated waste management system to have a regional impact, covering all areas, including the rural ones. In this context, it should be understood that no matter the physical location of capabilities of waste recycling or disposal is, but the expansion of the waste collection and transportation networks. In these circumstances it is necessary to develop new zonal environmentally friendly deposits and to create transfer stations for optimal implementation of an integrated waste management system to serve the population of municipalities, towns, communes and villages.

The solid waste management is closely related to the development objectives of the country. On the other hand, the inadequate management of waste from the country has a negative impact on:

- a) the development of agriculture, as a result of using the soil for waste storage, while this land could be used for agricultural activities;
- b) the development of tourism, as a result of a damaged image of the country associated with a waste storage facility and the unpleasant smell emanated from these facilities;
- c) the public health, as a result of unsanitary conditions of the waste storage facilities and the probability of becoming a plague spot.

On the other hand, the investments in this very sector would not only solve these issues but they will also contribute:

- a) to create new jobs through preparation and use of materials for recycling;
- b) to improve the supply for external exchange through recycling materials export;
- c) to bring forward the agricultural productivity by producing compost under the quality criteria;
- d) to contribute to the local energy security by recovering the energy from waste;
- e) to offer new income sources from the actions of reducing the carbon dioxide emissions associated with the devolution of waste.

4. Waste management in the Republic of Moldova: assessment and analysis of the current situation

The waste management is one of the difficult issues of the Republic of Moldova. The worsening of the matter of waste, and especially that related to solid household waste, is caused by the inefficient way the waste processing stages are held.

Existing Practices of Solid Municipal Waste Management

The waste management consists in the following activities: collecting, transportation, waste treatment, recovery and disposal. The responsibility for the waste management activities lies with its generators under the principle „the pollutant pays” or on its producers, under the principle „the responsibility of the producer”.

The local governments are responsible for the organization of waste collection and disposal

systems and therefore appropriate rates should be set in order to ensure the financing of these activities. The special waste collection and disposal services are rendered in municipalities, in all the district centres, therefore the municipal waste management is well-organized with the support of these services that work under a contract concluded with individual generators, however, this system covers only 60 – 90% of the generators of municipal waste from the urban areas.

In the rural areas, no services of waste management exist in most settlements; therefore the transportation of waste to the waste storage places is performed personally by the generators except for waste collection services established in some of the rural areas. The number of persons from the rural areas who use these services is relatively low because of the lack of financial sources. A small part of the rural settlements, and namely those situated in the neighbourhood of district centers, are serviced by special waste management entities (Chisinau, Falesti, Ungheni, etc.).

The production of municipal waste is influenced by a great number of factors and the most important are: the income of the population, the behaviour of consumers, the appearance of new packed product son the market and the demographic situation. A research of the International Bank shows that along with the increase of the level of income of the population the rate of waste generation per capita increases as well, which in rural areas usually is 0.3-0.4 kg/ capita/ day and 0.9 kg/ capita/ day or higher in urban areas. The consumption of food products generates today more waste. The introduction of new packages, especially those of plastic, has a significant impact on the environment. The packages made of polyethylene terephthalate (PET) have lately replaced the glass packages, while the bags, purses or the polyethylene (PE) boxes have replaced those of paper, influencing in this way the structure of the produced waste. The increase in the number of supermarkets and the growth of the GDP per capita have caused the purchase of packed products, and therefore, the produced waste. Demography also influences on the production of waste, and as a rule, the inhabitants of the urban areas produce more waste than those from the rural areas.

Currently, the most widely used method of household waste treatment is storing waste on the ground, which often is a major source of soil and groundwater pollution. In this context, sanitation of settlements and urban waste management is an important objective of the local government structures. Annually through sanitation services in urban areas around 1,144-2,210 thousand m³ of waste is transported to SHW deposits (Figure 1).

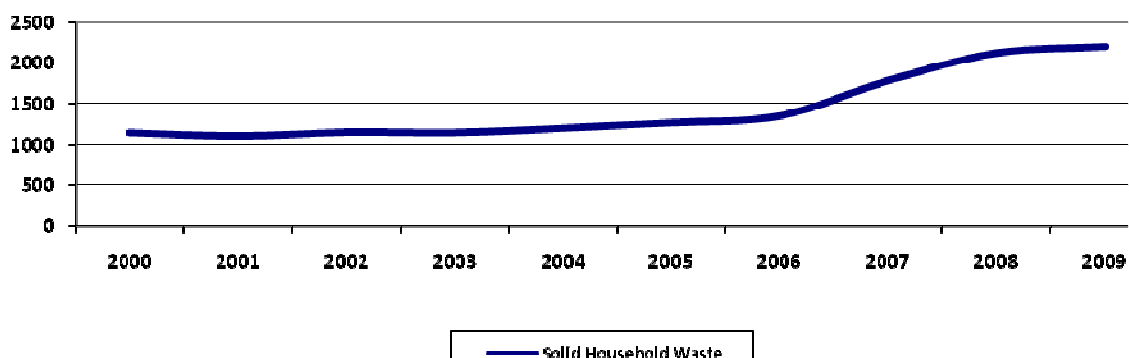


Figure 1. Dynamics of Solid Waste Disposal, thousand tones

The current waste storage facilities are not operated properly: they are not compacted and covered with inert materials in order to prevent the fires, the spread of unpleasant smells; there is no strict control of waste quality and amount within the waste storage facilities; there is no program of recovery of the produced bio-gas or for the recovery/treatment of the filter; the roads to the waste storage facilities are not maintained; the vehicles that provide the transportation of waste are not washed after they leave the storage places; the waste storage facilities are not railed in, they do not have an entrance or warning billboards.

Another negative aspect of the inefficient waste management is that many recycling and useful materials are stored together with the non-recyclable waste, therefore a great part of their useful potential is lost (paper, glass, metals, plastic materials); being mixed and contaminated from chemical and biological point of view their recovery is troublesome.

The rate of the daily produced waste by a person ranges from 0.25 kg in Nisporeni town and in Cimislia town, to 0.8 kg in Balti and 1.3 kg in Chisinau city. This difference may be explained through the waste management practices implemented in the respective settlement, where the daily collection and monitoring of waste is performed, the indexes show higher values. The minimum rate of waste production may be explained by the absence of a waste collecting system, thus the waste is transported to unauthorized waste storage places and it is not estimated. The effective planning of waste management is based on the morphological composition of the solid household waste. The morphological analysis of waste is imperative for the settlement of recycling and disposal operations for the produced waste. The morphological analysis of waste is paramount in establishing the generated waste recycling and disposal. The morphological analysis of SHW in the country is performed occasionally, and in most cases with the support of NGOs. These data have been gathered from informative notes, reports, special publications, while the national statistics has nothing to say with regard to this issue (Figure 2).

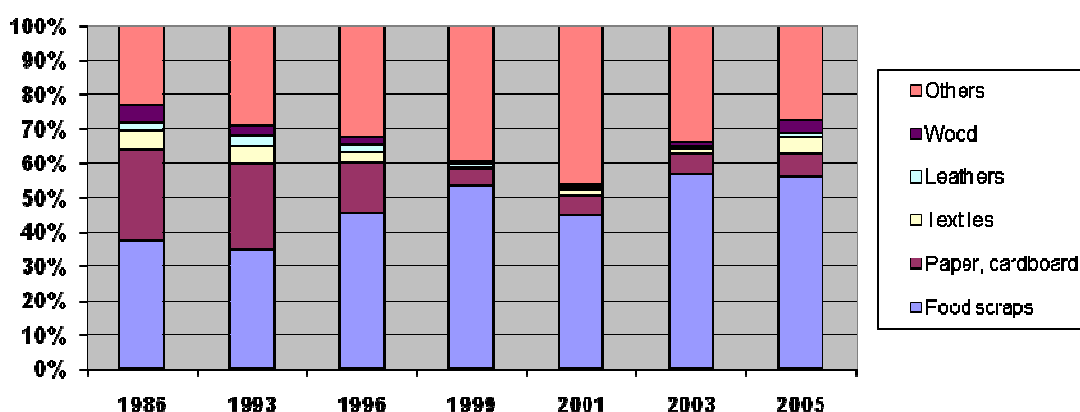


Figure 2. Morphological Composition of Solid Household Waste

Industrial and Hazardous Waste

Waste generators have the obligation to organize activities of production waste management. The economic entities carry out these activities with their own sources or use the sanitation services. For a better understanding of the cause of appearance of several problems and in order to estimate the range of these issues, we shall first characterize the field which has been studied on the base of a series of reference indexes on the evolution of waste production.

According to the statistical data (Figure 3) the production of waste in our country ranges annually, while the amount of the used and inhumed waste increases. Even if some waste processing enterprises work in the Republic of Moldova, the information on the volume of recycled waste is not under statistical monitoring

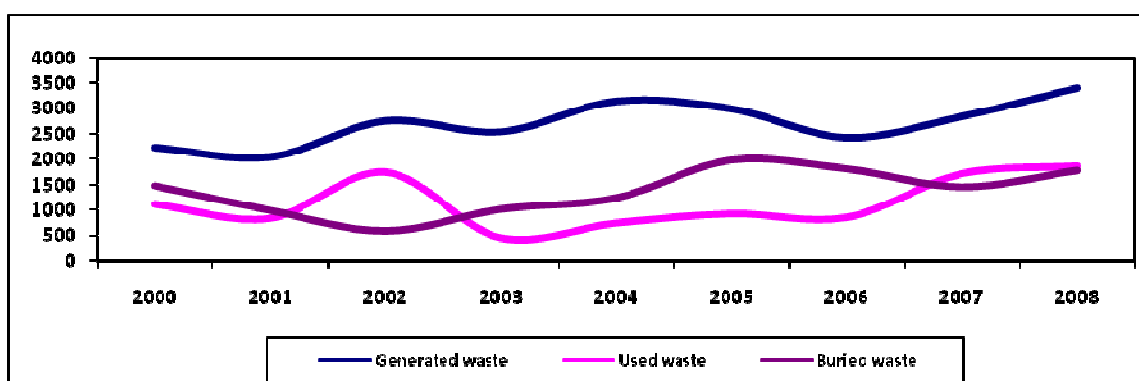


Figure 3. *Dynamics of Production, Use and Inhumation Of Waste, thousand tones*

In 2008, a total amount of 2,841.7 thousand tones of waste from the activity of enterprises was produced. Most of them, about 1,570 thousand tones are represented by the waste derived from food processing and beverage industries, 540 thousand tones from the extraction enterprises, 249 thousand tones from animal breeding (Figure 4). Only 30% out of the total amount of production waste have been used, 50% have been eliminated by storage, while 20% are kept on the territory of the enterprises.

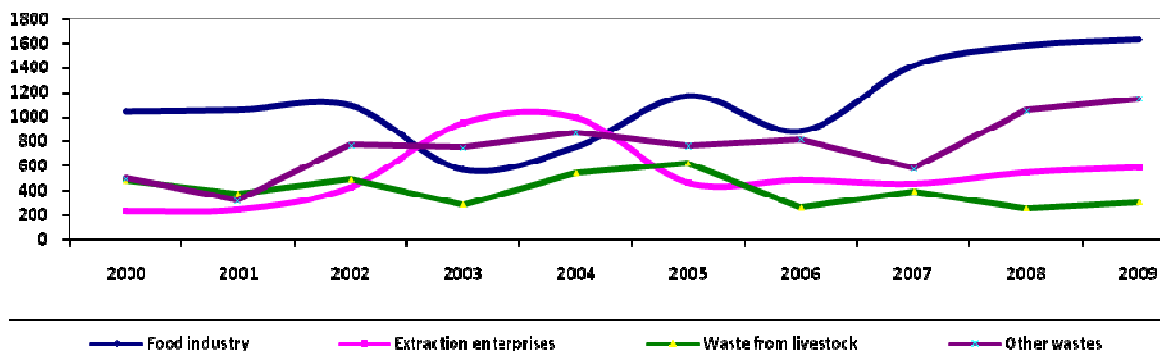


Figure 4. Dynamics of Waste Production per Branches (2000 – 2009), thousand tones

The monitoring of the toxic waste is performed on the base of the form „F-1 Toxic waste”. Though the number of enterprises that report on the production of toxic waste increased from 352 to 892 during the monitoring period (1995 – 2009), the accumulated amounts of waste decrease (Figure 5), on the ground of the economic decline that has been registered at end of the previous century and due to the structural changes of the industry of the Republic of Moldova.

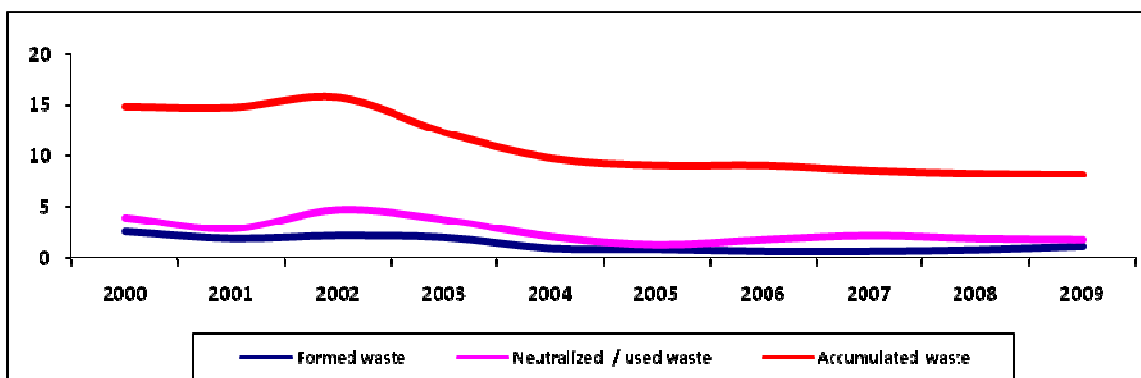


Figure 5. Dynamics of Formation, Neutralization and Accumulation of Toxic Waste, thousand tones

Up to the moment, the collection and processing of information related to the types and amounts of waste are performed under the standards of the former USSR, without being adjusted to the European classification requirements. Currently in Moldova two separate classifiers for waste and toxic waste are applied, while in EU the Waste List is applied, including hazardous marked with an asterisk.

Construction and Demolition Waste

The national statistics has no data on the amounts of construction and demolition waste (CDW). In the CE study "Contractual services for construction and demolition waste management - SR1" (May 2010), a CDW generation index is used being of 500-1000 kg / capita, depending on the size of this sector in the country. The use of this index for Moldova would mean that in 2010 1,800-3,600 tones of CDW was generated, which would be an overestimation. At the same time Latvia and Romania reported about 70 kg / capita, which seems to be an underestimate of actual data. As a compromise data for Bulgaria, which are 0.39 tones / capita in 2004 being used as a benchmark for the Republic of Moldova in 2010.

Medical Waste

Medical institutions produce various waste constituted from food left-overs, medical waste (drugs, powdery, reagents), laboratory antigen-tests, disinfectants, detergents, biological waste (culture mediums, biochemical materials, immunological), biological substrata (blood, serum, organic tissues), medical tools, radioactive materials, household waste. All this waste is defined as the flow of medical waste derived from medical assistance centers.

About 75-90% of the medical waste is similar to the household waste by being produced from paper, with plastic packages, food products, etc that was not in contact with the patients. However, about 10-25% of the medical waste is hazardous waste that needs a special treatment. This percentage of medical waste represents higher risks for human health and for environment. In the absence of special furnaces such waste accumulates together with household waste or is stored in medical institutions.

According to "*Health without any prejudice*" study (www.noharm.org) annually 15.7 thousand tones of medical waste is generated, of which 2.75 thousand tones are infectious waste and 314 tones are hazardous waste. These calculations do not include the medical waste generated in other medical institutions as well such as pharmacies, medical offices, dentists, which need to be taken into account in medical waste management plan. Another problem facing hospitals is the lack of a centralized network for the collection of used syringes. This issue must be solved through the creation of processing and reuse methods for this type of waste.

Other Flows of Hazardous Municipal Waste

The current statistical system of waste management reflects just partially the situation of household waste management, the information about the flows of specific hazardous waste such as waste oil, end of life motor vehicles, waste tires, accumulators and batteries, waste electrical and electronic equipment, as well as household waste is uncertain. Without the systems for the collection and treatment of these waste flows over the years they no attention was paid to them.

Waste Oil

According to the situation described in section 2, in 2009, in the Republic of Moldova, 232 tones of oil waste were produced, out of which 131 tones were used. On the base of these statistical data it is not clear whether these flows are industrial waste or waste oil produced by motor vehicles, and how this waste oil may represent the total flow of petroleum-based waste.

Analyzing as a whole the European data on oil consumption, it is clear that the biggest percentage is represented by the consumption of oil for motor vehicles (65% in 2000) and industrial oils makes up 35%. In order to conclude theoretically the magnitude of production of waste oil one shall use as a reference point the consumption of lubricants in the field of transportation, taking the example of Belgium. The 3.3 kg/tonne factor of producing waste oil was calculated on the basis of the amount of oil marketed in 2002 and the amount of collected waste oils.

Waste Tires

The current situation on tires collecting and processing is absolutely uncertain because of the lack of official statistics in this area. In the EU member states, the rate of using tires as fuel amounts to 49%, followed by the material recovery that amounts to 46%.

According to the Eurostat data on the number of cars per one thousand of inhabitants and the total number of population, the annual average figure of waste tires recovery amounts to 11.1 kg/motor vehicle, with big fluctuations, from 4.4 kg/motor vehicle/year in Lithuania to 21.8 kg/motor vehicle/year in Cyprus.

Waste Accumulators and Batteries

Up to the moment, the activities of collecting old accumulators and batteries are performed only by businesses, even if to a great extent this waste is produced by household consumers. According to the data reported by the Ministry of Environment to the Secretariat of Basel Convention in 2009, about 200 tones of waste batteries gathered from the businesses were exported in Ukraine for further processing. As for the collection of waste portable batteries and accumulators from population, such infrastructure is absent in the Republic of Moldova.

According to the Eurostat data for the period 1999 – 2002 the collection factor of waste batteries ranges between 2.6 kg/motor vehicle/year in Austria to 10.5 kg/motor vehicle/year in Sweden, while the average value amounts to 4.7 kg/motor vehicle/year.

Waste Electrical and Electronic Equipment

Currently the Republic of Moldova lacks a collecting and processing system for waste electrical and electronic equipment (WEEE) and no data is provided on the amounts of produced waste because no waste monitoring exists. The Eurostat data for year 2006 show that the amount of marketed electrical and electronic equipment (EEE) varies between 6.5 kg/ capita in Romania to

32.0 kg/ capita in Denmark, increasing in 2008 up to 11.2 kg/capita in Slovakia (in Romania it amounted to 11.3 kg/capita) and decreasing down to 30.7 kg/ capita in Finland). As for the Republic of Moldova, it was estimated that in 2010 6.5 kg/capita of EEE were marketed.

Persistent Organic Pollutants (POPs)

POPs issue is regarded as one of the most pressing environmental issues. A representative analysis shows that POPs pesticides make up 20-30% of the total stock of obsolete and inhabited pesticides in Moldova. Currently, this amount is estimated at about 3 thousand tons. The studies conducted in the close vicinity of deposits show that the soil and surface water are contaminated with such substances.

5. Forecast in Waste Production

The forecast in waste management was determined based in analysis, statistical data and experts estimates taking into consideration the macro-economic indices provided in the existent development strategies for some fields (industry, agriculture, etc.) and namely:

- a) value of the Gross Domestic Product (GDP);
- b) demographic trends,
- c) industrial development trends,
- d) agricultural development trends,
- e) waste management system development trends.

Trends in the Production of Solid Municipal Waste

According to the above mentioned analysis of statistical data (years 2000 – 2009), we may ascertain that the trends of increase in the SMW amounts in Chisinau make up 5 – 15%, while the rural areas experience an increase in the SMW amounts of about 10%. The increases may be explained by the improved activity of sanitation services in the settlements, including of the district centers. It is clear that the trends of increasing amounts of SWM are also explained by the increased consumption over the last decade. Nowadays, an increase attention is paid to the creation of capacities of SMW storage in the district centers and therefore these trends of annual increase by 10% will continue in the following years (2011-2015). Subsequently, it is supposed that this value will continue to increase by 5% in the both types of settlements. Based on these estimations, the trends in the production of solid household waste are given below (Figure 6).

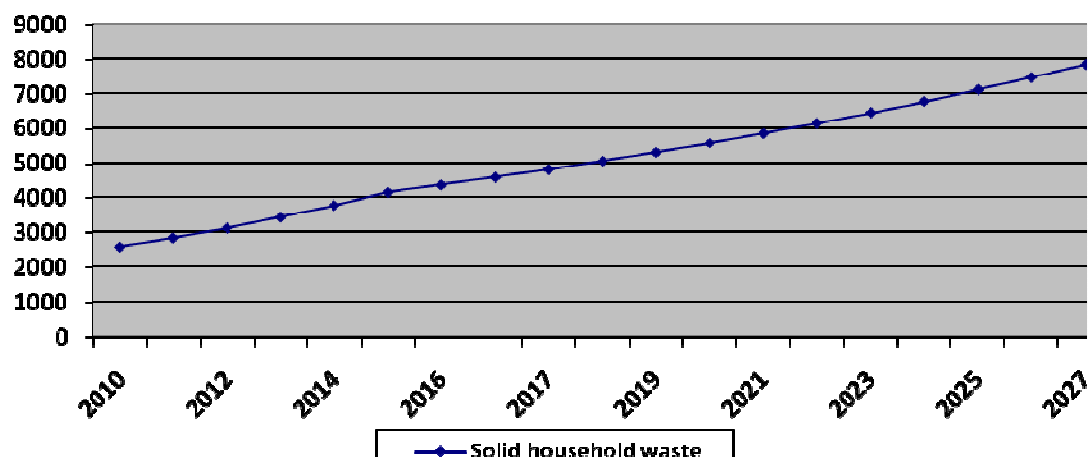


Figure 6. Forecasts of Solid Household Waste Generation

Trends in the Production of Industrial and Hazardous Waste

Production Waste

Agriculture is the main branch of the national economy, while the food processing and beverage industry produces the biggest amounts of waste in the Republic of Moldova (Figure 7). Since in the last years the industry of construction materials grew intensively, the amount of waste derived from the extraction enterprises of raw material increased as well. More mass consumer products, including the food, are marketed, and they contribute to the production of solid household waste.

According to different sources, an annual growth of 3% for agricultural products is forecasted (until 2010), while according to the Industry Development Strategy an annual growth of 10% (until 2030) is forecasted. For the produced waste, growths of 5% until 2015 and 7% until 2025 will be taken into account.

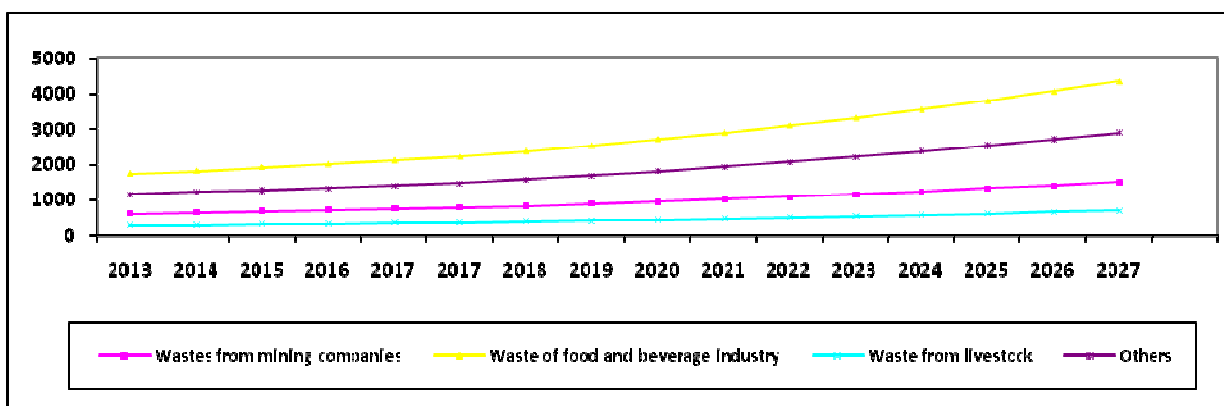


Figure 7. Dynamics of the production of waste per branches (2000 – 2006), thousand tones
Hazardous Industrial and Household Waste

At the moment, the flow of hazardous waste generated in the Republic of Moldova is „invisible”, because it is disposed together with solid household waste, taking into account only hazardous industrial waste. The evaluation of the forecasts for the generation of industrial waste is based on the statistical data provided by businesses under the form „F – 1 Toxic waste” and those mentioned previously in figure 5.

As a matter of fact, according to the experience of the EU member states, consumers produce huge amounts of hazardous household waste. Therefore, for the deduction of the forecasts on the production of the flows of hazardous household waste, the number of population, the production rate per capita/ year for Moldova was used as reference points, being constant in the period of until 2025 (Tab. 1).

The demographic forecasts show a decrease of 2.9% in the number of population for the period 2010 – 2020, while for the period 2020 – 2030 a decrease of 8.8% in the number of population is expected.

At the same time, for the deduction of the national reference data on the generation of these flows of waste the „Research on the hazardous household waste in the EU” (2002) was used, which presents a hazardous waste production rate ranging from 0.4 kg/capita/year in Greece to 5.5 kg/ capita/year in Luxemburg. The most recent researches in this very field bring new growing indices with regard to hazardous household waste. Therefore, the evaluation of the current situation on the generation of these specific hazardous waste flows was performed based on two scenarios according to the annual waste production rate of 1.5 kg/ capita („reduced” scenario) and of 4 kg/capita („growing” scenario). The forecasts on the hazardous waste production in the industrial field and the forecasts on the flow of hazardous household waste are given in table 2.

Table 1. Growth and Demographic Forecasts for Moldova by 2025

Year	GDP growth (% compared to the previous year)	Population,as,of,1,January, ,(thousand, persons)
2007	3.0%	3,581
2008	7.8%	3,573
2009	-6.0%	3,568
2010	6.9%	3,564
2011	3.6%	3,560
2012	5.0%	3,543
2013	5.0%	3,533
2014	5.0%	3,523
2015	5.0%	3,513
2020	5.0%	3,462
2025	5.0%	3,309

Source: International Monetary Fund, Country Report No. 10/234 (July 2010), Data on the GDP for the years 2007-2015, National Bureau of Statistics for Population for the years 2007-2010 and the Institute for Demography

of the Academy of Sciences from Vienna, Austria; Forecasts on the population from forty four European countries: Continuation of population ageing (2009); Forecasts on the population for the years 2010-2025.

Table 2. Hazardous Industrial and Household Waste, generated in 2009-2025

Years	Hazardous industrial waste, tones	Hazardous household waste, „reduced” scenario, tones	Hazardous household waste, „growing” scenario, tones	Total amount of hazardous waste, „reduced” scenario, tones	Total amount of hazardous waste, „growing” scenario, tones
2009	1,125	5,351	14,270	6,476	15,395
2010	1,131	5,346	14,255	6,476	15,386
2011	1,139	5,330	14,214	6,469	15,353
2012	1,150	5,315	14,173	6,465	15,324
2013	1,162	5,300	14,133	6,461	15,294
2014	1,173	5,284	14,092	6,458	15,265
2015	1,185	5,269	14,051	6,454	15,236
2020	1,246	5,193	13,848	6,438	15,093
2025	1,309	4,964	13,237	6,273	14,546

On the base of these estimations, the rate of hazardous household waste amounts to 79% out of the total amount of the produced hazardous waste if the reference factor of 1.5 kg of hazardous/capita / year is applied and 91% when the reference factor of 4 kg per capita/year (for the period of 2010 – 2025) is used.

Trends in the Generation of Construction and Demolition Waste

Given the experience in the formation of the construction and demolition waste rate in Romania and Latvia, it is expected that during 2010-2027 the CDW amount per capita in Moldova will increase relative to the real GDP growth in the country. As a result, the total amount of the CDW will increase from 1.4 million tones in 2010 to 2.6 million tones in 2027.

Given the regulations on the CDW reuse, recycling or recovery during 2013-2015 legal and organizational measures are required to be undertaken. Consequently, the rate of reuse, recycling or recovery of the CDW will increase from 165 thousand tones in 2015 to 1,520 thousand tones in 2020 and 1,850 thousand tones in 2027.

Trends in the Generation of Medical Waste

The above mentioned deductions on medical waste generation in the Republic of Moldova made

on the basis of typical composition of medical waste in Europe shown that annually, the medical institutions produce 15,700 tones of medical waste, 2,750 tones out of which are hazardous waste and 0.314 thousand tones are hazardous waste. Even if the demographic trends are decreasing in the period 2010 – 2027, the trends on medical waste generation shall increase, taking into consideration the medical waste produced by private medical institutions such as: drugstores, dental offices, etc.

The International Health Organization launched a website on the medical waste management (www.healthcare.org), which could become a starting point for the elaboration of the Plan on medical waste management. In addition, this website comprises data on the cost and available technologies in this field.

Since the contagious and hazardous waste treatment processes are very expensive and to reduce the investments and operational expenses, it is very important to reduce the amount of hazardous contagious waste. Therefore, the separate collection of these flows of waste would be the first and the most important step which should has to be made.

Trends in the Production of Hazardous Municipal and Industrial Waste

Waste Oil

The theoretical value of waste oil collection in the Republic of Moldova was determined based on of the consumption of lubricants in the field of transportation in 2008. This value amounted to 336 thousand tones. Therefore, the generator factor of waste oil amounted to 3.3 kg of collected waste oil per 1 tone of marketed transmission oil. As a result, 1,100 tones of waste oil were produced. Thus the real growth of the GDP value was used to establish a forecast of the future amount of collected waste oil and it is supposed that this amount will increase up to 2,200 tones by 2025.

Waste Tires

In the evaluation of the forecasts of waste tires generation available statistical data on the number of cars per one thousand inhabitants in Moldova and the GDP development and demographic trends were used. Thus for the period 2010-2018 it is assumed that the increase in the number of motor vehicles will follow the trends observed in Romania between 1998 and 2006 and for the period 2019-2027 the trend observed in Greece between 1992 and 1998 was used. According to the estimates the number of cars per 1000 inhabitants in Moldova will increase from 108 units in 2009 to 246 units in 2027. As a result, the number of motor vehicles registered in Moldova will increase from 386.6 thousands in 2009 to 814.1 thousands in 2027.

The application of the annual average of waste tires recovery in the EU-27 (11.1 kg / motor vehicle) to estimate the annual amount of waste tires, would lead to the overestimation of such waste. In these terms the Lithuanian emission factor of 4.4 kg / motor vehicle was used, resulting in an annual amount of waste tires from 1.7 thousand tones in 2009 to 3.6 thousand tones in 2027.

Waste Accumulators and Batteries

For the determination of the theoretical amount of waste portable batteries in Moldova, available data from the EU member states were evaluated. The annual average of portable batteries marketed in Poland was 0.1 kg / capita (2002) and in the Netherlands 0.31 kg / capita were marketed. Simultaneously the GDP in Poland and the Netherlands was evaluated as well, noting that sales reflect the GDP per capita ratio in these countries. Therefore by comparing the GDP per capita in the Netherlands and the Republic of Moldova the index makes up 0.031 kg / capita in 2009. According to the estimates in Moldova in 2009 about 117 tones of portable batteries were sold. The forecasts of amounts of batteries and accumulators sold in relation to the real GDP growth for portable batteries will make up 228 tons sold in 2027, and the amount of car batteries sold will increase from 1.8 thousand tons in 2009 to 3.8 thousand tons in 2027.

Waste Electrical and Electronic Equipment

Although the growth in the WEEE marketed in the EU member states in 2006-2008 was much higher than the GDP growth per capita over the same period, it was estimated that for the period 2010-2027 the amount of WEEE marketed in Moldova will increase in line with the real GDP growth. As a result, the amount of marketed WEEE will increase from 6.5 kg / capita in 2010 to 13.4 kg / capita in 2027. Although Moldova's population is expected to decline significantly in the period of 2010-2027, the total amount of WEEE will increase from 23.2 tons in 2010 to 44.2 tons in 2027.

Currently, in accordance with the Directive 2002/96/EC, the applicable collection objective in the EU in 2007 for the WEEE is 4 kg / capita. Combining this objective with the (decreasing) population number in Moldova would result in 14.1 thousand tons of WEEE collected in 2015, 13.8 thousand tons in 2020 and 13.2 tons in 2027.

6. Waste Management Issues

The issue on the waste management in the Republic of Moldova is for a long period a matter of priority in this period of transition to the market economy as a result of the appearance of a large variety of goods of current consumption, as well as their packages. The complexity of issues and standards in the field of waste management leads to increase of requirements regarding waste recycling, treatment and/or disposal installations. A controlled waste management system means recovery and recycling, closing the waste storage facilities that do not comply with the requirements and the decrease of quantity of stored bio-degradable waste. Up to date, the flow of waste was extremely simple, being more a logistic than a technological one.

Even if the situation in the field of waste management continues to be extremely sad, during the period of 2004 – 2006 the LPAs received about 1 million Euro from the EC Good Neighbourhood Program. At the moment, 4 projects with a budget of 15 million MDL, which are supported by the same program, are under implementation. The total investments made in the field of waste management in the period of 2005 – 2008, intended for the purchase of containers, specialized equipment for the transportation of waste, as well as for the liquidation of landfills during the last years amount to several millions of Euro. The National Ecological

Fund allocated about 51,728,911 MDL, mainly for the liquidation of landfills and the arrangement of the SHW storage facilities, purchase of containers for waste and auto scavengers, etc.

However, the waste continues to be a major source of environment pollution in the Republic of Moldova, as long as some concrete measures are not taken in order to implement an adequate waste management system based on a legislative, normative and technical framework under the principles of the EU directives.

Another major issue faced during the realization of the waste management projects is the lack of available territories for arranging the solid household waste storage facilities, and this causes the need to purchase these territories.

Based on the above mentioned, the following issues in the field of waste management were established:

- a) the lack of (legislative, normative and technical) regulations on waste management that would be adequate to the current situation and the requirements of the EU legislation;
- b) the lack of an infrastructure that could plan, organize and implement an incorporated waste management system at all levels (national and regional);
- c) the lack of clearly defined responsibilities for each participant that is involved in the waste management process at the level of state institutions, associations, non-governmental organizations, the private sector, the civil society, etc.;
- d) the lack of adequate capacities for waste disposal and partial coverage with waste collection and transportation services in urban settlements (60 – 80%) and practically, the absence of these services in the rural areas (up to 10-20%);
- e) the lack of waste final storage facilities constructed and operated in accordance with the environment standards;
- f) the lack of toxic waste treatment facilities, including the medical waste, which are stored together with the municipal waste and therefore represent a high risks for the environment;
- g) the lack of administration infrastructure for other categories of waste, such as: construction and demolition waste, animal waste, street waste, etc.;
- h) the insufficient financing in the field of waste management, both at state and private levels;
- i) the weak implementation of the existent legislative and regulating framework in this very field, the implementation of minor penalties that encourage the infringement law;
- j) the lack of support and reduced participation of policy in the current waste management system.

7. SWOT Analysis

Strengths:	Weaknesses:
<ol style="list-style-type: none"> 1. Existing bill on waste developed under the EU Directives; 2. Financial support and technical assistance provided to the Republic of Moldova by international donors; 3. Existing National Ecological Fund; 4. Existing functioning system capable of ensuring the implementation of a 	<ol style="list-style-type: none"> 1. Precarious infrastructure for waste collection, transportation and disposal; 2. Low level of awareness of population and businesses on the integrated waste management; 3. Increased amounts of waste generated and stored;

sufficient number of programs / projects	<ul style="list-style-type: none"> 4. Low level of waste selective collection; 5. Insufficient development of waste recycling and recovery market.
Opportunities:	Threats:
<ul style="list-style-type: none"> 1. Development of long-term investment plans under the conditions of lasting development; 2. Creation of an incorporated waste management system; 3. Use of the EU funds as a major contribution for the improvement of environment standards; 4. Adoption of the approach „Cleaner production” that would lead to the increase in the efficiency of using the resources and the energy, including the implementation of the principle: „The best available techniques” (called BATs); 5. Implementation of investment and technical assistance projects. 	<ul style="list-style-type: none"> 1. Organizational, political and financial difficulties caused by regionalization; 2. High costs for the conformity with the European standards on the exchange of waste management technologies and use of BATs; 3. Difficulties in the allocation of territories for the development of environment infrastructure, construction of SHW storage facilities; 4. Limited capacity of the country to obtain European funds as a result of the complex project drafting and management, as well as due to the expensive co-financing.

III. GENERAL AND SPECIFIC STRATEGIC PRINCIPLES AND OBJECTIVES

8. Waste Management Principles

The implementation of the principles on waste management will contribute to an effective evolution of the integrated waste management system by prioritizing the facilities of waste disposal, given the aspects of human health and environment protection and integrating the conservation of the biodiversity and natural resources. The following principles will fundament the activities of establishing a proper waste management in the country:

- a) The principle of primary resources protection is formulated within the broader context of the concept of „durable development” and establishes the need to minimize the waste and make the use of primary resources more efficient, namely the non-regenerative resources, insisting on the use of secondary raw material;
- b) The principle of preliminary measures together with the principle „The best available techniques that do not assume exceeding costs” states that in any activity (including waste management) the following main aspects should be taken into consideration: the current stage of the development of technologies, the requirements on environment protection, the choice and implementation of economically feasible measures;
- c) The principle of prevention establishes the hierarchy of waste management activities in a decreasing order according to the importance: the prevention of waste, the preparation of waste for reuse, recycling, including waste composting, recovery, including energy recovery and storage;
- d) The principle „the pollutant pays” correlated with the principle of producer and user responsibility establishes the need to create an adequate legislative and economic framework, so that the costs of waste management would be covered by its generator;
- e) The principle of substitution establishes the necessity of replacement of the hazardous raw materials with non-hazardous raw materials, avoiding in such way the production of hazardous waste;
- f) The principle of proximity correlated with the principle of autonomy establishes the idea that the waste must be treated and eliminated as closer as possible to the source of its production; moreover, the export of hazardous waste is possible only for those countries that have adequate technologies for disposal and only under the requirements for the international trade of waste;
- g) The principle of subsidiary correlated with the principle of proximity and principle of autonomy states that tasks should be given in such a way that the decisions in the field of waste management would be taken at the lowest administrative level towards the source of waste production, but under uniform criteria at regional and national levels;
- h) The principle of integration states that the waste management activities are a part of the social and economic activities that cause these activities.

The EU policies on waste management outline the importance of an incorporated approach with regard to waste management, which involves the construction of waste disposal facilities and prevention measures for waste production and recycling. Therefore, a hierarchy of waste management is proposed as mentioned above.

9. Vision, Purpose and Objectives of the Strategy

The observance of the environment policies in the field of waste management implies a long-term systematic approach for 2010 – 2025 and shall be focused mainly on the improvement of municipal waste management practices, which are considered to be the critical point in the field of environment protection.

The strategical vision of waste management consists in the development until 2027 of an integrated waste management system which would be economically efficient and would assure the protection of human health and environment.

The NWMS aims to promote a new way of household and production waste collection, recovery of re-usable materials, environment protection and realization of a program of uniform street sanitation which would contribute to the decrease in the amount of the waste which was stored in the respective areas by establishing an adequate system that would treat each type of waste separately for the protection of the environment.

Concluding the above, the general objectives of SNGD, are:

- a) Development of integrated municipal waste management systems by harmonizing the legal, institutional and regulatory framework to the EU standards based on regional approach (geographical location, economic development, existing access roads, soil and hydrogeological conditions, number of population, etc.), and territorial division of the country into 8 waste management regions;
- b) Regional infrastructure development for SHW deposit and transfer stations;
- c) Development of collection systems and treatment of specific waste flows (packaging, WEEE, tires, batteries, etc.) by promoting and implementing the principle „producer responsibility”, including the hazardous (medical waste, waste oils, etc.) waste, (one collection point at the region level).

The NWMS general objectives will be implemented through the *specific objectives* for each type of waste:

Municipal Waste:

- a) Promotion and implementation of selective collection systems in all areas, both in the domestic sector and production, as well as sorting, composting and recycling facilities;
- b) Improvement of waste transportation system and development of transfer stations (4-7 stations per district);
- c) Development of municipal waste disposal capabilities (construction of 7 regional SHW storage facilities and 2 mechanical and biological treatment plants);
- d) Improvement of institutional governance in municipal waste management by creating regional LPA associations (8).

**Recomandări AGRM
privind amplasarea DDMS regionale**



1:1 500 000

Figure 8. Recommendations on potential locations for SHW deposits location, depending on the geological and hydrological conditions of Moldova.

Packages and Waste Package:

- a) Increase in the degree of reuse and recycling of packages by 20% by 2027;
- b) Development of schemes of material and energy recovery from package waste which can not be recycled („inappropriate” for material recovery).

Vegetal waste, animal manure, waste from wood processing:

- a) Encouraging recovery by aerobic and anaerobic processes and waste composting and fermenting capacity building by at least 1 per district;
- b) Support for energy recovery where material recovery is not technically and economically feasible, in safety conditions for the health of population and environment protection.

Waste Tiers:

- a) Assurance of a network of waste tiers collection through the motor vehicle technical service centers, commercial centers, parking lots, etc.;
- b) Increase in the degree of material and energy recovery of waste tiers through recycling or in cement furnaces.

Waste Electrical and Electronic Equipment:

- a) Assurance of a collection/recovery network for end of life electrical and electronic equipment;
- b) Assurance of the possibility that the last owner of electrical and electronic equipment could deliver it for free to a collection/recovery entity;
- c) Extension of the reuse and recycling of materials from end of life electrical and electronic equipment

Toxic waste, except the waste oil:

- a) Assurance of the collection of hazardous waste performed separately from non-hazardous waste and the separate performance of this process;
- b) Creation of conditions for the separate collection, treatment (including the preparation for reuse and recycling) of hazardous waste;
- c) Promotion of the thermoenergetic recovery of some hazardous waste flows in cement furnaces, if possible.

Waste Oil:

- a) Assurance of a collection network of waste oil from users/population through the centers of motor vehicle technical service;
- b) Removal of the black market of waste oil whose use causes a negative impact on the health of population and environment;
- c) Reduction of the impact on the health of population and environment by improving the waste oil management;
- d) Encourage of the use of oils in a rational and ecological way in cement furnaces.

Waste Batteries and Accumulators:

- a) to assure a collecting network of old accumulators from users/population through the

- centers of motor vehicle technical service;
- b) to assure that the old batteries are well managed, recycled or stored.

End of life motor vehicles:

- a) to assure a collecting/recovery network of end of life motor vehicles;
- b) to assure the possibility that even the last owner of a motor vehicle could deliver it for free to a collecting/recovery entity;
- c) to extend the reutilization and recycling of materials from end of life motor vehicles as well as the recovery of energy of those motor vehicles that can not be sent to material recovery.

IV. ACTION DIRECTIONS

Promotion of the regional approach to waste management planning is essential both to attract necessary investments and to maintain high costs by achieving strategy implementation at economic level. It is also unacceptable and economically groundless to construct waste recovery or disposal enterprises in every urban area, regardless of the rural areas from the district, including the specific of the generated waste. The experience of the neighbouring countries shows that the financial sustainability of the recovery object and waste disposal is economically feasible when it has a territorial coverage of at least 200-300 thousand people. These considerations were taken into account in establishing the implementation measures.

10. Implementation Measures

In order to facilitate the implementation of the strategy, more instruments, such as: regulation, institutional, economic and statistical development instruments, etc.

The regulation instruments will be completed and the legal framework related to the waste management activities will be improved, through:

- a) regulation acts on the activities of material and energy recovery;
- b) regulation acts related to the responsibilities of waste generators and goods producers that become waste (the principle of „responsibility of the producer”);
- c) regulation acts on the responsibilities of public authorities and the relationships to be defined between these authorities and other involved factors;

The institutional development is a vital condition for the implementation of the NWMS objectives and is a forebear in attracting the necessary levels of partnerships and investments. During the development of the strategy several options for strengthening institutional capacity at national, regional and local levels were evaluated proposed by international experts under the „Waste Governance” Programme.

Simultaneously it is recommends to local authorities to create at regional level Waste Management Associations, which will jointly pursue the implementation of public investment projects of regional or regional interest in accordance with the regional Integrated Waste Management Strategies (Annex no. 2).

During the year 2013, with donor support, integrated waste management strategies in the North and Central Development Regions are to be developed using experience to develop an Integrated Waste Management Strategy in the South Development Region, approved on 27 December 2011 by the Regional Development Council. When planning activities within the regional waste management strategies the needs of Gagauzia ATU and Chisinau mun. must be covered.

In this context, the *regionalization of waste management* by territorial division of the country into 8 regions of waste management (Figure 9) is proposed. The basic criteria for regional planning are: geographical location, economic development, existing access roads, soil and hydrogeological

conditions, number of people, etc.

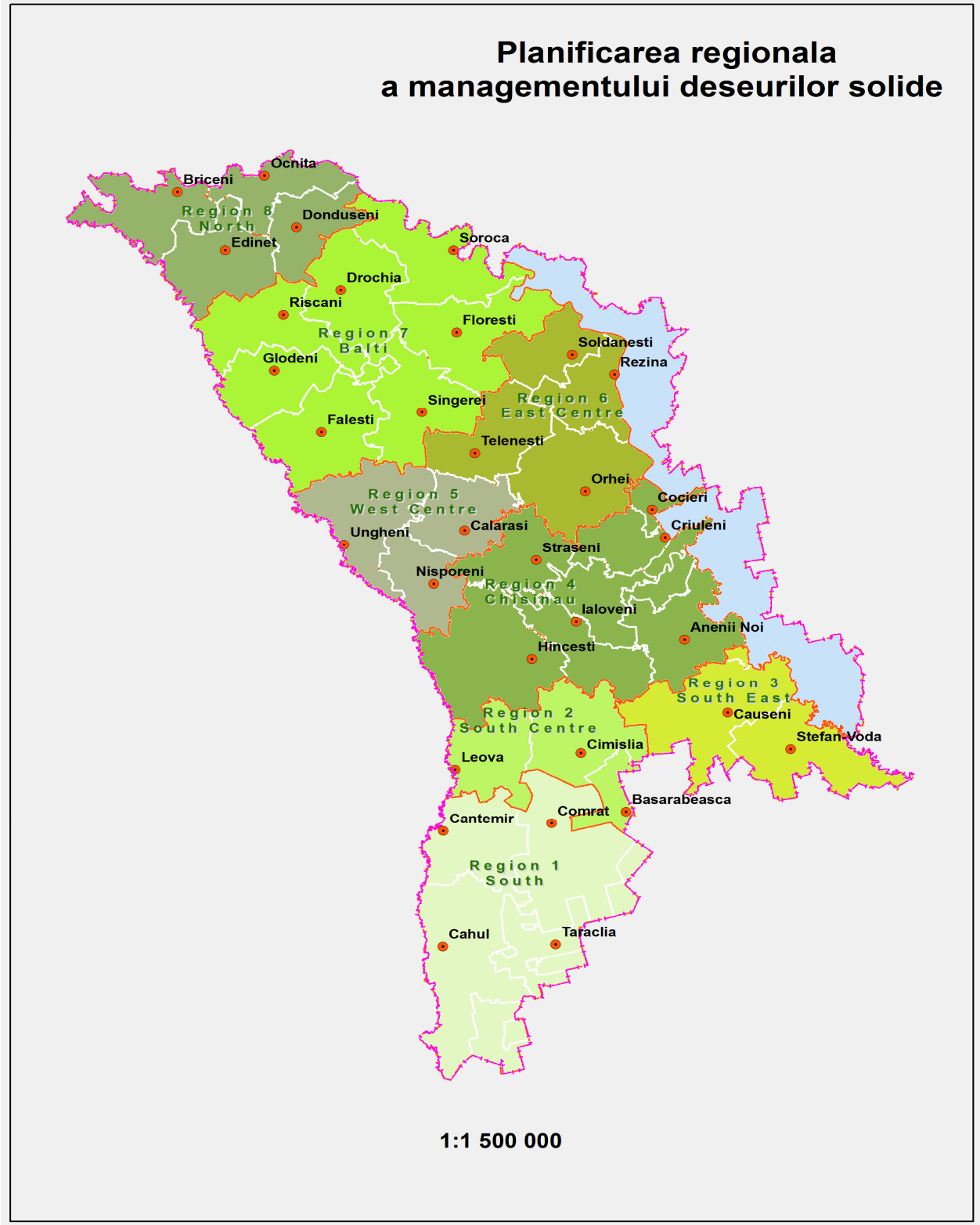


Figure 9. Regional Waste Management Planning

In order to develop attractive and competitive investment projects for waste recovery, the association of local authorities in Chisinau and Balti municipalities with local authorities from neighbouring districts is proposed, which would allow complex solution of waste management problems and the overcome of problems associated with the selection of land areas for the location of the SHW storage facilities.

The local authorities will set up Waste Management Associations at regional level, as recommended by the Ministry of Environment on the regional waste management planning and in accordance with the regulation on the establishment of such associations. The role of associations is to establish and approve the terms of reference for the selection of the company that will manage the waste in the region, the rates of waste collection and disposal, etc. The way of establishing associations and their regulation will be further developed by the Government.

Taking into account the country's economic development, the amount and the morphological composition of waste generated, as well as the soil and geological conditions, at the stage of the NWMS development three alternatives for establishing the integrated waste management system were examined selecting the option consisting of the construction of 2 stations of mechanical and biological treatment of waste in Region 4 Chisinau and Region 7 Balti and 7 municipal solid waste deposits for the other regions.

Economic instruments: The correct application of financial incentives on the one hand, and penalties, on the other hand, will encourage the management activities through prevention, reduction and recovery, by causing in the same time the disposal of management practices with impact on the environment or which contravene the principle „the polluter pays”.

The economic instruments shall be elaborated with the aim of encouraging the reflection of the costs for waste management activities in the cost of the product and in order to divide out the burden of costs between the producers and generators of waste. The extended scheme on the responsibility of the producer for the flows of special waste will be studied and established by keeping the status of producers of products marketing, ensuring in the same time that the unjustified costs are not covered by taxpayers.

The *statistical instruments* will help to obtain real data on waste generation and that would allow the evaluation of the current situation and the estimation of trends for objectives establishment. The improvement and adaptation of the current system of collection, validation and reporting of data on waste management are necessary.

Other instruments:

- a) application and control of the enforcement of existent legislation;
- b) elaboration of regional waste management plans;
- c) intersector coordination of management activities of different types of waste;
- d) analysis of products life cycle and the realization of the „ecological balance” aimed to implement the best practices on waste management;
- e) education, change of behaviour and communication.

11. Estimation of Impact and Implementation Cost

The realization of the NWMS objectives needs important investments in this very field, which means, obviously, the involvement of the government in financing the objects intended for waste recycling and disposal. The general evaluation of the costs, for the implementation of planned measures, was performed based on the identified priorities and activities which were formulated within the Action Plan (Annex no. 1).

The estimation of costs was elaborated in accordance with the main elements of the Action Plan and by taking into account the needs of this sector. Therefore, the costs were established according to the international experience, and namely the experience of the new EU member states, such as: Latvia, Romania, Bulgaria and that of the most developed countries of the EU. The experience of Latvia was taken as a reference point in the estimation of costs for treatment and collecting actions, transportation of hazardous household waste and various flows of waste, such as the waste oil, tires, electrical and electronical equipment, etc.

For the financing of the NWMS, the domestic and foreign sources will be used. The domestic financing consists mainly from the Annual Budget, the National Ecological Fund, individual contributions and those of the businesses.

The foreign financing comes from the financial and technical assistance framework, including grants and credits, offered by international financial organizations and bilateral donors, resources for the implementation of international agreements and foreign investments.

Therefore, the implementation of the NWMS planned measures needs major investments in the field of solid household waste management, hazardous waste, including different flows of waste, such as: waste oil, tires, accumulators, batteries, electrical and electronical equipment, construction and demolition waste, medical waste, etc. Thus, the costs should be divided as follows:

- a) institutional/administrative reform;
- b) purchase of containers, including for the separate collection of waste;
- c) construction of transfer stations and purchase of transport vehicles;
- d) closing and recultivation of storage facilities;
- e) construction of regional storage facilities;
- f) development of regional waste management centers (mechanical and biological treatment plants);
- g) collection and treatment of hazardous waste, including medical waste;
- h) collection, treatment or recycling of different flows of waste (waste oil, tires, accumulators, batteries, electrical and electronical equipment, construction and demolition waste, medical waste, etc.)

Also the amount of investment required for the implementation of the strategy will depend on:

- a) the regional waste management systems, which were developed to service the whole country;
- b) the modalities of financing, associated with capital investments (for example, interest rates,

- grace periods, etc.);
- c) the incomes associated with the waste management operations (for example, by sale of recyclable materials, compost, energy, credits for the drafts in equivalents of carbon dioxide, etc.);
- d) the methods of hazardous waste treatment by storage, physical and chemical treatment or incineration.

According to the practice of the EU, the total annual cost per household for the services of municipal solid waste management shall not overcome 1.5% of the total annual income per household in the area serviced by the waste management system.

An initial evaluation at strategical level on the investment costs necessary for the realization of the strategy's objectives was performed based on the costs incurred by some countries from the Central and Eastern European (Bulgaria and Romania), which are applying the waste management infrastructures. Thus the total investments needed for the sector of municipal waste in the period 2013-2027 range from 375-470 million Euro and depend on the factors mentioned above (disposal method, lending method, etc.).

The technical assistance is necessary to support key aspects of the NWMS implementation, including the harmonization of legislation, institutional consolidation, program development, preparation and implementation of projects, data management and communication. Therefore, the technical assistance is a key instrument to attract and deliver programs and investments and is estimated at 8% of the total costs of attracted capital investments.

The institutional development is vital if we want to achieve the objectives of the strategy and maintain the results. In this context it is important to establish and use the experience obtained within the projects of technical assistance in an institutional framework at national, local and regional levels. The institutional costs are estimated at about 1% of the total costs of capital investments, which would ensure the sustainability of waste management.

12. Expected Results and Progress Indicators

The adherence to the EU is a priority for the Republic of Moldova, although in long-term, and is a position actively supported by the EU as part of the " Western Balkans package". Currently, the EU and the Republic of Moldova negotiate the Association Agreement with the purpose of establishing a deep, extended Free Trade Area (DCFTA), if the conditions and obligations assumed are met. The Joint Action Plan adopted in February 2005 by the Cooperation Council EU – RM serves as an instrument to support the individual program for Moldova *regarding democratic and economic reforms*. In this context, it is important that the waste management in the country as a whole keeps up with these developments, implements similar standards *acceptable for* environmental protection like in the new member states, and develops a new approach for waste management. The achievement of the general objectives set out in NWMS will help to:

- a) the increase in the degree of coverage of waste collection services for all waste flows;
- b) the reduction of the amount of waste stored in not compliant landfill, and the cleaning of historically contaminated lands;
- c) the increase in the degree of secondary raw materials collection and use by promoting the waste recycling and reuse;

- d) extension of the duration of the SHW deposits operation and equipment of deposits with emission capture systems and leachate, treatment, thus limiting the impact of emissions of greenhouse gases, persistent organic pollutants and leachate from these waste deposits;
- e) reduction of the amount of untreated biodegradable municipal waste, stored on land;
- f) development of new processing capabilities, treatment and disposal facilities that meet the international standards.

Progress indicators for Monitoring and Evaluation of Strategy Results

Within the achievement of objectives and actions set out in the NWMS, the responsible institutions will be guided by performance and progress indicators set out in the strategy. Also the performance criteria and monitoring indicators for monitoring and evaluating the impact on the overall strategy that covers waste management will be taken in consideration.

In accordance with the objectives and priorities are established by monitoring the following indicators:

- a) changes in the legal and regulatory framework on waste management - the number of documents approved;
- b) number of LPA associations, operators working in waste management;
- c) level of internal investments attracted and secured for the development of institutional capacity of waste management, infrastructure and services;
- d) percentage of population covered by regular waste collection services;
- e) geographical coverage and number of facilities of environmentally compliant waste treatment and disposal;
- f) amount of waste collected separately and recycled (including special waste flows such as packaging equipment, electrical and electronic equipment, end of life vehicles, etc.);
- g) amount of waste subject to recovery (including energy recovery);
- h) amount of waste disposed through deposition;
- i) number of closed and recultivated non-conforming land;
- j) number of people trained in waste management;
- k) proportion of people with access to information on waste management;
- l) proportion of pupils and students educated and trained in waste management;
- m) number of NGOs interested in waste management.

13. Implementation Stages

The National Waste Management Strategy implies a systematic approach aimed to create a waste incorporated management and is planned for the period of 2013 – 2027, and is to be periodically reviewed according to the technical progress and the requirements on the environment protection.

Initially, the activities will be planned for a five year term (2013 – 2017) and will concentrate mainly on the improvement of the legal and normative framework in accordance with the international standards, on the elaboration of plans and regional waste management strategies; introduction of producer responsibility and other obligations for them to waste recycling and management according to the principles of the waste hierarchy; the creation of collection and investment capacities in waste management infrastructure, which meets international standards..

V. MONITORING, EVALUATION AND REPORTING MECHANISM

During the process of implementation of the NWMS, a permanent monitoring of the planned activities and their results shall be performed. The monitoring and evaluation are necessary for updating the activities and for the adjustment of the strategy to the internal and international requirements in this field. The aim of the monitoring is to correlate the priorities and objectives of the strategy with the results of its implementation.

In particular, the benefits of a continuous monitoring are: the analysis of the current situation and tendencies in the realization of the objectives, the analysis of the implementation modality of the Plan for actions which is afferent to the strategy; the objective evaluation of the obtained results.

The function to supervise and monitor the implementation of strategic activities stipulated in annex no. 1 of National Waste Management Strategy belongs to the Government of the Republic of Moldova supported by its available instruments and the responsible central public authorities in this field.

The Ministry of Environment shall exercise the role of technical coordinator in the process of implementation and monitoring of the strategy of action results collecting, analyzing and reflecting on the results of the actions stipulated by the plan of measures, and, It shall also provide annual report regarding the registered performances in the field of waste management. Especially, the Ministry of Environment will be responsible for:

- a) the analysis and estimation of the current situation, of tendencies in the field of waste management;
- b) the continuous monitoring of the final and intermediary results at national level;
- c) the evaluation of the progress in achieving the objectives and performance indicators;
- d) the evaluation of impact of the activities stipulated in the plan of actions;
- e) the consultation of the authorities of the public central and local administration, of the businesses, non-governmental organizations, education and research institutions, etc., with regard to monitoring, collecting of information, analysis and elaboration of reports;
- f) the presentation to the Government of suggestions and recommendations on the improvement of the actions stipulated in the Plan of actions of the NWMS (Annex no. 1);
- g) the elaboration of annual summarized reports on the implementation of the NWMS;
- h) the dissemination of monitoring results and of the reports to the interested parties in the field of waste management.

A major role in the process of strategy's results monitoring and evaluation belongs to the authorities of local public administration, to the businesses who are involved in the collecting and treatment of waste, as being one of the parties responsible for the implementation of the strategy and reaching the performance indexes and criteria.

For the realization of the general and specific objectives of the NWMS, the following activities listed in Annex no. 1 are proposed as follows: