# Solid Waste Management on Romanian Households

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The problem associated with the household behavior on solid waste disposal site in today's society is complex because of the large quantity and diverse nature of the wastes. Due increase the population, rapid development, global agricultural development has moved rapidly, limitations of financing, emerging limitations of both energy and raw materials and also add to the complexity of any waste management system, large quantities of wastes are being generated in different forms such as solid, liquid and gases. This research explored factors affecting the level of participation in solid waste segregation and recycling of households in Romania, as well as examining current Romania households waste management practices and their knowledge of waste management. This study investigated the solid waste situation and the organization of solid waste management in both urban and rural settings from the perspective of households. Solid waste management is a key component of public services which needs to serve the urban and rural municipalities in an efficient way in order to maintain a decent standard of public health.

Keywords: waste, household, development, environmental economics, indicators, strategy

The responsibility for the collection and management of municipal solid waste belongs to the municipalities.

Solid waste that is improperly disposed of can result in a number of problems. It can create a breeding ground for pathogenic microorganisms and vectors of disease, and cause a public nuisance due to unsightliness and bad smell. It can cause contamination of surrounding soil, groundwater and surface water, and it can also create fire hazards, physical hazards and have poisoning effects (from pesticides and insecticides) [1-11].

This paper tries to show the household behavior of Romania residents towards solid waste management. The waste generated by the part of the population who are without access to waste collection services has been calculated using a standard daily rate of 0.9 kg/capita/day for the urban areas and 0.4 kg/capita/day in rural areas [12]. This indicates that as there is more open space to throw the waste people usually generates more waste. As family size and income are the most significant factors that influence the quantity of solid waste from household consumption, a study on the relationship among these is vital in the decision making on waste management strategies [13].

Environmental protection is the obligation and responsibility of central and local public administration authorities, as well as all natural and legal persons [14].

# **Experimental part**

#### Materials and methods

Hazardous wastes are treated as a separate category of waste because special management and disposal methods are required. The main sources of hazardous substances are agricultural offices/stores, health offices/ stores and possibly also private firms, homes and retail shops and where modernization has substantially altered agroecosystems [15].

Even with all these research, the problem of solid waste management in Romania has been increasing over the years. Presently, the task of solid waste management comes under the protection of concerned municipalities. Data for this research were collected by means of handdelivered questionnaires during November and December 2012-2016.

The paper selected five waste indicators in order to assess the performance of an household waste management system based on five specific waste indicators such as: population access to waste collection services (%), separate collection, including five recyclable fractions such as paper/cardboard, plastic, metal, glass, wood and also the biodegradable fraction which may be used as compost (%), reuse & recycle (%), landfilling (%) and amounts of waste uncollected (Qwu-%).

**Results and discussions** The objectives of this paper are to discuss household behavior regarding waste generation and management of waste; the relationship of the waste component in different zones within the city; and the willingness to pay for changes in the provision of waste management services.

The management of solid waste has become a significant research problem that combines technical, economic, environmental and social issues [16-19].

The first goal of any waste management system is to maximize the economic benefit from the waste resource and maintain acceptable environmental standards. Sustaining effective solid waste management practices is crucial to both developed and developing countries. Waste management practices, especially the solid waste, differ significantly for developed and developing countries, for urban and rural areas, and for residential, commercial, and industrial producers [20].

In the following, we will present a number of good examples of waste prevention which we think are possible

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to initiate in municipalities in Romania and abroad. In their role as authorities, municipalities are able to work for the prevention of waste among industries, trade and households.

The selection of good examples is based upon several considerations: (1) what concrete examples of waste prevention are there in Romania and abroad? (2) Have the efforts been easy to realize and have results been successful? (3) Is it likely that the efforts would work in a Romanian setting, in case of an example from abroad? (4) Which kinds of waste are important to prevent from an environmental perspective? The project group made a joint assessment to determine which good examples to include in the paper [21-29].

These indicators are calculated for every urban locality based on information provided by Environmental Protection Agency from Iasi, local authorities or waste operators. Also, these indicators are calculated for 2007 (year of EU accession), 2015 (post-accession period reflecting the transition from a traditional to an integrated waste management system). Each indicator according to its percentage values will get a score which will be added to the total amount of points accumulated by a household waste management system.

Waste that does not pose an immediate threat to man or the environment, i.e. household waste, builders' rubble, garden waste, and certain dry industrial and commercial waste. It may, however, with decomposition, infiltration and percolation, produce leachate with an unacceptable pollution potential [30].

Under the conditions of a modern economy, waste is no longer just waste generated by anthropogenic activities, but real sources of raw materials and energy. The development of a strategy for the judicious management of waste on the basis of statistical reporting is of utmost importance for the full use of resources, their focus on areas that ensure superior capitalization and the elimination of material and energy losses.

Urban waste management is drawing increasing attention, as it can easily be observed that too much garbage is lying uncollected in the streets, causing inconvenience, environmental pollution, and posing a public health risk [31]. Table 1 is presented the composition of household waste in Romania at the level of 2013.

In the course of 2013, 12.60 million tons of waste was recovered, representing a recovery rate of 19.7%. By eliminating the tailings waste, the waste is a waste of 33% of recoverable waste. The recovery methods were as follows: 79% of the used waste was reused in the production units, respectively reused in other technological processes; 12% of the waste was recovered from other economic agents.

More than 4% of the waste was recovered through waste recycling units (type (REMAT). It is noted that out of the total waste used, only 16% were subject to sale-purchase processes.

Households' agriculture intensification will have to be achieved by boosting land, water, nutrient and labor productivity, while at the same time avoiding the environmental degradation caused in the past by wasteful resource and input use. Sustainable intensification, as this process is called, will take place under conditions of increasing resource scarcity and climate change [32].

Table 2 shows the share of each economic activity and of households in total waste generation in 2014. Construction contributed 33 % of the total in 2014 (with 871 million tons) in the EU-28 and was followed by mining and quarrying (29.8% or 774 million tons), manufacturing (11% or 256 million tons), households (8.1% or 209 million tons) and energy (3.7 % or 95 million tons), agriculture 1.7 %, the remaining 15 % was waste generated from other economic activities, mainly including waste and water services (7 %) and services (5 %).

Estimates of food waste in EU-28 in 2014 from this quantification study; includes food and inedible parts associated with food.

The collection and analysis of data from across Europe for this study generated an estimate of food waste in the EU-28 of 90 million tons (table 2). The quantity of waste for 2014 and includes both edible food and inedible parts associated with food. This equates to 173 kilograms of food waste per person in the EU-28. The total amounts of food produced in EU for 2015 were around 865 kg / person; this would mean that in total we are wasting 20 % of the total food produced.

Rural waste management sector is in a full expansion process at national, regional and local levels in order to comply the targets assumed by Romania to EU. The waste collection companies prefer to serve dense urban centers with high population density and avoid sparsely populated rural areas with a lower-income population [33]. The share of household waste collection services (WCS %) is a relevant indicator for studying an household waste management system in Iasi because these services still

		Urban waste			Household wa		
	Mil. tons/year	kg./person/year	kg./person/day	Mil. tons/year	kg./person/year	kg./person/day	Table 1DOMESTIC AND URBAN WASTEIN RELATION TO THE NUMBEROF INHABITANTS IN 2013
	7.64	356.50	0.97	4.96	230.20	0.63	

Source: The consultant's processing of data based on [ARSE Romania 2017]

Sector	Food waste (million tons) with 95% CI*	Food waste (kg per person) with 95% CI*
Primary production	9.1 ± 1.5	18 ± 3
Processing	16.9± 12.7	33 ± 25
Wholesale and retail	4.6 ± 1.2	9 ± 2
Food service	$10.5 \pm 1.5$	21 ± 3
Households	46.5 ±4.4	92 ± 9
Total food waste	87.6 ± 13.7	$173 \pm 27$

Table 2 ESTIMATES OF FOOD WASTE IN EU-28

 Table 3

 ASSESSMENT TABLE OF HOUSEHOLD AND SIMILAR WASTE INDICATORS

WCS	6 (%) Separate collection Reuse and recycling Landfilling		Qwu						
%	Score	%	Score	%	Score	%	Score	%	Score
>90	10	>80	10	>60	10	>90	0	>20	0
80-90	8	60-80	8	40-60	8	70-90	2	15-20	2
70-80	6	40-60	6	20-40	6	60-70	4	10-15	4
60-70	4	20-40	4	10-20	4	40-60	6	5-10	6
50-60	2	10-20	2	5-10	2	20-40	8	2-5	8
< 50	0	<10	0	< 5	0	< 20	10	< 2	10

do not cover the entire population, favoring illegal dumping of household waste. Furthermore, highlight the major disparities between Iasi counties regarding the urban population access to WCS. Also, these disparities are reflected at local scale between urban localities from Iasi County.

These indicators are used according to the waste hierarchy principle, thus, high values of some indicators that promote these principle such as waste collection services, separate collection (SpC), reuse and recycling (Rs&Ry) correspond to a higher score (table 3). On the other side, high values of some indicators which correspond to a traditional waste management system such as landfilling or uncollected waste will get fewer points. Also, these percentage values are specific to each indicator and cannot be uniform; these are selected in order to express more accurately the positive or negative implications for a household waste management system.

Finally, based on total score, each municipal waste management system corresponds to a certain category such as: excellent (45-50 max.), good or efficient (35-45), moderate or proper (25-35), inefficient (20-25), poor (10-20), rudimentary or lacking (<10).

# Reuse and recycling

EU member states must organize separate collection systems at least for paper, metal, plastic and glass by 2015 according to the 2008/98/EC Framework Directive. Preparative targets are imposed for waste re-use up to minimum 50% of the total mass for household and similar waste by 2020 and also for re-use, recycling and other material re-use operations, including waste-using filling operations for at least 70% of the mass of waste coming from construction and demolition activities. For packaging it was established as per the 94/62/EC European\Directive, as amended, to recycle at least 55% of the total weight of packaging materials contained in the packaging waste, at least 60% for glass and paper-paperboard, at least 50% for metals and at least 22.5% for plastic of the weight of each type of material contained in packaging waste [34].

The sectors contributing the most to food waste are households (47 million tons  $\pm$  4 million tons) and processing (17 million tons  $\pm$  13 million tons). These two sectors account for 72 percent of EU food waste, although there is considerable uncertainty around the estimate for the processing sector compared to all the other sectors. The quantity and quality of household waste depends on [34]: 1) the level of industrialization and mechanicalness reached by the human community, influencing both the quantity and quality (structure) of the produced waste; 2) the standard of living and civilization of the population; the amount of waste increasing with the increase; 3) new methods of conditioning the goods (packaging and delivery to final consumers); increasing the level of conditioning leads to an increase in the quality of waste (increasing the input of high calorific material such as paper and plastic); 4) the prevailing climate and seasons; 5) Seasonal and occasional movement of the population during holidays, holidays, holidays, weekends; 6) permanent population movement between localities, which is related to the area of attraction of large urban localities to the rural population and small urban localities. For example, statistical analyzes have highlighted the fact that in Bucharest, in addition to the stable population of 2300000 inhabitants, a total of approximately 300 to 400 thousand people pass through Bucharest daily. The evaluation of the production of waste is done by the formula of E.V. Peterson, where this production is considered to be a function of the degree of industrialization, population growth and the effectiveness of control measures. The formula does not give absolute figures but reference values over a base year [33-37].

A mathematical formula of the waste production rate describes the level of interaction between industrial development rate, based on the size of their capita productivity, the time in years of the year taken as the basis of calculation and waste production per capita in the base year:

$$W = 1 (+ht) \times 1 [(-b) \times e^{gt} + b] \times e^{rt}$$

where: w - is the function of the waste production rate; h industrial development rate, expressed in terms of per capita productivity in the base year; t - the time in years of the year taken as the basis of calculation; b - waste production per capita in the base year; g - factors that express the effectiveness of control and pollution control measures; r - population growth rate. Knowing the amount of household waste produced in an urban agglomeration within a specified period (usually 1 year) is of particular importance for the determination of the waste treatment lines and for the evaluation the financial and social effort that the community has to make. In general, Knowing the total amount of waste is the result of some measurements. For the assessment of the quantities of waste often use two indicators: (a) the average annual quantity expressed in kg/ha;

b) the average daily quantity expressed in kg/inhab. Such a grouping of the components of the waste gives the possibility based on the weighting of each category to determine the direction to which should make efforts to capitalize on them.

The sustainable development indicator *generation of waste excluding major mineral wastes* is defined as all waste generated in a country per inhabitant per year, excluding major mineral wastes. The indicator enables the monitoring of waste generation over time for the EU as a whole, and makes it possible to compare developments across countries.

The amount of generated and collected municipal waste varies from one year to the other but there is a general

AMO	UNIS OF COLL	ECTED AND RE	-OSED MONICI	PAL WASIE		
Waste categories	Quantity 2014		Quanti	ty 2015	Quantity 2016	
	Thousand tons Thousand tons		Thousa	nd tons		
	Col.	Re-used	Col.	Re-used	Co1.	Re-used
Household and similar waste	5669	56.8	5283	62	4572	245
Municipal services waste	889	15.3	982	39	754	51
Construction and demolition waste	813	23.1	674	84	497	155
Total	7371	95.2	6939	185	5823	451

 Table 4

 AMOUNTS OF COLLECTED AND RE-USED MUNICIPAL WASTE

http://www.anpm.ro/

growth tendency determined both by the growing consumption and by an increase in the proportion of people who benefit from centralized public waste collection services. In 2014 and 2016 we notice a decrease in the amount of municipal waste due to the economic crisis and to the significant drop of the people's purchase power. The amounts of collected and re-used municipal waste broken down per main categories for the years 2014-2016 are represented below in table 4.

In the structure of urban waste, the highest share is represented by household waste (75-80%), followed by municipal services waste (10-12%) while the construction and demolition waste has the lowest share. Currently, in Romania there is no mandatory requirement to keep a record of construction and demolition waste (from producer to user and to the disposal in landfills, if applicable) in order to have an accurate database reflecting the market reality and showing clearly the collection and re-use rate of this waste category. On the other hand, construction and demolition waste is disposed of at old municipal landfills without weighing systems and quite often the waste is thrown on fallow lands, therefore the recorded data is not exactly accurate [34].

Due to the rapid increase in population and increase in the consumption of packed goods, the amount as well as the quantum of non-biodegradable waste is increasing over time. Among the total waste generated in NE region of Romania, 80% is generated only from Iasi and only 30% of the total urban refuse is being collected in containers and transferred to the landfill site [35].

Thus solid waste management is a growing issue in the context of urban environmental degradation of *Romania*. Using the table provided, determine the amount of nitrogen and carbon in your materials. While this isn't possible to do exactly without submitting samples to a lab for analysis, you can estimate, which means take an educated guess!

Chemical composition analysis carried out for this study involved analysis of moisture content (MC) of waste, carbon and nitrogen analysis and three component analysis. For MC analysis, at least 1 kg of waste of each composition was used. First the samples were sealed in aplastic bag to avoid loss in MC and then kept in oven/incubator for 4-5 days at a temperature range of 90-100°C [36].

Good quality compost improves soil fertility and thereby increases the yield of the crops which eventually contributes to food security. The Carbon: Nitrogen (C/N) ratio of compost is an important factor that determines whether the soil fertility has improved or deteriorated (table 5).

Table 5

DETERMINE THE AMOUNT OF NITROGEN AND CARBON IN THE SOLID WASTE

Some Common Feedstocks and Their C:N ratio (from On-Farm Composting*)				
Feedstock	C:N			
Horse manure	30			
Dairy Manure	13			
Laying hens	6			
Sheep manure	16			
Alfalfa hay	16			
Wheat straw	127			
Wood shavings bedding (softwood)	600			
Dried fallen leaves	54			
Fresh grass clippings	17			
Household vegetable food wastes	11-13			
Coffee grounds	20			
Grass hay	32			

\*) Source: Adapted from the On - Farm Compositing Handbook, Natural Resource, Agriculture and Engineering Service [37]

# Energy content of solid waste components

The energy content of organic waste components can be determined experimentally using a boiler as a calorimeter or a calorimetric laboratory bomb or can be calculated if the elemental composition is known. The amount of ash and the percentage of moisture should be considered in the calculation of the energy content (table 6).

The approximate energy value (E) for individual waste materials can be determined using the equation:

E(J) = 145C + 610 (H-1/8O) + 4S + 10N,

where: C - carbon (% by weight); H - hydrogen (% by weight); O - oxygen (% by weight); S - sulfur (% by weight) and N - nitrogen (% wt).

The share of urban waste collection services (WCS %) is a relevant indicator for studying an urban waste management system in Pascani because these services still do not cover the entire population, favoring illegal dumping of household waste (Table 7). Furthermore, highlight the major disparities between Iasi counties regarding the urban population access to WCS. Also, these disparities are reflected at local scale between urban localities from Iasi County.

Nama	Simbol	Linit	Information source		
Ivame	SHIDDI	Onic	I.s. 1	I.s. 2	
Carbon	С	%	10.253	11.90	
Hydrogen	Н	%	1.386	1.49	
Oxygen	0	%	9.060	11.92	
Sulfur + Nitrogen	N+S	%	0.072	0.07	
Ash	А	%	21.808	19.72	
Total humidity	Wt	%	57.439	54.90	
Lower calorific		kJ/kg	2330	2650	
power	Hi	kcal/kg	556.5	633.0	

Table 6ELEMENTAL ANALYSIS AND INFERIORCALORIC POWER OF DOMESTIC WASTES IN<br/>ROMANIA

I.s. 1[38], I.s. 2[39]

WCS (%)	2012	2014	2016	(+/- %)2016 compare with 2012
Iasi	61.93	64.08	65.92	106.45
Pascani	72.10	80.00	83.35	115.60
Harlau	42.92	43.11	48.22	112.34
Targu Frumos	65.41	51.13	78.12	119.43

Table 7POPULATION ACCESS TO WASTECOLLECTION SERVICES (%)

According to table 7, no urban locality from the county has a higher value than 85 % of WCS in the 2012-2016 periods. Major differences between Pascani and others towns is due to rural localities included in Administrative territorial unit types (ATTY) of urban areas which are not served by WCS. The lists of codes represent the administrative territorial units, based on national official/ legal information and the ISO 3166-2 standard. Differences can be noticed due to the rapid changes occurring in the countries.

The codes have been created, as far as possible, by integrating the code used in UNECE [40]. The administrative territorial units must not be confused with the Nomenclature of Territorial Units for Statistics (NUTS). Also the private sector of WCS has developed earlier in Pascani and Iasi (including significant investments) than Targu Frumos or Harlau. Podu Iloaie has no WCS until 2011, since a separate collection is implemented and a transfer station is operational.

It is worth mentioning that in Romania the solid municipal waste system was also not very well developed, for example until 2006 in Iasi county was not established a separate collection of the municipal solid waste system. It is mentioning that in Iasi County in July 2009 was approved so called *Master Plan - Long Term Investment Plan for the period 2008-2038 regarding Integrated Solid Waste Management.* 

The project results will positively affect the both side of the border by: increased exchange of people; better cooperation at local level; establishment of cooperation between Local Public Authorities; increased capacities of

SpC (%)	2012	2014	2016	(+/- %)2016 compare with 2012
Iasi	0.13	39.83	4.11	31967
Pascani	0.10	1.11	1.34	1391
Harlau	0.00	0.00	0.00	0
Targu Frumos	0.00	0.00	0.00	0

Reuse and recycling (%)	2012	2014	2016
Iasi	0.037	9.33	3.86
Pascani	0.085	0.088	0.248
Harlau	0	0	0
Targu Frumos	0	0	0
		·	

Table 8SHARE OF SEPARATECOLLECTION (%) FROM TOTALAMOUNTS OF HOUSEHOLDAND SIMILAR WASTE (HSW)

 
 Table 9

 SHARE OF REUSE AND RECYCLING (%) FROM TOTAL AMOUNTS OF HSW COLLECTED

Data source: processing data from EPA Iasi, waste operators

Uncollected waste (%)	2012	2014	2016
Iasi	14	34.39	35.9
Pascani	13.2	5.05	26.39
Harlau	9.68	28.07	72.41
Targu Frumos	14.28	24.28	15.47

Table 10SHARE OF UNCOLLECTED WASTE (%)FROM TOTAL AMOUNTS OF HSWCOLLECTED

Causes	Total Number of HH	Core	Middle	Outer	
It is the duty of the Municipality	14 (5)	1 (2)	6 (4)	7 (8)	
It is the duty of the government	2 (1)	0	2 (1)	0	Table 11
Income is very low and could not afford	35 (12)	6 (12)	7 (4)	22 (25)	CAUSES OF NOT
My house's waste had not made any problem to me	62 (21)	8 (17)	28 (17)	26 (30)	WILLING TO FAI
Waste collection is continue in one or other way and no other problem	158 (53)	31 (65)	103 (64)	24 (28)	
Volume and quantity is very low	7 (2)	2 (4)	1 (1)	4 (4.5)	
Majority of waste is reusable and applicable to own self	19 (6)	0	15 (9)	4 (4.5)	]

Absolute number indicate number of households and Figure within bracket indicate percentage

the local population to lobby their rights for clean environment [41].

Mixed waste collection prevailed during 2012-2016 in Iasi and Podu Iloaie (SpC = 0), separate collection being provided since 2011. Also, separate collection systems were in early stages in 2012 for Iasi and Pascani (table 8).

SpC = Qrw \* 100/QHSW SpC- separate collection;

QHSW - household and similar waste collected;

Qrw = recyclable waste collected 5+1, (t/yr), total sum of paper/cardboard, plastic, metal, glass, wood and biodegradable waste, these fraction are collected from special containers.

Separate collection is insignificant in Pascani during 2012-2016 because there was no facility for recycling, treatment or composting municipal waste. On the other side, Iasi has extended the separate collection systems in every collection point of the town since 2007, reflecting the higher values compared to 2012.

Iasi has an operational sorting and composting stations (2007) which reflect higher values of RS&RY compared to 2012, yet the maximum values are still under 10% (table 9). This fact highlights the early stages of the integrated urban waste management system implemented through ISPA funds.

Most of the Romanian towns are facing the transition period from mixed waste collection and landfilling (traditional way) to reduce, reuse and recycling (3R policy) specific to an modern waste management system.

The poor value of the reuse and recycling indicator outline the fact the main current option in municipal waste management is still landfilling (over 90 % for every town of the county during 2007-2010). Thus, according to the assessment table (table8) the score of this indicator is 0 for all towns in every year.

Furthermore, municipal waste (beside HSW fraction is also included garden & street waste, construction & demolition waste) is disposed in non-compliant landfills which are often located on improper sites close to the residential areas [35]. Iasi has a sanitary landfill (2 cells) which serves only this municipality until 2017.

The last indicator used for PÂM refers to the uncollected waste [35] outlined the vulnerability to illegal dumping of

urban areas from Romanian counties using this indicator. In order to highlight this vulnerability at local scale it is calculated for every city applying the following formula (table 10):

Uncollected waste  $t/yr = Pu \cdot Ig \cdot 365/1000$ , Pu - pop. unserved by WCS (nr. of inhab.);

Ig -per capita generation of household waste (0.8 kg.inhab/day - an average value for 2003, adding an annual increase of 0.8%).

The next step is to calculate the share of Uncollected waste from total QHSW collected in the urban areas: S(%) Uncollected waste = Uncollected waste  $\cdot 100/QHSW$ .

Urban population without access to WCS disposes the HSW on improper sites from surroundings, polluting the local environment and threatening human health.

These situations prevailed in Podu Iloaie because of the lack of WCS during 2012- 2016 and also in rural localities included in the administrative territorial units (ATU) of Iasi, Targu Frumos and Pascani.

## *Causes of Not Willing to Pay*

Questions were asked regarding the unwillingness of the households to pay. Households have given more than one reason for not willing to pay for the management of the waste. Table 11 shows that the majority of the households (53%) were not willing to pay as their waste was collected and they do not have any problems from the waste. Some (21%) of them do not feel the problem from the waste since they have sufficient space to throw the waste either within their compound or outside. Few households were not ready to pay, as their income was very low [39-42].

They account for only 12 % among the unwilling households (8 % of the total surveyed households). They feel that their priority is hand to mouth survival and not the waste. Very few households feel that it is the duty of the municipality and the government and so they are not willing to pay.

#### Conclusions

The background of traditional waste management system based on mixed waste collection, waste disposal

in non-compliant landfills and illegal dumping prevails in most urban localities of Iasi County during 2012-2016, threatening the urban environment and human health. Only Iasi has a modern waste management infrastructure system since 2007, but it is outlined that the performance is poor so far.

The role of local authorities to prepare the people for the transition from a traditional to a sustainable waste management system in a short period of time is essential and cannot stagnate, otherwise Romania will not be able to comply the objectives assumed to the EU in this priority area of environmental policies.

The Emergency Ordinance no. 78/2000 on Waste regime approved with modifications by Law 426/2001, modified and completed by Emergency Ordinance no.61/2006. In accordance with article 8 of this Emergency Ordinance the national competent authority was elaborated Plans for management of wastes.

In accordance with article 19 (2) of the Emergency Ordinance no. 78/2000 modified and completed by Law 426/2001 and Emergency Ordinance no.61/2006, producers of wastes shall adopt technologies and solutions for reduction and elimination of generation of wastes.

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