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Analysis of waste data reported by the countries of Eastern Europe, Caucasus and Central Asia

Note by the secretariat*

Summary

The paper is part of a desk study to assess the capacity of countries of Eastern Europe, Caucasus and Central Asia (EECCA) to produce statistics on measuring sustainable development and environmental sustainability.

Reliable data on waste is a key for any country in implementing policies that aim at reducing the environmental impact of waste. In many countries, however, there are no comprehensive data or estimates on waste. United Nations Economic Commission for Europe (UNECE) conducted a data collection on waste statistics in the EECCA countries. This paper analyses the collected data and makes comparison with waste statistics collected by Eurostat where possible.

* This document was submitted late due to the need to consult with experts.

Introduction

1. Reliable data on waste is a key for any country in implementing policies that aim at reducing the environmental impact of waste. In many countries, however, there are no comprehensive data or estimates on waste. In preparation for the UNECE/Eurostat/EEA Workshop on Waste Statistics, held 11-13 April 2012, Geneva, UNECE conducted a data collection on waste statistics in the EECCA countries with the help of a detailed questionnaire. The UNECE questionnaire follows extensively the methodology and the definitions used in the questionnaire developed by the United Nations Statistics Division (UNSD). The collected data covered waste generation and waste management, including waste produced by the different economic sectors as well as municipal waste. The questionnaire also focused on certain types of waste that are of high priority for waste management, i.e., hazardous waste. All EECCA countries have responded, except Turkmenistan. The data include the time period 2000-2010.

2. The purpose of the UNECE questionnaire was to check the quality of the available data, identify data gaps and assess the reliability of the data for comparison across countries and time. The analysis is made to the extent possible given that the provided data were not always complete. In some countries, it is the case, that the requested data are collected or compiled by different institutions. Therefore, both the National Statistical Offices and the Ministries of Environment were asked to cooperate and bring together the data from the different sources.

3. The UNECE questionnaire contains four tables with time-series data on indicators for 2000-2010, as follows:

(a) Table 1. Waste generation;

(b) Table 2a. Final waste disposal: Management of municipal waste;

(c) Table 2b. Final waste disposal: Management of non-hazardous industrial waste;

(d) Table 3. Transboundary movements of hazardous waste.

4. This paper analyses the waste data as reported by the EECCA countries. Comparison with waste statistics collected by Eurostat from the National Statistical Offices of the Member States of the European Union (EU) was also included where possible.

I. Waste generation by economic activity

5. Table 1 of the UNECE questionnaire shows data on the amount of waste generated. The requested data followed the ISIC classification of economic activities, which is also the classification used in the UNSD questionnaire. Data were reported on the following economic sectors: “Agriculture, forestry and fishing”, “Mining and quarrying”, “Manufacturing", “Electricity, gas, steam and air conditioning supply”, “Construction” and “Other economic activities”, excluding ISIC 38. Waste generated by ISIC 38 (waste collection, treatment and disposal activities; and materials recovery) is from secondary sources, i.e., residual materials from recovery and disposal operations such as incineration and composting residues. In order to avoid double counting, it was excluded from the table.

6. A comprehensive and complete data set of the amounts of waste generated by the different economic activities was provided by Armenia, Azerbaijan, and Moldova. A relatively full set with data missing only for some years was provided by Belarus (only for 2008-2010), Kazakhstan (2009 is missing), the Russian Federation (2010 is missing).

Ukraine used different categories of waste across the reporting period, which makes it impossible to compare across time.

7. The other countries provided relatively incomplete data. Georgia had data only for 2007 and only for three sectors – "Mining and quarrying", "Construction" and "Other economic activities", Kyrgyzstan provided data only for 2010, and Uzbekistan had complete data for all years but only for one economic sector, that is "Agriculture, forestry and fishing". Tajikistan did not provide data.

8. Some countries did not collect data from all economic sectors but only from some of them, and therefore, it was not possible to provide a value for the "Total waste amount generated by economic activities". Other countries provided data on the total waste but did not specify the economic sectors that contribute to it.

9. In comparison to the EU Member States, the total waste generated by the EECCA countries in 2008 is relatively high, amounting to 4.7 billion tonnes, whereas in the EU Member States it is 2.6 billion tonnes. The Russian Federation alone has generated 1.5 times more waste than the EU countries (see Figure 1). Kazakhstan and Ukraine have generated more waste than any EU country. The largest contributors to the European waste are Germany (14%), France (13%), Italy (12%) and Bulgaria (11%). The largest producer of waste in the EECCA region is the Russian Federation accounting for around 90% of waste, whereas the distribution of the waste burden across the EU countries is more even.

Figure 1.
Total amount of waste generated in selected EU and EECCA countries in descending order, 2008, in tonnes

Russian Federation	3 876 941 000
EU (27 countries)	2 611 580 000
Kazakhstan	456 785 000
Ukraine	427 421 800
Germany	372 796 353
France	345 002 210
United Kingdom	334 127 092
Bulgaria	286 092 936
Romania	189 310 549
Italy	179 034 461
Spain	149 254 157
Poland	140 340 303
Netherlands	99 591 174
Sweden	86 168 590
Finland	81 792 854
Belarus	43 178 500
Armenia	11 841 440

Notes: The EECCA countries are highlighted in blue.
Data for the Russian Federation excludes municipal waste.
Data for Ukraine are for 2010. Data for earlier period does not show the total amount.

10. Looking across time, the EECCA countries show relatively unstable levels (when data are available). Likewise, at the EU country level, the data variations are significant – in four years (2004-2008) Greece doubled its waste, Italy and Denmark increased by 28% and 20% respectively, and Malta and Romania decreased by about 50% each.

11. Sometimes countries with small economies or populations have generated enormous amounts of waste compared to other countries or have shown great changes in the data in short time periods. This leads to the conclusion that the methodologies are still in process of development and any comparisons should be regarded with caution.

II. Major economic activities and municipal waste contributing to total waste generation in the EECCA countries

12. According to the data, in most countries, the economic activity producing the largest share of waste is the "Mining and quarrying" sector (see Figure 2). In Belarus, Moldova and Kazakhstan the "Manufacturing" sector also has a significant share in total waste generated in the country. For comparison, the major contributor to the total generation of waste in the EU in 2008 was the "Construction" sector (33% of total waste) closely followed by the "Mining and Quarrying" sector (28%).

13. Unlike other countries, Azerbaijan and Moldova show a very high share of municipal waste in total waste generated, respectively 75% (2010) and 56% (2010). It could be that this result may have been obtained due to the underreporting of waste generated in other sectors. Normally, the municipal waste in countries does not have such a high share. For example, the data for the EU countries show only 10% (2008).

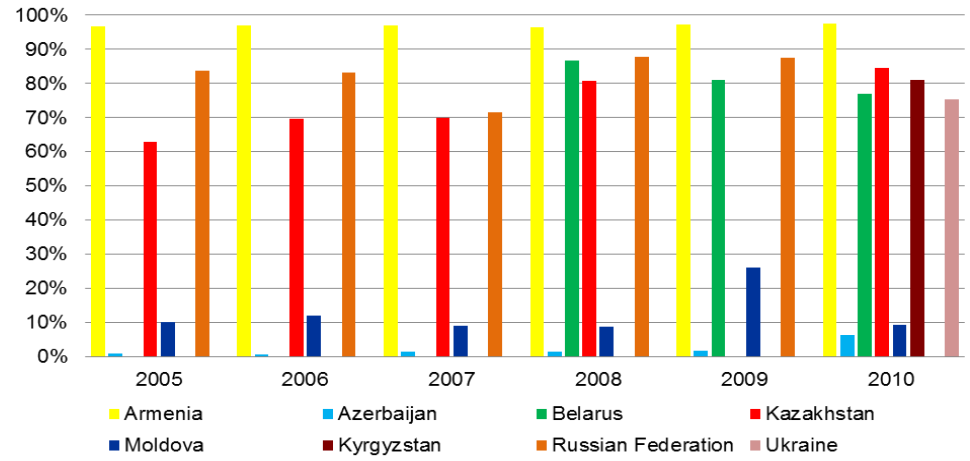
14. It was not possible to assess the contribution of the economic sectors to "Total waste generated" in Georgia, Tajikistan, and Uzbekistan since these countries did not report data on each economic sector. Georgia reported only on "Mining and quarrying", "Construction" and "Other economic activities", and municipal waste; Tajikistan only on municipal waste; and Uzbekistan only on "Agriculture, forestry and fishing" and municipal waste.

Figure 2.
Major economic activities and municipal waste contributing to total waste generation

	Major economic activities and municipal waste contributing to total waste generation
Armenia	Mining and quarrying
Azerbaijan	Municipal
Belarus	Mining and quarrying & Manufacturing
Georgia	n/a
Kazakhstan	Mining and quarrying & Manufacturing
Kyrgyzstan	Mining and quarrying (only 2010)
Moldova	Municipal & Manufacturing
Russian Federation	Mining and quarrying
Tajikistan	n/a
Ukraine	Mining and quarrying (only 2010)
Uzbekistan	n/a

15. Figure 3 shows the share of "Mining and quarrying" in total waste generation. In Armenia, Belarus, Kazakhstan, Kyrgyzstan, and the Russian Federation, this sector is the largest contributor to total waste, with a share above 60% in the period 2005-2010. In Ukraine, the "Mining and quarrying" sector generated 75% of total waste (2010).

Figure 3.
Share of "Mining and quarrying" in total waste generation, in percent



Notes: In Belarus, the "Mining and quarrying" and "Manufacturing" sectors are considered as a single economic activity, and therefore, are included together.

Ukraine used different categories of waste until 2010, and therefore, only 2010 is shown on the graph.

III. Management of municipal waste, including household waste

16. The UNECE questionnaire follows the same definition as the UNSD and OECD/Eurostat questionnaires, which states that municipal waste is waste collected by or on behalf of municipalities, by public or private enterprises, and includes waste originating from households, as well as from commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes bulky waste (e.g., white goods, old furniture, mattresses) and waste from selected municipal services, e.g., waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste. The definition excludes waste from municipal sewage network and treatment, municipal construction and demolition waste.

A. Municipal waste generated/collected

17. The EECCA countries were asked to report data on generation of municipal waste under Table 1 of the UNECE questionnaire. The UNECE questionnaire, however, did not make it clear that the data on municipal waste refer to *municipal waste generated* and not to *municipal waste collected*. Therefore, the countries reported the same numbers in Table 1, which requested data on *municipal waste generated* as in Table 2a, which requested data on *municipal waste collected.*

18. The countries were asked to report the data in tonnes. However, several countries, including Kyrgyzstan, the Russian Federation, Tajikistan, and Uzbekistan reported the municipal waste amounts in cubic meters (m^3) and not in tonnes, as requested. This made it

difficult to compare the data among the countries. Chapter 6 discussed in more details the issue of conversion of cubic meters into tonnes.

19. Table 1 reported on three main aspects with regard to municipal waste, including "Total municipal waste", "Household waste" and "Hazardous municipal waste".

1. "Total municipal waste"

20. All EECCA countries provided data on "Total municipal waste". The majority of countries reported for the period of 2000-2010, while other countries had fewer observations: Kazakhstan and Kyrgyzstan (2005-2010), Georgia (2007-2009), Tajikistan (2009-2010), and Ukraine (2006-2010). Since some reported in cubic meters and some in tonnes, it was not possible to calculate the "Total municipal waste" produced in the EECCA region. The available data, however, allows analyzing trends. In Armenia and Uzbekistan, the municipal waste levels remained stable during the 2001-2010. During the same period, in Belarus and Moldova municipal waste generated doubled. In Azerbaijan and the Russian Federation it increased by a third.

21. In the EU, the data on the municipal waste show stable levels in the period 2001-2010 of about 252 million tonnes per annum. The data for the majority of the European countries show that the municipal waste generated increased, sometimes to as much as 29% (Slovakia, Norway). Looking at the three main generators of municipal waste: Germany, France and Italy, which constituted nearly half of the municipal waste generated in the EU, one can see offsetting trends: while in Germany the waste generated dropped by 9% in 2010 compared to 2001, in France it went up by 7%, and in Italy by 8%.

2. "Household waste"

22. Only Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan and Tajikistan have reported on household waste generated. In all of these countries, except Kyrgyzstan, the share of household waste in municipal waste is very high (see Figure 4). This is in line with the data reported in the EU countries with a share of 85% (2008).

Figure 4.
Share of household waste in the amount of municipal waste, in percent

	2000	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
Azerbaijan	85%	83%	84%	86%	83%	82%	80%	80%	81%	81%	80%
Belarus							59%	58%	60%	65%	70%
Kazakhstan						80%	82%	86%	76%	85%	82%
Kyrgyzstan									27%	19%	42%
Tajikistan										81%	83%

3. "Hazardous municipal waste"

23. None of the EECCA countries has reported on generation of hazardous municipal waste. Eurostat collects data on hazardous household (not municipal) waste. Based on the available EU data, household hazardous waste amounts to 2.1 million tonnes in 2008, which is 1.0% of the EU household waste. Several EU countries did not report data or reported zero. This shows that data on hazardous household waste are also difficult to obtain and compare at the EU level.

24. It is important to mention that Eurostat also collects data on hazardous household waste according to waste streams, e.g., on waste of electronic and electrical equipment. Waste streams on batteries and waste oils are or will be subject to specific EC regulations

that make their separate collection mandatory, and are expected to be added to the data collection in the future.

B. Municipal waste generated/collected per capita

25. According to the reported data, Moldova generates the highest amount of municipal waste per capita among the EECCA countries for which there were available data (see Figure 5). In 2010 the data per person varied from 119kg in Armenia to 655kg in Moldova.

Figure 5.
Municipal waste per capita, in kilograms per person

	2004	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
Armenia	109	108	109	112	119	121	119
Azerbaijan	212	204	181	185	166	178	177
Belarus	274	291	318	337	358	380	397
Georgia				195	200	201	
Kazakhstan		138	157	216	218	244	232
Moldova	340	359	384	505	604	630	655
Ukraine			234	252	246	223	213

Note: Only countries, which reported data in tonnes (and not in cubic meters), are included for purpose of comparison

26. In comparison to the EECCA countries, the EU Member States have reported higher amounts of municipal waste per person. In the EU, on average the municipal waste generated per person was 513kg in 2009 and 502kg in 2010. The amount generated per person varied from about 300kg in Latvia, the Czech Republic, Estonia and Poland to about 700kg in Cyprus, Denmark, Luxembourg, and Switzerland.

C. Municipal waste management

27. In general, "Waste management" is considered to include all of the following activities: collection, transport, treatment and disposal of waste, including after-care of disposal sites, and according to some experts also activities aiming at reducing waste generation.

28. The UNECE questionnaire asked the countries to report on the amount of "Municipal waste managed in the country", i.e., the sum of the amounts going to "Recycling" + "Composting" + "Incineration without energy recovery" + "Incineration with energy recovery" + "Landfilling on a controlled site" + "Landfilling on a non-controlled site" + "Other" (Table 2a). Since the general definition for management is broader than the one used in the UNECE questionnaire, here the term "treatment" and/or "disposed of" is used (Chapter 5 addresses further the issue with definitions of waste management activities).

29. In some instances, part of the municipal waste may be exported to other countries before treatment. Countries may also import municipal waste for treatment. The UNSD questionnaire has therefore included the total amount of "Municipal waste managed in the country" calculated as: "Municipal waste collected in the country" – "Municipal waste exported" + "Municipal waste imported". Unfortunately, no country reported to the UNSD data on import/export of municipal waste.

30. Data on import/export of municipal waste were not requested by the UNECE questionnaire. However, some conclusion can perhaps be drawn for Ukraine and the Russian Federation. These countries reported *municipal waste generated*, which is not equal to the *municipal waste managed*. This may imply that municipal waste has been exported and/or imported during the year.

31. According to the data, in Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova and Uzbekistan all of the municipal waste is landfilled on a controlled site. Georgia, the Russian Federation and Tajikistan did not provide data for treatment methods. In Ukraine all methods of waste treatment are used (see Figure 6). The majority of the waste, however, is being landfilled on a controlled site.

Figure 6.
Management of municipal waste in Ukraine, 2006-2010, in thousand tonnes

	2006	*2007*	*2008*	*2009*	*2010*
Municipal waste collected	10 943.3	11 694.9	11 388.0	10 276.0	9 765.5
Municipal waste managed	10 784.4	11 456.7	11 049.4	12 959.6	12 502.8
Of which recycling	0.7	50.3	67.4	136.7	138.9
Of which composting					0.7
Of which Incineration without energy recovery	237.1	229.1	415.0	324.5	126.1
Of which Incineration with energy recovery					162.2
Of which landfilling on a controlled site	10 546.6	11 177.3	10 567.0	12 498.4	7 943.5
Of which landfilling on a non-controlled site					64.9
Of which other disposal					4 066.5

Notes: Until 2010, incineration was not divided into categories.
The line "Of which other disposal" includes removal by leakage, evaporation, fire, theft; by dumping on ground and into water surface.

32. While landfill is by and large the predominant treatment method used in the EECCA countries, in the EU[1] the treatment methods differ substantially between the Member States. Member States with landfill being the highest share of treated municipal waste are Bulgaria (100% of waste treated), Romania (99%), Malta (96%), Lithuania (95%), and Latvia (92%). Incinerated municipal waste has the highest shares in Sweden (49% of waste treated), Denmark (48%), the Netherlands (39%), Luxembourg (36%), Belgium (35%), Germany and France (with 34%). Recycling is most common in Germany (48% of municipal waste treated), Belgium and Sweden (both 36%), Slovenia and Denmark (both 34%), Ireland and the Netherlands (both 32%). The Member States with the highest composting rates were Austria (40%), Italy (32%), the Netherlands (28%), Spain and Belgium (both 24%), and Luxembourg (20%).

[1] Source: Eurostat News Release, "Recycling accounted for a quarter of total municipal waste treated in 2009", 37/2011, 8 March 2011, URL: http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-08032011-AP/EN/8-08032011-AP-EN.PDF

D. Population served by municipal waste collection

33. The UNSD questionnaire, unlike the UNECE questionnaire, has collected in addition some useful data on the percentage of total population served by municipal waste collection service in the EECCA countries.

34. The "Percentage of total population served by municipal waste collection" is usually estimated using the percentage of addresses in the municipalities from where waste is collected. It is expressed as a percentage of the total population. Similarly, the urban population served is expressed as a percentage of the total urban population, and the rural population served is expressed as a percentage of the total rural population. Only four countries have provided data on this indicator (see Figure 7). According to data, in Belarus, 100% of the population was served by municipal waste collection in 2009.

Figure 7.
Population served by municipal waste collection, 2003-2009, in percent

	2003	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
Armenia							
Total population served by municipal waste collection	74	76	75	76	80	78	72
Urban population served by municipal waste collection	96	95	96	95	96	96	96
Rural population served by municipal waste collection		45	39	43	50		
Belarus							
Total population served by municipal waste collection	85	85	90	95	100		
Urban population served by municipal waste collection	100	100	100	100	100		100
Rural population served by municipal waste collection							
Kyrgyzstan							
Total population served by municipal waste collection	100	100	100	100	100		
Urban population served by municipal waste collection							
Rural population served by municipal waste collection							
Georgia							
Total population served by municipal waste collection	56	56	56		60		
Urban population served by municipal waste collection	86	86	86		90		
Rural population served by municipal waste collection	12	12	12		12		

IV. Management of non-hazardous industrial waste

35. The EECCA countries were requested to provide data on the management of non-hazardous industrial waste (Table 2b). The UNECE questionnaire defined "industrial waste" as the waste generated by all economic activities. Accordingly, non-hazardous industrial waste is the part of the waste generated from the various economic activities that does not possess hazardous characteristics.

A. Non-hazardous industrial waste generated

36. Many countries did not follow the above-mentioned definition in reporting data on the amount of non-hazardous industrial waste generated. Only Azerbaijan and the Russian Federation reported data using the correct formula. Armenia and Moldova calculated industrial waste as waste generated by only "Mining and quarrying" and "Manufacturing" sectors. Kyrgyzstan (data only for 2010) used the "Total amount of waste generated" as the amount for "Total non-hazardous industrial waste generated". Ukraine (data for 1995-2009) and Georgia (data only for 2007) used the amount of "Total hazardous waste" as the amount for "Total non-hazardous industrial waste". Ukraine followed a different, but still incorrect formula in calculating the data for 2010. In Belarus the amount of "Total non-hazardous industrial waste" equals to the amount of "Total industrial waste". Kazakhstan, Tajikistan and Uzbekistan did not provide any data on the amount of non-hazardous industrial waste generated.

B. Treatment of non-hazardous industrial waste

37. Furthermore, the UNECE questionnaire requested data on the management of non-hazardous industrial waste by different treatment methods. Figure 8 shows the headings under which the data were requested. As written, the assumption is made that all of the waste generated is being treated. This is, unfortunately, not always true. Some of the waste is being stocked or simply exported for treatment elsewhere. Therefore, "Recycling", "Composting" and the other methods of waste treatment should not be listed under the "Total amount generated" but under the "Total amount treated". Data on "Total waste treated" should have been asked in addition.

Figure 8.
Requested data on management of non-hazardous industrial waste as according to the UNECE questionnaire

Total amount generated
Of which recycling
Of which composting
Of which incineration without energy recovery
Of which Incineration with energy recovery
Of which landfilling on a controlled site
Of which landfilling on a non-controlled site
Of which other disposal (specify in the footnote, please)

1. Data according to the treatment methods

38. According to the provided data, recycling of the waste took place in Azerbaijan, Belarus and Ukraine. Composting was reported only in Ukraine for 2010. Moreover, Ukraine and Belarus treated waste by incineration *without* energy recovery. Incineration *with* energy recovery was used in Azerbaijan, Belarus and Ukraine.

39. The most used treatment method was landfilling on a controlled site. In Armenia and Moldova all waste was treated by this method. Azerbaijan and Belarus also used this method, along with others. In Ukraine waste was landfilled on controlled sites; they were the only ones to also provide estimates on waste disposed on non-controlled sites. In Kyrgyzstan (data only for 2010) the majority of non-hazardous industrial waste was disposed of on the territory of the enterprises and the rest was landfilled on a controlled site. Georgia, Kazakhstan, the Russian Federation, Tajikistan, and Uzbekistan did not report on the amount of non-hazardous industrial waste treated.

2. Data issues – some examples

40. In general, the quality of the data on non-hazardous industrial waste was hard to validate. Given that different definitions were used in calculating non-hazardous industrial waste amount, it was difficult to compare the data across countries, i.e., to see the share of each treatment method, etc. Some of the numbers also looked implausible. For example, in the case of Azerbaijan, the data show some unrealistically elevated amounts on "Other disposal" (see Figure 9). The amounts are about 15 times higher than the annual amount of "Total waste generated".

Figure 9.
Management of non-hazardous industrial waste in Azerbaijan, 2000-2010, in thousand tonnes

	2000	*...*	*2006*	*2007*	*2008*	*2009*	*2010*
Total amount generated	106	…	838	742	762	550	508
Of which recycling	63	…	773	609	715	468	381
Of which composting		…					
Of which incineration-without energy recovery		…					
Of which Incineration with energy recovery		…		4	4	6	7
Of which landfilling on a controlled site	1	…	57	47	78	72	59
Of which landfilling on a non-controlled site		…					
Of which other disposal (specify in the footnote, please)	33 969	…	34 066	34 075	34 002	33 980	34 005

41. Perhaps, a conclusion that one might obtain from the data for some countries, is that the share of treated waste in total generated non-hazardous waste is very small. According to the data reported by Belarus, during the year the majority of waste generated is not treated by any method (see Figure 10). In 2010, for example, only 24% of the non-hazardous industrial waste generated was treated. Similarly, in Moldova, only 19% was treated. Given the misunderstanding with the definition, it is difficult to know whether this is a reflection of the actual situation or there is a potential problem with data.

Figure 10.
Management of non-hazardous industrial waste in Belarus, 2000-2010, in thousand tonnes

	2000	*2001*	*....*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
Total amount generated	23 260	24 549	….	34 782	33 455	37 956	39 768	27 278	43 775
Of which recycling			….	3 860	3 026	3 928	5 062	5 777	7 421
Of which composting			….						
Of which incineration without energy recovery			….	118	122	126	166	51	144
Of which Incineration with energy recovery			….	361	370	395	421	491	576
Of which landfilling on a controlled site	660	871	….	1 722	1 782	1 939	1 993	1 738	2 096
Of which landfilling on a non-controlled site			….						
Of which other disposal (specify in the footnote, please)			….	55	70	58	91	529	103

V. Management of hazardous waste

42. Hazardous waste has potential damaging effects on both human health and the environment. It is therefore of utmost importance that should be managed and disposed of safely. Data, however, was not readily available for all EECCA countries (see Figure 11); especially poor were the data on the breakdown by different treatment methods. Moreover, a comparison of the UNECE and UNSD questionnaires shows that countries have sometimes provided data only to one of the questionnaires.

Figure 11.
Data availability on hazardous waste management

	Export/Import amount		*Total treated amount*		*Breakdown by treatment methods*	
	UNECE questionnaire	*UNSD Questionnaire*	*UNECE questionnaire*	*UNSD Questionnaire*	*UNECE questionnaire*	*UNSD Questionnaire*
Armenia	Yes	Yes	No	Yes	No	Yes
Azerbaijan	Yes	No	Yes	Yes	No	Yes
Belarus	Yes	No	Yes	No	Yes	No
Georgia	Yes	No	No	No	No	No
Kazakhstan	Yes	No	Yes	No	Yes	No
Kyrgyzstan	No	Yes	No	Yes	No	Yes
Moldova	Yes	No	No	Yes	No	Yes
Russian Federation	Yes	No	Yes	Yes	Yes	Yes
Tajikistan	No	No	No	No	No	No
Ukraine	Yes	Yes	No	Yes	No	Yes
Uzbekistan	Yes	No	Yes	No	Yes	No

A. Stocks versus flows

43. Hazardous waste is commonly stored in temporary storage prior to treatment or disposal. Part of the hazardous waste may not be treated or disposed of during the year that it is generated. At the end of the year, this amount of hazardous waste not treated or disposed of will contribute to the stock of hazardous waste to be treated or disposed of for upcoming years. Also, part of the amount of hazardous waste generated may be exported to other countries before treatment. Countries may also have imported hazardous waste either for treatment or disposal. The full formula should be: "Stock of hazardous waste at the beginning of the year" + "Hazardous waste generated during the year" + "Hazardous waste imported during the year" – "Hazardous waste exported during the year" – "Hazardous waste treated or disposed of during the year" = "Stock of hazardous waste at the end of the year".

44. Some EECCA countries have accumulated enormous amounts of hazardous waste over the years, and therefore, it is important to collect data on both stocks and flows of hazardous waste. Regrettably, the UNECE questionnaire covered data only on waste flows and not on waste stocks. The UNSD questionnaire, however, collected data also on waste stocks. According to it, three EECCA countries: Azerbaijan, Kyrgyzstan and Moldova, have provided data on waste stocks.

B. Hazardous waste - generation, management and transboundary movements

45. The UNECE questionnaire requested data on generation, management and transboundary movements of hazardous waste in the EECCA countries (Tables 1 and 3).

1. Hazardous waste generated

46. All countries have reported data on hazardous waste generated, except Tajikistan. Georgia collects data according to the definition of the Basel Convention, while the other countries report the amounts according to national definitions and classifications. As per the new national classification in Kyrgyzstan, the hazardous characteristics of wastes are defined according to the list in Annex III of the Basel Convention. Azerbaijan reported that they are on the path of implementing the Basel Convention classification, and since 2005, both national and Basel Convention classifications are in use and only the latter will be used in the future. Ukraine uses the Basel Convention classification only for transboundary movement of hazardous waste and for issuing licenses for companies that manage the hazardous waste.

(a) Share of hazardous waste in total waste generated

47. Figure 12 shows the share of hazardous waste in total waste generation. The share varies significantly between the countries, from almost 0% in Moldova to 100% in Kazakhstan. The share is very high in Kazakhstan, Kyrgyzstan and the Russian Federation (only for some years). It was not possible to calculate the share of hazardous waste in Georgia and Uzbekistan since these countries did not report data on "Total waste generation". An explanation for the wide differences among countries in the share of hazardous waste could be that the classifications differ significantly. During the Workshop, for example, some countries mentioned that in their classification there are no "non-hazardous" wastes as such and that all wastes have some degree of toxicity.

Figure 12.
Share of hazardous waste in total waste generation

	Share of hazardous waste in total waste amount
Armenia	Very low
Azerbaijan	Very low
Belarus	Very low
Georgia	n/a
Kazakhstan	Very high or 100%
Kyrgyzstan	Very high (only 2010)
Moldova	Very low
Russian Federation	Very low (but 100% in 1995, 2000 and 2001)
Tajikistan	Very low (but 100% in 1995, 2000 and 2001)
Ukraine	No data
Uzbekistan	n/a

(b) Data on hazardous waste

48. The largest amount of hazardous waste in the EECCA region is being generated in Kazakhstan and the Russian Federation (see Figure 13). The amount of hazardous waste changed significantly during reported timeline in Armenia (after 2002) and Ukraine (after 2004). This could imply that these countries may have possibly changed the classification and/or definition of hazardous waste at those years. In 2008, according to available data, 622 million tonnes of hazardous waste was generated in the EECCA region.

49. An interesting comparison could be done with the data reporting on hazardous waste in the EU. The hazardous waste in the EU has been collected for three years: 2004, 2006 and 2008. In 2008, it amounts to 98 million tonnes, which is 6 times less than generated in the EECCA countries. The hazardous waste in the EU is 80% of the hazardous waste generated by the Russian Federation and only 22% of the hazardous waste generated by Kazakhstan. In the EU, the share of hazardous waste in total waste is only minor, e.g., in 2008, it represents only 3.7 % of the total waste generated.

50. It is useful to note that the data collected by Eurostat has much more details, e.g., an important breakdown by waste category. This allows, for example, seeing the main contributors to hazardous waste by waste categories, which in 2008 were the mineral wastes (28.6 %), combustion wastes (13.2 %), contaminated soils and dredging spoils (12.3 %), and chemical deposits and residues (11.8 %).[2]

[2] Source: Eurostat, Statistics Explained, Waste Statistics, URL: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Waste_statistics#Hazardous_waste_generation

Figure 13.
Total amount of hazardous waste generated, 2000-2010, in thousand tonnes

	2000	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
Armenia	2	2	1	42	55	66	69	64	55	64	62
Azerbaijan	27	16	10	27	11	13	30	10	24	16	26
Belarus	73	99	117	119	154	192	239	322	522	755	919
Georgia								909			
Kazakhstan	102 464	130 031	137 082	141 946	146 117	228 243	263 971	281 769	453 373	227 555	303 117
Kyrgyzstan											5 746
Moldova	3	2	2	2	1	1	1	1	1	1	0
Russian Federation	132 461	139 194	210 638	287 272	142 766	142 497	140 011	287 653	122 883	141 019	
Tajikistan											
Ukraine	81 375	77 514	77 605	79 001	62 911	2 412	2 371	2 585	2 301	1 230	1 660
Uzbekistan	14 447	27 710	31 365	33 107	35 728	40 318	38 571	40 260	42 726	43 038	41 398
Total	330 851	374 568	456 820	541 515	387 742	413 742	445 262	613 573	621 885	413 679	352 928

Box 1.
Armenia: Data reported to various institutions differs

Currently, it is the case that countries often report different data to questionnaires compiled by different international organizations. Figure 14 provides an example with data on hazardous waste from Armenia. The numbers seem close enough to each other for 2000-2002. There could be a reporting mistake for 2003-2004 as the numbers differ more or less exactly tenfold. It is, however, hard to find an explanation for the difference in the numbers for 2005-2009.

Figure 14.
Hazardous waste generated during the year in Armenia, 2000-2009, in tonnes

	2000	2001	2002	2003	2004	2005	2008	2009
UNSD Questionnaire	1 967	1 551	1 205	420 384	544 701	330 909	430 554	467 524
UNECE Questionnaire	2 000	1 600	1 200	42 000	54 500	66 100	54 500	63 500

2. Data on hazardous waste management and transboundary movements in the EECCA countries

51. All EECCA countries, except Tajikistan, reported data on transboundary movements (data from both UNECE and UNSD questionnaires are taken into account), i.e., export and import, of hazardous waste as well as on waste management by treatment methods "Recycling", "Incineration", "Landfilling" and "Other" (see Figure 11). Armenia, Kyrgyzstan and Ukraine reported complete data only to the UNSD questionnaire. Belarus, Kazakhstan, the Russian Federation and Uzbekistan reported complete data only to the UNECE questionnaire. Data for Azerbaijan and Moldova are complementary if the two questionnaires are considered. Georgia reported only on exports/imports of hazardous waste for 2007-2009 and not on treatment methods, as according to the UNECE questionnaire.

52. Kazakhstan and the Russian Federation generate the highest amounts of hazardous waste (see Figure 15). Nevertheless, in these countries, the share of hazardous waste that is being managed, i.e., treated or disposed of during the year is very low. This may lead to the conclusion that most of the hazardous waste generated is just being accumulated through the years, and therefore, it is even more important to obtain data also on the "stock" amounts of the hazardous waste.

Figure 15.
Hazardous waste generated and managed in Kazakhstan and the Russian Federation, 2006-2010, in thousand tonnes

Kazakhstan	*2006*	*2007*	*2008*	*2009*	*2010*
Total hazardous waste generated	263 971.3	281 768.8	453 373.1	227 555.0	303 116.6
Total hazardous waste managed				1.5	9.7

Russian Federation	*2006*	*2007*	*2008*	*2009*	*2010*
Total hazardous waste generated	140 011.0	287 653.0	122 883.0	141 019.0	
Total hazardous waste managed	0	0	0	3.2	

53. In 2010, the EECCA countries exported 65 thousand tonnes of hazardous waste and imported 520 thousand tonnes of hazardous waste. In comparison, the quantity of hazardous waste shipments from EU Member States to other EU Member States or out of the EU is much bigger and amounts to 7.2 million tonnes in 2009[3].

[3] Source: Eurostat, Statistics Explained, Waste Shipment Statitsics, URL: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Waste_shipment_statistics#Shipments_of_hazardous_waste_-_total_amount_and_per_capita

Box 2.

Management of hazardous waste in Kyrgyzstan

In Kyrgyzstan, hazardous waste is defined according to a national classification, which was approved by the Decree of the Government of Kyrgyz Republic dated 15 January 2010. The hazardous characteristics of wastes are defined according to the list in Annex III of the Basel Convention. Kyrgyzstan acceded to the Basel Convention in 1996.

Figure 16.

Location of Tailing Ponds with Hazardous Wastes in Kyrgyzstan

Source: Cadastre of Mining Wastes of Kyrgyzstan

Data on hazardous waste are collected from enterprises that generate, store, use or dispose of hazardous wastes. These companies are obliged to fill in a statistical form on hazardous waste on yearly basis.

The table below shows the number of hazardous waste disposal sites and their surface area. According to the data, the hazardous waste disposal sites have increased during the years, and in 2010, there were 50 disposal sites with total surface area of 406.5 hectares. In addition, there are 8 tailing ponds (Figure 16) where hazardous wastes are being disposed.

	2000	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
Number of hazardous waste disposal sites	38	44	48	47	47	47	50
Their surface area, ha	176.5	381.1	380.8	381.1	381.1	381.1	406.5