DESK STUDY

on

Assessment of the capacity of countries of Eastern Europe, Caucasus and Central Asia to produce statistics on sustainable development and environmental sustainability

under the UN Development Account project

TOPIC 1

Waste Statistics

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Introduction

1. The Statistical Division of the United Nations Economic Commission for Europe (UNECE) is implementing a United Nations Development Account (UNDA) project starting 2012. The project is titled: "Strengthening statistical capacity of countries with economies in transition to assess progress in achieving the Millennium Development Goal 7 on Environmental Sustainability and provide data on environmental vulnerabilities".

2. The project aims to support the Eastern Europe, Caucasus and Central Asia (EECCA) countries to meet the demand for high-quality statistics on sustainable development and environmental sustainability, and address the following issues:

(a) Lack of statistical processes in place to produce statistics and indicators to measure the long-term sustainable development and environmental sustainability;

(b) Problems with the quality, availability and international comparability of data to monitor the implementation of environmental policies; and

(c) Lack of timely data that can be used to identify vulnerabilities and monitor environmental sustainability.

3. In addition, strengthening the cooperation between various government institutions providing data on different aspects of sustainable development and environmental sustainability will help to assess correctly the current state and progress made by the countries.

4. Under the project, a desk study will be carried out. The objective of the desk study is to make an assessment of the capacity of countries with economies in transition to produce statistical data related to the environment for identifying environmental vulnerabilities and measuring sustainable development. The study will recommend further steps in priority areas where improvement is most needed.

5. The study aims to cover to the extent possible the following main aspects:

(a) Availability of data and indicator sets;

(b) Use of statistical classifications, data collection methods and procedures for the production of data and indicators;

(c) Data quality;

(d) Data dissemination.

6. In the context of the UNDA project, four workshops are being organized. The desk study, therefore, consists of four reports that will focus on specific topics that will be covered as topics during the four workshops. The first workshop took place on 11-13 April 2012 in Geneva and discussed waste statistics, in particular how to compile and disseminate high-quality, harmonised and timely statistics on waste generation and waste management. The current report is the first of the four reports of the desk study and focuses **on waste statistics**.

I. Background

A. The Environment Impact of Waste Generation and Waste Management

7. Every year, more than 2 billion tonnes of waste, including hazardous waste, are produced in the Member States of the European Union (EU) and this figure is rising steadily. According to the 2008 data of the Statistical office of the European Union (Eurostat), the major waste sources are construction (32.9%), mining industry (27.8%), manufacturing industry (13.1%), and households (8.5%). The situation is even more alarming in the EECCA countries. According to the data reported by these countries, the waste generated accounts for 4.7 (2008) and 3.9 (2009) billion tonnes. The Russian Federation alone has generated around 90% of waste in the EECCA region.

8. Furthermore, the international context has become more and more important. Growing globalization had led to increasing imports of raw materials and semi-manufactured materials in the advanced countries. The extraction of such materials produces large amounts of waste. At the same time, the exports of waste from more advanced countries also increased, which raises questions on the potential export of environmental problems to less developed countries, where waste ends up in poor waste management facilities. This makes it even more important to account correctly for the amount of imported and exported waste.

9. Waste management is a complex subject. Stockpiling waste is not a viable solution and destroying it results in emissions and highly concentrated, polluting residues. Most of the municipal and hazardous waste is disposed of into or onto land. There are many environmental drawbacks of landfills. Legal landfill sites are becoming increasingly full. Heavy metals and toxins are leaking into the surrounding groundwater and soil. Explosive and toxic gases are being generated. There exist an unknown, but surely very high, number of illegal landfills, the environmental risks of which cannot be quantified. The main alternative disposal method to landfilling — incineration — produces toxins and heavy metals. To prevent their release, expensive filters must be installed in incinerators. Used filters with highly concentrated contamination, together with a quarter of the waste's original weight, must still finally be landfilled.

10. Waste management is a key concern for the environment and the sustainable management of natural resources. The optimum solution is to prevent the production of such waste, reintroducing it into the product cycle by recycling its components where there are ecologically and economically viable methods of doing so. The primary targets of waste management are therefore:

(a) Prevention of waste - reducing toxicity and volume of waste generated in the different production and consumption processes;

(b) Recycling and reuse - increasing the share of recovered waste materials;

(c) Sound environmental management of waste for disposal, including optimum final disposal and improved monitoring.

B. Accounting for the Waste

11. To assess waste management policies effectively, policy-makers need sound waste statistics. Data, however, remain a key challenge. Statistics on waste production, composition, transport and treatment are not collected in the same way, neither in the same amount of detail, in the countries. This makes it difficult to obtain an overall picture of the waste situation and identify trends. Lack of data on hazardous waste is of particular concern.

12. At the EU level waste statistics are collected since the early 1990s, initially, on the basis of the Joint OECD/Eurostat Questionnaire. A new framework was created for collecting and reporting waste data based on the Regulation 2150/2002/EC on waste statistics in 2002. Year 2004 was the first reference year for EU waste statistics. Municipal waste data is available since 1995 for EU Member States and other European countries.

13. The data on waste generation collected on the basis of the Waste Statistics Regulation cover the whole economy and households. These data are dominated by some waste streams, such as mineral wastes from mining and from construction and demolition activities which makes the comparison of waste generation across countries difficult. Therefore a waste generation indicator excluding main mineral waste has been defined which draws the focus to other waste streams and facilitates the data comparison across countries. The data can be downloaded from the Eurostat database:

http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/data/database

14. The data quality of waste statistics on EU level has been continuously improved by measures such as thorough data validation and dialogue with countries, adjustment of the reporting categories, development of guidance materials, workshops on specific waste streams, etc. This process of improvement is not finalized; there is still work to be done, in particular regarding the development of suitable indicators for the monitoring of the implementation of EU waste policy.

15. The EECCA countries are facing similar challenges concerning data quality. In particular, there are issues with data collection from enterprises and municipalities, for example not all economic sectors are covered, estimates are needed for rural areas not covered by the municipal waste collecting system, data are collected mainly by the waste management companies and not from companies generating the waste, obligations for reporting are legally in place, however, not applied in practice.

16. If we try to compare the two regions – the EU and the EECCA regions, the outcome is even more puzzling. The data show that the Russian Federation alone has generated almost twice as much as the waste generated in the entire EU, and that Kazakhstan has generated more waste than France. These numbers do not look sufficiently plausible given the size of the population and the level of development of these economies. These and other examples indicate that there are certainly inconsistencies in the methodologies and/or differences in classifications that make it difficult at this moment of time to compare the data produced by the countries.

C. The Workshop on Waste Statistics

17. To address these data challenges, the UNECE organized jointly with Eurostat and the European Environment Agency (EEA) a workshop on Waste Statistics which was held in Geneva, Switzerland, from 11 to 13 April 2012. The workshop focused on how to compile and disseminate high-quality, harmonized and timely waste statistics in the EECCA countries. In particular, it discussed practical challenges and problems in producing statistical data, information and indicators on waste generation and waste management, including recovery and disposal of waste. The workshop was conducted in close collaboration with the Joint UNECE Task Force on Environmental Indicators. It aimed at national experts involved in the production of waste statistics. Experts from international organizations and institutions were invited to share experience and broaden the exchange of knowledge and best practices. All documents for the workshop are available online at the UNECE website: www.unece.org/stats/documents/2012.04.environ.html

18. This report makes a review of the waste statistics in the EECCA countries, also from the international and European perspectives. It also summarizes the discussions held during

the workshop, analyzes the data provided by the countries and highlights the main issues and challenges in the area.

19. The desk study consists of six chapters. Chapters I and II present an overview of the existing trends and international standards on waste. Chapter III makes an analysis of the waste data as reported by the EECCA countries and identifies the key issues and challenges in the process of collection and reporting of data. Chapter IV focuses on the latest developments in terminology and approaches for accounting for recovery and recycling of waste, which is a fairly new area where countries are not yet compiling regular statistics. Chapter V is dedicated to the main concern of countries – problems and issues with classifications and definitions, introduction of new classifications, changes in the terminology, etc. Chapter VI concludes and provides recommendations for future improvements.

II. Overview of internationally agreed standards and recommendations

20. Some 100,000 chemicals are present on the global market, of which about 20,000 are considered dangerous. These substances can contaminate air, water, land, animals, food, and human beings and thus need to be managed safely.

21. Various agencies within the United Nations are engaged in supporting governments, organizations, and stakeholders in developing capacity to protect human health and the environment from hazardous chemicals and wastes. This includes activities to support the implementation of international agreements, such as the Strategic Approach to International Chemicals Management (SAICM), the Stockholm Convention, the Rotterdam Convention, the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and the Basel Convention. In the recent years, EU has also developed an extensive legislation on waste, including waste classifications and definitions.

A. The Stockholm Convention

22. The *Stockholm Convention on Persistent Organic Pollutants (POPs)* is a global treaty to protect human health and the environment from chemicals that are persistent in the environment for long periods. The exposure to POPs can lead to serious health effects including certain types of cancer, birth defects, dysfunctional immune and reproductive systems, greater susceptibility to disease and even diminished intelligence.

23. The Convention was adopted on 22 May 2001 and entered into force on 17 May 2004. As of September 2013, 179 countries are Parties to the Convention, of which among the EECCA countries Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, and Ukraine. Each Party to the Convention has to report to the Conference of the Parties on the measures it has taken to implement the provisions of the Convention and on the effectiveness of such measures in meeting the objectives of the Convention.

B. The Rotterdam Convention

24. The *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade* addresses the countries' lack of monitoring system on the import of hazardous chemicals and pesticides. The growth in chemicals production and trade during the past three decades has raised both public and government concern about the potential risks posed by hazardous chemicals and pesticides. The Prior Informed Consent (PIC) procedure was introduced in 1989 to help ensure that governments have the information they need about hazardous chemicals for assessing risks and taking informed decisions on chemical imports. The Convention was adopted and opened for signature on 10 September 1998 and entered into force on 24 February 2004. As of September 2013, 153 countries are Parties to the Convention, of which among the EECCA countries Armenia, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, and Ukraine. Parties have an ongoing obligation to submit to the Secretariat their decision concerning the future import of the chemical as soon as possible and in any event no later than nine months after the date of dispatch of a decision guidance document. The responses submitted by Parties are published each June and December in the PIC Circular.[1]

[1] http://www.pic.int/TheConvention/Chemicals/AnnexIIIChemicals/tabid/1132/language/en-US/Default.aspx

C. Globally Harmonized System of Classification and Labelling of Chemicals

25. Given the extensive global trade in chemicals, and the need to develop national programs to ensure their safe use, transport, and disposal, it was recognized that an internationally harmonized approach to classification and labelling would provide the foundation for proper assessment of hazardous chemicals.

26. The work on developing the *Globally Harmonized System of Classification and Labelling of Chemicals* was mandated by the 1992 United Nations Conference on Environment and Development. The purpose is to offer countries consistent and appropriate information on the chemicals they import or produce in their own countries, the infrastructure to control chemical exposures and protect people and the environment. The *Globally Harmonized System* serves to address issues resulting, for example, from variations in definitions of hazards, e.g. a chemical may be considered flammable in one country, but not in another; or it may be considered to cause cancer in one country, but not in another.

27. The *Globally Harmonized System* includes the following two components:

(a) harmonized criteria for classifying substances and mixtures according to their health, environmental and physical hazards; and

(b) harmonized hazard communication elements, including requirements for labelling and safety data sheets.

28. The *Globally Harmonized System* covers all hazardous chemicals in all types of use situations, including production, storage, transport, workplace use, consumer use, and presence in the environment. They are intended to protect people, facilities, and the environment. Regrettably, products such as foods that may have trace amounts of food additives or pesticides in them are not currently labelled to indicate the presence or hazard of those materials and the *Globally Harmonized System* would not require them to be labelled as such.

D. The Basel Convention

29. The overarching objective of the *Basel Convention on Control of the Transboundary Movement of Hazardous Wastes and Their Disposal* is to protect human health and the environment against the adverse effects of hazardous waste. The Convention covers a range of wastes defined as “hazardous” based on their intrinsic properties, origin, composition and hazardous characteristics, as well as two types of “other wastes” - household waste and incinerator ash. Hazardous waste is further grouped into waste streams, e.g. clinical wastes from medical care in hospitals, and waste having specific chemicals (copper compounds, mercury, etc). The Basel Convention defines hazardous and non-hazardous waste, while it allows for the countries to adapt its legislation to its national needs.

30. The scope of the Convention does not include radioactive waste and wastes from normal operation of ships. Radioactive waste is considered subject to other international control systems, including international instruments, applying specifically to radioactive materials.

31. The Convention was adopted on 22 March 1989. As of September 2013, 180 countries are Parties to the Convention, of which among the EECCA countries Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian

Federation, Turkmenistan, Ukraine and Uzbekistan. Tajikistan is the only EECCA country, which is not a Party to the Convention as of September 2013.[2]

32. Every year, Parties are obliged to submit to the secretariat of the Convention a report on the previous year pursuant to article 13, paragraph 3. The national reporting format includes statistical information, which has to be updated every year, and it contains data on hazardous and non-hazardous waste. An important challenge faced by the Parties is to have an efficient information system in place to allow the compilation of data from different sources. Unfortunately, the record of national reporting to the Convention is irregular: for example, 108 parties reported for the year 2001, 92 parties reported for the year 2009 and 75 parties reported for the year 2010. The last reporting information year from the EECCA countries is as follows: Armenia – 2011, Azerbaijan – 2011, Belarus – 2011, Georgia – 2010, Kazakhstan - 2010, Kyrgyzstan – 2010, Moldova – 2009, Russian Federation – 2007, Tajikistan - not a Party to the Basel Convention, Turkmenistan - 2003 (no data provided), Ukraine – 2010, and Uzbekistan – 2010.

33. The secretariat of the Convention carries out limited quality checks on compliance with the reporting requirements on a continuous basis. A useful system for cross-checking of transboundary movement data is checking with other sources, e.g. statistics from customs. Furthermore, countries mentioned problems with waste data collected from trade statistics, for example problems with accounting for the purpose of treatment for which waste was shipped, e.g. waste shipped for recycling.

E. EU Waste Legislation

34. At the EU level the regulation of waste management has started in the 1970s and since then several amendments and adjustments including the introduction of new legislative acts have been made. Waste statistics at the EU level have had a legal basis since 2002 as a response to the need for comparable and harmonized data. The main legislative and guidance documents on waste statistics relevant in the context of this desk study are:

(a) Waste Framework Directive, or Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste. It provides for a general framework of waste management requirements and sets the basic waste management definitions for EU.

(b) Decision 2000/532/EC establishing a list of wastes. This Decision establishes the classification system for wastes, including a distinction between hazardous and non-hazardous wastes. It is closely linked to the list of the main characteristics which render waste hazardous contained in Annex III to the Waste Framework Directive. The List of Wastes is the waste classification in EU for administrative purposes, i.e. for permitting and supervision in the field of waste generation and management. The List of Wastes defines 839 waste types, which are structured into 20 chapters, mainly according to the source of waste (i.e. the economic sector or process of origin).

(c) Regulation 2150/2002/EC on Waste Statistics. The objective of this Regulation is to establish a framework for production of the Community statistics on the generation, recovery and disposal of waste. The regulation obliges the EU Member States to report statistical data on waste generation and waste treatment according to the statistical waste nomenclature named European Waste Categories – Statistics (EWC-Stat). The EWC-Stat is a mainly substance-oriented aggregation of the waste types defined in the European List of Wastes. Annex III to the regulation provides a transposition table between the EWC-Stat and the List of Wastes. The regulation was amended in 2010 with the Commission Regulation (EU) No 849/2010 replacing Annexes I, II and III with amended waste

[2] Source: http://www.basel.int/Countries/StatusofRatifications/PartiesSignatories/tabid/1290/Default.aspx

categories. The new version entered into force in 2010, and therefore, countries have applied it for the first time in 2012 for reference year 2010.

(d) Manual on Waste Statistics and Guidance on classification of waste according to EWC-Stat categories/ Supplement to the Manual for the Implementation of the Regulation 2150/2002/EC on Waste Statistics. The manual and the guidance support the producers of statistical data to apply the statistical waste nomenclature EWC-Stat in a correct way. In addition, the documents are designed to help the users of statistical data to use and interpret the data correctly. In practice, most of the EU Member States collect their data according to the List of Waste and convert it subsequently into the required EWC-Stat categories on the basis of the transposition table in Annex III of the Regulation. The direct use of the EWC-Stat for data collection is applied only by a few countries.

(e) Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste. This Regulation specifies under which conditions waste can be shipped between countries.

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

35. 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 on 11-13 April 2012 in 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/United Nations Environment Programme (UNSD/UNEP). 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.

36. 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 was made to the extent possible given that the provided data were not always complete. In some countries, 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.

37. 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.

38. This Chapter 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.

A. Waste generation by economic activity

39. 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/UNEP 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.

40. 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.

41. 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 on waste generation by economic activities.

42. Some countries did not collect data from all economic sectors but only from some of them. 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 generated but did not specify the economic sectors that contribute to it.

43. 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 which accounts for around 90% of waste, whereas the distribution of the waste burden across the EU countries is more even.

Figure 1

Total amount of and per capita waste generated in selected EU and EECCA countries in descending order, 2008, in tonnes

	Waste generated (total, in tonnes)	Waste generated (tonnes per capita)
Russian Federation 1/	3 876 941 000	27.3
EU (27 countries)	2 611 580 000	5.2
Kazakhstan	456 785 000	29.0
Ukraine 2/	427 421 800	9.4
Germany	372 796 353	4.5
France	345 002 210	5.4
United Kingdom	334 127 092	5.4
Bulgaria	286 092 936	37.5
Romania	189 310 549	8.8
Italy	179 034 461	3.0
Spain	149 254 157	3.3
Poland	140 340 303	3.7
Netherlands	99 591 174	6.1
Sweden	86 168 590	9.3
Finland	81 792 854	15.4
Belarus	43 178 500	4.5
Armenia	11 841 440	3.7

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

Sources: Data for EU countries: Eurostat database (http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/data/database)
Data for EECCA countries: UNECE questionnaire
Population numbers: UNECE database (http://w3.unece.org/pxweb/)

44. 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.

45. There are as well cases where the particular economic structure of a country results in very specific pattern of waste generation: energy generation on the basis of oil shale (Estonia), mining activities (Bulgaria), and construction activities (Luxembourg).

46. 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 the process of development and any country comparisons should be regarded with caution.

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

47. 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%).

48. 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 on waste generated by households for the EU countries show only 10% (2008).

49. 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.

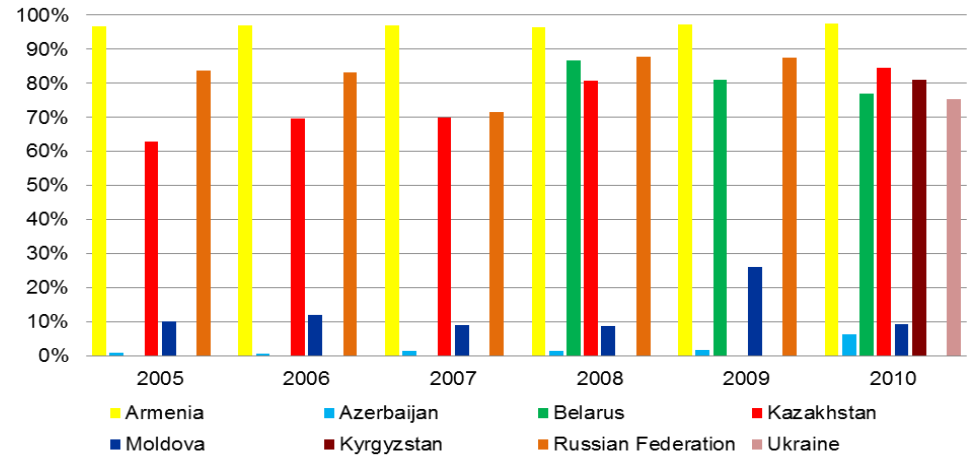
Major economic activities and municipal waste contributing to total waste generation

	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

50. 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 data are shown on the graph.

C. Management of municipal waste, including household waste

51. The UNECE questionnaire follows the same definition as the UNSD/UNEP 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, and municipal construction and demolition waste.

1. Municipal waste generated/collected

52. 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.*

53. 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 VI discusses in more detail the issue of conversion of cubic meters into tonnes.

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

a) "Total municipal waste"

55. 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 countries 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.

56. 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%.

57. Municipal waste generation per person in EU Member States has increased from 475 kg per person in 1995 to 503 kg per person in 2011. However since 2002, when 526 kg per person of municipal waste was generated, the generation of this waste has stabilized with a slight trend of decline since 2007.

b) "Household waste"

58. 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%

c) "Hazardous municipal waste"

59. None of the EECCA countries has reported on generation of hazardous municipal waste. Eurostat collects data on hazardous household waste (Eurostat data on municipal waste includes hazardous wastes). 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.

60. 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, waste from electrical and electronic equipment and waste oils are subject to specific EC regulations that make their separate data collection mandatory.

2. Municipal waste generated/collected per capita

61. 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 municipal waste per capita varied from 119 kg in Armenia to 655 kg in Moldova.

Figure 5.

Municipal waste generated 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

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

3. Municipal waste management

63. 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.

64. 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 V addresses further the issue with definitions of waste management activities).

65. 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/UNEP 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, the EECCA countries did not report data through the UNSD/UNEP on import/export of municipal waste. Armenia reported zeros, while Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, the Russian Federation and Ukraine had left the cells empty.

66. 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.

67. 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 separated categories.
The line "Of which other disposal" includes removal by leakage, evaporation, fire, theft; by dumping on ground and into water surface.

68. While landfill is by and large the predominant treatment method used in the EECCA countries, in the EU[3] 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%).

4. Population served by municipal waste collection

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

70. 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.

[3] *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

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		

D. Management of non-hazardous industrial waste

71. 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.

1. Non-hazardous industrial waste generated

72. 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.

2. Treatment of non-hazardous industrial waste

73. 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)

a) Data according to the treatment methods

74. 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.

75. 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.

b) Data issues – some examples

76. 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, figures marked in red). 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

77. 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 whether 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

E. Management of hazardous waste

78. Hazardous waste has potential damaging effects on both human health and the environment. It is therefore of utmost importance that it should be managed and disposed of safely. Data, however, were 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/UNEP 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/UNEP Questionnaire*	*UNECE questionnaire*	*UNSD/UNEP Questionnaire*	*UNECE questionnaire*	*UNSD/U Questionnaire*
Armenia	Yes	Yes	No	Yes	No	Yes
Azerbaijan	Yes	No	Yes	Yes	No	Yes
Belarus	Yes	No	Yes	No	Yes	No
Georgia	Yes	Yes	No	No	No	Yes
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	No	Yes	Yes
Tajikistan	No	No	No	No	No	No
Ukraine	Yes	Yes	No	Yes	No	Yes
Uzbekistan	Yes	No	Yes	No	Yes	No

1 Stocks versus flows

79. 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 to determine the stock of hazardous waste 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".

80. 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/UNEP questionnaire, however, collected data also on waste stocks. According to it, four EECCA countries - Azerbaijan, Kyrgyzstan Moldova, and Ukraine -have provided time-series data on waste stocks.[4] Armenia also provided data (although they are zero values).

2. Hazardous waste - generation, management and transboundary movements

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

a) Hazardous waste generated

82. 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 hazardous waste.

i) Share of hazardous waste in total waste generated

83. 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.

[4] Table R2, http://unstats.un.org/unsd/environment/Questionnaires/index1.htm

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

ii) Data on hazardous waste

84. 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.

85. 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 every two years: 2004, 2006, 2008, and 2010.[5] In 2008, it amounts to 98 million tonnes, which is 6 times less than generated in the EECCA countries (Georgia, Kyrgyzstan and Tajikistan excluded). 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.

86. 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 seeing the main contributors to hazardous waste by waste categories, which in 2008 were the mineral wastes (28.6 %),

[5] Before the implementation of the Waste Statistics Regulation data on hazardous waste was collected on the basis of the joint OECD/Eurostat questionnaire.

combustion wastes (13.2 %), contaminated soils and dredging spoils (12.3 %), and chemical deposits and residues (11.8 %).[6]

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.

The jump in data between 2002 and 2003 reported through the UNSD/UNEP questionnaire is explained by Armenia with the inclusion of waste from new mining operations. This, however, does not explain the difference in the numbers between the two questionnaires.

Figure 14.

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

	2000	2001	2002	2003	2004	2005	2008	2009
UNSD/UNEP 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

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

b) Data on hazardous waste management and transboundary movements in the EECCA countries

87. All EECCA countries, except Tajikistan, reported data on transboundary movements (data from both UNECE and UNSD/UNEP 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/UNEP 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 according to the UNECE questionnaire.

88. 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	

89. 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.[7]

[7] Source: Eurostat, Statistics Explained, Waste Shipment Statistics, 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 a 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.

Hazardous waste disposal sites, Kyrgyzstan, 2000-2010

	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

IV. Recovery and recycling of waste

90. There is no strictly agreed terminology with regard to waste operations. The differences start already with basic definitions, for example of what is understood by "waste management". In the EU legislation "waste management" means the "collection, transport, *recovery and disposal of waste*, including the supervision of such operations and the after-care of disposal sites, and including actions taken as a dealer or broker". At the same time, the UNSD/UNEP questionnaire defines "waste management" as "collection, transport, *treatment and disposal of waste*, including after-care of disposal sites". The definitions, although similar, have one key difference: the EU uses the term "treatment", whereas the UNSD/UNEP questionnaire uses the term "recovery". Some other definitions of "waste management" also include supplementary operations, which are related to the prevention and reduction of waste. Under the Basel Convention these operations are reflected in Annex IV of the Convention.

91. This Chapter focuses on the waste management with respect to the waste recovery and recycling operations and discusses the related terminology and approaches. Recent developments in collecting data on renewables and waste are also reviewed. This is a fairly new area, where countries need to build expertise in order to produce regular statistics.

A. Recovery and recycling operations — the European Union perspective

1. The meaning of recovery operations

92. The issue of recovery and recycling of waste has become a major priority for European policymakers. In December 2005, the Commission published a Communication on the Thematic Strategy on the prevention and recycling of waste. The strategy states the long-term goal of the EU, which is to become a recycling society that seeks to avoid waste and uses waste as a resource.

93. In its Resolution of 24 February 1997,[8] the Council calls for the need to distinguish more clearly between waste recovery and disposal operations. The need is further reiterated in the Waste Framework Directive:

> "The definitions of recovery and disposal need to be modified in order to ensure a clear distinction between the two concepts, based on a genuine difference in environmental impact through the substitution of natural resources in the economy and recognising the potential benefits to the environment and human health of using waste as a resource."

94. According to the Waste Framework Directive **"recovery"** means "any operation the principle result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfill a particular function, or waste being prepared to fulfill that function, in the plant or in the wider economy". Recovery operations are considered to include **preparing for reuse, recycling, composting and recovering energy from waste**.

95. It is important to distinguish between "reuse" and "preparing for reuse". **"Reuse"** is "any operation by which products or components that are *not waste* are used again for the same purpose for which they were conceived". Materials that are reused are not considered waste as such. **"Preparing for reuse"** is a different term, and includes "checking, cleaning or repairing recovery operations, by which products or components of products that have

[8] Council Resolution of 24 February 1997 on a Community strategy for waste management (OJ C 76, 11.3.1997, p. 1–4)

become waste are prepared so that they can be reused without any other pre-processing". These are considered *waste recovery* operations.[9]

96. **"Recycling"** is another recovery operation, which although similar is different from **"preparing to reuse". "Recycling"** is defined as "any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations."

97. The waste management operations follow a certain hierarchy depending on their impact on environment. With the current level of scientific and technological progress, "preparing for reuse" and "recycling" are considered to be the options preferred over "energy recovery from waste", where and insofar as they are the best choice from the environmental point of view. The hierarchy ranks the operations in the order from most to least favored operations, as follows:

(a) Prevention;

(b) Preparing for reuse;

(c) Recycling;

(d) Other recovery, e.g., energy recovery; and

(e) Disposal.

2. Recovery and disposal operations

98. The requirement to compile statistics on recovery and disposal operations is stated in Regulation (EU) No 849/2010. The recovery operations are marked with "R-codes" that range from R1 to R11, and belong to or are part of the economic activities (NACE Rev. 2). Figure 17 provides the list with the recovery operations as defined by the Regulation.

Figure 17.

Recovery operations according to the EU legislation

Incineration		
	R1	Use principally as a fuel or other means to generate energy
Recovery operations (excluding energy recovery)		
3a	R2 +	Solvent reclamation/regeneration
	R3 +	Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)
	R4 +	Recycling/reclamation of metals and metal compounds
	R5 +	Recycling/reclamation of other inorganic materials
	R6 +	Regeneration of acids or bases
	R7 +	Recovery of components used for pollution abatement
	R8 +	Recovery of components from catalysts
	R9 +	Oil refining or other reuses of oil

[9] In general, manure and slurry are only covered by waste statistics if they are treated in waste treatment facilities, e.g., in biogas plants. The huge amounts that are reused in agriculture are not reported as wastes.

	R10 +	Land treatment resulting in benefit to agriculture or ecological improvement
	R11	Use of wastes obtained from any of the operations numbered R1 to R10
3b		Backfilling 1/

Source: Extract from the Regulation (EU) No 849/2010
Note: 1/ In general, backfilling is defined as the practice of returning some or all of the waste produced into worked-out underground voids.

99. Disposal operations are designated with "D codes", ranging from D1 to D7, and D10 and D12. They include, for example, "deposit into or onto land" (D1), "release into a water body except seas/oceans" (D6), "deep injection" (D7), "incineration on land" (D10), "permanent storage" (D12), etc.

100. Eurostat collects data on waste recovery and disposal, as follows:

(a) by waste category;

(b) by treatment operation.

101. The waste categories are specified in the statistical waste nomenclature EWC-Stat Version 4, which is a mainly substance-oriented aggregation of the waste types defined in the European List of Wastes. The treatment operations include energy recovery, recovery other than energy recovery, incineration without energy recovery and disposal (deposit onto or into land, and land treatment and release into water bodies).

102. Figures 18a and 18b show the Eurostat reporting structure. Two forms are available for reporting the data sets. Figure 18a organizes the data by waste categories (0.1.1 – Spent solvents, etc.) and by the type of treatment operation (incineration, recovery, and disposal). Figure 18b adds information on the number of treatment facilities and their capacity.

Figure 18a.

Reporting structure – Waste recovery and disposal

Waste item	Treatment categories ➔ EWC-Stat Ver. 4		Hazardous	Dry	Energy recovery (R1)	Waste incineration (D10)	Recycling (R2 - R11)	Back-filling	Land-filling (D1, D5, D12)	Other disposal (D2, D3, D4, D6, D7)
	Code	Description								
1	01.1	Spent solvents	H							
2	01.2	Acid, alkaline or saline wastes								
3	01.2	Acid, alkaline or saline wastes	H							
4	01.3	Used oils	H							
…	…	…								
…	…	…								
46	12.6	Soils								
47	12.6	Soils	H							
48	12.7	Dredging spoils		T						
49	12.7	Dredging spoils	H	T						
50	12.8,13	Mineral waste from waste treatment and stabilised wastes								
51	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H							
		Total, non-hazardous								
		Total, hazardous	H							
		Total, general								

Source: *Eurostat*

Figure 18b.

Reporting structure - Facilities

	1		2		3		4										
Treatment	Energy		Waste		Recovery		Landfilling										
categories	recovery		incineration		(R2-R11)		(D1, D5, D12)										
	(R1)		(D10)		3a	3 b	haz waste			non-haz waste			inert waste			landfills total	
Regions, NUTS 2 level	no. of facilities	cap. t/a	no. of facilities	cap t/a	no. of facilities		no. of facilities	rest cap m³	closed	no. of facilities	rest cap m³	closed	no. of facilities	rest cap. m³	closed	no. of facilities	rest cap m³
Region 1																	
Region 2																	
Region 3																	
…																	
….																	
…																	
National total																	

Source: Eurostat

B. Recovery and recycling operations — the United Nations perspective

1. The terms “treatment”, “recovery” and “disposal”

103. In general, the UNSD/UNEP questionnaire does not define “treatment” alone and makes no particular distinction between “treatment” and “disposal”. For example, the UNSD/UNEP questionnaire considers “incineration without energy recovery” as “treatment or disposal”. While this is clearly a disposal operation according to the EU, here it is not obvious whether it is considered a “treatment” or “disposal” operation.

104. One should be also careful not to make a direct analogy between “treatment” and “recovery”. In the definitions provided by the UNSD/UNEP questionnaire, there is no definition of “recovery” as such. If the EU definition of “treatment” is applied, then “treatment” should be the general term that includes both “recovery” and “disposal” operations (Waste Framework Directive).

2. The term “recycling”

105. The UNSD/UNEP questionnaire has a distinct definition of “recycling”, which is close to the EU definition of the same term. A recycling operation is “any reprocessing of waste material in a production process that diverts it from the waste stream, except reuse as fuel. Both reprocessing as the same type of product, and for different purposes should be included.”

106. It is interesting to note that the UNSD/UNEP questionnaire, like the EU, excludes the “reuse as fuel” from the recycling operation. “Reuse as fuel” is not, however, defined by the UNSD/UNEP questionnaire, whereas according to the EU it is a type of incineration under recovery operations (see Figure 17, code R1).

107. Recycling within industrial plants, i.e., at the place of generation, is excluded from both the European and the United Nations definitions.

108. The UNSD collects data on the recycling of hazardous wastes and municipal wastes. It introduced changes to its questionnaire in 2008, suspending the use of the table on generation and recycling of selected waste materials due to the lack of data.

C. Recovery operations — the International Energy Agency perspective

109. In its work on renewables and waste, the International Energy Agency (IEA) takes a different perspective on waste terminology and waste data collection. For example, the IEA collects data on waste in energy units (net calorific value) rather than in mass (e.g., tonnes) or in volume (e.g., cubic metres). The IEA also uses the term "acquisition of renewable energy by combusting waste", which is not the same as the term "incineration with energy recovery" used by Eurostat and the UNSD/UNEP questionnaire. The IEA counts waste as renewable energy if the waste is coming from renewable source, biodegradable waste falls under this category; high calorific fractions like plastics do not fall under this definition.

110. According to the Energy Statistics Manual, waste is "a fuel consisting of many materials coming from combustible industrial, institutional, hospital and household wastes such as rubber, plastics, waste fossil oils and other similar commodities. It is either solid or liquid in form, renewable or non-renewable, biodegradable or non-biodegradable." For the purpose of energy statistics, "waste" is considered materials that are no longer required by their holders and refers only to the portion of industrial and municipal solid wastes, which can be used as fuels.

111. Waste (industrial and municipal) is categorized in renewables and non-renewables, as follows:

(a) Industrial wastes *(non-renewables):* Wastes of industrial non-renewable origin (solids or liquids) combusted directly for the production of electricity and/or heat.

(b) Industrial wastes (renewables): Renewable industrial waste should be reported in the solid biomass, biogas and/or liquid biofuels categories. **Note**: Industrial wastes (renewables) are not considered waste as such.

(c) Municipal solid wastes (non-renewables): Waste produced by households, industry, hospitals and the tertiary sector that contains non-biodegradable materials incinerated at specific installations.

(d) Municipal solid wastes (renewables): Waste produced by households, industry, hospitals and the tertiary sector, which contains biodegradable materials incinerated at specific installations.

112. The distinction between non-renewable and renewable wastes is important because the non-renewable component is counted when calculating CO_2 emissions. This is the reason why the IEA collects data on industrial wastes (non-renewables) and municipal solid wastes (non-renewables), even if they are not used to produce renewable energy.

113. The definition of municipal solid waste in the context of energy statistics is clear. In practice, however, it is difficult to distinguish between non-renewable and renewable municipal solid wastes as often they both contain components that are biodegradable and non-biodegradable. According to the Energy Statistics Manual, if it is not possible to distinguish between renewable and non-renewable municipal solid wastes, then the total quantity should be divided equally between both categories.

114. The IEA collects data through the Renewables and Waste Questionnaire, which is one of the five Joint IEA/Eurostat Annual Questionnaires. Currently, the data collection on renewables and waste faces a number of challenges. Estimation methodologies for accounting for the use of renewables are not standardised. They differ for each country and for each renewable energy source. For renewables, many statistical methods are based on

estimations, and not on measurements. Estimations are made, for example, using alternative data sources (e.g., industry reports); or using sales figures, present value or average efficiencies for technologies (e.g., to assess capacity). Often assumptions are needed to evaluate the energy consumption for non-energy uses (e.g., fuels like lubricants and greases that are used for their "slippery" properties and not for energy consumption).

115. There are also some challenges specific for the EECCA region. They include problems in determining the breakdown of electricity and heat from combustible fuels, lack of harmonization of measurement units across countries, and difficulties to match national with international (IEA, EU, etc.) statistical classifications.

V. Classifications and definitions related to waste statistics

116. The topic of classifications was found to be the most difficult as well as the most useful during the Workshop. In the evaluation feedback, more than two thirds of the participants ranked the session on classification issues as excellent. Among the main concerns of the EECCA countries were the use of different classification methods and definitions, the introduction of new classifications, inconsistencies in the terminology, e.g., defining toxic versus hazardous waste. It was noted that clear definitions and a common understanding of waste classifications are necessary in order to produce comparable and reliable data.

117. The European experience shows that classification issues also exist at the EU level. While the Waste Statistics Regulation (EU) No 849/2010 specifies the waste categories (EWC-Stat) that have to be used for reporting to Eurostat, it does not prescribe a specific classification to be used during data collection. The EU Member States are free to use any waste classification as long as they can report to Eurostat in the defined formats and with the required quality. The room for flexibility is much appreciated by the countries. In practice, however, issues frequently arise with the reported data. In most cases these issues are due to differences in classifications.

A. Waste classifications

1. Classifications related to waste generated by economic activities

a) Global and European classifications of waste generated by economic activities

118. Two main classifications are used when reporting to international organizations on waste generated by economic activities. These are the "International Standard Industrial Classification of All Economic Activities" (ISIC) and "Statistical Classification of Economic Activities in the European Community" NACE.[10]

119. In reporting to the UNSD/UNEP questionnaire, countries should follow ISIC Rev. 4. The data reported to Eurostat is compiled according to NACE Rev. 2 (Regulation (EU) No 849/2010 on European Waste Categories). In the previous version of Eurostat's Manual on Waste Statistics, NACE Rev. 1.1 was used. From the 2008 reporting round onwards countries have been required to use NACE Rev. 2.

120. According to the UNECE survey replies (Annex II) the majority of the EECCA countries follow the NACE classification. Armenia and Azerbaijan use NACE Rev. 2. Kazakhstan and Ukraine follow NACE Rev. 1.1. Georgia replied that they use the NACE classification and Kyrgyzstan indicated that they follow a national classification, which is based on NACE, without, however, specifying which revision of NACE. Moldova and the Russian Federation have their own national classification, which is based on NACE Rev. 1. Uzbekistan and Belarus have their own national classifications.

121. In reporting the data on waste generated by economic activities to the UNECE questionnaire, the EECCA countries were asked to follow the ISIC Rev. 4. Thanks to the correspondence tables, the matching codes are easy to find between the two classifications and for most of the EECCA countries it was not a problem to make the conversion from NACE to ISIC. There were, however, some difficulties for countries using national

[10] NACE is the acronym for "Nomenclature statistique des activités économiques dans la Communauté européenne".

classifications and for countries still using previous revisions where correspondence tables were not readily available.

122. The EECCA countries that send data to both Eurostat (reporting on ISIC) and UNECE (reporting on NACE) should note that the "total waste generated" may be different in the two cases. The difference could be due to the issue of residues from waste treatment. In reporting to UNECE, code E38 of ISIC Rev. 4 is excluded. This is not the case when reporting to Eurostat, where the matching code E38 of NACE Rev. 2 is included. In general, the residues need to be reported to Eurostat (see section 2.2.1. of the EU's Manual on Waste Statistics), thus, it is important to determine the cases in which the reporting of residues leads to double counting. There are, for example, some types of pre-treatment which do not change the structure of the waste, for instance re-packaging and temporary storage. The inclusion of waste from these pre-treatment operations would result in double counting of the same unaltered waste. Facilities performing such operations are excluded from the EU waste statistics. In general, countries should not report waste originating from such operations but only residues generated as a result of other activities (e.g., consumption residues).

b) The term "waste from consumption and production" as used by the EECCA countries

123. In the EU Member States, waste generation is categorized by economic activities that generate the waste, and household waste. When referring to waste, the EECCA countries use the term "waste generated by consumption and production". According to the Russian federal law on "waste generated by production and consumption", this term is defined as waste generated in the process of production and consumption. One understanding could be that waste generated by production corresponds to waste generated by economic activities, whereas waste generated by consumption would be equivalent to household waste. While this is a plausible supposition, without a detailed and clear definition, it is difficult to specify an exact relationship between the terminology used in the EU Member States and the EECCA countries.

2. Classifications related to waste categories and types

124. In addition to the breakdown by economic activities, Eurostat also collects data on waste generation and waste treatment by waste category and type.

125. In practice, most of the EU countries collect their data by type following the List of Wastes. They subsequently make the correspondence between the waste types and the EWC-Stat categories using the transposition table in Annex III of the Waste Statistics Regulation. The direct use of the EWC-Stat for data collection is applied by only a few countries.

126. Some EECCA countries have adopted, or are in the process of adopting, the List of Wastes in their data reporting on waste types. An example of how Ukraine has made the transition to the European standards is presented in Box 3.

Box 3

Ukraine: Example of transition to the European standards

In 2010 Ukraine adopted new standards of waste statistics based on the European standards. In the transition, Ukraine followed the Waste Statistics Regulation — Regulation 2150/2002/EC (later amended by Regulation 849/2010).

In order to better respond to the European standards, a new reporting form, Form 1 — Waste, was developed and put in place in 2010. Form 1 kept national specificities while integrating the European standards. The new form replaced three already existing forms, one of which (Form 1 — Hazardous waste) served as a basis for the former.

To develop the new form, Ukraine used, among others, the following classifications:

- The classification of economic activities harmonized with the NACE classification Rev. 1.1–2002
- State Classification of Waste DK 005-96
- Toxicity classification (4 classes of hazard level; radioactive waste is not covered by Form 1)

At the same time, in order to make its national waste statistics compatible with the European statistics, in 2010 the State Statistics Service of Ukraine developed and introduced two lists related to waste:

- List of waste categories by material, including 31 categories that correspond to 48 categories of the European Waste Classification for Statistics EWC-Stat, Version 3
- List of waste recycling and disposal operations: in order to facilitate the transition to the new form the list contains the codes used in Ukraine and their correspondence to the R- and D-codes of Eurostat

As a result, the reporting process has been significantly streamlined: according to the State Statistics Service of Ukraine it is now possible to account for almost all the positions of international statistical questionnaires on waste.

[1] When compared to international waste statistics, the waste of the fourth class (in accordance with the Ukrainian toxicological classification — low-hazard waste) is considered as non-hazardous.

3. Classifications related to hazardous waste

a) Global and European classifications of hazardous waste

127. Internationally, there are two main classifications of hazardous waste: the Basel Convention and the European Union classifications.[11] The two classifications are not easily comparable. They use their own coding systems that have no direct correspondence: the codes differ in defining the hazardous properties and the level of aggregation.

i) Hazardous properties (H-codes) — the Basel Convention and the European Union classifications

128. According to the Basel Convention, countries have to report on the quantity of wastes that possess any hazardous characteristics (H-codes) and classify them according to

[11] There is also a classification based on OECD regime, which is also implemented by EU countries members of the OECD.

the waste categories (Y-codes). Article 1.1 of the Basel Convention specifies "hazardous wastes" subject to transboundary movement, as follows:

> *"Wastes that belong to any category contained in Annex I (Y-codes), unless they do not possess any of the characteristics contained in Annex III (H-codes)."*

129. Furthermore, the EU Waste Framework Directive defines "hazardous waste" as waste which displays one or more of the hazardous properties listed in Annex III of the Directive. These hazardous properties, again called H-codes, are used to define the waste as hazardous or non-hazardous and to classify it according to the EU waste categories (EWC-Stat).

130. The challenge to the reporting countries comes from the fact that the H-codes of the Basel Convention do not match the H-codes of the EU Waste Framework Directive. Figures 19a and Figure 19b illustrate the extent to which the H-codes differ with a few examples.

Figure 19a.

Example of hazardous properties (H-codes) as according to the Basel Convention

Extract of the Basel Convention H-codes, Annex III of the Basel Convention: List of hazardous characteristics

6.1	H6.1	Poisonous (Acute)
		Substances or wastes liable either to cause death or serious injury or to harm human health if swallowed or inhaled or by skin contact.
6.2	H6.2	Infectious substances
		Substances or wastes containing viable microorganisms or their toxins which are known or suspected to cause disease in animals or humans.
8	H8	Corrosives
		Substances or wastes which, by chemical action, will cause severe damage when in contact with living tissue, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport; they may also cause other hazards.
9	H10	Liberation of toxic gases in contact with air or water
		Substances or wastes which, by interaction with air or water, are liable to give off toxic gases in dangerous quantities.
9	H11	Toxic (Delayed or chronic)
		Substances or wastes which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects, including carcinogenicity.

Figure 19b.

Example of hazardous properties (H-codes) as according to the EU

Extract of the European Union H-codes, Annex III of Waste Framework Directive 2008/98/EC: Properties of wastes which render them hazardous

H 6:	'Toxic': substances and preparations (including very toxic substances and preparations) which, if they are inhaled or ingested or if they penetrate the skin, may involve serious, acute or chronic health risks and even death.
H 7:	'Carcinogenic': substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence.
H 8:	'Corrosive': substances and preparations which may destroy living tissue on contact.
H 9:	'Infectious': substances and preparations containing viable micro-organisms or their toxins which are known or reliably believed to cause disease in man or other living organisms.
H 10:	'Toxic for reproduction': substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce non-hereditary congenital malformations or increase their incidence.
H 11:	'Mutagenic': substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce hereditary genetic defects or increase their incidence.

ii) The level of aggregation — the Basel Convention and the European Union classifications

131. Annex I of the Basel Convention gives 45 waste categories (Y-codes). At the same time, the EU has its own 51 waste categories (EWC-Stat), which are divided according to whether they are hazardous or non-hazardous. Thirty six categories can be either hazardous or non-hazardous, three categories are only hazardous and 12 categories are only non-hazardous.

132. The 45 Y-codes of the Basel Convention are different from the 51 EU waste categories (EWC-Stat). At the Workshop, countries mentioned that the Y-codes are too general, i.e., do not specify further the waste type to be allocated under each of them. In addition to its Annex I and II, for the purpose of clarifying the categories of hazardous wastes to be controlled, the Basel Convention has included Annexes VIII and IX. Annex VIII (List A) are hazardous while Annex IX (List B) are non-hazardous unless they demonstrate the Annex III characteristics.

133. The EU classification, however, does provide the necessary level of aggregation. The EU has its own List of Wastes that defines 839 waste types, which are structured into 20 chapters. Each waste type is characterized by a six-digit code and further defined as hazardous or non-hazardous. The transposition table between the EU List of Wastes and the 51 EU waste categories (EWC-Stat) allows easy identification of the correspondence of each *hazardous waste type* to each *hazardous waste category*.

b) National classifications of hazardous waste

i) National legislation

134. The Basel Convention allows for wastes to be defined as hazardous wastes by the national legislation of the country of export, import or transit, as per article 1(1) (b).

135. In the EU, the List of Wastes is binding to the Member States as regards the determination of the waste as hazardous waste. The EU reviews proposals for changes and

may amend (although it is not obliged to do so) the List of Wastes. Any change should be based on evidence provided by Member States on the hazardous properties of waste as defined by their national legislation. The following two paragraphs of Article 7 of the Waste Framework Directive discuss this possibility:

> *"A Member State may consider waste as hazardous waste where, even though it does not appear as such on the list of waste, it displays one or more of the properties listed in Annex III (of the Waste Framework Directive). The Member State shall notify the Commission of any such cases without delay. It shall record them in the report and shall provide the Commission with all relevant information. In the light of notifications received, the list shall be reviewed in order to decide on its adaptation."*
>
> *"Where a Member State has evidence to show that specific waste that appears on the list as hazardous waste does not display any of the properties listed in Annex III, it may consider that waste as non-hazardous waste. The Member State shall notify the Commission of any such cases without delay and shall provide the Commission with the necessary evidence. In the light of notifications received, the list shall be reviewed in order to decide on its adaptation."*

ii) Hazardous waste classifications in the Eastern Europe, Caucasus and Central Asia countries

136. One of the challenges for the EECCA countries is to define the correspondence of their hazardous waste classifications with those used by the Basel Convention and the EU. Majority of the EECCA countries use national classifications of hazardous waste according to which wastes are divided into several classes based on their level of toxicity (or hazard) such as extremely hazardous, highly hazardous, moderately hazardous and marginally hazardous. According to the UNECE survey (Annex II) Azerbaijan, Belarus, Moldova and Ukraine use four classes of toxicity (or hazard) in their national classification. The Russian Federation, in addition to the four classes, has an extra fifth class, which is "non-hazardous waste". Georgia collects data according to the classification of the Basel Convention. The new national classification in Kyrgyzstan defines the hazardous properties of wastes according to the Basel Convention. Armenia, Kazakhstan and Uzbekistan did not specify the number and definition of classes used. Tajikistan has yet to adopt a classification of hazardous waste.

137. The hazardous waste definition in the UNECE questionnaire refers to the classification of the Basel Convention. It is not clear if countries managed to follow the classification correctly when reporting to the questionnaire. There were some wide differences in the reported share of hazardous waste in the total waste generated, which could be perhaps explained by the different approaches countries have to defining waste as hazardous.

B. Waste related definitions

1. Waste definition

138. Each international entity has its own formal definition of waste. The Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste repealed Directive 2006/12/EC. According to article 3 of Directive 2008/98/EC ""waste" means any substance or object which the holder discards or intends or is required to discard".

139. The EU definition together with the List of Wastes provide a comprehensive and precise information on what is considered waste. However, the role of national law in the EU legislation is not clearly specified.

140. The Basel Convention defines waste as substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law. The Basel Convention therefore makes an explicit reference to the national law of the countries.

141. The UNECE and UNSD/UNEP questionnaires define the waste as “materials that are not prime products (i.e., products produced for the market) for which the generator has no further use for his own purpose of production, transformation or consumption, and which he discards, or intends or is required to discard”.

142. Meanwhile, the different wording in the definitions of the Basel Convention on one side and the EU, UNECE and UNSD/UNEP questionnaires on the other side creates debates. It is not clear whether the terms "dispose" and "discard" have the same meaning. Furthermore, the phrase “required to discard” does not specify by whom the waste should be discarded.

2. Municipal waste definition

a) Comprehensive and clear definition

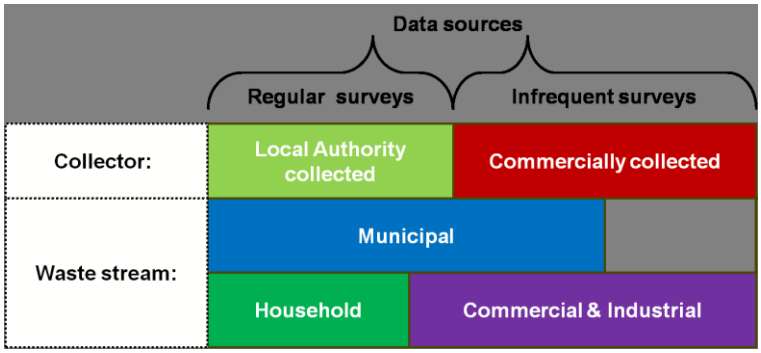
143. The definition of municipal waste is consistent among the international entities that deal with collection of municipal waste data. The collection of data, however, remains difficult due to the interpretation of the term “municipal”, which is used in different ways in the countries reflecting their country-specific waste management practices. The majority of the waste stream originates from households, although similar to household wastes, e.g., from sources such as commerce, offices and public institutions, are also included in the waste stream. Differences between countries are to some extent the result of the varying scope of these similar to household wastes.

144. In 2012, Eurostat published “Guidance on municipal waste data collection” to provide advice on the scope and coverage of municipal waste for the purpose of the annual data collection on municipal waste generation and treatment. The document notes that “Depending on national waste management and waste data collection systems, the approaches established in member states for municipal waste data collection vary to a large extent, thus hampering data comparability across countries”. Therefore, the guidance document is a useful step towards harmonizing the data collection practices.

145. The meaning of municipal waste can be illustrated by an example from the United Kingdom Department for Environment, Food and Rural Affairs (Figure 20). Municipal waste consists of waste collected from households, and also includes portion of waste generated by economic activities, which is collected together with the waste from households, for example waste from commerce and trade, small businesses, office buildings, etc. (see Figure 20, “Commercial & Industrial” waste stream).

Figure 20.

Municipal waste explained



Source: *UK* Department for Environment, Food and Rural Affairs (DEFRA)
Note: Excludes construction and demolition, and mining waste

b) Need for data estimates

146. Although the municipal waste definition is clear, it is not always possible to have complete data. The difficulty comes from producing annual estimates for the portion of the commercial and industrial waste stream collected as municipal waste, for which regular data collection is generally not available. Furthermore, the data on municipal waste are collected only in the areas where waste collection facilities exist, usually provided by the municipal authorities or by companies on their behalf. For areas not covered by municipal waste collection facilities, the amount of municipal waste needs to be estimated.

c) The use of municipal or household waste terms

147. In the various reporting systems, the terms *municipal* and *household* are used interchangeably. This makes data difficult to compare. For example, the UNECE questionnaire defines total waste generated as the sum of waste generated by economic activities and *municipal* waste. At the same time, the EU's total waste generated is calculated as the sum of waste generated by economic activities and *household* waste.

d) Eastern Europe, Caucasus and Central Asia countries definitions

148. Among the EECCA countries only Belarus has provided a definition of municipal waste (Annex III). The definition focuses more on the process of waste collection than on specific waste streams (e.g., households, small businesses, office buildings, etc.).

149. Several EECCA countries have provided a definition of household waste: Azerbaijan, Kyrgyzstan, Moldova, Tajikistan and Ukraine (Annex III). They follow more or less the same definition, which is waste from consumption originating from the everyday activities of households.

150. The EECCA countries did not provide a definition on hazardous household waste. A common definition does not exist also at the EU level.

VI. Key issues and challenges, conclusions and recommendations

151. During the Workshop, the countries shared their experiences and exchanged views on matters of their concern. In particular, the key issues and challenges in the following areas were discussed: **data sources; data availability, time series**; **methodologies**; **comparability across countries; validation of data; and legal frameworks**.

152. The main problems with reporting data are due to classification issues. Data on waste statistics reported by the countries to the various international organizations often vary significantly. The differences are mainly due to the various classifications and definitions used by the international organizations or to the poor correspondence between national and international classifications and definitions.

153. This Chapter summarizes further the outcome of the discussions and concludes by providing some recommendations for improvement.

A. Key issues and challenges

1. Data sources

Problems with data collection from enterprises and municipalities, from private or state sources, irregular reporting:

154. The most common problem stated by the EECCA countries is insufficient reporting by the enterprises collecting municipal waste. This occurs because of either a lack of binding legislative measures obliging such enterprises to report, or due to the absence of an officially defined list of the enterprises that should report data or be chosen as respondents to questionnaires and surveys.

155. Some countries also mentioned the low quality of the data reported by enterprises, e.g., data contain numerous errors in measurement units and are not compatible with the data provided by other enterprises.

2. Data availability, time series

Where are the data gaps? Insufficient coverage of the data (are all sectors of economic activities covered? are all municipalities covered?); timeliness of the data:

156. The comparison of data over time is challenging. Most of the EECCA countries reported breaks or gaps in their time series due to the transition to a new classification. In particular, Moldova harmonized its classification of economic activities with NACE in 2000, the Russian Federation in 2004, and Kyrgyzstan in 2010.

157. The majority of the EECCA countries reported that, in general, rural areas are not covered by their data collection system and that the data on municipal waste includes, as a rule, only urban areas.

3. Methodologies

Inconsistencies in methodologies and how to cope with them, e.g., measurement units, estimations, etc:

158. Several countries, e.g., Kyrgyzstan, the Russian Federation, Tajikistan, and Uzbekistan reported their data on municipal waste in cubic metres (m3) and not in tonnes, as requested. This made it difficult to compare the data among the countries. During the Workshop, this issue was discussed extensively. It was noted that conversion coefficients from cubic metres (m3) to tonnes are not available and most EECCA countries calculate

waste, including municipal waste in cubic meters (m3). This is due to the difficulty of identifying the waste composition and the lack of measurement equipment to weigh the waste. Nevertheless, some countries tried to convert the data into tonnes for the purpose of reporting to international bodies. Participants in the Workshop noted that this conversion should be regarded more as an experiment and that the data are not fully reliable.

159. Participants from Western countries and international organizations shared their experience on the issue. As a follow up to the Workshop, examples of conversion rates were provided from the Netherlands, Estonia and Germany (Bavaria). The information is now available to the countries on the Workshop's website.

4. Comparability across countries

How does the use of different methods affect the comparability of the results across countries?

160. The comparison of data by economic sectors across countries raises questions. For example, according to the data, the total amount of waste generated by "agriculture, forestry and fishing" in Uzbekistan is close to or higher than the amount of waste generated by the same sector in the Russian Federation (see Figure 21a). The waste generated by the same sector in Moldova is reported several times higher than the amount generated in Kazakhstan. Furthermore, waste generated, again by "agriculture, forestry and fishing", in Uzbekistan was more than the waste generated by the same sector in the entire European Union in 2008 (see Figure 21b). It could be that the numbers are unreliable given the size of economy, territory, natural endowments, and population of these countries. Another explanation could be that there is a data coverage problem and only part of the data is reported.

161. These and other examples indicate that there are certainly inconsistencies in the methodologies and/or differences in classifications that currently make it difficult to compare the data produced by the countries. Cooperation among countries would help to improve the quality of the reported data.

Figure 21a.

Total amount of waste generated by agriculture, forestry and fishing (ISIC 01-03), in thousand tonnes

Agriculture, forestry and fishing	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
Armenia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Azerbaijan	13	19	21	16	8	6	3	3	3
Belarus	..	..	..	..	..	..	304	235	364
Kazakhstan	3	38	15	24	46	78	69	..	86
Kyrgyzstan	..	..	..	..	..	..	..	..	18
Moldova	328	175	168	171	141	1,125	1,215	104	108
Russian Federation	..	..	15 154	14 339	17 532	26 654	68 030	77 483	..
Ukraine	..	..	..	193	257	224	216	231	8 575
Uzbekistan	46 151	48 258	50 365	52 365	54 367	56 267	58 267	60 264	62 166

Source: UNECE questionnaire

Figure 21b.

Total amount of waste generated by "Agriculture, forestry and fishing" sector in selected EU and EECCA countries in descending order, 2008, in thousands tonnes

Agriculture, forestry and fishing	*2008*
Russian Federation	68 030
Uzbekistan	58 267
EU (27 countries)	44 420
EU (15 countries)	22 540
Romania	17 035
Spain	11 356
Ukraine 1/	8 575
Netherlands	3 464
Finland	2 739
Germany	1 351
Poland	1 350
France	1 313
Moldova	1 215
Slovakia	789
Lithuania	786
Bulgaria	754

Source: Eurostat, UNECE questionnaire
Notes: The EECCA countries are highlighted in blue.
1/ Data for Ukraine are for 2010. Data for earlier period do not show the total amount.

5. Validation of data

How is validation implemented, including validation against other sources (e.g., custom data on hazardous waste)?

162. Validation is an important tool to ensure the quality of the data. Two key validation mechanisms for national statistical agencies are comparing the data collected against the corresponding data from other countries and from other sources within the country (e.g., customs services or environmental agencies).

163. During the Workshop, it was recommended to verify the data on transboundary movement of waste by cross-checking the data on waste exported by one country with the data on waste imported by its counterpart.

164. Some examples of validation against data from other sources within the country were shared during the Workshop. They referred mainly to the municipal waste, where countries faced significant challenges.

(a) Countries should aim to obtain data on both *municipal waste generated* and *municipal waste collected*. In practice, this is not easy to do. Normally, the data are based on information provided by the waste collecting agency. If the data both on *municipal waste generated* and *municipal waste collected* are available, the following validation check could be carried out:

municipal waste collected = proportion of population covered by the municipal waste collecting agency * *municipal waste generated*

Essentially, if 100 per cent of the population is covered by the municipal waste collecting agency the amount generated will be equal to the amount collected; if 80 per cent of the population is covered then the municipal waste collected should be 80 per cent of the municipal waste generated.

(b) Municipal waste per capita should be within a reasonable range, e.g., about 100 -1000 kg per capita. A check should be done to see whether the data provided are within this range.

6. Legal framework

Review of the national legal framework with respect to reporting requirements; legislation defining the needs and the procedures to collect information on waste:

165. The legal framework for waste management at the national level is in general well developed. However, legal instruments regulating the waste statistics such as data generation, collection, compilation and processing are not always in place. Further information on countries' legislation related to waste is available in Annex I.

B. Conclusions and recommendations

166. Statistics play an important role in identifying waste-related problems, assessing management priorities and formulating and achieving realistic objectives within the framework of waste management policies.

1. Interagency cooperation

167. The interagency cooperation is important. In some countries information on waste is scattered among different institutions. Therefore, cooperation needs to be strengthened in order to collect and to report statistical data of good quality. Data differ, for example, when the Ministry of Environment reports to the Basel Convention and when the National Statistical Office reports to Eurostat. In general, this is due to the use of different methods in data compilation and waste classifications, and reflects a lack of coordination between the national institutions.

168. The cooperation mechanism between statistical agencies and customs services, necessary to ensure the data quality on transboundary movement of hazardous waste, is often not efficient (and sometimes non-existent) in the countries. The capacity of the statistical institutions to carry out data validation on their own is limited since in many cases it requires the expertise of environmental specialists. Annex IV provides a detailed presentation of interagency cooperation mechanisms in the EECCA countries.

2. Dissemination of data

169. Effective dissemination of data is essential to reach the users of waste statistics. The EECCA countries have well developed traditional tools for reaching the public. They include statistical publications and yearbooks, environmental compendiums, publications and reports. Several countries, e.g., Belarus and Kazakhstan, also publish specialized newsletters on waste, which is an example of a good practice to follow. Most of the countries publish their waste statistics on the websites of either statistical or environmental agencies. Further efforts to make the data readily available online and to keep it up-to-date should be encouraged. Annex V gives a review of the different methods of statistical data dissemination used by the EECCA countries.

3. Recommendations

170. The following recommendations have been identified based on the discussions and the work done in preparation for and during the Workshop.

a) General recommendations

171. Cooperation between the international organizations dealing with different aspects of waste statistics, such as Eurostat, the European Environment Agency, the International Energy Agency, the United Nations Environmental Programme, the United Nations Statistics Division, and the secretariat of the Basel Convention, needs to be further strengthened in order to ensure correspondence between the various classifications, terms and definitions used at the international level.

172. Waste classifications and definitions used at the national level should be aligned with internationally-recognized classifications and terminology. This is to ensure that countries have the same understanding of the data and can interpret the data of the other countries. This will also help to develop regional and international cooperation regarding the cross-border management of waste.

173. National institutions, such as the National Statistical Office, the Ministry of Environment, environmental agencies and customs offices, should cooperate more closely in order to produce reliable and complete data on waste.

174. Quantitative targets aiming at reducing the amount of waste generated and at promoting sound practices, such as reuse and recycling, need to be in place to measure progress.

175. National institutions should provide regular training and explanatory materials for personnel of enterprises who are responsible for reporting data. The training should cover the methods of measuring and estimating quantities of waste. Additionally, personnel should be trained to report the data correctly when asked to complete questionnaires and surveys. This would lead to improvement in the quality of reported data.

b) Specific recommendations

176. Reporting in the same measurement units will increase the likelihood of the data being comparable. Countries should try to develop their own list of conversion rates from one measurement unit to another in line with the specific features of their economies. This is needed since the waste composition under each waste type (e.g., according to the List of Wastes) is not uniform across countries.

177. The area of waste statistics is relatively new and the European legislation is undergoing continuous changes. The countries referring to or introducing the EU legislation should follow the latest updates.

178. Common methodology across countries and across national institutions in defining the list of enterprises reporting on waste is needed. National legislation should oblige these enterprises to report. To the extent possible, cooperation across countries is recommended to achieve common methodology.

References

Council Resolution on a Community strategy for waste management, Official Journal of the European Communities No C76/1, 1997,

URL: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:1997:076:0001:0004:EN:PDF

Energy Statistics Manual, International Energy Agency, OECD and Eurostat, 2005

URL: http://www.iea.org/stats/docs/statistics_manual.pdf

Eurostat News Release: 37/2011 - 8 March 2011, Environment in the EU27, Recycling accounted for a quarter of total municipal waste treated in 2009

URL: http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-08032011-AP/EN/8-08032011-AP-EN.PDF

EU Focus on Waste Management, European Commission, Directorate-General Environment, Nuclear Safety and Civil Protection, European Communities, 1999

URL: http://ec.europa.eu/environment/waste/publications/pdf/eufocus_en.pdf

Manual on Waste Statistics, A handbook for data collection on waste generation and treatment, ISSN 1977-0375, Eurostat Methodologies and Working Papers, 2010 edition.

URL: http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-RA-10-011

Study on hazardous household waste with a main emphasis on hazardous household chemicals, commissioned by the DG Environment of the European Union, July 2002
URL: http://ec.europa.eu/environment/waste/studies/pdf/household_report.pdf

URL (summary): http://ec.europa.eu/environment/waste/studies/pdf/household_summary.pdf

Thematic Strategy on prevention and recycling of waste, 2005

URL: http://ec.europa.eu/environment/waste/strategy.htm

UNSD/UNEP Questionnaire on Environment Statistics/Section Waste

UNECE Questionnaire: Waste generation; Management of non-hazardous industrial waste; Management of municipal waste; Transboundary movements of hazardous waste

ANNEXES

I. Laws and regulations relating to waste accounting and waste management in the countries of Eastern Europe, the Caucasus and Central Asia

A. Laws and regulations governing the production, collection, compilation and processing of waste statistics

1. Armenia

(a) State Statistics Act;

(b) The entire waste accounting and movement system (waste management) is described in an instruction on filling in statistical form N-waste, approved by the State Council on Statistics, confirmed by an order issued by the Ministry of Environmental Protection and registered with the Ministry of Justice.

2. Azerbaijan

(a) The Official Statistics Act was first adopted in 1994 and was last amended in 2010. It provides for the tracking of information and data collection on economic and social processes at the national level.

3. Belarus

(a) Decision No. 277 of the National Statistical Committee, of 29 September 2011, approving State statistical reporting form 1-waste (Ministry of Natural Resources and Environmental Protection), reporting on the management of waste products, along with the instructions for its implementation;

(b) Order No. 143 of the Ministry of Housing and Public Services, of 4 November 2011, approving a list and forms for departmental reporting;

(c) Decision No. 934 of the Council of Ministers, of 19 June 2010, approving the rules for maintaining a State wastes register;

(d) Decision No. 39 of the Ministry of Natural Resources and Environmental Protection, of 17 September 2010, on certain questions related to maintaining the State wastes register;

(e) State statistical reporting form 1-waste (Ministry of Natural Resources and Environmental Protection), entitled “Report on industrial waste product management”;

(f) Departmental reporting form of the Ministry of Housing and Public Services, entitled “Report on sanitation in population centres”.

4. Georgia

1. There are currently no laws or regulations governing the production, collection, compilation and processing of statistical data on waste.

5. Kazakhstan

(a) Report form on hazardous waste (used for each type of waste), approved by Order No. 316-p of the Ministry of Environmental Protection, of 2 November 2007;

(b) Data on the processing and removal of hazardous waste is collected from reports from local environmental protection bodies. Under article 154, entitled "State wastes register", of the Environmental Code, natural resource users submit hazardous waste certificates, files with inventories of wastes, reports on hazardous wastes and a registration file on waste disposal;

(c) Data on the import and export of hazardous waste is collected in accordance with the Regulations governing the import, export and transit of waste, approved by Government Decision No. 594 of 11 June 2007, and in accordance with the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

6. Kyrgyzstan

(a) The State statistical reporting form for waste is form F No. 1-waste, entitled "Report on industrial and consumer waste generation and management". It was drawn up by the National Statistical Committee and came into force in 2010;

(b) State statistical reporting form F No. 1-amenities, entitled "Report on amenities and sanitation services in urban areas and population centres", includes indices for the removal of waste by municipal sanitation services;

(c) State statistical reporting form F No. 2-toxic waste, entitled "Report on industrial and consumer toxic waste generation and management";

(d) The Industrial and Consumer Waste Act, Act No. 89, of 13 November 2001. Article 18, entitled "State accounting in the field of hazardous waste management", provides for the following:

- The primary qualitative and quantitative accounting for hazardous wastes is the responsibility of the legal and physical persons involved in the generation of such waste.
- State accounting for hazardous waste management is done in a single system, under a procedure established by the State statistics service, ensuring that the information presented is thorough and reliable. Legal and physical persons carry out the accounting and present statistical bodies and the competent agencies with a report on the existence, generation and use of hazardous wastes generated by their own production, and also from other sources, in accordance with an established procedure.
- The procedure for primary accounting of hazardous waste management is established by the competent agency, and the procedure for official statistical accounting is established by the State statistical body, in agreement with the competent agency.

7. Republic of Moldova

(a) Joint orders issued by the Ministry of the Environment and the National Bureau of Statistics approving environmental reporting forms and methods for their collection and processing (forms entitled "Generation, use and decontamination of toxic wastes" and "Generation and use of wastes");

(b) Data on municipal waste is drawn up and collected from economic agents, using statistical report No. 1-gc, entitled "Urban area sanitation activities". The form is collected and processed by the National Bureau of Statistics;

(c) There are no statistical data reporting forms on the transboundary movement of waste, including hazardous waste. The Ministry of the Environment issues notifications

and accompanying documents for the transboundary movement of waste, including hazardous waste;

(d) Orders of the National Bureau of Statistics approving the statistical form entitled "Urban area sanitation activities".

8. Russian Federation

(a) The Federal Environmental Protection Act, Act No. 7-FZ, is the basic legal document governing environmental protection;

(b) The Federal Industrial and Consumer Waste Act of 24 June 1998, Act No. 89-FZ;

(c) Government Decision No. 442 on the transboundary movement of waste, of 17 July 2003;

(d) Government Decision No. 818 on the State wastes register and implementation of a certification system for hazardous wastes;

(e) The federal waste classification catalogue (approved by Order No. 786 of the Ministry of Natural Resources, of 2 December 2002);

(f) Official statistics are drawn up in accordance with the federal statistics plan approved by Government Order No. 671-r, of 6 May 2008 (as amended);

(g) Data collection and processing is done in accordance with annual federal statistical observation form No. 2-TP (waste), entitled "Information on the generation, use, decontamination, transport and disposal of industrial and consumer waste", and the instructions for its use, and also in accordance with annual federal statistical observation form No. 1-KX, entitled "Information on amenities in urban areas", approved by an order of the Federal State Statistics Service.

9. Tajikistan

(a) The Nature Conservation Act;

(b) The Statistics Act;

(c) Other laws and regulations in the field of environmental protection;

(d) Annual report 1-wastes, entitled "Report on the generation of communal wastes in the context of public collection", by agreement with the environmental protection committee.

10. Ukraine

(a) The State Statistics Act and Orders Nos. 233, of 21 June 2010, and 492, of 9 December 2010, respectively on the approval of form No. 1-wastes (annual), entitled "Waste management", and of an annex to that form;

(b) Order No. 308 issued by the Ministry of Construction, Architecture and Housing, of 19 September 2006, on the approval of form No. 1-TPV, entitled "Report on solid waste management", and the instructions issued for its use;

(c) Order No. 342 issued by the Ministry of Ecology and Natural Resources, approving primary reporting model form No. 1-VT, entitled "Report on waste, packaged materials and tares", and the instructions for its use.

11. Uzbekistan

(a) The Wastes Act;

(b) The Statistics Act;

(c) Decisions of the Cabinet of Ministers;

(d) The State statistics reporting form entitled "Report on the generation, use and storage of toxic wastes".

B. National laws and regulations governing waste management

1. Armenia

(a) Act No. 159-N, the Wastes Act, of 24 November 2004;

(b) Hazardous wastes:

- Government Decision No. 97 of 8 December 1995 on the regulation of the import and export of hazardous and other wastes in Armenia and their transport through the country in transit
- Decision on licensing for the processing, decontamination, storage, transport and disposal of hazardous wastes
- Government Decision No. 97 of 2 March 2000 on observance by Armenia of its obligations under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

2. Azerbaijan

(a) The Environmental Protection Act, Act No. 678-1Q, of 8 June 1999;

(b) The Environmental Security Act, Act No. 677-1Q, of 8 June 1999;

(c) The Industrial and Household Waste Act, Act No. 514-1Q, of 30 June 1998;

(d) Cabinet of Ministers Decision No. 74 of 21 April 2005 entitled "Regulations on the temporary storage, transport and recovery of household waste in cities and other population centres in accordance with sanitation, hygiene and environmental standards";

(e) Cabinet of Ministers Decision No. 13 of 28 January 2008, entitled "Regulations for the inventorying of wastes generated through industrial processes";

(f) Cabinet of Ministers Decision No. 185 of 12 August 2008 entitled "Regulations for setting payments for the collection, disposal, use and reuse of wastes";

(g) Cabinet of Ministers Decision No. 41 of 31 March 2003 entitled "Regulations for the certification of hazardous wastes";

(h) Cabinet of Ministers Decision No. 117 of 25 August 2004 entitled "State strategy for hazardous waste management";

(i) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, to which Azerbaijan acceded in 2001;

(j) Cabinet of Ministers Decision No. 167 of 25 July 2008 entitled "Regulations for the transboundary movement of hazardous waste";

(k) Cabinet of Ministers Decision No. 213 of 28 December 2007 entitled "Requirements for the management of medical wastes".

3. Belarus

(a) The basic instrument governing waste management is the Waste Management Act. A number of subordinate enactments have been drawn up as well;

(b) Hazardous waste management is governed by the legislation on licensing. Under Presidential Decree No. 450 of 1 September 2010 on the licensing of various types of activity, the use of wastes of hazard classes 1 to 3 and their decontamination and burial are activities subject to licensing. Licensing in this field is done by the Ministry of Natural Resources.

4. Georgia

(a) Georgia adopted an Act on the transit and import of waste in 1995. It prohibits the transit and import of industrial, municipal or other types of hazardous or radioactive waste;

(b) Legislation on waste management does not yet exist (it is to be drawn up through a recently approved twinning project on waste management policy);

(c) The Environment Protection Act (1996);

(d) The Licenses and Permits Act (2005);

(e) The Health-care Act (2007);

(f) The Waste Transit and Import Act (1997);

(g) The Local Self-governance and Governance Act (2005);

(h) The National Action Plan on Persistent Organic Pollutants (21 April 2011);

(i) Order of the Minister of Health on sanitary rules and norms for construction and the organization of solid municipal waste landfills (1996);

(j) Amendment to the Environmental Impact Permit Act (22 March 2011), under which landfills already in operation must obtain permits by 1 January 2014;

(k) Statute of the Government of Georgia setting out the rules for the issuance of permits for the generation, transport, import, export, re-export and transit of restricted materials and establishing a list of such materials (28 September 2006), (implementation postponed to 1 July 2011).

5. Kazakhstan

(a) The regulations on the import, export and transit of wastes, approved by Government Decision No. 594 of 11 June 2007, are in keeping with the Basel Convention;

(b) Under the Environmental Code, wastes may be imported into Kazakhstan for processing, burial or storage only by decision by the Government, and only if there is the technical and technological capacity to manage such wastes;

(c) The import into the country of wastes for burial is prohibited under the Regulations on the import, export and transit of hazardous wastes in the customs territory of the customs union.

6. Kyrgyzstan

(a) State control is exercised under the Industrial and Consumer Waste Act and the Regulations on State control of environmental protection, the rational use of natural resources and environmental security, approved by Government Decision No. 295 of 25 May 2000;

(b) State environmental expert assessments and environmental impact assessments, carried out during planned activities and when authorization or a licence is issued for the management of the waste;

(c) The Licensing Act. In order to ensure standards for the generation of waste and for environmental quality, under Government Decision No. 103 of 25 February 2004 all physical persons and legal persons regardless of form of ownership must have authorization for the disposal of waste in the environment;

(d) Government Decision No. 709 of 29 October 1998 establishes a list of license-issuing organizations and licensing experts for the export of specific goods;

(e) Government Decision No. 260 of 31 May 2001 on the licensing of various types of entrepreneurial activity;

(f) Monitoring of waste generation, collection, storage, transport, burial and reuse. The Industrial and Consumer Waste Act makes provision for:

- State accounting for hazardous waste management
- The collection, processing and analysis of waste management information
- A State wastes register

7. Republic of Moldova

(a) The Industrial and Consumer Waste Act, Act No. 1347, of 9 October 1997;

(b) Government Decision No. 637 of 27 May 2003 on the control of transboundary carriage of wastes and their neutralization;

(c) Ministry of the Environment and Natural Resources Order No. 233, of 10 November 2003.

8. Russian Federation

(a) The Federal Environmental Protection Act, Act No. 7-FZ, adopted on 10 January 2002, is the basic legal instrument in the field of environmental protection;

(b) The Federal Industrial and Consumer Waste Act, Act No. 89-FZ, of 24 June 1998;

(c) The Federal Act on Ratification of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Act No. №49-FZ, of 25 November 1994

(d) Government Decision No. 255 of 28 March 2012 on the licensing of activities related to the collection, use, decontamination and disposal of waste of hazard classes 1 to 4.

(e) Article 72 of the Constitution (which establishes in part (e) that the Russian Federation and its constituent entities share jurisdiction in matters of natural resource management, environmental protection and safety, specially protected natural reserves and the protection of historical and cultural monuments). The constituent entities too adopt environmental protection and safety legislation, in keeping with the federal law;

(f) Government Decision No. 818 of 26 October 2000 on the State wastes register and implementation of a certification system for hazardous wastes;

(g) The federal waste classification catalogue (approved by Order No. 786 of the Ministry of Natural Resources and Ecology, of 2 December 2002);

(h) Government Decision No. 442 on the transboundary movement of wastes, of 17 July 2003;

(i) The federal service for the supervision of natural resource use issues authorization for the transboundary movement of hazardous wastes in accordance with the Basel Convention and Government Decision No. 442. It provides information to the Federal Customs Service, the Ministry of Transportation, the Ministry for Civil Defence, Emergencies and the Elimination of the Consequences of Natural Disasters, the Ministry of Health and Social Development and the Federal Environmental, Industrial and Nuclear Supervision Service to allow them to ensure supervision within their specified terms of reference;

(j) The import and export of hazardous waste is licensed by the Ministry of Industry and Trade, with authorization from the Federal Service for Monitoring the Use of Natural Resources. The actual transboundary movement of hazardous wastes is subject to customs controls carried out by the Federal Customs Service.

9. Tajikistan

(a) Industrial and Consumer Waste Act, (as Act No. 109 of 25 July 2005).

10. Ukraine

(a) The Waste Act, and all its subordinate enactments.

11. Uzbekistan

(a) The Waste Act and decisions issued by the Cabinet of Ministers;

(b) Sanitation regulations and standards;

(c) Regulatory instruments and guidelines drawn up by the State Committee on Environmental Protection.

II. National and international waste classifications in use in Eastern Europe, the Caucasus and Central Asia

2. The topic of waste classification is a major concern for the countries of Eastern Europe, the Caucasus and Central Asia. The use of different classification methods and definitions, the introduction of new classifications and inconsistencies in the terminology (for example, in respect of the definition of toxic waste, as opposed to hazardous waste) make data difficult to compare across countries. The ECE Survey asked about existing classifications related to waste, including classifications by economic activities, national and international waste classifications of waste categories or waste types and classifications of hazardous waste. The results of the survey are summarized below.

Table 1

Armenia

Classification of types of economic activity	NACE rev.2.
Classification of wastes	Inter-State wastes classification system approved by the Armenian Government.
Classification of hazardous wastes	The applicable hazardous wastes classification was introduced by an order of the Ministry of Environmental Protection in 2006. The list of hazardous wastes and degrees of hazard was approved by Government Decision No. 874-N of 20 May 2004. The list serves also as a classification. It includes the designation of the wastes, generation of wastes by type of industry and a code reflecting the degree of hazard.

Table 2

Azerbaijan

Classification of types of economic activity	NACE rev.2.
Classification of wastes	A statistical classification of wastes was drawn up in 2010. It is in keeping with EWC-Stat (Version 3) and the European list of waste.
Hazardous wastes classification	Prior to Azerbaijan's accession to the Basel Convention, the toxic properties of hazardous wastes were defined according to the temporary classification of toxic industrial wastes of 1985, which determined toxicity using four hazard classes. Since 2005 a gradual transition has been under way to the classification of the Basel Convention, i.e., annual statistical reporting on wastes is for the time being simultaneously drawn up by enterprises according to the two classifications, with a subsequent transition solely to the Basel Convention classification.

Table 3

Belarus

Classification of types of economic activity	Since 2007, National Classification 005-2006, entitled “Types of Economic Activity”, has been in use. It was approved by Decision No. 65 of the State Committee for Standardization, of 28 December 2006.
Classification of wastes	The classification of wastes generated in Belarus was approved by Decision No. 85 of the Ministry of Natural Resources and Environmental Protection, of 8 November 2007.
Classification of hazardous wastes	The designation of wastes as hazardous is done in accordance with a classification that divides industrial wastes into five categories: hazardous (with four hazard classes) and not hazardous. The Waste Management Act introduced the following classification by type of waste, according to: • Origin – industrial wastes or consumer wastes • Physical state – solid or liquid wastes • Degree of hazard – hazardous wastes and non-hazardous wastes • Possibilities for use – reprocessing of resources and other industrial and consumer wastes Hazardous wastes are classified according to the class of hazard: • Class 1 hazard – exceptionally high hazard • Class 2 hazard – high hazard • Class 3 hazard – moderate hazard • Class 4 hazard – low hazard

Table 4

Georgia

Classification of types of economic activity	NACE classification.
Classification of wastes	No national classification exists.
Classification of hazardous wastes	Basel Convention classification.

Table 5

Kazakhstan

Classification of types of economic activity	The General Classification of Types of Economic Activity, based on the NACE international standard (2000–2008).
Classification of wastes	–
Classification of hazardous wastes	Since 2009, the Classification of Wastes of the Ministry of Environmental Protection has been in use. It was approved by an order issued by the Ministry on 31 May 2007, based on the Basel Convention.

Table 6

Kyrgyzstan

Classification of types of economic activity	State Classification 014-2011 of types of economic activity, version 3, approved by Government Decision No. 9 of 11 January 2011. The classification is based on the NACE classification.
Classification of wastes	In order to ensure implementation of the Industrial and Consumer Waste Act and to bring the laws and regulations governing waste management into line, Government Decision No. 9 of 15 January 2010 approved a classification of hazardous wastes and methodological recommendations for determining hazard classes. They were drawn up on the basis of inter-State standard GOST 17.9.1.2-2001, entitled "Environmental protection. Waste management. Classification of wastes. Identification and coding. Basic provisions". The classification sets out a list of wastes, along with their characteristics and codes.
Classification of hazardous wastes	The classification of hazardous wastes was approved by Government Decision No. 9 of 15 January 2010. According to the Instructions for filling in hazardous waste certificates, the hazardous characteristics of the waste are determined in accordance with annex III of the Basel Convention, which covers toxic, flammable, explosive and highly reactive substances and those containing infectious agents.

Table 7

Republic of Moldova

Classification of types of economic activity	The national classification of types of economic activity is based on NACE rev.1.
Classification of wastes	The 1997 Moldova Statistical Classification of Wastes is used for the collection and processing of information on wastes. There are plans to transfer to the European list of waste once a new legislative act on wastes is adopted and enters into force.
Classification of hazardous wastes	Toxic wastes are classified using a classification of toxic industrial wastes (with four hazard classes) approved by the Ministry of Health. The classification of toxic wastes does not encompass all hazardous wastes as required by the Basel Convention and ECE requirements.

Table 8

Russian Federation

Classification of types of economic activity	Statistics from federal statistical observation form No. 2-TP (wastes) are processed in accordance with the Russian National Classification of Types of Economic Activity, which is based on a harmonization with the official Russian-language version of NACE rev.1, with the maintenance in the national classification of the NACE rev.1 codes (including the four figures) and designations of the corresponding positions, with no changes in the scopes of the concepts in question.
Classification of wastes	Industrial wastes are classified in accordance with the classification catalogue of wastes drawn up by the federal Ministry of Natural Resources and Ecology.
Classification of hazardous wastes	The concept of "non-hazardous industrial wastes" does not exist in Russian law. All industrial and consumer wastes are considered hazardous. They are distinguished by the degree of hazard in question. Wastes are divided into five hazard classes in the light of their negative impact on the environment, in accordance with established criteria (art. 4.1 of the Industrial and Consumer Waste Act, Federal Act No. 89-FZ, of 24 June 1998). Class I – exceptionally high hazard Class II – high hazard Class III – moderate hazard Class IV – low hazard Class V – practically no hazard Federal statistical observation form No. 2-TP (waste) is filled in separately for each type of waste, with an indication of the code assigned by the federal waste classification catalogue approved by Order No. 786 of the Ministry of Natural Resources, of 2 December 2002. The data are successively entered for the classes, beginning with hazard class I and moving down to hazard class V, including by type of economic activity, according to a classification in line with NACE rev.1. Government Decision No. 442 on the transboundary movement of wastes, of 17 July 2003, includes a list of wastes subject to monitoring under the Basel Convention, which is used for the preparation of the country's reports under the Convention. Work is now under way to bring the list into line with the European list of waste for transboundary movement.

Table 9

Tajikistan

Classification of types of economic activity	The European waste classification is used for statistics on communal waste.
Classification of wastes	The European Waste Catalogue of the European Union is used.
Classification of hazardous wastes	So far, no official statistical reporting on hazardous waste has been introduced.

Table 10

Ukraine

Classification of types of economic activity	NACE rev.1.1.
Classification of wastes	For State statistics on the generation and management of waste in accordance with form No. 1-wastes, and for the issuance by agencies of the Ministry of Ecology and Natural Resources of authorizations to generate and manage waste, State waste classification DK 005-96 is used. The European Waste Catalogue for Statistics (EWC-Stat), adapted to the national accounting of wastes (containing 31 of the 48 category codes relating to hazardous wastes), is used for State statistics on the generation and management of wastes under form No. 1-wastes. The European list of waste is used by the agencies of the Ministry of Ecology and Natural Resources when documents are drawn up for the transboundary movement of hazardous wastes.
Classification of hazardous wastes	Two classifications are used in parallel to account for hazardous wastes in Ukraine: 1. For enterprises and organizations within the country: a toxicological classification. Class I – exceptionally high hazard Class II – high hazard Class III – moderate hazard Class IV – low hazard 2. The Basel Convention classification is used for the transboundary movement of wastes and for the issuance of the associated authorizations, as well as for the licensing of operations involving hazardous wastes.

Table 11

Uzbekistan

Classification of types of economic activity	National classification of services by type of activity.
Classification of wastes	–
Classification of hazardous wastes	Basel Convention, O'z RH 84.3.8: 2004, entitled “Methodology for assessing waste hazards”.

III. Definitions and terminology related to waste in the countries of Eastern Europe, the Caucasus and Central Asia

3. The definitions and terminology related to waste statistics provided below are based on the responses from the countries covered by the ECE survey. On several occasions countries did not provide exact definitions, therefore, other sources for this information were used. Sources are indicated under each table.

Table 1

Armenia

Waste	Industrial waste and household refuse (hereafter referred to as "waste"): Remains of materials, raw materials, output, products and production derived from industrial and consumer activities, as well as goods (products) that have lost their initial usefulness.
Municipal waste	n/a
Household waste	n/a
Waste management	Waste management: Activities aimed at the prevention of waste generation or at the collection, transport, disposal, processing, reprocessing, recycling, removal, or decontamination of waste or its use in landfills.
Hazardous waste	Hazardous waste: Waste with physical, chemical or biological characteristics that are or may be dangerous to human health or environmentally harmful and whose management requires special treatment methods, procedures and means (Basel Convention).
Recycling	Waste utilization: Use of waste for the production of goods, the generation of energy or other purposes. Waste recycling: Reprocessing of waste or use of waste for the production of energy.
Landfill	Waste storage: Temporary placement of waste in specially provided areas and structures for its further recycling or removal. Waste landfill: Final placement of waste in specially designated areas or structures in order to eliminate its impact on human health and the environment.
Treatment/disposal	Waste processing, reprocessing: Technological operations to change the physical, chemical or biological characteristics of waste. Waste removal: Waste management activities which do not result in the recycling of waste. Waste decontamination: Decrease or elimination of the hazardous characteristics of waste through mechanical, physical-chemical or biological processing. Waste disposal: Isolation of the waste, precluding its further use, and aimed at its neutralization and the prevention of transmission into the environment of dangerous substances.

Construction	n/a
Incineration	n/a
Total amount of municipal waste collected	n/a

Source: Basel Convention questionnaire; the Wastes Act of 24 November 2004.

Table 2

Azerbaijan

Waste	Industrial waste: Substances, items and materials generated in a production process, in agriculture or in a services sector, that are unfit for use at the place of generation and that have fully or partially lost their primary usefulness.
Municipal waste	n/a
Household waste	Household waste (solid household waste): Items, substances and materials generated by domestic life.
Waste management	n/a
Hazardous waste	Hazardous waste: Waste containing toxic, infectious, explosive or highly reactive or flammable substances with hazardous properties, creating either a potential or a direct danger to human life or the environment.
Recycling	n/a
Landfill	Movement of waste: Activity for the storage or burial of wastes.
Treatment/disposal	Waste treatment: Activity specifically aimed at collecting, conserving, sorting, transporting and decontaminating waste. Waste decontamination: Waste treatment at special facilities (including incineration) or burial to reduce the environmental impact and impact on human health of the waste.
Construction	n/a
Incineration	n/a
Total amount of municipal waste collected	n/a

Source: The Industrial and Consumer Waste Act.

Table 3

Belarus

Waste	n/a
Municipal waste	Communal wastes: Consumer and industrial wastes included in a list of wastes approved by the Ministry of Housing and Communal Services as being communal wastes, and the disposal of which is organized by local authorities and administrative bodies.

Household waste	n/a
Waste management	n/a
Hazardous waste	Hazardous waste: Wastes generated in Belarus and so defined in accordance with the classification of wastes are hazardous wastes.
Recycling	In Belarusian law “recycling” corresponds with the concept of “use”.
Landfill	Landfill: Facilities for the burial of wastes.
Treatment/disposal	Treatment/disposal: Temporary storage of waste or transport to waste storage, burial or decontamination facilities and/or waste use facilities.
Construction	
Incineration	Incineration includes both the use and the decontamination of waste.
Total amount of municipal waste collected	n/a

Source: UNECE Survey.

Georgia

4. No national definitions drawn up yet.

Table 4

Kazakhstan

Waste	Industrial and consumer waste (waste): Remains of raw materials, materials and other products generated during the production and consumption processes, as well as goods (production) that have lost their usefulness (Basel Convention).
Municipal waste	n/a
Household waste	n/a
Waste management	n/a
Hazardous waste	Hazardous waste: Waste containing hazardous substances with dangerous (toxic, explosive, radioactive, highly reactive) properties and that may represent a direct or potential danger for the environment and human life, independently or when in contact with other substances (Basel Convention).
Recycling	n/a
Landfill	n/a
Treatment/disposal	n/a
Construction	n/a
Incineration	n/a

Total amount of municipal waste collected	n/a

Source: Basel Convention questionnaire.

Table 5

Kyrgyzstan

Waste	Industrial waste: Remains of materials, raw material and semi-finished products generated in the production process or in carrying out works, and that have fully or partially lost their usefulness, as well as accompanying substances generated during the production process, and that are not used during such production. Consumer waste: Goods, materials and substances that have lost their usefulness as a result of physical or other obsolescence. Consumer waste also includes solid household waste generated by domestic life.
Municipal waste	n/a
Household waste	See "consumer waste".
Waste management	Waste management: All activities related to the collection, storage, use, decontamination, transport and burial of wastes.
Hazardous waste	Hazardous waste: Waste (apart from radioactive waste) containing substances having one of the hazardous properties (i.e., toxic, infectious, explosive, flammable or highly reactive) in sufficient quantity and in such a form that it represents a direct or potential danger to human health or the environment, either independently or when in contact with other substances.
Recycling	Use of waste: Utilization of waste in production or services, or to produce energy.
Landfill	Waste disposal: Any operation for the storage and burial of wastes. Waste storage: Keeping of wastes in specially equipped storage facilities awaiting removal for burial, decontamination or use. Waste burial: Sealing off of waste so as to prevent pollutants from entering the environment, excluding the further use of the wastes in question. Waste disposal facility: Waste disposal grounds, storage facilities, waste dumps, slurry pits, tailings ponds, rock dumps and other specially equipped places for the storage and burial of waste.
Treatment/disposal	Waste decontamination: Waste treatment (including incineration) at specialized facilities, reducing the waste's hazardous effects on the environment and on people.
Construction	n/a
Incineration	n/a

Total amount of municipal waste collected	n/a

Source: The Industrial and Consumer Waste Act, Act No. 89, of 13 November 2001.

Table 6

Republic of Moldova

Waste	Waste: Substances, materials or articles from the statistical classification of wastes that the owner or producer discards, intends to discard or is obliged to discard as refuse (Basel Convention). Waste: Substances, materials, articles or remains of raw materials generated from use in economic activity, in the consumption process or in everyday life and fully or partially having lost their initial usefulness, some of which is suitable, after treatment, for reprocessing. Industrial waste: Waste generated in certain technological processes.
Municipal waste	n/a
Household waste	Consumer waste: Household waste from everyday consumption.
Waste management	Waste management: Any activity related to the generation of waste and its treatment, packaging, disposal, transport, storage, decontamination, processing, use, burial or destruction.
Hazardous waste	Hazardous waste: Waste with one or more of the properties listed in List A (Annex 1 to the Regulations on control of transboundary transport of wastes and their disposal) (Basel Convention). Hazardous waste: Waste of a toxic, flammable, explosive, corrosive, infectious or other nature which, if left in the environment, may harm plants, animals or people.
Recycling	Waste processing: Technological operations (crushing, cutting, compacting, briquetting, grinding, melting-casting, fermenting, etc.) that change the waste's composition or physical, chemical or biological properties with the aim of transforming it into reprocessed material or decontaminating it and disposing of it without an environmental risk. Use of waste: Economic recuperation of waste as material resources, or for its reuse, after reprocessing, as semi-finished products, or integrated products or for the production of energy.
Landfill	Waste disposal: Storage of waste at authorized and specially equipped locations (waste disposal grounds, landfills, underground waste facilities) with the aim of burying or temporarily storing it, with the possibility of later reprocessing or use.
Treatment/disposal	Waste decontamination: Physical, chemical or biological waste processing to remove or diminish the properties of the waste presenting a danger to the environment or to human health.

Construction	n/a
Incineration	n/a
Total amount of municipal waste collected	n/a

Source: Basel Convention questionnaire; the Industrial and Consumer Waste Act, Act No. 1347, of 9 October 1997.

Table 7

Russian Federation

Waste	Industrial and consumer waste (hereinafter "waste"): Remains of raw materials, materials, semi-finished products and other goods and products produced in an industrial or consumption process, and also goods (and products) that have lost their usefulness.
Municipal waste	n/a
Household waste	n/a
Waste management	Waste management: Activities related to collection, storage, use, decontamination, transport and disposal of waste. Waste collection: Reception or intake of waste from physical or legal persons for its further use, decontamination, transport or disposal. Waste storage: Temporary storage of waste (for a period of six months or less) at a place (or facility) developed to meet legal environmental protection requirements, in keeping with the law relating to public health and epidemiology, with the aim of its further use, decontamination, disposal or transport.
Hazardous waste	Depending on the degree of environmental impact, waste is divided into five classes, in accordance with criteria established by the federal executive agency responsible for environmental protection: Class I – exceptionally high hazard Class II – high hazard Class III – moderate hazard Class IV – low hazard Class V – practically no hazard
Recycling	Use of waste: Utilization of waste to produce goods (or production) or to do work, provide services or produce energy.
Landfill	Waste disposal: Storage and burial of waste. Waste storage: Keeping of wastes in waste storage facilities with the aim of its further burial, decontamination or use. Waste burial: Sealing off of waste which is not subject to further use in special waste storage facilities, with the aim to prevent hazardous substances from entering the environment. Waste disposal facility: Specially equipped facility designed for

	waste disposal (waste disposal grounds, slurry pits, tailings ponds, rock dumps and other facilities).
Treatment/disposal	Waste decontamination: Processing of waste, including through incineration and decontamination at specialized facilities, with the aim of preventing harmful effects of the waste on human health and the environment.
Construction	n/a
Incineration	n/a
Total amount of municipal waste collected	n/a

Source: The Federal Industrial and Consumer Waste Act of 24 June 1998, Act No. 89-FZ.

Table 8

Tajikistan

Waste	Consumer waste: Manufactured goods, materials and substances that have fully or partially lost their usefulness in the consumption process.
Municipal waste	n/a
Household waste	Solid household waste: Consumer waste generated as a result of domestic life in populated areas.
Waste management	Waste management: All types of activity related to the collection, storage, transport, use, decontamination and burial of waste.
Hazardous waste	Hazardous waste: Waste containing substances with one of the hazardous properties (i.e., toxic, infectious, explosive, flammable or highly reactive) in such a quantity and in such a form that they represent a direct or potential danger to human health or the environment, either independently or when in contact with other substances.
Recycling	Use of waste: Utilization of waste in production or services or to produce energy.
Landfill	Waste storage: Keeping of wastes in specially equipped storage facilities awaiting removal for burial, decontamination or use.
	Waste burial: Sealing off of waste so as to prevent pollutants from entering the environment, excluding the further use of the wastes in question.
	Waste disposal facility: waste disposal grounds, authorized waste dumps, slurry pits, rock dumps and other specially equipped places for the storage and burial of wastes.
	Transboundary movement: Any transport of waste from a region under the national jurisdiction of another State.
Treatment/disposal	Waste decontamination: Treatment (including incineration) at specialized waste treatment facilities, reducing the hazardous effect of the waste on the environment and on people.

Construction	n/a
Incineration	n/a
Total amount of municipal waste collected	n/a

Source: The Industrial and Consumer Waste Act, Act No. 109, of 25 July 2005.

Table 9

Ukraine

Waste	Any substances, materials or articles generated in a production or consumption process or goods that have fully or partially lost their usefulness and have no further use at the place where they are generated or produced, and that the owner discards, intends to discard or is obliged to discard, through reprocessing or removal.
Municipal waste	The term "municipal waste" is not used.
Household waste	Household waste: Waste generated through domestic life and human activity in homes and other buildings (solid, outsized, renovation-related and liquid wastes, aside from those generated in the production activities of enterprises), and that are not used at the location where they are generated.
Waste management	Waste management operations: Collection, transport, storage, treatment (or re-treatment), use, removal, decontamination and burial of waste.
Hazardous waste	Waste having physical, chemical, biological or other hazardous properties that create or can create a significant danger to the environment and human health and that require special methods and means of waste management.
Recycling	The term "recycling" is not used. Reprocessing: Utilization of waste as a reprocessed material or energy source.
Landfill	This term covers specially assigned places or facilities (places for waste disposal, depots, waste disposal grounds, complexes and buildings) the use of which has been allowed by specifically authorized bodies for the removal of waste, or to carry out operations with waste. There is no definition of a controlled waste dump.
Treatment/disposal	n/a
Construction	n/a
Incineration	The term "incineration" is not in use. Decontamination: Reduction or elimination of the waste hazard, using mechanical, physical and chemical or biological treatment. The term "incineration with energy production" is not in use. The term "combustion for energy production" is used instead. There is no definition of the term.

Total amount of municipal waste collected	Instead, the term “household waste removal service” is used: Collection, storage, transport, treatment, reprocessing, decontamination and burial of household waste in populated areas, in accordance with the regulations relating to public services approved by the local authorities.

Source: ECE Survey.

Table 10

Uzbekistan

Waste	Waste: The remains of raw materials, generated during the process of production of goods or energy or the provision of services, and that have fully or partially lost their primary usefulness (industrial wastes), and also goods and materials that have lost their usefulness as a result of their physical wear and tear or age (consumer wastes). (Document O'z RH 84.3.19:2005, time frames and definitions) (Basel Convention). Waste: The remains of raw materials, materials and semi-finished products generated during the production and consumption processes, as well as goods (production) that have lost their usefulness.
Municipal waste	n/a
Household waste	n/a
Waste management	Waste management: Activity related to the generation, collection, storage, transport, burial, processing, reprocessing or sale of waste. Waste management facility: Facility used for the collection, storage, transport, burial, processing, reprocessing or sale of waste.
Hazardous waste	Hazardous waste: Waste containing substances having hazardous (toxic, infectious, explosive, flammable or highly reactive) properties and in such quantities that they represent a direct or potential danger to the environment or to human life or health, and also, in contact with other substances, to the environment (Document O'z RH 84.3.19:2005, time frames and definitions) (Basel Convention). Hazardous waste: Waste containing substances with at least one of the hazardous properties (toxic, infectious, explosive, flammable, highly reactive, radioactive) and in such quantities and in such a form that they represent a direct or potential danger to human life or health or to the environment, either independently or when in contact with other substances.
Recycling	Reprocessing of waste: Extraction from waste of valuable components, or the use of waste as reprocessed material, fuel or fertilizer, or for another purpose.
Landfill	Waste burial: Sealing off of waste so as to prevent pollutants from entering the environment, excluding the further use of the wastes in question.

	Waste storage: Keeping of wastes in specially equipped storage facilities awaiting removal for burial, decontamination or reprocessing.
	Waste disposal facility: Specially designated and equipped place for the storage and burial of waste.
Treatment/disposal	Waste processing: Technological operations to change the physical, chemical or biological characteristics of waste with the aim of preparing it for environmentally safe storage, transport or reprocessing.
Construction	n/a
Incineration	n/a
Total amount of municipal waste collected	n/a

Source: Basel Convention questionnaire; the Waste Act, Act No. 362-II, of 5 April 2002.

IV. Mechanisms for interdepartmental cooperation for the exchange of information on waste in the countries of Eastern Europe, the Caucasus and Central Asia

5. Effective inter-agency cooperation is key to improving the quality of data produced in a country. Often different institutions in a country collect and report different data on the same waste category or waste type. Lack of coordination sometimes leads countries to report different numbers to the various international bodies. The ECE secretariat therefore conducted a survey to address the issue. It requested the countries of Eastern Europe, the Caucasus and Central Asia to provide information on the responsibilities of the various national agencies and on the cooperation mechanisms in place. The information on the inter-agency cooperation provided below is based on the responses of the countries covered by the ECE survey.

A. Armenia

6. The main cooperating agencies are the Ministry of Environmental Protection, the Ministry of the Economy, the Ministry of Energy and Natural Resources, the National Statistical Service, municipalities, commercial organizations and legal persons. The coordination is regulated by appropriate laws. Data on hazardous waste is presented by the customs service of the State Revenue Committee, in accordance with interdepartmental agreements and the Act on State Statistics.

B. Azerbaijan

7. Regional statistical administrations collect and analyse statistics reported by enterprises and then transfer primary data from the respondents (enterprises producing waste) to the Main Computing Centre of the State Committee on Statistics. All the information collected from the regions is verified, compared with the previous year's and condensed for the entire country. The national digest is divided by type of economic activity and by region. All the data are then forwarded to the State Committee on Statistics, where they are verified and compared. Thereafter, a news release and a users' statistical bulletin are prepared, and the data are posted on the website of the State Committee on Statistics and published in statistical handbooks.

C. Belarus

8. Companies send reporting forms annually to a single State-authorized enterprise, "Ekologiya Belarusian Scientific Research Centre". Later, data from the Ministry of Natural Resources are sent to the National Statistical Committee.

9. Organizations collecting and removing communal waste report data annually to the Ministry of Housing and Communal Services.

10. Information on licences issued for the transboundary movement of waste is transmitted online to the State Customs Committee. Accounting for wastes is done by the Ministry of Natural Resources and the State Customs Committee.

D. Georgia

11. The last waste accounting was carried out in 2007 as part of an international project. Since then, data have not been reviewed. There is also a problem with the statistics of generated waste. There is no data collection system, and no system exists for exchanging information among the corresponding State institutions. Various establishments have fragmentary information on waste. The revenue service of the Ministry of Finance, together with the Ministry of Environmental Protection, monitor the transboundary movement of waste. The technical and building inspectorate of the Ministry of Economic and Sustainable Development is responsible for issuing authorizations and for waste import, export and transit controls. Local municipalities have data on household waste.

12. Under Georgian law, the local municipalities are responsible for providing household waste services and for removal.

E. Kazakhstan

13. From 2000 to 2008, data on waste generation was compiled by the Statistical Agency of Kazakhstan, but only for the volume of hazardous waste generated. In 2009, responsibility for hazardous waste was transferred to the Ministry of Environmental Protection. Data on household waste has been compiled by the Statistical Agency since 2005.

14. Data on the final removal of municipal waste is compiled by the Statistical Agency.

15. Data on the import, export, processing and removal of hazardous wastes in 2009 and 2010 were submitted by the Ministry of Environmental Protection.

F. Kyrgyzstan

16. The National Statistical Committee is responsible for collecting data on the generation, treatment and removal of waste from respondents (economically active entities) managing industrial and consumer waste, regardless of their form of ownership, and from enterprises involved in the movement of industrial and consumer waste (waste disposal grounds, slurry pits, tailings ponds, rock dumps, mining dumps, ash disposal areas, etc.).

17. Information on the transboundary movement of hazardous waste is prepared by the State Agency for Environmental Protection and Forestry, based on data from the State customs service.

G. Republic of Moldova

18. Information is collected by the local bodies of the Ministry of the Environment, and is processed by the National Statistics Bureau to produce aggregate data. Data on municipal waste are drawn up and collected from economic agents by the National Statistics Bureau. The Ministry of the Environment issues notices and accompanying documents on the transboundary movement of waste, including hazardous waste.

H. Russian Federation

19. The federal Ministry of Natural Resources and Ecology and the Federal State Statistics Service cooperate closely. The collection and processing of primary data from economic agents and the presentation to users of aggregate statistics is done by the federal service for the supervision of natural resource use, a unit of the Ministry of Natural Resources and

Ecology. Data on the removal of solid household waste by specialized transport services are collected and processed by the Federal State Statistics Service, which also publishes official statistical data. The federal statistical plan is approved by a federal Government order.

20. The federal service for the supervision of natural resource use issues authorizations for the transboundary movement of hazardous wastes, in accordance with the Basel Convention and Government Decision No. 442. It provides information to the Federal Customs Service, the Ministry of Transportation, the Ministry for Civil Defence, Emergencies and the Elimination of the Consequences of Natural Disasters, the Ministry of Health and Social Development and the Federal Environmental, Industrial and Nuclear Supervision Service, to allow them to ensure supervision within their specified terms of reference. The import and export of hazardous waste is licensed by the Ministry of Industry and Trade, with authorization from the federal service for the supervision of natural resource use.

I. Tajikistan

21. Since 2009, data have been collected by statistical bodies using annual report form 1-wastes, entitled "Report on the generation of communal wastes in the context of public collection", by agreement with the environmental protection committee.

J. Ukraine

22. The Ministry of Regional Development, Construction, Housing and Public Utilities collects information on solid household waste. The Ministry of Ecology and Natural Resources, the Ministry of Regional Development, Construction, Housing and Public Utilities and the State Statistics Service cooperate together on questions related to accounting for waste. The cooperation calls for the keeping of registers of State agencies whose activities are related to waste management, so as to set up a register of entities and provide for the possibility of obtaining quality waste accounting information.

23. Information on the transboundary movement of hazardous waste is collected at customs border stations by the environmental inspection service, and is then passed on to the agencies concerned. The State statistical bodies do not receive such information.

K. Uzbekistan

24. Data on waste is given by enterprises to the provincial branches of the State Statistics Committee, in agreement with the provincial committees of the State Committee on Environmental Protection. The data are then sent on to the main office of the State Statistics Committee.

V. Publication of statistical data on waste

25. Information is not always readily available in national publications. Below is a summary of the main publications related to waste as provided by the countries of Eastern Europe, the Caucasus and Central Asia.

A. Armenia

(a) National reports and departmental accounting by the Ministry of Environmental Protection (www.mnp.am);

(b) Statistical handbook: “The Environment and Natural Resources in Armenia”;

(c) Statistical yearbooks;

(d) www.armstat.am (National Statistical Service).

B. Azerbaijan

(a) Statistical handbook: “The Environment in Azerbaijan”;

(b) Statistical handbook: “Statistical Indices in Azerbaijan”;

(c) www.azstat.org (State Statistical Committee).

26. At the end of each year, a news release is issued on industrial and household waste, along with two statistical bulletins on these types of waste. This material is sent to the country’s main bodies.

C. Belarus

(a) Annually, in the “State of the Environment in Belarus” environmental bulletin (circulation: 1,000 copies);

(b) Statistical Yearbook of the Republic of Belarus (in Russian and English);

(c) The “Belarus and Russia” compendium (annually);

(d) The “Environmental Protection in the Republic of Belarus” compendium (in Russian and English), once every two years;

(e) The “Regions of Belarus” compendium;

(f) www.minpriroda.by (Ministry of Natural Resources and Environmental Protection).

D. Georgia

27. Indices are not currently published.

E. Kazakhstan

(a) Statistical handbook: “Environmental Protection and Sustainable Development” (annual), in Kazakh and Russian, trends from 2006 to 2010, http://www.stat.kz, Statistics Agency of Kazakhstan;

(b) National Report on the Environment in Kazakhstan in 2009, Kazakh Scientific Research Institute for Ecology and Climate (National State Enterprise), Ministry of Environmental Protection of Kazakhstan, Almaty, 2010, circulation: 100 copies, in Russian, http://www.aarhus.kz/media/nac_report_2009.rar;

(c) Statistical handbook: “Regions of Kazakhstan in 2009”, Astana, 2010, circulation: 500 copies, Statistics Agency of Kazakhstan: http://www.stat.kz/publishing/2010/Ежегодник%20РЕГИОНЫ%20КАЗАХСТАНА.pdf;

(d) Bulletin: “Collection, removal, sorting and deposit of communal waste”: http://www.stat.kz/publishing/Pages/OOS_2011.aspx;

(e) Report: “Preparation of a report by the Republic of Kazakhstan on control of the transboundary movement of hazardous waste and its removal and review of waste recognized as hazardous in Kazakhstan”, Environmental Information and Analysis Centre (National State Enterprise), Ministry of Environmental Protection of Kazakhstan, in Russian, Astana, 2008, 2009, 2010.

F. Kyrgyzstan

(a) National report on the state of the environment in Kyrgyzstan;

(b) Statistical handbook: “Environmental protection in Kyrgyzstan”;

(c) Statistical yearbook of the Republic of Kyrgyzstan;

(d) www.nature.kg (State Agency on Environmental Protection and Forestry).

G. Republic of Moldova

(a) Statistical yearbook of the Republic of Moldova;

(b) National reports on the state of the environment;

(c) Statistical handbook: “Natural resources and the environment in the Republic of Moldova”;

(d) Information on the transboundary movement of waste is presented to the secretariat of the Basel Convention;

(e) www.statistica.md (National Bureau of Statistics);

(f) www.mediu.gov.md (Ministry of the Environment).

H. Russian Federation

(a) Annual State reports: “State of the environment and environmental protection in the Russian Federation”;

(b) Statistical publications of the Federal State Statistics Service, including:

- Russian statistical yearbook
- Environmental protection in the Russian Federation
- Basic indicators of environmental protection

(c) www.gks.ru (Federal State Statistics Service);

(d) www.mnr.gov.ru (Ministry of Natural Resources and Ecology);

(e) www.rpn.gov.ru (federal service for the supervision of natural resource use, a unit of the Ministry of Natural Resources and Ecology).

I. Tajikistan

(a) Statistical handbook: “Environmental protection in the Republic of Tajikistan”.

J. Ukraine

(a) Ministry of Ecology and Natural Resources (annually):

- National report on the state of the environment in Ukraine (Ministry of Ecology and Natural Resources)
- Analytical report: “State of the environment”
- Reports
- Departmental reports of the Ministry

(b) State Statistics Service (annually):

- Handbook: “Statistical yearbook of Ukraine”
- Handbook: “Regions of Ukraine”
- Handbook: “Environment of Ukraine”
- Analytical report: “The environment”
- Section of a news release on agricultural and environmental statistics entitled “Waste management”

(c) www.ukrstat.gov.ua (State Statistics Service of Ukraine).

K. Uzbekistan

(a) National report on the state of the environment and the use of natural resources in Uzbekistan;

(b) Annual statistical handbooks issued by the State Statistics Committee.