UDC: 311+628
JEL Classification: C40, Q52, Q53
doi: 10.31767/nasoa.4-2020.03

O. MOTUZKA,
PhD in Economics,
Associate Professor of Department
of Economics and Management of Foreign Economic Affairs,
National Academy of Statistics, Accounting and Audit;
e-mail: olmotuzka@gmail.com,
ORCID: 0000-0001-9028-6994,
ResearcherID: K-6501-2018

An Analysis of the International Law on Waste Statistics

The article contains an analytical review of the regulatory framework in the waste statistics. By summing up documentary evidences (conventions on protection of the population health and environment, objectives and indicators of Sustainable Development Goals, related with waste), it is demonstrated that waste statistics plays important role in identifying waste-specific problems, priority setting in waste management, formulating and implementing policy goals in waste management.

It is shown that the waste statistics is collected by various international entities, and reports on waste generated in the process of economic activities are made up using two main classifications: International Standard Industrial Classification of All Economic Activities (ISIC), and Statistical Classification of Economic Activities in the European Community (NACE). The EU practices in the waste statistics are highlighted. The EU approach to waste treatment is based on "waste hierarchy". In practice, a major part of EU countries collects the data on waste types by the List of Waste. After that, the conformity between the types of waste and EWC-Stat is set using the translation table given in Annex III to the Waste Statistics Regulation. Only several countries collect data by the reliance on EWC-Stat.

Problems faced by the waste statistics are discussed (inadequate comparability of waste statistics due to different methods and definitions used in the data production; incomplete coverage of waste-specific issues by the official waste statistics), sources of these problems are determined.

The analysis demonstrates that the waste statistics is a rather new field in EU, which evidence is the ongoing change in the EU regulatory framework. The countries producing waste data with reference to it or implementing it should do it by taking account for the most recent change. The need for harmonization of national methodologies in the waste statistics is highlighted.

Keywords: *classification of waste, convention, waste statistics, waste treatment, waste management.*

О. М. МОТУЗКА,
кандидат економічних наук,
доцент кафедри економіки та менеджменту
зовнішньоекономічної діяльності,
Національна академія статистики, обліку та аудиту

Аналіз міжнародного законодавства в сфері статистики відходів

Досліджено міжнародну нормативно-правову базу в сфері статистики відходів шляхом аналізу відповідних рамкових документів. Розглянуто підходи до збирання даних про відходи, використовувані для цього міжнародні класифікації, визначено категорії даних, що збираються, проблеми статистики відходів і причини їх виникнення. Окрему увагу в дослідженні приділено практиці ЄС у сфері статистики

відходів. Показано, що статистика відходів є порівняно новою сферою у ЄС, про що свідчать постійні зміни європейського законодавства. На підставі результатів зробленого аналізу підкреслено необхідність гармонізації національних методологій у зазначеній сфері.

Ключові слова: *класифікація відходів, конвенція, статистика відходів, поводження з відходами, управління відходами.*

Introduction. The current Ukrainian practices of waste treatment show the increasing adverse effect for the environment and human health, and ineffective utilization of material and energy resources.

According to the State Statistics Service of Ukraine, nearly 500 million tons of waste is generated annually in the country, including waste in extracting (76%) and manufacturing (about 18%) industry, agriculture (2%) and solid household waste [1].

Hence, an effective waste management system and waste statistics is of critical importance in setting up regional, national and sub-national policies on waste treatment. The main framework documents requiring the comparability of waste statistics are as follows:

1. Sustainable Development Goals (7 indicators related with waste).

2. Basel Convention on the Control on Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention).

3. European Union: Waste Framework Directive 2008/98/EC, Regulation (EC) 2150/2002 on waste statistics, etc.

4. OECD: Recommendations of the Council on Environmentally Sound Waste Management.

The above political framework requires data on scopes (mass) of waste generation and waste utilization (including collection, processing and removal), first and foremost municipal, industrial and dangerous waste, and the level of its processing. Waste statistics is needed for the assessment of national and international political goals specific to waste (e. g. waste generation per capita, national level of waste processing, etc.) and their implementation progress.

However, the increasing demand for waste statistics raises important conceptual and methodological problems. Differences in concepts, definitions and methodologies entail the incomparability of data. The main directive documents provide only general guidelines and leave aside countless unresolved issues related with approaches and interpretations [2].

The abovementioned problems cause the importance of studies pertaining to various aspects of international and national law on waste statistics.

Literature review. Adverse effects of business operation for the environmental performance in Ukraine have been in focus of domestic economists: B. Danylyshyn, S. Dorohuntsov, V. Mesel-Veseliak, I. Sivachenko, M. Fedorov, V. Fedoriak, M. Khvesyk, and others [3].

Problems of statistical assessment of environmental effects have been addressed by V. Danylko, O. Yelisieieva, A. Yerina, T. Kobylynska, O. Osaulenko, N. Parfentseva, and others. But fundamental research works dealing with issues of waste statistics are still lacking in the Ukraine.

The objective of the article is to analyze the international law on waste statistics.

Research results. The key documents defining the principles of waste treatment and respective priorities in Ukraine are the Laws of Ukraine "Waste" [4] and "Protection of Natural Environment" [5].

The main policy objectives in waste treatment, according to the Law of Ukraine "Waste", are as follows:

1) full collection and timely clearance and removal of waste, and compliance with the rules of environmental safety in waste treatment;

2) minimization of the waste generation and making it less hazardous;

3) integrated use of mineral resources;

4) seeking for maximally possible utilization of waste;

5) safe removal of waste that cannot be subject to utilization by developing appropriate technologies, environmentally safe methods and techniques for waste treatment;

The Law of Ukraine "Principles (of the Strategy) for the Official Environmental Policy of Ukraine for the Period till 2030" states that the development of an environmental management system and the implementation of international nature protection initiatives in Ukraine will be supported through adopting international standards of environmental management

by enterprises and companies [6].

Waste statistics is collected by various international organizations (of which the leading ones are Basel Convention, *United Nations Statistics Division*, UNECE, Eurostat and OECD). The related effort is based on the principle of conceptual understanding, which says that the collected data need to be complementary, coordinated and consistent.

The international waste statistics covers the following categories of data (measured in the units of mass, tons per year) [2]:

a) waste generation (total, by form of waste, by economic activity and households);

b) treatment of municipal waste (collection, processing, burning, utilization etc.);

c) treatment of hazardous waste.

Eurostat is also engaged in the collection of statistical data on used package materials, waste from used and-of-life electric and electronic equipment and vehicles.

At international level, the main guideline documents on environmental statistics and environmental-economic accounts, including solid waste statistics, are Basic Concepts of Environment Statistics (BCES) that cover the preparation of all the environment statistics, and the Central Framework of the System of Environmental-Economic Accounting (CF SEEA), which is an international standard. The assignments and indicators of the Sustainable Development Goals pertaining to waste are highlighted in Table 1.

Table 1

Assignments and indicators of Sustainable Development Goals, pertaining to waste

Assignment	Indicator
8.4. Gradually improve, till 2030, the global effectiveness of resource exploitation in terms of consumption and products, and strive, with developed countries on the lead, to reduce the consequences for economic growth resulting of environmental degradation in line of the 10 Year Framework of Programs on Sustainable Consumption and Production Patterns	8.4.2. Internal consumption; internal per capita consumption; internal consumption in GDP
11.6. Reduce, till 2030, the devastating environmental impact of cities on the population, e. g. by improving the air quality, management of municipal and other waste	11.6.1. Share of solid municipal waste collected regularly, in the total scope of such waste; proper final utilization of all the municipal solid waste
12.2. Ensure the sustainable management of nature resources and their effective use till 2030	2.2.2. Internal per capita consumption; internal consumption in GDP
12.3. Till 2030, halve the global per capita food waste from retail trade and consumers, and reduce food losses in production and supply chains	12.3.1. Global Food Loss Index
12.4. Till 2030, achieve the environmentally sound management of chemicals and all the waste generated throughout their life cycle in compliance with the agreed international frameworks, and essentially reduce their dumping in the air, water and soil, which allows to minimize their devastating effect for human health and environment	12.4.2. Hazardous waste per capita; hazardous waste that are processed, by type of processing
12.5. Till 2050, achieve an essential decrease in the waste generation through its prevention, reduction, processing and reuse	12.5.1. Degree of domestic processing (tons of processed material)

Source: [2]

The EU approach to waste treatment is based in "waste hierarchy", defining the priority in setting the policy of waste and waste management at operative level: prevention, reuse, processing, utilization, and, optionally, removal of waste (which includes waste disposal in the landfill and burning without energy regeneration).

EU documents outline the priority objectives of the waste policy:

- reduce the amount of generated waste;
- maximize waste processing and reuse;
- limit waste burning to the materials that cannot be subject to utilization;
- abandon waste disposal in landfills in case of the waste that cannot be reused and irrecoverable production waste;
- ensure the full compliance with the goals of waste policy in all the member states.

The main EU documents pertaining to waste treatment are as follows [7]:

- Waste Framework Directive 2008/98/EC, defining the waste management requirements at EU level.
- Directive 2012/19/EC on waste electrical and electronic equipment.
- Directive 1999/31/EC on the landfill of waste.
- Directive 94/62/EC on packaging and packaging waste.
- Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture.
- Directive 2000/53/EC on end-of life vehicles.
- Directive 2006/66/EC on batteries.
- Regulation (EC) 2150/2002 on waste statistics. Its purpose is to create the foundations for developing EU statistics on generation, utilization and removal of waste [9]. The Regulation obliges EU member state to report statistical data on generation and processing of waste in compliance with the European *Waste Classification* for *Statistics* (EWC-Stat).
- Manual on Waste Statistics, Guidance on *EWC-Stat* Waste *Categories, and Supplement* to the Manual for the *Implementation* of the *Regulation* (*EC*). No *2150/2002* on waste statistics [10]. Manual and Guidance are intended to provide assistance to statistical data designers in the correct application of the European *Waste Classification* for *Statistics* (EWC-Stat), and statistical data users in using and interpreting of data. In practice, the majority of EU member states organize the collection of data according to the Nomenclature of Waste and proceed with translating them into the required categories of EWC-Stat using the translation table contained in Annex III of the Regulation. Only few countries practice the direct use EWC-Stat for data collection.
- Resolution 2000/532/EC defining the list of waste. It sets a system for the classification of waste including the separation of hazardous and safe waste. It is closely linked to the list of main properties making waste hazardous, contained in Annex III to the Framework Waste Directive. The list of waste is the classification of waste in EU for administrative purposes, i. e. for issuance of permissions, supervision of waste generation and waste management. The list specifies 839 types of waste, structured by 20 sections, usually by waste source (i. e. economic sector or process).
- Regulation (EC) No 1013/2006 on shipments of waste.
- Regulation (EC) No 2150/2002 on waste statistics, obliging all the EU member states to provide a report on statistics of education, utilization and removal of waste to Eurostat once in two years.

Eurostat has established the European Environmental Data Center on Waste, which has references to statistical databases on waste, a guideline document, legal acts and other background documents.

It was in 2004 that the OECD Council adopted Recommendation on Environmentally Sound Waste Management, and Guidance Manual on Environmentally Sound Waste Management was published in 2007.

The principal goal of the Council Recommendation involves the extended environmentally sound waste management in the OECD region. Three detailed assignments are formulated in it:

1. Rational use of nature resources, minimization of waste and protection of human health and environment from adverse effects that may result from dumping of waste.

2. Fair competition between companies in the OECD through implementing "Main exploitation elements" by use of structures for waste treatment, which is supposed to create a homogenous competitive environment with high environmental standards.

3. Implementation of initiatives and actions to achieve maximal re-direction of waste flows from the structures operating at low standards to the ones managing waste in an envi-

ronmentally sound and economically effective manner.

As shown by European practices, there still remain problems at EU level, related with the classification of waste. Although Regulation (EC) on waste statistics No 849/2010 fixes the waste categories (EWC-Stat) that need to be used for reporting to Eurostat, nothing is said in it about the obligatory use of a specific classification for data collection. EU member states, therefore, have free choice of a waste classification allowing them to report to Eurostat in compliance with the established format and quality requirements. But in practice it often raises issues of data presentation, which are for the most part related with differences in classifications [7].

An international classification of waste statistics does not exist. BCES include the following passage: "The lists of waste, used by countries and organizations for waste statistics, are usually based either on the process of generation or on material composition of waste, or on their combination. In many cases the origin of waste (economic activity) tends to determine the composition of waste" (item 3.183), and "Large categories of waste, which are often used in waste statistics, such as municipal, industrial and hazardous waste, combine many various materials of waste in categories on the basis of similarity of the procedures for its collection, processing and utilization" (item 3.184) [2].

Waste can be classified by source of generation, process of generation, composition, characteristics, type of generation and collection, but in practice various ways of waste classification are used, depending on the purpose of statistical data, and much more often it is not clear what principles are fundamental and what concepts are duplicated. The confusion has been aggravated when the same terms were used for denotation of different concepts.

A number of United Nations institutions are engaged in providing assistance to governments, organizations or stakeholders in building up the capacities for protection of human health and environment from hazardous chemicals and waste. This effort is based on international agreements, such as Strategic Approach to International Chemicals Management, Stockholm Convention, Rotterdam Convention, System of Classification and Labelling of Chemicals, coordinated internationally, and Basel Convention (Table 2).

Table 2

Conventions on protection of human health and environment

Title	Summary
Stockholm Convention on Persistent Organic Pollutants	Adopted 22.05.2001, enforced 17.05.2004. It is a global treaty on the protection of human health and environment from persistent chemicals. The impact of organic pollutants may entail serious consequences for health, including certain types of cancer, birth defects, abnormalities of the immune and reproductive system, the increased proneness to mental illnesses and even dementia
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	Adopted and open for signing 10.09.1998, enforced 24.02.2004. Intended to solve the problem faced by countries lacking monitoring of imports of hazardous chemicals and pesticides
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Adopted 22.03.1989. It specifies hazardous and safe waste but allows the countries to adapt the domestic law with consideration to national needs

Source: [2]

Two principal classifications are used for providing reports on waste generated in economic activities to international organizations: *International Standard Industrial Classification* of All Economic Activities (ISIC) and *Statistical Classification of Economic Activities* in the European Community (NACE) [8]. The preparation of data for reporting to Eurostat is made in accordance with NACE Rev. 2 (Regulation (EC) No 849/2010 for the European categories of waste).

OECD has been working with its member states and partner states for years in order to

enhance the quality of data on waste and the respective indicators by use of own Program for supervision of environmental indicators, to eliminate the gaps and improve the understanding of the situation at country level.

The main problems of waste statistics are as follows:

Inadequate comparability of waste statistics due to using various methods and definitions.

As a result, official statistical estimates of generation and collection of municipal waste per capita or level of domestic processing of municipal waste can often be found internationally incomparable, with the variations of 100% or more, depending on an applied method.

Also, Eurostat points out to the variation between reported and actual scopes of generated and processed waste, caused by various estimates of the population covered by waste collection schemes, losses in the mass due to dehydration, double accounts of waste when it goes through two or more phases of processing, exports and imports of waste, and the lag of time between waste generation and processing (temporary storage).

2. Incomplete coverage by the official waste statistics.

The waste statistics does not include important aspects of waste management, such as illegal imports and exports, illegal collection and trade in waste, illegal burial of waste, unofficial sorting of waste or waste management by entities from the private sector. It may result in considerably underrated figures of waste processing.

Issues like liquidation value of waste, food waste or electronic waste are not covered at all of covered incompletely [11].

Data on the abovementioned aspects are very difficult to collect by surveys or from administrative sources. Quite often they can be obtained only through ad hoc surveys, expert interviews or from custom services and supervisory bodies.

Problems of waste statistics are caused by the following factors:

1) lack of a standard international classification of waste;

2) inadequate coverage of the waste management process;

3) inconsistencies in key concepts and definitions (such as “municipal solid waste”, “processing”, “reuse”, “utilization”, “waste management”, etc.);

4) ambiguous interpretations of some concepts. For example, municipal waste is not the same as household waste;

5) blurred distinguishing line between products of processing and secondary raw materials;

6) many data sources involved in the data collection process;

7) various methods for assessment of covered objects (this is the case of municipal waste);

8) various methods of measurement of the amount of waste, etc.

The effort of public administration bodies and international organizations engaged in waste statistics, such as Eurostat, European Environment Agency, International Energy Agency, OECD, United Nations Environment Program, *United Nations Statistics Division, Secretariat of Basel Convention and others, should be focused on the harmonization of concepts and definitions, and the development of methodological guidelines to improve the quality and accessibility of waste statistics.*

Conclusions. An analysis of the international law on waste statistics demonstrates a great many problems in this field, calling for solutions. Unfortunately, adopted legal actions are not always fully implemented in practice. An effective system for waste treatment in Ukraine needs to be designed by considering and adapting best foreign practices, especially ones in the European countries that have already passed the way to harmonization of the environmental law with the EU law and ensured the compliance of local practices with the requirements of respective European directives.

Countries needs to further strengthen cooperation with international organizations addressing various issues of waste statistics, such as Eurostat, International Environment Agency, International Energy Agency, United Nations Environment Program, United Nations Statistics Division and Secretariat of Basel Convention, to ensure the consistency between various classifications, concepts and definitions used internationally in waste statistics.

References

1. TBO v Ukraine: potentsial razvitiya. Stsenarii razvitiya sektora obrascheniya s tverdyimi byitovyimi othodami. Itogovyiy otchet [Solid household waste in Ukraine:

the potential of development. Scenarios for the development of the sector of solid household waste treatment]. Retrieved from http://documents1.worldbank.org/curated/en/689821468337804553/pdf/Municipal-Solid-Waste-in-Ukraine-Development-Potential.pdf [in Russian].
2. Problemyi so statistikoy othodov i predlozheniya o prinyatii mer [Problems with waste statistics and propositions on taking actions]. UNECE. Retrieved from https://unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.33/2016/mtg2/rus_07-Waste_statistics.pdf [in Russian].
3. Osaulenko O. H., and Kobylynska T. V. (2020). Statystyka zminy klimatu: yevropeiskyi dosvid ta natsionalna otsinka [Statistics of climate change: European experiences and national assessment]. Kyiv: "August-Trade" [in Ukrainian].
4. Zakon Ukrainy "Pro vidkhody" [The Law of Ukraine "Waste"]. Vidomosti Verkhovnoi Rady Ukrainy (VVR) – Bulletin of Verkhovna Rada of Ukraine (VVR), 1998, No 36–37, art. 242. Retrieved from https://zakon.rada.gov.ua/laws/show/187/98-%D0%B2%D1%80#Text [in Ukrainian].
5. Zakon Ukrainy "Pro okhoronu navkolyshnoho pryrodnoho seredovyshcha" [The Law of Ukraine "Protection of Natural Environment"]. Vidomosti Verkhovnoi Rady Ukrainy (VVR) – Bulletin of Verkhovna Rada of Ukraine (VVR), 1991, No 41, art. 546. Retrieved from https://zakon.rada.gov.ua/laws/show/1264-12#Text [in Ukrainian].
6. Zakon Ukrainy "Pro Osnovni zasady (stratehiiu) derzhavnoi ekolohichnoi polityky Ukrainy na period do 2030 roku" [The Law of Ukraine "Principles (of the Strategy) for the Official Environmental Policy of Ukraine for the Period till 2030"]. Vidomosti Verkhovnoi Rady Ukrainy (VVR) – Bulletin of Verkhovna Rada of Ukraine (VVR), 2019, No 16, art. 70. Retrieved from https://zakon.rada.gov.ua/laws/show/2697-19?find=1&text=%D1%81%D1%82%D0%B0%D1%82%D0%B8%D1%81%D1%82#Text [in Ukrainian].
7. Otsenka potentsiala stran Vostochnoy Evropyi, Kavkaza i Tsentralnoy Azii v oblasti razrabotki statisticheskih dannyih dlya izmereniya ustoychivogo razvitiya i ekologicheskoy ustoychivosti [The assessment of the potential of East European, Caucasian and Central Asian countries in elaborating statistical data for the measurement of sustainable development and environmental sustainability]. UNECE. Retrieved from https://unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.33/2013/mtg2/SD_desk_study_RU_Final.pdf [in Russian].
8. Statistical classification of economic activities in the European Community. Retrieved from KS-RA-07-015-EN.PDF (europa.eu)
9. United Nations (2013). Framework for the Development of Environment Statistics. Retrieved from http://unstats.un.org/unsd/environment/FDES/FDES
10. Eurostat (2010): Guidance on classification of waste according to EWC-Stat categories. Retrieved from http://ec.europa.eu/eurostat/documents/342366/351806/Guidance-on-EWCStat-categories-2010.pdf
11. Balde C. P., Forti V., Gray V., et al. (2017). Globalnyiy monitoring elektronnyih othodov [The Global E-waste Monitor]. University of United Nations Organization (UUN), International Electronic Communication Union (IECU), and International Solid Waste Association (ISWA), Bonn/Geneva/Vienna [in Russian].

Bibliographic description for quoting:

Motuzka O. (2020). An Analysis of the International Law on Waste Statistics. *Scientific Bulletin of National Academy of Statistics, Accounting and Audit – Naukovyy visnyk Natsionalnoi akademiyi statystyky, obliku ta audytu, 4, 22-28.* doi: 10.31767/nasoa.4-2020.03.