WASTE STATISTICS (2020)

NATIONAL REFERENCE METADATA IN SINGLE INTEGRATED METADATA STRUCTURE (SIMS)

CONCEPT 1 – CONTACT

Sub-Concept 1.1: Contact organisation

National Statistics Office (NSO)- Malta

Sub-Concept 1.2: Contact organisation unit

Environment, Transport and Agriculture Unit

Sub-Concept 1.3: Contact name

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CONCEPT 2 – METADATA UPDATE

Sub-Concept 2.1: Metadata last certified

5th March 2021.

Sub-Concept 2.2: Metadata last posted

10th March 2021.

Sub-Concept 2.3: Metadata last update

10th March 2021.

CONCEPT 3 – STATISTICAL PRESENTATION

Sub-Concept 3.1: Data description

The NSO collects and publishes data on both the generation and the treatment of solid waste.
Data collection is mainly based on administrative sources that deal with the input and output of waste into and out of various waste treatment facilities. Data about waste exports from waste brokers are also taken into account.

Waste generation:
The information on waste generation is further broken down into waste categories according to the European Waste Classification for statistical purposes.

Waste treatment:
The information on waste treatment is broken down into six waste treatment aggregates and is classified according to the location of treatment (Malta / other countries). These treatment aggregates cover waste Recovery and Disposal codes.

NSO's main data sources for waste statistics are provided by WasteServ Malta Ltd. and the Environment and Resources Authority (ERA). Wasteserv provides Annual Environmental Reports (AERs) for major waste treatment facilities that it manages. These reports provide data on the input and output of waste from the respective facility, broken down by 6-digit List of Waste (LoW) codes.

From ERA, NSO requests annual waste inventories. These inventories are compiled with data that is sourced from all permitted waste treatment facilities (including private ones), inert waste treatment facilities and waste brokers. They provide waste generation data that is broken down by LoW codes and waste treatment data that is broken down by LoW codes and Recovery and Disposal codes. Inventories also classify waste treatment between that which takes place in Malta and that which takes place overseas (due to waste exports arising from the limited waste treatment capacity in Malta).

Municipal Waste: The NSO also publishes data on the generation and treatment of municipal waste, which is a subset of solid waste. The information on municipal waste generation is broken down by waste type and waste collection source. Municipal waste treatment data are broken down by waste type and four waste treatment aggregates which are currently applicable for the treatment of Malta's municipal waste.

Sub-Concept 3.2: Classification system

The domain consists of four major data sets from which tables published in the news releases are derived:

1. Generation of solid waste
2. Treatment of solid waste
3. Generation of municipal waste
4. Treatment of municipal waste

Both solid waste generation and treatment datasets are broken down into 51 waste categories according to the European Waste Classification for Statistical Purposes. This classification is mainly

substance-oriented and distinguishes between hazardous and non-hazardous waste. This classification is also linked to the European Union's LoW codes.

The European Waste Classification for Statistical Purposes comprises the following waste categories:

1.1 Spent solvents Hz.*
1.2 Acid, alkaline or saline wastes
1.2 Acid, alkaline or saline wastes Hz.*
1.3 Used oils Hz.*
1.4, 2, 3.1 Chemical wastes
1.4, 2, 3.1 Chemical wastes Hz.*
3.2 Industrial effluent sludges
3.2 Industrial effluent sludges Hz.*
3.3 Sludges & liquid wastes from waste treatment
3.3 Sludges & liquid wastes from waste treatment Hz.*
5 Health care and biological wastes
5 Health care and biological wastes Hz.*
6.1 Metallic wastes, ferrous
6.2 Metallic wastes, non-ferrous
6.3 Metallic wastes, mixed
7.1 Glass wastes
7.1 Glass wastes Hz.*
7.2 Paper and cardboard wastes
7.3 Rubber wastes
7.4 Plastic wastes
7.5 Wood wastes
7.5 Wood wastes Hz.*
7.6 Textile wastes
7.7 Waste containing PCB Hz.*
8 (excl. 8.1, 8.41) Discarded equipment
8 (excl. 8.1, 8.41) Discarded equipment Hz.*
8.1 Discarded vehicles
8.1 Discarded vehicles Hz.*
8.41 Batteries and accumulators wastes
8.41 Batteries and accumulators wastes Hz.*
9.1 Animal and mixed food waste
9.2 Vegetal wastes
9.3 Animal faeces, urine and manure
10.1 Household and similar wastes
10.2 Mixed and undifferentiated materials
10.2 Mixed and undifferentiated materials Hz.*
10.3 Sorting residues
10.3 Sorting residues Hz.*
11 Common sludges
12.1 Mineral waste from construction & demolition

12.1 Mineral waste from construction & demolition Hz.*
12.2, 12.3, 12.5 Other mineral wastes
12.2, 12.3, 12.5 Other mineral wastes Hz.*
12.4 Combustion wastes
12.4 Combustion wastes Hz.*
12.6 Soils
12.6 Soils Hz.
12.7 Dredging spoils
12.7 Dredging spoils Hz.*
12.8, 13 Mineral waste from waste treatment & stabilised waste
12.8, 13 Mineral waste from waste treatment & stabilised waste Hz.*
**Waste categories which have a description ending with 'Hz.' refer to hazardous waste.*

Solid waste generation data are also published according to the following sub-totals:

1. Total hazardous waste – Refers to the sum of all hazardous waste categories.
2. Total non-hazardous mineral waste – Refers to the sum of mineral waste from construction and demolition (12.1), Other mineral wastes (12.2, 12.3, 12.5); Soils (12.6), and Dredging spoils (12.7).
3. Total non-hazardous secondary waste – Refers to the sum of Sludges and liquid waste from waste treatment (3.3), Sorting residues (10.3), and mineral waste from waste treatment and stabilised waste (12.8, 13).
4. Total non-hazardous other mineral waste – Refers to the sum of the remaining non-hazardous waste categories.

It should be noted that both mineral waste and secondary waste may arise as hazardous waste, however since hazardous waste amounts for these categories are small, no breakdown is provided in the news release. Several other waste categories may include secondary waste as well. However, the quantification of the share of secondary waste within the waste covered by these categories is not possible.

With regards to solid waste treatment, the following waste treatment aggregates apply:

1. Recovery-backfilling
2. Recovery-energy recovery (R1)
3. Recovery-recycling (R2-R11)
4. Disposal-landfilling (D1, D5, D12)
5. Disposal-other (D2-D4, D6, D7)
6. Disposal-incineration (D10)

These treatment aggregates are based on the treatment operations (for which codes are shown in brackets above) defined in the Waste Framework Directive 75/442/EEC and amended by Directive 2008/98/EC. Since Malta exports significant amounts of waste to other countries due to its limited treatment capacity, the waste treatment dataset is also broken down by the location of treatment (Malta / other countries).

Municipal waste generation:

The classification of municipal waste generation by waste types is as follows:

1. Paper and cardboard
2. Plastic
3. Metals
4. Glass
5. Wood
6. Waste electrical and electronic equipmer
7. Mixed packaging
8. Mixed municipal waste
9. Bulky waste
10. Bio-waste – garden and park
11. Bio-waste – kitchen and canteen
12. Clothes/textiles
13. Other

Municipal waste generation is also broken down by waste collection source. These sources are as follows:

1. Bring-in sites
2. Civic amenity sites
3. Green/Grey bag and glass collection
4. Black bag collection - local councils
5. Black bag collection – other
6. Street cleaning
7. Organic waste collection
8. Other

Municipal Waste Treatment:

Municipal waste treatment is also classified by waste types. Many of these waste types are the same as those for municipal waste generation; however, certain differences exist due to the different nature and composition of treated waste. The following waste types apply:

1. Paper and cardboard
2. Plastic
3. Metals
4. Glass
5. Wood
6. Waste electrical and electronic equipment
7. Mixed municipal waste
8. Bulky waste
9. Bio-waste – garden and park
10. Street-cleaning residues
11. Digestate from anaerobic digestion
12. Reject from mechanical treatment of waste
13. Other

The breakdown of municipal waste by waste type does not follow any international classification although it is based on the codes of the LoW. On the other hand, the breakdown by waste treatment types is based upon Eurostat's reporting format for the data collection on municipal waste.

Besides being classified by waste type, municipal waste treatment is also broken down by waste treatment aggregates, of which the following categories currently apply:

1. Recovery-energy recovery (R1)
2. Recovery-recycling (R2-R11)
3. Disposal-landfilling (D1, D5, D12)
4. Disposal-incineration (D10)

Municipal waste data are published on a national level. A regional breakdown for municipal waste generation is also published in NSO's Regional Statistics Malta publication.

Sub-Concept 3.3: Sector coverage

Solid waste generation statistics: Cover all economic sectors and households. No breakdown by economic sector is provided, although such a breakdown is reported to Eurostat. Waste generation statistics include both primary waste generation and secondary waste generation (waste arising from waste treatment operations).

Solid waste treatment statistics: Cover waste which is generated in Malta (Malta has no imports of waste) and treated locally and in other countries as per applicable waste treatment aggregates.

Municipal waste generation statistics: Cover waste that is generated from households as well as waste generated by businesses and institutions which is similar in nature and composition to household waste.

Municipal waste treatment statistics: Cover municipal waste which is treated in permitted facilities both in Malta and in other countries as per applicable waste treatment aggregates.

Sub-Concept 3.4: Statistical concepts and definitions

- Waste: Any substance or object which the holder discards, intends or is required to discard.

- Municipal waste: Household and similar waste collected by or on behalf of municipal authorities. The bulk of this waste stream originates from households and similar wastes from sources such as commerce, offices and public institutions are also included. Municipal waste includes the following types of materials: paper, paperboard and paper products, plastics, glass, metals, food and garden waste, textiles, waste electrical and electronic products, bulky waste, (e.g. mixed waste from home renovation works, old sofas, mattresses), wood (e.g. old furniture); and garden waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste, if managed as waste.

Municipal waste covers waste that is collected from door-to-door both in a mixed and separated state. It also covers waste fractions collected separately for recovery operations through voluntary deposits such as bring-in and civic amenity sites.

The definition also includes waste that is similar in nature and composition and from similar sources which is collected directly by the private sector (business or private non-profit institutions) not on behalf of municipalities (mainly separate collection for recovery purposes), and waste that originates from rural areas not served by a regular waste service, even if it is disposed by the generator.

The definition excludes waste from municipal sewage network and treatment and municipal construction and demolition waste.

- Incineration: Means thermal treatment of waste in an incineration plant as defined in Article 3(4) or a co-incineration plant as defined in Article 3(5) of the European Parliament and Council Directive 2000/76/EC of 4 December 2000 on the incineration of waste. OJ L 332, 28.12.2000, p.91.

- Energy recovery*:* Is defined as the incineration that fulfils the energy efficiency criteria laid down in the Waste Framework Directive (2008/98/EC), Annex II (recovery operation R1).

- Recycling: Means 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. For further information, please refer to the Waste Framework Directive, 2008/98/EC.

- Composting and anaerobic digestion: Are processes of biological decomposition of biodegradable waste under controlled aerobic (composting) or anaerobic conditions. It may be classified as recycling when compost (or digestate) is used on land or for the production of growing media. For further information, please refer to the Green Paper on the management of bio-waste in the European Union, COM(2008) 811 final.

- Landfill: Is defined as the deposit of waste into or onto land; it includes specially engineered landfills and temporary storage of over one year on permanent sites. The definition covers both landfill in internal sites (i.e. where a generator of waste is carrying out its own waste disposal at the place of generation) and in external sites.

- Backfilling: Is defined as a recovery operation where suitable waste is used for reclamation purposes in excavated areas or for engineering purposes in landscaping and where the waste is a substitute for non-waste materials.

- Disposal – Other: Includes disposal operations other than landfilling and incineration. It comprises land treatment, deep injection, surface impoundment, release into a water body except seas/oceans and release into seas/oceans including seabed insertion. In Malta, only release into seas/oceans takes place.

Sub-Concept 3.5: Statistical unit

Reporting units primarily refer to the waste treatment facilities and waste brokers while observation units refer to units of weight of waste (tonnes).

Sub-Concept 3.6: Statistical population

- Solid waste generation: Refers to all waste generated nationally.
- Solid waste treatment: Refers to all waste that is generated in Malta and treated both locally and in other countries. Theoretically, imports of waste should also be included, however Malta does not import any waste from other countries.
- Municipal waste generation: Refers to all municipal waste generated nationally.
- Municipal waste treatment: Refers to the final treatment of municipal waste on the geographical territory of the country and overseas, inclusive of waste exports but excluding waste imports.

Sub-Concept 3.7: Reference area

Malta (NUTS 1).

Sub-Concept 3.8: Time coverage

Data on waste generation and treatment are available from 2004 to 2019. Data dissemination in news releases covers the most recent five years for which data are available.

Sub-Concept 3.9: Base period

Not applicable.

CONCEPT 4 – UNIT OF MEASURE

Tonnes.

CONCEPT 5 – REFERENCE PERIOD

The reference period for data collection and dissemination is the calendar year.

CONCEPT 6 – INSTITUTIONAL MANDATE

Sub-Concept 6.1: Legal acts and other agreements

The Malta Statistics Authority (MSA) Act empowers the NSO to collect, compile, extract and release official statistics related to demographic, social, environment, economic and general activities and conditions of Malta.

Two European legislations apply for statistics covering solid waste management and treatment, namely:

Regulation (EC) No 2150/2002 of the European Parliament and of the Council of 25 November 2002 on waste statistics.

Commission Regulation (EU) No 849/2010 of 27 September 2010 amending Regulation (EC) No 2150/2002 of the European Parliament and of the Council on waste statistics.

With regards to municipal waste reporting at the European level, Commission Implementing Decision (EU) 2019/1004 applies.

Sub-Concept 6.2: Data sharing

News Releases are published locally, and statistical data are transmitted to Eurostat.

CONCEPT 7 – CONFIDENTIALITY

Sub-Concept 7.1: Confidentiality – Policy

At National level:

The NSO requests information for the compilation of official statistics according to the articles of the MSA Act – Cap. 422 and the Data Protection Act – Cap. 586 of the Laws of Malta implementing the General Data Protection Regulations (GDPR).

Article 40 of the MSA Act stipulates the restrictions on the use of information while Article 41 stipulates the prohibition of disclosure of information. Furthermore, Section IX of the Act (Offences and Penalties) lays down the measures to be taken in case of unlawful exercise of any officer of statistics regarding confidentiality of data.

Since its inception, the NSO has always assured that all data collected remains confidential and that it is used for statistical purposes only according to the articles and derogations stipulated in the laws quoted above. The Office is obliged to protect the identify of data providers and refrain from divulging any data to third parties that might lead to the identification of persons or entities.

During 2009, the NSO has set up a Statistical Disclosure Committee to ensure that statistical confidentiality is observed, especially when requests for microdata are received.

Upon employment, all NSO employees are informed of the rules and duties pertaining to confidential information and its treatment. In line with stipulations of the MSA Act, before commencing work, every employee is required to take an oath of secrecy whose text is included in the same Act.

An internal policy on anonymisation and pseudo-anonymisation is in place to ascertain that adequate methods are used for the protection of data which the office collects and shares with the public in its capacity as the National Statistics Office. The policy is meant to safeguard confidentiality of both personal and business data entrusted to the NSO. The document provides guidance for all NSO employees who process data on a daily basis as to how anonymisation and pseudo-anonymisation methods should be applied. The policy applies to all confidential, restricted

and internal information, regardless of form (paper or electronic documents, applications and databases) that is received, processed, stored and disseminated by the NSO.

At European level:

Regulation (EC) No 223/2009 on European statistics (recital 24 and Article 20(4) of 11 March 2009 (OJ L 87, p. 164), stipulates the need to establish common principles and guidelines ensuring the confidentiality of data used for the production of European statistics and the access to those confidential data with due account for technical developments and the requirements of users in a democratic society.

Sub-Concept 7.2: Confidentiality – Data Treatment

All data about waste which are reported to Eurostat and published locally are not confidential.

CONCEPT 8 – RELEASE POLICY

Sub-Concept 8.1: Release Calendar

An advance release calendar is maintained by the NSO and published on the NSO website. The calendar projects three months of news releases (including the current and two subsequent months).

Sub-Concept 8.2: Release Calendar access

https://nso.gov.mt/en/News_Releases/Release_Calendar/Pages/News-Release-Calendar.aspx

Sub-Concept 8.3: User access

An internal policy on dissemination is in place to govern the dissemination of official statistics in an impartial, independent and timely manner, making them available simultaneously to all users.

The NSO's primary channel for the dissemination of official statistics is the NSO website. Tailored requests for statistical information may also be submitted through the NSO website.

Moreover, Waste Statistics news releases are available in electronic format on the NSO website.

CONCEPT 9 – FREQUENCY OF DISSEMINATION

Both solid waste and municipal waste data are disseminated annually. For solid waste, the data are disseminated fourteen months after the end of the reference period (t+14) while for municipal waste the data are disseminated eleven months after the end of the reference period (t+11).

CONCEPT 10 – ACCESSIBILITY AND CLARITY

Sub-Concept 10.1: News release

Solid waste management news releases may be accessed through:

https://nso.gov.mt/en/News_Releases/View_by_Unit/Unit_B3/Environment_Energy_Transport_and_Agriculture_Statistics/Pages/Solid-Waste-Management.aspx

Municipal waste news releases may be accessed through:
https://nso.gov.mt/en/News_Releases/View_by_Unit/Unit_B3/Environment_Energy_Transport_and_Agriculture_Statistics/Pages/Municipal-Waste.aspx

Sub-Concept 10.2: Publications

Waste statistics do not feature in any regular publications, however, municipal waste data was featured in the "Key Figures for Malta" publication of 2019 and in the "Regional Statistics Malta" publications.

Sub-Concept 10.3: Online Database

Waste statistics do not feature on the NSO's online database. However, waste statistics feature in the 'Selected indicators' section on the NSO's website under the 'Environment' domain.

Sub-Concept 10.4: Micro-data access

Micro-data is not shared on a regular basis and it is only made available for ad hoc requests. The dataset is accessible as microdata broken down by LoW codes which are then aggregated into the waste categories that are used for data dissemination. No anonymisation is necessary since the data do not refer to any enterprise or individual, except for WasteServ Malta Ltd. which is the largest operator in the waste management sector that is government owned. Data pertaining to this operator are not confidential.

Data originating from other operators in the waste management sector are obtained in aggregated format in the waste inventories that are provided by the Environment and Resources Authority and so such data are already anonymised.

Sub-Concept 10.5: Other

Not applicable.

Sub-Concept 10.6: Documentation on methodology

Work processes and procedures for the compilation of the Waste Statistics are documented in a standardised reporting template and aligned to the GSBPM model. The model covers all phases of the statistical production process, from the initial stages of identifying what statistics are needed and the scope of the particular survey, to the final stages of dissemination and evaluation. GSBPM is only available internally and may be accessed by all NSO employees.

Solid waste management data are compiled according to the guidance provided in Eurostat's Manual on Waste Statistics – 2013 edition.

Municipal waste data are compiled according to the provisions laid out in the Eurostat document: Guidance for the compilation and reporting of data on municipal waste according to Commission

Implementing Decisions 2019/1004/EC and 2019/1885/EC, and the Joint Questionnaire of Eurostat and OECD – version 20/10/2020.

The classification of LoW codes according to the European Waste Classification for statistical purposes (EWC-Stat) is used to aggregate data for dissemination purposes.

Sub-Concept 10.6.1: Metadata completeness rate

Information about all required metadata concepts (and sub-concepts thereof) are provided.

Sub-Concept 10.7: Quality Documentation

A Quality report is submitted every two years with every Waste Statistics Regulation data reporting to Eurostat.

A data quality/methodology report is submitted annually with every municipal waste data reporting to Eurostat.

Waste statistics SIMS reports are available to the public on the NSO's metadata website including concepts related to metadata and quality.

CONCEPT 11 – QUALITY MANAGEMENT

Sub-Concept 11.1: Quality Assurance

The NSO ensures the accuracy of data released to the public and prepares clear methodological notes which explain the processes involved in the collection and production of official statistics.

The NSO has developed an internal Quality Management Framework (QMF) which is built on common requirements of the ESS Code of Practice (ESS CoP). A document was prepared to include a set of general quality guidelines spanning over all statistical domains. Assuring methodological soundness is an integral part of the QMF, nonetheless, the document spans also on other areas related to institutional aspects.

Every five to seven years, the NSO participates in a Peer Review exercise through which the compliance of its operations with principles of the ESS CoP is assessed by an expert team. Peer Reviews are indeed part of the European Statistical System (ESS) strategy to implement the ESS CoP. Each NSI is expected to provide information as requested by a standard self-assessment questionnaire. Following this an expert team visits the office to meet NSI representatives and main stakeholders. Peer Reviews result in a compliance report and the listing of a set of Improvement Actions which need to be followed up by the NSI. The next round of Peer Reviews is planned to be carried out in 2022.

Sub-Concept 11.2: Quality Assessment

All data received from the data providers goes through a validation process, and after the final set of results become available the data sources and methods are described in quality reports. The applied concepts and classifications are defined in European legislation while the dissemination formats are tailored to take into account the local circumstances.

CONCEPT 12 – RELEVANCE

Sub-Concept 12.1: User needs

Primarily, all the waste statistics compiled on Malta are produced for Eurostat.

Data reporting for the Waste Statistics Regulation is mandatory, while data about municipal waste shall become mandatory from the 2020 reference year onwards (to be reported in November 2021). Currently, municipal waste data are reported on an informal non-legally binding agreement (gentlemen's agreement).

A systematic approach to assess user needs has never been undertaken. Knowledge about user needs is gained from the data and information requests which the NSO receives about waste statistics. Waste statistics are in fact regularly requested within the NSO for other EU-related reporting such as the Urban Audit and Material Flow Accounts. Consultants, researchers, teachers and students are also frequent users of waste statistics as part of their projects, dissertations and assignments. Requests are also received from other government entities carrying out regulatory, operational and audit functions with regards to the waste management sector.

Sub-Concept 12.2: User satisfaction

The last User Satisfaction Survey was held in 2014 with the aim to collect information about key users' satisfaction with statistical output.

The NSO keeps record of the number of News Releases and publications disseminated on its website; the users to whom statistical products are provided; as well as the number of requests that are processed every year.

Sub-Concept 12.3: Data Completeness

All the necessary information was collected from WasteServ (as the major operator in the waste management sector) and from ERA. In fact, ERA collects data from all permitted waste management facilities and brokers and the data are provided to NSO in aggregated format. The identified data gaps are then addressed through other data sources (data from the Quarries' Census and Transport Malta) and the computation of derived variables.

CONCEPT 13 – ACCURACY AND RELIABILITY

Sub-Concept 13.1: Overall accuracy

Waste statistics are based on the administrative data of waste treatment facilities and waste brokers, so the main sources of error and bias are related to the methodologies that these facilities use to generate the data which are reported to the competent authority (ERA) and the NSO. In quantitative terms, the magnitude of these errors is not known; however, data validation processes are in place to seek and identify such errors as well as to provide corrected data.

The following is an overview of errors which may affect waste statistics:

- Waste statistics are based on the data that are provided by permitted facilities to the competent authority and the NSO. Facilities which are operating illegally or with an expired permit do not submit any data.

- Coding errors occur because of incorrect entries about waste types entering or exiting facilities. Such errors may be intentional if facilities treat waste which does not fall within their respective permit conditions.
- Facilities which act in breach of their permit conditions can also omit waste which is not covered by the list of permitted wastes, thus contributing to coverage errors.
- Under-reporting of treated waste amounts may also take place for tax-evasion purposes.
- Measurement errors can occur if weighbridges are not calibrated in the appropriate manner or if there is inconsistency in the unit of weight that is used (kilogrammes vs tonnes).
- Incorrect estimations may arise due to outdated and inappropriate waste factors or due to errors in the counting of waste items (e.g. for WEEE – Waste Electrical and Electronic Equipment).

Sub-Concept 13.2: Sampling errors

Not applicable as the data are not based on survey data.

Sub-Concept 13.3: Non-sampling error

Main sources of non-sampling error relate to measurement and processing errors.

Sub-Concept 13.3.1: Coverage error

When it comes to waste statistics, the NSO collects data directly from WasteServ, the largest operator in the waste management sector, and under which remit fall numerous facilities. Data for the remaining facilities and brokers are collected by ERA and then provided to the NSO in an aggregated format. ERA collects and provides data for those facilities which have a valid waste management permit. No missing data were reported in the data sets provided since all permitted facilities and brokers provided their own respective data. Since the number of facilities operating illegally is not known, there is no estimate for under coverage.

Data about the generation and treatment of other mineral wastes from quarrying is estimated by the NSO on the basis of production levels reported in the survey on quarry owners carried out every two years by the NSO. All quarries operating under the necessary permits are included in this data collection, however, since the number of quarries operating illegally is not known, there is no estimate for under coverage.

In order to reduce the incidence of illegal dumping, treatment in unauthorised sites and under-reporting of waste amounts, the ERA obliges waste carriers to register their vehicles and to renew such registration annually. Since waste carriers have different classes upon registration, they are issued with a tag denoting the type of waste they can carry. Waste carriers which have not been registered or which do not display their appropriate tag are subject to legal action. Permit renewals are only considered upon the condition that the total quantity of disposed waste is submitted.

These figures are then used to verify the quantities reported by the operators of waste treatment facilities.

ERA also cross-checks the reports that are submitted by waste treatment facilities and waste brokers, and waste shipments records in order to identify any instances of under or over coverage.

Sub-Concept 13.3.1.1: Over Coverage

Not applicable.

Sub-Concept 13.3.1.2: Common Units Proportion

Not applicable.

Sub-Concept 13.3.2: Measurement error

Measurement errors may arise at the source of the data collection and may be present in the following data sources:

- Notifications which are submitted for waste exports
- Actual data readings from weighbridges and metres (for waste oils) which are installed at waste treatment facilities
- Estimates which are made by the operators of facilities which do not have weighbridges

Errors may arise out of notifications which are submitted by waste exporters, since:

- ERA requests that all entities exporting waste should submit a written notification detailing the waste types and quantities which are to be exported. Since these notifications are submitted according to Basel codes (codes used for waste shipments) notifiers may aggregate various LoW codes together under the same Basel code, thus making it impossible to know the amounts of exports by LoW codes. In such cases waste broker reports need to be consulted to make such a breakdown possible.

- Errors might also result if waste exporters under-declare waste quantities. In order to avert any instances of under-reporting, ERA notifies all exporters that the shipment of waste without a valid permit may be deemed as illegal traffic and may be liable to criminal procedures. Cross checks between waste export notifications and waste broker reports are done in order to monitor the coverage of waste exports data.

Measurement errors may arise out of data collection by means of weighbridges from waste management sites, such as in the following cases:

- Weighbridge calibration may result in over-reporting or under-reporting of waste amounts. In certain instances, weighbridges which are installed in different facilities yield different

measures for the same waste quantity. In order to prevent such errors, weighbridges are calibrated periodically by professional staff.

- Under-reporting by waste management sites due to tax evasion purposes or due to the acceptance of unauthorised waste types. ERA cross-checks all records submitted by authorised facilities and waste brokers in order to identify incongruent declarations.

Errors arising out of the estimates which are submitted by those operators who measure waste amounts without the use of a weighbridge:

- Estimates for inert mineral waste treatment are worked out by multiplying the number of trucks entering or leaving the facility by the average capacity (in tonnes) of a standard truck. Since there are different sizes of trucks the actual material processed in a given site may be higher or lower than the amounts which are estimated.

- Other private pre-treatment facilities also provide data about the weight of waste treated by an estimation process. Errors may arise because of outdated or inappropriate weight factors, and because of inaccurate counting of waste items.

On a general note it can be said that discrepancies that occur between waste inputs and outputs from treatment facilities are mainly explained as temporary storage of waste, time lags in waste treatment and changes in weight of waste due to moisture losses or gains; however these are not quantified individually, except for the temporary storage of waste.

Sub-Concept 13.3.3: **Non-response error**

Not applicable.

Sub-Concept 13.3.3.1: Unit non-response

All the facilities operating under the necessary permits have submitted their data.

Sub-Concept 13.3.3.2: Item non-response

Not applicable. The administrative sources report no missing data.

Sub-Concept 13.3.4: Processing error

Processing errors comprise:

Data providers may provide incorrect LoW codes, quantities and treatment destinations. To minimise the occurrence of such errors, the NSO performs checking of LoW codes and carries out validations by cross checking inter-facility transfers and by comparing the data with that from previous years.

Correct waste coding at the point of waste input into treatment facilities is essential for accurate waste statistics. In fact, waste management permits require facility officers to be fully conversant with such record-keeping. Officers are also requested to verify declarations by supervising trucks whilst they are being unloaded, while the waste carriers themselves need to be in possession of the minimum qualifications as defined by ERA.

Coding errors may also occur if waste EWC-Stat codes and waste treatment aggregates are allocated inappropriately by NSO. In order to prevent such errors, the NSO allocates these codes by means of automated processes which are run using IBM SPSS.

Processing errors may also arise with the incorrect application of the established methodology from one reporting period to the next, thus resulting in a lack of temporal coherence. Since the 2014 reference year, SPSS syntaxes were applied to the data in order to generate the required statistics. The syntaxes are updated from one year to the next according to necessity.

Sub-Concept 13.3.5: Model assumption error

Not applicable.

CONCEPT 14 – TIMELINESS AND PUNCTUALITY

Sub-Concept 14.1: Timeliness

- Data from waste management facilities and brokers are collected and validated over a period of eight months, starting from 6 months after the end of the reference year (t+6 to t+14).
- Solid waste management statistics are released fourteen months after the end of the latest reference year (t+14).
- Municipal waste statistics are released eleven months after the end of the latest reference year (t+11).
- Up to February 2019, municipal waste statistics were released fourteen months after the end of the latest reference year, however, after a joint effort with the data providers, the release date was moved by two months and a half earlier.

Sub-Concept 14.2: Punctuality

All waste statistics releases are delivered on time.

CONCEPT 15 – COHERENCE AND COMPARABILITY

Sub-Concept 15.1: Comparability – Geographical

Statistics are released on a national scale; however, they may also be generated on a regional basis (inclusive of both Malta and Gozo). No problems were ever reported with regards to the regional breakdown of waste statistics since common concepts and classifications are applied throughout the datasets.

Sub-Concept 15.2: Comparability – Over Time

The length of the comparable time series solid waste management statistics is from 2004 to 2019. Data for previous years may be comparable for individual facilities but not for total waste generation and treatment. Over this period, changes have occurred; however, these did not warrant a break in time series since they had a minimal effect on the end results. These changes include:

- The amount of waste generated by soft stone extraction is estimated on the basis of data from the census of quarry owners. This census provides data on the produced amounts of mineral products from Malta's quarries from 2010 onward. Prior to this date, estimates for soft stone waste are based upon estimates for soft stone production.

- Since 2011, ERA has provided the NSO with an aggregated dataset for waste input and output from private facilities and waste brokers. Prior to 2011, the data from the declarations of waste exporters were used. This data features both in waste generation and treatment statistics.

- Since 2012, the weight of scrapped vehicles for waste generation purposes has been extracted directly from the data that are provided by Transport Malta. Prior to 2012, an estimation based on the number of scrapped vehicles was worked out and used.

With regards to municipal waste statistics, these are currently comparable from 2015 to 2019. Data are not comparable with previous years due to a change in the coverage of LoW codes which are included as part of the municipal waste definition. Data for years prior to 2015 shall be revised by the end of 2021.

Sub-Concept 15.3: Coherence – Cross Domain

Solid waste management: As part of Malta's reporting obligations for the Waste Statistics Regulation (WStatR), the NSO produces statistics on both the generation and treatment of waste. These are closely related to statistics on solid waste management that are released locally, however there are notable differences between the two sets of statistics, namely:

Solid waste management statistics	Waste generation and treatment statistics (WStatR)
Data for sludges and dredging spoils are reported in tonnes of wet weight	Data for sludges and dredging spoils are reported in dry weight.
Data are broken down by EWC-Stat waste categories only	Data are broken down by source (NACE aggregates and households) as well as EWC-Stat waste categories
Waste treatment statistics include waste treatment that is carried out both in Malta and in other countries	Statistics only cover the final treatment that is carried out in Malta

Municipal waste statistics: Statistics on the generation and treatment of municipal waste, both those published locally and those sent to Eurostat are fully coherent, with the only difference being that locally, the data are broken down by the material categories and the waste collection source

which differ from the non-mandatory variables requested by Eurostat. Such non-mandatory variables for municipal waste generation by source include:

- Municipal waste generation by households
- Municipal waste generation by other sources

Non-mandatory variables for generation by waste type include:

- The generation of WEEE
- The generation of household and similar wastes
- The generation of bulky waste

Eurostat's variables include no breakdown by type for municipal waste treatment variables.

Sub-Concept 15.3.1: Coherence – Sub-Annual and Annual statistics

Not applicable. Waste statistics are only published on an annual basis.

Sub-Concept 15.3.2: Coherence – National Accounts

Coherence with national accounts is not required since different concepts apply (in example, the residency principle of national accounts does not apply for waste statistics since the coverage of waste statistics is based on the geographical territory of the country).

Sub-Concept 15.4: Coherence – Internal

The data are to a high degree, internally coherent (the totals are equal to the sum of the breakdowns).

The information on the generation of waste cannot be directly linked to the information on the treatment of waste for several reasons including the fact that the generation of waste concerns the waste produced in the country as calculated from the input into waste treatment facilities while the treatment of waste refers to the output, calculated from pre-treatment facilities and waste brokers and the input into final treatment operations. Discrepancies may arise because of waste storage, time-lags in the treatment of waste and moisture content losses or gains. Moreover, the generation of waste includes both the primary waste generation and the secondary waste generation (waste produced by waste treatment activities), thus there is an intentional double counting of waste while on the other hand, when it comes to waste treatment statistics, waste is only counted once.

CONCEPT 16 – COST AND BURDEN

The NSO's work when it comes to the production of waste statistics is equivalent to 0.4 FTE (Full-Time Equivalent). The majority of human effort is devoted to the data collection and validation processes; however, considerable effort is also devoted towards the automation of statistical processing. Recent efforts have also been devoted towards the creation of syntaxes on SPSS in order to aid the processes involved in the coding and the generation of results on waste generation and treatment statistics. This project, which was initiated in January 2018, was completed over a period of fourteen months in February 2019. The waste generation syntaxes were updated in December

2020 in order to eliminate waste allocations to NACE aggregates that are unlikely to generate such waste types.

The generation of waste statistics by the NSO places no direct burden on households, private enterprises, waste brokers and treatment facilities' operators in Malta. The data which are used by the NSO to compile these statistics is derived from administrative sources which have been set up as a requirement of other regulations and directives.

CONCEPT 17 – DATA REVISION

Sub-Concept 17.1: Data revision – Policy

Revision of data is compliant with the ESS Code of Practice principles.

At the NSO, there is currently no internal policy governing revisions that occur for all statistics produced. Nonetheless, a revisions policy is being drafted to safeguard a coordinated revisions system across statistical domains.

This policy will take account of the need and causes for revisions; time and frequency of revisions; data and other statistical products affected by such revisions; and length of periods revised.

When it comes to waste statistics, data are flagged as provisional in the year in which they are being published since any data revisions are carried out in the corresponding news releases of the following year.

Sub-Concept 17.2: Data revision – Practice and Data Revision

Data corresponding to 2019 is scheduled to be revised in 2021 when it comes to municipal waste and 2022 when it comes to solid waste management. From one year to another, the size and scale of the data revisions may vary. The size of the latest data revisions are as follows:

- Solid waste management – 2018
  Waste generation: 0.04%
  Waste treatment: not applicable as the table layout was revised

- Municipal waste – 2019
  Waste generation: 5.1%
  Waste treatment: 4.4%

It should be noted that the municipal waste revisions were methodological since the coverage of LoW codes that are considered to form part of the Municipal waste definition was expanded to include new codes.

CONCEPT 18 – STATISTICAL PROCESSING

Sub-Concept 18.1: Source data

The bulk of the data used for the compilation of waste statistics by the NSO is provided by WasteServ Malta Ltd. and by the ERA.

WasteServ is Malta's major waste management agency which is government owned. Its key responsibility is to develop and operate waste management facilities in order to implement the government's waste strategy. These waste management facilities are mainly of two types: waste collection depots, which comprise bring-in sites and civic amenity sites; and waste treatment facilities which include the landfill for non-hazardous waste, the Mechanical-Biological Treatment (MBT) plants (Sant' Antnin plant and the Malta North plant), the Gozo Waste Transfer Station and sorting plant, and the Marsa Thermal Treatment plant. WasteServ supplies data about its operations both to ERA and the NSO.

On the other hand, the ERA's Compliance and Enforcement Unit is entrusted with environmental permitting and compliance auditing of industrial and waste management installations. It supplies the NSO with data about the operations of privately-owned inert waste treatment sites which are permitted to treat inert mineral waste. The ERA's Ambient Quality and Waste Unit is responsible for air quality, waste management, radiation, noise and soil. This Unit provides the NSO with data originating from private pre-treatment facilities, waste brokers and the disposal of waste at sea.

All waste treatment facilities and brokers collect their data and report it to the ERA as part of their waste management permit conditions. All facilities collect data about incoming and outgoing waste by LoW code. Additional information on the sources and destinations of the waste is also requested.

Annual data on the weight of discarded vehicles by type is obtained from the "Out-of-action" vehicles register which is maintained by Transport Malta (Malta's competent authority for transport affairs).

Data about the production of minerals from the quarrying industry is used to close the data gap about the mineral waste that is generated by this industry. These data originate from a survey which the NSO carries out with all quarry owners every two years. Hardstone quarries generate no mineral waste, while in soft stone quarries, about 30 per cent of all the rock that is cut ends up discarded as mineral waste. The estimated amount of mineral waste is reported as generated and backfilled in solid waste management statistics.

Sub-Concept 18.2: Frequency of data collection

Data are collected annually. WasteServ provides the NSO with data on a monthly basis , while ERA provides data on an annual basis.

Sub-Concept 18.3: Data Collection

The NSO requests data from both ERA and WasteServ by forwarding data collection requests. The request for the Annual Environmental Reports (AERs) of waste management facilities is sent by email to WasteServ at the end of June (t+6 months). The facilities that are covered by these reports include the Għallis landfill, the Sant' Antnin Mechanical-Biological Treatment (MBT) plant, the Malta North MBT plant, the Marsa Thermal Treatment Facility, the Tal-Kus Gozo Waste Transfer Station and the six Civic Amenity Sites. Waste collection data for the grey/green (mixed recyclables and glass) bag, the white (organic waste) bag, the black (mixed municipal waste) bag and bring-in sites is also requested from WasteServ. The data are used for the compilation of both news releases.

NSO requests waste inventory data from ERA at the beginning of November (t+11 months) for municipal waste statistics, at the beginning of February (t+14 months) for the solid waste management data and an update at the end of May (t+17 months). Data requests to ERA are sent by email. No data are available from ERA prior to t+11 months.
Reminders are sent whenever no reply is received within two weeks from the original data request. When the data are received, the templates are checked for completeness. If any data are missing, they are requested anew.

Sub-Concept 18.4: Data Validation

The NSO verifies all the data which are provided by WasteServ and ERA. The first round of checking is carried out for coherence, where the sub-totals for the individual codes are compared to the overall total. The data are then also checked for any coding errors and for any missing variables and information (e.g. on waste destination). When all these issues are addressed, checks for implausible combinations, incompatible inter-facility waste transfers, and for time series inconsistencies are carried out. Whenever anomalous values are identified, clarifications from the corresponding data sources are sought in writing. In certain cases, the data are also amended by the data providers. Amendments carried out on the data provided by WasteServ are then transmitted to ERA by WasteServ itself so as to ensure all three organisations are in possession of the same datasets.

Sub-Concept 18.5: Data Compilation

The data compilation phase for waste statistics involves three major steps:

1. Calculation of dry matter for sludges and dredging spoils -

The following coefficients are applied for transforming data from wet weight into dry weight:
3.2 Industrial effluent sludges - 0.27
3.2 Industrial effluent sludges Hz. - 0.27
3.3 Sludges & liquid wastes from waste treatment - 0.925
3.3 Sludges & liquid wastes from waste treatment Hz. - 0.27
11 Common sludges - around 0.3 but varying from year to year according to data provided by the Water Services Corporation
12.7 Dredging spoils - 0.5

2. Weighbridge reports - After the data validation process is complete, the NSO requests WasteServ's weighbridge reports for the major facilities (the Għallis landfill, the MBT plants, the thermal treatment plant and the Gozo waste transfer station). These reports include the microdata for the waste and non-waste input and output of each facility. Waste and non-waste items are coded by the NSO in order to generate reports about waste inputs into each facility. Data from these reports is also cross-checked with the official data. For all instances where the sub-totals by LoW code are found to be incoherent with the official data, the LoW codes are recoded so that the results of the weighbridge reports are as close as possible to the official data.

3. Standardisation of Worksheets: Data for all facilities and waste brokers are entered into standardised worksheets having the same variables. LoW codes are recoded into EWC-Stat codes.

Sub-Concept 18.5.1: Imputation

No imputations are carried out when it comes to waste statistics as the administrative sources have reported no missing data.

Sub-Concept 18.6: Adjustment

No adjustment is carried out on waste statistics.

Sub-Concept 18.6.1: Seasonal Adjustment

Not applicable.

CONCEPT 19 – COMMENT

No further comments.