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Central
Statistics
Office

**Standard SIMS Report:
Environmental Accounts, Material
Flow Accounts**



Single Integrated Metadata Structure (SIMS) Report

For

Environmental Accounts, Material Flow Accounts

This documentation applies to the reporting period:

2021

Last edited: 10 July 2023



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2. Introduction

The general purpose of economy-wide material flow accounts (MFA) is to describe the interaction of the domestic economy with the natural environment and the rest of the world economy in terms of flows of materials.

3. Contact

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4. Metadata Update

4.1. Metadata last certified

10 July 2023

4.2. Metadata last posted

10 July 2023

4.3. Metadata last update

10 July 2023



5. Statistical Presentation

5.1. Data Description

Material Flow Accounts record the domestic extraction of resources from the environment (broken down between biomass, metallic minerals, non-metallic minerals and fossil fuels); physical trade; the release of materials back to the environment after being used in the domestic economy (emissions to air, landfill waste, emissions to water, dissipative use of products and dissipative losses); and input and output balancing items.

The principal variables disseminated are: Domestic Extraction (Biomass, Metals, Non-Metallic Minerals and Fossil Fuels); Physical Exports and Imports; Emissions to Air, Land, Water and Dissipative Use of Products and Balancing items.

The CSO publishes a Material Flow Accounts release on an annual basis. The accounts comprise the following tables and graphs:

Table 1: Net Material Accumulation 2012-2021. This category = Domestic Extraction + Trade Imports - Trade Exports - Domestic Processed Outputs+ Input Balancing Items – Output Balancing Items.

Table 2 Domestic Extraction 2012-2021 broken down by Biomass, Metallic Minerals, Non-Metallic Minerals and Fossil Fuels. These categories are then broken down into more detailed classes.

Table 3: Trade by Stages of Manufacturing 2012-2021 broken down into raw products, semi-manufactured products and finished products

Figure 1: Domestic Material Consumption 2000-2021

Figure 2: Domestic Extraction, Imports, Exports and Domestic Material Consumption 2000-2021

Figure 3: Domestic Extraction Selected Categories 2000-2021

5.2. Classification System

The Combined Nomenclature is used in the compilation of trade statistics used in Material Flow Accounts and the PRODCOM classification is used in the compilation of data on the domestic extraction of metals, non-metallic minerals and peat.

5.3. Statistical Concepts and definitions

Economy-wide material flow accounts (EW-MFA) provide an aggregate overview, in thousand tonnes per year, of the material flows into and out of an economy. EW-MFA cover solid, gaseous, and liquid materials, except for bulk flows of water and air. Like the system of national accounts, EW-MFA constitute a multi-purpose information system. The detailed material flows provide a rich empirical database for numerous analytical purposes.

Further, EW-MFA are used to derive various material flow indicators.

Domestic Extraction	Material inputs from the natural environment to the economy are called domestic extraction. There are four types of domestic extraction:
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	<ul style="list-style-type: none">• Biomass;• Metallic minerals;• Non-metallic minerals; and• Fossil fuels. <p>Materials that are extracted from the environment without the intention of using them are not included. Examples of unused extraction are soil and rock excavated during construction, overburden from mining, the unused parts of felling in forestry, unused catch in fishing, unused parts of the straw harvest in agriculture, and natural gas flared or vented.</p>
	<p>Biomass</p> <p>Biomass in general comprises organic non-fossil material of biological origin. The flow from the environment to the economy is recognised at the point of harvest. The classification of material flows for domestic extraction of biomass has six main sections:</p> <ul style="list-style-type: none">• Crops;• Used crop residues;• Fodder crops;• Grazed biomass;• Wood from cultivated and non-cultivated forests;• and wild fish catch, aquatic plants/animals, hunting and gathering. <p>A characteristic feature of all types of biomass is its considerable moisture content, which may account for more than 95% in the case of fresh living plant biomass. The moisture content is very variable across plant parts and species and vegetation periods. Fodder crops, grazed biomass and wood have to be converted to a standardised moisture content. Other biomass is accounted for at its weight at the time of harvest.</p> <p>Crops: Includes primary harvest of all crops from arable land and permanent cultures. This includes major staple foods such as cereals, roots and tubers, pulses, vegetables as well as commercial feed crops, industrial crops and all fruits and nuts from permanent cultures. It also includes flowers, Christmas trees, seeds, and short rotation wood such as Miscanthus and Willow. Own account production of agricultural goods is regarded as domestic extraction.</p> <p>Used Crop Residues: In most cases, primary crop harvest is only a fraction of total plant biomass of the respective cultivar. The residual biomass, such as straw, may be put to further economic use such as for bedding material in livestock husbandry, as animal feed, for energy production, and as industrial raw material. Crop residues are regarded as domestic extraction irrespective of whether they are sold or used for intra-unit consumption. Residues which are ploughed into the soil or burned in the field are not accounted for as used extraction. A significant amount of fodder is consumed by animals feeding directly from pastures (grazed biomass). Grazed biomass is regarded as domestic extraction. Grass type</p>



	<p>fodder crops have been reported in dry weight (15% moisture).</p> <p>Straw crop residue figures are generated by multiplying cereal crop tonnage by Eurostat harvest and recovery rates.</p> <p>Other crop residues are obtained by multiplying the tonnage figures of oil seed rape and sugar beet residues by their respective harvest and recovery rates.</p> <p>Fodder Crops: Figures are generated by taking grass silage, hay, arable silage, fodder beet, green maize, fodder rape and kale and other cereals figures and multiplying the area under cultivation by national yield factors. Fodder crops are reported in dry weight.</p> <p>Grazed Biomass: Two main estimation methods are possible for the calculation of grazed biomass: a supply-side approach or a demand-side approach. The supply-side approach multiplies the areas under grass silage, hay, pasture and rough grazing by national yield factors. The demand-side approach takes the annual fodder requirement of the existing livestock and subtracts it from the overall roughage requirement of livestock. The total roughage requirements for ruminant animals is calculated using average roughage intakes per animal multiplied by the number of animals in each category.</p> <p>The supply side approach to the calculation of grazed biomass has been the one adopted in the production of statistics for this release.</p> <p>Wood from cultivated and non-cultivated forests:</p> <p>Only harvested timber is regarded as domestic extraction and not the total growth of trees. Increments to the stock of standing timber are regarded as positive from an environmental viewpoint and are not considered part of domestic extraction until it is harvested.</p> <p>Wood output may be reported in solid cubic metres which must then be converted into tonnes.</p> <p>Wood figures are counted on an "overbark" basis. Bark accounts for approximately 10% of stem wood weight. A significant fraction of the bark is of economic use (e.g. energy production). The part of the bark which is used is regarded as domestic extraction. All biomass which remains in the forest, and is not used (branches, root-stock etc.), is not counted as domestic extraction. It is assumed that all harvested wood over bark is used economically.</p> <p>Wood in wet weight is transformed into dry weight at 15% moisture content by the application of national</p>
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		<p>conversion factors rather than Eurostat coefficients as in previous years.</p> <p>Wood figures for 2015 -2021 are based on the CSO's Roundwood Removals Survey. Before then they were calculated by the Forest Service.</p> <p>Wild fish catch, aquatic animals/plants, hunting and gathering: This category comprises the extraction of all wild (non-cultivated) aquatic biomass including seaweed as well as fish caught in sea and inland waters. Cultivated aquatic resources (aquaculture) are not regarded as domestic extraction. There is a discontinuity in the time series. Figures from 2007 onwards are compiled by the CSO and refer to fish landings by Irish vessels in Irish ports and Irish vessels in foreign ports (in tonnes of live weight equivalents). Figures between 2000 and 2004 are provided by the CSO and refer to fish landings by Irish boats in Irish ports, while figures for 2005-2006 are provided by the Sea Fisheries Protection Authority and refer to all fish landings in Ireland.</p>
	<p>Metallic minerals</p>	<p>In Material Flow Accounts extraction of metal ores is measured as gross ore. Accounting for domestic extraction of metals and non-metallic minerals refers to the run-of-mine production (the total amount of extracted crude mineral that is submitted to the first processing step). Material extracted but not used as an input for subsequent processing is not counted as domestic extraction.</p> <p>If two or more metals are obtained from the same crude ore then the total amount of ore has to be allocated to the different metals. This occurs in Ireland where lead and zinc are mined together.</p> <p>The total amount of gross ore is calculated by dividing the metal content of the main metal by the ore grade of that metal. The allocation of gross ore to lead and zinc was based on their relative shares of metal content in volume terms. In previous years relative value shares of metal content were used.</p> <p>A small amount of silver is also mined.</p> <p>The figures for lead, zinc, and silver extraction were obtained from the Department of the Environment, Climate and Communications.</p>
	<p>Non-metallic minerals</p>	<p>Non-metallic minerals cover the following categories:</p> <ul style="list-style-type: none"> • Marble, granite, sandstone, porphyry, basalt, other ornamental or building stone; • Chalk and dolomite; • Slate; • Chemical and fertiliser minerals;



		<ul style="list-style-type: none"> • Salt; • Limestone and gypsum; • Crushed rock; • Clays and kaolin; • Sand and gravel; and • Other. <p>The CSO PRODCOM survey was the main data source used to compile these figures. Adjustments were made in some years for non-response, incorrect returns and below threshold items. The crushed rock and sand and gravel statistics were supplemented using the CSO Road Freight Survey for data not reported in PRODCOM. The basis for this under-reporting assumption is that PRODCOM data relate to sales by enterprises with 3 or more employees and hence may exclude aggregates extracted for own use as well as below threshold activity.</p>
	<p>Fossil Fuels</p>	<p>The Sustainable Energy Authority of Ireland's energy balance is the main data source for the domestic extraction of fossil fuels. Peat and natural gas are the two main material products that are extracted. Peat used for non-energy purposes such as horticulture is also included where data is available (and are imputed using PRODCOM and trade figures for years where data is missing). Data on natural gas were converted from cubic metres into tonnes using conversion factors supplied by the SEAI.</p>
<p>Good Exports and Imports</p>	<p>The demarcation of trade flows follows the methodology used in external trade statistics (goods are measured as they physically cross the national frontier), rather than the residence principle as applied in National Accounts.</p> <p>Eurostat has provided a key for classifying goods according to their level of manufacturing (see below). This is useful as imports of semi-manufactured and finished goods are recorded using their imported weight rather than by their raw material equivalent weight and gives an insight into the relative composition of Ireland's imports.</p> <ul style="list-style-type: none"> • Raw materials are products produced by primary industries such as agriculture, forestry, fishing, and mining; • Semi-manufactured products are further processed raw products that do not yet constitute finished products; • Finished products are not subject to further processing. <p>Some traded products are measured in units other than net mass e.g. number of aircraft. The net mass has been estimated using the monetary value or the supplementary unit value.</p>	
<p>Domestic Processed Output</p>	<p>Domestic Processed Output indicates the total weight of materials which are released back to the environment after being used in the domestic economy. Exported and imported materials are not included in DPO. There are five main categories:</p> <ul style="list-style-type: none"> • Emissions to air; • Waste landfilled (uncontrolled); • Emissions to water; • Dissipative use of products; and • Dissipative losses. 	



	<p>Emissions to Air</p>	<p>Emissions to air are gaseous or particulate materials released to the atmosphere from production or consumption processes in the economy. Air emissions include emissions from controlled landfills because such landfills are considered to be part of the economy. N₂O emissions from product use and NMVOC emissions by solvents are accounted for as dissipative use of products. Emissions to air from fertiliser application, such as N₂O and NH₃ are not accounted for in Domestic Processed Output. The related primary output is fertiliser spread on agricultural soil. The inclusion of these emissions thus would represent double-counting.</p> <p>Air emissions figures are based on the application of the Territorial Principle used in National Inventory Reports compiled by the Environmental Protection Agency under the UN Framework Convention on Climate Change and the Convention on Long-Range Transboundary Air Pollution. Under the Territorial Principle emissions from the national territory are included and those outside the national territory are excluded. In contrast, under the Residence Principle, air emissions arising from resident units of a given national economy, are recorded regardless of where these emissions occur geographically.</p>
	<p>Waste Landfilled (Uncontrolled)</p>	<p>Wastes are commonly reported in wet weight which have been converted to dry matter value. The figures for this category were obtained from the EPA and they refer to the deposit of municipal waste only to uncontrolled landfills. Municipal and Industrial Waste sent to controlled landfills are excluded.</p>
	<p>Emissions to Water</p>	<p>Emissions to water are materials which cross the boundary from the economy back into the Environment. Only data on flows of pollutants into the water bodies were reported and not data on pollutant concentration in the water bodies. The figures for this category were obtained from the EPA.</p> <p>It is assumed that 5% of organic fertiliser (manure) produced is lost as an emission to water.</p>
	<p>Dissipative Use of Products</p>	<p>Examples of dissipative use are inorganic and organic fertilisers such as manure, compost, or sewage sludge. Manure spread on agricultural land is reported in dry weight.</p> <p>The fertiliser figures consist of three straight fertilisers - nitrogen, phosphorus and potassium – compound products and agricultural lime. These are reported in total weights rather than nutrient contents.</p> <p>Sewage sludge refers to any solid, semi-solid, or liquid residue removed during the treatment of municipal waste water or domestic sewage. Sewage sludge is reported in dry weight by the Environmental Protection Agency.</p>



		<p>Compost is used as a fertiliser. It is reported in dry weight.</p> <p>Pesticides have been reported as active ingredients rather than total mass.</p>
	Dissipative Losses	<p>Dissipative losses are unintentional outputs of materials to the environment resulting from abrasion, corrosion, and erosion at mobile and stationary sources, and from leakages or from accidents during the transport of goods. No data for dissipative losses have been calculated for this release.</p>
Balancing Items	<p>These data comprise items required on the input side to balance a given output which is already accounted for, or items which must be considered on the output side to balance a given input.</p> <p>Input Balancing Items: These consist of oxygen used in combustion processes; oxygen used in respiration by humans, livestock and bacterial respiration from solid waste and wastewater; nitrogen used in the Haber-Bosch process to produce ammonia; and water requirements for the domestic production of exported beverages. The calculation of these input items relies on the use of coefficients in the Eurostat Material Flow Accounts Compilation Guidelines.</p> <p>Output Balancing Items: These consist of water vapour released by the combustion of fuels; water vapour and carbon dioxide produced by the respiration of humans and livestock; and excreted water from biomass products. The calculation of these output items relies on the use of conversion coefficients in the Eurostat Material Flow Accounts Compilation Guidelines and Table G Estimation Tool in the Eurostat EW-MFA Questionnaire.</p>	
Derived Indicators	<p>Direct Material Input measures the input of materials directly used by the economy, which are all materials that form part of products or are used in production and consumption activities. DMI equals used extraction (including that which is used or contained in exports) plus imports.</p> <p>Physical Trade Balance measures the difference between the total mass of imports and the total mass of exports (imports minus exports) in tonnes.</p> <p>Domestic Material Consumption measures the total amount of material directly consumed by the economy. It is the sum of domestic extraction and imports less exports.</p> <p>Net Material Accumulation is the difference between inputs from the environment and the Rest of the World into the economy and the outputs from the economy into the environment and the Rest of the World.</p> <p>Resource Productivity measures the amount of GDP at constant prices compared with Domestic Material Consumption. It is a measure of how efficiently resources are used in the economy.</p>	

5.4. Statistical Unit

Statistical units differ, depending on the different data sources.



5.5. Statistical Population

EW-MFA include all materials (excluding water and air) crossing the system boundary of the national economy of the reporting country. The economy is demarcated by the conventions of the national accounting system (resident units). In Eurostat's EW-MFA material inputs to the economy cover extractions of natural resources (excluding water and air) from the natural environment and imports of material products (goods) from the rest of the world economy (ROW). Material outputs are disposals of materials to the natural environment and exports of material products and waste to the ROW.

5.6. Reference Area

State

5.7. Time Coverage

1994-2021 for PxStat data tables, 2012-2021 for MFA Release Tables; 2000-2021 for MFA Release Figures 1-3

5.8. Coverage – Time: by Release tables

MFA Release Tables	From (YEAR)	To (YEAR)	Comments
Table 1	2012	2021	
Table 2	2012	2021	
Table 3	2012	2021	
Figure 1	2000	2021	
Figure 2	2000	2021	
Figure 3	2000	2021	

5.9. Base period

Not applicable because EW-MFA are not reported as indices.

6. Unit of Measure

Million Tonnes

7. Reference Period

2021



8. Institutional Mandate

8.1. Legal Acts and other agreements

Economy-wide material flow accounts (EW-MFA) are legally covered by Regulation (EU) 691/2011 on European Environmental Economic Accounts.

8.2. Data Sharing

Not applicable.

9. Confidentiality

9.1. Confidentiality – policy

All information supplied to the CSO is treated as strictly confidential. The Statistics Act, 1993 sets stringent confidentiality standards: Information collected may be used only for statistical purposes, and no details that might be related to an identifiable person or business undertaking may be divulged to any other government department or body. These national statistical confidentiality provisions are reinforced by the following EU legislation: Council Regulation (EC) No 223/2009 on European statistics for data collected for EU statistical purposes. Further details are outlined in the CSO's Code of Practice on Statistical Confidentiality.

For more information on the CSO confidentiality policy please visit:

<https://www.cso.ie/en/aboutus/lqdp/csodatapolicies/>

9.2. Confidentiality – data treatment

Confidential data can be identified based on the number or dominance of individual enterprises. Confidential data are flagged '(c)' and not published.

10. Release Policy

10.1. Release Calendar

The date of dissemination of all statistics released by CSO can be found in the Release Calendar published in CSO.ie. This calendar is regularly updated. The deadline for 2021 release is 30th June (T + 18 months).

10.2. Release calendar access

The release calendar can be accessed via the CSO website, www.cso.ie, or directly from this link:

<https://www.cso.ie/en/csolatestnews/releasecalendar/>

10.3. User access

In accordance with Principle 6 of the European Statistics Code of Practice all users of CSO statistics have equal access via the CSO website at the same time of 11 AM. Any privileged pre-release access to any outside user is limited, controlled and publicised. In the event that leaks occur, pre-release arrangements are revised so as to ensure impartiality.

The CSO recognises that in very limited circumstances a business need for pre-release access may be substantiated. Any form of pre-release access is a privilege and a strict CSO pre-release access policy is adhered to for these special requests. The full pre-release access policy can be accessed at:



<https://www.cso.ie/en/aboutus/lgdp/csodatapolicies/csopolicyonpre-releaseaccess/>

11. Frequency of Dissemination

Annual.

12. Accessibility and clarity

12.1. News release

No news releases are issued.

12.2. Publications

The results are published on the following page of the CSO website:

<https://www.cso.ie/en/statistics/environmentaccounts/materialflowaccounts/>

12.3. On-line database

Selected extracts from the results are posted on the CSO's data dissemination database, PxStat

<https://data.cso.ie/product/MFA>

Eurostat Material Flow Accounts tables are posted on the Eurostat data dissemination database at:

https://ec.europa.eu/eurostat/databrowser/view/env_ac_mfa/default/table

12.3.1. AC 1. Data tables - consultations

There are approximately 1200 consultations to the online Material Flow Accounts tables annually with around 600 of those being unique page views.

12.4. Micro-data Access

Micro data are not disseminated to users.

12.5. Other

Not applicable.

12.5.1. AC2. Metadata consultations

Not measured.

12.6. Documentation on Methodology

The estimation process is based on the methodology set out in the 2018 Eurostat publication, "Economy-Wide Material Flow Accounts Handbook" and earlier Eurostat Manuals.

Information (e.g. manuals, electronic questionnaires) is available on the CSO's and Eurostat websites

<https://www.cso.ie/en/methods/environment/materialflowaccounts/>

<https://ec.europa.eu/eurostat/documents/3859598/9117556/KS-GQ-18-006-EN-N.pdf/b621b8ce-2792-47ff-9d10-067d2b8aac4b>



12.6.1. AC3 – Metadata completeness – rate

Not calculated.

12.7. Quality Documentation

Information (e.g. manuals, electronic questionnaires) is available on the CSO's and Eurostat website

<https://www.cso.ie/en/methods/environment/materialflowaccounts/>

<https://ec.europa.eu/eurostat/documents/3859598/9117556/KS-GQ-18-006-EN-N.pdf/b621b8ce-2792-47ff-9d10-067d2b8aac4b>

13. Quality Management

13.1. Quality Assurance

Quality Management Framework

The CSO avails of an office wide Quality Management Framework (QMF). This framework allows all CSO processes and outputs to meet the required standard as set out in the European Statistics Code of Practice (ESCOPE). The QMF foundations are based on establishing the UNECE's Generic Statistical Business Process Model (GSBPM) as the operating statistical production model to achieve a standardised approach to Quality Management. All and any changes implemented to CSO processes and outputs require adherence to the QMF.

To ensure quality of EW-MFA data The CSO implements the following quality assurance elements:

- 1) Methodological guidelines from Eurostat to assist countries in compiling and providing internationally harmonised EW-MFA;
- 2) A wide range of validation procedures to check the quality of data received. The validation procedures check:
 - completeness
 - internal consistency;
 - correctness of footnotes and confidentiality;
 - plausibility of reported time series (annual change rates);
 - plausibility of revisions;
 - external consistency (cross-domain plausibility);
 - And use of estimation tools contained in the EW-MFA Questionnaire.
- 3) Gap-filling of missing statistical information.

13.2. Quality Assessment

Quality management is good. Validation procedures, estimation of missing statistical data (gap-filling) and quality reporting are in place.

Data quality could still be improved, in particular for some quantitatively important elements which need to be estimated (e.g. fodder crops, grazed biomass, crushed rock extraction, sand and gravel extraction and sod peat harvest).



14. Relevance

14.1. User Needs

Eurostat is the main user of Material Flow Account statistics. They use the data for measuring environmental sustainability, resource productivity, material footprints and the circular economy.

14.1.1. Main National Users

National users of Material Flow Accounts statistics include environmental organisations, policy makers in government departments, the media, educational institutions and the general public.

14.1.2. Principal External Users

International users include Eurostat, the European Environment Agency and the OECD.

14.2. User Satisfaction

There are no systematic studies of user satisfaction.

14.3. Data Completeness

Data are complete for all tables and graphs associated with the MFA national release. However, no information on Raw Material Equivalents have been calculated.

15. Accuracy and reliability

15.1. Overall accuracy

EW-MFA are compiled from a wide range of data sources. The overall accuracy is considered good. But there may be problems with the accuracy of data on Fodder Crops and Grazed Biomass as year specific yield rates are not available. There may also a problem with the accuracy of data on the extraction of Crushed Rock and Sand and Gravel, which are based on PRODCOM data supplemented with data from based on road transport freight. Sod Peat and Peat for Horticulture figures have also been imputed for most years.

15.1.1. Annex 3: Data quality for Tables 1-3 by material categories

Characteristics 'Tables 1 Net Material Accumulation		
Category	Sub - Category	Data quality is lower, if it is case, please describe
Domestic Extraction	Biomass	
	Metals	
	Non-Metallic Minerals	
	Fossil Fuels	
Trade Imports	Biomass	
	Metals	
	Non-Metallic Minerals	
	Fossil Fuels	
	Other Products	



Characteristics 'Tables 1 Net Material Accumulation		
Category	Sub - Category	Data quality is lower, if it is case, please describe
Trade Exports	Biomass	
	Metals	
	Non-Metallic Minerals	
	Fossil Fuels	
	Other Products	
Domestic Material Consumption	Biomass	
	Metals	
	Non-Metallic Minerals	
	Fossil Fuels	
	Other Products	
Domestic Processed Output	Emissions to Air	
	Waste Landfilled (Uncontrolled)	
	Emissions to Water	
	Dissipative Use of Products	
Balancing Items Input Side		
Balancing Items Output Side		
Net Material Accumulation		

Characteristics Table 2 'Domestic extraction'		
Category	Sub-Category	Data quality is lower, if it is case, please describe
Biomass	Cereals	
	Roots, tuber	
	Sugar crops	
	Vegetables	
	Other crops	
	Straw	
	Other crop	
	Fodder Crops	Year -specific yields are not available for years before 2010 so constant national yields are used instead
Grazed biomass	Year -specific yields are not available for years before 2010 so constant national yields are used instead	
Wood		



Characteristics Table 2 'Domestic extraction'		
Category	Sub-Category	Data quality is lower, if it is case, please describe
	Wild fish catch and aquatic plants and animals	
Metals	Led Gross Ore	
	Zinc Gross Ore	
Non_Metallic Minerals	Marble, granite, sandstone	
	Limestone and gypsum	
	Crushed Rock	PRODCOM data is supplemented by road freight data
	Sand and Gravel	PRODCOM data is supplemented by road freight data
	Other Non-Metallic Minerals	
Fossil Fuels	Peat	Sod Peat and Peat for Horticulture figures are imputed for many years
	Natural gas	

Characteristics Table 3: Trade by Stage of Manufacturing		
Category	Sub-Category	Data quality is lower, if it is case, please describe
Imports	Raw Products	
	Semi-Manufactured products	
	Finished Products	
Exports	Raw Products	
	Semi-Manufactured products	
	Finished Products	

Characteristics Figure 1: Domestic Material Consumption		
Category	Sub-Category	Data quality is lower, if it is case, please describe
Domestic Material Consumption	Biomass	
	Metals	
	Non-Metallic Minerals	
	Fossil Fuels Other Products	



Characteristics Figure 2 Domestic Extraction, Imports, Exports and Domestic Material Consumption		
Category	Sub-Category	Data quality is lower, if it is case, please describe
Domestic Extraction		
Imports		
Exports		
Domestic Material Consumption		

Characteristics Figure 3: Domestic Extraction, Selected Categories		
Category	Sub-Category	Data quality is lower, if it is case, please describe
Domestic Extraction	Crushed Rock	PRODCOM data is supplemented by road freight data
	Sand and Gravel	PRODCOM data is supplemented by road freight data
	Grazed Biomass	Year -specific yields are not available for years before 2010 so constant national yields are used instead
	Fodder Crops	Year -specific yields are not available for years before 2010 so constant national yields are used instead

Characteristics Figure 4: Resource Productivity Index		
Category	Sub-Category	Data quality is lower, if it is case, please describe
Resource Productivity	€ GDP per KG Domestic Material Consumption	

15.2. Sampling Error

Not applicable.

15.2.1. A1. Sampling error indicator

Not applicable.

15.3. Non-sampling Error

Not applicable.

15.3.1. Coverage error

Not applicable.

15.3.1.1. A2. Over coverage rate

Not applicable.



15.3.1.2. A3. Common units – proportion

Not applicable.

15.3.2. Measurement error

Not applicable.

15.3.3. Non-Response Error

Not applicable.

15.3.3.1. Unit non-response rate

Not applicable.

15.3.3.2. Item non-response rate

Not applicable.

15.3.4. Processing error

Not applicable.

15.3.5. Model assumption error

Not applicable.

16. Timeliness and punctuality

16.1. Timeliness

The Material Flow Accounts are supposed to be published nationally within 18 months of the end of the year to which the figures relate.

16.1.1. TP1. Time lag – First results

The 2021 results were due to be published in June 2023 a month before the actual publication date of August 2nd, 2023

16.1.2. TP2. Time lag – Final results

Not applicable. Figures are revised and updated when the following year's MFA data are published.

16.2. Punctuality

The 2021 results were due to be published in June 2023 just over a month before the actual publication date of August 2nd, 2023

16.2.1. TP3. Punctuality – Punctuality - delivery and publication

The 2021 results were due to be published in June 2023 just over a month before the actual publication date of August 2nd 2023



17. Comparability

17.1. Comparability – Geographical

The accounts are compiled in line with Eurostat guidelines in so far as this is possible. They can therefore be considered methodologically sound, and as they are compiled annually in a consistent manner, they are comparable over time. A limitation with regard to comparability between countries is that some of the data received from the EPA refers to emissions produced in Ireland (territorial emissions), whereas a record of residential emissions is requested by Eurostat.

17.1.1. CCI. Asymmetry for mirror flow statistics

Not applicable because physical imports and exports as recorded in EW-MFA are not specified by origin and/or destination.

17.2. Comparability over time

The comparability over time is good due to clear statistical concepts and definitions. Revisions in methodology are usually applied backwards to the entire time series.

17.2.1. Length of Comparable Time series

There are discontinuities in some categories over time, such as fisheries in Domestic Extraction in Table 2 and fertilisers in Dissipative Use of Products in Table 1

17.2.2. Comparability over time – detailed

Year (of the break in series)	Table	MF-code(s)	Reason for 'break in time series'
2010	Table 2	MF.1.2.2 Fodder Crops and Grazed Biomass	Year invariant yield factors only available after 2010
2015	Table 2	MF1.3 Wood	New CSO survey introduced to collect data
2005 and 2007	Table 2	MF.1.4 Fisheries	Different definitions used in source data
1994-2021	Table 2	MF4.1. 4 Peat Production	Horticultural and Sod Peat imputed for missing years between 1994 and 2021.
2007	Table 1	MF.7.2 Dissipative Use of Products Fertilisers	Different definitions used in source data

17.2.3. Coherence – cross domain

Cross domain checks are carried out where possible. For example, total aggregates data for Crushed Rock and Sand and Gravel are taken from PRODCOM figures and cross-checked with Road Transport Freight data, British Geological Survey data, figures supplied by the Irish Concrete Federation and the European organisation UEPG.

17.2.4. Coherence – Sub annual and annual statistics

Not applicable; reported EW-MFA data are only annual.

17.2.5. Coherence with National Accounts



The data are coherent with national accounts and environmental-economic accounts.

17.3. Coherence – internal

The internal coherence is very high, ensured by the accounting framework.

18. Cost and Burden

Estimates of Cost and Burden of CSO surveys can be obtained from the Response Burden Barometer <https://www.cso.ie/en/methods/multisectoral/responseburdenbarometer/>

Compilation of the 2021 MFA Questionnaire and 2021 MFA national release will have taken seven month's work by one Statistician, one month's work by one Senior Statistician one month's work by two other members of the CSO Environment Division.

19. Data Revision

19.1. Data Revision Policy

Revisions refer to changes made to published statistical data when the information used in its production has been updated or corrected. This information includes all data used in compiling the statistic e.g., respondent data, administrative data, weights and factors, methodology, classifications, definitions, modifications to survey questionnaires, survey scope and data collection methods.

The data revision policy that CSO statistics adheres to can be found via the following link: <https://www.cso.ie/en/methods/quality/treatmentofrevisions/>

19.2. Data Revision Practice

Data are revised on an annual basis as corrections and revisions to the figures are applied.

20. Statistical processing

20.1. Source Data

Data sources used in Ireland include other divisions in the CSO; the Environmental Protection Agency, the Sustainable Energy Authority of Ireland; the Department of Agriculture, Food and the Marine, the Department of the Environment, Climate and Communications, Bord na Móna, Transport Infrastructure Ireland, Bord Iascaigh Mhara, the Sea Fisheries Protection Authority, the Irish Concrete Federation, the British Geological Survey and individual enterprises.



20.1.1. Sources data - Table 1,2 and 3

Characteristics Table1 Net Material Accumulation		Data sources		
Category	Sub-Category	Please specify the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an international data source? (yes/no)
Domestic Extraction	Biomass	https://www.cso.ie https://gov.ie/agriculture https://www.drma.com https://fisheriesireland.ie https://sfpa.ie	Yes	No
	Metals	http://decc.gov.ie	Yes	No
	Non-Metallic Minerals	https://www.cso.ie	Yes	No
	Fossil Fuels	https://www.seai.ie https://www.bnm.ie	Yes	No
Trade Imports	Biomass	https://www.cso.ie	Yes	No
	Metals	https://www.cso.ie	Yes	No
	Non-Metallic Minerals	https://www.cso.ie	Yes	No
	Fossil Fuels	https://www.cso.ie	Yes	No
	Other Products	https://www.cso.ie	Yes	No
Trade Exports	Biomass	https://www.cso.ie	Yes	Yes
	Metals	https://www.cso.ie	Yes	No
	Non-Metallic Minerals	https://www.cso.ie	Yes	No
	Fossil Fuels	https://www.cso.ie	Yes	No
	Other Products	https://www.cso.ie	Yes	No
Domestic Material Consumption	Biomass	Not applicable – Derived Data		
	Metals	Not applicable – Derived Data		
	Non-Metallic Minerals	Not applicable – Derived Data		
	Fossil Fuels	Not applicable – Derived Data		



Characteristics Table1 Net Material Accumulation		Data sources		
Category	Sub-Category	Please specify the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an international data source? (yes/no)
	Other Products	Not applicable – Derived Data		
Domestic Processed Output	Emissions to Air	https://www.epa.ie	Yes	No
Waste Landfilled (uncontrolled)		https://www.epa.ie		
	Emissions to Water	https://www.epa.ie	Yes	No
	Dissipative Use of Products	https://www.epa.ie https://www.gov.ie/agriculture https://www.tii.ie	Yes	No
Balancing Items Input Side		https://cso.ie https://www.seai.ie	Yes	No
Balancing Items Output Side		https://www.cso.ie https://www.seai.ie	Yes	No
Net Material Accumulation		Not applicable - Derived Indicator		

Characteristics Table 2 Domestic Extraction		Data sources		
Category	Sub-Category	Please specify* and provide the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an international data source? (yes/no)
Biomass				
	Crops	https://www.cso.ie	Yes	No
	Used Crop Residues	https://www.cso.ie	Yes	No



Characteristics Table1 Net Material Accumulation		Data sources		
Category	Sub-Category	Please specify the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an international data source? (yes/no)
	Fodder Crops	https://www.cso.ie	Yes	No
	Grazed Biomass	https://www.cso.ie	Yes	No
	Wood	https://www.drima.com https://www.cso.ie	Yes	No
	Wild Fish Catch & Aquatic Plants and animals	https://fisheriesireland.ie https://sfpa.ie	Yes	No
Metals				
	Lead	https://www.decc.gov.ie	Yes	No
	Zinc	https://www.decc.gov.ie	Yes	No
	Silver	https://www.decc.gov.ie	Yes	No
Non-Metallic Minerals				
	Marble, Granite and Sandstone	https://www.cso.ie	Yes	No
	Limestone and Gypsum	https://www.cso.ie	Yes	No
	Crushed Rock	https://www.cso.ie	Yes	No
	Sand and Gravel	https://www.cso.ie	Yes	No
	Other non-Metallic Minerals	https://www.cso.ie	Yes	No
Fossil Fuels				
	Peat	https://www.seai.ie https://www.bordnamona.ie	Yes	No
	Natural Gas	https://www.seai.ie	Yes	No



Characteristics Table 3 Trade by Stage of Manufacturing'		Data sources		
Category	Sub-Category	Please specify the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an international data source? (yes/no)
Imports	Raw Products	https://www.cso.ie	Yes	No
	Semi-Manufactured Products	https://www.cso.ie	Yes	No
	Finished Products	https://www.cso.ie	Yes	No
Exports	Raw Products	https://www.cso.ie	Yes	No
	Semi-Manufactured Products	https://www.cso.ie	Yes	No
	Finished Products	https://www.cso.ie	Yes	No

Characteristics Figure 1		Data sources		
Category	Sub-Category	Please specify the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an international data source? (yes/no)
Domestic Material Consumption	Biomass	See Table 1 above	Yes	No
	Metals	See Table 1 above	Yes	No
	Non-Metallic Minerals	See Table 1 above		
	Fossil fuels	See Table 1 above	Yes	No
	Other Products	See Table 1 above	Yes	No

Characteristics Figure 2 Domestic Extraction Selected Categories		Data sources		
Category	Sub-Category	Please specify the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an international data source? (yes/no)
	Trade Imports	See Table 1 above	Yes	No
	Trade Exports	See Table 1 above	Yes	No



Characteristics Figure 2 Domestic Extraction Selected Categories		Data sources		
Category	Sub-Category	Please specify the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an inter-national data source? (yes/no)
	Domestic Material Consumption	See Table 1 above	Yes	No

Characteristics Figure 3 Domestic Extraction Selected Categories		Data sources		
Category	Sub-Category	Please specify the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an inter-national data source? (yes/no)
Domestic Extraction	Crushed Rock	See Table 2 above	Yes	No
	Sand and Gravel	See Table 2 above	Yes	No
	Grazed Biomass	See Table 2 above	Yes	No
	Fodder Crops	See Table 2 above	Yes	No

Characteristics Figure 4 Resource Productivity Index		Data sources		
Category	Sub-Category	Please specify the exact data source (add URL or hyperlink if possible)	Is it a national data source? (yes/no)	Is it an inter-national data source? (yes/no)
Resource Productivity Index	€ GDP per KG of DMC	http://www.cso.ie	Yes	No

20.1.2. Source data – Table I

We do not compile Table I of the EE-MFA Questionnaire yet.

20.1.3. Population and sampling frame

Not applicable.



20.1.4. Sampling design

Not applicable.

20.1.5. Survey size

Not applicable.

20.1.6. Survey technique

Administrative and survey data was collected from the organisations mentioned in item 3.3 above. No specific Material Flow Accounts survey was undertaken.

20.2. Frequency of data collection

Data are collected annually.

20.3. Data Collection

No survey data are used in the data collection process for compiling the Material Flow Accounts. Administrative data are used instead.

20.3.1. Type of Survey/Process

This publication is based on administrative data.

20.3.2. Questionnaire (including explanations)

Not applicable.

20.3.3. Survey Participation

Not applicable.

20.3.4. Data Capture

Not applicable.

20.4. Data Validation

The CSO uses the EW-MFA Compilation Guidelines published by Eurostat and consults Eurostat about any significant errors, anomalies or uncertainties in the data.

Excel data is checked against output data generated by SAS programs;

Nation-specific conversion factors rather than European wide ones are applied where possible. European conversion factors taken from the Eurostat Manuals; missing data are imputed; proxy variables are examined; and relevant reports are consulted to consider the plausibility of our figures.

20.5. Data Compilation

The following issues connected with data compilation in the MFA release should be noted:

Emissions to Air: Figures in Table 1 are based on the application of the Territorial Principle rather than the Residence Principle as requested by Eurostat. This is because there is no continuous time series available for correcting air emissions based on the Residence Principle.



Fodder Crops and Grazed Biomass in Table 2 are based on the application of invariant national yield factors rather than the European factors contained in the calculation tool of the Questionnaire.

Both Crushed Rock and Sand and Gravel figures in Table 2 are based on PRODCOM data supplemented by Road Freight transport data rather than the calculation tools in the Eurostat Questionnaire.

Sod Peat and Peat for Horticulture figures in Table 2 are imputed for several years.

20.5.1. Imputation (for Non-Response or Incomplete Data Sets)

The PRODCOM data for non-metallic minerals are adjusted for missing data, units problems and inconsistent use of PRODCOM codes. Some peat extraction figures in Table 2 are imputed. Trade quantity data are also amended as necessary.

Imputation is based on carrying forward the latest available data.

20.5.1.1. Imputation rate

Not calculated.

20.5.1.2. Estimation approaches for specific items

Characteristics Tables 1, 2 and 3		Estimation methods			
Code	Label	Do you use the Eurostat estimation approach recommended in the EW-MFA compilation guide? (yes/no)	Have you developed your own estimation approach? (yes/no)	Please explain briefly the estimation approach including possible data sources for auxiliary data?	Please specify coefficients used (if not Eurostat coefficients)?
Table 1	Domestic Processed Output – Emissions to Air	No	Yes	Air Emissions figures are based on the Territorial Principle not the Residence Principle.	
Table 2	Straw	Yes	No	Cereal production figures are supplied by CSO Agriculture Division. These are then transformed into Straw figures by the application of Eurostat Harvest factors and Recovery Rates.	
Table 2	Other crop residues (sugar beet and oilseed rape, etc.)	Yes	No	Sugar Beet and Oilseed Rape figures are supplied by CSO Agriculture Division. These are then transformed into Used Crop Residue figures by the application of Eurostat Harvest factors and Recovery Rates	
Table 2	Fodder crops (including biomass harvest from grassland)	No	Yes	Fodder crop figures are supplied by CSO Agriculture Division and are then transformed by using national conversion factors to convert area size figures into dry weight volumes.	



Characteristics Tables 1, 2 and 3		Estimation methods			
Code	Label	Do you use the Eurostat estimation approach recommended in the EW-MFA compilation guide? (yes/no)	Have you developed your own estimation approach? (yes/no)	Please explain briefly the estimation approach including possible data sources for auxiliary data?	Please specify coefficients used (if not Eurostat coefficients)?
Table 2	Grazed biomass	No	Yes	Eurostat's Supply Side Approach is used. Silage, Hay, Pasture and Rough Grazing data are supplied by CSO Agriculture Division and then are transformed using national yield factors to produce Grazed Biomass figures.	
Table 2	Lead	No	Yes	Metals data are provided by the Department of Environment, Climate and Communications. Lead and Zinc are mined in Ireland as coupled production. Gross Ores are allocated to the two metals using relative volume weights for metal content (rather than relative value weights as in previous years).	
Table 2	Zinc	No	Yes	Metals data are provided by the Department of Environment, Climate and Communications. Lead and Zinc are mined in Ireland as coupled production. Gross Ores are allocated to the two metals using relative volume weights for metal content (rather than relative value weights as in previous years).	
Table 2	Crushed Rock			Crushed Rock figures are compiled using PRODCOM and Road Freight Survey Transport data concerning the delivery of goods to road works and building sites	
Table 2	Sand and Gravel			CSO PRODCOM Statistics supplemented by the BGS and Road Freight Survey Transport figures for the volume of goods delivered to road works and building sites.	
Table 2	Peat	No	Yes	Peat for combustion figures are supplied by the Sustainable Energy Authority of Ireland. Peat for horticulture are provided by individual enterprises and an industry representative organisation supplemented by PROCOM and Trade data where data is missing.	



20.5.1.3. Fuel trade, residence adjustment

20.5.1.4. Significant Problems

The most significant problem in compiling MFA data is the fact that no year specific yields are applied to Fodder Crops and Grazed Biomass in Table 2. Another issue is that Sod Peat and Horticultural Peat have been imputed for years where data are missing.

20.5.2. Grossing and Weighting

Metals: Data are supplied by the Department of the Environment, Climate and Communications. Lead and Zinc are mined together in Ireland as “coupled production”. Gross ores are allocated to the two metals using relative volume weights rather than value weights as in previous years.

20.6. Adjustment

Not applicable; i.e. in EW-MFA no time series adjustment necessary.

20.6.1. Seasonal Adjustment

Not applicable.

21. Comment