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Combinations of codes in the Combined Nomenclature for Swedish Material Flow Accounts – Method Development

2009:2

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Regional and Environment Statistics 2009:2

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Foreword

Since the summer of 2006, the Environmental Accounts Unit at Statistics Sweden has been conducting a project on developing national material flow statistics for Sweden. This report summarises two method- developing projects that were initiated in the beginning of the overall project. One of the strengths with the methods discussed in this report is that they generate the opportunity of producing additional environmental information from already existing data. Most of the analysis is based on Swedish foreign trade statistics, statistics on production of commodities and industrial services and statistics on waste.

Annica Carlsson, the Environmental Accounts, Statistics Sweden has been project manger for both projects and is responsible for the report[1]. The projects summarised in this report involved several people at Statistics Sweden: Anders Engvall, Christine Uhrlander Lindbom, Tomas Gustavsson and Louise Sörme whose valuable contributions are gratefully acknowledged[2].

Statistics Sweden, January 2009

Inger Eklund

Viveka Palm

Acknowledgement
We would like to express appreciation to our survey respondents – the people, enterprises, government agencies and other institutions of Sweden. Their cooperation enables Statistics Sweden to provide reliable and timely statistical information which meets the current needs of our modern society.

[1] Annica Carlsson was on parental leave from September 2007 until May 2008.

[2] Anders Engvall, Christine Uhrlander Lindbom and Tomas Gustavsson have all changed positions within Statistics Sweden or started new jobs.

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Summary

The overall idea of accounting material flows is simplified by the fact that in = out, or what comes into the system will come out of the system (Klein, 2000) For example, the largest environmental impact of hazardous substances is today related to consumption of goods and it is therefore important to identify methods of accounting these flows of goods in the statistical system.

The projects behind this report had in common a search for identifying a relevant and efficient method of compiling data of Swedish material flows. The first step was to analyse to what extent the dataset used for compiling Swedish MFA for 2004 represented the overall import, export and domestic production of Sweden the same year. We were also interested in flows of chemical products and flows of waste.

In general, those codes that were used for national MFA 2004 represent low values of the Swedish import and export. However, the dataset for MFA 2004 encloses over half of the import and one third of the export from Sweden, accounted in tonnes, the same year. One single good is highlighted in the import both accounted in tonnes and SEK millions. 'Crude oils' CN 27090090 represented almost one third of the total mass of Swedish import and about 6 percent of the total value for 2004.

Of those approximately 500 codes that were used for compilation of the Swedish MFA 2004 (Statistics Sweden, 2006), only 63 are represented in the statistics on production of commodities and industrial services. In all, they represent only about 1 percent of the total value of production of commodities and industrial services. However, this low share is fully reasonable since the codes that were used for compiling the Swedish MFA 2004 mainly consisted of codes representing raw materials. And businesses in the industries of 10-37 as included in the statistics production of commodities and industrial services mainly work with processed materials and manufacturing of products. It can be concluded that further analysis has to be done in order to compromise the material flows of the overall all domestic production. For example, codes representing production in agriculture, forestry and fishery need to be identified. Material flows related to service activities should however most likely not be included due to the risk of double counting.

Of those categories of waste included in this study (metal, glass, paper and card, plastics, textile and ashes) the largest import of waste is import of paper to the pulp and paper industry/publishing and printing (SNI 21-22). This also shows the difficulties in separating flows of materials and waste. Something that is true both for classification codes, such as the Combined Nomenclature and in reality. The imported "waste" paper is here used as a raw material in the production process of SNI 21-22.

We started with the idea of searching for a representative selection of codes for compiling Swedish MFA. But an 'optimal' selection of codes for Sweden is not necessarily the best combination of codes for international comparisons of MFA data. To make international comparisons (especially

in Europe) possible the Swedish MFA available in the statistical database at www.scb.se is now compiled according to the Eurostat Compilation Guide on MFA (Eurostat 2007). Results and conclusions in this report are therefore to be seen as input for further discussion and methodological development for MFA.

Explanatory symbols and abbreviations

CAS	Chemical Abstracts Service
CN	Combined Nomenclature
CPA	Classification of Products by Activity
EWC	European Waste Catalogue
ECICS	European Customs Inventory of Chemical Substances
HS	Harmonized Commodity Description and Coding System
Kg	Kilograms
MFA	Material Flow Account
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne / Statistical classification of economic activities
SEK	Swedish Kronor
SNI	Svensk Näringsgrensindelning
WStatR	Waste Statistics Regulation

Introduction

This report outlines the methodological steps that were taken in the initial construction work of a database for Swedish Material Flow Accounts (from now on called MFA). Before that, earlier compilations of Swedish MFA had been based on i) best data available from several Swedish governmental agencies (as in *Towards a national material flow statistics,* Statistics Sweden (2000)) and ii) a list of codes given by the Federal Statistics Office in Germany (as used in Statistics Sweden 2006 - *Material Flow Accounts and Policy. Data for Sweden 2004*). In the first report it was concluded that the data from the other governmental agencies to some extent enclosed too detailed material flows in order to become comparable with other countries and it was also time-consuming to collect data from several governmental agencies (Statistics Sweden, 2000). In the second report, it was uncertain how representative the combination of codes was in relation to the overall Swedish material flows due to import, export and domestic production. Thus at that point, the end of 2006, focus was on identifying statistical classification codes that best represented the mixture of Swedish material flows, i.e. to identify codes that could be used for the data collection to the Swedish database for MFA. However, at the end of 2007 it was decided that the database initially should be constructed according to the Compilation Guide for Material Flow Accounts that were released by Eurostat to the member countries at that point (Eurostat, 2007). The methods development for identifying representative classification codes for the Swedish flows of materials was then cancelled. However, for possible future development of the database and for the ongoing discussion in the task force on MFA in Eurostat, it was decided to bring together experiences of the projects in a report. Since the projects behind this report were not completed, the results and conclusions are to be seen as input for further development.

Aim and system boundary

The aims of both projects behind this report were basically to evaluate what combination of codes in the Combined Nomenclature (CN) that should be included in a database for MFA in Sweden. A special focus was on codes representing chemical products and flows of waste. Waste flows were included since they represent outcomes of materials that have been "processed" through the society as products. And chemical products were included since even small quantities might have an impact on large flows of other materials, or have a great impact on the environment. The idea was to start with the dataset used for MFA 2004 (Statistics Sweden 2006) and analyse to what extent they covered the import, export and domestic production of Sweden. Then the overall import, export and domestic production were considered, including an analysis of the most representative codes. The analysis on what codes to be included was based on the 2004 version of CN.

From Swedish foreign trade statistics data has been searched for both in quantity (kg) and value (SEK). From statistics on production of commodities and industrial services, data has only been searched according to

value (SEK). This was because statistics on production of commodities allow several alternative units for quantity, and to convert these into kilograms was not considered feasible at the time. For statistics on waste, data according to the European Waste Statistics Regulation[3] (WStatR) has been used.

It could be noted that MFA data for Sweden 1998-2005 according to the compilation guide by Eurostat has been accounted for and published after the projects behind this report were cancelled (Statistics Sweden, 2008). Hence, those results are not used in the projects behind this report.

[3] The Regulation of the European Parliament and the Council No 2150/2002 of 25 November 2002 on waste statistics.

Method and data sources

An important factor for the work of Statistics Sweden is to minimise the response burden of respondents supplying information. This implies that in the process of developing statistics of MFA in Sweden, data in existing statistical data sources mainly has been used. The methods and descriptions are thus found in more detail in each data source. (www.scb.se).

The Combined Nomenclature

The Combined Nomenclature (CN) is a European classification used for data on trade of goods and services[4]. CN is based on the Harmonized Commodity Description and Coding System (HS) plus two additional digits. This implies that at its most detailed level, CN has eight digits and today incorporates about 10 000 codes. The list of codes is modified every year, especially on its most detailed level. Codes both can be added, and or deleted from the list. Several codes may also be put together into one new code, or one code can be divided into two or more new codes. For example, a total quantity of a certain good one year represented by one code in CN may the next year be divided into several codes. This of course has implications on the ability of producing time-series per code on the most detailed level of CN. A new version of CN is published in October each year by Eurostat. As mentioned, in this project only codes for 2004 are included. Thus, no transformations between codes over years have been done. However, changes in CN might be something to bear in mind for future MFA projects when the most detailed level of CN is used.

Classification systems used in MFA for Sweden 2004

In 2006 Sweden reported a pilot study of national material flow accounts to Eurostat (Statistics Sweden, 2006). In that study a list of codes given by the Federal Statistics Office in Germany was used for compilation of data. The list covered codes according to the structure of 'Classification of Products by Activity' (CPA). However, the information in CPA is extracted from CN so the codes were translated back into to CN and these codes were then used for the compilation of MFA data (Appendix 1).

Foreign trade statistics and statistics on Production of commodities and industrial services

To a large extent, data from the foreign trade statistics at Statistics Sweden has been used for analysing the selection of codes to be included in the Swedish MFA. The foreign trade statistics include data on import and export of goods according to the CN (8-digit level). Concerning trade with other EU-countries – Intrastat - all businesses with an import exceeding 2.2

[4] For more information, please have a look at:
Eurostats: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090,30070682,1090_33076576&_dad=portal&_schema=PORTAL
or Swedish Customs http://taric.tullverket.se/

million SEK/year and an export over exceeding SEK 4.5 million/year are included. In the statistics, 97 percent of the total Swedish trade is estimated to be included (Statistics Sweden, 2004a). For trade with non-EU countries (Extrastat) no cut-off limit has been settled. For foreign trade statistics, data both according to total value (SEK) and quantities (e.g. kg) has been used.

Statistics on production of commodities and industrial services is an annual survey where in general all businesses with more than 20 employees are surveyed by questionnaire (Statistics Sweden, 2004b). Industrial operations of service companies are included if the industrial operation has 20 employees or more. However, in some industries companies with as few as 10 employees can be surveyed in order maintain sufficient quality of data. In all, 4500 companies report data each year (Statistics Sweden, 2004b). The total amount of the Swedish production of commodities and industrial services in quantities (kg) has not been analysed in this project since the statistics incorporate several alternative units[5]. To carry out such an analysis, considerable efforts in converting other units such as the number of items into kg would be needed.

Data on flows of waste

Statistics on waste are regulated in the Waste Statistics Regulation (WStatR), and the categories of waste are divided according to the European Waste Catalogue (EWC). The EWC is not a statistical classification. The list of EWC codes incorporates 48 different groups of waste. Data is also presented for a total of 20 different sectors (c.f. Appendix 2). Article 1(a) of Council Directive 75/442/EEC on waste defines the term "waste" as: "any substance or object which the holder discards or intends or is required to discard". The EWC applies to all wastes, irrespectively of whether they are destined for disposal or for recovery operations. It is a harmonized, non-exhaustive list of wastes, that is to say, a list which will be periodically reviewed and if necessary revised. However, the inclusion of a material in the EWC does not mean that the material is a waste in all circumstances. One issue for discussion that deserves to be highlighted for the waste statistics in relation to statistics on MFA is the intentional double-counting of generated amounts of waste. This can occur when one kind of waste (primary waste) after treatment is be reclassified into another kind of waste (secondary waste). The total amount of waste generated is thus the aggregated amount of primary and secondary waste. For comparisons within an industry this is not a big issue since internal recycling is not accounted for. However, when accounting the total amount of waste for all industries it implies an overestimation of the flow. For the waste categories included in this report, one possible source of error is also that the data suppliers classify waste as being environmentally harmful, when it should not be (Swedish EPA, 2006a).

The first Swedish reporting according to the regulation of waste was made in June 2006 and incorporated data on flows of waste for 2004 (Swedish EPA,

5 Basically, data is collected on value (SEK) per CN-code (8-digit level). But for data on quantities, several units are allowed (for example kg, number of items and m3 as well as other units). This is only in the case of data also being reported to ProdCom, a European system for the collection and dissemination of statistics on the production of manufactured goods. The title comes from the French "PRODuction COMmunautaire").

2006b). The report showed that in 2004, 118 million tonnes of non-hazardous waste and 1.35 million tonnes of hazardous waste were generated. Of the non-hazardous waste, waste from mining was absolutely dominating (58.4 million tonnes) followed by wood (18.6 million tonnes) and leakage water from dump sites (8.4 million tonnes) (ibid). However, statistics on flows of materials classified according to the CN, and flows of waste, is not easy comparable. As several other statistical agencies in Europe, Statistics Sweden in the early 2000s pointed out a need for better linkage between the EWC-stat codes and CN (Statistics Sweden, 2004c).

For the account of waste in the total MFA, a suggestion of 100 codes in the CN representing flows of waste has been used (Appendix 3). The codes listed include metals, plastics, paper and cardboard, glass and textile as well as ashes from combustion. Only non-hazardous waste has been included. Hence, the selection codes do not fully represent the national import and export of waste. To some extent there is also a risk of overlapping in the statistics. This is because some codes may both represent a waste and a good.

Chemical products in the Combined Nomenclature

The amount of chemical products classified as dangerous to health and or the environment is annually calculated within the Swedish Environmental Accounts, based on figures from the Swedish Chemical Agency (Statistics Sweden, 2003). In this project, we include data on flows of chemicals in relation to the Swedish MFA of 2004 and the foreign trade statistics of 2004. For the analysis, a linkage between the registration number according to Chemical Abstracts Service (CAS) and CN has been used. The cross-tables between CAS and CN are available by ECICS (European Customs Inventory of Chemical Substances http://ec.europa.eu/taxation_customs/dds/ecicau_en.htm). However, it should be noted that several CAS-numbers can be connected to one code in CN.

The Swedish Business Register

This study includes data on all active companies registered in the Swedish Business Register at Statistics Sweden at the end of 2004. The Swedish Business Register is a register of the number of companies and working sites in Sweden. All companies have at least one working site. A working site refers to each address, establishment, or group of establishments where a company has some type of activity. A company is considered as active if it is registered for tax and/or is an employer or is registered with an F-taxation in a non tax industry. In 2004 there were 870 189 companies and 945 546 workplaces registered in the Swedish Business Register (www.scb.se). For all active companies in the register in 2004, data on the variables organisation number, name and first level of industry code[6] were included.

[6] Industry code (built on NACE) (In Swedish Bransch/Näringsgren/SNI). The activity of an enterprise or a local unit respectively is described by a five-digit code according to Swedish standard industrial classification (SNI). An enterprise as well as a local unit can be coded with several industry codes. The activities are ranged by their contribution to turnover or their part of worked time.

Data treatment

- Data on Swedish foreign trade statistics for 2004, both import and export per code of CN 8-digits level, was summarised regarding quantity (kg)(kg) and value (SEK)(SEK).
- All codes that were included in the compilation of MFA for Sweden in 2004, in all 554 CN codes on the 8-digits level (c.f. Appendix 1) were listed in the dataset of the foreign trade statistics. Data was summarised according to quantity (kg) and value ((SEK))for import and export respectively.
- All codes connected to CAS-numbers were listed in the dataset of the foreign trade statistics, in all 1602 codes (8-digits level of CN). Data was summarised according to quantity (k)] and value (SEK) for import and export respectively.
- For account of waste, a suggestion of 100 codes representing flows of waste has been used (c.f. Appendix 3). The codes cover metals, plastics, paper and cardboard, glass and textile as well as ashes from combustion. Only non-hazardous waste has been included. Hence, the selection of codes does not fully represent the national import and export of waste. To some extent there is also a risk of overlapping in the statistics. This is because some codes may both represent waste and goods.
- A list of all companies that imported and/or exported goods in 2004 was created. For each company the following variables were noted: the amount of import and or export in kg and SEK, organisation number, name and first level of industry code (In all, a dataset of 13 384 550 lines).
- The list above was matched to the different subsets of codes and data was then analysed for total import and export per organisation/organisation number, company and first level of industry. However, is should be noted that some of the codes are included in several categories. About 5 percent of the organisation numbers in the foreign trade statistics were not possible to identify in the Swedish Business Register. Thus it was not possible to connect the first level of industry classifications in the Swedish Business Register to the data. However, the total quantity of the import of these organisation numbers was only 0.6 percent of the overall import and 0.5 percent of the total export accounted in quantity (kg). If the value (SEK) is considered, the unknown organisation numbers represent 3.2 percent of the import and 0.7 percent of the export. This simplified analysis can for obvious reasons be criticised, but most likely it is not connected to any problem if the data connected to organisation number with no match in the business register is excluded.
- Data on waste was summarised according to quantity (kg) and value (SEK) for import and export respectively. This has then been put in relation to the data on the Swedish MFA for 2004 (Statistics Sweden, 2006a), the Swedish reporting according to WstatR (Swedish EPA, 2006) as well as the overall foreign trade statistics of 2004.
- In order to sort the amount of waste generated or handled per industry, the organisation number of the company was connected to their first level of industry code in the Swedish Business Register. Some of the companies were registered as SNI 00 in the Business Register, and thus

some manual work on the industry classification had to be done. A major share of those companies included charitable associations exporting clothes, classified as textile waste. Since that sort of 'waste' not was considered as of importance for the aim of our study, the 1 948 tonnes was excluded. Based on our own investigations (mainly on the Internet), of activities of those companies that originally were classified as SNI 00, the following transformations into other industries were made: two companies were transformed to SNI 10, one to SNI 21 and one to SNI 51. The total quantities for these classifications equalled 140 292 tonnes. After that, the remaining share of 2759 tonnes was considered of no relevance for the further analysis. A number of transactions were also registered on companies with no industry classification at all, or 23 557 tonnes. These companies were not included in the analysis since it was not possible to connect these companies to an industry due to insufficient or incorrect organisation numbers..

- For comparison, the above data was aggregated per group of industries as in Sweden's reporting according to WStatR 2006. However, a difficulty in the comparison showed up, in that the reporting of WStaR 2006 was made per workplace whereas data in the foreign trade statistics used organisation numbers as the basic unit. A workplace is linked to one SNI classification whereas an organisation number is linked to the SNI classification of which most of the included work-places are associated with. This implies that a comparison per industry might be incorrect. In a large company one workplace could for instance be linked to one industry according to the WStatR-reporting, and the same workplace might then according to the organisation number be used in foreign trade statistics and be linked to another industry (SNI-code). In order to investigate the magnitude of this potential problem in our dataset, a list of all workplaces in WStatR 2006 together with their corresponding organisation numbers and SNI codes was created. This list was linked to the list of all companies that had been identified in the foreign trade statistics as importing or exporting waste. A comparison of the list showed that on 19 occasions the SNI classification of WStatR, and the SNI classification based on the organisation number in the foreign trade statistics did not agree. In total this corresponds to about 2 percent (or 39 974 tonnes) of the total quantity of waste that was imported. The problem with using workplace number and organisation number was then neglected.

Results and Discussion

Import and export of goods and subsets of CN

The overall import to Sweden in 2004 was about 76 760 000 tonnes distributed on 9389 codes in the CN (8-digit level). In all, the import summed up to a value of over SEK 722 billion.[7] The corresponding figures for the Swedish export of 2004, equalled 82 570 000 tonnes and a total value of almost SEK 894 billion distributed on 8849 different codes (8-digit level) [8]. The figures do not fully match with the figures presented in the Swedish statistical databases (www.ssd.scb.se) regarding weight and value of import and export in 2004, but they are in the same magnitude. One reason for the differences is that the data used in this report is not adjusted for non-response, and data presented in the Swedish statistical databases does not include confidential information.

Different combinations of codes classified according to CN and their share of the total import and export have been analysed (Table 1 - **Table 4**). The selection of codes that is used in the Swedish MFA 2004 (Statistics Sweden, 2006) equals slightly more than 50 percent the total mass of the import and about 30 percent of the total mass of the export the same year. However, the codes of the pilot study only include 10 percent of the total value of the import and about 2 percent of the total value of the export. The low share of the total value of the import and export can be explained by the fact that the included codes in Statistics Sweden (2006a) are mainly representing raw materials.

Table 1. Subsets of the Swedish import and their share of total import, 2004, SEK millions and percent, in rounded numbers. Please observe that codes of one subset can be represented in several of the subsets and thus the values not can be added to each other. For definitions of waste and chemical products se text. Data in the value of import of waste is not included due to methodological issues see text below (Flows of waste)

	MSEK	% of total import
A. MFA 2004 (Statistics Sweden 2006)	71 300	10
B. Import of waste	-	-
C. Chemical products with CAS number	90 300	13
Total value of subsets (A-C)	-	-
TOTAL IMPORT	722 200	-

[7] Import: 76 762 208 453 kg and SEK 722 217 912 694

[8] Export: 82 573 417 148 kg and SEK 893 692 380 548

Table 2. Subsets of the Swedish import and share total import, 2004, tonnes and percent, in rounded numbers. Please observe that codes of one subset can be represented in several of the subsets, and thus quantities not can be added to each other. However, in the category 'total quantity of subsets', duplicates have been removed. For definitions of waste and chemical products se text

	tonnes	% of total import
A. MFA 2004 (Statistics Sweden 2006)	40 850 000	53
B. Import of waste	1 200 000	2
C. Chemical products with CAS number	11 230 000	15
Total quantity of subsets (A-C)	51 510 000	67
TOTAL IMPORT	76 760 000	-

Table 3. Subsets of the Swedish export and share of total export, 2004, in rounded numbers. Please observe that codes of one subset can be represented in several of the subsets, and thus quantities not can be added to each other. Data on the value of export of waste is not included due to methodological issues. For definitions of waste and chemical products se text

	MSEK	% of total export
A. MFA 2004 (Statistics Sweden 2006)	13 800	2
B. Export of waste	-	-
C. Chemical products with CAS number	99 500	11
Total value of subsets (A-C)	110 500	12
TOTAL EXPORT	893 700	-

Table 4. Subsets of the Swedish export and share of total export, 2004, tonnes, and percent, in rounded numbers. Please observe that codes of one subset can be represented in several of the subsets, and thus quantities not can be added to each other. However, in the category 'total quantity of subsets', duplicates have been removed. For definitions of waste and chemical products se text

	tonnes	% of total export
A. MFA 2004 (Statistics Sweden 2006)	26 090 000	32
B. Export of waste	1 010 000	1
C. Chemical products with CAS number	11 240 000	14
Total quantity of subsets (A-C)	37 600 000	46
TOTAL EXPORT	82 570 000	-

Considering the value of the import, the single largest goods when the subsets are added to each other was import of 'Petroleum oils and oils obtained from bituminous minerals, (CN 27090090), Table 5. About 25 percent of the total value of the subset's import was enclosed by this single code (please observe that the total value of the subsets is hard to calculate due to the value import of waste). Petroleum oils is then followed by eight codes, and that each of them constitute more than 1 percent of the value of the all the subsets together.

Table 5. The six largest codes of the subsets and their share in percent of total value of Swedish import, 2004. (Please observe that the table by necessity does not show the largest products of the overall Swedish import)

Codes of CN 2004	Self- explanatory text	Share of Swedish import, % of total value
27090090	Petroleum oils and oils obtained from bituminous minerals, crude (excl. natural gas condensates)	6
72189110	Semi-finished products of stainless steel, of rectangular "other than square" cross-section, containing by weight >= 2,5 percent nickel	<1
29333999	Heterocyclic compounds with nitrogen hetero-atom[s] only, containing an unfused pyridine ring, whether or not hydrogenated, in the structure…/	<1
28442035	Uranium enriched in U 235 and its compounds; alloys, dispersions incl. cermets, ceramic products and mixtures containing uranium enriched in U 235 [Euratom]…/	<1
03021200	Fresh or chilled Pacific salmon "Oncorhynchus nerka, Oncorhynchus gorbuscha, Oncorhynchus keta, Oncorhynchus tschawytscha, Oncorhynchus kisutch…/	<1

Import of Crude oil, CN 27090090, is highlighted as the largest single good even when the import of the subsets is analysed in terms of quantity (Table 6). Petroleum oils represents almost one third of the total Swedish import accounted as mass in 2004.

Table 6. The six largest goods of the subsets and their share in percent of total quantity of Swedish import, 2004. (Please observe that the table by necessity does not show the largest products of the overall Swedish import)

Codes of CN 2004	Self- explanatory text	Share of Swedish import, % of total quantity
27090090	Petroleum oils and oils obtained from bituminous minerals, crude (excl. natural gas condensates	27
44039959	Birch, in the rough, whether or not stripped of bark or sapwood, or roughly squared (excl. sawlogs, rough-cut wood for walking sticks, umbrellas, tool shafts and the like; wood cut …/	4
27011290	Bituminous coal, whether or not pulverised, non-agglomerated (excl. coking)	4
44032039	Pine of the species "Pinus sylvestris L." in the rough, whether or not stripped of bark or sapwood, or roughly squared (excl. sawlogs, rough-cut wood for walking sticks, umbrellas,…/	3
44032019	Spruce of the species "Picea abies Karst." or silver fir "Abies alba Mill.", in the rough, whether or not stripped of bark or sapwood, or roughly squared (excl. sawlogs, rough-cut wood for walking…/	1
44032011	Sawlogs of spruce of the species "Picea abies Karst." or silver fir "Abies alba Mill.", whether or not stripped of bark or sapwood, or roughly squared	1

For the value of export, no single code of the subsets of codes in the CN is representing large values of the export. Since none of the codes are

representing more than 1 percent of the overall value of Swedish export, no data is shown here. For the quantity of the export, the two largest codes (26011200 - Agglomerated iron ores and concentrates (excl. roasted iron pyrites)) - and 26011100 - Non-agglomerated iron ores and concentrates (excl. roasted iron pyrites) – together represent about 20 percent of the overall Swedish export (Table 7). In addition to those two, 9 other CN-codes individually represent more than 1 percent of the total weight.

Table 7. The six largest goods of the subsets exported from Sweden 2004, and their share in percent of total quantity of Swedish export. (Please observe that the table by necessity not show the largest products of the overall Swedish export)

Codes of CN 2004	Self-explanatory text	Share of total export, %of total weight
26011200	Agglomerated iron ores and concentrates (excl. roasted iron pyrites)	12
26011100	Non-agglomerated iron ores and concentrates (excl. roasted iron pyrites)	9
25210000	Limestone flux, limestone and other calcareous stone, of a kind used for the manufacture of lime or cement	3
25171010	Pebbles and gravel for concrete aggregates, for road metalling or for railway or other ballast, shingle and flint, whether or not heat-treated	2
28070010	Sulphuric acid	<1
44032011	Sawlogs of spruce of the species "Picea abies Karst." or silver fir "Abies alba Mill.", whether or not stripped of bark or sapwood, or roughly squared	<1

In the original outline of the project behind this report, the idea was to continue the analysis of which codes that best would represent the Swedish MFA. The next step would have been to search for a satisfying cut-off limit in the number of codes to be included in relation to the total quantity or the total value of the Swedish import and or export. For example what codes are needed in order to enclose 90 percent, 95 percent or 99 percent of the total import and/or export accounted in quantity and or value. However, a part of data for such an analysis is rather easily available in the statistical databases at the website of Statistics Sweden www.scb.se.[9] For the analysis of what codes to include in the MFA statistics it should also have been important to consider if the codes represented several categories of material flows. In the Compilation Guide by Eurostat is the material flows for example divided between the major material categories Biomass, Minerals and Fossil Fuels. Another interesting parameter for the analysis would have been to consider the distribution of codes when it comes to different industries. For example are some industries over represented and are some industries not include in the MFA statistics at all.Flows of waste

In the long run an important challenge for material flow accounting is to identify the connection between materials and resources used (the input side of MFA) and the amount of waste that is generated (something that we can

[9] For internal purposes data is available within the MFA project.

call the output side of MFA). However, when trying to compare flows of waste and the overall material flows based on data classified according to CN, there is no doubt a risk of overlapping. For example, codes in the CN could sometimes both include a good and or a type of waste.

The codes used for accounting flows of waste only include non-hazardous waste of metals, plastics, paper and cardboard, glass, textile and ashes from combustion. Hence, they do not represent the full import and export of waste. Nor are the domestic waste flows included. To some extent there is also a risk of overlapping in the statistics. This is because some codes may both represent a waste and a good. In order to extend the connection between MFA data and statistics on waste, it is therefore necessary to further develop the analysis.

In this project we started with searching for flows of waste in the Swedish foreign trade statistics (c.f. data of Tables 1-4 above) and compare these flows with generated amounts of waste per industry (c.f. section Data on flows of waste). The analysis is based on the magnitude of flows in tonnes. The original dataset also includes values (SEK) of import and export of waste flows. However, it is not an easily comparable measure when it comes to flows of waste. For instance, the value of the waste flows imported and or exported could in reality be negative (i.e. the owner of the waste needs to pay in order to trade the waste materials). Since negative values are not allowed in the foreign trade statistics, the value of the waste might instead be settled to 0 or 1 SEK or maybe not reported at all and therefore not included in the statistics SEK 1 (foreign trade statistics, 2007). Moreover, the dataset of the Swedish MFA for 2004 (Statistics Sweden 2006) mainly covers raw materials and is not comparable with the values of the material flows when final products produced from the materials are becoming waste.

Of those categories of waste included in this study (metal, glass, paper and cardboard, plastics, textile and ashes) the largest import of waste is import of paper to the Pulp and paper industry/publishing and printing (SNI 21-22). This also shows the difficulties in separating flows of materials and waste. Hence, the imported paper is used as a raw material in the production process of SNI 21-22.

Of what is here defined as export of waste, the largest export is related to Wholesale incl. wholesale of waste and scrap (SNI 51, 51.7). However, it should be noted that even though there are large amounts of waste related to this industry due to trade, the generated amounts in the industry is limited. The explanation of waste generated in wholesale of waste and scrap (SNI 51, 51.7) is mostly the same as for the recycling industry (NACE/SNI 37). Most of the waste in NACE/SNI 37 Recycling is so called secondary waste generated in other industries. However, according to the European waste regulation the waste is considered as generated in the industry if it after sorting is changing classification. One example of this is vehicles which have served its time. After being taken to pieces in one company of Industry 37, the different parts are sold to other companies for recycling and in the statistics it is accounted for once again. In this case the generated (here secondary) waste is often classified as metal scrap.

Table 8. Import, export and generated amounts of waste, divided per waste category and industry. Note: the table only contains data on six waste categories (metal, glass, paper, plastics, textile and ashes) and hence does not correspond to the total amount of imported, exported or generated waste per industry in 2004. ** data is not shown due to confidentiality

SNI/Nace	Waste Category	Import (tonnes)	Export (tonnes)	Generated amounts WStatR 2004 (tonnes)
10-14 Mining and quarrying	**TOTAL**	**63 188**	**52 639**	**24 152**
	Metal	62 159	1 061	15 747
	Glass			1
	Paper and cardboard		5 971	205
	Plastics			269
	Textile		0	0
	Ashes	1 029	45 606	7 929
15-16 Food products, beverages and tobacco	**TOTAL**	**85**		**42 107**
	Metal			6 618
	Glass			6 262
	Paper and cardboard	85		20 459
	Plastics			8 768
	Textile	0		0
	Ashes			0
17-19 Textiles, clothing and leather	**TOTAL**	**1179**	**102**	**19 900**
	Metal		2	400
	Glass	0		0
	Paper and cardboard		0	500
	Plastics	1 179	0	0
	Textile		101	19 000
	Ashes	1 179		0
21-22 Pulp and paper – publishing and printing	**TOTAL**	**614 035**	**9 954**	******
	Metal		14	19 200
	Glass			25
	Paper and cardboard	612 186	9 939	593 677
	Plastics			9 536
	Textile	1 849	1	**
	Ashes			299 286

Table 8 (continue)

SNI/Nace	Waste Category	Import (tonnes)	Export (tonnes)	Generated amounts WStatR 2004 (tonnes)
23 Coke and petroleum products	**TOTAL**			****
	Metal			1 369
	Glass			14
	Paper and cardboard			352
	Plastics			83
	Textile			**
	Ashes			**
24-25 Chemical and chemical products, rubber and plastic products	**TOTAL**	**5 104**	**10 753**	****
	Metal	287	513	13 107
	Glass			407
	Paper and cardboard	0	0	14 000
	Plastics	4 095	10 233	35 432
	Textile	651	6	425
	Ashes	70		**
26 Other non-metallic mineral products	**TOTAL**	**2807**	**261**	****
	Metal			9 882
	Glass	417	231	17 850
	Paper and cardboard	38	27	4 867
	Plastics			1 696
	Textile		3	**
	Ashes	2 352	1	5 647
27-28 Basic metals and Fabricated metal products	**TOTAL**	**219 004**	**15 299**	**4 107 753**
	Metal	218 312	15 293	1 880 718
	Glass			879
	Paper and cardboard		0	38 083
	Plastics		0	3 189
	Textile	69	6	12
	Ashes	624		2 184 872

Table 8 (continue)

SNI/Nace	Waste Category	Import (tonnes)	Export (tonnes)	Generated amounts WStatR 2004 (tonnes)
29-35 Machinery and equipment – Transport equipment	**TOTAL**	**417**	**474**	**678 425**
	Metal	123	455	630 557
	Glass			1 811
	Paper and cardboard	290	1	25 139
	Plastics	2	14	12 033
	Textile	0	3	409
	Ashes	1	1	8 476
36 Manufacture of furniture	**TOTAL**	**68**	**2**	**17 900**
	Metal		1	10 000
	Glass			1 000
	Paper and cardboard		0	1 000
	Plastics	30	0	5 000
	Textile	38	0	900
	Ashes			0
37 Recycling	**TOTAL**	**27 190**	**233 095**	******
	Metal	1 286	74 518	421 428
	Glass		50 422	3 754
	Paper and cardboard	25 904	102 969	244
	Plastics		3 503	5 014
	Textile			0
	Ashes		1 683	**
40-41 Electricity, gas and water supply	**TOTAL**	**33 390**		******
	Metal			27 370
	Glass			126
	Paper and cardboard	33 309		889
	Plastics	82		72
	Textile			**
	Ashes			**
45 Construction	**TOTAL**	**4 540**	**34**	**541 001**
	Metal	33		250 001
	Glass		33	1 000
	Paper and cardboard	101	0	280 000
	Plastics			10 000
	Textile	1	1	0
	Ashes	4 406		0

Table 8 (continue)

SNI/Nace	Waste Category	Import (tonnes)	Export (tonnes)	Generated amounts WStatR 2004 (tonnes)
51, 51.57 Wholesale incl. wholesale of waste and scrap	**TOTAL**	**158 476**	**436 270**	******
	Metal	32 766	362 178	6 493
	Glass	390	213	2 049
	Paper and cardboard	106 572	59 332	177
	Plastics	3 066	9 694	**
	Textile	1 725	2 054	**
	Ashes	13 957	2 800	0
90 Sewage and reduce disposal sanitation and similar activities	**TOTAL**	**15 856**	**16 341**	**94 452**
	Metal	2	3 914	24 674
	Glass	129		**
	Paper and cardboard	15 677	12 391	**
	Plastics	48	36	**
	Textile			0
	Ashes			0

From 'Food products, beverages and tobacco' (NACE/SNI 15-16) only a dismissible amount of those waste categories included in this study were imported and or exported. One explanation is likely that the specified waste categories (metal, glass, paper, plastics, textile and ashes) to a large extent constitute packaging materials. For the industry of NACE/SNI 15-16 packaging materials only constitute 3.7 percent of the total amount of approximately 1 140 000 tonnes of non-hazardous waste that was generated in 2004 (Swedish EPA 2006b).

In the industries 'Pulp and paper' and 'Publishing and printing' NACE/SNI 21-22, large amounts of different paper waste is naturally generated. However, as noted the import of waste paper is also extensive, this since the supply of waste paper does not correspond to the demand by the industry.
NACE/SNI 40-41 Electricity, gas and water supply incorporates waste incineration plants. The import of plastic waste in the industry is thus for energy purposes. The amounts of metal waste generated by the industry is a result of the metal fraction that is generated after incineration.

After the project behind this report was cancelled, the national waste statistics have been updated. Statistics on the Swedish flows of waste for 2006 are found on the website of the Swedish EPA (www.naturvardsverket.se) . Furthermore, statistics on import and export of the waste categories plastic, paper, carbon, glass and metal have been included in the European WStatR and will be reported by the EU member countries for the first time in 2010. Thus, for future studies of waste flows

the ability of comparing data will be increased. Within the overall material flow project and related to the environmental accounts, another project was initiated aiming at distributing waste statistics per industry. This data will be available in the analysis tool of the environmental accounts and a brief report is available at the website of Statistics Sweden (Statistics Sweden, 2009).

CN-codes in statistics on production of commodities and industrial services

Of those approximately 500 codes that were used for compilation of the Swedish MFA 2004 (Statistics Sweden, 2006), only 63 are represented in the statistics on production of commodities and industrial services. In all, they represent only about 1 percent of the total value of production of commodities and industrial services. However, this low share is fully reasonable since the codes that were used for compiling the Swedish MFA 2004 mainly consisted of codes representing raw materials. By character, raw materials are found in the first part of the production chain and hold a low value per mass unit. However, such companies are not included in the statistics of production of commodities and industrial services, since the statistics include industries of SNI/NACE 10-37. Thus, most of the companies included in the statistics work with processed materials and manufacturing of products.

Based on above, it can be concluded that further analysis has to be done in order to compromise the material flows of the overall domestic production. Some examples are the identification of codes representing production in agriculture, forestry and fishery. Material flows related to service activities should however most likely not be included due to the risk of double counting. However, as noted, the developing projects behind this report were cancelled when it was decided to use the Eurostat compilation guide as a basis for the Swedish MFA. Further analysis on which selection of codes in the CN that best represents domestic production was therefore not accomplished.

Conclusions and ideas for future studies

For identifying a representative selection of data units for compiling national material flows, it is of course important to clarify the purposes of the accounting. In this study we first wanted to analyse to what extent the codes used in the Swedish MFA for 2004 (Statistics Sweden 2006) represented the import, export and domestic production of Sweden. We were also interested in other subsets of material flows, especially flows of chemical products and waste. The idea was that the first analysis should be followed by a step where the overall import, export and domestic production were considered. Then a process of identifying a reasonable cut-off for what codes of the C N included should follow. This was never completed within the project since we decided to use the compilation guide for MFA by Eurostat as base for compiling MFA data.

The basic unit for MFA is accounting of the flows in quantity (kg, tonnes, etc.), This since, it is substances, materials, resources and so on that in themselves cause the environmental impact. However, most of the data in the statistical system is related to economic values (and accounted in monetary terms). The result of this study show that in general, those codes that are used for accounting national material flows in tonnes will in monetary terms represent low values of the Swedish import, export and/or domestic production. The dataset for MFA 2004 encloses over half of the import and about one third of the export from Sweden in 2004, accounted in tonnes. However, the dataset only represented 10 percent of the value of Swedish import and 2 percent of the value of Swedish export in the same year. One good, "Crude oil …" CN 27090090, is highlighted as the largest single good when the import of the subsets is analysed. Petroleum oil represents almost one third of the total Swedish import in tonnes and about 6 percent of the total value. Of those codes that were used for Swedish MFA 2004 they in all represented only 1 percent the total value of domestic production of commodities and industrial services. The mass flow was not accounted since the statistics allow several alternative units besides kilograms (for example pairs, per unit, and m^3)

Consequently, if only the material flows in tonnes is considered in the choice of codes for compiling the statistics on MFA, large shares of the value of trade and domestic production is ignored. If only the value of the material flows is considered as the base for selection of codes, there might be a risk that single products is too dominating. As a result, large material flows in tonnes are missing. This triggers the question: is this a problem? And if so, what base is best to use in order to enclose for example 90 percent, 95 percent, and 99 percent of the Swedish import, export and or domestic production.

One goal for the overall MFA project at Statistics Sweden is to obtain a closer connection to the environmental accounts[10]. By doing so for instance the amounts of recourses, materials and substances used in the production of an industry can be related to the emissions and economic data of the same industry. A suggested method for distributing material flows per industry, and connect to the Environmental Accounts, is presented in Statistics Sweden (2006). It is basically based on the products groups of the Swedish national accounts. Since the Swedish MFA for 2004 (Statistics Sweden 2006) mainly cover flows of raw materials only 38 product groups of the national accounts were represented in the data. For the up-coming future in the overall MFA project the most reasonable strategy is most likely to select a number of industries, for example food production (SNI 15) and Construction (SNI 45) and here in account for the net inflow (i.e. import –export + domestic production of different goods or per code of the Combined Nomenclature). In order to avoid double counting it is of course important to consider the goods' individual order in the production chain. In combination with methods and data from the environmental accounts, it will then be possible to calculate an industry's use of resources, the amount of hazardous substances used and emissions generated in order to produce their products and services.

The codes used for accounting flows of waste in this project enclose non-hazardous waste of metals, plastics, paper and cardboard, glass, textile and ashes from combustion. Thus, they represent a share of the import and export of waste. In order to extend the connection between MFA data and statistics on waste, it is therefore necessary to extend the analysis. For example g to consider the input of materials per industry, the lifetime of the materials in use and the amounts of waste generated per industry. It would also be interesting to identify where in the waste treatment processes the materials are ending.

We started with the idea of searching for a representative selection of codes for compiling Swedish MFA. But an 'optimal' selection of codes for Sweden is not by necessity the best combination of codes for international comparisons of MFA data. For the possibility of international comparisons (especially in Europe) the Swedish MFA available in the statistical database at www.scb.se is now compiled according to the Eurostat Compilation Guide on MFA (Eurostat 2007).

[10] It can though be noted that the system boundary of national MFA is most often limited in space, i.e. the national boarder, but the system boundary of the Environmental Accounts is related to the economic activities of a country.

Facts about the statistics

Data presented in this report is a result of a method developing project and should not be considered as a final statistical product. Data is based on Foreign Trade Statistics, Production of Commodities and Industrial Services and statistics on waste according to European Waste Statistics Regulation (WStatR). Descriptions of the statistics are available at www.scb.se.

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Production of Commodities and Industrial Services. Description of the statistics. www.scb.se (in Swedish)

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Personal communication with people at foreign trade statistics and the production of waste statistics

Appendix

Appendix 1 –CPA codes and corresponding codes in the Combined Nomenclature used in MFA 2004 (c.f. Statistics Sweden, 2006)

CPA – codes					Corresponding codes of the Combined Nomenclature that has been included in the statistics
Biomass					
Crops, products of market gardening and horticulture					
	01.11	Cereals and other crops n.e.c.			
		01.11.1	Cereals		
			01.11.11	Durum wheat	10011000
			01.11.12	Soft wheat and meslin	10019010, 10019091, 10019099
			01.11.13	Maize (corn)	10051011, 10051013, 10051015, 10051019, 10051090, 10059000
			01.11.14	Rice, not husked	10061010, 10061021, 10061023, 10061025, 10061094, 10061096
			01.11.15	Barley	10030010, 10030090
			01.11.16	Rye, oats	10020000, 10040000
			01.11.17	Other cereals	10070090, 10081000, 10082000, 10083000, 10089010, 10089090
		01.11.2	Potatoes; dried leguminous vegetables; edible roots and tubers		
			01.11.21	Potatoes	07011000, 07019010, 07019050, 07019090
			01.11.22	Dried leguminous vegetables, shelled	07131010, 07131090, 07132000, 07133100, 07133200, 07133310, 07133390, 07133900, 07134000, 07135000, 07139000
			01.11.23	Edible roots and tubers with high starch or inulin content	07141010, 07141091, 07141099, 07142010, 07142090, 07149011, 07149019, 07149090
		01.11.3	Oil seeds and oleaginous fruits		
			01.11.31	Soya beans	12010010, 12010090
			01.11.32	Ground nuts	12021090, 12022000
			01.11.33	Sunflower, sesame, safflower, rape, colza and mustard seeds	12060010, 12060091, 12060099, 12074090, 12075010, 12075090, 12076090, 12051010, 12051090, 12059000
			01.11.35	Oil seeds and oleaginous fruits n.e.c.	12030000, 12040010, 12040090, 12079190, 12079920, 12079991, 12079998

(continue)

CPA – codes					Corresponding codes of the Combined Nomenclature that has been included in the statistics
		01.11.4	Unmanufactured tobacco		
			01.11.40	Unmanufactured tobacco	24011010, 24011041, 24011049, 24011050, 24011060, 24011070, 24011090, 24012010, 24012020, 24012041, 24012050, 24012060, 24012070, 24012090
		01.11.5	Plants used for sugar manufacturing		
			01.11.51	Sugar beet	12129120, 12129180
			01.11.52	Sugar cane	12129920
		01.11.6	Straw and forage		
			01.11.60	Straw and forage	12130000, 12149010, 12149090
		01.11.7	Raw vegetable materials used in textiles		
			01.11.71	Cotton, whether or not ginned	52010010, 52010090
			01.11.72	Jute and other textile bast fibres, except flax, true hemp and ramie	53031000
			01.11.73	Flax and true hemp; sisal and other textile fibres of the genus Agave, raw	53011000, 53021000, 53041000, 53051100
		01.11.8	Natural rubber		
			01.11.80	Natural rubber	40011000, 40012100, 40012200, 40012900
		01.11.9	Plants for perfumery, pharmacy and the like; sugar beet seeds, seeds of forage plants; other raw vegetable materials		
			01.11.91	Plants used primarily in perfumery, in pharmacy, or for insecticidal, fungicidal or similar purposes	12111000, 12112000, 12113000, 12114000, 12119030, 12119097
			01.11.92	Sugar beet seeds and seeds of forage plants	12091000, 12092100, 12092210, 12092280, 12092311, 12092315, 12092380, 12092400, 12092510, 12092590, 12092600, 12092910, 12092950, 12092960, 12092980
			01.11.93	Other raw vegetable materials	12101000, 12102010, 12102090, 12129980
	01.12	Vegetables, horticultural specialities and nursery products			
		01.12.1	Other vegetables, fresh or chilled		
			01.12.11	Root and tuber vegetables	07031011, 07031019, 07031090, 07032000, 07039000, 07061000, 07069010, 07069030, 07069090
			01.12.12	Vegetables cultivated for their fruits	07020000, 07070005, 07070090, 07081000, 07082000, 07089000, 08071100, 08071900

(continue)

CPA – codes					Corresponding codes of the Combined Nomenclature that has been included in the statistics
			01.12.13	Other vegetables n.e.c.	07041000, 07042000, 07049010, 07049090, 07051100, 07051900, 07052100, 07052900, 07091000, 07092000, 07093000, 07094000, 07095100, 07095200, 07095910, 07095930, 07095990, 07096010, 07096091, 07096099, 07097000, 07099010, 07099020, 0709904, 07099050, 07099060, 07099070, 07099090
		01.12.2	Live plants; cut flowers and flower buds; flower seeds and fruit seeds; vegetable seeds		
			01.12.21	Live plants; bulbs, tubers and roots; cuttings and slips; mushroom spawn	06011010, 06011020, 06011030, 06011040, 06011090, 06012010, 06012030, 06012090, 06021010, 06021090, 06022090, 06023000, 06024010, 06024090, 06029010, 06029020, 06029030, 06029041, 06029045, 06029049, 06029051, 06029059, 06029070, 06029091, 06029099
			01.12.22	Cut flowers and flower buds	06031010, 06031020, 06031030, 06031040, 06031050, 06031080, 06039000
			01.12.23	Flower seeds and fruit seeds	12093000, 12099910, 12099991, 12099999
			01.12.24	Vegetable seeds	12099110, 12099130, 12099190
	01.13	Fruit, nuts, beverage and spice crops			
		01.13.1	Grapes		08061010
				Table grapes	08061090
				Other grapes, fresh	
			Other fruit and nuts		
				Dates, figs, bananas, coconuts, Brazil nuts, cashew nuts, pineapples, avocados, mangoes, guavas	08011100, 08011900, 08012100, 08012200, 08013100, 08013200, 08030011, 08030019, 08030090, 08041000, 08042010, 08042090, 08043000, 08044000, 08045000
				Citrus fruit	08051010, 08051030, 08051050, 08051080, 08052010, 08052030, 08052050, 08052070, 08052090, 08054000, 08055010, 08055090, 08059000

(continue)

CPA – codes					Corresponding codes of the Combined Nomenclature that has been included in the statistics
				Other fruit, locust beans	08072000, 08081010, 08081020, 08081050, 08081090, 08082010, 08082050, 08082090, 08091000, 08092005, 08092095, 08093010, 08093090, 08094005, 08094090, 08101000, 08102010, 08102090, 08103010, 08103030, 08103090, 08104010, 08104030, 08104050, 08104090, 08105000, 08106000, 08109030, 08109040, 08109095, 12121010, 12121091, 12121099
				Olives and other nuts	08021110, 08021190, 08021210, 08021290, 08022100, 08022200, 08023100, 08023200, 08024000, 08025000, 08029020, 08029050, 08029060, 08029085, 07099031
			Beverage crops		
				Coffee, not roasted, not decaffeinated	09011100
				Green tea (not fermented), black tea (fermented) and partly fermented tea, in immediate packings of a content > 3 kg	09022000, 09024000
				Maté	09030000
				Cocoa beans	18010000
			Spices, not processed		
				Spices, not processed	
01.5 +01.25					
			01.25.21	Natural honey	04090000
			01.25.22	Snails, live, fresh, chilled, frozen, dried, salted or in brine except sea snails; frogs' legs, fresh, chilled or frozen	02082000, 03076000
			01.25.23	Edible products of animal origin n.e.c.	04100000
			01.25.24	Silk-worm cocoons suitable for reeling	
			01.25.25	Insect waxes and spermaceti	15219010, 15219091, 15219099
	01.50	Hunting, trapping and other gathering			
		01.50.1	Hunting, trapping and other gathering		
	02.01	Wood and other forestry products			
		02.01.1	Wood in the rough		
			02.01.11	Logs of coniferous wood	44032011, 44032019, 44032031, 44032039, 44032091, 44032099

(continue)

CPA – codes					Corresponding codes of the Combined Nomenclature that has been included in the statistics
			02.01.12	Logs of non-coniferous wood	44039951, 44039959, 44039110, 44039190, 44039210, 44039290, 44039930, 44039995
			02.01.13	Logs of tropical wood	44034100, 44034910, 44034920, 44034940, 44034995
			02.01.14	Fuel wood	44011000
			02.01.15	Other wood in the rough, including split poles and pickets	44041000, 44042000
		02.01.2	Natural gums		
			02.01.21	Balata, gutta-percha, guayula, chicle and similar natural gums	40013000
			02.01.22	Lac, natural gums, resins, gum-resins and balsams	13011000, 13012000, 13019010, 13019090
		02.01.3	Natural cork, raw or simply prepared		
			02.01.30	Natural cork, raw or simply prepared	40013000
		02.01.4	Other forestry products		
			02.01.41	Parts of plants, grasses, mosses and lichens suitable for ornamental purposes	06041010, 06041090, 06049121, 06049129, 06049141, 06049149, 06049190, 06049910, 06049990
			02.01.42	Vegetable materials n.e.c., for plaiting, stuffing, padding, dyeing or tanning; vegetable products n.e.c.	14041000, 14049000, 14011000, 14012000, 14019000, 14020000, 14030000
	05.00	Non-cultivated fish and other fishing products, non cultivated			
		05.00.1	Fish, live, fresh or chilled		
			05.00.11	Fish, live	03011010, 03011090, 03019110, 03019190, 03019200, 03019300, 03019911, 03019919, 03019990

(continue)

CPA – codes					Corresponding codes of the Combined Nomenclature that has been included in the statistics
			05.00.12	Fish, fresh or chilled	03021110, 03021120, 03021180, 03021200, 03021900, 03022110, 03022130, 03022190, 03022200, 03022300, 03022990, 03023110, 03023190, 03023210, 03023290, 03023390, 03023510, 03023590, 03023690, 03023990, 03024000, 03025010, 03025090, 03026110, 03026130, 03026180, 03026200, 03026300, 03026400, 03026520, 03026550, 03026590, 03026600, 03026911, 03026919, 03026925, 03026931, 03026933, 03026941, 03026945, 03026951, 03026955, 03026961, 03026966, 03026968, 03026969, 03026975, 03026981, 03026985, 03026987, 03026988, 03026991, 03026994, 03026995, 03026999
		05.00.2	Crustaceans, not frozen; oysters; other aquatic invertebrates, live, fresh or chilled		
			05.00.21	Crustaceans, not frozen	03062100, 03062210, 03062291, 03062299, 03062310, 03062331, 03062339, 03062390, 03062430, 03062480, 03062910, 03062930, 03062990
			05.00.22	Oysters	03071010, 03071090
			05.00.23	Other molluscs or shellfish and aquatic invertebrates, live, fresh or chilled	03072100, 03073110, 03073190, 03074110, 03074191, 03074199, 03075100, 03079100
		05.00.3	Other aquatic products		
			05.00.31	Corals and similar products, shells of molluscs, crustaceans or echinoderms and cuttle-bone	05080000
			05.00.32	Natural sponges of animal origin	05090010, 05090090
			05.00.33	Seaweeds and other algae	12122000
		05.00.4	Pearls		
			05.00.41	Natural pearls, unworked	71011000
Fossil Fuels					
10.1	Hard Coal				
	10.10	Hard Coal			
		10.10.1	Coal		
			10.10.11	Coal, not agglomerated	27011110, 27011190, 27011210, 27011290, 27011900

(continue)

CPA – codes					Corresponding codes of the Combined Nomenclature that has been included in the statistics
			10.10.12	Briquettes, ovoids and similar solid fuels manufactured from coal	27012000
10.2	Lignite				
	10.20	Lignite			
		10.20.1	Lignite		
			10.20.10	Lignite	27021000, 27022000
10.3	Peat				
	10.30	Peat			
		10.30.1	Peat		
			10.30.10	Peat	27030000, 27030000
		11.10.1	Petroleum oils and oils obtained from bituminous minerals, crude		
			11.10.10	Petroleum oils and oils obtained from bituminous minerals, crude	27090010, 27090090
		11.10.2	Natural gas, liquefied or in gaseous state		
			11.10.20	Natural gas, liquefied or in gaseous state	27111100, 27112100
		11.10.4	Bituminous or oil shale and tar sands		
			11.10.40	Bituminous or oil shale and tar sands	27141000
Minerals					
12.0	Uranium and thorium ores				
	12.00	Uranium and thorium ores			
		12.00.1	Uranium and thorium ores		
			12.00.10	Uranium and thorium ores	26121090
13.1	Iron ores				
	13.10	Iron ores			
		13.10.1	Iron ores		
			13.10.10	Iron ores	26011100, 26011200
13.2	Non-ferrous metal ores, except uranium and thorium ores				
	13.20	Non-ferrous metal ores, except uranium and thorium ores			
		13.20.1	Non-ferrous metal ores, except uranium and thorium ores		
			13.20.11	Copper ores and concentrates	26030000
			13.20.12	Nickel ores and concentrates	26040000
			13.20.13	Aluminium ores and concentrates	26060000
			13.20.14	Precious metal ores and concentrates	26161000, 26169000
			13.20.15	Lead, zinc and tin ores and concentrates	26070000, 26080000, 26090000

(continue)

CPA – codes					Corresponding codes of the Combined Nomenclature that has been included in the statistics
			13.20.16	Other non-ferrous metal ores and concentrates	26020000, 26050000, 26100000, 26110000, 26131000, 26139000, 26140010, 26140090, 26151000, 26171000, 26179000
	14.11	Ornamental or building stone			
		14.11.1	Ornamental or building stone		
			14.11.11	Marble and other calcareous ornamental or building stone	25151100, 25151220, 25151250, 25151290, 25152000
			14.11.12	Granite, sandstone and other ornamental or building stone	25161100, 25161210, 25161290, 25162100, 25162200, 25169000
	14.12	Limestone, gypsum and chalk			
		14.12.1	Limestone and gypsum		
			14.12.10	Limestone and gypsum	25201000, 25210000
		14.12.2	Chalk and dolomite		
			14.12.20	Chalk and dolomite	25090000, 25181000, 25182000, 25183000
	14.13	Slate			
		14.13.1	Slate		
			14.13.10	Slate	25140000
14.2	Sand and clay				
		14.21.1	Gravel and sand		
			14.21.11	Natural sands	25051000, 25059000
			14.21.12	Granules, chippings and powder; pebbles, gravel	25081000, 25082000, 25083000, 25084000, 25085000, 25087000
			14.21.13	Macadam; tarred macadam	25172000, 25173000
	14.22	Clays and kaolin			
		14.22.1	Clays and kaolin		
			14.22.11	Kaolin and other kaolinic clays	25070020, 25070080
			14.22.12	Other clays, andalusite, kyantite and sillimanite; mullite; chamotte or dinas earths	25081000, 25082000, 25083000, 25084000, 25085000, 25087000
14.3	Chemical and fertilizer minerals				
	14.30	Chemical and fertilizer minerals			
		14.30.1	Chemical and fertilizer minerals		
			14.30.11	Natural calcium or aluminium calcium phosphates; carnallite, sylvite, other crude natural potassium salts	25101000, 25102000, 31041000
			14.30.12	Unroasted iron pyrites; crude or unrefined sulphur	25020000, 25030010

(continue)

CPA – codes					Corresponding codes of the Combined Nomenclature that has been included in the statistics
			14.30.13	Other chemical minerals	25111000, 25112000, 25281000, 25289000, 25292100, 25292200, 25302000, 25309020, 25309098
14.4	Salt				
	14.40	Salt			
		14.40.1	Salt and pure sodium chloride		
			14.40.10	Salt and pure sodium chloride	25010010, 25010031, 25010051, 25010091, 25010099
14.5	Other mining and quarrying products n.e.c.				
	14.50	Other mining and quarrying products n.e.c.			
		14.50.1	Bitumen and asphalt, natural; asphaltites and asphaltic rock		
			14.50.10	Bitumen and asphalt, natural; asphaltites and asphaltic rock	27149000
		14.50.2	Precious and semi-precious stones; pumice stone; emery; natural abrasives; other minerals n.e.c.		
			14.50.21	Precious and semi-precious stones (excluding industrial diamonds), unworked or simply sawn or roughly shaped	71021000, 71031000
			14.50.22	Industrial diamonds; pumice stone; emery; natural corundum, natural garnet and other natural abrasives	25131100, 25131900, 25132000, 71022100
			14.50.23	Other minerals n.e.c.	25041000, 25049000, 25061000, 25062100, 25062900, 25120000, 25191000, 25199010, 25199030, 25199090, 25251000, 25252000, 25261000, 25262000, 25291000, 25293000, 25301010, 25301090, 26211000, 26219000

Appendix 2 – European Waste Catalogue – EWC-stat codes Version 3, Aggregated list

Item No	Code	Description	Hazardous/ Non-hazardous waste
1	01.1	Spent solvents	Hazardous
2	01.2	Acid, alkaline or saline wastes	Non-hazardous
3	01.2	Acid, alkaline or saline wastes	Hazardous
4	01.3	Used oils	Hazardous
5	01.4	Spent chemical catalysts	Non-hazardous
6	01.4	Spent chemical catalysts	Hazardous
7	02	Chemical preparation wastes	Non-hazardous
8	02	Chemical preparation wastes	Hazardous
9	03.1	Chemical deposits and residues	Non-hazardous
10	03.1	Chemical deposits and residues	Hazardous
11	03.2	Industrial effluent sludges	Non-hazardous
12	03.2	Industrial effluent sludges	Hazardous
13	05	Health care and biological wastes	Non-hazardous
14	05	Health care and biological wastes	Hazardous
15	06	Metallic wastes	Non-hazardous
16	06	Metallic wastes	Hazardous
17	07.1	Glass wastes	Non-hazardous
18	07.1	Glass wastes	Hazardous
19	07.2	Paper and cardboard wastes	Non-hazardous
20	07.3	Rubber wastes	Non-hazardous
21	07.4	Plastic wastes	Non-hazardous
22	07.5	Wood wastes	Non-hazardous
23	07.5	Wood wastes	Hazardous
24	07.6	Textile wastes	Non-hazardous
25	07.7	Waste containing PCB	Hazardous
26	08	Discarded equipment	Non-hazardous
27	08	Discarded equipment	Hazardous
28	08.1	Discarded vehicles	Non-hazardous
29	08.1	Discarded vehicles	Hazardous
30	08.41	Batteries and accumulators wastes	Non-hazardous
31	08.41	Batteries and accumulators wastes	Hazardous
32	09	Animal and vegetal wastes (excluding animal waste of food preparation and products; and excluding animal faeces, urine and manure)	Non-hazardous
33	09.11	Animal waste of food preparation and products	Non-hazardous
34	09.3	Animal faeces, urine and manure	Non-hazardous
35	10.1	Household and similar wastes	Non-hazardous
36	10.2	Mixed and undifferentiated materials	Non-hazardous
37	10.2	Mixed and undifferentiated materials	Hazardous
38	10.3	Sorting residues	Non-hazardous
39	10.3	Sorting residues	Hazardous
40	11	Common sludges (excluding dredging spoils)	Non-hazardous
41	11.3	Dredging spoils	Non-hazardous
42	12.1 + 12.2 +12.3 + 12.5	Mineral wastes (excluding combustion wastes, contaminated soils and polluted dredging spoils)	Non-hazardous
43	12.1 + 12.2 +12.3 + 12.5	Mineral wastes (excluding combustion wastes, contaminated soils and polluted dredging spoils)	Hazardous
44	12.4	Combustion wastes	Non-hazardous
45	12.4	Combustion wastes	Hazardous
46	12.6	Contaminated soils and polluted dredging spoils	Hazardous
47	13	Solidified, stabilised or vitrified wastes	Non-hazardous
48	13	Solidified, stabilised or vitrified wastes	Hazardous

Appendix 3 – Proposal of codes in the Combined Nomenclature for identifying flows of waste in trade statistics, from Wielenga, K. and Junker H. Codes according the Combined Nomenclature of 2004

CN Code	Description
71121000	Waste and scrap of gold, including metal clad with gold but excluding sweepings containing other precious metals
71122000	Waste and scrap of platinum, including metal clad with platinum but excluding sweepings containing other precious metals
71123000	Ash containing precious metal or precious-metal compounds
71129000	Other waste and scrap of precious metal or of metal clad with precious metal; other waste and scrap containing precious metal or precious-metal compounds, of a kind used principally for the recovery of precious metal
71129100	Waste and scrap of gold, including metal clad with gold but excluding sweepings containing other precious metals
71129200	Waste and scrap of platinum, including metal clad with platinum but excluding sweepings containing other precious metals
71129900	Waste and scrap of other precious metal
72041000	Waste and scrap of cast iron (ECSC)
72042110	Waste and scrap of stainless steel containing by weight 8 percent or more of nickel (ECSC)
72042190	Other waste and scrap of stainless steel (ECSC)
72042900	Other waste and scrap (ECSC)
72043000	Waste and scrap of tinned iron or steel (ECSC)
72044110	Turnings, shavings, chips, milling waste, sawdust and filings (ECSC)
72044191	Trimmings and stampings in bundles (ECSC)
72044199	Other trimmings and stampings (ECSC)
72044910	Other waste and scrap fragmentized (shredded) (ECSC)
72044930	Other waste and scrap in bundles (ECSC)
72044991	Other waste and scrap neither sorted nor graded (ECSC)
72044999	Other waste and scrap (ECSC)
72045010	Waste and scrap (blocks) of alloy steel (ECSC)
72045090	Other (ECSC)
74040010	Waste and scrap of refined copper
74040091	Waste and scrap of copper-zinc base alloys (brass)
74040099	Waste and scrap of other copper
75030010	Waste and scrap of nickel, not alloyed
75030090	Waste and scrap of nickel alloys
76020011	Waste of aluminium, turnings, shavings, chips, milling waste, sawdust and filings; waste of coloured, coated or bonded sheets and foil, of a thickness (excluding any backing) not exceeding 0,2 mm
76020019	Ohter aluminium waste (including factory rejects)
76020090	Aluminium scrap
78020000	Lead waste and scrap
79020000	Zinc waste and scrap
80020000	Tin waste and scrap
81019700	Tungsten waste and scrap
81029700	Molybdenum waste and scrap
81033000	Tantalum waste and scrap

(continue)

CN Code	Description
81042000	Magnesium waste and scrap
81053000	Cobalt waste and scrap
81060010	Unwrought bismuth, waste and scrap, powders
81073000	Cadmium waste and scrap
81083000	Titanium waste and scrap
81093000	Zirconium waste and scrap
81102000	Antimony waste and scrap
81110019	Manganese waste and scrap
81122200	Chromium waste and scrap
81123010	Unwrought germanium, powders, waste and scrap
81123040	Germanium waste and scrap
81124019	Vanadium waste and scrap
81129239	Niobium (columbium) and Rhenium waste and scrap
81129250	Gallium and Indium waste and scrap
81130040	Cermets waste and scrap
81123010	Unwrought germanium, powders, waste and scrap
81123040	Germanium waste and scrap
81124019	Vanadium waste and scrap
81129239	Niobium (columbium) and Rhenium waste and scrap
81129250	Gallium and Indium waste and scrap
81130040	Cermets waste and scrap
70010010	Glass wastes
47071000	Unbleached kraft paper or paperboard or corrugated paper or paperboard
47072000	Other paper or paperboard made mainly of bleached chemical pulp, not coloured in the mass
47073010	Old and unsold newspapers and magazines, telephone directories, brochures and printed advertising material
47073090	Other paper or paperboard made mainly of mechanical pulp (for example, newspapers, journals and similar printed matter)
47079010	Other, including unsorted waste and scrap of paper
47079090	Other, including sorted waste and scrap of paper
39151000	Waste, parings and scrap of polymers of ethylene
39152000	Waste, parings and scrap of polymers of styrene
39153000	Waste, parings and scrap of polymers of vinyl chloride
39159011	Waste, parings and scrap of polymers of propylene
39159013	Waste, parings and scrap of acrylic polymers
39159019	Waste of addition polymerisation products
39159091	Waste, parings and scrap of epoxide resins
39159093	Waste, parings and scrap of cellulose and its chemical derivatives
39159099	Waste, parings and scrap of other plastics
41100000	Parings and other waste of leather or of composition leather, not suitable for the manufacture of leather articles; leather dust, powder and flour
41152000	Parings and other waste of leather or of composition leather, not suitable for the manufacture of leather articles; leather dust, powder and flour
50031000	Silk waste (including cocoons unsuitable for reeling, yarn waste and garnetted stock) not carded or combed
50039000	Other silk waste

(continue)

CN Code	Description
51032010	Yarn waste of wool or of fine animal hair
51032091	Waste of wool or fine animal hair not carbonised
51032099	Waste of wool or fine animal hair carbonised
51033000	Waste of coarse animal hair
52021000	Cotton waste (yarn waste)
52029100	Cotton waste (garnetted stock)
52029900	Other cotton waste
53013090	Flax waste, incl. yarn waste and garnetted stock
55051010	Waste (including noils, yarn waste and garnetted stock) of man-made fibres of nylon or other polyamides
55051030	Waste of polyesters
55051050	Waste of acrylic or modacrylic
55051070	Waste of polypropylene
55051090	Waste of other synthetic fibres
55052000	Waste off artificial fibres
63090000	Worn clothing and other worn articles
63101010	Used or new rags, scrap twine, cordage, rope and cables and worn out articles of twine, cordage, rope or cables, of wool or fine or coarse animal hair, sorted
63101030	Rags of flax or cotton, sorted
63101090	Rags of other textile materials, sorted
63109000	Rags, unsorted
26180000	Granulated slag (slag sand) from the manufacture of iron or steel
26190091	Waste suitable for the recovery of iron or manganese
26190093	Slag from the manufacture of iron or steel suitable for the extraction of titanium oxide
26190095	Waste suitable for the extraction of vanadium
26190099	Other slag and waste from the manufacture of iron or steel
26201100	Hard zinc spelter
26209920	Ashes and residues containing mainly niobium and tantalum
26209930	Ashes and residues containing mainly tungsten
26209950	Ashes and slag containing mainly molybdenum
26209960	Ashes and slag containing mainly titanium
26219000	Other ashes and slag

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