



Statistics Sweden

Statistiska centralbyrån

Material Flows in Sweden 1998–2005

**Data sources, methods and
results**

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2008

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Foreword

This report covers the data sources, methods and results for compiling Material Flow Statistics according to Eurostat (Eurostat 2007).

The work has been possible due to a temporary grant from Swedish Ministry of Finance. The data was compiled by Louise Sörme during 2007-2008. All the results are available on the website of Statistics Sweden, www.scb.se.

Statistics Sweden, september 2008

Inger Eklund

Viveka Palm

A note of thanks

We would like to express appreciation to our survey respondents – the people, enterprises, government authorities and other institutions of Sweden – with whose cooperation Statistics Sweden is able to provide reliable and timely statistical information meeting the current needs of our modern society.

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Summary

This report describes the data sources, methods and results to fulfill the demands on Economy Wide Material Flows according to Eurostat. In material flow statistics the weights are reported in tonnes.

The data sources used are primarily statistics on foreign trade of goods and statistics on production of commodities and industrial services, both from Statistics Sweden. Some other sources are also used; Swedish Forest Agency, Swedish Board of Agriculture, and the Swedish Board of Fisheries. Some expert judgments have also been made to derive some specific biomass data. get all data for biomass.

The methods for gathering data are described in the Compilation Guide for Economy-wide Material Flow Accounting from Eurostat. This guide has been followed. In some cases different methods could be used according to the guide, in the report it is clarified what methods have been used.

The results show that the domestic extraction has increased from about 120 million tonnes 1998 to 170 million tonnes 2003. It is dominated by biomass and non-metallic minerals. Both make up about 40 percent of the total domestic extraction. Within biomass, wood dominates and within non-metallic minerals, gravel and sand dominates.

The imports are quite stable during the years and much less than the domestic extraction, by about 60-70 million tonnes. Imports are dominated by the import of fossil fuels (~30-35 million tonnes) followed by the import of biomass and biomass products (~15-20 million tonnes).

The exports are also quite stable and at about the same level as imports, at 70-80 million tonnes. It is dominated by export of metal ores and concentrates, processed metals (~22-28 million tonnes) and biomass and biomass products (~22-28 million tonnes).

The indicator domestic material consumption (DMC) (import – export + domestic extraction) can be calculated. The DMC of Sweden has increased from about 13 tonnes/capita 1998 to about 18 tonnes/capita 2005. An increase in domestic extraction of sand and gravel explains most of the increase.

All results are available on the Statistics Sweden website, www.scb.se.

1. Introduction

The statistics of Economy Wide Material Flows are made according to the Compilation Guide from Eurostat (Eurostat 2007a; Eurostat 2007b). Eurostat is using the term Economy Wide Material Flows, here the term Material Flow is used but the meaning is equal. This report is a detailed report about how the data is compiled, what data sources are used and so on.

The statistics on material flows are made from a large amount of already collected statistics which together gives data of the total use of Swedish material use.

The report follows the structure of the standard tables which are to be turned in to Eurostat. How data is retrieved for Biomass, Metal ores, Non metallic minerals, Fossil energy carriers and Other products is shown in this report.

Statistics Sweden has made earlier Material Flow Statistics when this Compilation Guide was still unavailable (Statistics Sweden, 2000 & Statistics Sweden, 2006). When comparing the results from these different statistics it is obvious how important it is to define method. It influences for example the indicator Domestic Material Consumption (DMC) quite considerably. The previous lack of a standardized method for Material Flow Statistics has made it difficult to make comparisons between different countries.

This report has the goal to describe the data sources, methods and results to fulfill the demands on Economy Wide Material Flows according to Eurostat.

2. Data Sources

Statistics on Economy Wide Material Flows is primarily based on already gathered statistics, a description of the sources is found below. The text is taken from the description of each statistics.

2.1 Statistics Sweden, production of commodities and industrial services

Production of commodities and industrial services is an annual survey where all enterprises with more than 20 employees are surveyed by questionnaire. Even the industrial section of service companies are included if the industrial operations reach up to 20 employees or more. Companies with a few as 10 employees are surveyed from certain sectors in order to maintain sufficient quality. The duty to submit information on the questionnaire is stipulated in the Official Statistics Act.

The questionnaire shall include some 4 000 companies, which account for 91% of the total production value.

Smaller companies, with 0 to 19 employees are mainly surveyed through administrative material from the National Tax Board. Their information is distributed over products in accordance with a model based on the answers from those companies include in the questionnaire survey. Companies with 1 to 19 employees account for only 9% of the production value.

More than half of the questionnaire surveyed companies has less than 50 employees. These, however, account for a smaller part of production, near to 14%. There are only 200 companies with more than 500 employees, but these account for approximately 55% of production.

2.2 Statistics Sweden, Foreign trade of goods statistics

1. Trade in goods with countries outside the EU

For companies doing trade with countries outside the EU - Extrastat - information is used from export requests and import declarations, submitted by companies to customs in relation to the import and export of goods. The part of trade in goods accounting got approximately 42% of the value of the total exports and imports during January to December 2005. (Values vary somewhat during the period in time 1998 - 2005.)

2. Trade in goods with EU countries

The total value of trade in goods with EU countries is calculated by means of two sets of basic data. The majority of the basic data, approximately 97% of EU exports and approximately 96% of EU imports, is directly collected each month from companies with an annual export of goods within the EU of at least SEK 4 500 000 or an import of at least SEK 2 000 000. Information submitted by companies is reported for goods and for EU countries. Data

collection, conducted by Statistics Sweden, is designed as a special statistical survey called Intrastat.

The survey has a high rate of non-response from companies liable to submit information, but fail to. The value of trade in goods for non-responsive cases and for companies not liable to submit information is estimated by using the information from VAT declarations. This information refers to the value of goods purchased and delivered within the EU that are declared monthly by companies.

2.3 Swedish Board of Agriculture, Production of cereals, oilseeds, dried pulses and temporary grasses

Text from JO 16 SM 0601.

Regarding 2005, ARARAT was used as a sample frame. Four samples were taken up: one for grains; dried pulses and oilseed crops (4350 companies); one for food potatoes (1240 companies); one for starch potatoes (8186 companies); and one for temporary grasses (1000 companies). Samples were drawn from among agricultural enterprises farming more than 5 hectares as of 2005.

For grains, dried pulses and oilseed crops, data collection occurs by means of the farmers submitting their harvest results on a special Internet page or through telephone interviews conducted by Statistics Sweden's interviewers. Information about the total harvested quantity and the moisture content of each crop is collected. Given the quantities reported, the moisture content for grains would reach 14%. Dried pulses would have 15% moisture content and oilseed crops 9% moisture content.

Information for potatoes is collected by a postal questionnaire that is sent to a select number of potato growers. The post questionnaire is sent out in the middle of October. A reminder is later sent and follow-up telephone calls for outstanding questionnaires. The information on quantities harvested and unharvested areas is collected. Information about temporary grasses is collected by post questionnaire with follow-up telephone calls. Information about quantities reported leads to a general moisture of 16.5%.

To find the crop areas for each enterprise, the yield per hectare for each enterprise and each crop are calculated. Information about crop areas is the same, as a rule, as the farmer reported in the application for crop area compensation earlier in the year. Total harvests are the estimated by the yield per hectare for each reporting area and the given crop area. In the event of the final estimates for total harvests, a final statistic is used about crops areas published in "Agriculture's use 2005" (JO 10 SM 0601). The crop areas for grains and dried pulses reported in the final statistics have decreased by that area devoted to harvesting green fodder.

One calculates the reduced yields per hectare for potatoes, which is drawn from the downward correction of the total yield per hectare after inspecting crops for acceptability and size. The reduction uses standard numbers based on information from the objective yield estimates from 1979-1998. No corrections are made for inspecting for acceptability and size with regard to food potatoes. Potatoes for starch have no correction for inspected size.

Temporary grasses only include enterprises with at least 0.5 hectare of sampled surveyed crops. The survey has been limited to included temporary grasses, first yield and regrowth of temporary grasses. Regrowth considered due to grazing or grazing pastures is not included. Thus harvested yield is what is counted. Yield per hectare and total first harvest, yield per hectare and regrowth harvest and total yield for all harvested pasture production are reported. In case of multiple regrowth harvests, these are combined and reported as a regrowth harvest. The total pasture area, with division into temporary grass and grazing pasture, is reported.

2.4 Swedish Board of Agriculture, Harvesting garden crops

Text from JO 33 SM 0601.

The questionnaire was sent out to all known garden enterprises. Information about new companies is gained from Industry and Ministry of Agriculture's support system.

Information received has been reviewed and arranged according to a pre-arranged tabular plan. Complementary information has been gained through follow-up telephone conversations. When improbable information or when information is missing has not been able to be verified by the respondent, then the information is tested against a linear regression model on the national level.

2.5 Swedish Board of Fisheries, Salt water fish

Text from JO 55 SM 0601.

Receivers of catches submit copies of the accounts kept on fish species and individual fishermen in relation to first hand sales of catches to the National Board of Fisheries. The copies indicate the amount delivered, unit price, market value, breadth, size classification and freshness per species. Accounting notes are registered with the National Board of Fisheries for further result analysis and publication.

The duty to provide information is in accordance with the National Board of Fisheries guidelines about inspecting the fishery areas (see Code of Fishery Statutes FIFS 1995:23).

Preliminary results from this survey are published monthly in Statistical Reports, series JO 50. Definitive information regarding the entire year is published yearly in series JO 55.

2.6 Swedish Board of Fisheries, Fresh water fish

Text from JO 56 SM 0601.

The survey is a total survey of all fishermen in the population. Information is collected by means of catch logs where fishermen provide information about the catch, catch value, and the equipment used in relation to species caught. Information was collected by unit offices of the Fishery Councils in each county up to 1994. The National Board of Fisheries has conducted the collection, registration and review of information since 1995. Since 2004,

the National Board of Fisheries has also taken over the reporting of results and publishing, earlier performed by Statistics Sweden.

The duty to provide information is in accordance with the National Board of Fisheries guidelines about Inspecting the Fishery areas (see Code of Fishery Statutes FIFS 2004:25).

Results of this survey are published yearly.

2.7 Swedish Forest Agency, Wood

There are a number of ways to calculate deforestation. The Swedish Forest Agency's model is, in part, a gross deforestation model and, in part, a model based on consumption statistics from the Timber Measurement Council.

The gross deforestation model is used for an initial preliminary calculation of deforestation. This model is based on lumber industry production of milled coniferous timber products and wood pulp. Lumber consumption is calculated by means of the consumption figures for the production of certain products. Adjustments are made for the consumption of milled deciduous timber, wood for the plywood industry, fire wood and other woods. Then corrections are made for imports and exports of round timber and wood chips and adjustments are made for inventory changes.

The final calculation for the size of gross deforestation uses a gross deforestation model where the Timber Measurement Council's statistical information about round timber consumption in the forestry industry is used. Thus, the model does not "use the backdoor" and derive results from production statistics and consumption figures.

3. Method

3.1 Biomass – Primary crops

The data are mostly based on official statistics. The statistics on cereals, pulses, oil-bearing crops, potatoes (roots, tubers) are produced by Statistics Sweden (JO 16 Statistical Report, relevant years). The statistics on vegetables and fruits are produced by Swedish Board of Agriculture (JO 33 Statistical Report, relevant years). The statistics on production of sugar beets can be found in Agricultural Yearbook (Table 4.6). In Sweden there is no production of nuts, fibres or other crops. The dominant part of the primary crops is covered by official statistics, but some crops with very small production (maize (tröskad majs)), Swedish turnip (kålrot) and dry beans (bruna bönor) have been based on expert judgment (Statistics Sweden, G. Ländell).

3.2 Biomass – Crop residues

Crop residues are straw and other crop remains (sugar and fodder beet leaves) confer with the Compilation Guide, MFA (page 22, section A 1.2). In Sweden there are values for the crop residues so harvest factors and recovery rates are not needed. Data is produced by Statistics Sweden, expert judgment (G. Ländell).

3.3 Biomass – Fodder crops incl. grassland harvest

In Sweden the fodder crops are maize for forage, green oilseeds for silage, legumes for silage, grasses for silage and hay. The statistics for fodder crops area, with the exception of hay, is produced by Statistics Sweden (JO 16 Statistical Report, relevant years). The yield per hectare is estimated by experts from Statistics Sweden (G.Ländell). Data for hay is produced by Statistics Sweden (JO 16 Statistical Report)

The moisture content in data is 16.5%, in the Compilation Guide, MFA one is instructed to adjust this to 15%. Since uncertainties in the data are probably larger than this difference the Swedish data is reported with moisture content of 16.5%.

Hay meadows and hay-nonleguminous are biomass harvested from grassland. This hay (non-leguminous) is usually not harvested, it is supposed to be left unharvested. But during dry years one can get permission to use the area for animals to graze (Statistics Sweden, G. Ländell, 080115). As the calculations are made, it is estimated that the hay (non-leguminous) is part of the harvested amount, which is not true for all years.

3.4 Biomass – Grazed biomass

Grazed biomass can be calculated in two ways, from the amount of grazing animals (demand) or from the area where the animals can graze (supply). For more information, see Compilation Guide, MFA.

To calculate the amount of grazed biomass from the number of grazing animals (demand) would be misleading in Sweden, due to the fact that large amounts of oats and barley are reported under cereals and other crops. This means that if only the amounts of fodder crops are subtracted from the grazed biomass the estimation will be an overestimation. Due to this Sweden chose to use the calculation based on the grazed area (data from Statistics Sweden, G. Ländell). The demand calculation could be used if it was complemented by using food balance sheets to get some knowledge about the amount of oats and barley the animals eat. This has not been done. Although the calculation based on demand is not used in the reporting to Eurostat, the method is shown, see below.

Method 1, Demand

This method is based on the following equation (from Compilation Guide, MFA);

$$\text{roughage requirement} = (\text{livestock (number)} * \text{annual feed intake (tonnes per head and year)}) - (\text{fodder crops (tonnes at 15\% + biomass harvested from grassland (tones at 15\%)})$$

In JO 20 Statistical Report 0402 (produced by Swedish Board of Agriculture) there is information about the number of livestock in Sweden, both cattle and sheep. In JO 24 Statistical Report 0501 (produced by Statistics Sweden) there is information about the number of horses in Sweden. It is a thorough investigation with a relatively small standardised margin of error. There is no other investigation of such available, so it is difficult to know the number of animals during other years with certainty. A personal estimation is that there is a small increase in the number of horses, maybe some percent annually (M. Bratt, Statistics Sweden). I assume the number of horses to be constant during the years 1998-2005, because there is no reliable information about these numbers during the years in question. The assumption will affect the total marginally since the number of horses is much less than cattle and they eat less as well. Thus the horses demand are a small part of the total demand.

Method 2, Supply

Temporary grazing (betesvall), Grazed biomass (betesmark, ej slåtteräng, skogsbete, allvar och fåbodbete), range pastures (skogsbete, allvarbete och fåbodbete) are areas which are not harvested; they are grazed by animals (according to Statistics Sweden, G. Ländell 080115). Temporary grazing are areas that are grazed on farmland (åkermark).

Data on temporary grazing is from JO 16 Statistical Report (produced by Statistics Sweden). Data on grazed biomass and range pastures are based on expert judgement (Statistics Sweden, G.Ländell).

3.5 Biomass – Wood

According to Compilation Guide, MFA Annex 1 (Eurostat 2007b) (pg. number 1) domestic extraction of wood does include CPA 0201. This includes a lot of CN codes, see Annex 1 to this report. The results for Sweden only account for the data with CN codes beginning with 4401 and 4403. These refer to different types of fuel wood and timber. Sweden has not gathered data for the other CN codes. It is unimportant since the

Fish statistics are taken from JO 55 Statistical Report (produced by Statistics Sweden 1998-2003, Swedish Board of Fisheries 2004-2005) and JO 56 Statistical Report (produced by Statistics Sweden 1998-2002, Swedish Board of Fisheries 2003-2005).

Data for recreational fish is taken from an earlier study, "Fiske 2005 en undersökning om svenskarnas fritidsfiske". (Fish 2005, a study of the Swedes' recreational fishing). The report is available on the Statistics Sweden website

3.7 Biomass – Hunting and gathering

For the years 1998-2005 data on hunting and gathering are not included in the statistics.

3.8 Fossil energy carriers

EU has specified the relevant CPA codes which should be included in domestic extraction of fossil fuels, in Annex 1 to the Compilation Guide, MFA. The concordance between CPA and CN is found on a website, RAMON, see http://ec.europa.eu/eurostat/ramon/relations/index.cfm?TargetUrl=LST_REL.

For the import and export of fossil fuels (Standard table B and C) the relevant SITC codes are specified in Annex 3 to the Compilation Guide, MFA. There are also translations of terms between SITC codes and CN to be found hereon RAMON, see http://ec.europa.eu/eurostat/ramon/relations/index.cfm?TargetUrl=LST_REL.

In case data is missing, we have translated this to mean zero, "0".

Domestic extraction

For domestic extraction of fossil fuels, the relevant CPA codes are used according to the Compilation Guide, MFA. Production of peat for energy is reported in Statistical Report MI 25, produced by Statistics Sweden. The title is "Peat 2005 Production, use, environmental impact". In that Statistical Report the amount is only reported in cubic meters. But it is stated in the report that the weight is 300 kg per m³. A conversion to tonnes has been made. All other data is coming from Statistics Sweden, Production of commodities and industrial services, for the relevant years

Import and export

The SITC codes 322.2 and 278.96 are used for the import and export of brown coal, including oil shale and tar sands, see Annex 3, Compilation Guide, MFA. They are translated into CN 27021000, 27022000, 27141000. The CN codes are the same as for the pilot work for 2004 (Statistics Sweden, 2006). In CN 2702 all the numbers are included, in CN 2714 one is excluded (27149000).

The SITC codes 321 and 3221 are included for the import and export of hard coal. They are translated into CN 27011100, 27011190, 27011210,

27011290, 27011900. The CN codes are the same as for the pilot work of 2004 (Statistics Sweden, 2006). All the CN codes in 2701 are included.

The SITC codes 333, 334 and 335 are included for the import and export of petroleum. They are translated into all CN codes in 2709 (SITC 333), all CN codes in 2710 (SITC 334) all CN codes in 2706, 2707, 2708, 2712, 2713, 2715 (SITC 225). The CN codes are not the same as in the pilot work for 2004 (Statistics Sweden, 2006), then it seems as only SITC code 333 (crude oil) was included. Now a lot of different petroleum products are included.

The SITC codes 343, 344, 345 and 342 are included for the import and export of natural gas. With these all CN codes in 2705 and 2711 are included.

The SITC code 3223 is included for the import and export of peat. This is translated into CN 2703.

To conclude, chapter 27 is almost totally included in the Material Flow Analysis, there are only two exceptions; 2716 electrical energy and 27149000 (SITC 27897).

3.9 Metal ores, Non-metallic minerals, Other products

The CPA codes for domestic extraction and SITC codes for import and export are used according to the Compilation Guide, MFA (Annex 1, domestic extraction, Annex 3, import and export). Data is coming from Statistics Sweden (Foreign trade of goods statistics and production of commodities and industrial services) detailed data is not provided in a Statistical Report, instead data is reported in the Statistical database.

4. Results Domestic Extraction – Standard Table A

4.1 Biomass – Primary crops

The results for the primary crops are shown in Table 1. In Sweden there is no harvest of nuts, fibres or other crops (spices, stimulant crops, tobacco, rubber and other crops) in reported amounts. From Table 1 one can see that the primary crops are dominated by cereals, followed by sugar crops and roots and tubers. The moisture content varies between these crops but it is nothing that need be accounted for according to the Compilation Guide, MFA.

Table 1. The production of primary crops in Sweden 1998-2005 (thousands of tonnes)

	1998	1999	2000	2001	2002	2003	2004	2005
Cereals (1)	5 619	4 932	5 671	5 391	5 463	5 353	5 509	5 052
Roots, tubers (2)	1 206	997	986	931	918	861	983	952
Sugar crops (3)	2 571	2 753	2 602	2 659	2 664	2 484	2 287	2 381
Pulses (4)	91	85	73	83	95	89	102	82
Nuts	0	0	0	0	0	0	0	0
Oil bearing crops (5)	130	195	129	109	164	202	239	214
Vegetables (6)	242	261	257	245	243	252	279	273
Fruits (6)	32	33	37	32	32	35	34	33
Fibres	0	0	0	0	0	0	0	0
Spices, tobacco and other crops	0	0	0	0	0	0	0	0
Total	9 891	9 256	9 755	9 450	9 579	9 276	9 433	8 987

1) Swedish Board of Agriculture (JO 37 Statistical Report, relevant years)

2) Potatoes from Statistics Sweden (JO 16 Statistical Report, relevant years), Swedish turnip (estimation from Statistics Sweden)

3) Sugar beets from Agricultural yearbook (Table 4.6, relevant years)

4) Pulses broad beans, dry (åkerbönor) and peas, dry (ärtor) from Statistics Sweden (JO 16 Statistical Report, relevant years) and beans dry estimation from Statistics Sweden

5) Rapeseed (höstraps, vårraps, höstrybs, vårrybs) and Linseed (oljelin) from Statistics Sweden (JO 16 Statistical Report, relevant years)

6) Swedish Board of Agriculture (JO 33 Statistical Report, relevant years). If data was not available for a specific year, data for previous year has been used.

4.2 Biomass – Crop residues

This group is composed of straw and other crop remains (sugar and fodder beet leaves, etc.), according to Compilation Guide, MFA. The data in Table 2 shows that straw is the most important crop residue.

Table 2. The production of crop residues in Sweden 1998-2005 (thousands of tonnes) are composed of straw and other crop remains (sugar and fodder beet leaves etc). This data was provided by from Statistics Sweden, expert judgement (G.Ländell)

	1998	1999	2000	2001	2002	2003	2004	2005
Straw	2 112	1 838	2 112	2 023	2 159	2 001	2 065	1 886
Sugar beet leaves etc.	174	186	176	180	180	168	154	161
Total	4 284	2 024	2 298	2 203	2 339	2 169	2 219	2 047

4.3 Biomass – Fodder crops incl. Grassland harvest

The amount is largely comprised of hay and others (maize for forage, green oilseeds for silage, legumes for silage, and grasses for forage) are of minor importance. The amount is notably constant during the years 1998-2005 at around 4 million tonnes.

Table 3. The production of fodder crops including grassland harvest in Sweden 1998-2005 (tonnes)

	1998	1999	2000	2001	2002	2003	2004	2005
Maize for forage (1)	525	11 970	14 805	18 922	22 648	24 238	31 379	34 671
Green oilseeds for silage (1)	525	525	902	615	671	378	457	2 220
legumes for silage (1)	1 770	1 770	1 583	2 280	2 294	1 864	1 670	3 720
Grasses for forage (1)	41 000	41 000	43 465	64 179	84 752	72 274	67 559	84 340
Hay (Clover, Lucerne, etc.) (2)	3 839 120	3 930 027	3 669 783	3 721 570	4 012 000	3 826 400	3 784 200	3 895 400
Total	3 882 940	3 985 292	3 730 538	3 807 566	4 122 365	3 925 154	3 885 265	4 020 351

1) Area from Statistics Sweden (JO 16 Statistical Report, relevant years). The yield per hectare is estimated by experts from Statistics Sweden (G.Ländell).

2) Statistics Sweden (JO 16 Statistical Report, see relevant years)

The grassland harvest is shown in Table 4. Grassland harvest is comprised of hay meadows and hay-nonleguminous.

Table 4. The grassland harvest in Sweden 1998-2005 (tonnes)

	1998	1999	2000	2001	2002	2003	2004	2005
Hay (non leguminous) (1)	33 935	47 616	43 570	46 816	49 251	48 334	47 033	54 430
Hay meadows (1)	400	800	1 796	2 626	1 870	1 847	2 127	2 272
Total	34 335	48 416	45 366	49 442	51 121	50 181	49 160	56 702

1) Estimation by expert (G.Ländell).

4.4 Biomass – Grazed biomass

To calculate the amount of grazed biomass from demand will be misleading in Sweden, due to the fact that large amounts of oats and barley are reported under cereals and other crops. This means that if only the amounts of fodder crops are subtracted from the grazed biomass the estimation will be an overestimation. Due to this Sweden chose a

calculation based on the grazed area (supply). Although this is the case, the result based on demand is shown here. The grazed biomass is therefore estimated to about 1.5 M tonnes, see below.

Calculation based on demand

Based on the annual intake of the animals (4.5 tonnes for cattle, 0.6 tonnes for sheep and 3.7 tonnes for horses, from Compilation Guide, MFA) and the number of animals (see method), the demand is calculated to about 5 M tonnes annually, see Table 5.

Table 5. Grazed biomass based on demand (tonnes)

	1998	1999	2000	2001	2002	2003	2004	2005
Amount grazed, based on demand (tonnes)	5 158 979	4 984 132	5 082 186	4 893 272	4 586 594	4 574 992	4 683 412	4 684 612

Calculation based on supply:

The grazed biomass results from temporary grazing such as range pastures are areas that are not harvested and those are grazed by animals (according to Statistics Sweden, G. Ländell 080115). Temporary grazing refers to areas that are grazed on farmland (åkermark). The amounts are summarised in Table 6.

Table 6. Grazed biomass in Sweden 1998-2005 (tonnes) includes grazed biomass, range pastures and temporary grazing

	1998	1999	2000	2001	2002	2003	2004	2005
Grazed biomass (1)	533 826	530 579	544 897	493 548	522 365	526 672	555 280	536 005
Range pastures (1)	1200	1200	5260	19 629	20 002	20 361	22 131	24 069
Temporary grazing (2)	866 298	775 031	731 638	739 463	662 778	624 396	650 766	758 821
Total	1 401 324	1 306 810	1 281 795	1 252 640	1 205 145	1 171 429	1 228 177	1 318 895

1) Statistics Sweden, expert judgement (G.Ländell)

2) Statistics Sweden (JO 16 Statistical Report, relevant years).

4.5 Biomass – Wood

Data from production of wood is mainly based on statistics from the Swedish Forest Agency. Table 5 shows that the production is relatively constant, see Table 7. Although in 2005 there was a large storm called Gudrun that made the production rise that year.

Table 7. Production of wood (timber and wood fuel and other extraction) in Sweden 1998-2005

	1998	1999	2000	2001	2002	2003	2004	2005
Coniferous sawlogs (Mton) (1)	16,38	15,76	17,00	17,00	17,42	17,78	18,51	29,38
Broad leaved sawlogs (Mton) (2)	0,34	0,34	0,34	0,34	0,20	0,20	0,20	0,07
Pulpwood (Mton) (1)	11,54	11,18	12,38	12,27	13,73	13,68	14,46	18,36
Fuelwood (Mton) (1)	3,07	3,07	3,07	3,07	3,07	3,07	3,07	3,07
Other roundwood (Mton) (1)	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,26
Reed canary grass (Mton) (3)	0,0035	0,0035	0,0047	0,0047	0,0045	0,0037	0,0044	0,0012
Energy wood (Mton) (3)	0,087	0,086	0,086	0,086	0,084	0,083	0,081	0,081
Total timber (kton) (4)	31 090	30 004	32 692	32 578	34 487	34 830	36 489	52 584
Total wood fuel and other extraction (kton) (5)	3 751	3 750	3 752	3 751	3 749	3 747	3 746	3 743
Total wood (kton) (6)	34 842	33 754	36 444	36 329	38 236	38 578	40 235	56 328

1) Swedish Forest Agency, Table 7.10. Calculation from cubic meters to ton, 0.52 according to Compilation Guide, MFA. 10% weight is added to adjust for bark, according to Compilation Guide, MFA. In wood fuel are tops, branches and roots excluded due to missing data.

2) Swedish Forest Agency, Table 7.10. Calculation from cubic meters to ton, 0.68 according to Compilation Guide, MFA. 10% weight is added to adjust for bark, according to Compilation Guide, MFA.

3) Statistics Sweden, expert judgment (G.Ländell)

4) Includes coniferous sawlogs, broadleaved sawlogs, pulpwood.

5) Includes wood fuel, other roundwood, reed canary grass and energy wood.

6) Total of all types of wood.

4.6 Biomass – Fish catches, crustaceans, molluscs and aquatic invertebrates

Table 8 shows the results for fish catches, crustaceans, molluscs and aquatic invertebrates. Commercial fishing has decreased markedly during these years. The statistics of commercial fishing show the amount landed in Sweden, which means that the fish can have been caught abroad. according to the Compilation Guide, MFA. Data of recreational fishing for 2005 is retrieved from a 2006 report from Statistics Sweden. Expert recommendation would have one use these numbers for the whole period, although there is a report from 2000 about recreational fishing. Experts regard the report from 2000 as an overestimation. The majority of the report's data is derived from smaller lakes in Sweden.

Table 8. The domestic extraction of fish, crustaceans, molluscs and aquatic invertebrates in Sweden commercial and recreational fishing, (tonnes)

	1998	1999	2000	2001	2002	2003	2004	2005
Fish from Baltic Sea (ton) (1)	402 840	328 206	146 276	123 399	126 448	106 011	118 824	121 375
Fish from fresh waters (ton) (2)	1 575	1 487	1 459	1 246	1 435	1 490	1 395	1 418
Recreational fishing (3)	46 523	46 523	46 523	46 523	46 523	46 523	46 523	46 523
Total	450 938	376 216	194 258	171 168	174 406	154 024	166 742	169 316

1) 1998-2003 Statistics Sweden (JO 55 Statistical Report), 2004-2005 Swedish Board of Fisheries (JO 55 Statistical Report)

2) 1998-2002 Statistics Sweden (JO 56 Statistical Report), 2003-2005 Swedish Board of Fisheries (JO 56 Statistical Report)

3) Statistics Sweden, Fish 2005 (Fiske 2005). It is assumed that this amount has been constant during the years 1998-2005 (see method).

4.7 Fossil energy carriers

The statistics of production of peat for energy is taken from Statistics Sweden (MI 25 Statistical Report). The title is: "Peat 2005 Production, use, environmental impact". In that Statistical Report only the amount in cubic meters is reported. But it is stated in the report that the weight is 300 kg per m³. The production of fossil energy carriers is shown in Table 9. All other data was provided by Statistics Sweden, Production of commodities and industrial services, for primary data see Statistical Database

Table 9. The production of fossil energy carriers in Sweden 1998-2005 (thousands of tonnes)

	1998	1999	2000	2001	2002	2003	2004	2005
Brown coal (kton) (1)	0	0	0	0	0	0	0	0
Hard coal (kton) (1)	0	0	0	0	0	0	3	2
Petroleum (kton) (1)	0	0	0	0	0	0	0	0
Natural gas (kton) (1)	0	0	0	0	0	0	5	3
Peat (1000m3) (2)	392	2 652	1 372	2 496	2 885	2 644	1 871	1 788
Peat (kton) (3)	118	796	412	749	865	793	561	536
Total (kton) (4)	118	796	412	749	865	793	569	541

1) Statistics Sweden, Production of commodities and industrial (see Statistical database, Statistics Sweden)

2) Statistics Sweden (MI 25 Statistical Report, relevant years)

3) Calculated from Statistics Sweden (MI 25 Statistical Report, relevant years) and a weight of peat to 300 kg per m³.

4.8 Metal ores

For the production of metals the relevant CPA codes are specified in the Annex to the Compilation Guide, MFA. In Table 10 the production is shown. All data was provided by Statistics Sweden, Production of commodities and industrial services, for primary data see Statistical Database.

Table 10. The production of metals ores in Sweden 1998-2005 (in thousands of tonnes). All data is from Statistics Sweden, Production of commodities and industrial services

	1998	1999	2000	2001	2002	2003	2004	2005
Iron ores	20 256	18 422	20 851	18 863	19 661	21 734	22 867	23 451
Copper ores	271	263	283	268	279	309	300	355
Nickel ores	0	0	0	0	0	0	0	0
Lead ores	2 296	2 310	2 257	1 908	355	412	451	491
Zinc ores	0	0	0	0	0	0	0	0
Tin ores	0	0	0	0	0	0	0	0
Gold, silver, platinum and other precious metal ores	0	0	0	0	0	0	0	0
Bauxite and other aluminium ores	0	0	0	0	0	0	0	0
Uranium and thorium ores	0	0	0	0	0	0	0	0
Manganese, molybdenum, titanium and other metal ores	0	0	0	0	0	0	0	2

4.9 Non-metallic minerals

For the production on non-metallic minerals the relevant CPA codes are specified in the Annex to the Compilation Guide, MFA. In Table 11 the production is shown. All data is from Statistics Sweden, Production of commodities and industrial services. No data of excavated soil is available so therefore there is no data shown for this. Slag/ashes/waste from iron/steel production/combustion of waste etc. is equivalent to the heading "other mining and quarrying products", see Annex to the Compilation Guide, MFA.

Table 11. The production of non metallic minerals in Sweden 1998-2005 (in thousands of tonnes). All data is from Statistics Sweden, Production of commodities and industrial services

	1998	1999	2000	2001	2002	2003	2004	2005
Ornamental or building stone	106	91	91	94	152	179	143	141
Limestone, gypsum, chalk, and dolomite	3 398	2 918	3 541	3 332	3 632	3 888	3 406	4 067
Slate	16	17	21	19	16	18	14	15
Gravel and sand	36 252	43 248	38 454	37 063	51 308	53 989	63 660	68 904
Clays and kaolin	71	64	34	0	86	141	143	164
Chemical and fertilizer minerals	106	99	139	143	141	170	276	315
Salt	0	0	0	0	0	1	1	1
Slag/ashes/waste from iron/steel-production/combustion of waste etc.	61	61	52	40	124	107	126	90

4.10 Other products

Other products are only relevant for imports and exports, see Compilation Guide, MFA (Eurostat 2007a, 2007b)

5. Results Import and Exports (Standard Table B)

5.1 Biomass

Table 12 shows the import of biomass to Sweden from all countries 1998-2005. Table 13 shows the export of biomass from Sweden to all countries 1998-2005. All data is from Statistics Sweden, Foreign trade of goods statistics.

Table 12. The import of biomass to Sweden from all countries 1998-2005 (thousands of tonnes). All data is from Statistics Sweden, Foreign trade of goods statistics

	1998	1999	2000	2001	2002	2003	2004	2005
Cereals, primary and processed	372	394	344	437	499	373	401	445
Roots, tubers, primary and processed	27	50	49	73	66	79	73	50
Sugar crops, primary and processed	140	158	158	153	155	151	155	154
Pulses, primary and processed	0	0	0	0	0	0	0	0
Nuts, primary and processed	0	0	0	0	0	0	0	0
Oil bearing crops, primary and processed	170	258	213	267	187	255	255	175
Vegetables, primary and processed	406	448	441	465	541	505	549	569
Fruits, primary and processed	689	705	724	715	747	802	827	826
Fibres, primary and processed	10	11	14	13	11	12	6	6
Spices, tobacco and other crops, primary and processed	159	163	158	172	189	182	197	205
Straw (1)	..	..	..	..	..	..	..	..
Other crop residues (sugar and fodder beet leaves)	822	834	865	836	795	774	687	678
Fodder crops	15	18	18	16	13	22	21	12
Biomass harvested from grassland (1)	..	..	..	..	..	..	..	..
Grazed biomass (1)	..	..	..	..	..	..	..	..
Timber, primary and processed	9 381	10 491	12 331	10 386	11 123	10 784	11 384	11 012
Wood fuel and other extraction, primary and processed	785	856	949	982	1 176	1 430	1 243	1 247
Fish catch, primary and processed	168	183	195	208	220	271	317	355
Hunting and gathering (2)	..	..	..	..	..	..	..	..
Live animals	0	0	1	1	1	1	1	0
Meat and meat preparations	84	100	122	121	150	166	177	204
Dairy products, birds eggs, and honey	80	94	94	110	131	166	183	210
Other products from animals (animal fibres, skins, furs, leather etc.)	91	85	95	120	208	280	271	236
Products mainly from biomass (beverages, paper etc.)	2 193	2 498	2 742	2 654	3 124	3 790	4 080	4 224
Total biomass	15 592	17 346	19 513	17 729	19 336	20 043	20 827	20 608

1) Not applicable for import.

2) No data available.

Table 13. The export of biomass from Sweden to all countries 1998-2005 (in thousands of tonnes). All data is from Statistics Sweden, Foreign trade of goods statistics

	1998	1999	2000	2001	2002	2003	2004	2005
Cereals, primary and processed	1 618	1 490	1 491	1 703	1 139	1 651	1 348	1 324
Roots, tubers, primary and processed	5	6	5	10	6	9	11	6
Sugar crops, primary and processed	82	106	131	134	157	116	154	145
Pulses, primary and processed	0	0	0	0	0	0	0	0
Nuts, primary and processed	0	0	0	0	0	0	0	0
Oil bearing crops, primary and processed	10	6	11	6	3	4	7	10
Vegetables, primary and processed	50	47	44	50	66	80	72	83
Fruits, primary and processed	44	46	41	49	74	82	89	82
Fibres, primary and processed	0	0	0	0	0	0	0	0
Spices, tobacco and other crops, primary and processed	49	53	57	63	66	67	64	77
Straw (1)	..	..	..	..	..	..	..	..
Other crop residues (sugar and fodder beet leaves)	101	88	79	71	68	70	85	91
Fodder crops	10	7	8	8	13	18	25	16
Biomass harvested from grassland (1)	..	..	..	..	..	..	..	..
Grazed biomass (1)	..	..	..	..	..	..	..	..
Timber, primary and processed	7 075	6 987	7 005	7 111	7 764	7 323	7 793	9 598
Wood fuel and other extraction, primary and processed	723	697	680	690	707	651	646	708
Fish catch, primary and processed	237	226	264	264	263	279	322	362
Hunting and gathering (2)	..	..	..	..	..	..	..	..
Live animals	2	3	2	2	2	2	3	3
Meat and meat preparations	76	72	50	54	52	62	66	68
Dairy products, birds eggs, and honey	95	95	97	101	87	92	124	130
Other products from animals (animal fibres, skins, furs, leather etc.)	142	152	170	177	233	258	271	212
Products mainly from biomass (beverages, paper etc.)	12 446	12 936	13 427	13 013	13 799	14 337	15 013	15 300
Total biomass	22 765	23 017	23 562	23 506	24 499	25 101	26 093	28 215

1) Not applicable for export.

2) No data available.

5.2 Fossil energy carriers

Table 14 shows the import of fossil energy carriers, primary and processed to Sweden from all countries 1998-2005. Table 15 shows the export. All data is from Statistics Sweden, Foreign trade of goods statistics.

Table 14. The import of fossil energy carriers, primary and processed to Sweden from all countries 1998-2005 (in thousands of tonnes. All data is from Foreign trade of goods statistics

	1998	1999	2000	2001	2002	2003	2004	2005
Brown coal	18	7	6	12	7	9	5	9
Hard coal	3 039	2 932	2 995	2 768	2 668	3 181	3 057	3 197
Petroleum	26 309	24 877	26 588	25 567	24 922	27 486	27 082	27 363
Natural gas	1 282	1 374	1 216	1 464	1 441	1 554	2 112	1 817
Peat	159	169	196	229	329	384	426	339
Plastic/goods of plastic, rubber, organic chemicals	2 383	2 796	2 795	2 720	3 067	3 018	2 965	2 996
Total fossil energy carriers, primary and processed	33 190	32 155	33 796	32 760	32 434	35 632	35 647	35 721

Table 15. The export of fossil energy carriers, primary and processed from Sweden to all countries 1998-2005 (in thousands of tonnes. All data is from Foreign trade of goods statistics)

	1998	1999	2000	2001	2002	2003	2004	2005
Brown coal	4	2	3	4	1	7	2	3
Hard coal	3	2	2	2	2	2	9	3
Petroleum	9 296	10 751	11 548	10 861	10 605	10 842	12 233	12 433
Natural gas	147	208	272	263	288	448	526	481
Peat	89	82	94	90	91	104	157	130
Plastic/goods of plastic, rubber, organic chemicals	1 817	1 756	1 787	1 978	2 037	2 123	2 283	2 298
Total fossil energy carriers, primary and processed	12 801	13 706	13 198	13 024	13 526	15 210	15 348	15 348

5.3 Metal ores

Table 16 shows the import of metals ores and concentrates and processed metals to Sweden from all countries 1998-2005. Table 17 shows the export of metal ores and concentrates from Sweden to all countries in 1998-2005 (thousands of tonnes). All data is from Statistics Sweden, Foreign trade of goods statistics, relevant years. For primary data, see Statistical database at Statistics Sweden.

Table 16. The import to Sweden from all countries of metal ores and concentrates and processed metals in 1998-2005 (in thousands of tonnes). All data is from Statistics Sweden, Foreign trade of goods statistics

	1998	1999	2000	2001	2002	2003	2004	2005
Iron	4 087	3 816	4 213	3 702	3 922	4 077	4 225	4 212
Copper	177	206	292	421	426	390	424	410
Nickel	31	32	38	34	35	33	36	36
Lead	6	6	8	6	20	24	32	12
Zinc	50	42	39	44	43	40	51	51
Tin	1	1	1	1	1	1	1	1
Gold, silver, platinum and other precious metals	5	6	4	1	1	1	2	3
Aluminium	438	362	476	433	472	493	536	481
Uranium and thorium	0	0	0	0	0	0	0	0
Manganese, molybdenum, titanium and other metals	470	403	589	376	457	376	716	464
Machines, vehicles, aircrafts, ships etc.	2 443	2 586	2 722	2 774	2 788	3 138	3 342	3 796
Total metal ores and concentrates, processed metals	7 708	7 460	8 382	7 792	8 165	8 573	9 365	9 466

Table 17. The export from Sweden to all countries of metal ores and concentrates and processed metals in 1998-2005 (in thousands of tonnes). All data is from Statistics Sweden, Foreign trade of goods statistics

	1998	1999	2000	2001	2002	2003	2004	2005
Iron	19 134	18 353	21 187	18 736	19 885	21 104	23 271	23 204
Copper	208	223	240	248	245	234	232	232
Nickel	5	105	6	6	7	5	4	5
Lead	166	180	193	143	125	131	129	133
Zinc	299	321	336	262	284	306	381	407
Tin	1	0	1	0	0	0	0	0
Gold, silver, platinum and other precious metals	4	2	0	0	2	3	1	1
Aluminium	175	211	228	220	262	218	271	245
Uranium and thorium	0	0	0	0	0	0	0	0
Manganese, molybdenum, titanium and other metals	137	137	169	171	182	234	190	177
Machines, vehicles, aircrafts, ships etc.	2 972	2 986	3 233	3 290	3 270	3 554	3 985	4 149
Total metal ores and concentrates, processed metals	23 101	22 518	25 593	23 076	24 262	25 789	28 464	28 553

5.4 Non-metallic minerals

Table 18 shows the import of non-metallic minerals, primary and processed to Sweden from all countries 1998-2005. Table 19 shows the export of non-metallic minerals, primary and processed from Sweden to all countries 1998-2005. All data is from Statistics Sweden, Foreign trade of goods statistics.

Table 18. The import of non-metallic minerals, primary and processed to Sweden from all countries 1998-2005 (in thousands of tonnes). All data is from Statistics Sweden, Foreign trade of goods statistics

	1998	1999	2000	2001	2002	2003	2004	2005
Ornamental or building stone	65	60	107	131	106	92	73	96
Limestone, gypsum, chalk, and dolomite	722	672	811	612	591	579	880	770
Slate	1	1	1	1	1	2	1	1
Gravel and sand	873	1 040	1 127	1 094	1 531	1 278	1 386	1 576
Clays and kaolin	692	708	820	799	812	886	807	838
Chemical and fertilizer minerals	1 717	1 479	1 482	1 575	1 429	1 630	1 235	969
Salt	948	1 076	904	883	1 031	829	937	887
Slag/ashes/waste from iron/steelproduction/combustion of waste etc.	380	372	360	391	391	405	464	526
Glass and products of glass, ceramic products	502	643	581	609	606	635	662	715
Total	5 900	6 051	6 193	6 095	6 498	6 336	6 445	6 378

Table 19. The export of non-metallic minerals, primary and processed from Sweden to all countries 1998-2005 (in thousands of tonnes). All data is from Statistics Sweden, Foreign trade of goods statistics

	1998	1999	2000	2001	2002	2003	2004	2005
Ornamental or building stone	458	384	257	243	303	292	335	163
Limestone, gypsum, chalk, and dolomite	1 433	1 450	1 545	1 622	1 232	1 975	2 413	2 241
Slate	9	5	6	5	5	6	5	7
Gravel and sand	2 819	2 670	2 511	2 400	2 309	2 129	2 294	2 524
Clays and kaolin	140	108	122	110	123	127	133	140
Chemical and fertilizer minerals	427	447	429	392	383	417	351	397
Salt	2	2	8	2	20	156	10	9
Slag/ashes/waste from iron/steelproduction/combustion of waste etc.	501	432	393	395	403	409	400	466
Glass and products of glass, ceramic products	1 423	1 130	1 651	1 649	1 683	1 513	1 335	1 804
Total	7 212	6 628	6 922	6 818	6 461	7 024	7 276	7 751

5.5 Other products

Table 20 shows the import to Sweden from all countries and export from Sweden to all countries of other products; furniture, chemical products etc. 1998-2005. Other products include the SITC codes 269, 53, 54, 55, 59, 65, 8, 91, 93 (Eurostat, 2007b) All data is from Statistics Sweden, Foreign trade of goods statistics, relevant years.

Table 20. The import to Sweden and export from Sweden of other products; furniture, chemical products etc. All data is from Statistics Sweden, Foreign trade of goods statistics.

	Import	Export
1998	2 061	1 727
1999	2 189	1 971
2000	2 276	1 958
2001	2 308	2 025
2002	2 428	2 110
2003	2 608	2 177
2004	2 883	2 331
2005	3 011	2 413

6. Results Material Flow Indicators

In accordance with the compilation guide (Eurostat, 2007), indicators are to be calculated. Sweden calculates the following indicators DMI (domestic extraction + imports), DMC (domestic extraction + import – export), PTB (imports – exports).

The DMC of Sweden is shown in Table 21. It clearly shows that the DMC has increased during the years 1998-2005. This is mainly due to an increased domestic extraction of sand and gravel. During 2008 an investigation at Statistics Sweden has been underway in order to explain this increase.

Table 21. The Domestic Material Consumption (DMC) (tonnes/capita) in Sweden 1998-2005 (rounded numbers)

	1998	1999	2000	2001	2002	2003	2004	2005
Domestic material consumption (DMC) (tonnes/capita)	12.9	13.2	13.3	12.8	14.6	15.2	16.1	18.2

7. Facts about the statistics

Statistics on Economy Wide Material Flows are primarily based on statistics that are already gathered, a description of the main sources is found in Section 2, "Data Sources". In that section there is a short description on facts about the statistics, what they include and how they are produced. For more detailed information, see that statistical product at the Statistics Sweden Database. There is more information about where the information can be found in the reference list.

The Material Flow Statistics complies with instructions from the Compilation Guide from Eurostat (Eurostat, 2007a, 2007b).

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