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# INDUSTRIAL AND CONSUMPTION WASTE. HOW TO MEET THE INDICATOR NEEDS. EXPERIENCES FROM FINLAND.

Paper submitted by Statistics Finland [1]

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## Abstract

Statistics Finland has compiled waste statistics since the mid-1980s. The data material has included administrative registers, inquiries and research results. Waste was classified according to a 'Finnish' classification based on composition of waste until the mid-1990s, later on according to the European Waste Catalogue (EWC). A Guide to Waste Classification was drafted to help classification in 1999. The Standard Industrial Classification (NACE) has been employed as background classifications for waste statistics. Waste statistics have been used especially for preparing the national waste strategy and the waste management guidelines, at the planning stage of waste treatment plants, for research and as supplementary material for compilation of material flow accounting.

Although Finnish waste statistics have been fairly exhaustive, they have not been able to elucidate all the required features. The biggest problem is that the development trends of waste volumes have still remained unclear and also, regional and international comparability has been weak. When waste statistics are not sufficient to describe the change, they can neither be adequate indicators of sustainable development. At the heart of these problems may be that waste has been separated from its social nature – measurement of environmental load, such as emissions and waste, has been made 'scientifically' although they are results of economic and social activity.

This report attempts to demonstrate by a few examples how various social changes influence waste and lead to interpretative errors with respect to development of waste volumes. In general, it is not possible to correct these errors, nor is it even attempted.

- The first example is the volume change caused by extensions/reductions in the definition of waste, which usually result from changes in social views and attitudes. Social atmosphere and conditions are reflected in different sectors of waste management, thus also in the volumes of waste generation and treatment in statistics, as well as in classifications and data collection.
- The second example concerns absence from consumption waste statistics of means familiar from consumption expenditure surveys, such as the size of consumption unit. It can be easily shown that both consumption and volumes of consumption waste grow although nobody would consume more or produce any more waste.
- The third issue is the connection of waste flows to economic development. The time series of the Total Material Requirement (TMR) appear to indicate that the volume of waste generated inside a country does not follow exactly the same growth track as economic development.

## Background

*Waste in Finland: data and statistics*

Statistics Finland has compiled waste statistics for about 17 years. The first statistics, containing empirical material, were published in 1985. Before this, some random surveys had been made, mainly to supplement commission reports. Before 1969 statistical data concerning waste were very modest in nature.

Statistics Finland's waste statistics have concerned industrial production, that is, manufacturing, mining and quarrying, and energy supply. Statistics on all these have been compiled on the basis of inquiries made to large industrial establishments. Nowadays the data of the environmental administration monitoring register (=VAHTI, The Monitoring and Environmental Loading Data System) are the principal data sources.

In order to help the respondents and supervising authorities we have prepared a classification guide presenting the typical types of waste and the process charts for each sector (NACE 2). The inquiries have been made with the EWC classification since 1997. The EWC is used by the environmental administration, industrial organisations, waste processors and major production plants. Groups including waste classified as hazardous waste in Finland have been specified in the Finnish version of the EWC ever since its introduction.

Statistics compilation on construction waste was started in Finland in 1991. Waste statistics on construction cannot be made with an inquiry but the methods used for it have been external to official statistics. The Technical Research Centre of Finland has compiled characteristic coefficients for each type of newbuilding and type of waste which are used together with the construction register to estimate the volume of construction waste. Statistics are compiled separately on demolition, renovation and newbuilding. Surplus soil and dredging are also included in these statistics.

Statistics on waste quantities in agriculture and forestry are prepared by the relevant Ministry and the officials subject to them on the basis of calculations. Statistical data on municipal waste, or in practice consumption waste, are collected from environmental administration and monitoring registers as well as research results.

The Finnish national waste plan was drafted by using the figures in the table above (Table 1.). The Ministry of the Environment has estimated future waste volumes by employing sector-specific forecasts on economic development. Statistics Finland, the Ministries, the Regional Environment Centres and the Finnish Environment Institute have taken part in supervising Finnish waste management. The inquiry and monitoring forms and system have been made in co-operation. The preparation of a programme for waste management monitoring was also a joint effort. Waste statistics have also been used in compiling material flow accounting for the whole country. The time series has been calculated from 1970 onwards. The Total Material Requirement (TMR) time series were calculated for 1970-1999, preliminary material balances for 1992 and 1997, and physical input-output tables by sector (NACE) for 1995. The calculations were made by utilising material-based statistics on production and raw materials.

**Table 1. Generation and treatment of waste in Finland in 1997**

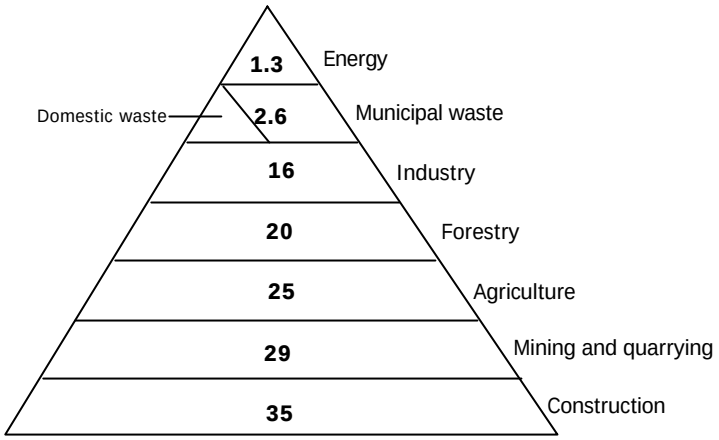
| Economic activity | Total[1)] | Recovery | | Other treatment | |
|---|---|---|---|---|---|
| | | Incineration, with energy recovery | Recycling and other recovery | Landfill | Other treatment |
| | 1 000 tonnes | | | | |
| **Waste from production** | | | | | |
| Agriculture | 25 500 | – | 20 000 | – | 5 500 |
| Forestry | 20 000 [5)] | 600 | . . | . . | . . |
| Mining and quarrying | 29 600 [2)] | – | . . | . . | . . |
| Manufacturing | 15 910 | 5 365 | 4 820 | 4 100 | 1 470 |
| Energy and water supply | 1 350 | 39 | 835 | 415 | 40 |
| Construction | | | | | |
| Construction and demolition waste | 1 690 | . . | . . | . . | . . |
| Surplus soil | 33 500 [3)] | – | 18 000 | . . | . . |
| **Municipal waste** | | | | | |
| Solid municipal waste total | 2 510 | 80 | 820 | 1 610 | 0 |
| Municipal sewage sludge | 136 [2)] | 0 | 83 | 53 | 0 |
| **Total generation** | **130 196** | | | | |
| Hazardous waste | 485 | . . | . . | . . | . . |
| Domestic waste | 980 [4)] | . . | . . | . . | . . |
| Packaging waste | 423 | 47 | 190 | 186 | . . |

1) Also including waste in short-term storage during the statistical period.
2) Dry weight
3) Contains 8.5 million tonnes of surplus soil from house building sites and 25 million tonnes from civil engineering sites.
4) Estimate
5) Fresh weight

Sources: Statistics Finland; Finnish Environment Institute; Ministry of the Environment;
The Finnish Forest Research Institute.

A simplified image of the ratios of waste volumes by sector is given in Figure 2. At simplest it can be noted that waste volumes in primary production are larger than in the processing industry, where they are in turn larger than in the service sector. The proportion of domestic waste is smallest. For types of waste the direction is opposite, since primary production waste is mainly of one kind, as is that of the basic industry, while processing industry and consumption waste consists of many types and is often contaminated.

**Figure 1. Waste generation by sector in Finland, million tonnes**



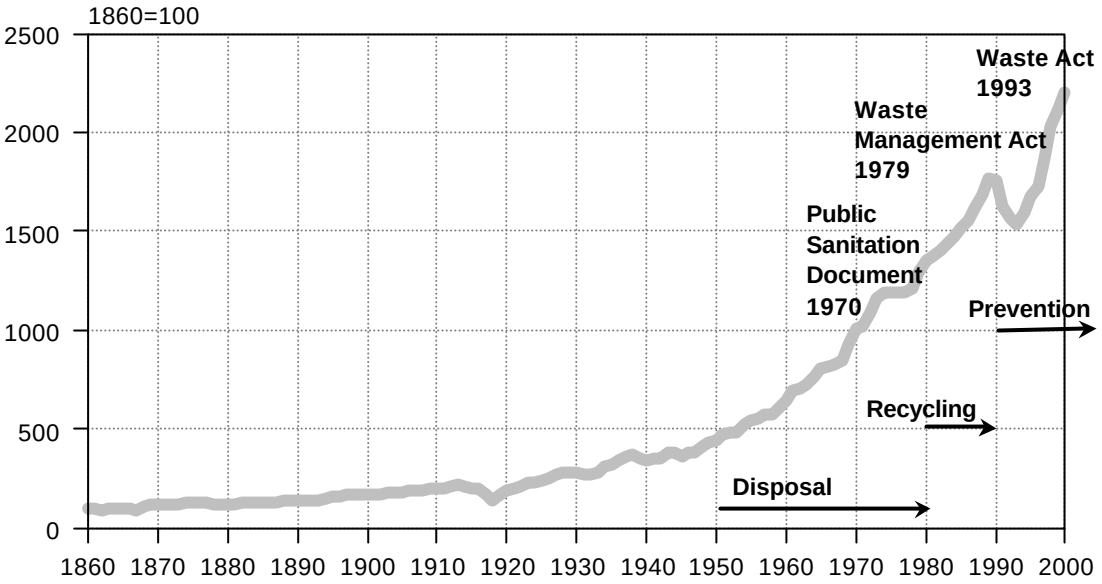

*Institutional changes and waste indicators*

The growth of production and consumption together with environmental awareness has changed waste management towards material management, management of the sufficiency of natural resources. As the area of waste management has thus widened greatly, the definitions of the statistical area have become problematic and as a result of this, it is more difficult to describe changes in time by means of indicators. These changes are reflected in swift cyclical revisions of waste management strategies and legislation during the last three decades. There are signals of distress visible in the progress of the strategy. The history of statistics and study on waste is nevertheless fairly short and is still looking for its place.

Diverse plans and methods for waste disposal were superseded at the end of the 1970s, first to give prominence to recycling and later on to prevention of waste generation. The fact that 'waste management' became a 'waste issue' describes how this phenomenon turned into a comprehensive concern. Under these circumstances the 'total volume of waste' could not act as an indicator of sustainable development, and naturally 'waste generation' did not describe the change that had taken place in ways of thinking, on the strategic level. The most essential goal of waste management – prevention of waste generation – has not yet been described by any indicator, or statistics.

The above-mentioned distress signal concerning material management arose together with the strong growth of consumption, naturally alongside that of production. That 'stable' and local economic growth that had continued until the post-World War II period went up at almost an exponential rate into a strong growth of private and public consumption and exports, fuelled by production that increased manifold at the same time. The figure below shows the development between GDP and changes in waste management in Finland (Figure 2.).

**Figure 2. GDP per capita and Strategy of Waste Management in Finland since 1860**



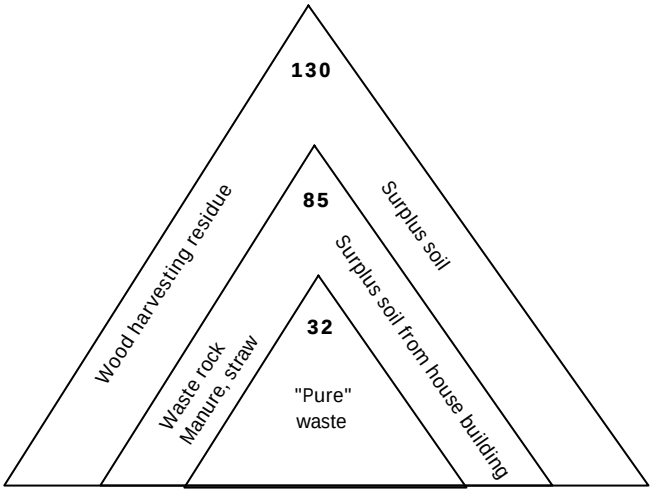

*Waste volume as an indicator of production waste*

There is still a certain degree of confusion concerning the definitions of waste, more so in a situation where we neither have any consensus about waste itself. Instead, at the moment some substance or object appears to be waste depending on from whose and what viewpoint it is regarded. Waste producers, supervising authorities, legislators, waste processors, statistics compilers and ordinary citizens jointly accept as waste only a few of the substances or objects that have 'officially' been defined as waste, each from their own reasons and premises.

In addition, the definition waste used in material flow accounting differs from that used in waste statistics. Surplus soil, the majority of waste rock and felling residue do not fall into the category of waste in material balances. In material balances they represent domestic hidden flows, materials that have not been taken into use or processed by the economy, but have only been transferred during the extraction of natural resources.

Finland's waste statistics for 1997 indicate how the volume of waste quadruples if waste is defined in the broadest way possible, that is, if manure, waste rock, logging residue, surplus soil and straw are counted as waste as compared to a situation where waste is defined in the narrowest way possible. Waste defined in this narrow way can be referred to as 'pure waste' – on that there is consensus. It includes consumption waste, the majority of industrial waste, ash, construction waste such as demolition waste, and sludges from waste water treatment (Figure 3.). It is naturally conceivable that only part of waste, e.g. this 'pure waste', could be used as the indicator for the volume of production waste. This would also bring us closer to conventional waste management.

**Figure 3. Waste generation by different definitions in Finland in 1997, million tonnes**




A continuous bi-directional movement can be seen in the case of hazardous waste, which is caused, on one hand, by the re-orientation of production and, on the other hand, by the definition of hazardous waste. As the types of hazardous waste or its definition are changing, the growth of its volume has started to appear huge in Finland. In such a situation it has been difficult to find an indicator that would show the 'real' change. Former major types of hazardous waste, such as oil wastes, are no longer dominant.

**Table 2. Hazardous waste generation in Finland**

| year | tonnes | Major types of waste |
|---|---|---|
| 1975 | 197 000 | oil wastes, vegetable and animal oils and fats |
| 1982 | 124 000 | oil wastes, wastes containing heavy metals |
| 1987 | 233 000 | acids, oil wastes |
| 1992[1)] | 367 000 | acids, inorganic salt wastes |
| 1992[2)] | 559 000 | mineral sludges |
| 1999 | 485 000[1)] | process wastes from metallurgy and inorganic chemical industry, oil and oil containing wastes, solvents, wastes from thermal processes |

[1)] National classification

[2)] The Hazardous Waste List observed in the EU

Sources: SITRA, Committee on Hazardous Waste 1975; Ministry of Environment, Wahlström et al. 1982; Statistics Finland 1987 and 1992; VAHTI and Statistics Finland 1999.

**Table 3. Hazardous waste generated in manufacturing by economic activity in 1987, 1992 and 1997**

| | 1987 | 1992 | 1997 |
|---|---|---|---|
| | % | | |
| Manufacturing of pulp, paper and paper products | 5.9 | 6.5 | 9.4 |
| Manufacturing of petroleum products and chemical products | 73.7 | 46.0 | 38.3 |
| Manufacturing of basic metals | 7.8 | 33.0 | 40.2 |
| Others | 12.6 | 14.5 | 12.1 |
| **Total** | **100.0** | **100.0** | **100.0** |

Annex 1. presents Finnish industrial waste placed under the EWC categories. The breakdowns are fairly skew and in fact, no waste at all or a small volume of waste is placed in approximately one half of the categories. It is evident that continuous changes to the classification are needed.

### *Landfills and storages as special issues*

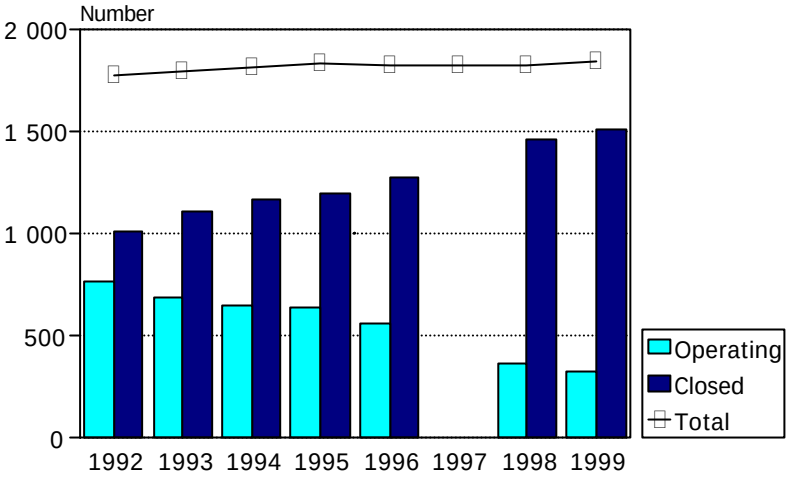
Statistics on waste or waste indicators are concentrated on annual statistics, they do not include figures concerning the state of the environment. The resulting problem is similar to the National Accounts if simultaneous deterioration of the environment is not taken into account in the output figures. Landfills and long-term storages present problems for waste statistics.

This issue can be said to culminate in the saying 'new requirements set for landfills have decreased the number of landfills'. In reality, a landfill is still a landfill even if it is closed. Its environmental effect or load will still be the same or even greater when it is closed. Landfills often create the problem of contaminated soil. This is not visible in the annual statistics. Figure 4. shows the number of operating and closed landfills in Finland. There are ever more closed landfills per each operating one.

Annual statistics do not either provide information on the volume of waste in long-term storages, only their growth may be included there. Storages are very important sites for waste, especially mineral-based waste. It was calculated that the storages of the enterprises operating in Finland contained about 265 million tonnes of waste in 1992.

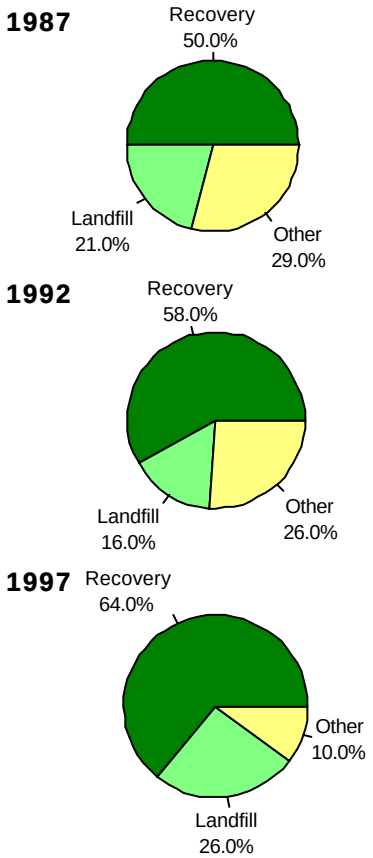
The third 'storage issue' is contaminated land, of which one thousand cases have been found in Finland by local authorities. Several of them are old industrial sites, petrol stations or the like. Both the state of these and of old landfills and storages and treatment of waste therein should be taken into account in the indicators of sustainable development. If contaminated land is cleaned, the reduced environmental load could be regarded as a deductible item in the indicator.

**Figure 4. Number of landfills in Finland in 1992-1999**




The questions of definition are essential for waste treatment as well if the intention is to use them as indicators of sustainable development. In Finland the definition of landfill changed at the end of last decade and the breakdown of waste treatment became different at the same time. The figure below shows this change (Figure 5.). The 'official' figure misleadingly indicates that at the same time as the recovery of industrial waste has grown, the volume of waste taken to landfills would also have increased.

**Figure 5. Treatment and disposal of industrial waste in Finland in 1987, 1992 and 1997, %**



Institutional changes are not reflected only in statistics compilation but also in data collection, in the change of the data basis. In Finland when the regional environmental authorities started to collect data on waste, a clear 'institutional' difference emerged compared to the data gathered by the statistical authorities. The waste to be monitored became more important than the others, the technical issues gained more emphasis, the statistical basic population became obscure and the logic of statistical aggregation was forgotten.

## *Problems of municipal waste*

The common conclusion to all the problems involved in the definition of waste has been that the definition has been sought from the 'correct result'. Therefore, it seems that after a long effort to harmonise waste statistics we have arrived at a situation where instead of the definitions and methods, we have managed to harmonise the results. Especially in statistics on municipal waste a strong scientific approach dominates and social structures, customs and so on are not taken adequately into consideration. Or else, their content becomes odd. Waste paper in Finland serves as a good example of this. It could be said that the most municipal waste in Finland is generated by the desire and ability to read. Newsprint and magazine paper forms the majority of household waste – every fourth household subscribes to a newspaper, the annual volume weighing over 100 kilogrammes.

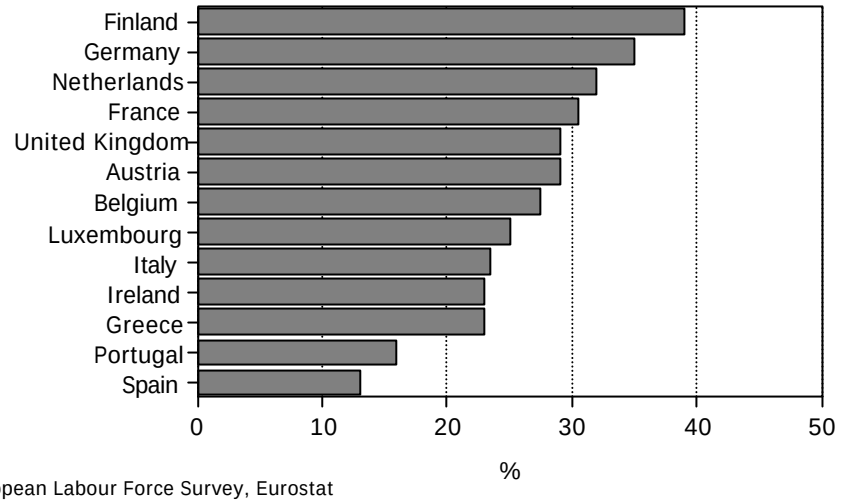
The main problem involved in statistics on consumption waste is that the background of diminishing family sizes is not taken into account in the indicators. Thus, the volume of both consumption and household waste is growing even though the average size of households is declining, and thus more waste is generated although nobody would consume any more – even with smaller consumption more waste is produced. Waste is adhered to the social structure of our society. More of everything is needed as consumption units are becoming smaller – dwellings, household equipment, washing agents, food packaging and energy. This produces a paradox which in conventional consumption expenditure surveys has been taken into account by calculating consumption household-specifically with equivalence scales, but no sign of this has been visible in waste statistics.

Table 4. presents the development of average household size in Finland since 1966. At the moment, the average size is one of the smallest of all EU countries, only 2.13 persons per household, on average. According to the population projection, the number of one-person households will quadruple from 1966 to 2020. This development has also increased the volume of construction waste. It would also be erroneous to use construction waste as an indicator of sustainable development without this background information.

**Table 4. Average size of households in Finland in 1966-1999**

| | Average size | number of households |
|---|---|---|
| | individuals | mill. |
| 1966 | 3.34 | 1.38 |
| 1976 | 2.86 | 1.64 |
| 1985 | 2.36 | 2.05 |
| 1994 | 2.23 | 2.26 |
| 1996 | 2.19 | 2.31 |
| 1998 | 2.16 | 2.34 |
| 1999 | 2.15 | 2.36 |

**Figure 6. One -person households in some EU countries in 1997, per cent of all households**




Source: European Labour Force Survey, Eurostat

A new institution completely external to waste management may also alter waste statistics. Below is given an odd time series concerning the development of end of life vehicle numbers in Finland. In the late 1980s they still numbered almost 100,000 per year, but their number fell gradually, into a quarter of that by the mid-1990s. The reason for this change is the neighbouring countries – Russia and the Baltic States, from where people came to Finland to purchase used cars, probably often for spare parts.

**Table 5. End of life vehicles in 1992-1998**

| Year | Number[1)] |
|---|---|
| 1992 | 51 400 |
| 1993 | 41 000 |
| 1994 | 24 900 |
| 1995 | 24 300 |
| 1996 | 29 100 |
| 1997 | 81 100 |
| 1998 | 46 500 |

[1)] Removed from register - re-registered

Source: Ministry of the Environment.

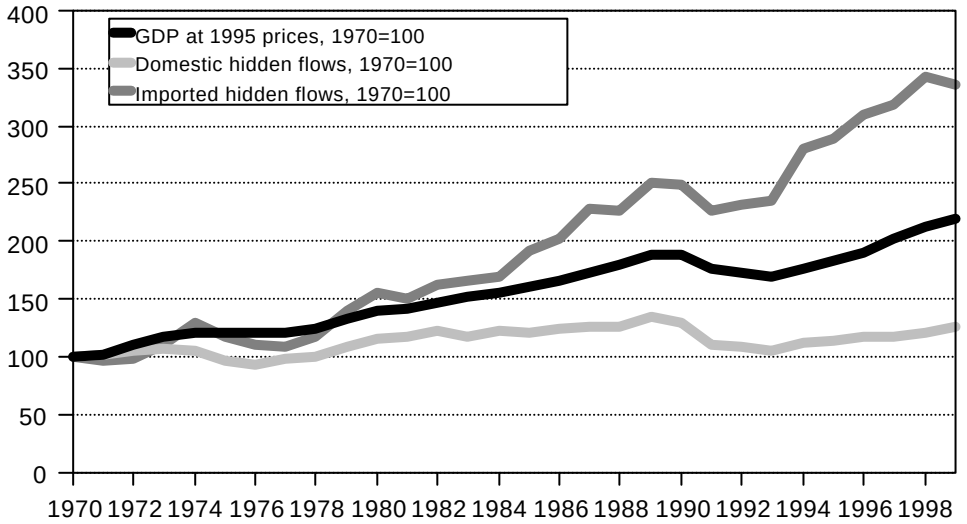
*'Hidden flows' as indicators of sustainable development*

The Sixth Environment Action Programme of the European Community sets decoupling of waste generation from economic growth as the Community waste policy objective. Waste generation and economic growth probably have a most strong positive mutual correlation but this issue has been discussed empirically quite little on the macro economic level.

The Thule Institute at the University of Oulu has surveyed Finland's material economy and in this connection it also examined the 'hidden flows', or in practice, the volumes of waste generated in the use of material inputs. The time series of material inputs have been calculated backwards until 1970. These data can be used to examine the volume of hidden material flows in relation to the production value and roughly estimate the connection between economic growth and waste generation. Of material inputs the largest generations of waste materials in volume are visible. In material balances the placement of waste to landfills or elsewhere is part of output and no time series are available on outputs. A preliminary material balance for 1992 and 1997 is presented in Annex 3.

From the graphs shown in Figure 7. it can be clearly concluded: domestic hidden flows, that is, the growth of ore dressing sand, surplus soil, logging waste, straw and the like has remained considerably smaller than that of GDP at fixed prices. This means that the growth of domestic hidden flows – i.e. waste – does *not* go hand in hand with economic growth. In fact, the volume of hidden flows seems to have remained fairly stable between 1970 and 1999, although GDP has more than doubled.

**Figure 7. GDP and Hidden Flows in Finland in 1970-1999**




The reason for the above result is visible in the same figure – examination of waste generated only in Finland as an indicator of eco-efficiency or sustainable development will lead to decisively erroneous conclusions. The waste issue is international, not national. At the same time as the volume of domestic hidden flows has remained stable in Finland, that of imported hidden flows has increased three or four-fold. This means that waste related to primary production is now generated abroad. In the case of Finland this signifies that as the mining industry is exhausted, more ore is imported than before, similarly as other biotic production inputs such as energy minerals.

The size ratios of domestic hidden flows and those remaining abroad are presented in Figure 8. Imported hidden flows started to increase in the 1970s and soon surpassed the domestic ones. At the moment they are double the domestic ones in terms of tonne volumes. This means that we would get a better picture of our development of material use by measuring only the hidden flows remaining abroad than domestic waste generation. Neither waste statistics nor waste management provide any information on these hidden flows. The quantitative development of hidden flows in Finland for different types of waste from 1970 is presented in Figures 9. and 10.

**Figure 8. Domestic Hidden Flows and Hidden Flows of Imports in Finland in 1970-1999, 1 000 tonnes**

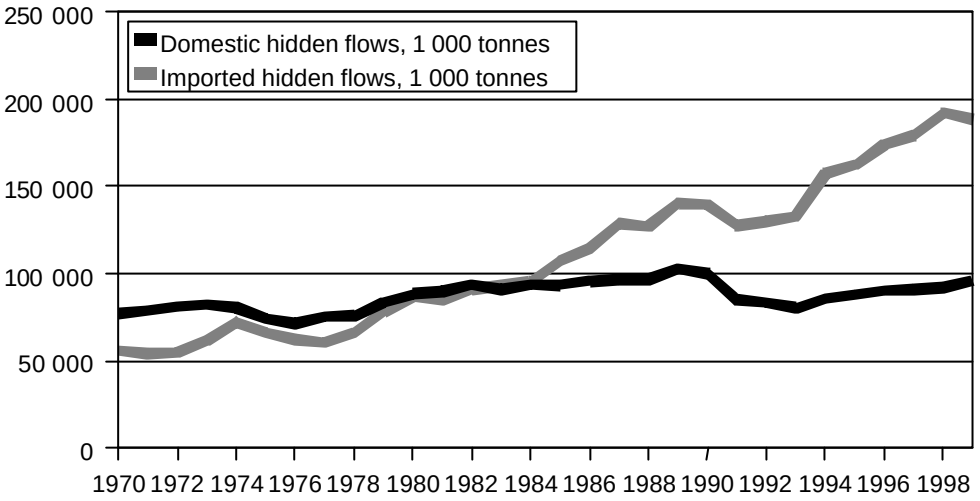



**Figure 9. Domestic Hidden Flows by Material in Finland in 1970-1999, 1 000 tonnes**

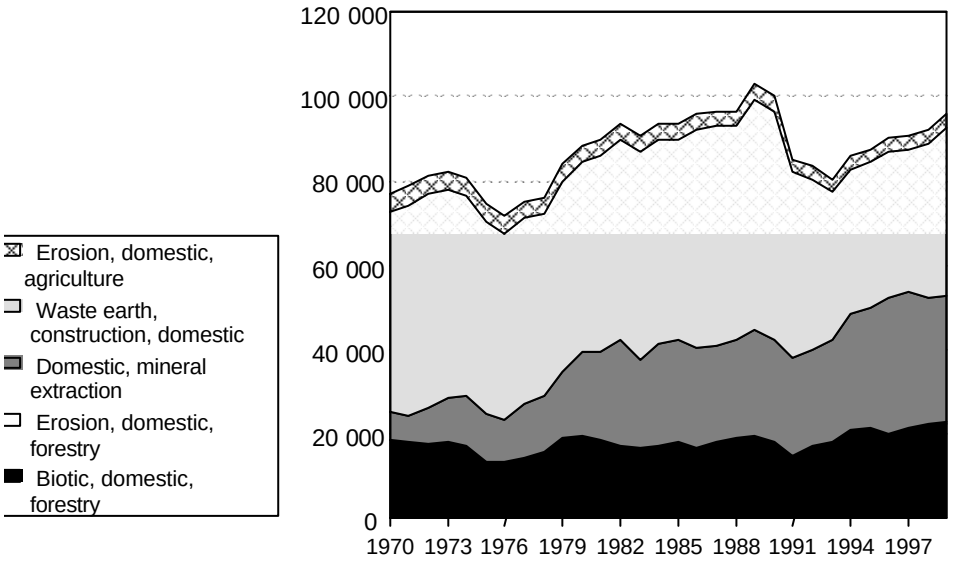
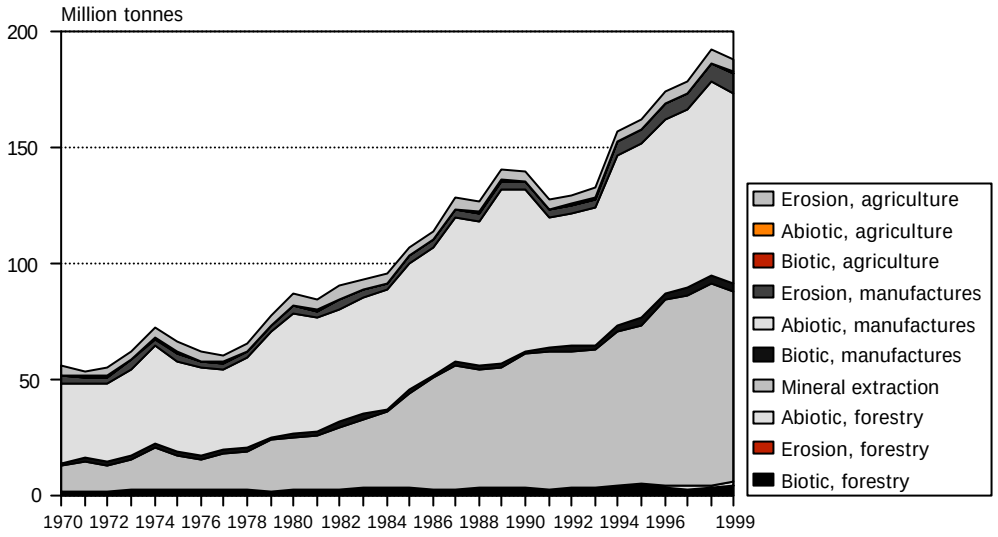


**Figure 10. Hidden Flows of Imports by Material in Finland in 1970-1999, 1 000 tonnes**




On the other side of the coin is naturally the contrary nature of the situation: In Finland the largest volumes of waste are generated by the manufacture of export products, that is, we accumulate exported hidden flows. Our wood and paper industry alone produces more than one third of all our industrial waste, although we consume hardly 10 per cent of the paper manufactured in Finland. This means that if our exports petered out, our waste load would reduce massively.

In conclusion, it must be said that the production of waste statistics would not be on a very firm footing without the global aspect, that is, imported hidden flows. Changes in exports and imports are also materials for waste statistics. Otherwise an internally improved state of one country might weaken the global material economy by the same degree.

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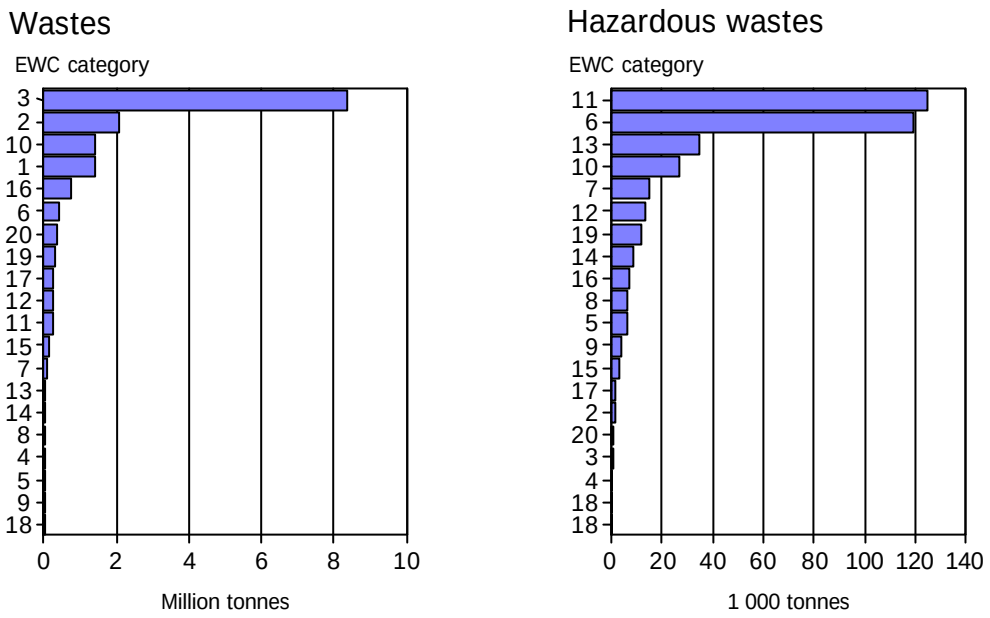
**Annex 1.**

## Wastes generated in manufacturing by EWC category in Finland 1997




EWC categories

1 Waste resulting from exploration, mining, dressing and further treatment of minerals and quarry

2 Waste from agricultural, horticultural, hunting, fishing and aquaculture primary production, food preparation and processing

3 Wastes from the mechanical wood industry and the production of paper, cardboard, pulp, panels and furniture

4 Wastes from the leather and textile industries

5 Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal

6 Wastes from inorganic chemical processes

7 Wastes from organic chemical processes

8 Wastes from the manufacture, formulation, supply and use (MFSU) of coatings (paints, varnishes and vitreous enamels), adhesive, sealants and printing inks

9 Wastes from the photographic industry

10 Inorganic wastes from thermal processes

11 Inorganic waste with metals from metal treatment and the coating of metals and from non-ferrous hydro-metallurgy

12 Wastes from shaping and surface treatment of metals and plastics

13 Oil wastes and other liquid wastes of comparable nature (except edible oils, 05 00 00 and 12 00 00)

14 Wastes from organic substances employed as solvents (except 07 00 00 and 08 00 00)

15 Packaging, absorbents, wiping cloths, filter materials and protective clothing not otherwise specified

16 Wastes not otherwise specified in the catalogue

17 Construction and demolition waste (including road construction)

18 Wastes from human or animal health care and/or related research (excluding kitchen and restaurant wastes which do not arise from immediate health care)

19 Wastes from waste treatment facilities, off-site waste water treatment plants and the water industry

20 Household wastes and comparable waste from industrial, service or other operations (municipal wastes) including separately collected fractions

**Annex 2.**

## Composition of domestic waste in 1970, 1985 and 1996

| | 1970[1)] | 1985[2)] | 1996[3)] |
|---|---|---|---|
| | % | | |
| Paper and cardboard | 65 | 51 | 40 |
| Biowaste | 13 | 30 | 33 |
| Metals | 5 | 2 | 5 |
| Glass | 5 | 6 | 5 |
| Plastics | 3 | 5 | 10 |
| Textile | 2 | 2 | 2 |
| Others (ash) | 7 | 4 | 5 |
| **Total** | **100** | **100** | **100** |

[1)]Committee on Waste Management

[2)]Advisory Board on Waste Management

[3)]Finnish Environment Institute; Statistics Finland

**Annex 3.**

## Material Balance in Finland 1992 and 1997, mil. tonnes (preliminary)

### INPUTS (origin)

| | | 1992 Mil. tons | 1997 Mil. tons | 1992 % of TMI | 1997 % of TMI |
|---|---|---|---|---|---|
| 1 | **Domestic extraction** | **201.8** | **219.1** | **62.0** | **60.6** |
| | Energy minerals (including peat) | 6.1 | 9.5 | 1.9 | 2.6 |
| | Other minerals | 96.7 | 86.2 | 29.7 | 23.8 |
| | Biomass | 49.0 | 60.4 | 15.1 | 16.7 |
| | Oxygen input (related to air emissions) | 50.0 | 63.0 | 15.4 | 17.4 |
| 2 | **Imports** | **40.4** | **52.6** | **12.4** | **14.5** |
| 3 | **DMI - Direct Material Inputs** | **242.2** | **271.7** | **74.4** | **75.1** |
| 4 | **Unused domestic extraction (hidden flows)** | **83.3** | **90.1** | **25.6** | **24.9** |
| | Mining and quarrying overburden | 23.0 | 31.4 | 7.1 | 8.7 |
| | Soil excavation for construction | 40.3 | 33.8 | 12.4 | 9.3 |
| | Logging residues | 17.0 | 21.5 | 5.2 | 5.9 |
| | Erosion | 3.0 | 3.4 | 0.9 | 0.9 |
| 5 | **TMI - Total Material Input** | **325.5** | **361.8** | **100.0** | **100.0** |
| 6 | **Imported hidden flows** | **123.3** | **172.4** | | |
| 7 | **TMR - Total Material Requirement** | **448.8** | **534.2** | | |

### OUTPUTS (destination)

| | | 1992 Mil. tons | 1997 Mil. tons | 1992 % of TMO | 1997 % of TMO |
|---|---|---|---|---|---|
| 8 | **Waste and emissions** | **92.9** | **109.2** | **28.5** | **30.2** |
| | Waste landfilled | 9.7 | 9.9 | 3.0 | 2.7 |
| | Bedrock placement of waste | 0.3 | 0.2 | 0.1 | 0.1 |
| | Sewage sludges for soil improvement | 0.4 | 0.5 | 0.1 | 0.1 |
| | Other: destination not defined | 4.3 | 4.2 | 1.3 | 1.2 |
| | Emissions to water | 9.1 | 7.4 | 2.8 | 2.0 |
| | Emissions to air | 69.1 | 86.9 | 21.2 | 24.0 |
| 9 | **Dissipative use of products** | **26.2** | **22.5** | **8.1** | **6.2** |
| | Fertilisers | 0.3 | 0.3 | 0.1 | 0.1 |
| | Pesticides | 0.0 | 0.0 | 0.0 | 0.0 |
| | Seeds | 0.3 | 0.3 | 0.1 | 0.1 |
| | Lime and horticultural peat | 1.1 | 1.5 | 0.3 | 0.4 |
| | Manure and straw from animal husbandry | 23.4 | 19.4 | 7.2 | 5.3 |
| | Sand and salt for roads and streets | 1.1 | 1.1 | 0.3 | 0.3 |
| 10 | **DPO - Domestic Processed Output to nature** | **119.1** | **131.7** | **36.6** | **36.4** |
| 11 | **Disposal of unused dom. extraction (hid.fl.)** | **83.3** | **90.1** | **25.6** | **24.9** |
| 12 | **TDO - Total Domestic Output to nature** | **202.4** | **221.8** | **62.2** | **61.3** |
| 13 | **Exports** | **26.0** | **33.5** | **8.0** | **9.3** |
| 14 | **Balancing item: To material stock** | **97.1** | **106.5** | **29.8** | **29.4** |
| | including storages of waste | 20.8 | 16.9 | 6.4 | 4.7 |
| 15 | **TMO - Total Material Output** | **325.5** | **361.8** | **100.0** | **100.0** |

**3 = 1+2, 5 = 3+4, 7 = 5+6, 10 = 8+9,**
**12 = 10+11, 14 = 3-10-13, 15 = 12+13+14**