

Steurer, Anton

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Towards an environmental accounting framework for the EU

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Fondazione Eni Enrico Mattei

**Towards an Environmental
Accounting Framework for the EU**

Anton Steurer

NOTA DI LAVORO 96.2000

Corso Magenta, 63, 20123 Milano, tel. +39/02/52036934 – fax +39/02/52036946
E-mail: letter@feem.it
C.F. 97080600154

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Towards an environmental accounting framework for the EU

Anton Steurer, Eurostat

September 2000

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The basis of Eurostat's work. - The 1994 Communication from the European Commission to the Council and Parliament COM(94)670 '*Directions for the EU on Environmental Indicators and Green National Accounting - Integration of Environmental and Economic Information Systems*' identified six actions, including '*continuing and enlarging work on satellites to National Accounts (natural resources accounting, environmental expenditures, etc.)*', '*improving the methodology and enlarging the scope of monetary valuation of environmental damage...*' and '*linking economic performance indicators and environmental pressure indices*'. The Council Decision 2179/1998/EC on the review of the EU's 5th Environmental Action Programme, in its Article 7 (Improving the basis for environmental policy) states: '*Particular attention will be given to (...) developing (...) satellite accounts to national accounts (...) with the aim of drawing up a comprehensive system of green national accounting...*'. The Treaty of Amsterdam, in force since 1 May 1999 and amending the Treaty on European Union, strengthened environmental protection and the promotion of sustainable development as objectives of the EU and requires their integration into Community policies.

The COM(94)670 and support by the European Commission's Directorates General Environment and Regional Policy allowed funding of a substantial number of statistics-related pilot projects and implementation studies in Member States for each of the budget years 1996-2000. About 60 projects and pilot applications have been completed and a considerable number is ongoing. At the same time, several projects to improve monetary valuation methodology and practice have been supported by the Commission's Directorate General Research including e.g. GARPI and II and Greenstamp but also several other research activities related to physical accounting (e.g. ConAccount on Material flow accounting) and valuation.

Areas of work. - The role of Eurostat is not itself to compile environmental accounts, but to encourage and co-ordinate production by the Member States. Environmental accounts work is co-ordinated with the European Environment Agency, interested Commission services, other international institutions and - within Eurostat - the units responsible for basic statistics (e.g. forest statistics, environment statistics). Eurostat is working on the following areas of environmental accounting:

- *Asset accounts* - Forests, Subsoil assets, Land, Water
- *Emission accounts (NAMEA)* - Air emissions and energy use, Water use and pollution, Waste, Other aspects (expenditures, taxes, land, etc.)
- *Material flows* - Economy-wide material flow accounts, physical input-output tables (PIOTs)
- *Environmental economics* - Environmental expenditure, Environment industry, Environment taxes
- *Valuation/modelling* - statistics-related research with a focus on Commission activities
- *Handbooks* - Involvement in SEEA revision, European handbooks (e.g. expenditure - SERIEE (1994), OECD/Eurostat environment industry manual (1999), forests - IEEAF (2000), etc.)

Environmental accounts development work is undertaken together with interested Member States. Task Forces have been established for Forests, Subsoil assets, Land, Water, Environmental economics (SERIEE) and Material Flows. A workshop on NAMEA is organised each year with participants from all EU Member States and EFTA countries. The results are regularly reported to, and discussed by, the Eurostat Working Party 'Economic Accounts for the Environment'.

Typically, the Task Forces start with a review of existing experience with accounting, an analysis of data availability, the definitions and classifications used in basic statistics and the identification of policy interests. An accounting framework and set of practical implementation tables is developed and then tested by volunteer countries. The test applications are analysed and the framework and set of tables refined. The results of the pilot applications as well as the final framework and set of tables are then published and the Task Force concludes its work. Regular production of environmental accounts is encouraged and the implementation of data systems that allow regular and efficient production of the accounts is supported.

Forests. - The Eurostat Task Force on Forest Accounting developed a framework for Integrated Environmental and Economic Accounting for Forests (IEEAF) and a set of 20 main tables covering monetary and physical balance sheets for land and standing timber, economic accounts for forestry, monetary and physical supply-use tables, material balances and tables describing non-market environmental functions of forests. The tables have been the basis for a first set of pilot applications completed in 1998 and a second set completed in 1999. The results of the first set of pilot applications were published as '*The European framework for integrated environmental accounting for forests: Results of pilot applications*' in 1999. The first set of pilot applications covered Germany, France, Finland and Sweden (representing 70% of the European Union's forest area). Key results were:

- 85% of the forests are 'available for wood supply', ranging from 78 % (Sweden) to 94 % (Germany).
- Between 4 and 11 % of the total forest area has some form of protection status. The proportion of protected areas increased by 760 000 ha over the reporting period (5 years).
- The stock of standing timber is about 10 billion m³ over bark.
- The annual growth of standing timber (after deduction of natural losses) is about 360 million m³ over bark - i.e. about 3.5 % of the stock of standing timber.
- The annual fellings are about 220 million m³ - i.e. about 2.2 % of the stock of standing timber.
- The annual growth exceeds fellings by about 140 million m³, which represents a net increase of about 1.4 % of the stock of standing timber per year.

In addition, ad-hoc studies on the applicability and data needs of different valuation methods (and their variants) have been conducted. These comprehensive ad-hoc studies showed that due to the differences among forests in Europe (climate, soil, species, age profile, uses, etc.) there is no 'standard' valuation method that can be applied in a uniform way. Rather, an informed choice of the method must be made based on the characteristics of the forests.

Eurostat published the results of these new ad-hoc valuation studies and other pilot applications as *Valuation of European Forests - Results of IEEAF Test Applications* in 2000. With the studies covering about 73% of EU-15 forestland available for wood supply (and 83% of the EU-15 growing stock of standing timber), the total value of EU-15 forest assets could be estimated at about 400 billion ECU in the mid-90s, about 25% of which is the value of the forest land and 75% the value of the standing timber (for the timber value see table below). For the European Economic Area (EEA), the value of forests may be estimated at about 430 billion ECU.

Timber value in test countries and EU-15 (forest available for wood supply)

	Growing stocks (million m ³)	Average prices (ECU/m ³)	Total values (million ECU)
Germany	2 820	31	87 420
Austria	1 037	22	22 814
France	2 836	24	68 064
Sweden	2 567	16	41 072
Finland	1 867	20	37 340
Total 5	11 127	23	256 710
Other EU countries	2 292	:	52 879*
EU-15	13 419	:	309 589*

* Eurostat estimates
 Source: Eurostat (2000)

The total value of EEA forest resources (430 billion ECU) is in the same order of magnitude as the value of EEA oil and gas reserves, estimated at about 350 billion ECU at the end of 1996 (see next section). For EU-15, the value of forest assets (400 billion ECU) is twice the value of EU-15 oil and gas reserves (about 200 billion ECU). If compared to the total value of EU-15 capital stock (i.e., buildings and machinery), however, forest assets only represent 2.4 %.

The Task Force met several times in 1999 to review pilot applications and conclude on methods for the valuation of timber and land appropriate in different circumstances. For non-ESA functions of forests (i.e. non-market environmental functions that are outside the national accounts) a draft classification and set of tables was developed. Monetary description of non-ESA functions remains difficult. The short-term focus will be on physical accounting and experimental valuation of carbon binding and recreational services and functional analyses of government expenditure related to recreational and protective functions of forests.

Development work is thus largely finalised and Eurostat published the *Manual for Integrated Environmental and Economic Accounting for Forests* in early 2000. Regular delivery of data on physical and monetary balance sheets and the other IEEAF tables will be integrated with Eurostat data collection activities (national accounts including balance sheets, Economic Accounts for Forestry, Forestry statistics data collection in co-operation with other international institutions, etc.). Further experimental work will focus on non-ESA functions and on regional accounts. Also, forest accounts by main forest regions is important for valuation as even within a country the forest characteristics can vary a lot. This is illustrated by the results of a pilot account for France, undertaken by Ifen for Eurostat (see table below).

French regionalised forest accounts, comparison of timber values, by region and valuation method (FRF/m³, 1991)

Region	Market value	Present value	Consumption value	Stumpage value inc. fuel wood	Stumpage value exc. fuel wood
North East	76	326	278	193	251
Centre East	66	165	167	152	183
Centre West	4	106	100	72	77
Landes	138	138	155	131	131
Pyrenean	46	197	175	107	144
Mediterranean	144	70	106	100	102
West	84	282	271	145	190
Centre	38	360	265	152	229
Paris Basin	48	263	268	143	199
France	70	233	210	142	182

Source: Eurostat (2000)

Subsoil assets. - The Eurostat Task Force on subsoil assets concluded its work in June 1999. Work focused on oil and gas and included the definition of reserves and resource rent, calculation of values of reserves and ownership issues. A set of tables was developed and tested by volunteer countries. Reserves should be valued as the net present value of the expected future resource rent. The resource rent is calculated as the value of output less all extraction costs, including a standardised return to fixed capital. Alternatively, the resource rent can be calculated based on government receipts from resource taxes (but a crosscheck with the Net Present Value method is recommended). The Task Force also investigated subsoil assets other than oil and gas but – due to their limited economic importance – referred further work to Material Flow Accounting. The conclusions and results from pilot exercises will be published in 2000. Regular data collection will begin in 2000.

Key results from the pilot applications are that there are no signs of exhaustion of oil and gas reserves. Because the costs of proving reserves are quite high extraction companies do not prove more than needed for maintaining their activity during a limited number of years, typically 5 to 10 years. Including broader categories of reserves, namely probable, possible or even "undiscovered" reserves do not result in a very different picture. Extraction is more than compensated by discoveries and reassessment of earlier estimates. As shown by the following tables, with few exceptions, reserves after many years of intensive extraction are higher than at the beginning of the recording period.

Gas reserves (billion m³)

	Initial year	Initial reserves	Final year	Final reserves	Total extraction
Norway	1984	2910	1997	4820	338
United Kingdom	1977	773	1997	1271	1091
France	1980	65	1995	21	57
Austria	1975	14	1997	32	24

Source: Eurostat (1999)

Oil reserves (million tonnes)

	Initial year	Initial reserves	Final year	Final reserves	Total extraction
Norway	1984	1677	1997	4113	1282
United Kingdom	1977	1915	1997	1134	2159
France	1980	14	1995	16	41
Austria	1975	23	1997	15	25

Source: Eurostat (1999)

However, from an economic point of view the large fluctuations in oil prices cause quite substantial changes in the value of reserves. For example, the ratio of the value of reserves to the GDP was about 50% for the United Kingdom and 300% for Norway in 1985/86 (high prices) and about 10% (UK) and 50% (N) in 1996 (low prices)

The results of the pilot applications and new work done by pilot countries have been published by Eurostat as *Accounts for Subsoil Assets – Results of Pilot Studies in European Countries* in 2000. Summary results on the value of EU and EEA subsoil assets are presented in the table below.

Resource rent and closing stocks of oil and gas in EU-15 and EEA (million ECU, 1996)

	Resource rent	Closing stock
Denmark	244*	3296*
France	166	1039
Netherlands	5177	53042
Austria	102*	1331*
United Kingdom	9665	117992
Total 5	15354*	176700*
Other EU countries	1989*	27001*
EU-15	17343*	203701*
Norway	8383	145120
EEA	25726*	348820*

* Eurostat estimates.

Source: Eurostat (2000)

Land accounting. - In 1999 the Task Force on Land Accounting took stock of activities on Land use/Land cover information systems and experience with land accounting and developed a draft framework and set of

tables for land accounting. The starting point was the framework developed by the UN-ECE working group on Physical Environmental Accounting which includes core accounts describing stocks and flows of land use and cover, and issue-oriented supplementary accounts. The Task Force concluded that land accounting is useful because: it provides a complete picture of land cover and land use for a nation; allows to derive trends and indicators of change; aids integration of diverse data sources on land cover/land use as well as other data including population, economic activity, water balances, species distribution or fertiliser use; allows to link changes in land use, land cover, habitats and biodiversity to the driving forces and can be flexibly applied at regional, watershed, landscape-type or Eco-zone level.

The draft land accounting framework includes the classifications used, tables describing stocks in detail, two sets of tables that include flows - the first set for land use, the second set for land cover, and two tables in monetary units – an ESA asset account for the categories of land use and a detailed industry by land use account. This framework will be refined at the next meeting of the Task Force with a focus on classifications and on supplementary accounts. Experimental accounts are foreseen for 2000-2001 and the publication of the results and the framework in 2002. Important medium-term developments for EU-wide primary data on land use and land cover are the update of Corine Land Cover (CLC 2000), the introduction by Eurostat of LUCAS (Land Use/ Cover statistical Area frame Sampling) and the related work on land use and cover classifications.

Water Satellite Accounting. – In 1999, the Eurostat Task Force on Water Satellite Accounting continued the discussion of water accounts (for the draft accounting framework see proceedings of the 1997 London Group meeting in Ottawa). The Task Force consolidated the framework and set of tables for Water Satellite Accounting taking into account recent results from pilot studies by Member States. The Task Force investigated the use of monetary data from the national accounts and discussed outstanding issues such as the concept of ‘scarcity of water’ and the linking of data on water flows between the economy and nature to a description of water in nature, building e.g. on French experience with water quality and quantity accounts. A main conclusion was that policy priorities differ across countries so that economic accounts and physical quantity as well as quality accounts need to be developed in parallel. Regionalised water accounts are important but wider implementation must wait for improvement of water statistics and the reconciliation of administrative areas normally used in regional statistics with water catchment areas (work ongoing at EU level). An interesting development are the water quality accounts developed by the French Environment Institute (Ifen) – see table below.

Account of the quality of watercourses in France, by quality class (organic matter) and by size class of watercourses, in standard kilometre-river (1km stretch with a flow of 1m³/s)

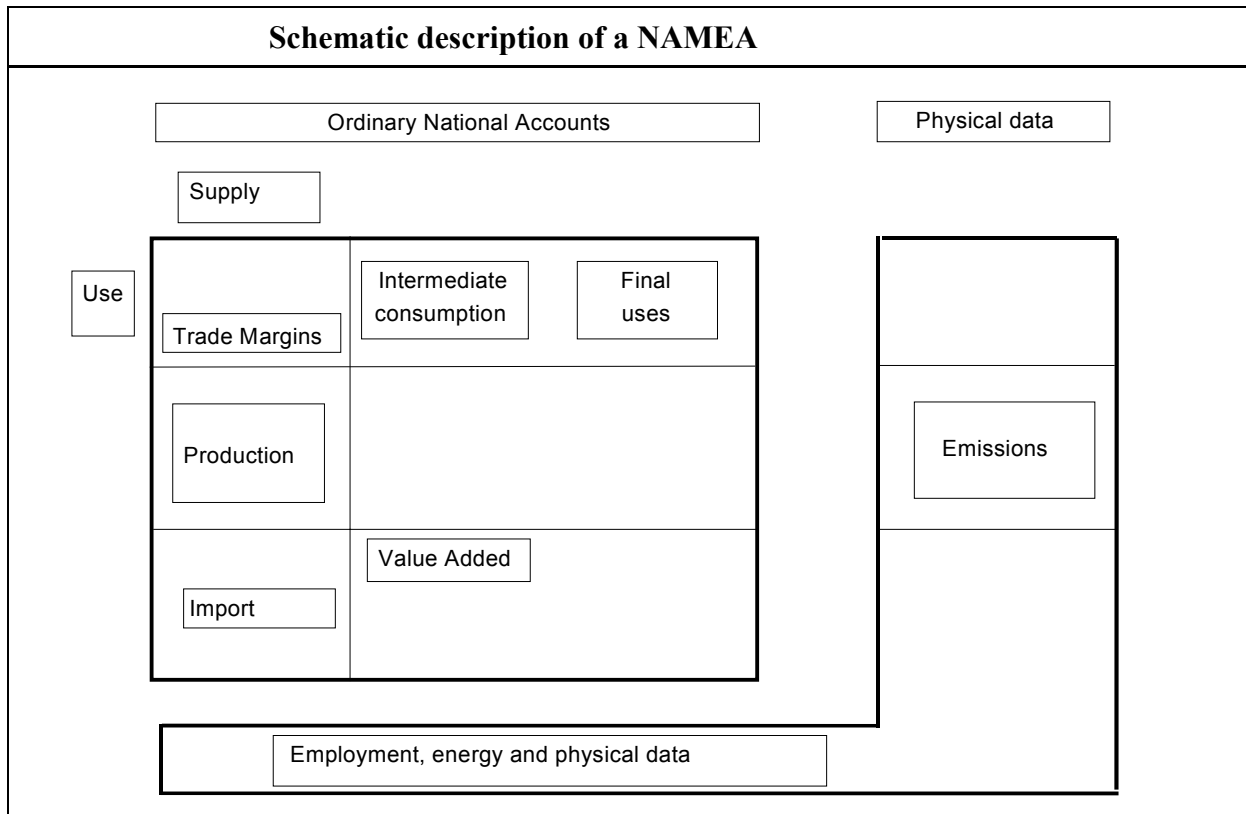
Size class	1992 state					Differences by quality class					1994 state				
	1A	1B	2	3	HC	D1A	D1B	D2	D3	DHC	1A	1B	2	3	HC
(Big) Rivers	5	1253	891	510	177	3	336	9	- 183	- 165	8	1583	893	358	12
Large rivers	309	1228	1194	336	50	16	464	- 275	- 182	- 22	325	1691	919	154	28
Rivers	260	615	451	128	47	44	130	- 129	- 17	- 28	306	749	322	110	18
Brooks	860	1464	690	243	95	- 44	- 176	228	15	- 23	810	1295	917	258	72
Total	1434	4560	3226	1217	369	19	754	- 167	- 367	- 238	1448	5318	3051	881	131

Note: the difference between the 1994 and 1992 states is not always identical to the difference as shown in the columns ‘Differences by quality class’.

Source: Ifen 1999, translation by Eurostat

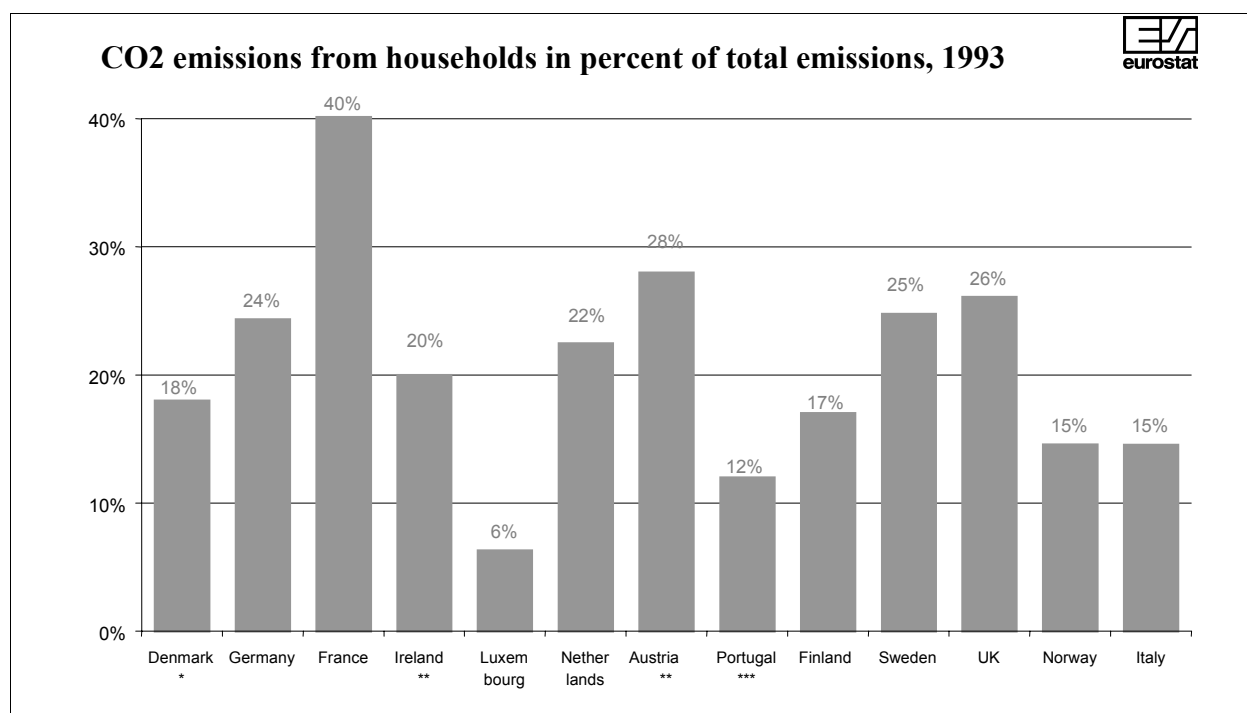
Emission Accounts (NAMEA). – The NAMEA (National Accounts Matrix including Environmental Accounts) is now well established in most EU Member States as a framework for presenting the contribution of industries and households to a variety of environmental concerns (emissions to air, waste water, and waste) compared to their economic performance. Some Member States have already included environmental expenditure, environment taxes, the use of natural resources (e.g. energy or water use) and land use in the NAMEA framework. A lot of interest has been shown from users, especially in time series of NAMEAs. A

key priority for Eurostat is thus to advance standardisation of the framework and to help harmonising the NAMEAs compiled in Member States. The inclusion of new elements into NAMEA is a key priority for the future. The basic NAMEA scheme is presented below.



Source: Eurostat (1999)

Air emissions. – The results of pilot studies on NAMEAs for air emissions have been summarised in the 1999 Eurostat publication *'Pilot Studies on NAMEAs for Air Emissions with a comparison at European Level'*. The publication compares the results from the Member States and provides detailed tables for several pollutants. At the June 2000 NAMEA workshop the methods and definitions for compiling NAMEAs for air emissions were a main topic. This area is now moving from the pilot into the implementation phase with regular collection of NAMEA air emissions data from Member States via electronic worksheets and development of a methodological manual. An example of the kind of analysis possible with a NAMEA is presented below.



Notes: Emissions from waste dumps are excluded from total emissions for Denmark, the Netherlands and France. For Luxembourg and Ireland, household emissions are excluding own account transport emissions. * data for 1992 ** data for 1994 *** data for 1990

Source: Eurostat (1999)

Water. - Several Member States have carried out pilot studies leading to a number of reports focusing on different parts of the framework (water abstraction and use, water pollution, etc.). The results are normally presented as part of the NAMEA framework but are at the same time designed to test different parts of the tables of the water satellite accounting framework (see above).

Waste. - Several Member States have included data on waste generation in their NAMEAs but outcomes differ to some extent as data availability does not allow allocation of waste data by industries in all Member States. Data availability will improve once the EU Regulation on waste statistics is in place.

Material Flow Accounts (MFA). – Beyond material flows included in natural resource accounting (e.g. forest accounts) and NAMEAs (e.g. use of energy and water or emissions generated) work focuses on Physical Input-Output tables (PIOT) and Economy-wide material flow accounts. PIOTs are IO tables in physical units and are a very comprehensive but also labour intensive approach. Eurostat does not work towards having PIOTs for all Member States. Many elements of a PIOT are already present in NAMEA. PIOTs can be (and are) used as a production tool for NAMEAs.

Economy-wide material flow accounts are aggregate descriptions of the total material throughput of economies. Important material categories are construction materials, fuels and biomass. Most basic data are available from statistics on production (agriculture, forestry, mining, manufacturing and construction), foreign trade, energy, waste, water and air emissions. These data are then integrated and made consistent. Economy-wide material flows are a useful long-term indicator for resource productivity and have attracted policy interest in Member States. Some have already set reduction targets for material flows.

The publication in 1997 of 'Resource Flows: the material basis of industrial economies' (by World Resource Institute, Wuppertal Institute, Dutch Environment Ministry and Japanese National Institute for Environmental Studies) attracted high-level policy interest. Currently, a follow-up of that study is ongoing which focuses on the output side (i.e. the emissions, waste generation, dissipative uses and additions to the stock of infrastructure and machinery). This represents an important step towards linking quantities of materials flow with their environmental impact. Final results are expected for early 2000. Eurostat is associated with this international project as an observer.

Eurostat is developing a framework and recommendations for economy-wide material flow accounts with the aim of harmonising terminology, coverage, categories of materials to be distinguished and practical compilation and estimation procedures. A project is ongoing to establish economy-wide material flow accounts EU-wide. The basic outline of the account is given below.

Economy-wide material balance with derived resource use indicators

INPUTS (origin)	OUTPUTS (destination)
<p>Domestic extraction Fossil fuels (coal, oil...) Minerals (ores, sand...) Biomass (timber, cereals...)</p>	<p>Emissions and wastes Emissions to air Waste landfilled Emissions to water</p>
<p>Imports</p>	<p>Dissipative use of products and losses (Fertiliser, manure, seeds, corrosion...)</p>
<p><i>DMI - direct material inputs</i></p>	<p><i>DPO - domestic processed output to nature</i></p>
<p>Unused domestic extraction From mining/quarrying From biomass harvest Soil excavation</p>	<p>Disposal of unused domestic extraction From mining/quarrying From biomass harvest Soil excavation</p>
<p><i>TMI - total material input</i></p>	<p><i>TDO - total domestic output to nature</i></p>
<p>Indirect flows associated to imports</p>	<p>Exports</p>
<p><i>TMR - total material requirements</i></p>	<p><i>TMO - total material output</i></p>
<p>Indirect flows associated to exports</p>	<p><i>Net Additions to Stock (NAS)</i> Infrastructures and buildings Other (machinery, durable goods, etc.)</p>

*Note: excludes water and air flows (unless contained in other materials).
Source: Eurostat (2000)*

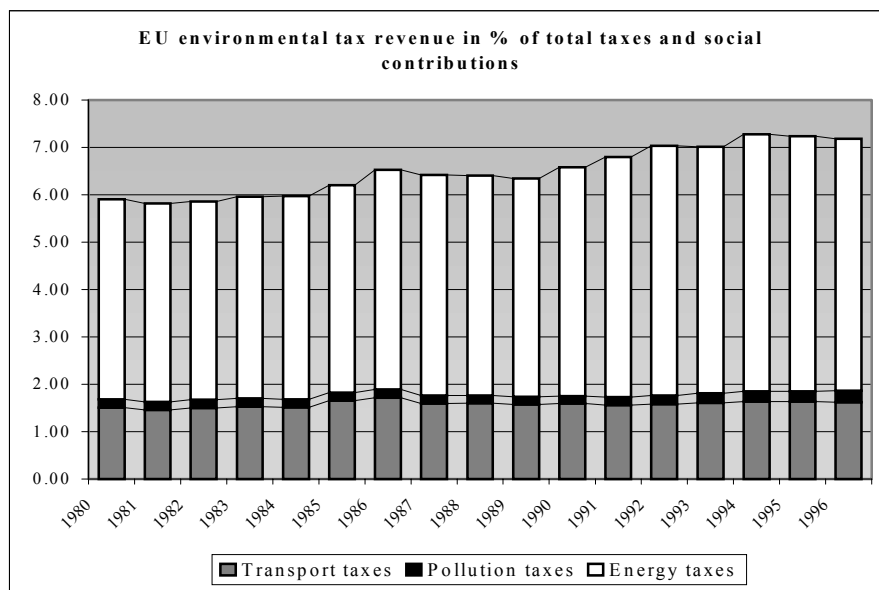
This account allows derivation of key material use indicators for inputs (DMI, TMI and TMR), outputs (DPO, TDO and TMO) as well as calculation of aggregate material consumption indicators (NAS, DMC and TMC). DMC and TMC are calculated as follows:

- *DMC (domestic material consumption)* = Domestic extraction (used) + Imports - Exports
- *TMC (total material consumption)* = Domestic extraction (used and unused) + Imports + hidden flows imported - exports - hidden flows exported

These indicators are linked by accounting identities. For example, TMI (total material input) = TMO + NAS; or NAS = DMC – DPO. It is important to have the indicators in a long time series in order to identify longer-term trends and isolate changes that are due to economic cycles.

Environmental Protection Expenditure Accounts. - The framework (SERIEE 1994 version) was tested in many Member States and other countries. EU-wide implementation of the EPEA will be facilitated once relevant developments in the standard statistical system are completed (revision of the national accounts including new COFOG, environmental expenditure variables in the EU's Structural Business Statistics Regulation, business registers (e.g. NACE/ISIC 90), etc.). Eurostat focuses on the continuation of pilot applications by volunteer countries, methodological development (e.g. resource management expenditure) and production of a compilation manual to the SERIEE handbook (a key priority in 2000). An interesting aspect are capital stock models which are used to estimate the environmental capital stock and the consumption of fixed capital as well as operating expenditure.

Environmental taxes. - The basic framework was established in 1997 in co-operation with other Commission services, IEA and OECD. Political interest is high in economic instruments for environmental protection (taxes, fees, state aid, pollution charges, deposit-refund systems, etc.). Studies of environmental taxes are available for virtually all Member States. Some Member States have started to publish their results regularly. Environmental tax revenue data are published annually by Eurostat in co-operation with the Directorate General Taxation and Customs Union.



Source: Eurostat (2000)

Environment Industry. - This activity focuses on the supply side aspect of environmental protection. Political interest is high (environmental jobs, export markets, etc.). This area integrates data from standard statistics, environmental expenditure and surveys of producers of environmental goods and services in a satellite accounts approach. 'The Environmental goods and services industry: Manual for data collection and analysis' was published in conjunction with OECD in 1999. Several studies have recently become available for individual Member States and at EU level.

Valuation and modelling. - Eurostat is following up several research projects funded by the European Commission's Directorate General for Research. A project of particular relevance for environmental accounting was GREENSTAMP (GREENed National STATistical and Modelling Procedures). This project focused on various aspects of producing 'Greened' National Accounts aggregates and concluded that such

aggregates are most useful when resulting from modelling exercises including co-operation of policy makers, statisticians and modellers. Environmental accounts are essential inputs into such modelling work. A Workshop 'From research to implementation: policy-driven methods for evaluating macro-economic environmental performance' was organised in Luxembourg, 28-29 September 1998 jointly by the Directorates General 'Environment' and 'Research', the European Environment Agency and Eurostat. The proceedings from that workshop have been published in 1999. The workshop concluded inter alia that efforts were needed to enhance consistency and comparability among results of valuation studies so as to render them more useful for more policy purposes.

Future directions. - So far work has largely focused on developing and testing frameworks and methodologies for different areas of environmental accounting. A substantial body of data has become available as well. The various areas are in different states of maturity:

Mature or nearing maturity	Further development and testing
NAMEA air	NAMEA water
Forest accounts	Forest accounts (non-ESA part)
Environmental protection accounts	Environmental valuation & modelling
Material flow accounts	Water accounting
Environmental taxes	Land accounting
Subsoil asset accounts	NAMEA waste
Environment Industry estimates	

In the more mature areas frameworks and methods have been developed and their applicability demonstrated in practice. For these, the focus will shift to supporting systematic implementations in Member States so as to allow generating results more regularly and at lower costs. Systematic implementation includes the production of *operational guidelines* to facilitate and automatise production of environmental accounts, analyses and re-processing of historical data so as to *establish long time series*, adjustment of existing *surveys* and establishment of regular *co-operation and data exchange* with other institutions (Environment Agencies, Forest Institutes, etc.). Several Member States have started to regularly publish environmental accounts results, sometimes as an integral part of their key national accounts publications (e.g. the Netherlands or the United Kingdom).

New multi-annual priorities of the European Commission will influence the direction of the work. For example, new priorities include resource use and efficiency, and enlargement.

Eurostat environmental accounts publications and material

European Commission (2000): Accounts for Subsoil Assets – Results of Pilot Studies in European Countries, Office of Official Publications, Luxembourg

European Commission (2000): Valuation of European Forests - Results of IIEAF Test Applications, Office of Official Publications, Luxembourg

European Commission (2000): Environmental Taxes in the EU, Eurostat Statistics in Focus, Theme 2 – 20/2000, Luxembourg

European Commission (2000): Material flow analysis in the framework of environmental economic accounting in Germany (Eurostat Working Paper 2/2000/B/9)

European Commission (2000): A material flow account for Italy, 1988 (Eurostat Working Paper 2/2000/B/8)

European Commission (2000): Environment employment in France, methodology and results 1996-1998 (Eurostat Working Paper 2/2000/B/7)

European Commission (2000): Material flow accounts - material balance and indicators, Austria 1960-1997 (Eurostat Working Paper 2/2000/B/6)

European Commission (2000): The environment industry in Sweden, 1999 (Eurostat Working Paper 2/2000/B/5)

European Commission (2000): Environment industry and Employment in Portugal, 1997 (Eurostat Working Paper 2/2000/B/4)

European Commission (2000): Environment-related employment in Netherlands, 1997 (Eurostat Working Paper 2/2000/B/3)

European Commission (2000): Material flows accounts – DMI and DMC for Sweden, 1987-1997 (Eurostat Working Paper 2/2000/B/2)

European Commission (2000): Material flows accounts - TMR, DMI and material balances, Finland 1980-1997 (Eurostat Working Paper 2/2000/B/1)

European Commission (2000): The European Handbook for Integrated Environmental and Economic Accounting for Forests – IEEAF, Office of Official Publications, Luxembourg

European Commission (1999): Pilot Studies on NAMEAs for air emissions with a comparison at European level, Office of Official Publications, Luxembourg

European Commission (1999): The European Framework for Integrated Environmental and Economic Accounting for Forests: Results of pilot applications (Office of Official Publication)

European Commission (1999): From research to implementation: policy – driven methods for evaluating macro-economic environmental performance – proceedings from a workshop, Luxembourg 28-29 September 1998 (DG Research: Report Series 1999/1)

European Commission (1999): A material flow account for sand and gravel in Sweden (Eurostat Working Paper Nr. 2/1999/B/4)

European Commission (1999): The Environment Industry in Sweden (Eurostat Working Paper Nr. 2/1999/B/3)

European Commission (1999): Industrial Metabolism (Eurostat Working Paper Nr. 2/1999/B/2)

European Commission (1999): The Policy Relevance of Material Flow Accounts (Eurostat Working Paper Nr. 2/1999/B/1)

European Commission (1999): Statistics on Environmental taxes and other economic instruments for environmental protection in EU Member States, Luxembourg (internally produced by Eurostat – November 1999)

European Commission (1998): The Economy, Energy and Air Emissions (Eurostat Working Paper Nr. 2/1998/B/2)

European Commission (1998): Physical Input-Output Tables for Germany, 1990 (Eurostat Working Paper Nr. 2/1998/B/1)

European Commission (1997): Material Flow Accounting – Experience of Statistical Institutes in Europe (internally produced by Eurostat – December 1997)

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