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Environmental Protection Expenditure and Revenue Joint Questionnaire/ SERIEE Environmental Protection Expenditure Account

Conversion Guidelines

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PREFACE

The Environmental Protection Expenditure Account (EPEA) was one of the first areas of the System of Environmental Economic Accounting to be developed. In 1994, Eurostat published the European System for the Collection of Economic Information on the Environment, known as the SERIEE.

The main task of Eurostat in the field of SERIEE has been to find a common methodology and harmonising definitions with the European countries. Guidelines have been published to help compilers in understanding the various methods, data sources and their links with the EPEA framework.

There has never been a collection of the full EPEA data in Europe and pilot studies showed that adjustments and simplifications of the SERIEE were necessary. However, the pilot exercises showed that in statistical practice it is difficult to fully implement the 1994 SERIEE framework. Accordingly, Eurostat published the SERIEE Environmental Protection Expenditure Accounts Compilation Guide in 2002.

Already in 1991, the OECD started international data collection on environmental protection expenditure. The data was then collected in association with the Group on the State of the Environment. Separately, Eurostat collected data on environmental protection expenditure in the intervening years of the OECD collection. However, in 1996 the collection of environmental protection expenditures became an area of co-operation. And now, in order to bridge the gap between the EPEA system and the JQ this publication is made available.

Thanks are due to the many experts who provided comments on a draft version of these conversion guidelines. This publication has benefited from financial support provided by the Directorate General Environment.

Rainer Muthmann
Head of Unit E5
Environment

This publication was prepared under the responsibility of:

Rainer Muthmann

Head of Unit E5 Environment – Eurostat

Publication Editors

Ulf Johansson, Eurostat

Nancy Olsson, Eurostat

For further information please contact Eurostat:

Nancy Olsson, Eurostat

Tel (+352) 4301 – 37040

E-mail nancy.olsson@cec.eu.int

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1. INTRODUCTION

In 1994, Eurostat published the European System for the Collection of Economic Information on the Environment, popularly known as the SERIEE manual, following the recommendations of Chapter XXI of the 1993 System of National Accounts.

The primary purpose of the 1994 SERIEE manual was to set up the conceptual framework for a monetary description of environmental-protection activities. This included drawing up the Environmental Protection Expenditure Account (EPEA), which is based on, and closely linked to, the national accounts. The SERIEE manual also included the first version of the Classification of Environmental Protection Activities and Expenditures (CEPA).

The environmental protection expenditure account was thereby one of the first areas of the System of Environmental Economic Accounting to be developed. A number of countries worldwide have engaged in pilot exercises of the implementation of the EPEA since the publication of the SERIEE manual. Some countries have also made production of EPEA type information a regular activity.

Eurostat has so far not started voluntary EPEA data collection, contrary to some other areas of the environmental accounts. However, the Task Force 'European Strategy for Environmental Accounting' (ESEA) has , in its recommendations to the Statistical Programme Committee, identified the environmental expenditure and eco-industries account as one of the environmental accounts modules that directly respond to key user needs and where methods are sufficiently mature and data are available so as to allow immediate implementation EU-wide.

Following the conclusions of the OECD Group of Economic Experts in the late 1970s, the OECD started international data collection on environmental protection expenditure. Since 1991, data have been collected in association with the two-yearly data collection of the Group on the State of the Environment. This data collection has been a joint OECD/Eurostat exercise since 1996.

For some time, Eurostat collected data on environmental protection expenditure also through a Eurostat-specific SERIEE type questionnaire (intervening years). In order to increase harmonisation and minimise reporting efforts in Member Countries, the Joint OECD/Eurostat Questionnaire was reviewed in detail and revised. The Eurostat-specific questionnaire could then be abandoned.

After several revisions, the Joint OECD/Eurostat Questionnaire on Environmental Protection Expenditure and Revenues (JQ) is now based on an accounting structure rather close to that of the EPEA. The Joint questionnaire adopted the CEPA as the basic classification of environmental domains used in the reporting of environmental protection expenditure. As with the EPEA, the JQ's classification of institutional sectors follows rather closely the SNA classification, although some differences in the classification of economic units exist. Moreover the definition of environmental protection expenditure is the same in the JQ and the EPEA.

This means that expenditure accounts could be used for JQ reporting and that JQ data could be used for expenditure-accounts analysis. A number of countries are already using EPEA results as a basis for the data reporting in the JQ. However, comparison between EPEA publications and data reported in the JQ shows that there are often differences both in terms of data quantity and in actual figures.

This document presents "conversion guidelines" which show clearly the links between the two systems, using data from the extensive Worked Examples included in the recently published SERIEE Compilation Guide. The objective is that the conversion guidelines should:

- facilitate reporting of environmental expenditure data in the Joint OECD/Eurostat Questionnaire,
- increase consistency between EPEA results and Joint Questionnaire data,
- serve as a basis for discussion on how to implement the European Strategy for Environmental Accounting.

The rest of this text is structured as follows. The second chapter gives an overview of the concepts of the Joint Questionnaire and the Environmental Protection Expenditure Accounts, and establishes the major differences between the two approaches. The third chapter looks in a more detailed way at the classifications of the two concepts and their differences, which mainly relate to differences in the classification of statistical units. Chapter four presents the actual conversion guidelines.

Annexes cover main data sources and present detailed worked examples.

2. THE JQ AND THE EPEA – AN OVERVIEW OF CONCEPTS AND OBJECTIVES

There are a number of aspects in which the Joint Questionnaire (JQ) and the environmental protection expenditure accounts (EPEA) are quite similar. Both systems distinguish units referring to the public sector, specialised and non-specialised producers and households. Both concepts are interested in assessing the environmental protection expenditure (EPE), in terms of both the institutional sector in which expenditure was undertaken and the units financing the expenditure. Finally, both concepts distinguish between different types of environmental protection (EP) activities: specialised, ancillary, secondary, market and non-market activities.

The coverage and the classification of domains of environmental protection are identical, the two systems referring to the Classification of Environmental Protection Activities and Expenditure (CEPA).

Nevertheless, a closer examination of the two systems shows that differences exist with respect to the exact grouping of units, in the coverage of specific expenditure items and in the valuation of some elements recorded as Environmental Protection Expenditure (EPE). This section gives a first overview of the systems and identifies the differences between them; these are then presented in more detail in the following two chapters.

The structure of chapter is the following:

Section 2.1 Joint Questionnaire (JQ)

- Expenditure concepts, aggregates and variables
- Classification of economic units and related tables
- Valuation of environmental protection expenditure

Section 2.2 Environmental Protection Expenditure Accounts (EPEA)

- Expenditure concepts, aggregates and related tables and variables
- Economic units and their classification
- Valuation concepts

Section 2.3 A first comparison of JQ and EPEA

- Expenditure concepts
- Classification of units
- Financing

2.1. Joint Questionnaire (JQ)

The Joint Questionnaire is a statistical questionnaire with the general feature that it relies directly on "observation" data, and "observable" flows, such as current payments (purchases of goods and services, salaries, etc.). Its aim is to collect data on expenditure for environmental protection, defined as 'all purposeful activities that directly aim at the prevention, reduction and elimination of pollution or any other degradation of the environment resulting from the production process or from the use of goods and services'.

2.1.1. Expenditure concepts, aggregates and variables

The Joint Questionnaire distinguishes two expenditure concepts, expenditure I and expenditure II, and consequently evaluates environmental protection expenditure according to two principles: the abater principle and the financing principle.

Expenditure according to the abater principle is reflected in the aggregate 'expenditure I' (EXP I).

For a given sector or economic unit, expenditure according to this principle comprises all expenditure (either capital or current) by the sector on the environmental protection activities it undertakes. In the case of households, expenditure according to the abater principle covers the purchases of adapted and related products.

For the questionnaire "expenditure" is a measure of "outlays". With its general feature of relying on observation data, the JQ only records actual outlays - purchases of energy, materials, salaries and social contributions (current expenditure) and purchases of capital goods (investment) – and excludes national accounts' "imputed" transactions such as the consumption of fixed capital.

With the aim being to calculate the net amount of money spent by the sectors for their own activities, any economic benefits directly linked with the environmental protection activities, e.g. recovered energy and materials sold or used internally, are deducted.

Expenditure is also presented according to the financing principle, which is recorded in the aggregate 'expenditure II' (EXP II).

Here, for a given sector or economic unit, expenditure corresponds to what they contribute to overall environmental protection activities, *whatever the unit that executes them*. Consequently, for a given sector or economic unit expenditure according to the financing principle is equal to EXP I plus any environmental protection services purchased from another sector or unit, less revenues from sales of environmental protection services to others. Transfers related to environmental protection, either paid or received, are equally taken into account.

The following table presents in a general form the expenditure and financing variables taken into account by the JQ and thus the composition of each of the two aggregates.

Table 1: Composition of JQ aggregates

Variables and aggregates		Definition
	Investment expenditure	Purchases of capital expenditure (end-of-pipe and integrated investment) and land acquisition
+	Internal current expenditure	Intermediate consumption and compensation of employees for the EP activities
-	Receipts from by-products	Economic benefits linked to the EP activity
=	**EXP I**	Expenditure according to the abater principle
+ (-)	Transfers paid (received)	Transfers related to EP activities, incl. earmarked taxes
+	Fees & payments for EP services	Environmental protection services purchased from another unit/sector
-	Revenues from EP services	Sales of environmental protection services to other sectors/units
=	**EXP II**	Expenditure according to the financing principle

Payments of environmental taxes (energy, transport, pollution and resource taxes) are excluded from the framework, except earmarked taxes. Earmarked taxes are those taxes whose receipts are used to

finance environmental protection expenditure through, for example, subsidies or capital grants. They are recorded as transfers: paid by the unit which pays the tax and received by the unit which receives the subsidy or the capital grant.

Furthermore, whereas the JQ in principle takes into account financial transfers with the rest of the world, it does not account for imports and exports of EP services. However these flows are generally low compared to other expenditure items.

With the JQ following the logic of double entry bookkeeping, for the economy overall EXP II in principle equals EXP I. Normally subsidies paid and received compensate each other across sectors, and the same holds for sales and purchases. Only the distribution of expenditure between sectors changes when passing from EXP I to EXP II. Some differences may however occur due to transfers from and to the rest of the world and due to the recording of VAT (see chapter 4).

2.1.2. Classing of economic units and related tables

The JQ classifies units of the economy into four main sectors: public sector, specialised producers, business and households. This grouping of economic units is based on a number of distinctions made between the types of environmental protection activity involved.

A first distinction is made between, on the one hand, units that carry out environmental protection activities for third parties and, on the other hand, units that carry out EP activities for their own internal use (ancillary activities).

The first category (units which carry out activities for third parties) is divided between the public sector and specialised producers.

Units grouped under the public sector are those units which carry out "non-market" activities i.e. activities for the "community as a whole". Units grouped under specialised producers are those units which produce market environmental protection services. This group also includes those market producers that carry out environmental protection activities as a secondary activity. Specialised producers are divided between public specialised producers and private specialised producers.

The second category refers to business and covers internal (ancillary) activities, i.e. those activities carried out on the organisation's own behalf.

The households sector groups together those units that belong to the institutional sector of households in the National Accounts (NA), considered in their capacity as final consumers.

The sectors, types of expenditure and roles of sectors can be cross-tabulated as follows:

Table 2: Grouping of economic units and EP activities in the JQ

Public sector	Specialised producers *	Business	Households
Units producing non-market EP services For this they invest and have internal current expenditure	Units producing market EP services For this they invest and have internal current expenditure	Other producing units They engage in own account EP activity and purchase market EP services from specialised producers	They only act as final consumer (of market EP services and adapted products)

* Specialised producers are divided between public specialised producers and private specialised producers

Following from the JQ concept and as suggested by the presentation of variables and aggregates above (cf. table 1), the JQ fundamentally consists of only one table which allows the calculation of EXP I and EXP II for the various sectors and the economy overall. Chapter 3 presents in more detail how the 4 main sectors, and in particular the "specialised producers" and "business" sectors, are further broken down into sub-sectors. Moreover, expenditure of each sector is calculated for a set of generally 7 environmental domains based on the Single European Standard Classification of Environmental Protection Activities and Expenditure (CEPA 2000) - cf the classification of environmental protection domains in section two of chapter 3.

2.1.3. Valuation of environmental protection expenditure

The JQ is not very specific about the price concepts to be used for the various transactions on goods and services it covers. In particular the only specification made is that fees and purchases of environmental protection services should be recorded, including non-deductible VAT. One can, however, assume that payments are recorded at purchaser's price.

2.2. Environmental Protection Expenditure Accounts (EPEA)

The EPEA is a satellite account of national accounts, based on the methodology set out in Chapter XXI of the System of National Accounts (SNA). As a satellite account, it follows rather closely the principles of National Accounts (NA) as concerns the classification of units, valuation and categorisation of transaction. More specifically the objective is to calculate an aggregate which could be compared with the GDP (main aggregate of NA) as well as with other NA aggregates (final consumption, etc.).

2.2.1. Expenditure concepts, aggregates and related tables and variables

The central concept which the EPEA is based upon is that of national expenditure and, consequently, one of its major objectives is to value the national expenditure for environmental protection, i.e. the resources devoted by the resident units of the economy to environmental protection. A major difference between this and the JQ concept is that national expenditure is based on the **uses** of environmental protection services and not on the (partial) **costs** of producing these services. National expenditure for environmental protection is defined as the sum of uses of EP services by resident units, gross capital formation for EP, uses of connected and adapted products by resident units, and specific transfers for environmental protection (which are not a counterpart of previous items), less financing by the rest of the world (cf. table 3).

National expenditure is very similar to national accounts aggregates. It constitutes a 'gross' variable (as used in the NA), including gross fixed capital formation **and** consumption of fixed capital.

Table 3: Components of national expenditure

Final consumption of EP	final consumption of (market) EP services by households; and final consumption of (non-market) EP services by general government as collective consumer
Adapted and connected products	Final and intermediate consumption of adapted and connected products
Intermediate consumption of EP	Uses of EP services (either market or ancillary) by the producers of the national economy*
Gross capital formation and land acquisition	Investments made by EP producers for producing EP services
Specific transfers	Those transfers for EP (mainly subsidies) that are not a counterpart of the previous elements
Less financing by the rest of the world	Transfers from the rest of the world (e.g. European Union institutions, for the financing of previous elements)
National expenditure for EP	The sum of final consumption and intermediate consumption of EP services, gross fixed capital formation and uses of adapted and connected products less financing by the rest of the world

* excluded are the purchases of EP services by the producers of EP services

In the EPEA, national expenditure for environmental protection is calculated in Table A and recorded with respect to user categories (see table 5 below for the classification of units).

A second table describes the production of environmental protection services, either for third parties or for internal uses (ancillary activities). The structure of the table is presented below as shown in table 4 below.

Table 4: The production table in the EPEA

Intermediate consumption	Intermediate consumption by producers of EP services
Compensation of employees	Salaries and social security contributions
Net taxes on production	Other taxes less subsidies on production
Consumption of fixed capital (CFC)	Economic depreciation of fixed capital
Net operating surplus (NOS)	Nil for ancillary and non-market producers
Total Output	**Sales less changes in inventories**
Less non environmental output	Receipts from by-products
Environmental output of which market non-market ancillary	Production of EP services (bought and sold on the market, produced and used in-house)
GFCF and land acquisitions	Investment and land acquisition

The production of environmental protection services is described in the EPEA Table B. The table refers strictly to producers of EP services, covering specialised and ancillary producers.

Finally, similarly to the JQ, the EPEA also takes a second approach to describing expenditure: that of the units actually financing the national expenditure, irrespective of which unit makes the expenditure, thus making it possible to take into account the financing of specific transfers and capital aid (EPEA table C) (Please see Annex • for examples of table A, B and C).

2.2.2. Economic units and their classification

The EPEA uses a two-stage classification of economic units: units are first classified according to their relation to production of EP services and are then further classified according to the institutional sectors they belong to.

Specialised producers are those units of the national economy that produce EP services as their principal activity. Within specialised producers, those producers pertaining to the general government institutional sector are distinguished from other specialised producers.

All other producers of the national economy are classified as non-specialised. This category thus covers secondary producers of EP services, producers that execute EP activity for own account and finally producers that only purchase EP services from others.

The other sectors are the households (similar to the institutional sector of the NA), general government (in its capacity as collective consumer) and the rest of the world.

A specific feature of the national expenditure approach is that in the EPEA classification the sector general government only covers the general government units in their capacity as collective consumer (i.e. as a consumer of non-market services). Activities of general government units specialised in the production of EP services are described under the "general government specialised producers" category. Overall, the basic classification of the EPEA is the following:

Table 5: Basic classification of units and activities in the EPEA

Producers			Consumers		Rest of the world
Specialised		Non-specialised	Households	Government	
Government sector	Corporations sector				
Invests for and produces EP services (mainly – but non exclusively - non-market)	Invests for and produces EP services (only market)	- Produces as secondary activity or - Invests and produces ancillary activity or - only purchases EP	Purchase EP services and adapted & connected products	Only consume non-market EP services	Benefit from and grant transfers

2.2.3. Valuation concepts

As the EPEA determines the expenditure from the "use side", valuation is basically made at purchaser's price. This means that all (non deductible) taxes on products are included, whereas subsidies on products are deducted. However, the valuation of output of EP services is made at basic prices or cost of production. A specific table converts output to expenditure valuation (cf. chapter 4).

2.3. A first comparison of JQ and EPEA

Various features of the two systems are similar or rather close, although there are differences with respect to the expenditure concept and the classification of units. The paragraphs below focus on the main differences, while a more detailed comparison is made in the following chapters.

2.3.1. Expenditure concept

Some components of expenditure are similar (or rather close – for details see chapter 4) in the two frameworks.

- Investments correspond to GFCF and land acquisition: In both systems (JQ and EPEA) these transactions refer to producers of EP services as market, non-market or ancillary.
- Households' consumption of adapted and connected products: both systems in practice cover the same transactions. Unlike the JQ, the EPEA also records the use of connected products by units which do not produce EP services but this element, in practice, is difficult to assess.

Therefore, the main difference between the two systems stems from differences in the recording of the current costs of production of EP services.

- While in the JQ only intermediate consumption and compensation of employees are considered, in the EPEA all production costs are included through the recording of the value of output/uses. The difference corresponds mainly to the GOS, i.e. net operating surplus + consumption of fixed capital, of producers of EP.

Whereas the EPEA consists of a whole system of tables of supply, use and financing of environmental services and expenditures, the JQ presents important elements of environmental expenditures in a less complex way.

Some other discrepancies exist but as will be shown in chapter 4 they are relatively minor in relation to this one. These other discrepancies relate to the treatment of VAT and subsidies on EP products, to the recording of secondary output, and to some transactions related to the rest of the world.

2.3.2. Classification of units

In this domain too, there exists one major and a number of small differences between the two systems, JQ and EPEA.

The main difference corresponds to the classification of producers and the recording of General Government expenditure.

- In the EPEA, specialised producers are strictly those which carry out EP activity as their main activity and they therefore exclude secondary producers, whereas in the JQ these secondary producers are classified as specialised producers.
- In the JQ, public sector producers refer only to non-market producers, whereas in the EPEA the general government specialised producers may include those market producers which depend upon an institutional unit classified in the general government sector.
- Furthermore, whereas in the EPEA the expenditure of the general government as consumer (in the expenditure table) corresponds only the value of non-market services, in the JQ expenditure of the public sector also includes investments for the production of non-market EP services.

Small differences are due to the fact that the JQ does not introduce a rest of the world sector.

2.3.3. Financing

As far as financing is concerned, the two frameworks are more or less similar. The effect of the transition from EXP I to EXP II is to bring expenditure by sector, according to the financing principle, closer to the distribution of expenditure according the EPEA (this does however not change anything with respect to the remarks above concerning the differences in amount).

3. A DETAILED COMPARISON OF CLASSIFICATIONS

Some modifications of the JQ have recently been introduced as preparation for the 2004 data collection process, both as regards the JQ tables and the explanatory notes. These modifications have largely been taken into account in this chapter and also in the numerical examples given in the following chapter and the worked examples in the annex.

Changes in the JQ tables refer to:

- The introduction of a new variable 'total current expenditure' which previously was calculated based on information reported for the variables 'internal current expenditure' and 'fees and purchases'.
- The introduction of a new variable 'investments in integrated technologies' which previously was calculated as the difference between the variables 'total investments' and 'end-of-pipe investments'.
- The introduction of a new table for private specialised producers for EP services (table 4B), which previously could be calculated as the difference between the two tables "Public and private specialised producers" (table 4) and "Public specialised producers" (table 4A).

Following these modifications, the table structure was changed from a structure following the calculations of the aggregates EXP I and EXP II (as presented in chapter 2 above) to a hierarchical structure of variables where the aggregates Exp I and II are now calculated at the bottom of each table (see the new structure in the worked examples).

Current proposed modifications of the explanatory notes refer mainly to clarifications of the classification of units between public sector and specialised producers and the link to the industry classification (NACE).

The structure of the chapter is the following:

Section 3.1 Classification of statistical units

Joint Questionnaire (JQ)

Environmental Protection Expenditure Accounts (EPEA)

Similarities between the JQ and the EPEA

Differences between the JQ and the EPEA

Differences in the recording of activities I: general government/public sector versus specialised producers

Differences in the recording of activities II: specialised versus specialised producers

Differences in how the 'rest of the world' is taken into account.

Section 3.2 Classification of environmental domains

Section 3.3 Implications and some further comments

3.1. Classification of statistical units

3.1.1. Joint Questionnaire (JQ)

The JQ consists of a number of tables for different sectors of the economy, in which all relevant variables for the sector in question are to be reported. The sectors largely follow the NACE classification but adjustments have been made so as to record separately different types of

environmental protection activities, where units are classified into sectors depending on the type of environmental protection activity involved (specialised, ancillary, secondary) as outlined in chapter 2.

The recording of transactions corresponding to the production of EP services depends upon the type of service produced.

Transactions corresponding to the production of non-market EP services are recorded under the public sector (Table 1).

Transactions corresponding to the production of market EP services are recorded under the sector "specialised producers" (Table 4). Within specialised producers, public and private producers are distinguished, to be recorded in Tables 4A and 4B respectively. Public market specialised producers are those producers which are owned by public authorities. In the European system of accounts (ESA 1995) they are denominated "public non-financial corporations" and defined as consisting of all non-financial corporations and quasi-corporations that are subject to control by government units.

Transactions corresponding to EP activities for own account (ancillary environmental protection activities) are recorded under the business sector (Table 2), which includes a further division into 6 sub-tables related to the main activity of the unit (according to NACE/ISIC, see below). Where EP services are produced as secondary activity (i.e. secondary to the producer's non-environmental principal activity), these secondary activities are recorded under the specialised producers (Table 4), while these companies' ancillary activity is to be recorded under the industry in question, i.e. under the business sector (Table 2).

Expenditure by households for consumption of EP services is recorded under the "households" sector (Table 3).

Therefore, for producers - with the exception of secondary producers - the JQ follows a classification which is based on the NACE rev1.1

The JQ basic table (cf. table 1) is broken down into the following 10 producer related sub-tables.

Table 6: Producer related sector des-aggregation in the JQ

Economic sector	NACE group	Corresponding JQ Tables
Business Sector Total	1-99, excl. 75, 90	Table 2
Agriculture, Hunting, Fishing, Forestry	1-5	Table 2A
Mining & Quarrying	10-14	Table 2B
Total Manufacturing	15-36	Table 2C
Detailed Manufacturing Industries		Table 2C add
Food, beverages	15-16	
Textiles, leather	17-19	
Wood, wood products	20	
Pulp, paper, printing	21-22	
Refineries	23	
Chemicals, rubber	24-25	
non-metallic minerals	26	
Basic metals	27	
Metal products and other	28-36	
Electricity, Gas & Water Supply	40; partly 41	Table 2D
Other Business	Partly 37 + 45-99, excl. 75, 90	Table 2E
Specialised Producers of EP Services	Mainly 90, partly 37 and 41	Table 4
Public		Table 4A
Private		Table 4B
Public Sector	Mainly 75	Table 1

3.1.2. Environmental Protection Expenditure Accounts (EPEA)

The EPEA, on the one hand, classifies economic units into producers, consumers and 'rest of the world'. Producers are further classified on the basis of the concept of local KAU (local kind-of-

activity units) according to the unit's principal activity. On the other hand, the "institutional" sector the respective unit belongs to is taken into account.

Two main categories of producers are distinguished: specialised and non-specialised.

Specialised producers are those producers whose principal activity is the production of EP services. The use of this criterion is intended to allow for a strict correspondence with the NACE. It also means that the economic units which are considered are local KAUs (kind-of-activity units).

Specialised producers are further sub-divided into those which pertain to the general government institutional sector and those which pertain to other institutional sectors (in practice only the non-financial corporations sector). In general, specialised producers pertaining to the general government sector are non-market producers. However, this is not always the case and a specialised producer of the general government sector may produce market services as its main activity. This is in particular the case for the wastewater and waste management services where "municipal departments" *without any autonomy of decision* produce and cover their costs of production by their sales.

Non-specialised producers are all other economic units of the national economy in their capacity as producers, i.e. pertaining to these NACE positions which do not correspond to EP activities.

These units may have several types of environmental protection activity: they may be secondary producers of market (or non-market) EP services, they may engage for their own account in EP activities (one speaks of ancillary or internal activity), and they may finally execute neither secondary nor ancillary EP activities and their involvement in environmental protection may thus be limited to the purchase of EP services produced by others.

The SERIEE manual[1] distinguishes these various categories of non-specialised producers. However, more recently, the SERIEE compilation guide[2] proposed grouping together these producers under "other" (non-specialised), without specifying further their situation.

Alongside producers , the EPEA distinguishes a consumer category, consisting of households that purchase environmental protection services as well as adapted and connected products, and of government, which only consumes non-market EP services. Finally, the 'rest of the world', benefiting from and granting transfers, is considered.

3.1.3. Similarities between the JQ and the EPEA

Similarities between both systems exist firstly with respect to the coverage of units and the sector classification. The coverage of units in the EPEA and the JQ is actually almost identical, as can be seen in box 1 below, and the sector breakdown (sector classification) is broadly similar, although the terms used differ.

Box 1: Covered units

EPEA	**JQ**
PRODUCERS	
Specialised	
General government	
Non-market	Public sector
Market without autonomy of decision	Public specialised producers
Other (market)	
Public firms and similar	Public specialised producers
Private	Private specialised producers
EPEA	**JQ**
Non-specialised (by industry)	
With secondary EP output	Public or private specialised producers
With ancillary EP output	Business sector
Without ancillary or secondary EP output	Business sector

[1] Eurostat (1994) SERIEE – 1994 Version, Luxembourg.

[2] European Communities (2002) SERIEE Environmental Protection Accounts – Compilation Guide. Theme 2 Economy & Finance.

CONSUMERS	
Households	Households
General Government	**Public sector**
Rest of the world	(transactions indirectly included but not separately recorded[3])

Also the definitions of sectors are partly similar under both systems.

Both the EPEA and the JQ distinguish "households". The EPEA defines households as final consumers, and in the JQ households are considered as purchasing adapted and connected products and paying for the purchase of environmental protection services. Their definition is therefore similar under both classifications.

Both classifications also distinguish a sector related to government. The JQ refers to a 'public sector' and defines it as including "central, regional and local government, authorities, communities and government agencies". This is quite similar to the EPEA, which refers to the 'general government' and defines it as all institutional units which as their main activity produce services delivered free or at a not economically significant price for individual or collective consumption, and which are mainly financed by compulsory payments made by units belonging to other sectors, and/or all institutional units principally engaged in the redistribution of national income and wealth.

Finally, also the coverage of the sector 'private' specialised producers is comparable under both systems. In the EPEA, public corporations and quasi-corporations, i.e. market producers with autonomy of decision that are subject to control by government units, are not classified as specialised producers of the general government sector, but as 'other' specialised producers. The same distinction is made in the JQ where these are reported under private specialised producers together with privately owned companies.

The following sub-section focuses on cases where the allocation of EP activities to economic units differs between the JQ and the EPEA.

3.1.4. Differences between the JQ and the EPEA

Differences in the recording of activities I: general government/public sector versus specialised producers

A first major difference between the two systems is that general government in the EPEA includes also market producers which do not have autonomy of decision and which are subject to control by government units, while in the JQ these should be recorded under (public) specialised producers. The idea in the JQ is to record all market activities separately in one sector/table 'specialised producers'.

Table 7: Classifying market producers

	EPEA	JQ
Market producers belonging to the general government institutional sector	classified as general government specialised producers	classified as public specialised producer

In the JQ, all *non-market activities* of the general government should be recorded as EP by the public sector. This constitutes a second major difference as according to the EPEA concept, by convention,

[3] For example, part of the subsidies paid or received by public sector could relate to environmental aid/funding. Part of the revenues received (and associated expenditure) by specialised producers could relate to exports. Part of the investments could relate to purchase of capital goods from abroad etc.

all general government activities should be recorded under the heading 'specialised producers, general government'.

Table 8: Classifying non-market producers

	EPEA	JQ
Non-market producers belonging to the general government institutional sector	classified as general government specialised producer	classified as general government (public)

Finally, it is worth referring to the JQ statement that public sector is mainly – but not exclusively - composed of producers classified as pertaining to NACE 75. In a number of environmental domains one actually finds cases where EP services are carried out by a producer classified under a NACE position other than NACE 75. Such examples are likely to occur in the environmental domains waste and wastewater (market or non-market producers of EP services without autonomy of decision: municipal departments), biodiversity & landscape, R&D, etc.

Let's take the example of a national park financed through public funds. The activity 'national park' would fall under the NACE group 92 but, given the public funding of this activity, the EPEA would record it under general government as specialised producer. The JQ, on the other hand, would record it as a public sector activity, given its non-market character. Comparable cases are imaginable in public R&D (NACE 73) to the extent that they are non-market activities financed by public funds.

Differences in the recording of activities II: specialised versus non-specialised producers

A major difference between the two systems is found where EP expenditure of secondary producers is concerned. According to the JQ concept, secondary market environmental protection output should be recorded under the "specialised producers" sector, and not under the industry relating to the producer's principal activity. According to the EPEA concept, such EP services are recorded as secondary output under the industry the producer's principal activity pertains to.

Typical cases of environmental protection services which are produced in the form of a secondary activity are sewage treatment services when they are produced by integrated water supply and wastewater treatment companies – classified in NACE 41, or waste management services produced by companies in the recycling industry – NACE 37.

For the example of NACE 41 integrated water companies, the recording would be the following:

The JQ would record expenditure related to the secondary activities - expenditure for wastewater treatment plants - together with expenditure for all other market EP activities, under the "specialised producers" sector (JQ table 4). Opposite this it would record any expenditure for an ancillary environmental protection activity (= services for own internal use) - in so far as it relates to the production of drinking water, i.e. under JQ table 2D (electricity, gas and water supply). Here, the JQ therefore breaks up the activities of units of a given NACE group among different tables.

In the EPEA, secondary activities of this type are always recorded under the industry in question; i.e. the secondary output of the NACE 41 integrated firm has to be recorded together with this sector's ancillary EP activity (if any) under the sector of non-specialised producers.

Table 9: Secondary EP producers- specialised or non-specialised producers?

	EPEA	JQ
Secondary EP producers'		
Secondary EP activity	recorded under non-specialised producers	recorded under specialised producers
ancillary EP activity	recorded under non-specialised producers	recorded under business

The example of NACE 37 (recycling) represents a somewhat comparable case. The JQ does not consider recycling as a separate EP activity. Again, that part of NACE 37 that constitutes secondary environmental activities (expenditure minus receipts from by-products) could be covered under the JQ table 4 (specialised producers) and here under the domain "other" (or waste), while this sector's ancillary EP expenditure is to be recorded under Table 2 (business sector).

In the EPEA, recycling is considered as an EP activity, and the units carrying out recycling as EP, but non-specialised, producers. Recycled products, however, are not considered as EP products but as by-products, therefore output corresponding to recycled products needs to be subtracted. In other words, the market environmental output of the recycling unit corresponds to the payments made by the holders of waste in order to get rid of their waste. Characteristic ancillary activities the recycling unit may undertake are also counted. Both the market EP output and the ancillary output are, again, recorded under the non-specialised producers' category.

Summing up, the JQ and EPEA record largely the same EP expenditure, but they do not necessarily record it under identical producer groups. While both record ancillary EP activities under the sector in question (i.e. the industry the producer's principal activity pertains to), secondary environmental output is allocated to different producer groups.

As a result, one can also conclude that the EPEA's non-specialised producer category corresponds to a large extent to the "business" category of the JQ - with the only difference being that the secondary producers are classified as specialised producers in the JQ. As will be seen in the following chapter, this difference of classification hinders the comparison between the EPEA and JQ aggregates.

Differences in the way the 'rest of the world' is taken into account

It was decided not to add a separate sector 'rest of the world' to the JQ in order to keep the framework simple and because for many countries such transactions (subsidies/transfers and imports & exports of environmental services) are very small compared to other types of expenditure. But while imports and exports of EP services are not taken into account, transfers to and from the rest of the world are taken into account. These are environmental aid to the rest of the world (transfers paid) and transfers received (for example from the EU). This is important insofar as financing of environmental protection in developing or transitional economies may imply that these expenditure types are becoming more important. This recording of international transfers has as a consequence that expenditure I and II do not necessarily balance (cf. chapter 4).

In the EPEA, for the valuation of national environmental protection expenditure, exchanges with the rest of the world (imports and exports of EP services) are explicitly taken into account. This is one reason why the aggregates under the two systems may differ in their value (cf. chapter 4).

3.2. Classification of environmental domains

In principle, both concepts define environmental domains according to the Single European Standard Classification of Environmental Protection Activities and Expenditure (CEPA 2000). Under the EPEA, in principle, each domain defined in the CEPA (one digit level) should be developed in the accounts, although this is not obligatory. Practical experience shows that not all countries develop tables for the full set of domains or they do so only for some sectors. Sometimes CEPA 1-digit domains are regrouped to derive a more comprehensive domain; sometimes data for individual domains are not collected at all. Most countries do separately report data for the wastewater management, waste management, air protection, noise abatement, and "other" domains.

The Joint Questionnaire aggregates a number of CEPA domains to a larger domain 'other', as shown in box 2 below. Furthermore, because the relevance of EP expenditure in specific environmental domains differs between economic sectors, the domain breakdown varies according to institutional sectors.

For specialised producers, the JQ concept records data only according to four separate environmental domains: "wastewater management", "waste management", protection and remediation of soil,

groundwater and surface water" and 'other'. In this case, the domain "other" should thus cover the 6 remaining environmental domains specified under CEPA.

Box 2: Environmental domains

CEPA classification	JQ
Protection of ambient air and climate	Protection of ambient air and climate
Wastewater management	Wastewater management
Waste management	Waste management
Protection and remediation of soil, groundwater and surface water	Protection and remediation of soil, groundwater and surface water
Noise and vibration abatement	Noise and vibration abatement
Protection of biodiversity and landscapes	Protection of biodiversity and landscapes
Protection against radiation	Other
Research and development	
Other environmental protection activities	

3.3. Implications and some further comments

Without repeating the detailed cases presented above it is worth noting that the similarities and differences between the systems JQ and EPEA can result in cases where

- Classification and coverage of units as well as the valuation of expenditure are similar
- Coverage of units is similar but the classification into sectors differs (or vice versa)
- Additionally, the valuation differs.

The impact these differences have on environmental expenditure aggregates calculated under the two systems is shown in the following chapter and further exemplified in the worked examples to be found in the annex.

However it should be noted that there is sometimes also a difference between the theoretical concepts and the reporting done by countries in practice.

Reporting in practice

It is worth mentioning that in practice data are not always in a form that makes it possible to fill in the tables according to the proposed EPEA classification. In the wastewater and waste domains (recycling) some countries classify secondary producers according to the JQ classification also for the purpose of environmental protection expenditure accounts. For the wastewater domain, the reason is that wastewater treatment is often a secondary activity of producers classified under NACE 41. If the EPEA classification were strictly respected, the production of wastewater treatment services would be "hidden" in the category "other (non-specialised) producers", which would drastically reduce the information base.

Also with respect to the public specialised producers, some countries have adopted the JQ classification and grouped in this category the non-market producers, thus putting all market producers in the "other specialised producers" category, even when the producers pertain to the general government institutional sector.

In the same way, reporting to the JQ has also so far not always been in line with the concepts. Just to give one example, not all countries have in the past recorded market producers without autonomy of

decision and which are controlled by government units under the “public specialised producers” category. Instead, they were often reported under the public sector category.

When comparing data across countries, attention should therefore be paid to the specific way each country classifies the producers.

4. CONVERSION GUIDELINES

4.1. Comparing JQ and EPEA expenditure concepts: reminder

The valuation of environmental protection expenditure

As far as the measurement of environmental expenditure is concerned, the main difference between the JQ and the EPEA is that in the JQ the gross operating surplus of the producers of environmental protection services is omitted, whereas in the EPEA the national expenditure includes both the GOS operating surplus and the investments of the producers of environmental-protection services.

Some other differences between the two measurements exist, but they are of minor importance as may be seen from the overview below[4].

Table 10: Transition between JQ expenditure and EPEA national expenditure

JQ EXP I	18 710,2
VAT	357,5
balance of transfers to the rest of the world	93,0
JQ EXP II	19 160,7
Implicit subsidies on environmental protection services	883,0
Net other taxes on production	188,5
Gross operating surplus	6 711,9
GOS and other taxes on secondary output	145,6
EPEA National expenditure	27 089,7

The distribution between sectors

In the presentation, and in part 3, the grouping of units was examined. The conclusions drawn were that the classification of units was rather similar between the two frameworks but that slight differences exist in the regrouping of producers of environmental protection services, namely with regard to the specialised producers of the general government sector which produce market output and to the secondary producers.

Table 11: Comparison of the sectoral distribution of expenditure

JQ	EXP I	EXP II
Public sector	1 404,6	3 507,3
Business	5 448,9	11 260,7
Households	772,9	7 557,7
Specialised	11 083,8	-3 165,0
Total	**18 710,2**	**19 160,7**

[4] All numerical illustrations and examples are extracted from the Workbook: "Worked example and JQ", which is available on the Eurostat site.

Table 11 continuing		
EPEA	National expenditure	Financing
General government	1 257,1	3 977,8
Non-specialised	13 794,8	13 530,8
Households	7 845,4	7 557,7
Specialised	4 099,5	2 023,5
Rest of the world (net transfers)	93,0	10,5
Total	**27 089,7**	**27 089,7**

Summary of the chapter

This chapter will present in some detail the relationship between the two measurements of environmental protection expenditure and their distribution by sectors. The chapter is structured as follows:

Section 4.2 The description of EP activities in JQ and EPEA

The description of production: coverage of production costs

The distribution of expenditure I by sector in the JQ

Section 4.3 The transition from the output of EP services to national expenditure in EPEA

From production to uses

Distribution of expenditure by sector in the EPEA

Section 4.4 Comparing expenditure I and national expenditure

Total amount

Distribution

Section 4.5 Analysis of the financing

The transition of EXP I to EXP II in the JQ

The financing of national expenditure in the EPEA

Comparing EXP II and financing

4.2. The description of EP activities in JQ and EPEA

4.2.1. The description of production: coverage of production costs under EPEA and JQ

As indicated in the first part of the document, the main difference between JQ and EPEA expenditure concepts is that JQ is restricted to “actual outlays” made by the producers for environmental protection activities they undertake, whereas EPEA accounts for the uses of environmental protection services by the various categories of resident units.

As far as, for example, market environmental protection services are concerned, the JQ records (under specialised producers) the investments and the internal current expenditure (i.e. intermediate consumption and compensation of employees), less receipts of by-products, whereas EPEA records (under the users) the purchases of market EP services.

Thus, independently of the categories of units where expenditure is recorded, the difference is:

Table 12: Recording of EP services

EPEA		JQ	
Net uses of EP services	19 649,8	Internal current expenditure for EP production	13 928,3

The value of uses of EP services is closely related to their production, and the EPEA describes the transition from supply to uses of EP services. However before analysing the uses as recorded in the EPEA national expenditure, it is necessary to examine the consequences of the partial recording of costs of production in the JQ.

The EPEA table B, which describes the production of EP services makes it possible to identify the costs of production which are not included in the internal current expenditure as defined by the JQ.

The total net output of market environmental protection services in the EPEA comprises the sum of all costs of production, including the gross operating surplus, of specialised producers of EP services plus the secondary production. The same holds for the non-market EP services and the ancillary activities, the only difference with respect to market services being that, by convention, the net operating surplus of producers of non-market and ancillary services is nil, in line with National Accounts valuation.

Table 13: Recording of costs of production in EPEA and JQ

EPEA		JQ	
Net Intermediate consumption *	7 396,8	Intermediate consumption *	7 531,8
Compensation of employees	6 293,5	Compensation of employees	6 396,6
Other net taxes on production	188,5		
Consumption of fixed capital	6 071,9		
Net operating surplus	640.0		
Total (net output)	20 590,7	Total (internal current expenditure)	13 928,3
Secondary production	383,6		
Non environmental output	1 682,1	Receipts from by-products	1 682,1
Total net output of environmental protection services	19 292,2	Internal current expenditure net of receipts	12 246,2

*Intermediate consumption excluding purchases of EP services by EP producers

Note that both measurements are “net”, in the sense that non-environmental outputs (or receipts from by-products) are deducted from the costs, as well as the intermediate consumption of EP services by specialised producers of EP.

Note on receipts from by-products and non environmental output

Although they largely correspond, the two variables are not identical. In EPEA, non environmental output is rather strictly defined as that part of the output of specialised producers that does not correspond to environmental protection services; e.g. recyclable materials for the NACE 37 producers.

In the JQ the definition of the variable is broader, as it also includes “savings of raw material, energy etc”. However it is not clear whether this information is available. One should also note that receipts from by-products are an output-type measurement. Deducting these from “internal expenditure” may lead to a bias.

As concerns the recording of EP services (from the “supply side” point of view) the transition between the EPEA measurement and the JQ measurement is explained by the following items:

Table 14: Transition between the net output of EP services and internal current expenditure

Total net output of environmental protection services	19 292,2
GOS and net taxes (specialised producers)	- 6 900,4
Difference in recording of secondary output	-145,5
Internal current expenditure net of receipts	12 246,3

Therefore, in the first instance the difference between JQ and EPEA boils down to the CFC and NOS of the producers of environmental protection services. However, there is another difference, related to the recording of secondary output.

The treatment of secondary output

As noted above, secondary producers (and thus secondary output) are not classified in the same way in the JQ and EPEA. More precisely, whereas in the JQ internal current expenditure corresponding to secondary output is accounted for in the internal current expenditure of specialised producers, the corresponding costs of production are not described in the EPEA table B, on the ground they cannot be known, given the definition of secondary output.

This difference in the classification and recording has to be catered for in the conversion from EXP I to national expenditure in respect of market EP services, by introducing (in the row "difference in recording secondary output") the net balance of total secondary output (in the EPEA) and costs which are taken into account in the JQ's internal current expenditure.

Note: in the numerical example above the difference between intermediate consumption and compensation of employees corresponds to the intermediate consumption and compensation of employees of secondary producers.

4.2.2. Distribution of expenditure by sectors in the JQ

This subsection analyses the way expenditure is distributed by sector. Since in the EPEA output is not directly distributed by users, the same presentation for the EPEA has been postponed to the next section. The two distributions are then compared in section 4.

In the JQ, expenditure according to the abater principle is assigned to the unit that incurs the expenses:

Table 15: Recording of expenditure under JQ EXP I aggregate

Category of units	Expenditure I
Specialised producers	investment costs and internal expenditure
Business	investment and internal current expenditure for own pollution abatement activities
Households	purchases of adapted and connected products
Public	investment and internal expenditure for their non-market EP activities

In all cases, receipts of by-products are deducted.

Table 16: EXP I numerical example

	Public	business	households	specialised	**whole economy**
Investments	187.6	1 591.6	-	3 911.9	**5 691.1**
Internal current expenditure	1 217.0	4 011.7		8 699.6	**13928,3**
Adapted and connected products	-	-	772.9	-	**772.9**
Receipts from by-products	0.0	154.4	-	1 527.7	**1 682.1**
Total EXP I	**1 404.6**	**5 448.9**	**772.9**	**11 083.8**	**18 710.2**

4.3. The transition from EPEA's table B to national expenditure

4.3.1. From output to uses

As explained above, in the EPEA current national expenditure is mainly defined by the uses of EP services by residents units. These uses do not exactly correspond to "output" as described in table B.

The main differences are summarised below.

External flows

The EPEA records only the uses of EP services by residents unit, which means that the national production of EP services has to be corrected by the inclusion of exports, which by definition are not used by resident units. Conversely resident units may use EP services which have been imported and whose production is not described in table B. These corrections are handled within a specific table of the EPEA, the supply and uses table - B1

As will be seen below (see from EXP I to EXP II in the JQ) the JQ framework does not allow for the integration of these discrepancies and (as indicated in the second chapter) the difference between sales (revenues) and purchases (payments) of EP services due to external flows may be a reason for a difference between EXP I and EXP II (see also section 4 below).

However, in most countries these external exchanges of EP services are very small compared to other types of expenditure.

VAT and other taxes

In national accounts (and thus in EPEA table B), output is valued at basic prices, which means that it does not include taxes on products (whether deductible [VAT type] or not), whereas uses are recorded at the purchaser's price, including taxes on products. This results in another difference between the value of sales and the value of purchases of EP.

As explained above (see chapter 2 section 2) when compiling EXP II from EXP I, the JQ introduces sales (revenues of producers) and purchases (payments by users) of EP services. JQ instructions indicate that EPE should be recorded including non-deductible VAT, which means that purchases (payments) by households should include non-deductible VAT. Although the JQ is not explicit on this point, payments should also include other taxes on products. However neither non-deductible VAT, nor other taxes on products are receipts of producers (revenues or sales). Therefore there is a difference between sales and purchases (revenues and payments), which produces a difference between EXP I and EXP II. In the numerical example, this difference corresponds to non-deductible VAT only.

Subsidies on products

Subsidies are a specific kind of transfers, the effect of which is to reduce the price paid by the purchaser of a product. Therefore the EPEA considers that valuing the uses of EP at purchaser's price underestimates the actual cost of environmental protection, and that subsidies on EP services (and

adapted and connected products) should be taken into account. For this purpose it introduces the concept of "specific transfers". For the different kind of uses (valued at purchaser's prices) the amount of subsidies, which lower the price paid for EP services, is added to the value at purchaser's price. Specific transfers are thus a component of national expenditure.

The EPEA even includes "implicit subsidies". These implicit subsidies correspond to the case where a unit that belongs to the general government and that produces market EP services suffers a net operating loss. In this case, the EPEA considers that this net operating loss is implicitly compensated for by the institutional unit to which the producer belongs.

This element of national expenditure is not explicitly taken into account in the JQ. In the JQ, payments and receipts of subsidies (like other transfers) are shared out between the various sectors so that they do not add a specific element to the expenditure.

However, it could be argued that as intermediate consumption and compensation of employees are taken at their full value in the internal expenditure of producers, this measurement implicitly integrates "a part of subsidies". Experience has shown that subsidies could be important in some domains (waste water management), although this situation is changing due to the increasing obligation imposed to the producers of market EP services to balance their accounts.

Treatment of purchases of EP services by producers of EP services

In the same way that JQ does not record (under expenditure I) the purchases of EP services by the units that execute EP activities; the EPEA does not record under national expenditure the intermediate consumption of EP by EP producers.

In the logic of the two systems this would lead to double counting when compiling the expenditure for the whole economy. In the JQ, this would lead to accounting twice for the costs (internal expenditure) corresponding to the production of the EP services purchased by producers of EP services. In the EPEA, this would lead to accounting twice for the value of these services: initially as uses (Intermediate consumption) of producers and a second time, for example, in the value of the final consumption of the services.

Ø The case of subcontracting

In some countries, municipalities (or groupings of municipalities) are responsible for waste water and/or waste management. In this case they may subcontract totally or partially the services to private (or public) firms. They receive fees or payments from users and pay the sub-contractor, which may lead to substantial double counting if both the payments by users to municipalities and by municipalities to their sub-contractors are recorded. The solution adopted by the JQ and the EPEA avoids this double counting.

Others components of national expenditure

Apart from current expenditure that takes the form of EP services, both the EPEA and the JQ include two other components: the investments of producers and the adapted (and connected) products.

Investments: they correspond to similar transactions in the JQ and EPEA. In both systems, the gross capital formations of units that undertake environmental protection activities either for own account or for third parties are included in the environmental expenditure. The two systems also include the net acquisitions of land. The only, very small, difference is that in the EPEA changes in inventories are (theoretically) also included, which, although more in line with the definition of the gross capital formation in NA, has almost no practical consequences.

A small difference may also appear due to the recording of land improvement. Land improvement is a result of the decontamination of soil (soil and groundwater domain). In the EPEA, it is considered as a use of EP services in the form of gross fixed capital formation (either by general government units or non-specialised). It is not clear where this transaction should be recorded in the JQ, under investment or, more probably, under internal current expenditure of the producers in the soil and groundwater domain.

When land improvement is recorded under gross fixed capital formation in the EPEA aggregates, there is thus a small discrepancy between this and the total of investments in the JQ.

The two systems also record adapted and connected products. This means those products of which the use corresponds to EP purpose although they are not EP services (trash bins, catalytic converters, etc.). Here the difference between the two systems is more substantial: whereas the JQ only records purchases of adapted and connected products by households, the EPEA also seeks to record the purchases of adapted and connected products by non-specialised producers (the business sector in the JQ). Although this is theoretically sound, experience proves that in practice it is rather difficult to evaluate the consumption of these products by this category of units. Furthermore a part of this component of expenditure may be already included in the "internal expenditure" declared by units of the business sector.

Table 17: Conversion table from the cost approach to national expenditure

	net EP services (output less IC of EP by EP producers)	*19 292,2*
	plus taxes on products(VAT)	*+357,5*
	less exports plus imports	*negligible*
	of which land improvement included in investments	*-47,9*
1	**= Purchases (net current uses) by resident units**	**19 601,8**
2	**Investments**	**5 739,0**
	Of which land improvement	*47,9*
3	**Adapted and connected products**	**772,9**
4.1	**Specific transfers; implicit subsidies**	**883,0**
4.2	**Net specific transfers (rest of the world)**	**93,0**
	National expenditure = 1+2+3+4.1+4.2	**27 089,6**

4.3.2. Distribution of national expenditure by sector in the EPEA

In the EPEA approach, national expenditure is recorded under the users of EP services (or beneficiaries in the case of subsidies). A main difference between this and the JQ approach is that for the market producers only investments are recorded, given that the market producers are not the users of their production. Furthermore, since general government is analysed in its capacity as consumer (of non-market services), investment s by public specialised producers are recorded in the specialised producers' category. The only investment that appears in the government sector corresponds to its capital formation in the form of 'land improvement' (domain soil and groundwater).

Table 18: The national expenditure in EPEA

	Specialised	Households	Non-specialised	General Government	Rest of the world	**Total**
Final consumption	-	6 784,8	-	1 225,1		**8 009,9**
IC of market services	-		5 854,5	-		**5 854,5**
IC of ancillary	-		5 737,5	-		**5 737,5**
Adapted and connected	-	772,9	-	-		**772,9**
GFCF and land …	4 099,5		1 607,5	32,0		**5 739,0**
Specific transfers (net)		287,7	595,3	-	93,0	**976,0**
National expenditure	**4 099,5**	**7 845,4**	**13 794,8**	**1 257,1**	**93,0**	**27 089,7**

In the table, for the sake of simplification, transfers from and to the rest of the world is netted out; i.e. financing by the rest of the world is deducted. Thus the aggregate corresponds strictly to the EPEA national expenditure.

4.4. Comparing expenditure I and national expenditure

4.4.1. Total amount

As described above, the differences between EXP I and national expenditure stem from:

- Step 1 the accounting for cost of production
- Step 2 the conversion from output to national expenditure

Table 19: Transition EXP I national expenditure

	EXP I	GOS and taxes	Correction for secondary output	Transfer of GFCF	VAT	Specific transfers	**National expenditure**
Internal current / output	**12 246,2**	6 900,4	145,6				**19 292,3**
Transition output /uses					357,5		**357,5**
Net current uses of EP services				-47,9			**19 649,8**
Investments	**5 691,1**			47,9			**5 739,0**
Adapted and connected	**772,9**						**772,9**
Specific transfers						976,0	**976,0**
Total	**18 710,2**	6 900,4	145,6	0,0	357,5	976,0	**27 089,8**

4.4.2. Distribution

The differences in distribution of expenditure result from the specific rules of the two systems.

Public / General government

In the JQ, expenditure comprises investments plus internal current expenditure less receipts from by-products for the sole non-market activities

Table 20: Public expenditure I in JQ

Investments	187.6
Internal current expenditure	1 217,0
Receipts from by-products	0,0
Total	**1 404,6**

In EPEA's table A, the general government is considered in its capacity as consumer and its expenditure comprises the value of non-market services consumed by general government. The value of these services comprises the internal current expenditure in the JQ plus the gross operating surplus of non-market producers (other taxes on production are nil), plus the purchases of EP by the non-market producers less revenues (partial payments) of non-market producers.

Uses of non-market output take the form of current expenditure and gross capital formation for that part of the output that consists in land improvement.

Table 21: Formation and uses of non-market output

Internal current expenditure	**1 217,0**	**JQ**
Gross operating surplus	121.7	
Less revenues	129,5	
Plus EP purchases	47.9	
Total non-market output	**1 257.1**	**EPEA**
Current uses	1 225,1	
Investments (GFCF in land improvement)	32,0	

In the EPEA, investments by specialised producers within the general government are recorded under specialised producers and not under general government; accordingly, general government expenditure is limited to the non-market output.

Business / non-specialised

In the JQ, expenditure comprises investments plus internal current expenditure less receipts from by-products.

Table 22: Expenditure I by business

Investments	1 591.6
Internal current expenditure	4 011,7
Receipts from by-products	154.4
Total	**5 448.9**

In the EPEA, expenditure by non-specialised producers comprises investments by ancillary producers plus ancillary output plus the purchases of EP services by non-specialised (IC of EP services) plus subsidies on purchases. Ancillary output comprises internal current expenditure plus gross operating surplus, less receipts of by-products.

Table 23: Formation and uses of ancillary output

Internal current expenditure	**4011,7**	**JQ**
Gross operating surplus	1880,2	
Less receipts from by-products	154,4	
Total ancillary output	**5 737,5**	**EPEA**
Intermediate consumption of ancillary output	5 737,5	

Under non-specialised producers, the EPEA also records the purchases of market EP services by non-specialised producers (which is recorded under EXP II in the JQ), as well as the subsidies on these purchases.

Investments by non-specialised producers include not only investments by ancillary producers (as recorded in JQ under business) but also those investments which take the form of land improvement (produced as market output by the specialised producers of the soil and ground water domain).

Table 24: National expenditure by non-specialised

Investments	1 607,5
Of which land improvement	*15,9*
Intermediate consumption of ancillary output	5 737,5
Intermediate consumption of market EP	5 854,5
Subsidies	595,3
Total	**13 794.8**

Specialised

In the JQ, expenditure by specialised producers corresponds to internal current expenditure plus investments less receipts from by-products

Table 25: Expenditure I by specialised producers

Investments	3 911,9
Internal current expenditure	8 699,6
Receipts from by-products	1 527,7
Total	**11 083,8**

In the EPEA the expenditure of specialised producers is restricted to their investments. However these investments include the investments of non-market general government specialised producers (see "public")

Table 26: National expenditure by specialised producers

Investments	**4 099,5**
Of which general government specialised	187,6
Of which other specialised	3 911,9

Households

Under JQ's expenditure I, the expenditure of households is limited to the purchases of adapted and connected products, whereas in the EPEA expenditure also includes the purchases of market EP services by households (final consumption of market EP services) and the subsidies on these products

Table 27: Expenditure of households

Adapted and connected products	**772,9**	**JQ**
Final consumption of market EP services	6 784,8	
Subsidies on final consumptions	287,7	
Total	**7 845,4**	**EPEA**

Rest of the world

In the JQ, the rest of the world sector is omitted, and no expenditure is recorded, whereas in the EPEA the expenditure of the rest of the world comprises the transfers it benefits from. In the presentation adopted here the expenditure of the rest of the world is netted: transfers paid by the rest of the world are deducted from the transfers paid to the rest of the world.

4.5. Analysis of financing in JQ and EPEA

4.5.1. The conversion from EXP I to EXP II in the JQ

Changes in the amount of expenditure

As explained above, the JQ presents two expenditure approaches: EXP I (according to the abater principle, discussed above) and EXP II (according to the financing principle).

Conversion from EXP I to EXP II involves two types of transactions. It results in a modification of the distribution of expenditure between categories of units and (may) affect the level of expenditure.

Ø Transfers

Units (categories of units) may receive transfers (generally from the government), i.e. unrequited payments which cover a part of their expenditure. These may be capital transfers when they are intended to finance a part of investments (e.g. antipollution investments of ancillary producer), or current transfers when they are intended to finance some part of the cost of internal current expenditure (e.g. transfers to finance environmentally-friendly agricultural practices).

Transfers are recorded twice: as a resource for the unit (category of units) that benefits from the transfer and as the charge for the unit which pays the transfer. Normally positive and negative transfers should balance each other out and only redistribute the charge of environmental protection between units (categories of unit).

However, there are at least two cases where transfers paid and received may not balance each other out:

The first case concerns transfers to or from the rest of the world: when transfers paid to the rest of the world are not equal to the transfers received from the rest of the world, there is a difference between expenditure I and expenditure II.

The second case is when transfers paid are known (e.g. through general government accounts) but the *beneficiary* of the transfers cannot be identified: "open ended" transfers. In this case also there is a difference between EXP I and EXP II. The best solution is to impute the transfers to the most probable beneficiary.

Ø Sales and purchases of EP services

The other way the charge of environmental protection is redistributed between units or grouping of units it through sales and purchases of market EP services.

When one unit (e.g. household) purchases EP services it is recorded as a purchase with the purchasing unit, while the receiving unit record a sale, i.e. an increase of charges for the purchasing unit and a reduction of the amount of the payment of the unit which receives the payment. One might think that these two flows balance each other out. This is not always the case:

Exports and imports of EP services

Firstly, some units who pay may be outside the national economy (e.g. waste treated in a foreign country); in this case, the payment is recorded but the sale is not recorded. The contrary is also possible: a domestic producer may export and in this case the sale is recorded but not the purchase … As has been said, these flows may be very small and negligible at the level of the whole economy and all domains (but this may not be the case for a specific domain or category of units, namely industrial waste …)

Taxes on products

There is a more generic reason why sales and purchases may not correspond: sales are generally recorded at basic prices, i.e. without taking into account taxes on products (and subsidies on products),

whereas purchases (payments by users) are generally at purchaser's prices, which are defined as basic prices plus taxes less subsidies. In general, therefore, sales and purchases will not balance each other out.

Changes in the distribution of expenditure

Integration of transfers and sales and purchases generally increase the expenditure by government, households and business, whereas for specialised producers, the recording of their sales may produce a negative net financing, when receipts are higher than internal current expenditure and investments.

Table 28: From EXP I to EXP II

	EXP I	transfers	*capital aid*	*subsidies*	Sales - purchases	*sales*	*purchases*	EXP II
Public sector	1404,6	2184,3	*1794,4*	*389,9*	-81,6	*129,5*	*47,9*	3507,3
Business	5448,9	-58,6	*331,3**	*-389,9*	5870,4	*0,0*	*5870,4*	11260,7
Households	772,9				6784,8		*6784,8*	7557,7
Specialised	11083,8	-2032,7	*-2032,7*		-12216,1	*15149,4*	*2933,3*	-3165,0
Total	**18710,2**	**93,0**	***93,0***	***0,0***	**357,5**	***15278,9***	***15636,4***	**19160,7**

*earmarked taxes paid by business, which finance capital aid to specialised producers

The balance of capital aid corresponds to capital aid paid by the public sector to the rest of the world, less aid received by specialised producers from the rest of the world.

The difference between sales and purchases corresponds to VAT.

The effect of the conversion from EXP I to EXP II is that it brings the distribution of expenditure according to the JQ closer to the distribution of the expenditure according to the EPEA. In fact, the EPEA records as expenditure by the various categories of unit mainly their purchases of environmental protection services, whereas the treatment of investments and adapted products is quite similar.

4.5.2. Financing in the EPEA

As well as the JQ, the EPEA redistributes the charge of environmental protection between the various categories of units. However this redistribution does not affect the amount of expenditure. All flows are balanced by others, owing to the fact that there are no "open ended" flows (the "rest of the world" sector exists).

Redistribution of expenditure

The redistribution operated by the financing table is rather simple.

Initially, only capital transfers are taken into account, in the same way as in the conversion from EXP I to EXP II. Note that the capital aid is not strictly identical: in the EPEA, the general government finances the investment of the non-market producers (in the R&D domain), which are classified as specialised producers, whereas in the JQ they stay in the public sector, which means that there is no transfer (internal transfers within a sector are not recorded).

Secondly, the financing of specific transfers is introduced: whereas in the national expenditure subsidies are recorded under the category of users that benefits from them, in the financing table, the subsidies are recorded as financed by the unit at the origin of the funds that where used for the transfers (the same principle holds in the treatment of earmarked taxes in the conversion from EXP I to EXP II – earmarked taxes are recorded as paid by the units that pay them and received by the units that benefit from them).

Table 29: From national expenditure to Financing in the EPEA

	National expenditure	Specific transfers	*of which implicit subsidies*	Capital aid	Financing
General Government	1 257,1	883,0	*493,1*	1 837,7	3 977,8
Non-specialised	13 794,8	-595,3	*-205,4*	331,3*	13 530,8
Households	7 845,4	-287,7	*-287,7*		7 557,7
Other specialised	4 099,5			-2 076,0	2 023,5
Rest of the world	93,0			-93,0	0
Total	**27 089,8**	**0,0**	***0,0***	**0,0**	**27 089,8**

* earmarked taxes

4.5.3. Comparison of financing in the JQ and EPEA respectively

Finally, starting from EXP I in the JQ and national expenditure In the EPEA, one may check how financing in JQ relates to financing in the EPEA.

Public sector / General government

In EXP II, financing by the public sector comprises expenditure I plus transfers paid by the public sector plus purchases, less sales.

Table 30: Public sector from EXP I to EXP II

	National expenditure
EXP I	1404,6
Capital aid paid	1794,4
Of which to the rest of the world	*103,5*
Current transfers paid	389,9
Sales	129,5
Purchases	47,9
Total	**3 507,3**

In the EPEA, financing by government comprises non-market output (including investments in land improvement) plus specific transfers paid

Table 31: General government financing in the EPEA

	National expenditure
Non-market output	1 257,1
Financing of investments	1 837,7
Of which of specialised non-market general government producers	*43,3*
Current transfers paid	883,0
Of which transfers	*389,9*
Of which implicit subsidies	*493,1*
Total	**3 977,8**

Business / non-specialised

In EXP II, the financing by the business sector comprises expenditure I plus transfers paid less transfers received plus purchases of EP services.

Table 32: Business from EXP I to EXP II

	National expenditure
EXP I	5 448,9
Transfers paid (earmarked taxes)	331,3
Transfers received	389,9
Purchases of marked EP services	5 670,4
Total	**11 260,7**

In the EPEA, the financing by business comprises ancillary output plus investments for ancillary activities, plus purchases of market EP services for intermediate consumption, plus transfers paid, less transfers received.

Table 33: Non-specialised financing in EPEA

	National expenditure
Investments	1 607,5
Of which land improvement	*15,9*
Intermediate consumption of ancillary output	5 737,5
Intermediate consumption of market EP	5 854,5
Transfers paid (earmarked taxes)	331,3
Transfers received	*595.3*
Total	**13530,8**

Specialised

In EXP II the financing by the specialised producers comprises expenditure I plus purchases less transfers received less revenues from sales

Table 34: Specialised from EXP I to EXP II

	National expenditure
EXP I	11 083,8
Purchases	2 933,3
Revenues	15 149,4
Capital aid received	2 032,7
Total	**3 507,3**

In the EPEA, the financing by the specialised producers comprises their investments less the capital aid received non-market output (including investments in land improvement) plus specific transfers paid

Table 35: Specialised financing in EPEA

	National expenditure
Investments	4 099,5
Capital aid received	2076,0
Of which corresponding to specialised non-market general government producers	*43,3*
Total	**2 023,5**

Household

In EXP II, financing by the specialised producers comprises expenditure I (adapted and connected products) plus purchases of EP services for final consumption

Table 36: Households from EXP I to EXP II

	National expenditure
EXP I	772,9
Purchases	6 784,8
Total	**7 757,7**

As in the EPEA, the expenditure by the households already includes the subsidies; the financing is the same as in the JQ

Table 37: Households financing in EPEA

	National expenditure
Expenditure	7 845,4
Of which purchases of market EP services for final consumption	*6 784,8*
Of which adapted and connected products	*772,9*
Of which subsidies on final consumption	*287,7*
Less subsidies on final consumption	287,7
Total	**7 757,7**

ANNEX I: Main data sources

National accounts

National accounts, if sufficiently detailed, can provide much of the data necessary for compiling expenditure data. This is true in particular of the general government sector, specialised producers belonging to NACE 90 and secondary producers of EP services. Ancillary activities, however, are not accounted for separately in national accounts. The three most important types of national accounts directly usable for compiling EP data are the production and generation of income accounts, the general government transactions and supply-use tables.

The production and generation of income accounts directly provide the relevant data on EP services of 'pure' EP producers, i.e. NACE 90. In general, these accounts describe the output of industries as well as the inputs necessary for its production. Information referring to output at basic prices or cost of production differentiated according to market and non-market output is provided, as well as information on intermediate consumption, compensation of employees, consumption of fixed capital, and taxes and subsidies on production. If disaggregated to sub-divisions of NACE 90, EP expenditure of specialised producers of waste (90.02) and wastewater (90.01) management is directly available. This needs, however, to be supplemented by the secondary waste and wastewater services produced by other industries, e.g. in NACE groups 37, 41, 51, 45. This information often needs to be extracted from basic statistics underlying the national accounts, which makes it possible to separate these industries' production of EP services from that of non-environmental services (cf. surveys of industries producing EP services as secondary output below).

The classification of functions of the governments (COFOG) provides a classification of transactions of government units by their purpose (such as general public services, defence, environmental protection, etc.). It is generally used to compile the corresponding production and generation of income accounts. One advantage of this classification ist that it allows one to analyse trends in government expenditure on specific functions over time, as the classification is unaffected by organisational changes within government. While COFOG previously only distinguished one position for EP (07.3: sanitary affairs and services including pollution abatement and control) the most recently adopted version includes a full division dedicated to environmental protection, which distinguishes 6 groups broken down according to CEPA. These are 05.1 waste management, 05.2 wastewater management, 05.3 pollution abatement, 05.4 protection of biodiversity and landscape, 05.5 R&D environment protection, and 05.6 environmental protection n.e.c.

Transactions distinguished in COFOG (ESA 95 codes in brackets) are:

- Gross capital formation + acquisitions less disposal of non-financial non-produced assets (P.5+K.2)
- Compensation of employees (D.1)
- Subsidies (D.3)
- Property income (D.4)
- Social benefits and social transfers in kind for products supplied to households via market producers (D.62+D.6311+D.63121+D.63131)
- Intermediate consumption + other taxes on production + current taxes on income, wealth, etc. + adjustment for the change in net equity of households in pension funds reserves (P.2+D.29+D.5+D.8)
- Other current transfers (D.7)
- Capital transfers (D.9)
- Total general government expenditure
- For information: final consumption expenditure (P.3)

These expenditure data available in COFOG correspond to those listed in Table 11 "general government expenditure by function" of Annex B to the ESA 95 Regulation (Council Regulation (EC) No 2223/96 of 25 June 1996 on the European System of National and Regional Accounts in the Community).

It should be noted that some positions of the COFOG other than those directly relating to EP may also be relevant for EP expenditure. This is the case because expenditure should be classified under only one position of the classification. The issue may arise, for example, for multi-purpose activities. Furthermore, specific functions may contain secondary environmental elements. To identify such parts of EP in COFOG based data sets is considered difficult.

Supply-use tables, finally, if sufficiently detailed, can provide data both on the supply of EP services by specialised producers and on the uses of corresponding EP services. In general, they describe for the main categories of products their origin (whether produced domestically or imported) and their uses (intermediate consumption by industries, final consumption by households and general government, capital formation, export). *Supply tables* give information on output at basic prices, generally detailing information on market output, non-market output for own final use and other non-market output. By adding information on trade and transport margins and on taxes less subsidies on products, they generally also include the transformation of total supply at basic prices into total supply at purchasers' prices. *Use tables* present the uses in purchaser's prices, and give information on total intermediate or final consumption, compensation of employees, other net taxes on production, consumption of fixed capital and net operating surplus, and thus also on value added. Final uses at purchasers' prices are generally also presented in a way disaggregating them into final consumption, gross capital formation (consisting of gross fixed capital formation and changes in inventories) and exports.

Government finance statistics and budget analysis

A second major group of sources for obtaining data on government EP expenditure - next to the COFOG classification of all transactions of government units by function described above - are the government budgets and accounts. Together with COFOG they are used in establishing the national accounts.

Government accounts determine the value of the output of government units. Depending on the level of detail of these accounts, most units of the government sector may be classified under NACE division 75 ('public administration and defence'), although part of their activity belongs to NACE 90 (specialised producers), such as is the case for municipalities providing waste or wastewater management services. It will therefore be necessary to scrutinise budgets of central and state governments and government finance statistics, data collections of municipality associations, etc. for local governments, in order to identify which departments and agencies are involved in EP activities, to split their expenditure into that related to EP activities and that related to other activities, to allocate the expenditure to environmental domains and to classify expenditure according to its nature (e.g. salaries, investment, purchases of goods and services, transfers). Revenues from sales of EP services or transfers received are available from the income side of budget documents. As a result, these expenditure items are generally split up for different government units and levels.

Attention should be paid to avoiding double-counting. As far as central or state government is concerned, it is necessary to distinguish between purchases of goods and services for own production activities (e.g. energy) and purchases of EP services produced by specialised producers under contract with the administration. There is a risk of the output of the specialised industry being recorded under the corporation sector. As far as local governments are concerned, it is necessary to analyse whether specialised units (for waste and wastewater management) are not already covered by industrial surveys, whether subcontracting or delegation of public services to private or public enterprises plays an important role and whether this can be traced by the data. To avoid double-counting across overall government, transfers between different levels and units need to be analysed.

Production statistics or survey data

When national accounts are not sufficiently detailed, recourse to production statistics (often industry surveys) is necessary to compile data for industry (and specialised producers). Surveys are also at the basis of compiling households' final consumption expenditure as presented further below.

Industrial surveys of specialised producers (NACE 90) generally give information on sales (or turnover) by product and on gross fixed capital formation (GFCF). Given that, for market producers, sales determine output, an analysis of sales by product makes it possible to identify the part of output that corresponds to EP services and which is to be recorded in the EPEA table B. GFCF data can directly be used in the EPEA tables A and B as well as in the JQ. More detailed surveys may also record information on costs (intermediate consumption, salaries and social security payments, taxes, subsidies, etc.). Surveys may provide data only for the whole NACE class 90 overall or disaggregate these data to environmental domains, in particular by separating waste and wastewater management services.

> A number of issues require attention to correctly interpret the data. This is firstly the coverage of the survey. The most important thing is to verify whether the survey corresponds to all specialised producers, i.e. all units with a main activity in class 90 of NACE Rev. 1, or whether government units carrying out waste or wastewater management services are excluded. Furthermore, grossing-up may be necessary if the sample does not cover producers of all size classes. A second important issue is the identification of possible sub-contracting and purchases of EP services by specialised producers, in order to avoid overestimation of EP services produced by this sector.

Surveys of other industries producing EP services as secondary output and environment industry surveys: Characteristic producers with EP output are often found in NACE Rev.1 classes 41 (collection, distribution and purification of water), 37(recycling), 51 (wholesale of metal and non-metal waste and scrap and materials for recycling), but also in other NACE divisions. Surveys covering these specific NACE classes may makes it possible to distinguish between the firms' primary non-environmental output and their secondary EP output. For NACE 41 this is the output of wastewater collection and treatment services when water supply and the collection and treatment of wastewater are provided by integrated firms. For NACE 37, it is the production of waste treatment services (income from payments for accepting waste for recycling). Some waste treatment services can also be found in NACE 51.57; here an analysis of subsidies and other government transfers is important, e.g. where the price paid for waste materials collected for recycling is guaranteed or where the collection systems are subsidised. This may also hold for NACE 37. Specific environment industry surveys carried out in various countries similarly provide data on secondary output of EP services and additionally cover producers of equipment and facilities for environmental protection.

Production surveys on industries producing related products are often provided by industrial associations. These provide production and sales data on connected and adapted products, such as catalytic converters, unleaded petrol, waste bins, etc. can be used as a basis for estimating expenditure by the users of these products.

Surveys on environmental protection expenditure

Surveys on EP expenditure by industries are an important data source for assessing ancillary EP activities, i.e. the expenditure made by the various industries for reducing the environmental pressure caused by their production activity. Most common are surveys for the NACE Rev. 1 groups C to E and for the environmental domains air, wastewater, waste and noise & vibration control; sometimes the coverage is more extensive. In some countries, such surveys cover only capital expenditure or costs, in others they cover also current expenditure. Capital expenditure may refer to end-of-pipe investment only or also to integrated technologies. Where *capital expenditure surveys* have existed for many years, they makes it possible to compile time series of investment (GFCF for ancillary activities) and hence to calculate the stock of EP fixed capital. The latter serves as a basis for estimating the consumption of fixed capital and operating expenditure of the EP capital stock, a substantial part of the current expenditure for ancillary activities.

Where *current expenditure or operating cost surveys* exist, these serve as a source for data on intermediate consumption, labour costs, pollution taxes and expenditure on anti-pollution activities

contracted out. If surveys cover both internal ('own account') current expenditure, such as costs for energy, material or own personnel, and purchases of EP services, i.e. payments for EP activities done outside the firm such as waste and wastewater collection and treatment services, these must be separated to avoid double-counting of the purchases. Double-counting arises if the purchases of EP services are counted as a cost element of the ancillary activity and hence as EP output, and at the same time as EP output of the market producers. This allows, furthermore, an assessment of the uses of external EP services sold by specialised producers.

Household expenditure surveys provide information on household final consumption expenditure according to various categories of products; whereas household budget surveys cover all outlays by households. This includes households' uses of EP services, i.e. payments for waste and wastewater services, uses of connected and adapted products, contributions to non-profit institutions and taxes paid. Depending on the country, items relating to the use of EP services may be separately provided or be covered in wider expenditure categories. For example, wastewater removal may be included in the water bill. Connected and adapted products are generally grouped together with broader categories.

> Attention need to be paid to the coverage of households and corrections or estimates may be necessary to assess the value of final consumption of EP services, sometimes relying on physical data, such as quantities of products, and unit prices. Contributions to non-profit institutions may be better assessed using annual reports of these institutions.

Further statistics on environmental protection expenditure

Structural Business Statistics (SBS): As far as EP expenditure is concerned, industry belonging to the sectors mining & quarrying, manufacturing industries, and electricity, gas & water supply is covered by this legal framework for data collection. Legal reporting requirements cover 'end-of-pipe investments' (variable 21 11 0), 'investments in integrated technologies' (21 12 0) and 'total current expenditure on environmental protection' (21 14 0). Data on the first variable is available since 1995, for the latter two variables the reference year for data collection is 2001. These variables are to be reported broken down to 4 groups of environmental domains (air, wastewater, waste and "other")[5] and to the NACE Rev.1 divisions C to E at the two-digit level[6]. Data on investment in EOP and integrated technologies is to be compiled annually, data on total current expenditure every three years.

> The legal background is the Council Regulation 58/97 concerning Structural Business Statistics (SBS) which constitutes a framework for the collection of data for the industry sector describing the activity of business in the EU. It applies to all market activities (except agriculture) normally included in industry, construction, distributive trades and services (NACE Rev.1 groups C to K and M to O). The statistical units for the compilation of data are listed in the annex of Section I of the Council Regulation (EEC) No 696/93 on the statistical units for the observation and analysis of the production system in the European Community. These are enterprise, kind-of-activity-unit (KAU) and local units. The SBS domain is split into several collections, of which those relating to industry, construction, distributive trade and services are: a) annual enterprise statistics, b) annual structural statistics broken down by size-class, c) breakdown of turnover of enterprises of distributive trade by product, and d) regional statistics.
>
> The reference year for data collection established by Regulation N° 58/97 is 1995 onwards. The legal reporting requirements relevant to the compilation of EP data has until recently been limited to 'end-of-pipe investments'. An amendment of the Regulation adopted in November 2002 (Regulation (EC) No 2056/2002 of the European Parliament and the Council amending Council Regulation (EC, Euratom) No 58/97 concerning structural business statistics) expands legal reporting requirements to include also the variables 'investments in integrated technologies' and 'total current expenditure on environmental protection'. The first reference year for data reporting is 2001, but a four-year transitional period during which derogations may be allowed is foreseen.

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[5] Separate recording for the domains biodiversity & landscape and soil & groundwater is subject to pilot studies.

[6] Sub-sections C, DA, DB & DC, DD, DE, DF, DG & DH, DI ; division 27, 28 (together make up sub-section DJ) ; sub-sections DK & DL & DM & DN; divisions 40, 41 (together make up sub-section E).

ANNEX II: Detailed Tables

This annex gives the background information for the numerical examples.

Starting from the **worked examples of the Compilation guide,** two types of worksheets have been developed:

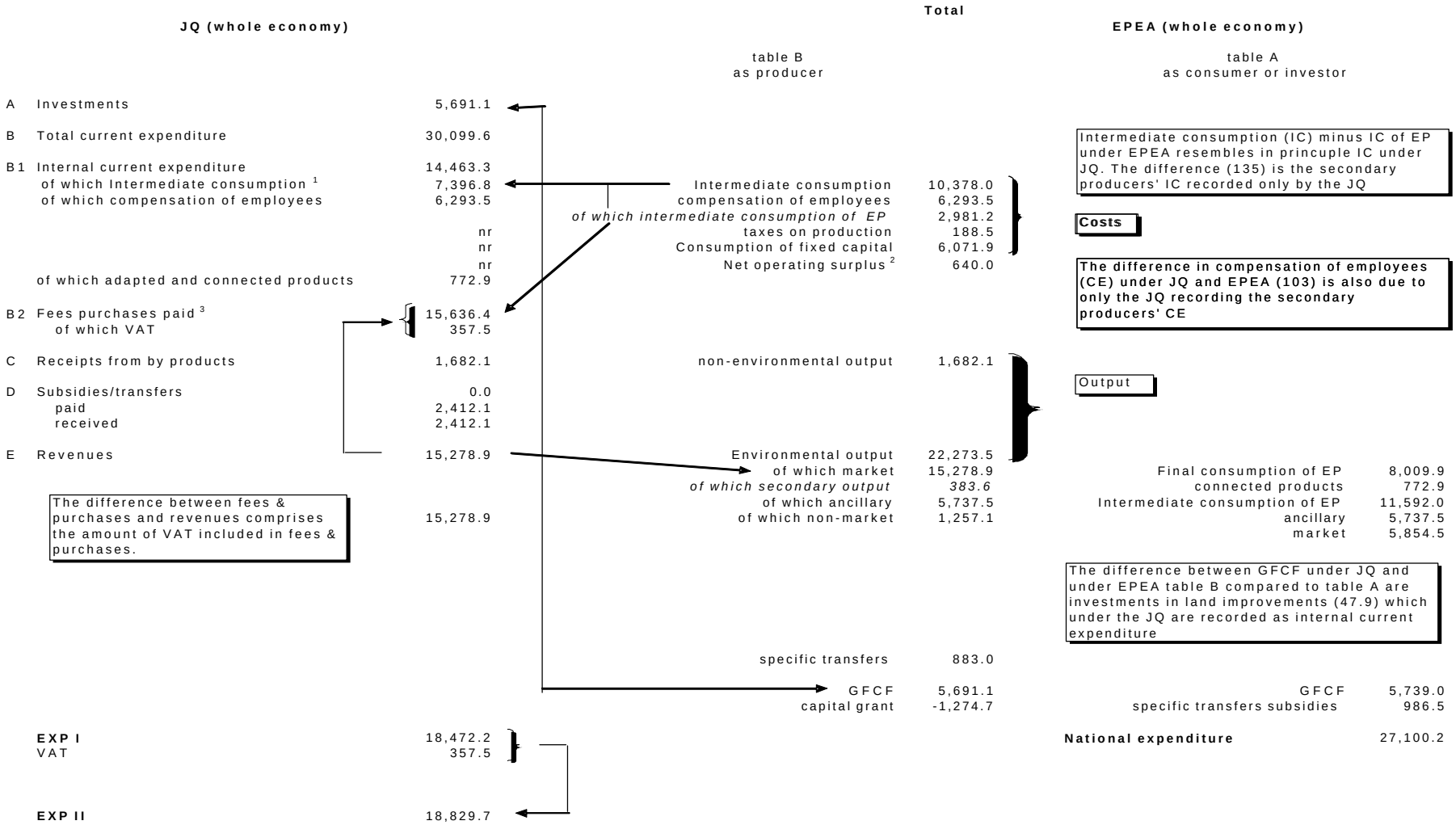
a) the first series of 9 worksheet collects all data of the worked examples in a way that makes it possible to compare the EPEA and JQ approaches. This was done by domain and for the whole economy

b) then, on this basis, JQ files were filled-in, linked with the previous worksheets

Tables of the first category presented below, as an example, refer to the sum of all domains. 5 tables are presented: one for each category of units and for the whole economy and a table presenting the conversion from EXP and EXP II and to national expenditure.

JQ tables are presented by sector and for the whole economy

Table 1 Conversion from EPEA to JQ: all domains, whole economy



1. Intermediate consumption in JQ= intermediate consumption as producer – intermediate consumption of EP

2. Net Operating surplus= output-cost- secondary output.

3. Fees and purchase paid includes intermediate consumption of EP from the public sector and from specialised producers

Table 2 Conversion between EPEA and JQ public sector/general government, all domains

JQ (public sector)			Total		EPEA (government)	
			table B specialised producers (government)		table A government as consumer	
A	Investments	375.6				
B	Total current expenditure	2,108.1				
B1	Internal current expenditure	1,920.2			983.2	
	of which Intermediate consumption	983.2	Intermediate consumption	1,171.1		
			of which intermediate consumption of EP	*187.9*		
	of which compensation of employees	937.0	compensation of employees	937.0	2,506.6	
		nr	net other taxes on production	0.0	2,413.7	
		nr	Consumption of fixed capital	398.5	-92.9	
		nr	Net operating surplus	-92.9		
B2	Fees purchases paid	187.9				
C	Receipts from by-products	0.0	Non-environmental output	0.0		
D	Transfers	2,080.8				
	paid	2,080.8				
	received	0.0				
E	Revenues	1,156.6	Environmental output	2,413.7		
			of which market	1,156.6		
			of which ancillary	0.0		
			of which non-market	1,257.1		
					Final consumption of EP	1,225.1
					connected products	0.0
					Intermediate consumption of EP	0.0
					ancillary	0.0
					market	0.0
			implicit subsidies	92.9		
			GFCF	375.6	GFCF	32.0
			Capital grant	0.0		
					subsidies	103.5
	EXP I	2,295.8			**National expenditure**	1,360.6
	EXP II	3,407.9				

Table 3 Conversion between EPEA and JQ business / non-specialised all domains

JQ (business)			Total			EPEA (non specialised)			
			table B as producer			table A as consumer		table C as financer	
A	Investments	1,591.6							
	of which end-of-pipe	1,258.9							
	of which integrated technologies	332.7							
B	Total current expenditure	9,882.1							
B1	Internal current expenditure	4,011.7							
	of which Intermediate consumption	2,228.4	Intermediate consumption	2,228.4					
			of which intermediate consumption of EP	*nr*					
	of which compensation of employees	1,783.3	compensation of employees	1,783.3					
		nr	net taxes on production	0.0					
		nr	Consumption of fixed capital	1,880.2					
		nr	Net operating surplus	0.0					
B2	Fees purchases paid	5,870.4							
C	Receipts from by-products	154.4	non-environmental output	154.4					
D	Subsidies/transfers	-58.6							
	paid	331.3							
	received	389.9							
E	Revenues		Environmental output	6,121.1					
			of which market	383.6					
			of which secondary output	383.6					
			of which ancillary	5,737.5					
			of which non-market	0.0					
						Final consumption of EP	0.0		
						connected products	0.0		
						Intermediate consumption of EP	11,592.0		
						ancillary	5,737.5		
						market	5,854.5		
			specific transfers	389.9					
			GFCF	1,591.6		GFCF	1,607.5		
						subsidies	595.3		
	EXP I	5,448.9				**National expenditure**	13,794.8	**National expenditure**	13,794.8
								fianancing (earmaked taxes)	331.3
								subsidies	595.3
	EXP II	11,260.7						**Financing**	13,530.8

Table 4 Conversion between EPEA and JQ households all domains

JQ (households)			Total	EPEA (households)					
			table B as producer		table A as consumer			table C as financer	
A	Investments	nr							
B	Total current expenditure	7,557.7							
B1	Adapted connected products	772.9							
			Intermediate consumption	nr					
			compensation of employees	nr					
			net taxes on production	nr					
			Consumption of fixed capital	nr					
			Net operating surplus	nr					
B2	Fees purchases paid	6,784.8							
C	Receipts from by-products	nr							
D	Subsidies/transfers								
	paid								
	received								
E	Revenues	nr							
			Environmental output	nr					
					Final consumption of EP	6,784.8			
					connected products	772.9			
					Intermediate consumption of EP				
					ancillary				
					market				
			specific transfers						
					GFCF				
					subsidies	287.7			
	EXP I	772.9			**National expenditure**	7,845.4		**National expenditure**	7,845.4
								subsidies	287.7
	EXP II	7,557.7						**Financing**	7,557.7

Table 5 Conversion between EPEA and JQ specialised all domains

JQ (specialised)			Total		EPEA (specialised)			
			table B as producer		table A as invester		table C as financer	
A	Investments	3,723.9						
B	Total current expenditure	10,551.8						
B1	Internal current expenditure	7,758.4						
	of which Intermediate consumption	4,185.2	Intermediate consumption	6,978.6				
			of which intermediate consumption of EP	*2,793.4*				
	of which compensation of employees	3,573.2	compensation of employees	3,573.2				
		nr	net taxes on production	188.5				
		nr	Consumption of fixed capital	3,793.2				
		nr	Net operating surplus	732.9				
B2	Fees purchases paid	2,793.4						
C	Receipts from by products	1,527.7	non environmental output	1,527.7				
D	Subsidies/transfers	-2,022.2						
	paid	0.0						
	received	2,022.2						
E	Revenues*	14,122.3						
			Environmental output*	13,738.7				
			of which market	13,738.7				
			of which secondary output	383.6				
			of which ancillary	0.0				
			of which non market	0.0				
					Final consumption of EP	nr		
					connected products	nr		
					Intermediate consumption of EP	nr		
					ancillary	nr		
					market	nr		
			specific transfers	400.2				
			GFCF	3,723.9	GFCF	4,099.5		
			capital grant	-1,274.7	subsidies	nr		
	EXP I	9,954.6			**National expenditure**	**4,099.5**	**National expenditure**	4,099.5
							capital aid received	2,065.5
	EXP II	-3,396.5					**Financing**	2,034.0

*includes the output of secondary producers

Table 6 Recapitulative

Conversion from EXP to national expenditure

EXP I	18,472.2
VAT	357.5
EXP II	18,829.7
Implicit subsidies on environmental protection services	986.5
net other taxes on production	188.5
gross operating surplus	6,711.9
secondary output	383.6
National expenditure	27,100.2

Calculation of EXP I to EXP II and from national expenditure to financing

	EXP I	EXP II	From national expenditure to Financing
Public sector	2,295.8	3,407.9	Public sector
Business	5,448.9	11,260.7	Business
Households	772.9	7,557.7	Households
Specialised	9,954.6	-3,396.5	Specialised
Total	18,472.2	18,829.7	Total

Table 7 JQ public sector

ENVIRONMENTAL PROTECTION EXPENDITURE AND REVENUES (EPER)		Table 1: PUBLIC SECTOR							
Country:									
MIO national currency Expenditure	Year	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	TOTAL
(A) INVESTMENT EXPENDITURES	1990	0.00	125.00	63.00	0.00	0.00	91.90	95.70	375.60
	2000								
(B) TOTAL CURRENT EXPENDITURE (= B1 + B2)	1990	3.00	456.80	386.40	47.90	0.00	377.00		1,271.10
	2000								
(B1) Internal current expenditure	1990	3.00	407.55	295.68	0.00	0.00	377.00	837.00	1,920.23
	2000								
(B2) Fees / purchases	1990	0.00	49.25	90.72	47.90	0.00	0.00	0.00	1,920.23
	2000								
(C) RECEIPTS FROM BY-PRODUCTS	1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2000								
(D) SUBSIDIES/TRANSFERS	1990		1,202.20	354.90		0.00	471.30	52.40	2,080.80
	2000								
(E) REVENUES	1990	0.00	602.10	425.00	15.90	0.00	16.70	96.90	1,156.60
	2000								
EXPENDITURE I (= A + B1 - C)	1990	3.00	532.55	358.68	0.00	0.00	468.90	932.70	2,295.83
	2000								
EXPENDITURE II (= EXP I + B2 + D - E)	1990	3.00	1,181.90	379.30	32.00	0.00	923.50	888.20	3,407.90
	2000								

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Table 8 JQ business

ENVIRONMENTAL PROTECTION EXPENDITURE AND REVENUES (EPER)		Table 2: BUSINESS SECTOR TOTAL							
Country:									
MIO national currency Expenditure	Year	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	TOTAL
(A) INVESTMENT EXPENDITURES (= A1 + A2)	1990	702.50	397.30	175.90	0.00	35.90	152.00	128.00	1,591.60
	2000								
(A1) End-of-pipe investments	1990	507.40	365.00	70.60		35.90	152.00	128.00	1,258.90
	2000								
(A2) Investments in integrated technologies	1990	195.10	32.30	105.30		0.00	0.00	0.00	332.70
	2000								
(B) TOTAL CURRENT EXPENDITURE (= B1 + B2)	1990		4,428.60			1.20	16.70	249.90	4,696.40
	2000								
(B1) Internal current expenditure	1990	1,686.50	1,444.20	726.80		1.20	0.00	153.00	4,011.70
	2000								
(B2) Fees / purchases	1990		2,984.40	2,756.46	15.90	0.00	16.70	96.90	5,870.36
	2000								
of which to Public sector (table 1)	1990								
	2000								
(C) RECEIPTS FROM BY-PRODUCTS	1990	17.90	27.30	105.30		0.80	0.00	3.10	154.40
	2000								
(D) SUBSIDIES/TRANSFERS	1990		201.90	129.40			-389.90	0.00	-58.60
	2000								
EXPENDITURE I (= A + B1 - C)	1990	2,371.10	1,814.20	797.40	0.00	36.30	152.00	277.90	5,448.90
	2000								
EXPENDITURE II (= EXP I + B2 - D)	1990	2,371.10	4,596.70	3,424.46	15.90	36.30	558.60	374.80	11,377.86
	2000								

Table 9 JQ Households

ENVIRONMENTAL PROTECTION EXPENDITURE AND REVENUES (EPER)		Table 3: HOUSEHOLDS							
Country:									
MIO national currency Expenditure	Year	Air	Wastewater	Waste	Soil & Groundwater	Noise	Biodiversity & Landscape	Other	TOTAL
EXPENDITURE I	1990	92.80	325.10	178.90	0.00	176.08	0.00	0.00	772.88
	2000								
(B2) Fees / Purchases	1990		4,823.71	1,961.11			0.00	0.00	6,784.81
	2000								
of which to Public sector (table 1)	1990								
	2000								
(D) SUBSIDIES/TRANSFERS	1990						0.00	0.00	0.00
	2000								
EXPENDITURE II (= EXP I + B2 - D)	1990	92.80	5,148.81	2,140.01	0.00	176.08	0.00	0.00	7,557.69
	2000								

Table 10 JQ specialised producers

ENVIRONMENTAL PROTECTION EXPENDITURE AND REVENUES (EPER)		Table 4: PRIVATE & PUBLIC SPECIALISED PRODUCERS OF EP SERVICES				
Country:						
MIO national currency Expenditure	Year	Wastewater	Waste	Soil & Groundwater	Other	TOTAL
(A) INVESTMENT EXPENDITURES	1990	2,568.27	1,155.59	0.00	0.00	3,723.86
	2000					
(B) TOTAL CURRENT EXPENDITURE (= B1 + B2)	1990	6,079.27	4,441.39	31.14	0.00	10,551.79
	2000					
(B1) Internal current expenditure	1990	4,608.48	3,118.83	31.14	0.00	7,758.44
	2000					
(B2) Fees / purchases	1990	1,470.79	1,322.56		0.00	2,793.35
	2000					
of which to Public sector (table 1)	1990					
	2000					
(C) RECEIPTS FROM BY-PRODUCTS	1990	792.70	735.00		0.00	1,527.70
Energy, recycled materials and revenues from	1995					
non-environmental activities	2000					
(D) SUBSIDIES/TRANSFERS	1990	1,404.10	484.30		133.80	2,022.20
	2000					
(E) REVENUES	1990	8,453.00	5,621.40	47.90	0.00	14,122.30
	2000					
EXPENDITURE I (= A + B1 - C)	1990	6,384.05	3,539.42	31.14	0.00	9,954.60
	2000					
EXPENDITURE II (= EXP I + B2 - D - E)	1990	-2,002.26	-1,243.72	-16.77	-133.80	-3,396.54
	2000					

Table 11 JQ Whole economy

ENVIRONMENTAL PROTECTION EXPENDITURE AND REVENUES (EPER)		Table 5: WHOLE ECONOMY					
Country: ___ _____							
MIO national currency Expenditure	Year	Air	Wastewater	Waste	Soil & Groundwater	Other	TOTAL
(A) INVESTMENT EXPENDITURES	1990	702.50	3,090.57	1,394.49	0.00	1,206.00	5,691.07
	2000						
(B) TOTAL CURRENT EXPENDITURE (= B1 + B2)	1990	1,782.30	16,113.47	10,451.06	94.94	3,440.18	30,099.64
	2000						
(B1) Internal current expenditure	1990	1,782.30	6,785.33	4,320.21	31.14	3,326.58	14,463.25
	2000						
(B2) Fees / purchases	1990	0.00	9,328.14 *(1)*	6,130.85 *(1)*	63.80	113.60	15,636.39 *(1)*
	2000						
of which to Public sector (table 1)	1990						
	2000						
(C) RECEIPTS FROM BY-PRODUCTS	1990	17.90	820.00	840.30	0.00	21.80	1,682.10
Energy, recycled materials and revenues from	1995						
non-environmental activities	2000						
(D) SUBSIDIES/TRANSFERS	1990	0.00	0.00	0.00	0.00	0.00	0.00
	2000						
(E) REVENUES	1990	0.00	9,055.10 *(1)*	6,046.40 *(1)*	63.80	113.60	15,278.90 *(1)*
	2000						
EXPENDITURE I (= A + B1 - C)	1990	2,466.90	9,055.90 *(2)*	4,874.40 *(2)*	31.14	4,510.78	18,472.22 *(2)*
	2000						
EXPENDITURE II (= EXP I + B2 - D - E)	1990	2,466.90	9,328.94 *(3)*	4,958.85 *(2)*	31.14	4,510.78	18,829.71 *(2)*
	2000						
YOUR FOOTNOTES è			*(1) difference between revenues and fees and purchases is due to VAT*				
			(2) difference between EXPI and EXP II is due to VAT				

ANNEX III: the worked example

The Excel file “Worked examples with JQ” may be found on Circa

References

OECD / Eurostat the joint Questionnaire on Environmental Expenditure and revenues.(2003)
SERIEE the 1994 version Eurostat
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