

In the introduction it should be clearly stated that the economic environmental accounts are satellite accounts to the National Accounts, which identify the environmental parts in these monetary accounts and add physical environmental data according to the economic classifications used in the National Accounts. Paragraph 5 expresses this more or less, and should be placed in the introduction, instead of in section 2.2.

In paragraph 1 it would be better to replace “(i) the physical flows of *materials and energy...*” by “(i) the physical *natural resource* flows...”. In my opinion there is a problem in using the word “material” in order to describe all physical matter. A distinction should be made between materials or environmental assets that can be used in economic production and consumption processes, and types of physical matter which cannot be used in such processes (like polluting emissions).

It would be better to merge paragraphs 7 and 8, and write them as follows:

The measurement of this basic economic model in monetary terms is defined in the SNA. In its measurement of the production, consumption and accumulation of goods and services to undertake environmental activity in monetary terms the SEEA adopts the same approach. Examples of such activity include...

Paragraph 9 talks about flows to and from other countries as if these are not included in EPEA and EGSS, which are mentioned in the previous paragraph. These international flows should not be part of the enumeration of taxes, subsidies... Paragraph 9 also says that environmental taxes, subsidies... are recorded in a sequence of accounts. This is rather strange. We are talking here about the measurement of economic activity related to the environment. Environmental taxes, subsidies,... are recorded in functional accounts just like environmental expenditure. It has nothing to do with the sequence of accounts, which as explained earlier refers to an application of economic environmental accounting.

Paragraph 11 could be rewritten as: “A key focus of measurement is the use of physical units to record flows of *natural resources* that enter and leave the economy and flows of *natural resources* within the economy itself..., and residuals – undesired materials and *non-material physical matter* resulting from production and consumption activity.”

An alternative for “undesired materials and non-material physical matter” could be “undesired remains of natural resources” or just “undesired physical matter”.

Figure 2.2.1 does not only show physical flows between the environment and the economy, but also within the economy. The title should be changed. Furthermore, not all products flowing within the economy are flows of natural resources. The economy should thus not be drawn entirely within the confines of the environment. There should be an overlap, and this overlap is the subject of the SEEA. As such the figure would be in line with paragraph 24, where the following sentence appears: “The stocks and flows that exist entirely outside of the environment are not recorded”.

In the environment part of the figure non-fuel energy inputs should be added as the third category of natural inputs, and some examples of ecosystem inputs should be added like soil nutrients, nitrogen, and oxygen. As concerns ecosystem inputs, I do have my doubts however, whether they should be included in economic environmental accounts. According to paragraph 47 of chapter 3 they would only serve to obtain a balance between the supply and the use of all physical matter (confusingly called “materials”) recorded in the system. This type of balance seems to be the subject of biological environmental accounts instead of economic environmental accounts. The link with the economy is unclear to me, while economic environmental accounts should

be satellite accounts of a system of economic accounts. I do not believe that it is the task of the economic environmental accountant to calculate how much oxygen and nitrogen is supplied by our planet for the cultivation of cattle and edible plants. This is not to say that such calculations are of no importance, but they do seem to be beyond the reach of what I understand to be satellite accounts of the National Accounts.

In paragraph 21 points (iii) and (v) should not be mentioned. These are not parts of the main accounts of the SEEA. They concern applications of the SEEA. In point (i) "supply and/or use tables..." should be written, as not all economic environmental physical flow accounts fit into a SUT-framework. Only those accounts in which both supply and use are performed by economic agents should be presented in the form of a PSUT.

In paragraph 25 environmental assets are said to consist primarily of natural resources and land. Is land not a natural resource ? Just like in chapter 3, the interpretation of natural resources as being limited to natural material inputs which can be extracted or harvested, creates confusion. A resource is a means that can be used to achieve particular objectives. Land is such a means, and it is provided by planet Earth. Therefore I see no reason why it should not be considered to be a natural resource.

Further in paragraph 25 "residuals which are undesired materials" could be replaced by "residuals which are undesired materials and non-material physical matter" in order to make the distinction between tangible and non-tangible remains of natural resources, or if the latter is deemed unnecessary, by "residuals which are undesired remains of natural resources" or "residuals which are undesired physical matter".

In paragraph 32: "described in Section 2.3.6" should be replaced by "described in Section 2.3.5". Section 2.3.5 should not be part of this chapter, however.

In paragraph 34 no distinction should be made between water and materials. This has not been done in previous paragraphs. It is written that "they are used to assess how an economy supplies and uses energy and materials..." A complete PSUT format is only necessary when both supply and use are performed by economic agents. If only the supply or the use is performed by economic agents (as in the case of emissions) no double entry needs to be recorded. In the case of natural input flows of environmental assets this also avoids the double registration of exactly the same flow. As designed currently, the extraction of environmental assets has to be recorded both as a use of natural inputs by the extraction industry and as a supply of a product by the extraction industry. The same flow is counted both as a natural input and as a product. For environmental resources which are no environmental assets, like non-fuel energy inputs and ecosystem inputs there is no such double counting, because these natural input flows are not extracted by an industry who sells the extracted natural resources as products. In table 2.3.2 the line natural inputs is only necessary in the use table in order to register these flows. It should also be possible to register their use by households. The column "Environment" is only added to obtain a balance between total supply and use of physical matter. This balance doesn't really have a link with the economy, and is therefore uncalled for in economic environmental accounts.

The part on 2.3.5 doesn't belong in this chapter as already pointed out. This becomes very clear by the way in which the subject is introduced. In paragraph 51 it is said that the supply and use tables and asset accounts record the bulk of the information of interest concerning interactions between the economy and the environment. It goes on to say there are other monetary transactions which are of interest. One would expect a reference here to the functional accounts (EPEA, EGSS, RUMEA, taxes, subsidies...). Instead, it only refers to environmentally related transfers and similar flows, including

transactions concerning environmentally related assets, which is only a subset of the functional accounts. Why is the focus put on this subset ? Because taxes, subsidies and other transfers are part of the main entries in the income accounts. However, these taxes, subsidies and other transfers in the income accounts are not limited to environmentally related transfers. For if they were, you would obtain a faulty operating surplus (depletion adjusted or not). In fact, the only link between the sequence of economic accounts and the environment is the measure of the cost of the depletion of natural resources, which hasn't got anything to do with environmental taxes, subsidies...

Paragraph 56 states that the SEEA sequence of economic accounts is only in monetary terms because no transactions in products are recorded. Yet, it starts from output and intermediate consumption. Are output and intermediate consumption not transactions in products ? The reason why the sequence of economic accounts is only in monetary terms is because the SNA sequence of economic accounts is in monetary terms, and the SEEA sequence is an environmental adjustment of this SNA sequence.

Section 2.3.6 would gain in clarity when rewritten as follows:

In paragraph 62 just add "usually" before "require additional disaggregation" on the third line.

Then continue with paragraph 64: *The approach taken in the SEEA is to define the activities, goods and services as environmental when their main purpose is environmental, and then to highlight the information in the monetary supply and use table to clearly identify the environmentally related transactions associated with the environmental activities and environmental goods and services.* Then continue in the same paragraph with paragraph 63: *By highlighting environmental activities and products, information can be presented on the economic response to environmental issues.* Then continue in the same paragraph with paragraph 65: *Particular flows of interest are the output of environmental goods and services, expenditures on environmental protection and on resource use and management, as well as environmentally related taxes and subsidies.* Then continue with paragraph 66.

In paragraph 78 it would be better to replace "(i) natural resource inputs" by "(i) environmental assets" or "(i) natural material inputs", because non-fuel energy inputs and ecosystem inputs are also natural resources.

In paragraph 80: "Residuals are the undesired flows of *physical matter...*" instead of the reference to "*materials, water and energy*".

Paragraph 82 says that physical flows are often separated into 3 categories, namely energy, water and materials. However, this three ways distinction between the different physical flows is not made on the basis of the substance for which the account is created, but on the basis of the unit of measurement. This is illustrated by the example given in the same paragraph, where it is written that the analysis of coal and oil may focus on the energy content, mass or volume. Which unit of measurement is to be used will depend on the purpose of the account. In some cases it might even be desirable to draw up accounts containing data expressed in different units of measurement.

In paragraph 86, what is called natural resource inputs in table 3.2.2 plus land is called environmental assets here. I believe this is a more precise description for mineral and energy resources, timber resources, fish resources... As I already mentioned, land, non-fuel energy inputs and ecosystem inputs are all natural resources as well. Not all natural resources are environmental assets, however. Because no ownership rights can be established over natural resources like solar energy or oxygen. Only if ownership rights can be established, an environmental resource is an environmental asset, for which an

asset account can be built, or in other words, of which there exists a stock which can grow and decrease. In the UN 2000 Integrated EEA Manual, paragraph 142 refers to the economic non-produced natural assets as being material goods that enter the economic system for intermediate or final consumption. I have therefore also suggested to use the term “natural material inputs” for this type of natural resources.

Paragraph 92 ends with a sentence saying that one requires information on the stock of assets in physical terms when one wants to apply the NPV approach. I believe this to be true for any type of valuation of a stock of assets. The sentence is stating nothing more than the obvious.

Paragraph 95 states that the environment itself is not considered to be a unit. I fully sympathise with this view. However, if this is really the case, the environment should not be introduced as an extra column next to the columns for the economic units in the physical supply and use tables.

Paragraph 121 states that within a single account in physical terms only one unit of measurement should be used. In many instances this is indeed the case. However, in some physical accounts different types of data are brought together, each with their own unit of measurement. An example is the forest accounts, in which data in mass, in volume and in surface are gathered. So, the choice of the unit of measurement depends on what one wants to learn from any individual account.