The Revised SEEA Draft, Chapter 5 Asset accounts
Discussion Note

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This note highlights eight subjectively selected issues related to the draft *Chapter 5: Asset Accounts* of the revised SEEA (Version for Global Consultation 13 May, 2011). Most of the eight issues – although not all - emerges from the comments received by the UNSD in relation to the Global Consultation on the Chapter[1] .

## 1. The definition of environmental assets

Chapter 5 defines environmental assets in the following way:

*Environmental assets are defined as the naturally occurring living and non-living components of the Earth, together comprising the biophysical environment, that are used in production and that deliver ecosystem services to the benefit of current and future generations.*

Several Global Consultation comments on this definition suggested that the reference to "used in production" is too restrictive, and in fact not in line with what is presented later on in the Chapter.

This seems hard to neglect, but the real problem with the definition of environmental assets is probably that it is not entirely clear what it should be used for. If the purpose is that it should indicate what is in and out of the scope of the asset accounts in SEEA, it is probably useful to start by discussing what is *not* within the scope, and why we want to keep it out? However, one could argue that there is *a priori* no reason to keep any part of the naturally occurring living and non-living components of the Earth out of the scope. Including all of it as assets is not the same as to say that we need to set up accounts for it. Isn't it rather meaningless to refer to the benefits of future generations (and production in the future) whose preferences and technological possibilities we know nothing about?

## 2. Ecosystem services

The Global Consultation pointed at 1) a need for a proper definition of ecosystems and ecosystem services, 2) that the distinction between ecosystem goods and services should be made clear, and 3) that it should be made clear what the central framework covers and what not.

Another view put forward in the Global Consultation is that the reference to eco-system services in the beginning of Chapter 5 is not subsequently used in the text of the Chapter.

[1] http://unstats.un.org/unsd/envaccounting/seearev/chapter.asp?volID=1&chID=5

Taken together these views indicate that perhaps it would be more useful to restrict the somewhat unclear references to ecosystems even more, and instead refer to the experimental part for clearer and more comprehensive definitions and explanations of concepts related to ecosystems.

### 3. Depletion of non-renewable resources

The global consultation shows that the text on depletion is broadly supported as far as the non-renewable assets concerns.

It should be noted, however, that Chapter 5 approaches the measurement of depletion differently compared to what previously have been agreed by the London Group and reflected in the outcome paper on the issue.

Chapter 5 and the annex states that the depletion (and other physical changes) of a non-renewable asset, e.g. mineral and energy, is measured based on the average subsoil price multiplied by the extraction (or other physical change) in the asset.

An average subsoil price is estimated based on the values of the asset and the physical quantity at the beginning and end of the period:

Average price of the subsoil asset in period t is: $\frac{1}{2}(P_{t-1}+P_t) = \frac{1}{2}(V_{t-1}/X_{t-1} + V_t/X_t)$,

where the V's and X's refer to total value and total physical quantity of the stock.

Then this price is used for the valuation of the change in the quantity due to the extraction in the period, ΔXt:

Depletion = Change in value due to extraction= $\frac{1}{2}(P_{t-1}+P_t)\,\Delta X_t$

The new valuation method for depletion has the advantage that it is based on a common sense approach familiar to statisticians and accountants: The value of a physical change is obtained by multiplying a physical quantity by a corresponding price. As such it is not linked in any way to a specific theory, the net present value method or any other method for valuation of the stock. If, for instance, observed market values for the stock are available, the method can be used just as well.

In contrast, the former agreed approach (cf. the outcome paper on issue 13) was to define the depletion as the resource rent, $RR_t$, minus a return to the asset, $rV_{t-1}$: depletion $d_t = RR_t - rV_{t-1}$. This measurement of the depletion is linked to specific strong assumptions and theories on the division of the resource rent between depletion and income, and to the net present value method. It suffers from being less transparent, and it leads to counterintuitive results, for instance, that the depletion is negative (i.e. increases the stock value) when extraction is small compared to the total stock.

The new approach to valuation of depletion can be compared to the "old" approach by using the formulas in the Chapter 5 annex:

Depletion = $RR_t - rV_{t-1} + \frac{1}{2}(X_{t-1}+X_t)\,\Delta P_t$

The difference between the outcome paper approach and the new Chapter 5 approach is that the new measure is ½ $(X_{t-1}+X_t)\ \Delta P_t$ larger than the old measure. This element represents a revaluation of the average stock due to changes in the price of the subsoil asset.

It is worth noting that the last revaluation item also includes the so-called unwinding of the discounting (time passing), which is equal to $rV_t$. Therefore, if other price changes are not too big the measurement of depletion will more or less correspond to the resource rent of the period.

While the new measurement and the properties of the depletion seem logical and sound it is somewhat unclear from the draft Chapter 5 what the consequences are for the depletion adjusted production and income accounts. It seems that it may be necessary to introduce some extra items and a somewhat new approach to the depletion adjusted accounts. However, this may not pose a big problem.

### 4. NPV measurement of physical changes in the stocks

It is unclear whether the present Chapter 5 indicates that all physical changes in the stock should be valued in the same way, i.e. as the average subsoil price multiplied by the physical change.

Assuming that the same subsoil price is used for all changes implicitly means that each tonne or cubic metre of the resource is regarded as the same resource/product, and that no distinction is made between whether a specific part of the total resource is easily accessible and ready for extraction or not. In relation to the net present value method it corresponds to an assumption that all physical changes, whether caused by extraction, new discoveries, catastrophic losses, etc. will affect the extraction profile in exactly the same way. Although convenient for practical calculations, this may not be a very realistic assumption, at least if we look at total national stocks of resources, which may include a large number of different deposits and huge quantities.

Further, it seems not to be necessary to make such a simplification. If information on specific prices or resource rents/extraction profiles for different parts of the resource as available it seems appropriate to use that information.

Thus, it could be suggested to more clearly explain that that in some cases, and if information is available, it may be appropriate to use the described valuation principles for stocks and changes on different parts of the resource by using data specifically representing these parts.

### 5. Weighting of proven, probable and possible resources to give an aggregate valuation

Chapter 5 includes references to proven, probable and possible resources and suggests that a valuation of all resources is applied by a weighting of the individual values based on the likelihood of extraction.

This gave rise to several Global Consultation suggestions. Somme comments support the inclusion of all three categories and the weighting. Others are in opposition and mention that SNA 2008 includes proven resources only. Some also finds the weighting based on likelihood of extraction problematic.

The use of the categories proven, probable and possible is linked to the so-called McKelvey box and to various specific classifications used by organisations and countries. At the same time Chapter 5 makes reference to the Unites Nations Framework Classification, UNFC-2009, for mineral and petroleum

resources. The UNFC-2009 is an overall classification aimed at being an "umbrella" for all other classifications, and it includes mapping schemes towards the other classifications. It is worth noting that the UNFC-2009 does not refer to proven, probable and possible reserves and resources, since these categories are not defined in an entirely uniform way across the different classifications. In addition, the UNFC-2009 does already take the probability of extraction specifically into account. Therefore, it seems that a more useful and simple approach is to say that the monetary valuation of mineral and energy resources should be based on the so-called best estimate of the UNFC-2009 class of Commercial Recoverable Resources without making reference to proven, probable and possible resources and weigthing.

With regard to the link between SEEA valuation and SNA 2008 valuation there is a slight problem since in fact the SNA 2008 is not clear with regard to what should be included. However, since both SEEA and SNA 2008 should be based on market prices, it seems reasonable to define a clear and logical market based valuation principle for SEEA and then suggest that in practice this value could be used also for SNA 2008. This seems better than to try to interpret the rather unclear statements in SNA 2008, and try to link SEEA to that.

### 6. Depletion transfers

Some Global Consultation comments indicated that the so-called depletion transfer between the owner and extractor of the resource (cf. § 220 and Table 5.5.5) is problematic. The background for the depletion transfer is the split of the asset into a part belonging to an owner and a part belonging to an extractor. All depletion is in the first place allocated to the extractor, but since there is a need also to adjust the owner's stock value over the period, the depletion transfer has been introduced. The problem is that the depletion transfer is an artificial construct and that there is no real transaction behind it. It is not consistent with the 2008 SNA definition of transactions and transfers.

Instead of including an artificial depletion transfer one suggestion is to include adjustment items, which reconciles the accounts.

### 7. Depletion of biological resources

Chapter 5 states that it is necessary to apply relevant biological models and to include the concept of maximum sustainable yield. In physical terms harvest in access of the maximum sustainable yield, MSY, represents depletion of the biological resource.

Among the Global Consultation comments to this description of physical depletion was:

- The maximum sustainable yield, MSY, refers to an optimal stock with maximum growth. If the stock is smaller, measuring depletion as the harvest in access of MSY will understate the real depletion.
- Using maximum sustainable yield (MSY) as the point to define 'depletion' is extremely dangerous and totally unacceptable from fishery management view point.
- It is not clear that MSY is the best concept to use. Australian fisheries practices use the Maximum Economic Yield instead.
- For forest accounts it may be necessary to include information on age classes of planted forest and this may rely on remote sensing techniques, and the accuracy is dependent of the scale of the satellite images.

It seems that the reference to the Maximum Sustainable yield is problematic. However, it is not obvious that a reference to the sustainable yield corresponding to the actual stock size is better, since it does not take external factors and the risk of extinction, etc. into account.

It is a big question if statistical institutes are in fact able to incorporate the concepts of sustainable yields and to base the production of official statistics on biological models. There may be more than one opinion on what the sustainable extraction level is and there are very big uncertainties on the measurement side.

However while the depletion of biological resources is explained in the first general part of Chapter 5 using the concepts of excess harvest and sustainability, the depletion concepts seems not to be used when it comes to the specific asset accounts for e.g. timber resources (table 5.8.3) and fish resources ( Table 5.9.3). Instead gross growth and harvest/catch are identified separately. Therefore, it could be considered to exclude or further minimize the text on depletion of biological resources in this Chapter, and to introduce it if needed elsewhere in SEEA in relation to depletion adjusted accounts.

**8. Social or market valuation of assets**

Several comments from the Global Consultation reveals a wish to incorporate and discuss social values (social discount rates) in SEEA. This seems however to be in contrast to the fundamental principle of SNA 2008 and the central framework of SEEA to base valuation on market values.

Thus, the question is whether the central framework of SEEA should open up for social values. Besides affecting the choice of discount rate this is also of importance in relation to the specific rules for calculation of the resource rent as the difference between output and costs of extraction, because there is some ambiguity whether so-called specific taxes less subsidies should be included in the resource rent or not. For instance the Eurostat guidelines on subsoil asset suggest that they should be included. The background is probably that they only represent a transfer of the “real” resource rent so they should not be subtracted from the resource rent. It seems that this view reflect a wish to calculate a social value. If we instead want to calculate market values it seems reasonable to let the resource rent reflect that specific taxes less subsidies are paid by the investor, and therefore will affect the market value of the asset.

Anyway, since the NPV stock values are very sensitive to the choice of discount rate (and the return to fixed assets) it could be suggested that the Chapter 5 includes a recommendation that the sensitivity of the NPV calculation is explored by providing supplementary valuations using a high and a low discount rates, etc.