DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
UNITED NATIONS

System of Environmental Economic Accounting

System of Environmental-Economic Accounting— Ecosystem Accounting

Global Consultation on the complete document: Comments Form

Deadline for responses: 30 November 2020
Send responses to: seea@un.org

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The comments form has been designed to facilitate the analysis of comments. There are six guiding questions in the form, please respond to the questions in the indicated boxes below. To submit responses please save this document and send it as an attachment to: seea@un.org.

All documents can be found on our website at: https://seea.un.org/content/global-consultation-complete-draft

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General comments

Question 1: Do you have comments on the overall draft of the SEEA Ecosystem Accounting?

We very much welcome the revised draft. It is a major step forward from the 2013 version and pulls together in an effective way all the experience we have gained and the lessons we have learned in the intervening years. The language is also much tighter and clearer.

The sections on valuation are particularly welcome as the relationship between the definition of the service and the options for valuing the service need to be considered together. A little more work is needed to extend the number of services covered in the logic chains so that these connections are apparent in a wider number of cases.

Comments by sets of chapters

Question 2. Do you have comments on Chapters 1-2 of the draft SEEA Ecosystem Accounting?

1.22. Ecosystem service flows are only partly related to supply capacity in the form of ecosystem type, size, extent and condition. As the concept of supply = use is fundamental, it would be worth noting use (and other influencing) factors here too.

Annex 1.2. A visualisation of the links and distinctiveness of CF and EA would be very useful. We present one version in Figure 2.2 of the UK Principles Paper which is one way of setting out the relationships.

2.14. Definition of ES. "ES contribution to the *benefits that are used* in economic and other human activity". This is odd terminology – the services are used but the benefits are experienced, especially non-market services. 2.15 refers to "used and enjoyed" and here it might be better to say "or enjoyed". See also para 6.9.

2.16. "Revealed in observable interactions". This requires a fairly loose definition of 'observable'. Is pollution removal observable?

The final reference to 'exchanges' in this para should read 'interactions'.

Figure 2.1. We didn't find the diagram particularly helpful, perhaps because some of the subtlety of the overlapping placement of boxes was easily lost. The arrow implies that all services enter the economy (as defined by the GDP boundary) but that some of the benefits fall outside? And that there are parts of the economy which fall outside the GDP boundary but are distinct from the services which are used by wider society?

Question 3. Do you have comments on Chapters 3-5 of the draft SEEA Ecosystem Accounting?

General. On whole well written. How to deal with mosaics in the landscape could do with more detail.

3.41. Linear features. We agree with the proposal to incorporate linear features as part of condition.

3.45 & 3.46. This is a brief discussion on what to do with mosaics. We disagree with the balance of the text: essentially we consider the delineation of green spaces and other features of urban habitats as being policy relevant and readily feasible for all countries (as promoted by SDG 11.7) and it is inappropriate to recommend treating changes in the extent of green space as a condition change, with a fall-back option of separate measurement. The consequence of this treatment is that changes in the condition of the green spaces themselves (e.g. the degree to which they meet certain standards) are unlikely to be recorded in the accounts, as those areas will only ever account for a small proportion of the total area of the mosaic.

In any case it seems inconsistent to recommend a condition indicator of "% of open green space" (Annex 5.1), since if the extent is known then it makes more sense to include the area within the extent account and formally record the gross changes in the different subtypes.

It would be helpful to have more guidance on the treatment of mosaics. Chapter 13 deals with urban mosaics and can be referenced in this section, but more on farmland mosaics would be helpful.

Table 4.1. It almost certainly will not always be possible to determine the causes of change. How should these unknowns then be recorded?

4.14. The term regression is inappropriate and is possibly value-laden (i.e. "a return to a former or less developed state", though the examples given are to more developed state). The changes are simply reductions in extent, which may be a reduction in extent of developed or undeveloped land but may not be a change back to a former state.

Managed regression. We assume the reference to exclusion of deforestation is a typo? Unless of course it refers to the exclusion of "natural"/unmanaged deforestation.

4.37. A bit of clarity between the industry sector owning or managing the ecosystem and the economic activity related to the use of the land would be worth having here, as the two can be quite different.

The reference to an 'underlying' ecosystem is a bit odd. Underlying what?

5.36. It follows from this paragraph that we need to say more about the relevant characteristics for heavily managed ecosystem types e.g. relevant management

regimes, the use of quality standards for green spaces etc. Organic farming is listed in Annex 5.1 but in general there is little discussion of how to include management regimes within the framework.

Section 5.3.2. How realistic are all these reference levels? How can the top rating for each variable be determined? It doesn't seem to make sense in modified systems, where 'maximum wildness' or 'undisturbed state' aren't relevant. 5.64 acknowledges this, and asserts that the reference level should be determined by reference to integrity, stability and resilience, but there is no discussion of quite what these terms mean in modified ecosystems and the implication of the possibility of different options is that there is no objective basis.

The fall-back is clearly to use an earlier year as the reference level, however in practice the determining factor is likely to be the earliest year for which consistent data exists.

Footnote 30. Not sure what the term 'composition of a species' means. Is this a typo?

Table 5.7. Air pollutant concentration may be seen as a condition indicator for woodland, but it also helps determine the service – similar for other waste services. Whereas for urban ecosystems, pollutants other than NOx will be relevant.

Question 4. Do you have comments on Chapters 6-7 of the draft SEEA Ecosystem Accounting?

General. A useful chapter that is largely clear in its recommendations and clarifies a number of areas that were unclear in the SEEA EEA, including treatment of abiotic flows, water services and intermediate services. It is also useful to have a clearer explanation and definition of ecosystem capacity. Several areas, including treatment of capacity, overlap with the SEEA CF and it would be helpful to have, if not an explanation of the differences and similarities, then signposting to the CF when overlaps occur.

6.25. Water purification services aren't purely intermediate, in fact this is not the preferred treatment, so it would be worth making that clear here.

6.32 final bulletin point. *Spatial functions are not treated as either ecosystem services or abiotic flows. Two main types are identified (i) the use of the environment for transportation and movement on land, water or through the air; and (iii) as the base for buildings and structures; and (ii) the use of the environment as a sink for pollutants and waste (beyond the mediation of such residuals by ecosystems which is treated as an ecosystem service*). It's not clear from this that carbon storage is not to be included as a spatial function.

It would be helpful to link more explicitly to the overlaps and differences in the EA and CF accounts here: provisioning services and abiotic flows are covered extensively in the CF.

N.B. Typos: Three main types are listed rather than two and the (ii) and (iii) are the wrong way round.

6.34 / Table 6.1. Abiotic flows are covered under CF and SNA, but no clear guidance on transport spatial functions is given in either document, even though these are acknowledged as part of the "contributions from the environment".

Table 6.3. The ecosystem services list is really helpful and clear. It would also be helpful to have these mapped to the CICES and the other ecosystem services classification. It might be useful to summarise or signpost to the livestock explanations that come later in the chapter.

Water supply. Can be seen as an intermediate service to e.g. agricultural biomass services?

Water purification services. The use of the words 'excess' and 'storage' in relation to nutrients would seem to need more care. 6.116 refers to excess in relation to the limits of capacity to mediate; and 6.117 makes it clear that the storage of unmediated pollutants is not an ecosystem service. Hence from the use of these terms, there can be no ecosystem service relating to excess nutrients. It would be better to delete the word 'excess' so that the service only relates to mediated pollutants.

The related question is whether there is a storage/retention ecosystem service in respect of mediated pollutants, and if so whether it is in addition to the mediation service and how one might measure it. This might depend upon the nature of the pollutant: some pollutants are absorbed and hence stored, and some are actively altered. Pollutants which are absorbed (including PMs?) could be released at a later point and hence there are parallels to the proposed treatment of carbon.

Recreation and related services. Good to see that 'local' and tourism visits are no longer distinct services. However, depending upon the definition of local (day trippers can and do travel hundreds of kilometres), there would still seem to be a risk that the guidance given leads to non-local day tripper visits being overlooked.

Other cultural services. Some confusion here. Artistic services are included under spiritual services but 'representative interactions' are included in education services. Artistic services are not further described in the text and would seem to fit better under the 'intellectual' category.

6.93. IPCC advice. Given that the scope is different, there is presumably some advice we should not follow?

"Changes in the stock will reflect capture and release of carbon". More care needed – elsewhere in the text we refer to removal of carbon, as it is acknowledged that removal from the ecosystem does not automatically imply release.

6.97. "Little or no risk of carbon removal". This would seem to be a key phrase, relevant to the convention of maximum 2m depth of soil; also to the treatment of remote stores of carbon and carbon in soil under dwellings; and to the valuation approach (is the storage of carbon at high risk, a more valuable service?). It might also be appropriate to distinguish here between risk of removal and risk of release. The accounting implications of this qualification need much further discussion.

"Above ground (including seabed)". The brackets are misplaced, they should come after the 'plus', as the substances in the seabed are presumably not above ground. But why is the 'plus' limited to peatlands and organic rich soils – aren't all soils (and other near surface) containing carbon which is at risk of removal, to be included?

6.103 and 6.105. Not convinced how the second type of cultural service is sufficiently distinguishable from non-use values, especially when donations reflect that non-use value. How is a conservation motive reflected in a "direct experience"?

6.119. The reference to a "portion of the direct economic benefit" seems to be confusing the benefit of using the sink service with the benefit of having the water purification service. The latter doesn't need to be reduced. However, the treatment proposed – of recording the polluter as the user – does not seem right: the user is the user of the mediation service - which may be the water company and may be measured by reductions in operating costs. The valuation might be based on the avoided costs to the polluter but this doesn't make them the user of the service.

Annex 6.1
Logic chains. It would be good to have logic chains for a wider selection of services, in particular for water filtration.

7.31 to 7.32. Overplays distinction between local and global public goods. Flood mitigation is a public good, non-rival and non-excludable. The difference to carbon is that there are identifiable beneficiaries within a local geography. Use would be by "households"; the problem comes with monetisation: a replacement rather than damage cost approach to valuing water regulation shifts the focus of the beneficiary to Government rather than Households; a similar challenge applies to valuing air filtration services.

In general it would seem better to avoid the dichotomy, and recognise and provide for the existence of quasi-public goods. These are only mentioned once, in A12.13.

7.52 and 7.53. We agree with the proposed treatment of business benefits from recreation services.

7.73 to 7.76. See comments below. It is not meaningful to assume zero baseline for air filtration – bare soil and even buildings will absorb some pollutants.

Table 7.7.
Global climate regulation. Worth adding a comment "Relates to the organic carbon stores judged to be at risk of removal and/or release"?

Water flow regulation counterfactual. We need to say something about the nature of the bare earth – e.g. is it compacted or not? The assumption must be that it is in a 'natural unvegetated' state, but without micro-organisms it might well be less porous than it otherwise would.

Water purification counterfactual. As it stands, this is effectively 'no service', which is circular. Whereas the earlier examples all related to 'no ecosystem functioning'. A counterfactual of 'no service' won't be much help in measuring the service, for example in relation to short lived pollutants. One possibility, equivalent to bare earth, is of an unmoving abiotic (i.e. no active biotic elements) water body. That is, an aquatic environment which is doing nothing to provide the service.

Question 5. Do you have comments on Chapters 8-11 of the draft SEEA Ecosystem Accounting?

Chapter 8

General. Much of this chapter concentrates on the size of the value but we would emphasise the importance of prices as information within an appropriate local and international context. For instance, it is important that if there are significant drops in agricultural productivity globally that the price reflects the relative increase in importance of the local production.

The price doesn't tell us the absolute value of these services to humanity because that is often infinite. They tell us about the relative supply and demand given everything else that is going on, which is more policy relevant. For example, having a large provisioning service value relative to GDP may be a sign that the economy is not sufficiently decoupled from extractive use of the natural world and needs to be adding value much further up the supply chain to promote more sustainable wealth.

8.4. The support of "micro-macro linkages" is an interesting thought and should be expanded upon. Individual CBAs can risk us highlighting individual changes and missing the wider or cumulative impacts on our natural capital. A key benefit of a national framework should be to capture the wider degradation and feed this back into the micro-analyses.

8.20. Perhaps the text needs to acknowledge, if not address, upfront a fundamental internal contradiction – namely, that exchange values should reflect the current institutional context, but the current institutional context is that there is no market / exchange value for many ecosystem services.

8.28. We should consider the possibility that the production boundary may change in subsequent SNA revisions.

Chapter 9.

General. For non-market ecosystem services, the exchange value justification could be strengthened by reference to (a) a clear description of the notional users and beneficiaries; (b) the logic that the loss of the ecosystem service would increase economic costs elsewhere in the economy, for government, businesses or households, either because of damage or mitigation (whichever are the lower); (c) whether government may be posited as a (monopoly) buyer, especially of regulating or cultural services as a means of meeting public policy objectives (e.g. investing in urban parks to save on health costs; or in forestry to reduce carbon and pollutants) . These possibilities are not mutually exclusive.

9.11, 2nd bullet. The example of aesthetic enjoyment could be spelt out more to elaborate the principle of different metrics for physical and monetary. Text currently is not clear, but this is practically quite relevant. Note also the tension where valuation via replacement cost intuitively suggests a different beneficiary from the user (e.g. where government would pay replacement costs in the absence of a regulating service to avert health or property damages e.g. flood regulation, air pollution removal.)

9.22. Pollination services "not additional to the service of land". This is ambiguous, should it state additional to the value of the provisioning services"? If it's land in the round, that would not itself be a direct ecosystem service value.

9.25. What services other than crop production or grazing are likely to be implicit in farm **rental values**? There is more likely to be divergence when looking at sales of farmland, as the value of the asset may reflect other factors (e.g. future subsidy flows, lifestyle motivations, development and diversification potential) – but these would not affect a standard farm rental? Farm rentals over time also have the merit of reflecting the quality / yield of the soil.

9.28. If you apply a social carbon cost what are the implications? Especially if a global carbon price is used?

9.32. **Similar markets method**. This in theory could apply to many recreational assets, where there is a large sample of sites involve parking charges. One problem is though, similar to SEV, that if you applied those prices to all comparable sites, visitor demand would go down, and would need to be properly modelled – in other words, this method leads to an over-valuation. The same would apply with the mushrooms example, where use of non-marketed wild mushrooms would fall if charged. The current text just focuses on the reverse link of non-marketed mushrooms affecting the market price. The text could clarify to what extent the over-valuation implicit in this method is tolerable.

9.34. A further issue is that the estimates are often based on national level data and lack the granularity required to estimate values for more spatially explicit areas.

9.37. **Hedonics**. A key challenge is, assuming perfect modelling, identifying the nature of the ecosystem service revealed by the modelling – more than one service / benefit may be involved - and the extent to which this overlaps with other values e.g. recreation. Compilers should set out their reasoning why hedonic values are additive to other values.

9.42 to 9.44. **Travel Cost.** Some confusion in drafting. The TCM is about modelling a demand curve, but here the modelling is referred to under "Travel Cost data". There are basically two options: the sophisticated TCM (which gives consumer surplus, so not directly an accounting price); and consumption / travel expenditure approach (mentioned twice, in 9.42 and 9.44) based on actual travel cost data, which is more practical, but has the disadvantage of not directly valuing the ES contribution. In the expenditure approach, we see this as a proxy for the value of the service, not as a re-allocation from SNA sectors to the ecosystem assets of recreational sites. In both TCM and expenditure approaches, ideally also need to net off non-ecosystem costs / inputs which will be part of the output of recreational sites (e.g. playgrounds, visitor attractions, maintenance, signage, paths etc.).

9.48, 9.49. **Damage costs**. In principle, damage costs will be greater than replacement costs. Take for example flood regulation. A replacement cost approach (if applied correctly) that say values the cost of man-made replacements to forests, saltmarsh etc. will provide a lower bound to the welfare benefit; but a damage costs approach would value the likely damages to properties etc. that would occur in the absence of a replacement. This necessarily will be higher than the replacement cost (e.g. we build flood defences to avoid damages that are much greater than the cost of flood defences), so it is not a "least cost" approach if a replacement cost approach is available (although the latter may not be as robust). It is also problematic to posit that potential flood victims would actually be prepared to pay up to the full extent of the potential damage. Here the beneficiary may be the Government rather than households (in terms of reduced costs of building and maintaining flood protection

infrastructure), so there is a disconnect between physical user and the monetary beneficiary.

9.65. This para accepts that non-SNA benefits includes improvements to **human health** in terms of air filtration (also 12.24). In this case there is no logical reason in principle to preclude health improvements that arise directly (in a physiological sense) from physical activity within ecosystem assets. These in principle can be measured and valued by a "contribution to health" function that relates physical activity to "quality adjusted life years" which is a metric with a replacement cost value (i.e. without green spaces, the health service would have to spend more on maintaining the quality adjusted life years that are no longer supplied). Clearly there are data and conceptual challenges, but they don't seem to us in principle different from the valuation treatment for air filtration services. It's unclear that paras 12.24-26 on health provide a distinctive alternative treatment (what would this look like for air filtration).

Chapter 10.

10.67. At what point should government policy be reflected in projections? This is vital and may cause issues. In general we seem to be edging towards so-called 'funded commitments', even though these are not always met or the funds may not result in the expected change.

10.17. This para refers to 'declines in condition'. It remains ambiguous as to whether this implies a direct link with the change recorded in the condition account for the accounting period, or is something more nuanced, e.g. taking into account more qualitative information about the change over a number of years. Annex 10.1 refers to 'a direction of change' but this raises questions about how to attribute degradation to particular years.

Footnote 78. The recognition that there is an issue with the timing of the first year discount is welcome, but we don't think the reference to returns accruing at the start of the year is right. Because the formula applies a discount to the returns in the first year, they are effectively all discounted at the full rate i.e. they are deemed to occur at the end of the year. Whereas if they were deemed to occur at the start of the year then they would not need to be discounted at all, and if they occurred at mid-year then they would need to be "semi-discounted".

Figure 10.1. It would be better to call 'crops' as 'cropland', in line with the text in A10.2 and with the nature of the ecosystem.

10.60. Another good example for regulating services is the likely increasing value of urban vegetation for local climate regulation with projected increase in hotter summers in future.

10.72. The reason for the use of declining discount rates is to allow for increasing uncertainty (largely concerning future income growth) about the more distant years.

A10.2. Changes driven by degradation/enhancement. This is least likely – it's most likely that the changes will mainly be explained by price and other volume changes.

Footnote 84. We welcome this qualification.

Table 10.2.
The heading "Q (cumulative stocks)" is wrong, these are in fact cumulative flows.

It would be better to show the discount factors to 2 decimal places.

Should show the units in dollars as these suddenly appear in Table 10.4.

A10.11. The use of the term 'accounting periods' to represent the period over which future returns are projected is a bit confusing. Section 10.3.5 refers to asset life and sticking with this would be preferable. Otherwise need to make it clear that these are "all future accounting periods" rather than "all accounting periods".

A10.12 and A10.13/A10.14. These paras would seem to be the wrong way round: better to run through the generalised equations and then run through the example.

A10.15. A10.12 uses the example of recreation services, which isn't carried through and instead we skip in A10.15 to carbon services. Need either to stick with recreation or change A10.12.

Table 10.3. Should show the units in dollars as these suddenly appear in Table 10.4.

The calculation takes into account Footnote 86 but it would be better to make this part of the main text as it's not immediately clear that the formula in A10.13 isn't entirely the one used in the example.

Table 10.4. A slight warning that this anticipates the decomposition into degradation/ enhancement, rather than concludes on the volume/price decomposition, would seem to be needed.

A10.20. The reference to "the direction of change" in ecosystem condition was unexpected, and seems to be out of line with our efforts to establish concrete links between the condition account and the monetary asset account. Previously we established that the process should link degradation to actual reductions in condition recorded in the accounting period. Para 10.17 doesn't go quite this far

but does refer to a decline in condition (rather than an expected decline, or a direction of change). A10.21 is more specific: degradation is recorded when the condition account for the accounting period shows a decline in condition and the volume change in the asset account is negative.

A10.21. Following on from the above, there is the possibility to be even more specific, by limiting degradation to a decline in those the indicators in the condition account relating to that particular service.

Table 10.6. Again, it's not clear from footnote 90 that the 3! combinations and not just the formula in para A10.27 have actually been used to calculate the figures in the table.

Chapter 11.

Section 11.3. We are broadly happy with the approach taken, except that a clearer distinction needs to be made between the value of ecosystem assets as calculated in accordance with Chapter 10, and the value of other environmental assets. The current draft simply generates confusion between the two.

Table 11.3. This needs a separate entry for 'other (non-ecosystem) environmental assets', which will allow the entries for ecosystem assets to be consistent with the ecosystem asset accounts. It will also side-step any issues concerning a divergence between the valuation of Work in Progress and the NPV of future flows of a particular service.

11.33. "valuation of these [timber] resources will align with the value of the associated provisioning services supplied by ecosystem assets." This seems highly unlikely if the capitalised value of the latter is based on the NPV of expected future flows. In which case any difference will need to be accommodated within Table 11.3.

11.34. "SNA values for livestock and aquatic resources should be deducted from the value of produced assets and recorded against the total value of terrestrial ecosystems (or freshwater and marine ecosystems in the case of cultivated aquatic resources)." This would seem to go against the advice in the rest of the SEEA EA that livestock and at least some cultivated aquatic resources are not produced by ecosystems and therefore their value cannot be recorded as part of the value of terrestrial or aquatic ecosystems.

Instead, the table needs a clearer distinction between ecosystem assets and other environmental assets, with the former fully aligned to the approach to valuation as set out in Chapter 10. This means that "the contribution of terrestrial and aquatic ecosystems to the SNA values for livestock and aquatic

resources should be deducted from the value of produced assets and recorded against the value of the relevant ecosystem type; the remaining part of the SNA value of livestock and aquatic resources should be recorded separately under 'other environment assets'."

11.36. The reference to energy in the title would seem to refer to fossil fuel and geological energy sources? It would not be appropriate to record wind, biomass, wave, solar energy etc. under deep geological systems. Note that it will include open cast mining of fossil fuels so some additional clarification will be needed.

11.37. Again, for clarity, the capitalisation of any service from peatland which is not defined as an ecosystem service should be recorded separately to the value of the ecosystem asset.

11.42. The recommendation that inland water resource SNA values should be seen "as additional to the value of ecosystem services of freshwater ecosystems" would seem to depend upon the approach taken to the valuation of water-related ecosystem services. In the event that the Resource Rent of water supply is treated as an ecosystem service, then the SNA value may not be wholly additive to the capitalised ecosystem service value.

Question 6. Do you have comments on Chapters 12-14 of the draft SEEA Ecosystem Accounting?

Chapter 12.

This section is quite challenging to understand. It covers a lot of complex theory without explicit reference to prior sections of the guidance. It covers a lot of topics and whilst interesting is perhaps raising more questions than answers. It is at risk of leaving the reader requiring more guidance as to when these alternative approaches would be best applied.

12.9: "In addition, other people who do not visit the site have a non-use value for it (of 25)." – Should be 15 not 25?

Table 12.1. The bridge table is helpful.

12.11. The assumption that provisioning services have no consumer surplus is problematic and creates inconsistencies in treatment, even if it is unavoidable.

Non-use values are not always easily identified with an ecosystem service, perhaps more related to the value of the in situ asset than to any particular service.

12.19. The reference to excess fertiliser use relates unmitigated pollutants and to water that is abstracted by the water supply company. Otherwise there are no additional costs borne by the water company.

12.47. It would be good to reference the draft BSI standard in a footnote. https://standardsdevelopment.bsigroup.com/projects/9020-04869#/section

Chapter 13.

Ocean accounts

Section 13.5. While the draft rightly emphasises the multi-faceted nature of ocean accounts, incorporating Central Framework, Blue Economy and Governance elements, the coverage in this chapter needs to say much more about the ecosystem accounting elements and the potential issues and how the ecosystem accounts fit into the picture. For example, there should be more about the ecosystem services which are specific to marine ecosystems or need special further explanation (such waste mediation or carbon burial); more about dealing with the three-dimensional nature of the ecosystem and the migratory component assets; and possibly more on data issues – e.g. reliance on the use of pressure indicators in the absence of more direct measures of condition, and on the lack of knowledge about the nature of the seabed (as set out in the JNCC report on the UK accounts).

More specifically:

13.65 – "an integrated and standardised set of accounts that record economic activity, social conditions and environmental conditions". Why is there no mention of the ecosystem in this sentence?

Figure 13.2. This is far too simplified. Where do ecosystem asset fit into the framework? Where do non-market ecosystem services fit in? Where are the flows? What are the relationships between the entries?

13.74. Biotic ecosystem services is a new term. Section 6.4.5 discusses abiotic flows but the definition is based on the active role of the ecosystem in generating the service rather than on the nature of the flow.

Is this all that four pages on ocean accounts in a document on ecosystem accounting has to say about ecosystem services?

13.75, final sentence. Surely we could find a better example of a marine ecosystem service. It's not even clear what the service is. The draft Ocean Accounts Guidance gives a useful list of relevant services, but charitable donations don't feature there.

Urban accounts

13.90. Detail and "continuous urban extent" are seen as differentiators of a "thematic" account. This is a little vague – could say more about how a core urban ecosystem type account might differ from a "thematic" urban account and what this might look like. "Thematic" accounts are presented as bringing together information from different accounting sources. This could be made clearer in the urban section on what non-ecosystem accounting (from Central Framework, SNA) information might be relevant to an urban thematic account.

13.98. There is a tension between national applications and specific local applications of urban accounts, because they have different drivers / focus. In UK experience, at national level we try to see urban areas in morphological terms, and what they have in common regarding ecosystem services (although we have some spatial disaggregation). But city-level accounts have tended to adopt slightly different methodologies e.g. in terms of valuation. Need to stress that in latter case, repeating the accounts is important and also the extent to which local-level applications follow accounting methods that are consistent with national picture.

13.96. Urban airshed. We agree that air quality may be a predictor of some recreation / amenity, and indeed regulating services, but does that make it an ecosystem asset? Better to say it is a condition indicator (as in Chapter 5)?

May need to recognise that there are many spatial information sources, models and studies in urban areas which may not have been developed with an accounting approach in mind. For example, models or spatial analyses which are "one-offs", or adopt unique classifications. Where city-level accounts are produced, in the UK experience, they are often presented as one-off studies, rather than the start of a process of repeated and ever-refining accounts. National accounts can provide a source of both data and inspiration for local-level accounts to make this ongoing investment.

Chapter 14.

14.29 and Table 14.4. The more general point needs to be made that in all but the last case (cost of degradation), the indicators listed have to be treated with care as it is not possible to tell without further analysis whether a change in the metric is a positive or a negative.

It would be worth expanding further on all of these indicators.

(1) GEP appears to have some status already established as an indicator. However, in practice it seems to be seen as a mechanism for maintaining cross-boundary flows of ecosystem services. In which case it is not so

much the indicator itself which has policy relevance so much as certain components of the aggregate. As with the following three indicators, changes in the aggregate metric over time need to be interpreted with care.

More often than not it is the relationship between market and non-market services which is important. However, more work is needed in order to establish the implications of changes in the ratio between the two, and whether these implications vary depending upon the ecosystem type.

Another possibility is to link the monetary service account with the extent account, to derive measures of ecosystem service intensity.

(2) Value of ecosystem services linked to industry value-added. There are two possible metrics: i) the relative significance of ecosystem services in the share of an industry's GVA; and ii) as an input into an assessment of the GVA at risk in the absence of ES (the WEF paper refers). More explanation is needed about the nature of the second, as it is difficult to see quite what the indicator itself is in this case. The WEF paper estimates the share of the industry GVA which is at risk – but this doesn't appear to bear any resemblance to the "percentage by ecosystem type" set out in Table 14.4.

(3) Ecosystem asset value per capita. It is difficult to see what merit this indicator has. Per capita values will generally be lower in densely populated areas, and higher in heavily visited tourist but low resident population areas. A more common metric is values per hectare. This is a useful illustration of an indicator compiled by linking different accounts together, although caveats on the use of these values to impute value for individual assets will be needed.

There are other possibilities. The first is simply to monitor the aggregate value: increases in the asset value will generally be interpreted as a positive, although reductions in the asset value may not indicate a loss of natural capital.

The second is the relate the current value of services from an asset or ecosystem type, to the asset value. Changes in this ratio give an indication of the extent to which the current level of services is or is not expected to be maintained into the future.

A third possibility is to compare restoration and maintenance costs with asset values.

(4) Asset value as a percentage of national wealth. This is very much Table 11.3 territory. It's not clear quite clear what changes in the percentage would tell us.

(5) Cost of degradation (=consumption of ecosystem capital?). This is the only indicator that explicitly links the condition account with the monetary accounts. To the extent that the impact of changes in

ecosystem type on the asset value are measured separately, it would seem to be worth thinking about an indicator that reports on the impact of these changes in addition to one that reports on the impact of changes in condition. The latter is of course dependent upon the look-up table (Table 10.5) effectively capturing the relationship between changes in condition and changes in asset value.

14.29 and Glossary. The Glossary defines GEP as domestic production less imports. It needs to be made clear that these only relate to imports of intermediate services (para 7.45 refers). Other forms of imports e.g. fish caught by resident operators from areas outside the EEZ, should not be subtracted from domestic production.