



DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
UNITED NATIONS



System of
Environmental
Economic
Accounting

System of Environmental-Economic Accounting 2012 – Experimental Ecosystem Accounting Revision

First Global Consultation on:

Chapter 8: Principles of valuation for Ecosystem Accounting

Chapter 9: Accounting for ecosystem services in monetary terms

Chapter 10: Accounting for ecosystem assets in monetary terms

**Chapter 11: Integrated and extended accounting for ecosystem services and
assets**

Comments Form

Deadline for responses: 6 July 2020

Send responses to: seea@un.org

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The comment form has been designed to facilitate the analysis of comments. There are twelve 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 the following e-mail address: seea@un.org.

All documents can be also found on the SEEA EEA Revision website at:

<https://seea.un.org/content/seea-experimental-ecosystem-accounting-revision>

In case you have any questions or have issues with accessing the documents, please contact us at seea@un.org

Questions related to Chapter 8

Question 1: Do you have comments on the principles proposed to underpin monetary valuation for the revised SEEA EEA, including the use of exchange values and net present value approaches?

Click here and start typing (The length of your response is not limited by this text box.)

Question 2. Do you have any suggestions for topics to include in Annex 8.1?

Click here and start typing (The length of your response is not limited by this text box.)

Question 3. Do you have any other comments on Chapter 8?

Click here and start typing (The length of your response is not limited by this text box.)

Questions related to Chapter 9

Question 4. Do you have comments on the range of valuation methods proposed for use in estimating exchange values of ecosystem services?

Click here and start typing (The length of your response is not limited by this text box.)

Question 5. Do you have any other comments on Chapter 9?

Click here and start typing (The length of your response is not limited by this text box.)

Questions related to Chapter 10

Question 6. Do you have comments on the definitions of entries for the ecosystem monetary asset account including ecosystem enhancement, ecosystem degradation and ecosystem conversions?

Click here and start typing (The length of your response is not limited by this text box.)

Question 7. Do you have comments on the recommendations concerning the selection of discount rates for use in NPV calculations in ecosystem accounting?

Click here and start typing (The length of your response is not limited by this text box.)

Question 8. Do you have comments on Annex 10.1 describing the derivation and decomposition of NPV?

Click here and start typing (The length of your response is not limited by this text box.)

Question 9. Do you have any other comments on Chapter 10?

Click here and start typing (The length of your response is not limited by this text box.)

Questions related to Chapter 11

Question 10. Do you have comments on the proposed structure of the extended balance sheet that integrates the monetary values of ecosystem and economic assets?

Click here and start typing (The length of your response is not limited by this text box.)

Question 11. Do you have comments on the approaches to assigning the ownership of ecosystem assets that underpins the structure of the extended sequence of institutional sector accounts?

Every good or service consumed has a private or collective owner. Establishing the ownership of product consumption leads us to the non-financial corporation and government institutional sectors, which through a social pact are those which law fully appropriate them individually and in representation of a collective of consumers.

It is necessary to define economic activity as the existence of at least one of the classic production factors of the land (environmental asset), human labour and manufactured capital investment. This definition of economic activity allows us to incorporate the harvesting of free access natural resources, which involve no human production factors like an environmental work in progress product or an ordinary environmental net operating margin of the public activity belonging to the government; therefore, it is not necessary to include other human activities in the household institutional sector.

Question 12. Do you have any other comments on Chapter 11?

Comments on the integration of the standard accounts in the extended ecosystem accounts

The draft chapter 11 of the SEEA-EEA still has the limitation of not having refined the structure of the production and capital balance accounts integrated in the total incomes system of the society extended accounts in a national/subnational territory. In this respect, the SEEA-EEA is a sub-system of environmental economic accounts integrated in the extended accounts of an area with activities which include biological production factors in which there is no human economic intervention, but final consumption.

In the following paragraphs the review notes are divided into a first part providing general comments and a second part in which the structure of the institutional sectors, products, costs, valued added and ecosystem services in tables 11.3 and 11.4 is refined in accordance with the extended accounts proposal developed and applied to real forest and agro-silvo-pastoral systems and which we have published recently (see bibliography below).

1. Integration of the standard accounts net domestic product at market prices into the total income at social prices of the extended accounts

1.1 General comments

The concept of net domestic product (NDP) in the standard System of National Accounts (SNA) is an incomplete, inconsistent and biased measure of total income (TI) at social prices generated by the economic activities of a country or region. The objectives behind the integration of the standard SNA (henceforth standard accounts) into our extended accounts methodology are to estimate total income at social price along with its classic factorial distribution of labour service income, manufactured capital service income and land environmental income (including marine areas).

Our extended accounts apply a valuation of the consumption of commercial products based on the transaction price in the standard accounts, they extend the concept of economic activity in the standard accounts to include economic activities with production functions in which no human production factors are employed, and they substitute the valuation at production cost of final products consumed without market prices under the standard accounts for the simulated transaction price of the revealed and declared amounts consumed by the users.

The limitation of the standard net domestic product with respect to the theoretical concept of total income of society is mainly due to political decisions by governments and to a lesser extent to the debate around the concept of total income. Our extended accounts avoid the bias, omissions and inconsistencies of the standard accounts through the following refinements and extensions: (i) omission of commercial intermediate products, (ii) omission of non-commercial intermediate products of government compensations (annualized net subsidies of taxes on production and capital), (iii) omission of own ordinary commercial and non-commercial intermediate consumption of government compensation services, (iv) omission of the final products of natural growth of woody products and hunting (game hunting), (v) omission of ordinary intermediate consumption of work in progress used of standing stock of biological products at the opening of the period, (vi) incorporation of the livestock fixed capital gain in the final product, (vii) omission of the voluntary opportunity cost represented by the entries of non-commercial intermediate products of services of amenity and donation, and their counterparts of own ordinary non-commercial intermediate consumptions of services of amenity and donation, (viii) valuation according to the manufactured production cost of final products without market prices, which is substituted for the transaction price revealed or declared by the willingness to pay of final consumers, (ix) omission of the imputation of normal ordinary manufactured net operating surpluses of government activities, and (x) omission of economic activities without manufactured production factors.

The inclusion of the capital gain in the extended accounts is not a novelty, since the standard accounts include it in the valuation of manufactured fixed capital according to the replacement cost and in own-account gross formation of livestock inventory net of purchases.

The incorporation of the simulated transaction price of final products consumed without market prices is also not a novelty in itself, since the standard accounts simulate the transaction price of the consumptions of final products of the government activities

assuming that it is equal to the production cost, and the extended accounts in this case change the cost price for the simulation of the price based on the revealed and declared consumer preferences.

Whereas the production cost is inconsistent with total income theory, the simulated valuation in the extended accounts is, in this case, consistent with the concept of total income estimated at social prices.

Below we present a selection of the society total income system terms in the extended accounts, specifying explicitly the environmental income links:

1. Total income (TI) is the net value added (NVA) plus capital gain (CG).
2. Total income is labour cost (LC) plus manufactured capital income (CI_m) plus environmental income (EI).
3. Net value added is labour cost plus net operating margin (NOM).
4. Net operating margin is the manufactured net operating margin (NOM_m) plus environmental net operating margin (NOM_e).
5. Capital gain is the manufactured capital gain (CG_m) plus environmental asset gain (EA_g).
6. Manufactured capital income is the manufactured net operating margin plus manufactured capital gain.
7. Environmental income is the environmental net operating margin plus environmental asset gain.
8. Environmental income is the ecosystem service (ES) plus change in adjusted environmental net worth (CNW_{ead}).
9. Ecosystem service is the environmental work in progress used (WPe_u) plus ordinary environmental net operating margin (NOM_{eo}).
10. The change in the adjusted environmental net worth is the natural growth (NG_c) minus degradation of the fixed environmental asset (CF_{Ce}) plus environmental asset gain minus environmental work in progress used.

The aforementioned ecosystem services and incomes are all derived from the total income of the individual activities. An activity contains a main product, from which the name of the activity is taken, and complete production (including the residual estimates of the net value added and the ecosystem service) and capital balance accounts (divided into work in progress and fixed capital).

The corporation and government activities are additive and are linked to each other in a spatial economic unit, for which the aggregate total income for all the individual activities is valued.

The proposal of the authors of the SEEA-EEA, which includes the ecosystem services as final products in a new government institutional sub-sector called the “ecosystem trustee”, is not consistent with the theoretical concept of total income. However, if the value of the consumption of a final product coincides with that of its ecosystem service, this tells us that the only production factor involved in the generation of the product is the ordinary environmental net operating margin, and that, given they are economic income, they coincide in value but not concepts. In other words, we can consume the products but not the ecosystem services that contribute to part if not all the value of the product.

The corollary of these brief comments is that we must integrate the refined standard accounts in the extended accounts, thus satisfying the economic principal that the observed or simulated transaction value of the final product consumption is the consistent criterion for the measurement of total income and other incomes subject to consistency with the total income concept. The SEEA-EEA lacks the objective of measuring total income and its classic factorial distribution, thus is incapable of mitigating the various limitations observed in this draft currently subject to consultation. In short, the economic income is a subjective residual value and cannot be determined without previously having estimated the total capital gains and margins of the individual products of the georeferenced economic unit, since the order of preference of the remuneration is labour compensation, the ordinary manufactured net operating margin and finally, the possible existence of ordinary environmental net operating margin.

1.2 Single comments

We define economic activity as that which generates a main product, the production function of which contains at least one production factor appropriated individually or collectively by the farmer and government institutional sectors. The production factors are the classic land (environmental asset), human labour effort and manufactured capital factors.

The correct valuation of the consumption of final products will come from the prices and quantities of the observed and simulated transactions of the final products consumed without market price derived from the revealed or declared consumer willingness to pay in the period in which the products are valued.

We define ecosystem service as the contribution of nature of the spatial economic unit to the value of an individual product consumed, generated in the period and valued according to its social price.

The social price is defined as the incorporation of the non-commercial intermediate products of services and their counterparts of own ordinary non-commercial intermediate consumptions of services into an individual activity. The non-commercial intermediate products of services are originated by the government compensations and the voluntary manufactured operating opportunity costs of the owners of the territorial unit.

We understand our definition of ecosystem services as being consistent with that given in the glossary of the draft SEEA-EEA: "Ecosystem services (ES) are the contributions of ecosystems to benefits used in economic and other human activity". However, Table 11.3 shows the final product of natural growth of timber (gross formation of environmental work in progress) as an ecosystem service, whereas in fact this is a concept that refers to an expected future consumption, hence it would not be an ecosystem service of the period since it does not form part of the consumption of the product in the period.

Due to the need to clarify the meaning of the net operating surplus (NOS) concept in the SNA we avoid using it in the extended production account since, in the case of timber, it contains the value of the intermediate consumption of the environmental work in progress used (WPeu). We substitute the net operating surplus for the net operating margin, which represents a pure capital income having subtracted the WPeu from NOS.

The extended production account incorporates the natural growth in the final product and the environmental work in progress used in the intermediate consumption of the individual activity, thus avoiding the timing bias in the estimate of value added in the standard SNA.

In our extended accounts the resource rent is attributed to the on-site activity which generates it. For example: the resource rent of the consumption of the final product of stored forest water is attributed to the forest and the irrigated crop will register the same value as environmental intermediate consumption incorporated in the final product along with the gross formation of manufactured capital of the growth of the cultivated trees. In practice, the free cession by the government of the resource rent of forest water to the owner of the irrigated land is considered to be property of the latter in the forested land and that it is “purchased” for use as environmental economic input in the operation of the irrigation.

The standard accounts estimate the cost of manufactured inanimate fixed capital consumption and livestock fixed capital is not amortized. In this case the standard accounts estimate the total income and not the value added, since the variation in the livestock inventory net of the purchases in the period is admitted as gross capital formation. In the case of woody vegetation inventories, the standard accounts omit the environmental degradation and gross capital formation (natural growth). The adjustment of incomes and net worth by the SEEA-EEA represent implicit recognition of the total income, although it is not defined as such in the ecosystem accounts.

The double counting of an ecosystem service which is already included in the product of wheat is an unnecessary accounting artifice and it is inconsistent to include it as intermediate consumption when it is in the production function of wheat that it is visible as resource rent in the form of ordinary environmental net operating margin.

It is not necessary to incorporate the household institutional sector since the government can be considered as owner of the atmosphere, representing consumer collective ownership and there is no transfer of final product auto-consumption. Nevertheless, it is necessary to estimate the existence of the simulated transaction value though revealed or declared preferences of the auto-consumers (collective owners of the atmosphere).

The extension of the standard accounts can originate mainly in the incorporation of a new activity (e.g. air filtration) and from substituting the valuation of the final products consumed of government activities in the SNA for their simulated transaction prices revealed or declared by the final consumers.

The adjustment of the gross/net value added in the SEEA-EEA is due to the absence of total income estimate for the spatial economic unit. It is necessary to consider the work in progress used inventoried at the opening of the period as production factors of the land (including the sea) as well as the environmental net operating margins as the operating return of the environmental assets embedded in the total product of the period. It is not necessary to adjust the production function gross/net value added of a product in which it is embedded; consequently, it is inconsistent with operating income theory that the latter be adjusted.

It should be understood that the implicit adjustment of the gross/net value added is due to the recognition that it does not measure the total income of the individual product, but in such a case, the adjustment of the GVA/NVA is that of the capital gain of the product which originates the true total income of the product. In other words, the adjustment of the GVA/NVA which is consistent with the measurement of total income is that of the revaluation of capital minus destructions and instrumental adjustments of capital to avoid double counting of the extended gross/net value added in the value of the total income.

2. Critical comments on the extended production accounts of the SEEA-EEA

This critical note on the sequence of entries of the extended production account of an individual economic activity is based on our definitions of economic property right, production function and ecosystem service, among others that we omit here in order to simplify our reasoning (see below bibliography list). We refer here to the refined tables presented and to the information provided in tables 11.3 and 11.4 of the draft chapter 11.

2.1 Comments on Table 11.3: Models for including ecosystem services in the sequence of accounts (excluding financial account and change in balance sheet entries)

An area of agricultural land generates a final product consumption composed of wheat of \$200 and atmospheric pollution mitigation service of \$30. The total cost of the wheat crop is \$50 ordinary labour compensation, \$10 consumption of ordinary manufactured fixed capital and the ordinary environmental fixed operating margin is \$80. To simplify, the ordinary manufactured intermediate consumption is \$0 and the ordinary manufactured operating margin is \$0.

The farmer gross value added is \$200 and the “net saving” is \$140. The latter is synonymous with the net operating surplus.

As regards double counting of an ecosystem service that is already included in the product of wheat, it is an unnecessary artifice and inconsistent to include it as an intermediate consumption when it is not in the production function of the wheat and is visible in the NOMEo.

Table 11.3 (refined proposal). Stylized extended ordinary production account measurements of net value added and ecosystem services of wheat and air filtration products in a cropland area (market and simulated transaction monetary units).

Institutional sectors	Farmer	Government	Cropland area
Products	Wheat	Air filtration	Wheat + Air filtration
1. Final product consumption (FPc)	200	30	230
2. Ordinary gross value added (GVAo)	200	30	230
3. Ordinary consumption of fixed capital (CFCo)	20	5	25
3.1 Manufactured (CFCmo)	10		10
3.2 Environmental (CFCEO) j	10	5	15
4. Ordinary net value added (NVAo)	180	25	205

4.1 Ordinary compensation of employees (LC _{eo})	50		50
4.2 Ordinary net operating margin (NOM _o)	130	25	155
4.2.1 Ordinary manufactured (NOM _{mo})	50		50
4.2.2 Ordinary environmental (NOM _{eo})	80	25	105
5. Ecosystem services (ES) (3.2 + 4.2.2)	90	30	120
6. Ecosystem service/final product consumption coefficient (ES/FP _c)	0.45	1.00	0.52

2.2 Comments on Table 11.4. Stylised example of an extended SUA from Annex 11.1: Example of an extended supply and use account (draft chapter 11: pp. 18-19)

2.2.1 Refined forestry activity

Part B includes natural growth (NG) of timber as the final product consumed (FP_c) of the new institutional sector of the ecosystem asset and it is defined as the ecosystem service. The FP_c is attributed as input of intermediate consumption of the forestry industry (silviculture). These interactions are inconsistent with the theory of the production function of timber and its total income for the following reasons:

The natural growth (NG_c) at the close of the period is the expected present discounted value of the future consumption at the planned moment of harvesting valued according to the resource rent. At the opening of the period it was valued in the forest environmental asset as opening period expected natural growth (NG_o), where NG_o is NG_c/(1+r). That is, the NVA of the ecosystem asset is overvalued by the value of the expected natural growth at the opening of the period. In other words, the net value added of the ecosystem asset comes down to its revaluation in the period due to the discount effect of being one period closer to the future moment when the physical growth of the wood in the period is harvested. However, the alternative to this overvaluation is to incorporate the adjustment in the capital gain, thus avoiding double counting of the net value added in the environmental income of the timber.

In order to avoid double counting, the natural growth of the timber cannot be included as an ecosystem service of the timber, although it does represent the net present value of the future ecosystem service and it is not consistent to substitute the contribution of nature to the value of a product consumed in the period for the contribution of nature to the expected future consumption of a product.

The refined standard Economic Account for Forestry (código 02) (rEAF) in the case of timber comprises the sub-activity of silviculture (“forestry industry”) without manufactured cost and the timber cutting sub-activity (Manufacturing industry) which only has labour cost. The cut timber is an intermediate product of the silviculture and an intermediate consumption of the environmental work in progress used (WPeu) of the sub-activity of timber cutting. The net value added of the silviculture under the rEAFs coincides with the natural growth (NG) and the refined value added of the cutting under the rEAFI is the final product consumption of the timber (FP_c) less the WPeu. That is, the

estimated farmer net value added of the timber under the rEAF(rEAFs + rEAFI) is the FPc less WPeu.

The present ecosystem service and the expected future ecosystem service are not additive so as to avoid double counting.

The rEAF excludes the visibility of the household institutional sector in the estimate of the ecosystem service of the timber.

2.2.2 Forest air cleaning service activity

Part C presents the final product consumption (FPc) of air filtration service as a concept synonymous with ecosystem service (ES).

In the data presented in Table 11.4 it is assumed that the manufactured intermediate consumption (ICm) and the consumption of fixed capital (CFC) have values of zero.

Table 11.4 (refined). Stylized extended production account measurements of net value added and ecosystem services of timber and air cleaning service products in a forest area (market and simulated transaction monetary units)

Class	Silviculture sub-activity (1.1)	Logging sub-activity 1.2	Forestry activity (1 = 1.1 +1.2)	Air cleaning service Activity (2)	Forest area (1 + 2)
Product	Timber	Timber	Timber	Air filtration	Timber and air cleaning service
1. Final product (FP)	30	80	110	15	125
1.1 Final product consumption (FPc)		80	80	15	95
1.2 Natural growth (NGc)	30		30		30
2. Environmental work in progress used (WPeu)		50	50		50
3. Net value added (NVA)	30	30	60	15	75
3.1 Manufactured net value added (NVAm)		30	30		30
3.2 Environmental net operating margin (NOMe)	30		30	15	45
3.2.1 Ordinary Environmental net operating margin (NOMeo)				15	15
3.2.2. Investment environmental net	30		30		30

operating margin (NOMei)					
4. Ecosystem service (2 + 3.2.1)		50	50	15	65
5. Ecosystem service/final product consumption coefficient (ES/FPc)		0.62	0.62	1.00	0.68

3. Selected bibliography

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