

Accounting for Biological Resources

Advisory Expert Group (AEG) on National Accounts (26th of April, 2022)

Peter van de Ven (lead editor of the update of the 2008 SNA)

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Current guidance in the 2008 SNA

- Biological resources yielding **repeat products** versus yielding **once-only products**
- **Resources yielding repeat products not that problematic:**
 - Typically cultivated
 - Market prices of relevant assets often available (except possibly orchards)
 - Expenditures on growing the future income potential of the asset to be accounted as GFCF, while using up the resources in production to be accounted for as CFC
- **Also resources yielding once-only products in traditional agriculture, such as animals for slaughter and agricultural harvesting, also excluded from analysis:**
 - Typically cultivated
 - Apart from agricultural land (for which market prices are usually available), no assets involved, with the exception of work-in-progress for animals and plants, of which maturing takes more time than the accounting period

Current guidance in the 2008 SNA

- **Remainder is focusing on resources yielding once-only products, such as timber and fish**
- **Cultivated resources:**
 - Output recorded on accrual basis
 - Growth/regeneration and extraction/depletion to be accounted for as work-in-progress
 - Income from leasing: probably output/intermediate consumption???
- **Non-cultivated resources:**
 - Output recorded at the time of extraction
 - Impact on value of asset (growth/regeneration and extraction/depletion) to be accounted for other changes in the volume of assets
 - Income from leasing: rent
- **In both cases: valuation of asset = Net Present Value of expected future returns**

Broadening the asset boundary in physical terms (Section 3)

Already discussed in 14th AEG-meeting

Recommendation:

The AEG “... recognized the analytical usefulness of extending the asset boundary for the uncultivated biological assets or those resources with zero asset value, at least in physical terms, in supplementary tables or extended accounts”

Cultivated versus non-cultivated resources (Section 4)

- Distinction between cultivated and non-cultivated biological resources is depending on whether the **growth (and regeneration) process** of the biological resources **is controlled by, managed by and under the responsibility of an economic agent**
- It shows, however, that in practice it is difficult to make this distinction
- For example, “... *forest management in Europe represents a continuum from intensely managed to totally undisturbed, and a clear-cut division into a cultivated and a non-cultivated category will always be difficult. Often, the data that would be needed to separate the stocks and related flows are not available. It was therefore **decided not to distinguish between cultivated and non-cultivated timber***” (Eurostat 2002a)

Cultivated versus non-cultivated resources (Section 4)

- It is recommended to consider **migrating resources (e.g. fish in open waters) always as non-cultivated**
- For non-migrating resources, two options are considered:
 - **Option 1: A strict application of the significance of management practices**, in which case the biological resources are only considered as cultivated if they are more or less fully managed => only plantations and fish farming would qualify as cultivated
 - **Option 2: Treatment of all (non-migrating) biological resources as cultivated**, assuming that the growth process is, implicitly or explicitly, under some form of control and management by economic agents, either individually or collectively

Cultivated versus non-cultivated resources (Section 4)

- It is recommended to take the **continuum from intensely managed to totally undisturbed as a starting point** for the recording of biological resources, as a consequence of which the distinction between cultivated and non-cultivated ceases to exist
- Ecologically speaking **all biological resources are impacted by human activity** (directly or indirectly)
- However, it would be meaningful to distinguish the **degree of human input versus natural inputs**, which could be materialised **by measuring output**, and growth in inventories, **as the percentage of natural growth that is expected to be exploited in the foreseeable future**

Cultivated versus non-cultivated resources (Section 4)

- Taking it one step further: **treat natural resources as a separate class of assets**
- It would provide opportunities,
 - **To get away from the current dichotomy**, as biological resources always contain an element of natural growth, not induced by human intervention
 - **To classify the various flows related to natural resources in a way which is considered most relevant** for these resources
 - **Time of recording of output**, i.e. accrual recording versus recording at the time of felling trees or catching, **could be relaxed**, and based on practical circumstances and the feasibility of measurement
 - **To give the accounting for natural resources the prominence it deserves**
- Table A.2 in Annex 1 provides a first proposal for such a new classification of assets, including the recording of the most relevant flows, but ...
- ... more to come

Cultivated versus non-cultivated resources (Section 4)

Recommendations:

It is recommended to first make a distinction between migrating and non-migrating biological resources.

- *For migrating resources, it is proposed to always treat them as non-produced assets.*
- *For the non-migrating resources, it is recommended to take the continuum from intensely managed to totally undisturbed as a starting point for the recording of biological resources, as a consequence of which the distinction would cease to exist between produced assets and non-produced assets*

It is also recommended to treat natural resources as a separate class of assets. Such a treatment would not only open the door for not having to make a distinction between produced and non-produced assets. It would also allow for more flexibility in the recording of all flows related to natural resources (see Table A.2 in Annex 1 of the Guidance Note)

Classification, valuation, and accounting for leasing (Section 5)

Classification according to 2008 SNA

- Cultivated biological resources yielding repeat products => separate category under produced assets
- Cultivated biological resources yielding once-only products => inventories
- Non-cultivated biological resources yielding once-only products => separate category under non-produced assets
- (Permissions to use natural resources)

Recommended classification for 2025 SNA

- AN33: Biological resources
 - AN331: Biological resources yielding repeat products
 - AN332: Biological resources yielding once-only products
 - AN3321: Migrating biological resources yielding once-only products (underlying asset)
 - AN3322: Non-migrating biological resources yielding once-only products (underlying asset)
 - AN3323: Work-in-progress on non-migrating biological resources yielding once-only products

Classification, **valuation**, and accounting for leasing (Section 5)

Valuation according to 2008 SNA

- Work-in-progress for cultivated resources: *The conventional way of valuing standing timber is to discount the future proceeds of selling the timber at current prices after deducting the expenses of bringing the timber to maturity, felling, etc.* (para 13.41)
- Non-cultivated resources: *As observed prices are not likely to be available, they are usually valued by the present value of the future returns expected from them* (para. 13.51)

Paragraph 13.41, on the valuation of work-in-progress, has led to considerable confusion and ambiguity

However: “Once you see it, it is easy” (Johan Cruijff)

Intermezzo: work-in-progress versus underlying asset

A (very) simple example:

- Trees take five years to mature
- After five years, trees are felled and sold for 400 (after deduction of felling costs)
- Management costs: 60, consisting of compensation of employees (40) and intermediate consumption (20)

Intermezzo: work-in-progress versus underlying asset

EXAMPLE 1: No discount rate						
	Start	(End) year 1	(End) year 2	(End) year 3	(End) year 4	(End) year 5
Proceeds						400
Costs		60	60	60	60	60
(Changes in) balance sheets						
Inventories (SNA 2008)	100	160	220	280	340	0
Changes in inventories (SNA 2008)		60	60	60	60	-340
Inventories (proposal)	0	80	160	240	320	0
Change in inventories (= output)		80	80	80	80	-320
Underlying asset (proposal)	100	80	60	40	20	0
Change in underlying asset (= depletion)		-20	-20	-20	-20	-20
Production and generation of income account						
Output (accruals for growth of trees)		80	80	80	80	80
Intermediate consumption		20	20	20	20	20
Compensation of employees		40	40	40	40	40
Gross operating surplus		20	20	20	20	20
Return on inventories		0	0	0	0	0
Return on underlying asset		0	0	0	0	0
Depletion		20	20	20	20	20
Residual		0	0	0	0	0

Intermezzo: work-in-progress versus underlying asset

EXAMPLE 2: Discount rate of 5%	Start	(End) year 1	(End) year 2	(End) year 3	(End) year 4	(End) year 5
Proceeds						400
Discounted proceeds	313	329	346	363	381	400
Costs		60	60	60	60	60
Discounted costs	260	213	163	112	57	0
(Changes in) balance sheets						
Inventories (SNA 2008)	54	116	182	251	324	0
Change in inventories (SNA 2008)		63	66	69	73	-324
Inventories (proposal)	0	72	148	228	312	0
Change in inventories (= output)		72	76	80	84	-312
Underlying asset (proposal)	54	44	34	23	12	0
Change in underlying asset (= depletion)		-10	-10	-11	-11	-12
Production and generation of income account						
Output (accruals for growth of trees)		72	76	80	84	88
Intermediate consumption		20	20	20	20	20
Compensation of employees		40	40	40	40	40
Gross operating surplus		12	16	20	24	28
Return on inventories		0	4	7	11	16
Return on underlying asset		3	2	2	1	1
Depletion		10	10	11	11	12
Residual		0	0	0	0	0

Intermezzo: work-in-progress versus underlying asset

Recommendation:

Regarding the recording of (cultivated) biological resources yielding once-only products, it is recommended to split the value, compiled according to the Net Present Value of future resource rents, into a part representing (the) “pure” (building up of) inventories, and another part representing the underlying asset

Classification, valuation, and **accounting for leasing** (Section 5)

Leasing according to 2008 SNA

- *A resource lease is an agreement whereby the legal owner of a natural resource that the SNA treats as having an infinite life makes it available to a lessee in return for a regular payment recorded as property income and described as **rent**. **The resource continues to be recorded on the balance sheet of the lessor even though it is used by the lessee** (para. 17.310)*
- **Clear for leasing non-cultivated resources; however, no specific guidance on leasing cultivated resources:** probably to be recorded as **output and intermediate consumption**
- ***(Tradable) permits to use natural resources** are third-party property rights relating to natural resources. An example is where a person holds a fishing quota and he is able, ..., to sell this to another person (para. 10.191)*
- Moreover, **a permit ... leads to the creation of an asset for the user, distinct from the resource itself but where the value of the resource and the asset allowing use of it are linked** (para. 17.315)

Not entirely clear how all of this interrelates, when it comes to recording and valuation of biological resources

Classification, valuation and **accounting for leasing** (Section 5)

A simple example:

- Government establishes fishing quota for a period of 10 years
- Resource rent derived from the underlying fish resources, initially owned by government, equals 45 per year
- Government decides to provide permits to use these resources, i.e. the fishing quota, for an annual payment of rent of 30
- Rents are paid upfront for a total amount of 300 ($10 * 30$)

Classification, valuation and **accounting for leasing** (Section 5)

- Case A: Full value of biological resources remains on the balance sheet of government
- Case B: Value of biological resources on the balance sheets of government is downgraded, in view of the actual rents being lower than the total resource rent
- Case C: Similar to case B; however, the NPV of resource rents implicitly handed over by government ($10 * 45 \text{ minus } 10 * 30$) is recorded in the books of the fishing industry => split-asset approach proposed for the recording of mineral and energy resources.
- Case D: It has been assumed that the permits are transferable, and that the market value approximates the difference between the accumulated amount of resource rents and the actual payments of rent

	Case A	Case B	Case C	Case D
Government				
- Biological resources	450	300	300	300
- Other accounts receivable/payable	-300	-300	-300	-300
Fishing industry				
- Biological resources	0	0	150	0
- Permits to use natural resources	0	0	0	150
- Other accounts receivable/payable	300	300	300	300

Classification, valuation and **accounting for leasing** (Section 5)

Issues related to recording and valuation:

- Some argue that the value of biological resources is equal to the NPV of the actually observed rents => resource rent appropriated by the fishing industry is flawed, due to inappropriate estimation procedures (more later)
- Accounting for permits has a negative impact on value of biological resources => classification under biological resources, either or not as a separate category
- Accounting for handing over of resource rents
 - Sale of biological resources and a concomitant capital transfer at inception
 - Alternative: Levelling up of rents, with a concomitant income or capital transfer

Classification, valuation and accounting for leasing (Section 5)

Recommendations:

Regarding the valuation of biological resources, it is recommended to consider the Net Present Value of resource rents as an appropriate method, also in the case of providing (non-transferable) rights to use the resources at a price lower than the estimated resource rent

An exception is made for biological resources, the leases of which are auctioned in a fully competitive environment. In these latter cases, the resulting market values are considered as the best representation of the value of the relevant resources

Furthermore, assuming the appropriateness of valuing the resources with the Net Present Value method, it has been proposed to introduce a split-asset approach, in line with the recommendations made for mineral and energy resources (see guidance note WS.6)

This proposal would also imply the recording of the (partial) handing over of rights to use for free or at prices below the resource rent, as a transfer of non-financial assets with a concomitant capital transfer

Accounting for depletion and regeneration (Section 6)

- Depletion of biological resources differs from depletion of non-renewable natural resources, in that **biological resources are able to reproduce and grow over time**
- **Necessary to consider both the impact of depletion and the impact of (re)generation of these resources**
- Depletion can be defined as levels of extraction that surpass sustainable yields
- **Recording according to 2008 SNA**
 - **Cultivated resources yielding repeat products:** (re)generation is recorded as gross fixed capital formation, and (positive) depletion is recorded as consumption of fixed capital
 - **Cultivated resources yielding once-only products:** implicitly recorded as positive (regeneration) and negative (depletion) changes in inventories
 - **Non-cultivated resources:** changes are recorded as other changes in the volume of assets

Accounting for depletion and regeneration (Section 6)

- For **non-migrating biological resources yielding once-only products**, for which it is recommended to abandon the distinction between cultivated and non-cultivated, one could consider **two options**:
 - Option 1: Treat positive and negative depletion as a (negative) cost of production
 - Option 2: Treat positive depletion as a cost of production, and negative depletion as gross fixed capital formation
- **Certain preference for option 2**, although this would result in an extension of the production boundary for resources, which currently are treated as non-cultivated
- Having a separate asset class for natural resources could provide more flexibility in the recording of (negative) depletion:
 - Possibility to record the run-down of all biological resources as depletion, also in the case of cultivated biological resources, for which the 2008 SNA prescribes the recording of consumption of fixed capital
 - More leeway to account for the regeneration of natural resources as either gross fixed capital formation or other changes in the volume of assets, depending on whether one considers the regeneration as linked to human intervention, or as a product of natural processes

Accounting for depletion and regeneration (Section 6)

Recommendation:

Regarding the recording of depletion (and regeneration) of biological resources, it is recommended to record positive depletion of these resources as a cost of production, while negative depletion, i.e. (net) regeneration of the relevant biological resources, is treated as gross fixed capital formation

The depletion would be allocated to the relevant economic agents in proportion to the generated resource rents

Accounting for leasing more generally (Section 7)

- **Question: Are there good reasons for recording resource leases and rent?**
- *A **resource lease** is an agreement whereby the legal owner of a natural resource **that the SNA treats as having an infinite life** makes it available to a lessee in return for a regular payment recorded as property income and described as rent. ... By convention, **no decline in value of a natural resource is recorded in the SNA as a transaction similar to consumption of fixed capital** (para. 17.310)*
 - **Infinite life** is a convention for many natural resources; this convention is not valid anymore when recording depletion as a cost of production
 - In the case of biological resources, one may wonder about the **practical implementation**
 - In the case of land, a very significant share of land leases is **implicitly recorded as output**; probably rents only relevant for agricultural land
 - No **production process**? But what about e.g., royalties/license fees on artistic originals and software?
 - On the other hand, significant **impact on government**, becoming a market producer in the case of leasing natural resources
 - **Proposals for extending resource leases and rent** to the use of other “intangibles”
 - **Separate issues note**, to be discussed at AEG-meeting on 10th of May

Accounting for leasing more generally (Section 7)

Recommendation:

It is proposed to reconsider the difference in treatment between leasing produced assets versus leasing non-produced assets.

It is recognised that this would constitute a major departure from the 2008 SNA. However, it is considered important to investigate this potential change in more detail

Note: Treatment of rent is on the agenda of AEG-meeting on 10th of May

Divergent views

- **Only rights to use**, which are observable by exchange values (market transactions), **lead to economic assets**; NPV of future resource rents does not represent an asset; collective ownership, by government, is not recognised
- **Net Present Value of future resource rents is not a valid method for valuing assets**, because of hidden costs, higher returns on capital required, etc.; it is therefore better to rely on actual rent payments
- **Objections against split-asset approach**; instead, it is proposed to have an alternative recording of the transfer element, in cases that actual rents are well below resource rents
- The first two points basically come down to considering the NPV of future resource rents as an invalid methodology for valuing assets:
 - **Resource rents are also an (indirect) reflection of market prices**
 - **Many examples where actual rents are (significantly) below resource rents**, which cannot be explained by less accurate estimations
- The third point could indeed be considered as a **valid alternative for recording the ownership of natural resources**
- Three questions (13 to 15) have been added

Questions to the AEG

- Question 1: Do you agree with **only recording resources with zero, or very marginal, monetary benefits in extended accounts or supplementary tables**, in line with SEEA CF, and not in the SNA?
- Question 2: Do you agree that **migrating biological resources should always be considered as non-produced assets**?
- Question 3: Do you agree that **in the case of non-migrating biological resources a continuum from intensely managed to totally undisturbed should be taken as a starting point for the recording of biological resources**, as a consequence of which the distinction between non-produced assets and produced assets ceases to exist for these resources?
- Question 4: **If you don't agree with the above proposals, how do you want to distinguish, if at all, between cultivated and non-cultivated biological resources?** On the basis of a very strict application of the significance of management practices? If yes, do you agree that these non-migrating biological resources should be treated as produced assets?
- Question 5: How do you look upon the proposal to treat **natural resources as a separate class of assets**, which will also allow for more flexibility in recording of the related flows (to be further elaborated)?
- Question 6: Do you agree with the interpretation of the **Net Present Value of future resource rents as representing both an underlying asset and "pure" inventories**, including the consequences for the interpretation of regeneration/natural growth and depletion/ extractions?

Questions to the AEG

- Question 7: Do you agree that the **Net Present Value of resource rents is an appropriate method for valuing biological resources**, also in the case where (non-transferable) rights to use are provided at prices below the resource rent?
- Question 8: Do you agree with the **split-asset approach**, in line with the recommendations for mineral and energy resources? See also question 15.
- Question 9: Do you agree with the proposal for **recording depletion, including the allocation of this depletion to economic agents, in proportion to the generated resource rents?**
- Question 10: Do you agree with the **recording of (net) regeneration (or negative depletion) as gross fixed capital formation**? Or would you prefer a recording as a negative cost element? Moreover, would you prefer a gross recording or a net recording of regeneration and (gross) depletion?
- Question 11: How do you look upon the proposal to **further investigate the need for treating leasing of non-produced assets differently from the leasing of produced assets?**
- Question 12: Do you agree to add **more clarifications** on the treatment of natural resources in the update of the 2008 SNA?

Additional questions to the AEG

- Question 13: How should **transferability of natural resources** in relation the SNA asset boundary be understood? Is it a necessary condition or are there cases when it is not relevant (migrating natural resources)?
- Question 14: How should **collective ownership** be understood in relation to natural resources? A corporation is collectively owned by the shareholders, does the concept collective ownership imply a joint ownership by the stakeholders of a specific natural resource?
- Question 15 (related to question 8): How do you look upon the **alternative way of accounting for the transfer element**, as raised in the third point of part 2 in the list of divergent views?

Thank you for your attention!

