Integrierte ökologische und ökonomische Gesamtrechnung für den Wald

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Gliederung

1. Rechtliche Grundlage
2. Konzept des Integrated Environmental and Economic Accounting for Forests (IEEAF)
3. Ökonomische Einordnung des IEEAF in die Bewertung von Umweltgütern

Rechtliche Grundlage

BESCHLUSS Nr. 1386/2013/EU DES EUROPÄISCHEN PARLAMENTS UND DES RATES
vom 20. November 2013
über ein allgemeines Umweltaktionsprogramm der Union für die Zeit bis 2020 „Gut leben innerhalb der Belastbarkeitsgrenzen unseres Planeten“

83. Die Entwicklung von Indikatoren zur Verfolgung des wirtschaftlichen Fortschritts, die den Indikator Bruttoinlandsprodukt (BIP) ergänzen und darüber hinausgehen, sollte fortgesetzt werden. Zur Sicherung von transparenten, nachhaltigen Investitionen ist eine angemessene Bestimmung des Wertes von Umweltgütern erforderlich. Um politische Entscheidungen und Investitionsentscheidungen in Kenntnis der Sachlage zu ermöglichen, müssen weitere Anstrengungen zur Messung des Wertes von Ökosystemen und der Kosten des Raubbaus an diesen unternommen und entsprechende Anreize geboten werden. Die Schaffung eines Systems von Umweltgesamtrechnungen, das auch physische und monetäre Konten für Naturkapital und Ökosystemdienstleistungen umfasst, muss vorangetrieben werden. Dies steht im Einklang mit dem Ergebnis der Rio + 20-Konferenz, auf der anerkannt wurde, dass die Fortschritte in Bezug auf Lebensqualität und Nachhaltigkeit nicht nur anhand des BIP gemessen werden dürfen.

Tabellenrahmen IEEAF

- ✓ überwiegend ökologische Indikatoren
- ✓ überwiegend ökonomische Indikatoren

Table	Table name	
Table 1a	Forest balance: area of wooded land	✓
Table 1b	*Forest balance: value of wooded land*	✓
Table 2a	Forest balance: volume of standing timber	✓
Table 2b	Forest balance: value of standing timber	✓
Table 2c	Defoliation (% of sample trees)	✓
Table 3a	*Output related to wooded land by industry and type of output*	✓
Table 3c	Economic accounts for forestry and logging	✓
Table 4a	Supply-use physical table: use	✓
Table 4b	Supply-use physical table: supply	✓
Table 5a	Supply-use monetary table: use	✓
Table 5b	Supply-use monetary table: supply	✓
Table F1	Carbon balance for woody biomass	✓
Table F2	Carbon balance for the forest ecosystem	✓

Waldfläche

- Waldfläche insgesamt (Bestandesgröße) sowie danach, ob für die Holznutzung verfügbar oder nicht
- Flussgrößen nach ökonomischer Tätigkeit sowie nach natürlichen Prozessen
- Statuswechsel möglich
- Bilanzen in ha und Euro

Table 1a Forest balance: area of wooded land (1000 ha)
Country: **Unit:**
Year: **years up to and including 2009**

	Forest and other wooded land		
	Available for wood supply	Not available for wood supply	Total
Opening area			
Changes due to economic activities			
Afforestation			
Deforestation			
Other changes			
Natural colonisation			
Natural regression			
Other			
Changes in use/status (wooded land)			
Closing area			

Notes on the table

The table applies to wooded land, i.e. to forest and other wooded land as defined in UN-ECE/FAO TBFRA-2000. Except where otherwise indicated, terms and definitions of the UN-ECE/FAO TBFRA-2000 apply.

Changes
Changes due to economic activities: afforestation, i.e. the increase in the wooded land area (generally for wood production) due to human activity; and deforestation, i.e. the reduction in the area of wooded land due to human activity (for building use, agricultural activities, etc.)

Other changes: other changes in area due to natural, multiple or non-specified causes; e.g. natural colonisation or regression, etc.

Changes in use/status (wooded land): this category of changes includes all changes in classification within the wooded area (from available for wood supply to not available for wood supply, etc.).

Data on changes may not be available on annual basis and may have to be estimated.

Annual data on afforestation and deforestation from administrative sources may be incomplete (only subsidised afforestation, only registered deforestation) but may provide useful indicators to which grossing factors can be applied.

These data have to be coherent with the indicators for sustainable forest management ("Helsinki indicators").

Holzvorrat

- Holzvorrat insgesamt (Bestandesgröße) sowie danach, ob für die Nutzung verfügbar oder nicht
- Flussgrößen nach ökonomischer Tätigkeit sowie nach natürlichen Prozessen
- Statuswechsel möglich; nur AWS-Vorrat bewertet
- Bilanzen in ha und Euro
- Umbewertung wesentlicher Bilanzposten

Table 2b Forest balance: value of standing timber (million national monetary units)
Country: **Currency and unit:**
Year: **years up to and including 2009**

	Standing volume on wooded land			On other land	Total
	Available for wood supply	Not available for wood supply	Total		
Opening stocks					
Gross increment					
Total removals					
Other changes					
Changes in use/status					
Changes in classification					
Revaluation					
Closing stocks					

Notes on the table

The rows and columns of Table 2b strictly correspond to the rows and columns of Table 2a, with the only exception of the addition of the rows "changes in classification" and "revaluation".

Valuation
The stumpage value method is a simple method which provides a good starting point for valuation of standing timber. It can be used for all entries in the physical forest account.

Removals must be valued consistently with economic transactions in the national accounts; therefore the value of removals has to be consistent with the total value of raw wood output (CPA 02.01.1), as assessed either directly (through stumpage prices when they are available) or as a residual (the full harvesting costs being deducted from the total value of raw wood output (CPA 02.01.1), whatever the nature of this output and the classification of its producer.

Other conclusions from the IEEAF pilot studies were:
- a zero value should be given to the stocks of standing volume located in wooded land not available for wood supply. However, timber located on wooded land not available for wood supply may be occasionally harvested. In this case, a positive increase in value is recorded in the row "changes in use/status", which is the counterpart of the decrease recorded in the row "removals".
- if it is likely that part of the standing timber on land that is available for wood supply will never be harvested or will not be recoverable, it may be necessary to take this into account by reducing the value of the stock and the gross increment.

Changes
The row Changes in classification records the transfer of the (initial) value of the standing volume of timber whose category has changed between the beginning and the end of the period, as an increase in the column corresponding to the final category, and a decrease in the column corresponding to the initial category.

Revaluation records the change in the value of the volume of standing timber due to changes in prices between the opening and the end of the period. On the condition that flows are valued at the prices prevailing at the time they occurred, the revaluation item is given by [value of the closing stock less value of the opening stock] less [value of all the other changes].

Entlaubungszustand

- Entlaubung nach Laub- und Nadelholz
- Schwellenwert: > 25%
- Unterscheidung transnationaler und nationaler Datenquellen

Table 2c Defoliation (% of sample trees)
Country:
Year: years up to and including 2009

	1		2		3	
	Transnational survey data Defoliation % > 25		National survey data Defoliation % > 25		Corresponding area and/or standing volume	
	Reference year	Current year	Reference year	Current year	Reference year	Current year
Conifers						
Broadleaves						
Total						

Notes on the table

Although the development of Geographical Information Systems linked to National Forests Inventories allows for extending the cross-classification of data, it is generally admitted that data on defoliation cannot be presented according to the Table 1a format. A specific table on defoliation is proposed. The table should be based on data collected under the aegis of the International Co-operative Program (ICP Forests) of the Executive Committee for the Convention on Long-range Transboundary Air Pollution in Europe.

As far as possible, data on the % level of defoliation for sample trees have to be transformed into areas of wooded land and volumes of standing timber.

Columns
Column 1 records the % of trees in the defoliation classes 2 to 4 of the UN-ECE and EU classifications, i.e. with needle/leaf loss of more than 25%, according to the transnational survey. Defoliation is recorded for the reference year (ideally the year corresponding to the closing year of the last available forest balance) and to the current year.

Column 2 records the % of trees in the defoliation classes 2 to 4 of the UN-ECE and EU classifications, i.e. with needle/leaf loss of more than 25%, according to the national survey. Defoliation is recorded for the reference year (ideally the year corresponding to the closing year of the last available forest balance) and to the current year.

Column 3 records an estimate of the area and/or standing volume corresponding to trees in the defoliation classes 2 to 4 of the UN-ECE and EU classifications. As far as they are statistically more significant, area and standing volume should be based on national data. Area and standing volume refer first to a reference year (ideally the year corresponding to the closing year of the last available forest balance) and to the current year.

Rows
Only main species are considered in the rows. If necessary more species may be distinguished. Data by age class may also be judged useful.

Gesamtrechnung der Forstwirtschaft und Holzproduktion

- Trennung in biologische und technische Produktion
  Bilanzverlängerung gegenüber FGR
- Güterentstehung, Einkommensentstehung und Vermögensbildung
- Erstellung in Übereinstimmung mit dem System volkswirtschaftlicher Gesamtrechnungen (SNA) der EU

Table 3c: Economic accounts for forestry and logging (NACE Rev.2 Division 02)
Country:
Year: 2011
NACE version used:
Terms in red have been changed to make them easier to understand. A new item was added in line 12.

Description	Million national currency
Forestry goods output	
Net annual increment of standing timber in cultivated forests	
Sawlogs and veneer logs	
Fuelwood including wood for charcoal	
Pulpwood and other industrial roundwood	
Small-diameter timber and stumps	
Own account planting of trees to provide regular income	
Other forest products	
Cork	
Forestry and nursery plants	
Other products	
Forestry services output	
Planting of trees to provide regular income	
Other services related to forestry and logging, in particular tree planting for wood	
Forestry output at basic prices	
Non-forestry secondary activities (inseparable)	
Total output of forestry at basic prices	
Total intermediate consumption	
Timber removed by logging	
Plants	
Energy, lubricants	
Fertilisers and soil improvers	
Plant protection products and pesticides	
Maintenance of materials	
Maintenance of buildings	
Forestry services	
Financial intermediation services indirectly measured (FISIM)	
Other goods and services	
Gross value added at basic prices	
Fixed capital consumption	
FCC in trees	
FCC in equipment and buildings	
Other FCC	
Net value added at basic prices	
Other taxes on production	
Other subsidies on production	
Factor income	
Compensation of employees	
Operating surplus / mixed income	
Rents and other real estate rental charges payable	
Interest payable	
Interest receivable	
Entrepreneurial income (net)	
Gross fixed capital formation (excluding deductible VAT)	
GFCF in all planting of trees to provide regular income	
GFCF in equipment and buildings	
Other GFCF	
Net fixed capital formation (excluding deductible VAT)	
Changes in inventories	
Of which: work in progress	
Capital transfers	
Labour input (in 1000 AWU)	

Note: The full explanatory notes are available on CIRCABC (see introduction for the link).

FGR: Forstwirtschaftliche Gesamtrechnung
SNA: System of National Accounting

Aufkommen und Verwendung von Holz und Produkten auf Basis Holz

	Intermediate consumption of industries							Total	Final consumption	Capital formation	Exports	Total use
	Forestry & logging	Manufacture of wood products	Manufacture of pulp	Manufacture of paper	Printing	Recycling	Other					
Net annual increment of standing timber in cultivated forests												
Sawlogs and veneer logs												
Fuelwood including wood for charcoal												
Pulpwood and other industrial roundwood												
Sawnwood and wood-based panels												
Other wood products												
Pulp												
Paper												
Wood waste as a product												
Paper waste as a product												
Other												
Total intermediate consumption												
Gross Value added												
Consumption of fixed capital												
Net value added												
Compensation of employees												
Other taxes less subsidies												
NOS/mixed income												
Output (basic prices)												

- Einbindung in die VGR
- Produkt spezifische Verflechtung, bis auf Halbwarenebene
- Tabellen in physischen (m³/t) und monetären Einheiten

VGR: Volkswirtschaftliche Gesamtrechnung

Kohlenstoffbilanz in der Holz-Biomasse

- Kohlenstoffvorrat insgesamt (Bestandesgröße) sowie danach, ob für die Nutzung verfügbar oder nicht sowie nach Laub- und Nadelholz
- Flussgrößen nach ökonomischer Tätigkeit sowie nach natürlichen Prozessen
- Statuswechsel möglich
- Bilanzen nur in t Kohlenstoff

Table F1 Carbon balance for woody biomass (1000 tonnes of carbon)
Country: **Unit:**
Year: years up to and including 2009

	Opening stock	Gross increment	Total removals	Other changes	Changes in use/status	Closing stock
Total woody biomass 1)						
Standing timber 2)						
Available for wood supply						
Coniferous						
Broadleaved						
Not available for wood supply						
Coniferous						
Broadleaved						
Other woody biomass 3)						

Notes on the table

1) The mass of the woody parts (wood, bark, branches, twigs, stumps and roots) of trees, alive and dead, shrubs and bushes, measured to a minimum diameter of 0 mm (d.b.h.). Includes above-stump woody biomass, and stumps and roots. Excludes foliage (TBFRA 2000).

2) Volume of standing trees, living or dead, above-stump measured overbark to top (0 cm). Includes all trees with diameter over 0 cm (d.b.h.) Includes tops of stems, large branches; dead trees lying on the ground which can still be used for fibre or fuel. Excludes small branches, twigs and foliage (TBFRA 2000).

3) The woody biomass not included in standing timber, i.e. small branches and twigs, shrubs and bushes, stumps and roots.

Definitions of the different types of changes are as for Table 2a.

The conversion factors used to convert from m3 of timber to tonnes of carbon should be reported in the table notes.

These data have to be coherent with the indicators for sustainable forest management ("Helsinki indicators").

Zwischenfazit

- Ökonomische Kennzahlen
  => weitgehend VGR-konform
  (sowohl in Bezug auf Inlandsproduktberechnung als auch auf Vermögensrechnung)
- Ökologische Kennzahlen
  => nur sehr grobe Anhaltpunkte
  (Waldfläche, Holzvorrat, Kohlenstoffvorrat, jeweils getrennt für Wälder mit und ohne Holznutzung, Entlaubungszustand)
  => keine Anbindung an oder Einbindung in die VGR
- => keine klare Zuordnung der Kennzahlen zu Naturkapital oder Ökosystemleistung
  (Beispiel Kohlenstoffvorrat)

VGR: Volkswirtschaftliche Gesamtrechnung

Grundschema einer Input-Output-Tabelle zur Vorbereitung der ökonomischen Einordnung

Verw. / Aufk.		Produktionssektoren 1	2	3	....	n	Endnachfragebereiche 1	2	3	
Produktionssektoren	1	X_{11}	X_{12}	X_{13}	....	X_{1n}	C_1	I^b_1	Ex_1	X_1
	2	X_{21}	X_{22}	X_{23}	....	X_{2n}	C_2	I^b_2	Ex_2	X_2
	3	X_{31}	X_{32}	X_{33}	....	X_{3n}	C_3	I^b_3	Ex_3	X_3
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	n	X_{n1}	X_{n2}	X_{n3}	....	X_{nn}	C_n	I^b_n	Ex_n	X_n
Primäraufwandsbereiche	1	M_1	M_2	M_3	....	M_n				
	2	T^{ind}_1	T^{ind}_2	T^{ind}_3	....	T^{ind}_n				
	3	A_1	A_2	A_3	....	A_n				
	4	L_1	L_2	L_3	....	L_n				
	5	G_1	G_2	G_3	....	G_n				
		X_1	X_2	X_3	....	X_n				

X_{ij} = Vorleistungsstrom, C = privater und staatlicher Konsum, I^b = Bruttoanlage- und Vorratsinvestitionen, Ex = Exporte, M = Importe, T^{ind} = indirekte Steuern minus Subventionen, A = Abschreibungen, L = Einkommen aus unselbständiger Arbeit, G = Betriebsüberschüsse, X_i = Gesamtverwendung = X_j = Gesamtaufkommen

Mögliche ökonomische Einordnung der ÖSL in die VGR am Beispiel der Input-Output-Tabelle

Verw. / Aufk.		Produktionssektoren 1	2	3	....	n	Endnachfragebereiche 1	2	3	
Produktionssektoren	1	X_{11}	X_{12}	X_{13}	....	X_{1n}	C_1+F_{E11}*Vö	$I^b_1+F_{E12}$*Vö	Ex_1+F_{E13}*Vö	X_1
	2	X_{21}	X_{22}	X_{23}	....	X_{2n}	C_2+F_{E21}*Vö	$I^b_2+F_{E22}$*Vö	Ex_2+F_{E23}*Vö	X_2
	3	X_{31}	X_{32}	X_{33}	....	X_{3n}	C_3+F_{E31}*Vö	$I^b_3+F_{E32}$*Vö	Ex_3+F_{E33}*Vö	X_3
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	n	X_{n1}	X_{n2}	X_{n3}	....	X_{nn}	C_n+F_{En1}*Vö	$I^b_n+F_{En2}$*Vö	Ex_n+F_{En3}*Vö	X_n
	1	$X_{ö1}$	$X_{ö2}$	$X_{ö3}$	....	$X_{ön}$	$X_{öC}$	$X_{öI}{}^b$	$X_{öEx}$	$X_ö$
	2	M_1	M_2	M_3	....	M_n				
	3	T^{ind}_1	T^{ind}_2	T^{ind}_3	....	T^{ind}_n				
	4	A_1	A_2	A_3	....	A_n				
	5	L_1	L_2	L_3	....	L_n				
	6	G_1	G_2	G_3	....	G_n				
		X_1	X_2	X_3	....	X_n				

VGR: Volkswirtschaftliche Gesamtrechnung
ÖSL: Ökosystemleistungen

$X_ö$ = Bewertete Menge an ÖSL, Vö = Vorleistungen in Form von ÖSL, FE_{ij} = Faktoren für die Endverwendung der Vö in den Produkten i in den einzelnen Endnachfragebereichen j , $\sum F_{ij} = 1$, andere Abkürzungen siehe vorherige Folie

Schlussfolgerungen

- Das IEEAF wird dem Anspruch, monetäre Konten für Naturkapital und Ökosystemleistungen (ÖSL) bereitzustellen, noch nicht gerecht.
- Grundsätzlich können ÖSL bewertet werden. Ihr Wert kann den Wert der überwiegend privaten Güter wesentlich erhöhen.
- Die Werte sind aber hypothetisch. Beispiele:
  Durch was würde Holz ersetzt werden, wenn der Wald kein Holz produzierte?
  Würde ohne Lawinenschutz tatsächlich die gesamte Siedlungs- und Infrastruktur bestehen bleiben?
- Handlungsleitender ist die Bewertung von (marginalen) Änderungen und die Klärung der Frage, wer profitiert und wer die Kosten trägt.
  Sie ist aber nicht deckungsgleich mit dem Beschluss Nr. 1386/2013/EU des Europäischen Parlaments und des Rates vom 20. November 2013.

THÜNEN

Vielen Dank für Ihre Aufmerksamkeit!

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Münchenwiler,
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