

Timber flows and stocks, comparison of the monetary valuation methods

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Content of the presentation

Aim of the study

Valuation methods in different frameworks

Estonian experience within EFA

National Accounts perspective

SEEA EA perspective

Key aspects to consider

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Aim of the study

Developing and refining approaches to the valuation of timber assets in line with the principles of the European Forestry Accounts (EFA), based on the principles of the SEEA Central Framework (SEEA CF).

To clarify the relevance of methodological choices for ensuring alignment between SEEA CF, SEEA EA, and the System of National Accounts (SNA).

Methods applied in different frameworks from EFA perspective

EFA (SEEA CF)	SEEA EA	SNA 2008	SNA 2025	OECD manual
Stumpage value method	Stumpage value for the valuation of increment	Market value or cost for cultivated timber at harvest	Observed market prices, market-equivalent prices, past expenses, indirect valuation	Stumpage value method
EFA: Net income method	The NPV approach		NPV of resource rent	Net income method
SEEA CF: resource rent by residual value method				Resource rent method
Age constant method				Age constant method
Consumption value method				Consumption value method

Tested methodologies for EFA

For the assessment of opening and closing stocks different concepts were looked into:

- Stumpage value method
- Unit resource rent method (residual value)
- Net income method = the Net Present Value method

Average stumpage price was used for the monetary assessment of the annual net increment, removals, and other timber flows (losses, reclassification, balancing items).

The stumpage value method

The current volume of the timber stock is multiplied by the current average stumpage price.

To calculate stumpage value, harvesting costs (felling + hauling) were deducted from roadside price.

Roadside prices from the State Forest Management Centre (RMK)

Harvest costs were considered in two ways:

1. Actual market information from the RMK.
2. Harvest costs by tree species and assortments modeled in Statistics Estonia.

Unit resource rent method

Resource rent reflects the overall return to the economic owner of a resource per unit of output (1 m³ of timber).

To calculate unit resource rent, forecasted forest management costs were deducted from forecasted timber revenue

RMK's 2022 annual report indicated an unit resource rent per cubic meter €34.27.

This net income (residual value) per m³ was multiplied by the volume of timber stock.

The net income method (NPV)

Also referred to as **the net present value** method.

Expected timber volumes at harvesting age are estimated by dominant tree species. Future net income flows are calculated, multiplying the average stumpage price of the tree species by the expected volume of final felling for each age class.

These values are discounted using a 2.3% interest rate over the remaining years until clear-cutting.

C_t – revenue

r – discount rate

t – period (years until final felling)

$$PV = C_t \times \frac{1,00}{(1 + r)^t}$$

Steps to calculate the net income (NPV)

- Distribution of stands by age classes and tree species (NFI)
- Harvesting age of different tree species (Forest Management Regulation)
- Distribution of stock into assortments at rotation age (modelling with the special program)
- Calculation of the average stumpage price of tree species assortments at final felling (State Forest Management Centre)
- Calculation of the value/revenue of timber at final felling
- Discounting the future revenues by tree species to present value
- Calculation of the net present value of current stock

Value of timber stock, removals and net increment on forest land, 2022, millions euros

Method	Openin g stock	Closin g stock	Remo- vals	Incre- ment	Comment
Stumpage value method I	25 349	24 567	762	514	Stumpage value is based on RMK road-side prices and on RMK average harvesting cost
Stumpage value method II	24 218	23 471	728	491	Stumpage value is based on RMK road-side prices and on modelled harvesting costs, tree species and assortments are considered separately (SNA)
Unit resource rent	7450	13267	762	514	Data on the forecasted timber sales revenue and forest management costs (10 years period) in RMK
Net income (Net Present Value)	14 861	20 639	762	514	Discount rate 2.3% in 2022 and 3,2% in 2021. Stumpage price was used for the valuation of timber flows.
Age constant method					Age class coefficients are absent in Estonian forestry practise
Consumption value method					Data on the stumpage prices of timber for different age classes are missing

Approach taken for the asset valuation

The **Net Income Method** was identified as the most appropriate approach for the valuation of timber assets. The timber stock under consideration comprises forest stands of varying age classes. By discounting the future revenues of currently immature stands, it becomes possible to assign them a monetary value that is both comparable and commensurate with that of mature stands.

The resulting **NPV** is inherently sensitive to the choice of discount rate. In this analysis, the same discount rate was applied as that used by the **RMK** in the assessment of its biological assets. This rate corresponds to the return on equity, calculated annually for RMK by the Ministry of Finance.

For the valuation of timber flows, it is appropriate to use either assortment-specific stumpage prices or aggregated average stumpage prices, depending on data availability.

Timber asset and flow, links between the accounting components

EFA: Economic aggregates of forestry and logging

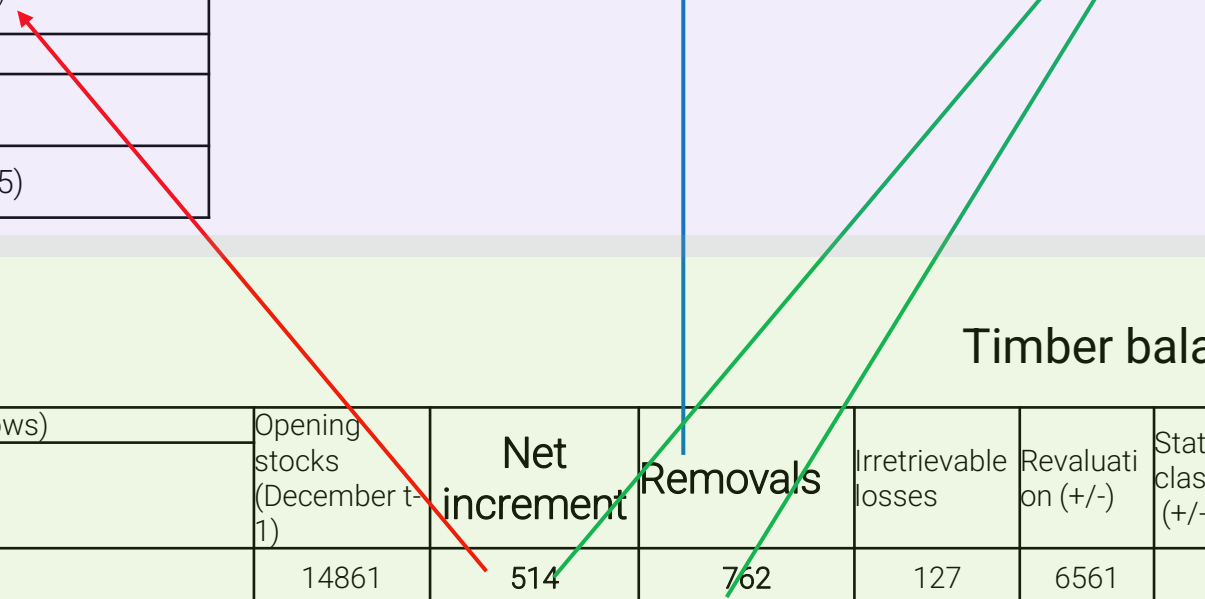
1	Total output (at basic prices) [P.1]
1.0	Of which output for own final use [P.12]
1.1	Goods characteristic of the forestry and logging activity
1.1.1	Trees, tree plants and forest tree seeds
1.1.1.1	Live forest tree plants (02.10.11) and tree seeds (02.10.12)
1.1.1.2	Forest trees (02.10.30) ⁽¹⁾
1.1.2	Wood in the rough (02.20.1)
1.1.2.1	Logs ⁽²⁾
1.1.2.2	Fuel wood (02.20.14 and 02.20.15)

2	Total intermediate consumption [P.2]
2.1	Goods input
2.1.1	Trees, tree plants and forest tree seeds ⁽⁶⁾

8	Changes in inventories [P.52]
8.1	Work-in-progress on cultivated biological assets [AN 1221] ⁽¹¹⁾
8.2	Other changes in inventories

"EFA: Timber balance on wooded land

Assets (stocks and flows)		Opening stocks (December t-1)	Net increment	Removals	Irrecoverable losses	Revaluation (+/-)	Statistical re-classification (+/-)	Balancing item ⁽²⁾ (+/-)	Closing stocks (December t)
1	Forest	14861	514	762	127	6561	-305	-102	20640
1.1	Forest available for wood supply	14861	514	762	127	6561	-305	-102	20640
1.2	Forest not available for wood supply	0	0	0	0	0	0		0
2	Other wooded land	59						1	60
2.1	Of which available for wood supply	59						1	60



Harmonization of EFA with national accounts

- **Many** variables are already calculated and available from NA
- Main differences are:
 - EFA has more detailed output and intermediate consumption (by products and services)
 - Output of forest trees:
 - „enterprise statistics (NA)“ vs „net increment X stumpage price (EFA)“
 - Output of wood in the rough:
 - „enterprise statistics (NA)“ vs „harvest physical q X roadside prices (EFA)“
 - Intermediate consumption of trees:
 - „not specified (NA)“ vs „removals from EFA table A2b“
 - Work-in-progress on cultivated biological assets:
 - available in NA but needs update regarding dead wood and increment, in EFA already updated
- **Very important is to decide if we will use physical amounts and price data for forest trees and wood in the rough in B table and analyse how it will affect gross value added. At least five years timeseries is needed**

Timber as ecosystem service, links to SEEA EA methods

SEEA CF vs. SEEA EA

CF: economy-first (timber as input)

EA: ecosystem-first (forest as ecological asset)

Timber flow (ecosystem service)

Forests transform nutrients, water & energy → merchantable wood

Valued by exchange values + resource rent

Indicators published

Flows (annual) – current forest contribution timber

Stocks (assets) – long-term sustainability & Wealth

Valuation methods & figures (Estonia)

Stumpage price: €514m (net increment), €762m (removals)

Output & resource rent: Output €1,308m – costs → €171m rent

Annuity value: €86m (annualised asset value of bare forest land)

Timber as ecosystem asset, links to SEEA EA methods

Timber stock = accumulated ecosystem services (ES) not yet harvested,
2022 closing stock: €20.6 billion

Reflects owners' potential income if harvested (though unrealistic at once)

Valuation approaches (NPV-based):

Method 1: Stumpage prices disaggregated by species/assortments/age
Lifespans: species-specific, legally defined, improve accuracy

Method 2: Sustainable future harvest (increment-based, simplified)

Land value perspective

Forest land (FAWS) valued at €3.9 billion

Sustainability & policy relevance

Discount rate choice matters (esp. for protected areas)

Additional value as carbon sink (CO₂ storage)

Adds societal/climate value via carbon markets/social cost of carbon

Conclusions

Timber stock and flow valuations vary widely depending on:

- Selection of input data and aggregation

- Discount rates

International standards are general and allow flexibility

- Application and harmonization and transparency remain national responsibilities

Robust timber stock and flow assessments require:

- Sound methodological choices

- High-quality data

- Institutional cooperation

Stronger collaboration improves coherence and comparability:

- Forest, ecosystem, and national accounts compilers

- Formalized workflows

- Consistent terminology

Questions to London Group

- Does selecting a particular method affect the scope or applicability of the results?
- Is the uniform application of the timber flows and accounts methods across the accounts important?
- Given the methodological flexibility currently within SEEA and SNA, how can coherence and harmonization of timber valuation be achieved without undermining the value of country-specific approaches?
- How do assumptions regarding discount rates and asset lifetimes influence the comparability of timber valuations across accounting frameworks (EFA, SEEA CF, SEEA EA, SNA), and what criteria should guide their selection?

Thank you !

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Earlier report and tables are available on the website

[Description of the methodology and methodological issues for forestry account.pdf](#)

[EFA tabels](#)

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