DAY 02: SESSION 04

Asset Account for Timber Resources: Monetary Terms

Regional Training Workshop on the System of Environmental-Economic Accounting

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Learning Outcomes

On completion of this unit, you will understand:

- the scope of timber resources
- the structure of monetary asset accounts for timber
- the valuation of timber resources in these accounts

Unit Outline

- valuation of timber resources
- net present value
- group activity

Acronyms

COFC	=	Consumption of Fixed Capital
COE	=	Compensation of Employees
GMI	=	Gross Mixed Income
GOS	=	Gross Operating Surplus
GOSMI	=	GOS plus GMI
GVA	=	Gross Value Added
NPV	=	Net Present Value
NOS	=	Net Operating Surplus

Acronyms

OTS	=	Other Taxes less Subsidies on Production
SEEA	=	System of Environmental-Economic Accounting
SEEA-CF	=	SEEA Central Framework
SNA	=	System of National Accounts
2008 SNA	=	SNA Manual (2008 Edition)

Asset Account for Timber Resources

This session is based on Section 5.8.4 *Monetary asset accounts for timber resources* in Chapter 05 of the System of Environmental-Economic Accounting 2012 - Central Framework (pp.196-198).

Valuation of Timber Resources

Both the SNA and SEEA recommend asset valuation based on market prices, but these prices are often unavailable, especially for environmental assets. In particular, the following conditions may apply to environmental assets:

- **never sold or rarely sold**
- **leased instead of sold**
- **have long production 'lead' times**
- **sale price is unrepresentative of value of similar assets**

Valuation of Timber Resources

SNA and SEEA-CF suggest methods to approximate market values for environmental assets where market prices are unavailable or unsuitable:

- net present value method
- rights-based valuation
- appropriation method

Valuation of Timber Resources

Net Present Value (NPV) method

- resource rent (or RR) derived using residual value method
- discounted value of expected future economic benefits from the asset

Rights-Based Valuation method

- on the basis of tradeable rights to own or use asset

  e.g. fishing rights

Appropriation method

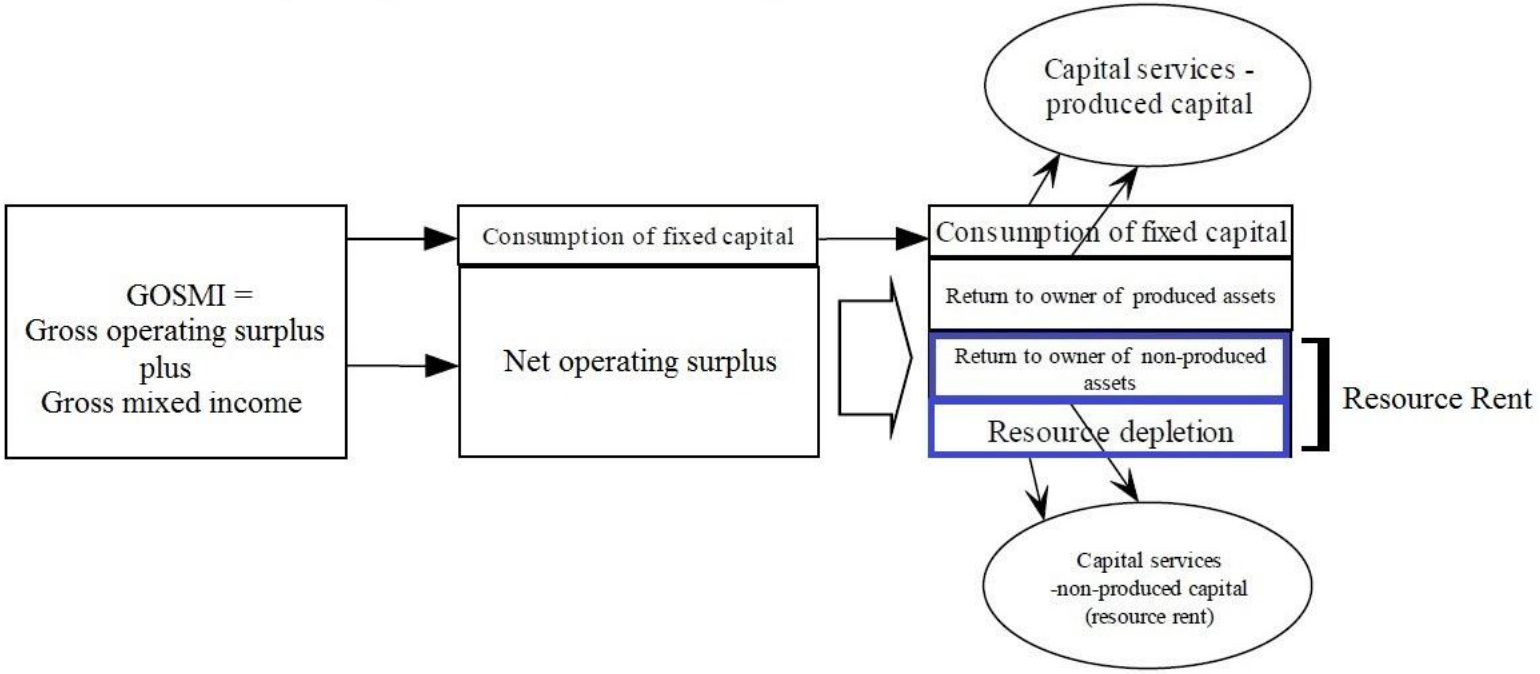
- sum of taxes, levies, royalties collected by government

Net Present Value Method

1. measurement of returns on environmental assets – *resource rent derived through residual value method*
2. rate of return on produced assets
3. expected pattern of future benefits
4. asset life of the resource
5. choice of discount rate

NPV: Residual Value Method

Resource rent is benefit institutional units are entitled to claim from using timber resources or other environment assets with an economic value. It is derived as a residual.



NPV: Residual Value Method

Resource rent is also used to estimate value of ecosystem services based on recommendations made in SEEA Experimental Ecosystem Accounting (or SEEA-EEA):

- **also known as *unit resource rent***
- **common method of pricing provisioning services**

  e.g. agriculture, forestry and fishing industries
- **difference between the unit costs of labour and assets and the benefit price represents unit resource rent**

NPV: Residual Value Method

Residual value method is based on concept of *gross value added* or GVA, where GVA equals:

output *minus* intermediate consumption

OR

GOS	**gross operating surplus**	***plus***
GMI	**gross mixed income**	***plus***
COE	**compensation of employees**	***plus***
OTS	**other taxes less subsidies on production**	

GOSMI = gross operating surplus and mixed income

NPV: Residual Value Method

GVA is calculated in a production account and recorded at the industry level by convention:

- an industry like forestry consumes intermediate goods in order to produce output of timber (ISIC Division 02)

An industry also uses factors of production (labour and fixed capital) to produce that output:

- GOSMI is the income or surplus earned by corporations and unincorporated enterprises (or fixed capital)
- COE is the income earned by labour

NPV: Residual Value Method

Note that resource rent is an estimate only:

- **represents value of capital service flows rendered by natural resources, or their share in GOSMI**

A number of market conditions must be in place for this price to accurately reflect the potential for degradation of the resource:

- **resource is extracted or harvested in a sustainable way**
- **owners of resource seek to maximise their resource rent**

NPV: Residual Value Method

GOSMI — the income earned by capital as a factor of production — can be likewise broken down into:

1. consumption of fixed capital (or COFC)
2. net operating surplus (NOS)

NOS can then be broken down into:

3. a return to the owner of produced assets (fixed capital)
4. a return to the owner of non-produced assets
5. resource depletion

resource rent = 4 *plus* 5

NPV: Residual Value Method

GOSMI is the national benchmark of control total which drives the derived estimates for resource rent, along with the discount rate used to calculate returns to fixed capital.

In this context, the operating surplus earned by an enterprise is considered to comprise a return for the investment in produced assets and a return to the environmental assets used in production.

The relationships between the relevant variables are shown in the following table presented in the Central Framework:

NPV: Residual Value Method

An expected rate of return on produced capital is needed to split gross operating surplus into:

- **a return to produced capital**
- **resource rent (residual)**

Rate of return should reflect the return and risk specific to the activity being undertaken:

- **in many cases, there is a lack of suitable data**
- **realistically, use an economy-wide rate of return based on say government bond rates**

Asset Account for Timber Resources: Monetary Terms

Relationships between different flows and income components

Output (sales of extracted environmental assets at basic prices, includes all subsidies on products, excludes taxes on products)
Less Operating costs
Intermediate consumption (input costs of goods and services at purchasers' prices, including taxes on products)
Compensation of employees (input costs for labour)
Other taxes on production plus other subsidies on production
Equals **Gross operating surplus—SNA basis**[a]
Less Specific subsidies on extraction
Plus Specific taxes on extraction
Equals **Gross operating surplus—for the derivation of resource rent**
Less **User costs of produced assets**
Consumption of fixed capital (depreciation) + return to produced assets
Equals **Resource rent**
Depletion + net return to environmental assets[b]

SOURCE: Table 5.5 in UN (2014) *System of Environmental-Economic Accounting 2012 - Central Framework*, p.153.

NPV: Residual Value Method

Resource rent on timber resources can be derived as GOS from harvest of timber resources *less* the value of the user costs of produced assets used in the harvesting process:

- **implicitly includes a share that should be attributed to the land on which the timber stands**
- **that share may be deducted for the purpose of deriving estimate of resource rent on timber resources.**

GROUP ACTIVITY 03

NPV: Discounted Value of Future Benefits

Resource rent may be estimated more directly by using (a) contract prices or (b) estimates of the stumpage price, which is the amount paid per cubic metre of timber by the harvester to the owner of the timber resources:

- **these prices can then be multiplied by estimates of the expected volume of standing timber per hectare at the expected harvesting age to yield estimates of future receipts**
- **future receipts are then discounted (over the time from current period to expected harvest period) for purpose of estimating a value per hectare for each age class.**

NPV: Discounted Value of Future Benefits

In turn, these values are multiplied by the total area of each age class and added to give the value of the total stock of standing timber:

- **this method should ensure that trees harvested after reaching maturity are separately accounted for.**
- **a simpler method is to use the current age structure and assume that each tree of a particular age grows to maturity and is harvested at maturity.**

NPV: Discounted Value of Future Benefits

The primary difficulty in applying this NPV method lies in the extent to which information is available on the age structure of the trees, and how these trees will mature into the future.

Care should be taken in using these pricing models for the purpose of valuing timber resources, as the value of the forest may include estimates of the value of alternative land uses rather than estimates of only the future income stream from the timber resources.

Key Concepts

SNA and SEEA measure the same assets. SNA uses balance sheets and SEEA uses asset accounts:

- **balance sheets measure the value of stocks of assets and liabilities at the beginning and end of the accounting period**
- **all changes between the opening and closing balance sheet are recorded in the various accumulation accounts**