Asset accounts

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Content

- What is an environmental asset ?
- How do the asset accounts look like ?
- Valuation
- Small quiz
- Questions ?

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Overview

Asset accounts….

→Present stocks and flows of individual environmental assets in physical and monetary terms

→Record changes due to growth, extraction, catastrophic losses, revaluation etc.

→Valuation using market price concepts

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What can you do with the asset accounts?

→Physical asset accounts are important tools for **assessment of the economic situation**

→Analysis of **national security, self-sufficiency and commercial conditions**

→Monitoring and management of **natural wealth**

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Key questions

- *What is the contribution of natural assets to national wealth?*
- *Are we maintaining total wealth (produced and natural) over time, both in total and per capita?*
- *What is the life length of the environmental assets*
- *To what extent are we substituting produced assets for natural assets?*
- *Is resource rent recovered successfully by governments?*
- *What is the depletion adjusted income ?*

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Defining Economic Assets

- **Economic owner:**
  →The institutional unit entitled to claim the benefits associated with the use of an asset in an economic activity
- **Economic benefits**
  → Include operating surplus from sale of extracted resources, rent earned by allowing use of resources, receipts from sale of assets
- **Economic asset**
  → Store of value representing the benefit or series of benefits accruing to the owner by holding or using the asset over time

What are environmental assets ?

"Environmental assets are the **naturally occurring living and non-living components of the Earth**, together constituting the bio-physical environment, which may provide **benefits to humanity**"

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One Environment : Two Perspectives

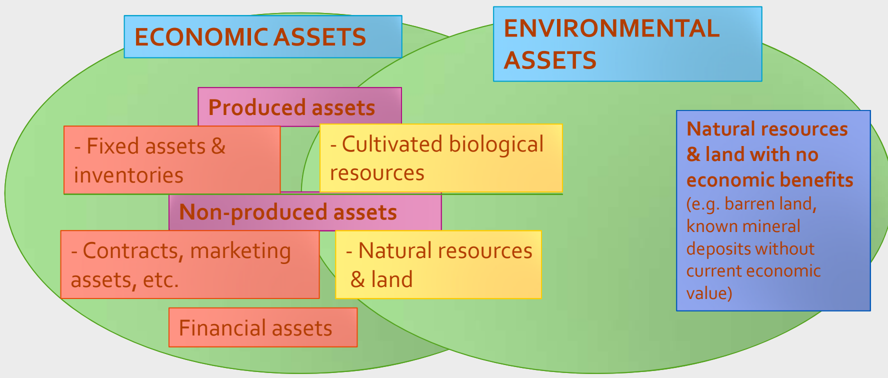
Individual environmental assets / resources

Timber
Water
Soil
Fish

Ecosystems

Forests
Lakes
Agricultural areas

Economic and Environmental Assets



Key points and boundary Issues

- Distinct treatment of **land**
  →Account for its provision of space / area not the resources that are within it
- Include **natural and cultivated biological resources**
- **Oceans and atmosphere** excluded
- Stocks of potential energy **from renewable sources excluded**
  - E.g. solar, wind, tidal power
  - Slight exception for hydropower

Classification of environmental assets

1	**Mineral and energy resources**
1.1	Oil resources
1.2	Natural gas resources
1.3	Coal and peat resources
1.4	Non-metallic mineral resources (excluding coal and peat resources)
1.5	Metallic mineral resources
2	**Land**
3	**Soil resources**
4	**Timber resources**
4.1	Cultivated timber resources
4.2	Natural timber resources
5	**Aquatic resources**
5.1	Cultivated aquatic resources
5.2	Natural aquatic resources
6	**Other biological resources** (excluding timber resources and aquatic resources)
7	**Water resources**
7.1	Surface water
7.2	Groundwater
7.3	Soil water

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Accounting structure: physical

Table 5.5.3 Physical asset account for mineral and energy resources (physical units*)

	Type of mineral and energy resource (Class A: Commercially recoverable resources)				
	Oil resources ('000 barrels)	Natural gas resources (m3)	Coal & peat resources ('000 tonnes)	Non-metallic minerals (tonnes)	Metallic minerals ('000 tonnes)
Opening stock of mineral and energy resources	800	1 200	600	150	60
Additions to stock					
Discoveries					20
Upwards reappraisals		200		40	
Reclassifications					
Total additions to stock		200		40	20
Reductions in stock					
Extractions	40	50	60	10	4
Catastrophic losses					
Downwards reappraisals			60		
Reclassifications					
Total reductions in stock	40	50	120	10	4
Closing stock of mineral and energy resources	760	1 350	480	180	76

* Different physical units (e.g. tonnes, cubic metres, barrels) will be used for different types of resources.

→ ***The basic identity*** (Opening stock + Changes = Closing stock) must always be fulfilled

Causes of change in stocks

Opening stock

\+ **Additions to stock**
- Discoveries
- Upwards reappraisals
- Reclassifications

Three items for additions/increases

\- **Reductions in stock**
- Extractions
- Catastrophic losses
- Downwards reappraisals
- Reclassifications

Four items for reductions/decreases

= Closing stock

Exercise

To which category would you assign the following flows ?

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Exercise

1) During the year a new coal deposit is discovered and made ready for extraction. It contains 3000 tons of coal.

Additions to stock
a) Discoveries
b) Upward repraisals
c) Reclassifications

Reductions in stock
d) Extractions
f) Catastrophic losses
g) Downward repraisals
h) Reclassifications

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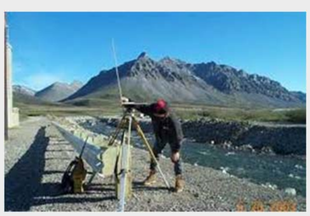
Exercise



2) The geologic survey discovers that the their previous estimate of the coal deposit underestimates the stock by 1.4 million tonnes.

Additions to stock
a) Discoveries
b) Upward repraisals
c) Reclassifications

Reductions in stock
d) Extractions
f) Catastrophic losses
g) Downward repraisals
h) Reclassifications

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Exercise

2) An earthquake totally destroys a mining site, which makes it uneconomically in the foreseen future to extract coal from this site. It was otherwise expected that 0.2 million tonnes of coal could have been extracted from this mining site.

Additions to stock
a) Discoveries
b) Upward repraisals
c) Reclassifications

Reductions in stock
d) Extractions
f) Catastrophic losses
g) Downward repraisals
h) Reclassifications

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Exercise

4) Due to a new ambitious climate change policy the government decides that half of the available coal resources must stay in the ground, never to be extracted.

Additions to stock
a) Discoveries
b) Upward repraisals
c) Reclassifications

Reductions in stock
d) Extractions
f) Catastrophic losses
g) Downward repraisals
h) Reclassifications

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Different asset accounts

Asset accounts	Topics covered (detailed definition)
Mineral and energy resources	Physical and monetary accounts for minerals and energy stocks (oil, natural gas, coal and peat, non-metallic minerals and metallic minerals) (CF 5.172)
Land	Physical and monetary accounts for land, land cover, land use and forest (CF 5.235)
Soil resources	Area and volume of soil resources (CF 5.318)
Timber resources	Physical and monetary accounts for timber resources (CF 5.343)
Aquatic resources	Physical and monetary accounts for fish, crustaceans, molluscs, shellfish and other aquatic organisms such as sponges and seaweed as well as aquatic mammals such as whales. (CF 5.393) (CO_2, pollutants) (CF 3.233)
Other biological resources	Cultivated animals and plants including livestock, annual crops such as wheat and rice, and perennial crops such as rubber plantations, orchards and vineyards. (CF 5.462)
Water resources	Stock of water resources (CF 5.471)

Accounting structure: monetary

Conceptual form of the monetary asset account (*currency units*)

Opening stock of resources
Additions to stock of resources
Growth in stock
Discoveries of new stock
Upward reappraisals
Reclassifications
Total additions to stock
Reductions in stock of resources
Extractions
Normal loss of stock
Catastrophic losses
Downward reappraisals
Reclassifications
Total reductions in stock
Revaluation of the stock of resources
Closing stock of resources

Valuation

If natural resources are bought and sold in the market, the observable **market values** should be used for the valuation of the resource.

However, although prices of the output from extraction of an resource can be found, often no market transactions of the resource itself take place, and **as a rule market values of the natural resources can not be observed**.

In such cases, **proxies for the market values has to be estimated based on economic theory and assumptions.**

The net present value method, NPV

Various methods for estimation of proxies for market values of energy resources exist, but the recommended method is the so-called ***net present value method***

The method is based on the ***assumption that the market value is equal to the sum of expected future earnings from the use of the ressource***

Future earnings are assumed to be of less value here and now than earnings accruing presently

Future earnings therefore have to be multiplied by a ***discount factor*** to estimate the present value of the future earnings.

Calculation of the resource rent

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]

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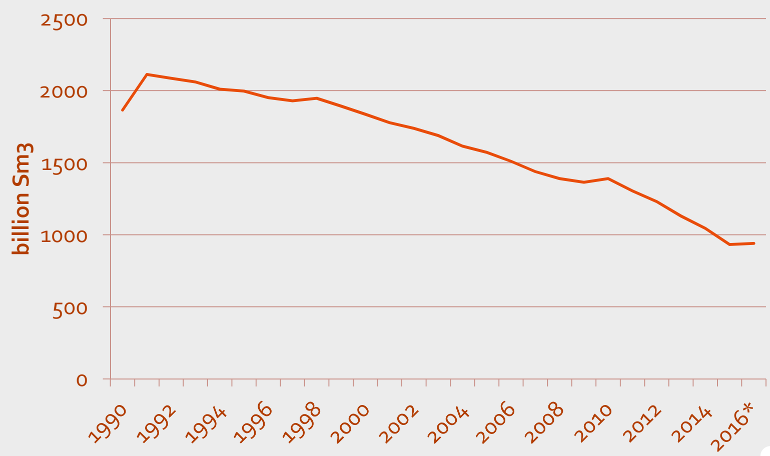
Example from the Netherlands: Natural gas rserves

Mld Sm3	2010	2011	2012	2013	2014	2015	2016
Opening stock	1390	1304	1230	1130	1044	932	940
Net change in stock (+):	-86	-74	-100	-86	-112	8	-95
New discoveries of natural gas (+)	5	6	4	0	2	1	1
Re-evaluation of discovered resources (+)	-5	-2	-25	-2	-46	60	-49
Gross Extraction (-)	-86	-79	-78	-84	-70	-52	-51
Underground storage of natural gas:	2	2	1	0	1	-1	-1
Other adjustments (= remainder)	-2	-2	-1	0	1	1	5
Net closing stock	1304	1230	1130	1044	932	940	846

Stock of natural gas in physical terms



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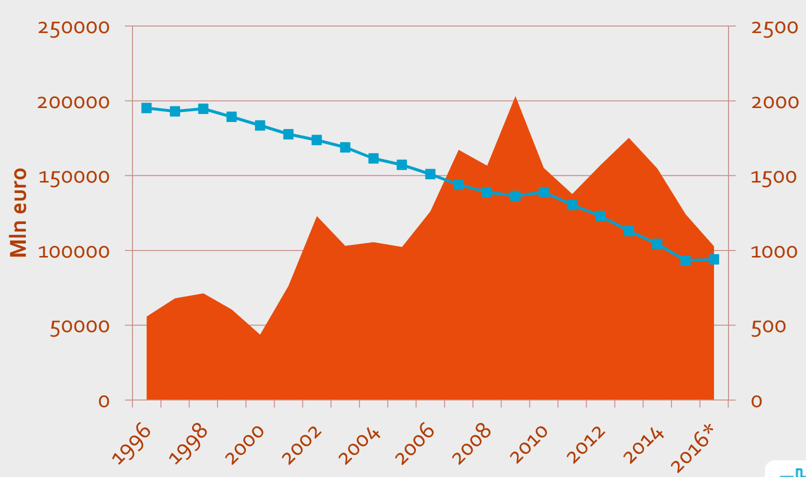
Monetary stoch of natural gas



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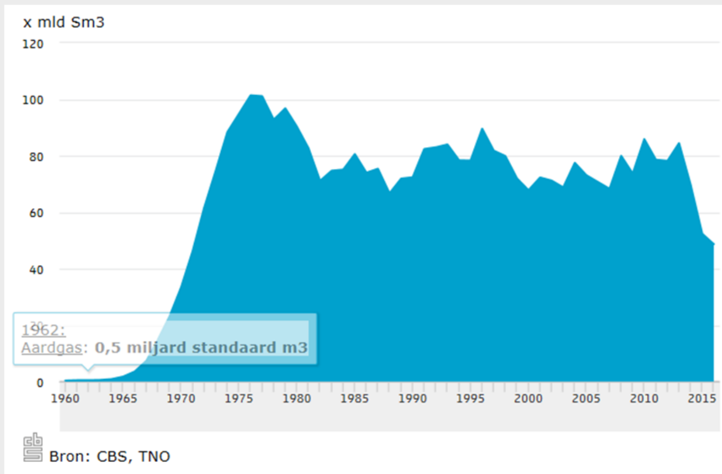
Extraction of natural gas



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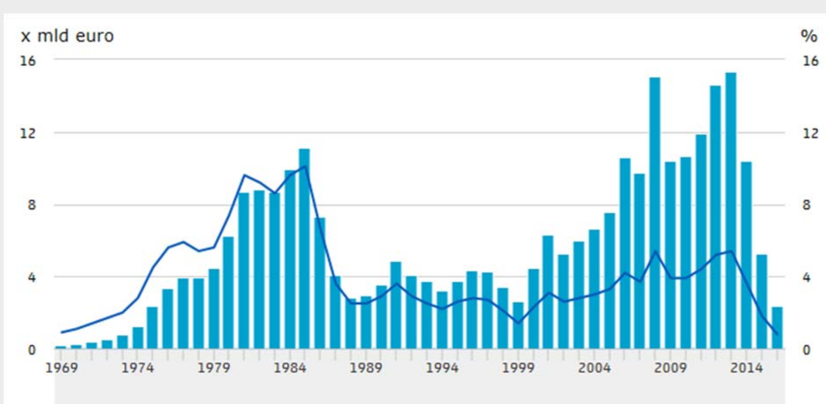
Natutal gas revenues and % of government income



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Questions ?

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