

Recent development in Swedish Forest Accounts

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Paper prepared for the London Group meeting in Rome, 5-7 November 2003

Background

In 1992 the Swedish government assigned Statistics Sweden to develop physical environmental accounts and the National Institute of Economic Research (NIER) to report on the most important links between the economy and the environment and including R&D in the field of monetary accounts.

Forest accounts, describing the stocks and changes of stocks for forest land and timber, together with analyses of the supply and use of timber have earlier been developed jointly by the environmental division and the national account division of Statistics Sweden. The results “Result of a pilot application” with data from 1990-1994 have been published by Eurostat in The European Framework for Integrated Environmental and Economic Accounting for Forest (IEEAF). A report in Swedish is to be found in www.scb.se/publkat/Filer/MI71ÖP9903.pdf . After that Data for 1992-96 and supply and use tables for 1999 have been send to Eurostat on their request.

That first part of the forest accounts did not regard functions of the forests without market values as carbon binding, recreation, biodiversity, protective functions, all of them important for understanding the development of sustainable forest management. Therefore, the Eurostat Task-Force on Forest Accounts developed a set of tables describing ecological and social functions of the forest.

We will here present selected results from a second report ‘Environmental Accounts for Forests. Test of a proposed framework for non-esa/sna functions’. This report, which is a test to link physical data with economic valuation methods, consists of two sections. Section one comprises a discussion of the physical tables of non-SNA function of forest, suggested by Eurostat, discussion of data availability and data quality and compilation and presentation of available data. Section two includes a monetary valuation of non-SNA functions produced by the Swedish forest ecosystems.

Part one “Physical description of non-ESA/SNA functions” is prepared by Leif Norman, Statistics Sweden, with assistance by Hillevi Eriksson, National Board of Forestry and Marianne Eriksson, Statistics Sweden. Part two “Monetary Forest accounts for timber and other forest related goods and services for Sweden 1987-99” is prepared by Kristian Skånberg, formerly at National Institute of Economic Research (NIER). Kristian Skånberg has also used the material in an article with Bengt Kriström which is published on <http://www.inia.es/IASPF/2001/fueraserie/krist.PDF>.

The Forestry statistics is well developed in Sweden where the Swedish University of Agricultural Sciences (SLU) is responsible for National Forest inventory and the National Board of Forestry is responsible for Forestry production and Employment in forestry. Physical data on forest area and volumes as current five years averages is presented yearly. Supply and use table can be compiled yearly. Valuation of forest land and timber is made at The National Accounts(NA) in Statistics Sweden.

The Swedish definition of forests land is defined by production standards which differs from the international used definition of forests (e.g. TBFRA). For international reporting international a comprehensive work is needed to adjust Swedish data, e.g. to add on the forest land which is protected.

Many different forest accounts, and forest ecosystem production measures, can be constructed depending on:

- Which aspects (timber, forest co-production capacity, ...) one wants to focus on,
- Which valuation methods one feels comfortable with,
- If the purpose is to analyze the socio-economic importance of the forestry (ecosystem) sector as a part of the Swedish economy: i.e. to bring all forest-related SNA and non-SNA items, wherever they appear at the moment, into the accounts.
- If the purpose is to discuss possible efficiency gains (cost-benefit analysis) in the forestry (ecosystem) sector ; i.e. discuss production measure improvements, no matter under which heading (forestry, agriculture, tourism) they appear.

The accounts and production measures will have to be constructed differently when it comes to scope (what is included), valuation methods used and aggregation level (aggregated GDP-level, or disaggregated into different economic sectors, or even goods: timber, non-wood goods, forest services). Table 1 present the Swedish forest accounts, summarizing the valued items into three subtotals, which can be added upon preference.

Subtotal 1 comprises timber values and non-wood goods. Except for the rather small volumes of household production of berries and mushrooms, subtotal 1 consists of SNA values; i.e. the values that add up to GDP or somehow appear in the System of National Accounts. In subtotal 2, the value of forest services is presented, of which all items are non-SNA values, even if the carbon sequestration could also be presented as the stumpage value of the change in the timber stock, which would turn it into a SNA-value. Subtotal 3 comprise stock changes related to forest area changes, soil chemistry, biodiversity, and berry and lichen production capacity. The forest area is included in the SNA stock accounts, as a part of the wealth of a nation, while the others are non-SNA stock changes.

In the report 'Environmental accounts for forests, Non ESA/SNA functions' an overview is also given of how physical data from the EU suggested framework is used and not used as a base for valuation. See chart in annex.

Issues for discussion

Should the carbon sequestration be adjusted?

There is research going on indicating that the forest system may not only be sink for carbon but also a source. This seems to depend on how the ground is being managed. At least in Sweden, there is not much statistics yet to assess how much of the forested area would be affected. There are also political and ethical discussions on whether and how the carbon dioxide shall be included in the climate change issue. We would like to stress that the methods that are used should make this explicit in some way.

Who are the main users internationally?

Since the forestry statistics is well developed in Sweden the main use of the accounts have been for valuation purposes, mostly valuation of non-SNA values at NIER. There have also been a cooperation with the National Accounts for their work with valuation of forest land and timber. Are there international users that we should be aware of?

Can we make a linking with other renewable resource accounts?

Statistics Sweden have been testing the data availability for resource accounts such as forest accounts, water accounts, land accounts, as well as some first attempts at fish accounts. We have not seen a need for yearly compilation of the natural resource accounts yet. It might be useful to compile a report linking resource accounts for all renewable resources on a five year basis. The valuation work at NIER is largely based on other types of data, e.g. concerning quality of resources and CVM studies.

Table 1. Total Value of Swedish Forests: Mill. of Euros

	1987	1991	1993	1995	1997	1999
Value of timber harvest ¹	2050	2080	2180	2540	2430	2370
Total value of non-wood goods	277	273	249	233	223	225
Subtotal 1 (forest goods)	2327	2353	2429	2743	2663	2595
Value of forest services:						
Recreation ²	2370	2370	2370	2370	2370	2370
Protection of soils + noise ³	20	20	20	20	20	20
Carbon sequestration ⁴	810	1050	930	630	750	810
Subtotal 2 (forest services)	3200	3440	3320	3020	3140	3200
Changes in natural capital stock:						
Non-wood capital	-65	-65	-65	-65	-65	-65
Biodiversity	-230	-200	-190	-180	-170	-160
Chemical soil quality	-125	-115	-110	-105	-100	-95
Forest area	17	17	17	17	17	17
Subtotal 3 (stock changes)	-403	-363	-348	-333	-318	-303
Sum of subtotal 1+2+3 (Value of goods+ services+stock changes)	5124	5430	5391	5430	5485	5492

¹ The value of the timber harvest could have been Euro Mill. 80 higher annually if it had not been for the damage caused by ground ozone.

² The value of recreation could have been Euro Mill. 360 in 1987 and Euro Mill. 270 higher in 1999, if it had not been for acid deposition and acidification-related problems.

³ Forestry affect downstream watershed probably to a greater extent than it protects agricultural soils and residential areas. That fact would turn up as a cost if the polluter pays principle would be used bilaterally.

⁴ To avoid double counting, the value of the timber stock is taken out of the accounts, as the increased timber storage is valued at the carbon price, exceeding the timber price with 30%. Timber stock changes could have been accounted for either as timber production not yet harvested in subtotal 1, or as a stock change in subtotal 3. That could be the case if e.g. the carbon sequestration price would have been less preferable, or if production services were not to be included in a more limited version of forest accounts.

	Suggested tables from the Eurostat Task Force on Forests accounts	Physical data	Monetary valuation by NIER	Monetary data	Comments
<i>Non-timber goods</i>					
Harvested berries, mushrooms hunted game	values are included in SNA (the agricultural sector)	X	Value of picked berries, game and lichen (reindeer feed)	X	Included in the valuation study in order to set up comparable time series from 1987
Change of production capacity of non-wood forest goods		-	Included as change of capital	X	Based on expert estimates.
<i>Non-wood services</i>					
Carbon binding	E1 Carbon balances and accumulation in standing timber, tons of carbon	X	Valuation with data from E1, net growth of stem timber	X	All tables concerning binding of carbon should be harmonized with the Kyoto agreement
	E2 Balance and accumulation of woody biomass dry matter	X		-	
	E3 Balance and accumulation of woody biomass dry matter ton of carbon	X	Valuation with data from E3	X	
	E4a Changes in carbon stored in the forest eco system	-		-	
	E4b Changes in land cover, ha	X	Used for valuation of quantitative changes of the forest ecosystem area	X	
	E5 Changes in total carbon storage (forest related resources and products)	-		-	

	Suggested tables from the Eurostat Task Force on Forests accounts	Physical data	Monetary valuation by NIER	<u>Monetary data</u>	Comments
Recreation	E9 Recreational areas, 1000 ha	X		-	Sweden has a law of common access, which makes all forest area accessible for recreation.
	E10 Visits by main purpose	X	Valuation of recreation	X	Based mostly on willingness to pay studies
	Proposal for a new table Accessibility to recreation areas	(X)		-	A suggested indicator for monitoring of the environmental objective 'A good urban environment'.
	Proposal for a new table: Forest areas free from noise	-		-	Important part of recreational values.
Protective functions	E11, Primary management objective of forest land	-	Valuation of protection of soils	X	Based on estimates by experts
		-	Valuation of shielding urban areas from noise	X	Based on estimates by experts
Maintenance of biodiversity, quality changes	E6 Forest occurring species at risk or endangered	X		-	Can be done with CVM studies
	E7 Forest balance: Protection of forest and other wooded land	X	Base for valuation of biodiversity	X	Valuation based on the difference between actual protected area and national target..
	E8 Regeneration and extension of forest and other wooded land	X		-	
Health of trees	E12 Defoliation of trees by classes and species	X		-	Physical indicator used to compare the health state of forests between different countries.
Chemical quality changes		-	Chemical quality changes of soils, affecting production capacity in the future	X	Valuation by the cost of liming to counteract acidification. Possible physical data could be areas with need for liming
Quantitative changes of forest ecosystem area	See table E4b	X	Valuation of loss of productive capacity	X	Based on statistics of area changes, valuation by estimates by experts

		Monetary valuation by NIER	Comments
External effects affecting the forestry sector		No valuation	Discussion of possible effects, no data Need to be further researched
External effects caused by the forestry sector		No valuation	Discussion of possible effects, no data Need to be further researched
Possible long term environmental threats having an impact on forest ecosystem		No valuation	Discussion of possible effects, no data Need to be further researched
Possible measures to increase overall forestry efficiency		No valuation	Discussion of possible effects, no data Need to be further researched