

IR-3.2.1 Study on Forest Resource Accounting

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Abstract

In line with the research plan which is based on review of environmental and natural resource accounts in Norway, France, and other international organisations, research work has been devoted to methodologies for developing forest accounting system of Japan. According to the framework of French Natural Patrimony Accounts, (1)French satellite accounts on forest management for recreational use, (2)close examination and evaluation on statistics on forest sector/ resources/ products, and (3)experimental work for methodologies for handling and processing statistical data through GIS, were made.

Key Words Forest Statistics, Natural Patrimony Accounts, Satellite Accounts,
Geographic Information System

1. Introduction

For last few decades, emphasis has been placed on the need for integration of statistical data on environment and natural resources into economic accounting. Such an interest prompted international organisations investigating the methodologies to set up an environmental accounts which is linked with national accounts. One of the most important contributions to this interest of research is French Natural Patrimony Accounts system⁴⁾⁽¹¹⁾⁽¹⁸⁾, while "SEEA" by United Nations¹⁶⁾ has attracted international attention as well.

An effort to develop statistical system which demonstrate the state of natural resources and the environment known as natural resource accounting had begun in Japan at Forest Policy Research Institute in 1986. Further effort of research on forest resource accounting has been made for 4

years including a feasibility study in FY 1991.

2. Research Method and Result

To identify the relevant approach for developing forest accounts, review had been made on development of environmental and natural resource accounts in Norway, France, and Canada in 1992. The French natural patrimony accounts system(NPA) which comprises with central, peripheral, and agent accounts was considered to be most instructive and useful for development of forest accounts in Japan. Based on the review of the French system, developing both framework on recreation accounts as one of the main components of forest accounts and methodologies for handling and processing statistical data through geographic information system(GIS) was considered to be the most adequate approach.

In line with the research plan which was based on review of NPA, research work of 1993 was devoted to (1)further examination of French system (including both NPA and French Satellite Account(FSA)¹⁾³⁾⁷⁾¹⁰⁾¹²⁾¹⁴⁾, (2)experimental work for methodologies for handling and processing statistical data through GIS. As the sequel to examination on French NPA, insight into "forest balance" of France which put focus on forest resources in detail - such as crossing physical data on species by ecological zones - was obtained. For NPA, it was also implied that agent accounts and territory accounts were important; the former was represented by FSA and the latter with GIS. In order to investigate methodologies on FSA, an attempt was made to establish satellite account on forest management for recreational use. As for GIS, methodology was examined to establish relational database which consists of cadastral identifier and attributes on forest resources.

Research work of 1994 was concentrated on the methodology for developing forest accounting system. Related information was obtained from specialists at UNSTAT, OECD, EUROSTAT, Finland, and France, and a couple of implications were gained; i.e.(1)the importance of both statistical survey system on economic agents concerning forestry and forest products and inventory system on forest resources, and (2)the importance of the way to breakdown forest sector/ resources/products, that is 'nomenclature' of sectors/ commodities, which should be aimed at the most suitable representation of forest sector/ resources/products in each country.

Based on these implications, (1)FSA on forest management for recreational use, and (2)close examination and evaluation on data on forest sector/resources/products in Japan were made. For FSA on forest management for recreational use, the same accounting system was adopted in both Hokkaido region and Tohoku region, which is similar to French satellite accounting system, with

physical balance sheets being added to standard system of French satellite accounts (table 1). Examination and evaluation of data in Japan is shown in table 2, which follows the example of UN(1991)¹⁵⁾ and Scherp(1994)¹³⁾.

3. Discussion

In conclusion, it is recognized that "stock" is the most important component for representation of forest sector, forest resources, and forest products, because information on stocks (the state of forest resources) is essential for decision-makers to attain sustainable management and/or sustainable utilization of forest. Regarding this conclusion, suggestions were derived for implementation of forest resource accounting system in Japan as follows;

Firstly, theoretically, it is concluded that disaggregated data on stocks in physical term themselves are more important for evaluation of sustainability than aggregated data in monetary term, with all refined valuation methodologies and plausible hypothesis on market structure, because monetary evaluation of stock of forest resources could not avoid some criteria and may tend to lose self-consistency. It is considered to be rather important how to disaggregate and classify relevant physical data, in order to give some informations on sustainability without losing self-consistency of accounts. From this viewpoint, Xu & Bradley's conceptual classification of forest resources¹⁹⁾ may be helpful.

Secondly, technically, it should be emphasized that forest resource inventory system like that of France⁸⁾⁹⁾ and/or Nordic countries⁵⁾⁶⁾ is important for representing the physical stock of forest resources. GIS and/or remote sensing technology is also important which has been developed in these countries in order to compile the inventoried resource data. Such technology may enable forest resource data to be combined with related economic data, such as incomes from sales of timber and/or labor inputs on forest management of forest owners.

Thirdly, at the stage of implementation of accounts, the way to breakdown data on forest sectors/resources/products²⁾¹⁷⁾ was considered to be most important. French forest balance in the 4th chapter of "NPA"⁴⁾ was considered to be the best example of such breakdown of forest resources. As noted above, physical balance sheet (such as managed area) and data on physical flow (such as the number of users) were added in the attempt to develop satellite accounts on forest management for recreational use. The efficiency and advantage of such system were found to be able to show difference in structures of finance, management, and utilization between different recreational sites.

Fourthly, an attention should be paid to the fact that the flow of timber consumption in Japan significantly affects the balance sheets of forest resource in exporting countries, especially those of south-east Asian countries. It might mean that Japanese timber flow accounts should be connected with forest resource stock accounts of south-east Asian countries. International input-output tables might be helpful for such linkage.

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Table 1 Satellite accounts on forest management for recreational use
in a test site at Appi district in Tohoku region, Japan
(FY 1992, Unit:thousand yen if not specified)

Table 1-1 Balance Sheet (31st Mar 1991)

Uses		Resources	
Fascilities	17,896,280+X	Subsidies received	117,280
		Direct finance	17,779,000
		Borrowing	0
		Public debt balance	0
		Other resources	X
Total of Uses	17,896,280+X	Total of Resources	17,896,280+X

Contents of "Fascilities"		Contents of "Other resources"	
Skiing ground	356ha	Forest land	914ha
Horse riding field	1ha		
Conservation forest	20ha		
Forest*	914ha		

*Forest; accumulated cost of which is unknown, while operational cost of which is X.

Table 1-2 Production Account (a)current transactions

Uses		Resources	
Remuneration of wage-earners	514,691+Y*	Sales of marketed goods and services	
Intermediate consumption		Utilization fee	5,742,511
Consumption goods	1,978,865	Operating subsidies	0
Energy(electricity, gas, etc.) cost	11,472	Operating transfers	
Rent	72,771	Direct finance	1,261+Y
Surplus of current transactions account	3,165,973		
Total of Uses	5,743,772+Y	Total of Resources	5,743,772+Y

*Y shows operational cost of forest management.

Table 1-3 Production Account (b) capital-financial transactions

Uses		Resources	
Capital formation	514,000+Z*	Surplus of current transactions account	3,165,973
Surplus of capital-financial transactions account	2,351,972	Other resources	0
Total of Uses	3,165,973+Z	Total of Resources	3,165,973+Z

*Z corresponds to net increase of forest stock.

Table 1-4 Balance Sheet (31st Mar 1992)

Uses		Resources	
Fascilities	18,410,280+X+Z	Subsidies received	117,280
		Direct finance	18,293,000
		Borrowing	0
		Public debt balance	0
		Other resources	X+Z
Total of Uses	18,410,280+X+Z	Total of Resources	18,410,280+X+Z

Contents of "Fascilities"		Contents of "Other resources"	
Skiing ground	356ha	Forest land	914ha
Horse riding field	1ha		
Conservation forest	20ha		
Forest*	914ha		

*Forest; accumulated cost of which is unknown, while operational cost of which is X.

Table 1-5 Financing transfers

Initial Financer	Manager	Nation	Pref.	Town	Enterprises	Total
Nation	Y+Z					Y+Z
Prefecture						0
Town				1,261		1,261
Enterprises					3,165,972	3,165,972
Households					5,742,511	5,742,511
Total	Y+Z	0		1,261	8,908,483	8,909,744+Y+Z

Table 1-6 Land owners/managers (Unit:hectares)

Owner	Manager	Nation	Pref.	Town	Enterprises	Total
Nation		914			251	1,165
Prefecture						0
Town						0
Enterprises				20	106	126
Households						0
Total		914	0	20	357	1,291

Source: Oishi, et al: mimeo. (1995)

Table 2 Data coverage, quality, comparability, and frequency for forest accounts in Japan (continuing)

Field/Problem	Main data source	Evaluation of data		Notes
Forest resources	Forest register	Cover:	good	*Inventory has not been executed since 1961
		Quality:	poor*	
		Compar:	poor	
		Freq:	every 5 years	
Forested land area	Cadastral map	Cover:	good	*Dizitisation has been needed
		Quality:	n. g. *	
		Compar:	good	
		Freq:	every time	
	Statistics of permission on land conversion	Cover:	n. g. *	*Small-scale conversion left out
		Quality:	good	
		Compar:	good	
		Freq:	every year	
Forestry management (Forest management for timber production)				
Output	Mokuzai Jukyu Hokokusho	Cover:	good	*Not equal to volume of harvesting
		Quality:	n. g. *	
		Compar:	good	
		Freq:	every year	
Input	Rinka Keizai Chosa Hokoku	Cover:	good	*Short of samples
		Quality:	n. g. *	
		Compar:	poor*	
		Freq:	every year	
	Forestry Census	Cover:	poor*	*Lack of data on capital goods
		Quality:	good	
		Compar:	poor	
		Freq:	every 10 years	
Wood processing	Mokuzai Jukyu Hokokusho	Cover:	n. g. *	*Lack of stock data in the factories nor energy data
		Quality:	good	
		Compar:	good	
		Freq:	every year	
Intermediate inputs to other industries	Mokuzai Jukyu Hokokusho	Cover:	good	
		Quality:	good	
		Compar:	good	
		Freq:	every year	
Household consumption	Household survey (Kakei Chosa)	Cover:	n. g. *	*Confined to paper and wood charcoal
		Quality:	good	
		Compar:	good	
		Freq:	every year	

Table 2 Data coverage, quality, comparability, and frequency for forest accounts in Japan(continued)

Field/Problem	Main data source	Evaluation of data		Notes
Forest management for non-timber use				
Recreational use	Special survey (by Oishi & Tsuchiya)	Cover:	n. g. *	*Lack of data
		Quality:	-	on supply side
		Compar:	-	in private
		Freq:	-	sector
Watershed management	-	Cover:	poor*	*Available in
		Quality:	-	some forested
		Compar:	-	watersheds
		Freq:	-	only
Relation between forest resources & forestry management	Experimental study using GIS(by Yamamoto)*	Cover:	-	*ID of owners
		Quality:	-	can link
		Compar:	-	different
		Freq:	-	attributes
Relation between forest resources and environment				
Relation between forest resources & water resources	-	Cover:	-	'Tank model'
		Quality:	-	might be
		Compar:	-	applicable
		Freq:	-	

Cover: How complete is the description of the field/problem? Quality: How accurate is the description statistically? Compar: How would the data be compared adequately with the data on developed countries? (How general method is adopted to attain the data?)
Freq: How often are statistical surveys carried out?
Scale: good > n. g. (not good) > poor
Source: Furuido, mimeo. (1995)

Table 3 Forest Balance in Japan (1985)
(Unit: million CUM)

	Total	Softwood	Hardwood
Opening Stock	2791.2	1726.9	1064.4
Natural growth	113.9	85.5	28.4
Natural depletion	0.7	0.5	0.3
Removals	42.1	26.1	16.0
Closing Stock	2862.3	1785.8	1076.5

Source: Koike, mimeo(1992)