FOREST BALANCE ON THE NATIONAL LEVEL

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SELOSTE:
KANSALLINEN METSÄTASE

DEFINITION OF FOREST BALANCE

Forest balance is a comparison between the growing stock volume at the beginning and end of a balance period and the gross increment and drain during that period. The forest balance of Finland during the period 1967–1973 and the increment and drain balance during the period 1953–1977 are used as examples. Concepts and terminology follow the usage presented in the reference paper (1). The unit of measurement is cubic meter (m³) of stemwood from the stump to the top of trees, over bark. The growing stock, increment and allowable drain were estimated by the National Forest Inventory; the drain and its parts by the Timber Utilization and Drain Investigation. Both these studies were carried out independently by two research departments of the Finnish Forest Research Institute. Allowable drain in this connection is the greatest amount of timber which can be harvested on the basis of sustained yield.

FOREST BALANCE 1967–1973

The balance area comprises 19.7 mill. hectares of forest land, and 3.6 mill. hectares of poorly productive land, or a total area of 23.3 mill. hectares of wooded land. The balance period is 6 years.


The growing stock at the beginning of the balance period (G₀), according to the 5th inventory, was 1 492 mill. m³, and at the end of the period (Gₙ+₅), according to the 6th inventory, 1 520 mill. m³ (Fig. 1).

The annual gross increment estimated on the basis of the measurements of diameter and height increment during the 5 years preceding each inventory was 57.4, mill. m³. The gross increment during the balance period (I) was 344 mill. m³ including the accretion (volume of wood including
Trends and developments of timber production can be studied by time series. Annual increment according to three inventories (1952, 1967 and 1973) and annual drain are illustrated in Fig. 2 by tree species. Some conclusions are obvious:

- During the period 1955–1964 the drain was greater than the gross increment. The estimate of the growing stock decreased from 1.538 mill. m³ in 1952 to 1.492 mill. m³ in 1967.
- During the period 1965–1977 the drain was smaller than the increment and the growing stock increased. Drain for years 1976 and 1977 are preliminary estimates.
- The volume of spruce has increased and the volume of deciduous species, mainly of birch, has decreased in the growing stock.
- The trend for drain has been a decreasing one since 1961. Excluding the depression years 1975–1977, drain has levelled at 55 mill. m³ per year.

**THE INCREMENTAL BALANCE, ACTUAL DRAIN AND ALLOWABLE DRAIN WITH REFERENCE TO TIMBER IMPORTS AND INPUTS INTO TIMBER PRODUCTION 1955–1976**

Forest balance estimates combined with other information concerning forestry production is illustrated in Fig. 3. During the years 1960–1964 the balance was characterized by overcutting. The capacity of forest industries and the need for timber were increasing. Several measures were introduced:

- Plans were prepared to increase and finance silvicultural and forest improvement measures.
- Annual achievements of peat land drainage, seeding and planting new tree stands and forest fertilization increased.
- Timber exports decreased and imports increased.

Overcutting ceased in 1970. However, the drain continued to decrease. This can be explained by the structural changes in the Finnish national economy. Production industrialized very rapidly and the rural population decreased. During the period 1950–1970 the rural population urgently needed income from forest work and sales of timber. More recently the bulk of forest owners have become less dependent of forestry income and have lost their earlier willingness to sell timber. Shortage of forest labour has also been a local problem.
CONCLUSIONS

Forest balance is a check of the accuracy of basic estimates. If the discrepancy between the calculated growing stock at the end of a balance period and the growing stock estimated by an inventory is great, it calls forth improvements in forest inventory methods and timber utilization statistics.

Balance may reveal possibilities for improving and increasing the utilization of forest resources:

- If natural losses are great, increased thinnings and regeneration cuttings of mature and over-mature tree stands increase the supply of timber.
- If logging losses are great, the efficiency of harvesting should be improved.

- An overcutting situation calls forth efforts to increase timber production or to decrease the uses of timber in order to avoid the overexploitation.
- If gross increment is greater than the drain there are possibilities to increase harvesting, forest industrial expansion, etc.

Forest balance is a way to check and improve the basic estimates of forestry production, to increase the effective use of timber grown in the forest, to commence policies and measures concerning increment and to control timber utilization on the basis of sustained yield.

SELOSTE:

KANSALLINEN METSÄTASE

Metsätase tarkoittaa puiston runkotilavuuden, tilavuuden kasvuja ja puun poistumaa vertaamista toisinsa tasejakson pituisen ajan kuluessa. Vertaalus voidaan ottaa myös hakuussahdollisuuden arvio eli suunnite.

Tase on välittämön jo sen vuoksi, että vain sillä voidaan tarkistaa puustoa ja sen käyttöä koskevien tärkeimpien arvioiden keskinäinen yhtäpäiväisyys ja luotettavuus.

Metsä- ja puualouden kehittäjille se osoittaa miten metsävarat kehittyvät, kuinka suuri on puun kasvu ja poistuma toisinsa verrattuna, onko tapahtunut liikkuvyytä tai onko metsään kertynyt hakuussahdollisuutta ja minkälaisia puuttaviaan on hakuussahdollisuuskeinoja. Metsätase ja sen aikasarja on keskeisin tietojärjestelmä suunnittelussa ja ohjattessa metsä- ja puualoustta.

ASSessment OF FOREST RESOURCES FOR FOREST MANAGEMENT

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SELOSTE:

METSÄVAROJEN ARVIOINTI METSÄTALOUDEN SUUNNITTELUA VARTEN

The general requirements for forest information required in forest management include the availability of quantitative data concerning forest areas and timber volumes, data describing the structure and quality of the forest by classes, data dealing with the forest dynamics such as increment and mortality, standwise data tied to on-the-ground locations, and the timeliness of all this information.

A review of the present inventory systems reveals variations in the information used to manage forests. In many cases, there appears to be an inadequacy of information. There may be no inventory system, or sampling may concern only overall features of the forest. The general trend has been towards a more common use of delineation of stands and the estimation of stand characteristics. In European countries, survey techniques have been improved by, for instance, trying to avoid subjective features in standwise assessments and through the use of index sub-compartments which are remeasured. In North America, a new approach was recently introduced to generate stand tables which seems to have significant inventory capabilities. In some cases, the advanced inventory systems may simultaneously employ three kinds of inventories, each complementing the other.

In designing an inventory and management information system experiences gained elsewhere should be utilized with studies of sampling methods, remote sensing techniques, new instrumentation and computer services. Yield tables and other aids are also important. While the decision-making can thus be improved, it also becomes possible to introduce cheaper methods of periodic inventories. The information system should be only as elaborate as is required to do the job. The contents and accuracy of quantitative and qualitative information should be considered and differentiated according to the real needs. The costs of acquisition of inventory information correlates with a degree of sophistication of the system, but rarely exceeds one percent of the stumpage of the timber cut. Moreover, it is a common experience that the increase in wood production more than compensates the costs of planning on the basis of inventories.