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Forest Planning in Private Forests in Finland

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1 The role of forest planning

In Finland, approximately 52 % of forestry land (totalling 13,8 million hectares) and 67 % of growing stock (totalling approximately 1,4 million m^3) is owned by non-industrial private forest owners (NIPF, see Metsätilastollinen… 2005). Individual forest owners make their own decisions concerning cutting and silvicultural operations that consequently affect the supply of timber and forest conditions for all citizens.

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Since the World War II, forestry and the forest industry have been playing an important role in the Finnish national economy. Therefore, different forest policy measures have been defined to encourage intensive forest utilisation and management of private forests to provide raw material for the forest industry on both a short and long term basis. Policy measures include strategic forest planning at the national level co-ordinated by the Ministry of Agriculture and Forestry (MAF) as well as regional and property level forest planning for NIPF carried out by regional forest centres (RFC).

Strategic forest planning at the national level covers forests in all ownership categories (NIPF, company, state and other) and is supported by calculations based on sample plot and tree data from the national forest inventory (NFI) begun in Finland as early as the1920s. Planning at the national level has resulted forest programmes reacting to different pressures in different decades. After World War II, forest financing programmes (e.g. HKLN, Teho, MERA I-III) were designed to support intensive work in forest management and improvement. The timescale of these programmes was several decades. Since the 1980s, the Forest 2000 Programme and its successors such as the National Forest Programmes (NFP) supported by Regional Forest Programmes (RFP) have had wider interests in forests and forestry than solely timber production. For this purpose, the Finnish MELA system as a forestry model has been used in the analyses of wood production possibilities and consequences of different management alternatives. Usually, timescale of the MELA analyses has been 50 years. The first National Forest Programme (NFP for the period 2000-2010) was published in 1999 (Ministry…1999).

For NIPF, regional level forest planning including standwise inventories to support the preparation of property level plans dates back to 1960s. These inventories are based on the delineation of stands on aerial photographs and a field check of each stand is carried out on a 10−15 year interval by regions (e.g. villages) whose size varies (2000−5000 hectares). The role of property level forest planning is to support forest owners in their own decision making for the coming 10-year period.

2 Forest inventory and planning system in private forests

Since 1980s inventory data are collected into computerised database and mapping systems. The first system was called TASO and it was based on Nalle mapping system. The current Luotsi – originally referred to as Solmu – is based on Tforest mapping system. Luotsi - as its predecessor TASO - contains the Finnish MELA system as a decision support system to provide estimates of wood production possibilities and future development of forests under different management alternatives.

In 1990s the planning system of RFCs was re-designed to collect forest data applicable for continuous updating of forest data and its utilisation in operational planning between field checks. However, only a part (less than 75 %) of the Luotsi data are used to prepare property level management plans for forest owners, and an even smaller portion of the data are stored in operational information systems of Forest Management Associations (FMA) or forest companies for continuous updating and operational planning (Figure 1). The rest of the Luotsi data are used only in regional forest centres for their own work, but not kept up-to-date after cutting or other silvicultural operations that are frequent in Finland due to the high utilisation rate of forests.

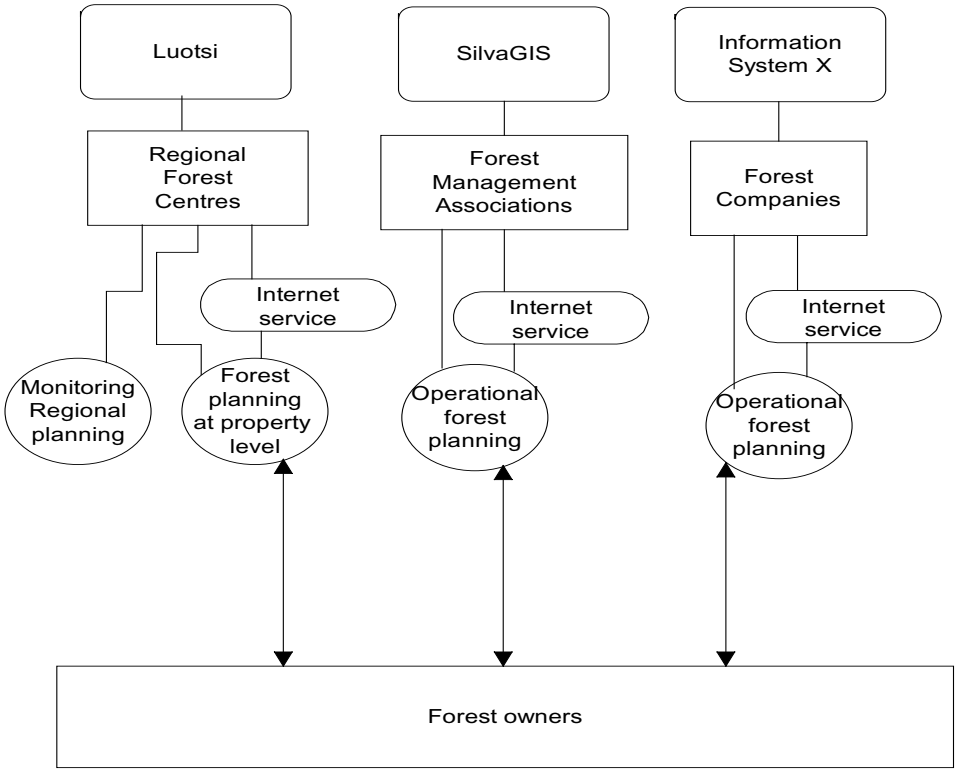

Figure 1. Service providers for forest planning.

NFP 2010 (Ministry…1999) set a target to increase the coverage of forest plans in private forests up to 75 % to support high utilisation rate and good management of forests. Consequently, the government increased the support for forest planning. For example, in 2005 the government financed regional planning by 16,5 million € which was expected to cover standwise inventory costs of approximately 1 million hectares. In addition to this unit cost of 16−17 € per hectare 50 % of which is due to field work, forest owners pay 7−10 € per hectare for plans they order. The existence of plans generates some benefits and tax reduction possibilities to forest owners. In addition, a forest owner ordering a plan is allowed to decide who has the right to use the stand data for his/her property. In spite of the benefits, the coverage of property level plans has remained lower than the target.

3 Planning process and its products

Typically the planning process consists of several phases. In the office, stand boundaries are delineated on aerial photographs. The stand delineation from previous inventory can be utilised if available. The office work also includes data collection on different restrictions concerning forest management or interests of other parties. During the field work, stand delineation is checked and stand level field data recorded based on visual assessment (so called relascope method). In Finland, the average stand size is 1.5−2 ha. Therefore the average productivity of field work is low: approximately 30−40 hectares per day. Stand data include 1) site and management variables for stands, 2) mean values by tree cohorts and 3) management proposals for stands. Since the introduction of field computers, it is almost standard procedure to utilise stand data from previous inventory where available as a basis for field checking.

Increasingly, forest owners are encouraged to participate in the planning process (either in the field or in the office when the plan is prepared, or both) in order to define management proposals matching the forest owner's needs and/or interests. In principle, multiple goals of forest owners should be taken into account and alternative plans should be calculated to support the decision making process. In practice, however, the interaction between planner and forest owner varies a lot depending on both the planner and the forest owner.

The contents of a property plan is standard: 1) standwise data (by tree strata) and management proposals (cuttings and silvicultural work), 2) estimates of costs, income and subsidies, 3) stand maps and thematic maps, 4) sites of specific interests (habitats) and 5) summaries. Today, an important result is an export file containing stand data that can be transferred to service providers (see Figure 1).

4 Future challenges

The forest policy measures including forest planning have been successful in Finland. The utilisation level of cutting possibilities is very high: annual drain is 60 million m^3 which is 73 % of increment and 85 % of sustainable cutting possibilities. Despite the high utilisation level, wood resources in Finland are larger than ever: currently over 2000 million m^3. Supported by the effective utilisation of wood resources and the resulting economic welfare, Finland has also been able to take care of other forest ecosystem services as well: over 10 % of forestry land is reserved as

conservation and wilderness areas. (Metsätilastollinen…2005)

Finnish forestry is facing new challenges due to e.g. globalisation and consequent requirements for improvements in cost-efficiency that need to be balanced with the multiple needs of people and society. Forest companies responsible for wood procurement or silvicultural work seek cost-efficiency via logistics for which they request up-to-date forest resource data. Forest owners seek to make their own forests economically viable (in relation to available markets and limitations set by the society) and effective (in relation to their forest resources and interests) achieving a combination of forest ecosystem services and products with subsequent operations. The government seeks effective policy measures to fulfil the current and future needs of people and society that sometimes conflict with the market behaviour of forest enterprises and forest owners.

Luckily there is potential to improve effectiveness and cost-efficiency. For example, so called multi-source NFI (MNFI) based on intensive field measurements annually covering the whole country is applicable for monitoring and regional planning at a cost of only 2 c per ha.

Therefore, the MAF has given the Finnish Forest Research Institute the task of establishing a research and development programme whose aim is to support the development of cost-efficient forest resource information system and effective operational planning. For this purpose, the programme will study and develop models, processes (involving different organisations and individuals) and IT applications for continuous forest resource data updating and planning based on the integration of multiple data sources (e.g. MNFI and operational information systems) and interactive decision support tools. To increase cost-efficiency in research and development, the programme will facilitate interaction between the operational, developmental and research organizations.

References

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