

LONG-TERM FORECASTING OF FOREST POLICY ALTERNATIVES

Jan-Erik Nylund

Dept. of Forest Products, Swedish University of Agricultural Sciences, PO Box
7008, 75007 Uppsala, Sweden. E-mail: jan-erik.nylund@sprod.slu.se

UDC 630.6

Received: 13 May 2010

Accepted: 21 February 2011

Abstract

Forest policy making is a process, making compromises of conflicting interests and political ambitions. However, the outcome in terms of i.e. timber production tends to be a guesswork. In Sweden, forecasting tools based on national inventory data and detailed simulations make hundred-year forecasts of policy alternatives possible. A case is presented where the government's ambitious policy of fomenting wood production for sawmilling, pulpwood and biofuel is contrasted with an equally ambitious action proposal to reach general environmental objectives formulated by parliament. A realistic scenario to implement both policies proved to differ very little from the, by itself quite ambitious, business-as-usual scenario, but would have a notable impact on the forest landscape. Yet, the past 50 years' management sets a general trend of increasing potential cut and standing stock, regardless of policy alternative examined. The analysis underlines that policy needs a hard factual base but cannot be separated from political values. The role of changed perceptions of forestry in society is also discussed.

Key words: policy evaluation, harvesting opportunity forecast, national forestry plan.

Introduction

Policy decisions are a result of political processes, where both value-based arguments and material interests are taken into account. In forestry, a policy decision will have a material outcome in the form of timber production. Regional and national modelling can illustrate the consequences of policy alternatives – and may show ways how to balance seemingly opposed interests.

Sweden got its first modern forestry act and a forest agency structure to enforce the forest policy in 1903. Based on the gloomy picture of state of the

nation's forest presented by the 2nd national inventory after 1950, the restoration of the forests started only after World War II, culminating in stringent demands on owners in legislation of 1979 and 1983. The policy was successful in terms of timber production. In 1950, the total felling was about 50 m³; in 2007, 94 m³ (Nylund 2009).

In 1993, a new act put environment and production on an equal footing, yet without defining environmental goals for forestry. Such goals were later formulated by the Forest Agency based on general environmental objectives formulated by Parliament, and much of the counselling

of it's agents had greener management as a goal. The new policies are analysed in detail in Nylund (2010). For the next ten years, the Forest Agency made a determined effort to teach forest owners 'green management', and to expand the area of forest under various categories of protection, but a few years ago, it realised that more forceful policies were required if biodiversity and other targets were to be reached. The 1993 relaxation of coercive management policies had a base in the high level of allowable cutting, but ten years later, the rapidly growing use of bio-fuel and good prospects of the forest industry caused the government to present a new policy emphasising production, yet with good environmental standards and without reintroducing detailed management regulation.

The National Forest Inventory, operated by the Swedish University of Agricultural Sciences (SLU) in close cooperation with the Forest Agency, makes possible a continuous monitoring of the development of the forest resources, and provides a basis for long-term forecasting. The present report comments the results of the 2008 policy consequence analysis made by Swedish Forest Agency and the National Forest Inventory (Skogsstyrelsen 2008) and presents some questions on the further development, as several assumptions of the 20th century's policy seems to become outdated.

Methods

In a regular update of the 100-year timber production forecast, the Forest

Agency and SLU's forecasting team modelled the consequences of four alternative policies (Skogsstyrelsen 2008):

Reference: Extrapolating today's actual management, assuming no dramatic change in forest owner or market behaviour. The policy implies a relatively high standard of "general environmental consideration" in management of production forest.

Environment: The Forest Agency's own estimate of the means necessary to reach the Parliament's general environmental objectives regarding forestlands. Most notably, the scenario sets aside 2 mi ha for strict protection and management primarily for environmental purposes. In the simulation, specific 'stands' were identified for protection on a national basis in line with general criteria.

Production: The 2008 policy decision to intensify timber production without compromising present environmental standards was translated into a number of simulated practices, such as fertilisation, genetic improvement, intensively managed plantations on abandoned farmland, etc.

A compromise, where 2 mi ha were brought under protection, but with intensified management was applied to the remaining production land necessary cutting in protected areas was taken into account.

The modelling was performed using the "Hugin" package, which treats every test plot in the national inventory as a stand, simulating its proper management in ten-year-iterations.

Results of the Consequence Analysis

Regardless of policy, both potential cut (Fig. 1) and standing stock (Fig. 2) will continue to increase, due to 60 years of improved silviculture. With 'business as usual', over the next 20

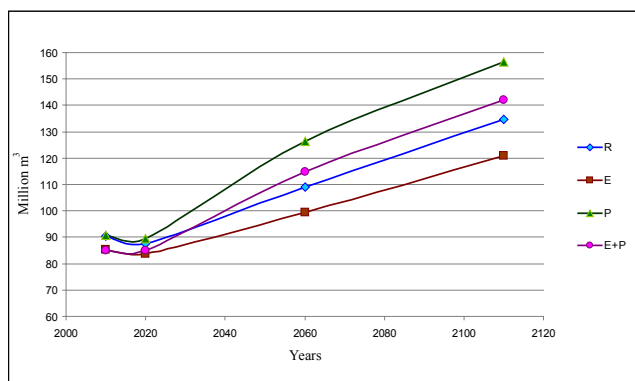


Fig. 1. Potential cut under four scenarios; million m³, over 100 years.

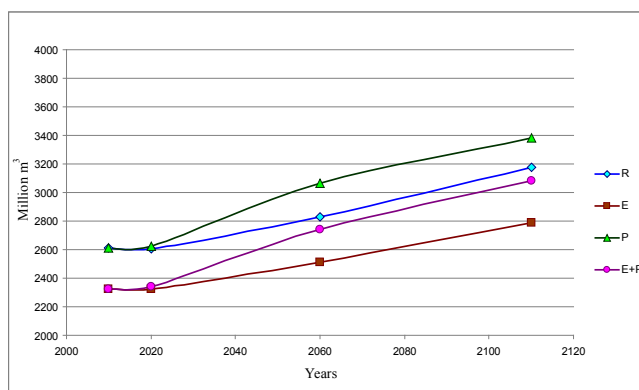


Fig. 2. Standing stock under four scenarios; million m³, over 100 years.

R – Reference; E – Environment; P – Production; E + P – Environment and Production.

years potential cut will be marginally (3 mi m³) higher than today. Under the 'Environment' scenario it will be reduced by 5 mi m³.year⁻¹ due to the transfer of old forest to reservations, while intensified management adds 2 mi m³. After that, differences accelerate. In 100 years, potential cut will be over 50% higher under the reference scenario. Under the 'Environment' scenario, potential cut would be 10 mi m³ less after 50 years and 15 mi m³ after 100 years. Under the 'Production' scenario, it would increase by 15 and 20 mi m³ after 50 and 100 years, respectively. In relation to today's level, 90 mi m³, the gap between the minimum and maximum scenarios is striking; 35 mi m³, after 100 years.

The potential cut under the 'compromise' alternative differs little from the 'Reference' or business as usual, but requires larger investments.

Discussion

Basic values, compromises and results

The environment scenario expresses values questioning the idea of maximising timber production in the country, and would result in some

10% of the area (including previously protected land) taken out of production-oriented management. Whether even this degree of protection would be enough to ensure the parliament's biodiversity goal cannot be said, but at least a price tag can be set in terms of 'lost' cubic meters of timber. Choosing this policy is clearly a matter of values, questioning the maximum-production philosophy.

The production scenario assumes, besides market opportunities and acceptable prices for a long time to come, that a reasonable level of environmental consideration can be maintained even under an intensified management regime. The promoters of such a policy are satisfied with today's environmental ambitions (which are quite ambitious when it comes to production forest), but also put a high value on increased raw material availability for forest and energy industries. They are also willing to pay a price right now in the form of making management more capital intensive.

While compromise has been a characteristic of Swedish forest policy in the past, the present compromise scenario brings up some consequences not enough discussed in the national discourse. It satisfies the conservationists' primary target of protected forest, but the intensified management of the remaining 90% of the land may lead to unacceptable sacrifices for biodiversity, recreation, visual landscape and reindeer herding. On the other hand, industrial and private owners have to work harder and spend more money, if they wish to keep production on more or less the same level as the business-as-usual scenario. How to strike a correct balance?

Is the loss under the reference scenario larger than the combined gain through conservation and loss due to intensification? The compromise scenario seems to invite value conflicts both within and between stakeholder camps.

Assumptions and preconditions for future policy making

The recent state of the forests in the country, and thereby the reference scenario, reflects a relative political unity in forest policy over the last century, as well as some basic assumptions regarding markets and prices. Interestingly, that policy represent the visions of professional foresters all around Europe during the 19th century, which became viable due to the technical and economic development during the 20th. High, sustainable timber production for the forest industry has been the leading theme. Economic gain and other owner objectives have been secondary. The restoration of the nation's forest to full production capacity has been seen as a civic obligation. Setting aside forest for conservation purposes has been seen as a loss of potential income for the country. In contrast with densely populated Central Europe, there has been enough semi-natural forest for recreation purposes, and conflicts over forest land use have been few, and mostly limited to reindeer herding in the North. Yet, looking into the future, two changes in Nordic society challenge these assumptions.

Firstly, the Nordic forest industry is becoming transnational, and is rationalising its domestic production without regard to the interests of the home region or country. As a consequence, it can no

longer be expected that forest owners or policy makers in general will be willing to give top priority to raw material production for the industry, at the expense of other interests. The owners increasingly wish to act according to their own priorities, even if this does not mean maximum timber production, and a growing number do so; anyhow, for the majority of small-scale owners (50% of the forest area) forest income represents a minor part of the family budget (Ingemarson 2004).

Secondly, as management is intensified, the forest landscape is successively changing away from the semi-natural condition favoured for recreation, hunting, mushroom and berry collection, etc. The political support from a predominantly urban population for using most of the forestland primarily for timber production can be expected to wither.

Thus, it may prove that even the reference scenario builds on unrealistic assumptions regarding the management of 50% of the forestland. But, at least for the present rotation, the forecast shows that yield and stock will increase or at least not decline. If anything, the forecasts underline the long time perspective in cold and temperate region forestry. Hardly any

news for the forestry professionals, but possibly more so for politicians with mandate periods of four-five years.

References

Ingemarson F. 2004. Small-scale forestry in Sweden – owners' objectives, silvicultural practices and management plans. PhD thesis; Acta Universitatis Agriculturae Sueciae; Ser. Silvestria 318. <http://epsilon.slu.se/s318.pdf>

Nylund J.-E. 2009. Forestry legislation in Sweden. SLU dept. of Forest Products, Report 14, 42 p. http://publikationer.slu.se/Filer/Rapp_14.pdf

Nylund J.-E. 2010. Swedish forest policy since 1990 – reforms and consequences. Proceedings from 11th International Symposium on Legal Aspects of European Forest Sustainable Development. IUFRO 6.13.00 Forest Law and Environmental Legislation, Zvolen, Slovakia, May 13–15 2009. <http://publikationer.slu.se/Filer/Nylund-Swedishforestpolicysince1990.pdf>

Skogsstyrelsen 2008. Skogliga konsekvensanalyser 2008 [Swedish Forest Agency: Forest management consequence analysis] (in Swedish). Skogsstyrelsen, Jönköping. Report 25/2008, 157 p. Jönköping. <http://www.skogsstyrelsen.se/forlag/rapporter/1812.pdf>