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COMPARISON OF METHODOLOGIES TO EVALUATE AID PROGRAMS TO NONINDUSTRIAL PRIVATE FORESTS

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Seloste

YKSITYISMETSIIN KOHDISTUVIEN AVUSTUSOHJELMIEN EVALUOINTIMENETELMIEN VERTAILU

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A methodology to evaluate forestry programs aimed at increasing timber supply from nonindustrial private forests is presented that aggregates the marginal social cost and marginal social benefit of a sample of program participants and compares them in a benefit-cost efficiency ratio. The marginal analysis is based on detailed property and landowner behavior surveys which are costly but represent a good standard to compare the performance of other approaches.

INTRODUCTION

From the general perspective of development and forestry development programming, Table 1 classifies a variety of policy instruments that operate through prices or quantities. The range extends from general monetary policy that affects the price of money (the interest rate) to specific policies that affect the prices of commodities through taxes or subsidies. Instead of controlling prices, quantity could be controlled to achieve a given effect on production. In this respect subsidies to private nonindustrial forest (NIPF) owners are an alternative to production by government. Some of the main issues of economic policies are concerned with the choice between general and specific instruments and between using prices or quantities as control variables (Chenery 1958). In either case, careful evaluations of policy instruments are at order.

General policy instruments are generally preferred. The interest rate and the level of income taxation can be used to some extent in forestry to stabilize prices while economic growth is left to the free market forces. The advantage of general instruments is that they interfere less with the choices of producers and consumers than do measures that discriminate by sector. However, if deficiencies in the price mechanism applying to a specific sector exist, as for the forestry sector, the need for specific instruments, e.g. cost-sharing, may arise to supplement these general measures, e.g. the capital gain tax in the US. These specific measures are devised so that they will improve the workings of the competitive economy without losing the advantages of private initiative and the automatic adjustment of the price system.

The superiority of operating through price variables (tax, subsidy) rather than through quantity variables (government plantation or forest management) for the forestry sector, like for any other sector, is based on reasoning similar to the case for general over specific instruments. They distort the choices open to

Table 1. *Classification of Policy Instruments. Source: Chenery 1958.*

Area of policy	*Price variables*		*Quantity variables*	
	Instrument	*Variables affected*[a]	*Instrument*	*Variables affected*
		General		
Monetary	Interest rate	Level of investment Cost of production	Open market operations	Money supply Prices
Fiscal	Personal income tax	Consumption and saving	Government expenditure	National income
	Corporate income tax	Profits Investment		Price level
Foreign trade	Exchange rate General tariff level	Cost of imports Price of exports Balance of payments	Exchange auctions	Exchange rates
Foreign investment	Taxes on foreign profits	Level of foreign investment	Foreign loans and grants	Investment resources Exchange supply
Consumption	General sales tax	Consumption	Social insurance, relief, other transfers	Consumption Income distribution
Labour	Wage rates	Labour cost Profits and investment Labour income	Emigration and immigration	Labour supply
		Specific		
Production	Taxes and subsidies Price control	Profits and production Investment	Government production	Level of production
			Government research and technical assistance	Cost of production
Investment	Interest rates Tax exemptions	Profits Investment by sector	Government investment capital rationing	Level of investment
			Restrictions on entry	Prices and profits Level of investment
Consumption	Specific sales taxes	Consumption by commodity	Government services (health, education)	Consumption Income distribution
Trade	Export subsidies	Price to consumer Profits on domestic production	Import quotas and prohibitions	Level of imports Domestic prices
	Tariffs	Profits and investment	Exchange controls	
Labour	Wage subsidy	Labour cost and use Profits and investment	Labour training	Supply of skilled labour
Natural resources	Taxes and subsidies	Cost of production Rate of exploitation	Surveys, auxiliary investment, etc.	Rate of development

a. All taxes affect government revenue and saving in addition to the variables cited.

producers and users of a commodity less than do allocation systems, and hence are conducive of greater flexibility and overall economic efficiency. Furthermore, the administrative costs for price intervention are generally lower (Chenery 1958).

The choice between direct investment in government implemented forestry projects and incentive programs in which the funds are directed to NIPF owners involves social and political factors to a large extent. In countries that do not have strong ideological preferences for either private or government enterprise, forest policy measures should rely on private investments unless their performance have been deficient. Since the reaction of NIPF investors to various incentives is subject to considerable variation and uncertainty, the extent to which reliance on private implementation is desirable can be determined only by evaluations of specific forestry programs.

This paper will expose a methodology followed to evaluate several forestry programs in Massachusetts and will discuss its advantages and inconveniences compared to other methodologies that have been used for the same purpose.

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TOWARDS A METHODOLOGY TO EVALUATE FORESTRY PROGRAMS

If intervention is needed in the forestry sector it is essentially because the timber markets deviate from the ideal conditions of perfect competition. Two of these conditions are perfect knowledge about expected prices and costs involved in forestry investments and the difficulty in entering or exiting the industry of growing trees. These two conditions are not met principally because of the long time span of forestry projects and the location specificity of land investments. Particularly relevant to any interventions in the forestry sector are also the presence of externalities and the discrepancy between the time preference of society and the NIPF owners.

Because of the lack of information and the low mobility of the capital invested in forestry activities, NIPF owners are not in a good position to respond to the supply and demand of timber forecasts. These forecasts included in any forestry sector analysis usually show a discrepancy between production and consumption of timber at present price levels. But the uncertainty involved in the production and consumption forecasts of timber over long period of time is such that even with a better information about the profitability of their forestry activities and a greater mobility of the capital invested (e.g. if forestland value would reflect better their timber productive capacity at any time of the rotation) the private investors will need some good warranty before involving their own non-forestry income. It is recognized also that some owners may manage or not manage their forests for non-timber reasons. Usually because of a relatively high alternative rate of return, forest investments often look poor.

The inherent quality of timber as a material requiring little energy to be processed, renewable, recyclable, and generating diverse positive externalities when growing provides the argument to interfere in the market place where all these positive elements are not taken into consideration. In situations of market failure, remedial policies are then necessary to remove the market imperfections or to internalize the externalities. A major task of any government is to devise remedial forest policies that will correct private market signals when necessary and improve the allocation of resources. Stated in formal terms, the objective should be to allocate resources in such a way that they are devoted to a forestry activity up to the point where the expected marginal social benefit equals the marginal social benefit in an alternative use. The foregone marginal social benefit (MSB) is the marginal social cost (MSC).

The forestry policy measures to remedy the failures of the market, such as taxation, subsidization, regulation or possibly the establishment of a public enterprise, have to be evaluated on the basis of their MSB and MSC. And this brings us to forestry project appraisal or the individual analysis of each NIPF owners benefitting from the foresty policy measures. The aggregation and compari-

son of the individual MSB and MSC should give an overall picture of the efficiency of that particular forestry program.

A general methodology to evaluate forestry programs aimed at increasing timber supply from NIPF can be deduced readily from this discussion. First the individual or private (as opposed to social) net return on forest management based on the actual private costs and benefits in real terms, have to be shown lower than acceptable for the owner in order to justify public intervention on that property. Any subsidy directed to owners who should expect profit in managing their woodlots given the actual market conditions and expectations is misallocated. The reason is that the management should have occurred without the program anyway. If some of the owners were still hesitant, the investment could have been initiated probably through a much cheaper extension program. The costs and benefits of managing the forests of these owners, even if they receive a subsidy or other incentives, cannot be reckoned to the social costs and benefits of the program. At the limit, the costs and benefits may represent simple transfer payments that move from one group of individuals to another group without really changing the overall production or consumption of goods and services in that society.

The NIPF owner that could not manage profitably the forest could but should not necessarily receive the incentives to undertake forestry activities. Indeed, it is only if the MSB is greater than MSC that such an investment of public money would be appropriate. The aggregation of the MSC and MSB for all the NIPF owners whose financial return on management is negative but the economic return is positive, will give an indication of the overall efficiency of that public program.

The methodology applied

The evaluation of several forestry programs aimed at increasing timber supply from nonindustrial private forests in Massachusetts has been undertaken in the last six years. The results from these evaluations have been reported in several articles (Harou 1983, 1984a, 1984b) and publications (Robbins et al. 1982, Fitzsimmons and Harou 1981, Kronrad and Harou 1983, Burniske and Harou 1984). The basic methodology explained in the previous section has had its applications reported also (Harou 1984b). Briefly, the marginal social benefit and cost of each participant are aggregated and compared in an efficiency benefit cost ratio[1] of the form:

$$B/C = \frac{\sum_{i=1}^{n} MSB}{\sum_{i=1}^{n} MSC + AC}$$

where MSB is the marginal social benefit induced by the forestry program discounted with a social discount rate

MSC is the marginal social costs necessary to incur the MSB discounted with a social discount rate

AC is the total administrative cost of the program

The marginal social benefits and costs are established by following a 'with' or 'without' analysis. This marginal analysis may give different results depending on the different management scenarios that are considered with and without the forestry program under investigation. The management with and without the different programs were established by different methods.

The financial analysis: the private costs and benefits based on the best actual and future estimates of yield and price with and without forest management were assessed. If forest management was profitable at the landowner's alternative rate of return (ARR), the owner benefits and costs were not included in the aggregated benefit and cost of the program. The administrative cost of handling the paperwork and inspection of the

[1] Sometimes another B/C ratio called program effectiveness ratio is used that relates the program marginal benefit to the administrative cost and the entire subsidy (Harou, 1983). Such ratio can be used in allocating public funds between competitive forestry program alternatives if the relevant social discount rate is used (Harou, 1985) but the efficiency B/C is usually preferred.

property was considered a real cost to society that the owner needed the program or not because this cost would not have occurred in the absence of the program.

The questionnaire method: the owners were asked directly or through indirect questions if they would have managed their forest without the program. If they would have managed anyway, their MSC and MSB were set at zero. Only the administrative costs were included.

The ex-post field inspection: these landowners who did not make any following up treatments after receiving the program aid (mostly cost-sharing for timber stand improvement) were not contributing the full net MSB to be expected from the management of their stands. In fact they often only burdened the cost of the program.

The participation in other programs: the NIPF owners participating in another forestry program may have been obliged to manage anyway even without the extra help of the program being evaluated. The benefits and costs of these owners cancelled out in the marginal analysis.

Following the same methods of estimating MSC and MSB, other criteria in addition to the social benefit cost ratio were used such as the cost minimization and cost price criteria. The cost minimization approach looks at the over-subsidizing or the amount of subsidy given over and above what was necessary to just induce forest management on a private property, i.e. to break even given the owner ARR. The summation of every subsidy over (or eventually under) the amount necessary to break even gives an idea of how much public money could have been saved if that extra information would have been available on an *ex-ante* basis.

The cost price criterion is calculated by compounding and aggregating all the MSC and dividing it by the expected marginal yield induced by the program. This cost price is then compared with the actual timber price or the future timber price allowing for some possible relative price increase over time.

It should be stressed at this point that the social price of the inputs and outputs of forest management are used to compute the MSC and MSB. The social price, also called shadow price, differs sometimes from the market prices used in the financial analysis when the markets for the inputs or outputs are far from competitive. Notice also that transfer payments are systematically ignored in the social accounting of program costs and benefits (Harou 1984a). For practical purposes the social price of goods and services are determined by the opportunity cost approach. The program evaluator has to investigate from where the resources will be withdrawn and what their values would have been in those uses. As long as resources with low value uses can be transferred to higher value uses, the change is beneficial. The demand for an input may curtail supply elsewhere or some additional quantities of the input may be produced to satisfy the extra demand. Shadow pricing has to be made accordingly.

The social rate of discount is usually set by a governmental agency. In the US this rate is 4% (Row et al. 1981) and was based on the opportunity cost of capital in the private sector for long-term investment.

The different evaluations made in Massachusetts were based on a detailed survey of the program participants and their properties. It is because of this level of detailed information that the evaluator can feel comfortable in assessing the efficiency of the programs and proposing ways to improve them. The programs investigated were deemed efficient with aggregated MSB/MSC ratios greater than one but not necessarily cost effective (Harou, 1984b).

DIFFERENT APPROACHES FOLLOWED TO EVALUATE FORESTRY PROGRAMS

The different approaches used to evaluate forestry programs aimed at increasing timber supply from NIPF (mostly cost-sharing programs) may be divided in three main classes: the descriptive approach, the efficiency approach and the econometric approach. The descriptive approach summarizes the allocation of the funds per type of landowners and properties. The larger the amount of subsidy directed toward high productivity sites and landowners with high propensity to manage their forests in the future, the more successful the program should be (Robbins et al., 1982). Detailed physical descriptions of the silvicultural treatments undertaken by the participants and the state of the forests few years later are useful to evaluate the silvicultural criteria used for property selection and to evaluate the guidelines for management. The physical characteristics of the land and some assumptions about landowner behavior may be taken as a proxy for the program effectiveness.

Broad classifications of practices by species group have been associated with a financial return from "stylized" (standard) management practices that are supposed to be followed by the program recipients (Mills and Cain 1978, Risbrudt and Ellefson 1983). These "average" returns are weighted by the percent of cases, on a sample basis, that did not meet the minimum silvicultural standards followed for the stylized management regimes. Other descriptive statistics, like the average federal cost and average tract size by practices and through time, the percentage of acres cost-shared remaining in forest or under relatively intensive forest management, give a general idea on the possible effectiveness of the program. These broad physical assessments are appropriate for national program evaluation for which more information would be expensive and time consuming to gather. These detailed or extensive descriptive approaches have always shown the Forestry Incentives Program (FIP), a cost sharing program in the US, to be effective.

The social efficiency approach is similar to the one described earlier for the evaluations made in Massachusetts. It was also used in Minnesota (Gregersen et al. 1978) for the ACP plantation cost-shares program. The approach requires a detailed analysis of the forest sites which receive the treatment under the program and the behavioral characteristics of the landowners in order to identify the marginal net social benefit of the program through a detailed with-without the program analysis for each participant. Such approaches are the more detailed and provide the most information to fine tune or decide on the continuation of a forestry program when a relatively small number of participants or samples of them are involved. This approach has shown the FIP and ACP cost-share Programs in the US to be efficient but not exactly cost-effective.

The econometric approach has been introduced by Tikkanen who called this type of evaluation an effectiveness approach (1981a), and tried recently by several authors: at the national level, (Tikkanen 1983); at the regional level, (Tikkanen 1981b, de Steiguer 1983, Cohen 1983); at the state level, (Boyd 1983); and at the local level, (Wallace and Silver 1983). The OLS model of de Steiguer (1983) shows that autonomous forestry investments in the southern US were not influenced by the government cost-share payments (FIP and ACP). The same model refutes the capital substitution argument – that the presence of government subsidies simply replaces autonomous investment. For the same region Cohen (1983) reaches the opposite conclusion, namely that there is capital substitution between public and private investments. The model shows that the trade off between public cost-shares and private investment in forestry evolves around 50 percent suggesting that around 50 percent of the acreage planted under FIP would have been planted had subsidies not existed. The program is not found responsible for as much private investment as the enrollment of acreage in FIP might at first suggest.

Boyd (1983) attempts to analyze the effectiveness of technological information provided to landowners by foresters and compare its impact on timber improvement and harvest activities with that of cost-sharing using a detailed owners survey in North Carolina and a probit model. The author concludes that due to its factor neutrality, technology has a significant effect on both aspects of supply, namely increased harvest and forest management, while cost-sharing, which affects supply primarily through its impact on capital costs, has little or no effect on the probability of timber harvest.

Wallace and Silver (1983) evaluated FIP in 57 coastal plain counties in Georgia from 1974 to 1978 based on production, site characteristics and ownership data published by the US Forest Service for this period and the forest inventory of 1971 and 1981. The authors found little evidence of any added harvesting (as could be suspected when cost of production decreased) and subsequent reforestation effort due to cost-sharing. This in some way concurs with Boyd's (1983) findings that cost-sharing progams have little bearing on increasing timber harvest. However the primary purpose of the extension program and FIP are not a change in short-term timber supply but of increasing forestry investments on NIPF land. So the econometric models of Boyd, and Wallace and Silver, do not correspond to an effectiveness approach that specifies aims and means and the causal relationship between them as specified by Tikkanen (1981a).

Finally Tikkanen (1981b) explains the past level of investments on NIPF by the expected income of the owners, the amount or proportion of government grants and the business cycle using an OLS with a quasi-first difference transformation model. This was then used to establish the amount of subsidy that should have been provided in order to meet the government policy target (Tikkanen 1983).

DISCUSSION OF THE DIFFERENT APPROACHES TO EVALUATE FORESTRY PROGRAMS

In order to discuss the different approaches classified in the previous section the most important advantages and disadvantages of each will be compared to the methodology proposed here to evaluate forestry programs. In comparing them however, it should be understood that the analytical aims of the different evaluations may be different.

The efficiency analysis of a forestry program using an individual financial analysis for each participant or a representative sample of them and subsequently aggregating them into MSB and MSC, is probably the most detailed evaluation that can be accomplished to quantify the net social benefits of a forestry program. If the methodology is followed, a detailed physical input-output of the sites of each or some representative participants will permit an assessment of possible increase in harvest and yield with a relatively good level of precision depending on the behavioral information about the landowners and on the with and without management yield information available for the region and for a given site productivity. Furthermore the silvicultural prescriptions and the behavior of each program participant will be translated into a detailed cash flow analysis for the individual and society. This approach is expensive and time consuming however.

The general descriptions of the forest types involved and the statistics on the apportionment of the funds to different owners and sites together with the stylized net return per forest type is an attempt to pursue objectives met in the social efficiency approach. The level of information to evaluate the program or propose improvement is much lower than with the previous approach. This approach is a realistic attempt to extend the social efficiency methodology to the evaluation of a large number of properties as in the national or regional evaluation of a program. The main drawback of this extensive evaluation is that the characteristics of the participants are not known well enough. This is a limitation because participants' characteristics have been shown to be a major source of variability in

the marginal social benefits of the programs evaluated in Massachusetts. The landowner's management decisions make more impact on the marginal social net benefit of the programs than the different marginal value yield potentials of the different forest types and site (Fitzsimmons and Harou 1981).[1)]

Finally the econometric approaches sometimes give contradictory results given the weakness of the data used and the generality of the model involved. Two evaluations of cost-sharing programs in the southern US reach diametrically opposite conclusions for these reasons. Sometimes the model is not set on realistic premises even if they are theoretically correct, expecting the harvest to increase soon after cost-shares have been distributed for instance. The timing of the analyses also obscures their interpretations. The econometric models are particularly appropriate when a solid data base exists. Probit models that help categorizing landowners to better allocate scarce program funds, could be a useful byproduct of a econometric program evaluation (Schuster 1983). An econometric effectiveness method is useful if policy aims and means are properly identified. Also analysing policy programs attempting to affect timber supply requires the theory of supply to be incorporated in the model (Tikkanen 1981a).

[1)] Lönnstedt (1981) observes that the state of the forest in Sweden is a more important explanatory variable than the category of owner to explain logging intensity. In Massachusetts the forests have a relatively uniform age due to historic and catastrophic events (hurricane 1938). Furthermore we are talking about the owner propensity to manage here but not to log.

CONCLUSIONS

A methodology to evaluate forestry programs aimed at increasing timber supply from NIPF has been proposed. This approach relies on a detailed and costly field survey that permits a precise characterization of the forest and the owner behavior. The social efficiency criterion proposed is backed by recognized welfare economics theories. The methodology seems an ideal to strive for but is costly and time consuming.

One of the drawbacks that this methodology shares with all the other approaches is that the alternatives to the program under investigation are not well specified so that the marginal analysis is not set properly. Usually the extra supply of timber from NIPF generated by the program is quantified assuming that the "without" the program situation means "no programs" at all. As a matter of fact many alternatives to the existing program may exist. The alternatives may be to spend the same amount of funds on public (federal or state) forests, to provide subsidized loans, forest damage insurances, forest depreciation schedule for plantations, etc. Supposedly the appropriate social rate of discount gives the evaluator the value of the next best public investment alternative (Harou 1985). In practice the rate used in an evaluation is usually established independently of these alternatives by referring to a rate of return in the private sector, e.g. AAA Corporate bond in the US. This problem may be mitigated by insuring that the program is cost effective in addition to being socially efficient.

To finalize this discussion it is appropriate to refer to the introduction of the paper where it was recognized that the prime reason to intervene in the timber market by subsidizing timber production was the apparent market failure caused by a lack of information and liquidity of the capital invested in forestry production. If these were indeed some important reasons why NIPF owners do not invest in their woodlots, as any utility maximizers or disutility minimizers should do, the program evaluator has to study the extent to which these programs' actions contribute to disseminate the right information on forest management. This information should permit a better and more competitive market of forest land. The program that contributes the most to awake the NIPF owners and general investors to the economic rationale of forest management, would be favored because it will help to correct the market failures more rapidly. Once these market failures are corrected or diminished, the programs may disappear. The "right" price of forest land should do the rest.

LITERATURE CITED

Boyd, R. 1983. The effects of FIP and forester assistance on nonindustrial private forests. *in* Royer, J. et al. (eds.) Nonindustrial private forests – A review of economic and policy studies. Duke Univ., Durham, NC, pp. 189–203.

Burniske, G. & Harou, P. A. 1984. The ACP fuelwood evaluation in Massachusetts (unpublished manuscript). Dept. of Forestry and Wildlife Mgt., Univ. of Massachusetts, Amherst, MA, 39 pp.

Chenery, H. B. 1958. Development policies and programmes. Economic Bull. for Latin America (3) 1: 55–60.

Cohen, M. A. 1983. Public cost-share programs and private investment in forestry in the South. *in* Royer et al. (eds.) op. cit., pp. 181–188.

de Steiguer, J. E. 1983. The influence of incentive programs on nonindustrial private forestry investment. *in* Royer et al. (eds.) op. cit., pp. 157–164.

Fitzsimmons, W. & Harou, P. A. 1981. An economic analysis of FIP in Massachusetts. Agr. Exp. Sta. Univ. Mass. Bull. 669, p. 115.

Gregersen, H., Houghtaling, T. & Rubinstein, A. 1978. Economics of public forestry incentive programs: A case-study of cost-sharing in Minnesota. Res. paper (unpublished) Univ. of Minnesota, St. Paul, MN, 138 pp.

Harou, P. A. 1983. The economics or forestry incentives in Massachusetts: ACP, FIP and the Special Yield Tax. *In* Royer et al. (eds.) op. cit., pp. 227–237.

— 1984a. Possibilities for shadow pricing forestry investments. Forest Ecology and Mgt. (3) 59–73.

— 1984b. Evaluation of forestry programs – the with-without analysis. Canadian J. of For. Research. (in press).

— 1985. On a social discount rate for forestry. Canadian J. of For. Research, vol. 15, nr. 5, pp. 927–934.

Kronrad, G. & Harou, P. A. 1982. An economic analysis of the Massachusetts yield tax program. Mass. Agr. Exp. Sta. Univ. Mass. Bull. 678, p. 88.

Lönnstedt, L. 1981. The influence of Swedish forestry policy on the annual cuts of private woodlot owners. Silva Fennica (15): 100–111.

Mills, T. & Cain, D. 1978. Timber yield and financial return performance of the 1974 FIP. Res. Pap. RM-204. USDA FS Rocky Mountain For. and R. Exp. Sta., 56 pp.

Risbrudt, C. D. & Ellefson, P. V. 1983. An evaluation of the 1979 FIP. Univ. of Minn. Ag. Exp. Sta. Bull. No. 550 St. Paul, MN, 55 pp.

Robbins, J., Harou, P. A. & Abbott, H. 1982. The economics of forestry incentives in Massachusetts – FIP and ACP program effectiveness: A physical assessment. Mass. Agr. Exp. Sta. Univ. Mass. Bull. no. 674, p. 42.

Row, C., Kaiser, F. & Lemons, J. 1981. Discount rate for long-term forest service investments. J. of forestry: 367–369.

Schuster, E. 1983. Evaluating non-industrial private landowners for forestry assistance programs: A logistic regression approach. USDA FS Int. F. and R. Exp. Sta. Res. Pap. INT-320. 7 pp.

Tikkanen, I. 1981a. Causality as a conceptual frame for forest policy analysis. Silva Fennica (15): 30–37.

— 1981b. Effects of public forest policy in Finland – An econometric approach to empirical policy analysis. Silva Fennica (15): 38–64.

— 1983. Effectiveness of forest policy programs: A policy analysis perspective. *in* Royer et al. (eds.) op. cit., pp. 352–368.

Wallace, D. & Silver, J. 1983. Public cost-sharing and production in NIPF: The case of FIP in Coastal Georgia. *in* Royer et al. (eds.) op. cit., pp. 165–180.

Total of 22 references

SELOSTE[1)]

YKSITYISMETSIIN KOHDISTUVIEN AVUSTUSOHJELMIEN EVALUOINTIMENETELMIEN VERTAILU

Artikkelin tarkoituksena on ensinnäkin esitellä Massachusettsin osavaltiossa toimeenpantujen metsätalousohjelmien arvioinnissa sovellettua menetelmää sekä tarkastella toisaalta sen etuja ja puutteita muihin evaluointimenetelmiin verrattuna.

Raakapuumarkkinoiden poikkeaminen täydellisen kilpailun olosuhteista, metsätalouden pitkä aikajänne, metsävarojen käyttöön liittyvät ulkoiset hyöty/haittavaikutukset sekä yhteiskunnan ja yksityismetsänomistajan väliset aikapreferenssierot ovat syinä siihen, että yksityismetsätaloutta ohjataan metsäpolitiikan keinoin. Metsäpolitiikan harjoittamiseen kytkeytyy toisaalta myös voimavarojen kohdentamisen näkökohta. Tavoitteena tulisi olla resurssien allokointi metsätalouteen siten, että voimavaroja käytettäisiin siihen määrään saakka, jossa odotettavissa oleva yhteiskunnallinen rajahyöty on yhtä suuri kuin se olisi vaihtoehtoisessa käytössä. Vaihtoehtoisessa käytössä menetetty rajahyöty on samalla yhteiskunnallinen rajakustannus. Metsäpolitiikan keinoja, kuten verotusta ja valtion tukitoimia, tulisikin arvioida niiden rajahyötyjen ja -kustannusten perusteella.

Tästä ajattelusta voidaankin johtaa yksityismetsien raakapuun tarjonnan lisäämiseen tähtäävien metsätalousohjelmien arvioinnin yleinen metodologia. Kunkin metsätalousohjelmiin sisältyvistä toimenpiteistä hyötyvän yksityisen metsänomistajan rajahyötyjen ja -kustannusten analysoinnin sekä näiden aggregoinnin ja keskinäisen vertailun pitäisi antaa yleiskuva tietyn ohjelman tehokkuudesta. Massachusettsin yksityismetsiin viime vuosina kohdistettujen useiden metsätalousohjelmien tehokkuuden arviointi on perustunut seuraavaan hyötykustannussuhdetta ilmaisevaan kaavaan:

$$B/C = \frac{\sum_{i=1}^{n} MSB}{\sum_{i=1}^{n} MSC + AC}$$

jossa

MSB = metsätalousohjelman tuottama yhteiskunnallinen rajahyöty yhteiskunnallisella korkotekijällä diskontattuna,

MSC = rajahyödyn aikaansamiseksi välttämättömät yhteiskunnalliset rajakustannukset yhteiskunnallisella korkotekijällä diskontattuina,

AC = ohjelman hallinnon kokonaiskustannukset.

Yhteiskunnallisten rajahyötyjen ja -kustannusten laskenta on perustunut siihen, onko metsänomistaja ollut metsätalousohjelman vaikutuksen kohteena vai ei. Tutkimusmenetelminä käytettiin finanssista analyysia, metsänomistajille kohdistettua kyselyä ja ohjelman toteuttamisen jälkeen kentällä suoritettuja tarkastuksia. Kustannusten ja hyötyjen finanssinen analyysi perustui todellisiin tuotos- ja hintaestimaatteihin ja näiden ennusteisiin ohjelman mukaisen metsänhoidon toteutuessa sekä ilman ohjelman vaikutusta. Metsänomistajilta tiedusteltiin mm. sitä, olisivatko he suorittaneet metsänhoitotoimenpiteitä ilman avustusohjelmaa. Siinä tapauksessa, että he olisivat näin menetelleet, heidän rajahyötynsä ja -kustannuksensa asetettiin laskelmissa nollaksi. Vain hallintokustannukset sisällytettiin tällöin laskelmiin. Kenttätutkimuksessa puolestaan sellaisten avustusta saaneiden metsänomistajien, jotka eivät huolehtineet metsänhoitotoimenpiteiden loppuunsaattamisesta, ei katsottu myötävaikuttaneen täysimääräisesti odotettujen yhteiskunnallisten hyötyjen syntymiseen, vaan he itse asiassa ainoastaan lisäsivät ohjelman kustannuksia.

Yhteenvetona kirjoituksessa todetaan, että Massachusettsissa tutkitut ohjelmat arvioitiin niiden hyöty-kustannussuhteen perusteella tehokkaiksi, mutta ne eivät olleet välttämättä vaikuttavia.

Artikkelissa vertaillaan myös metsätalousohjelmien evaluoinneissa sovellettuja erilaisia tarkastelutapoja jakamalla ne kolmeen pääryhmään: kuvailevaan tarkastelutapaan, tehokkuustarkasteluun sekä ekonometriseen vaikuttavuusanalyysiin.

Kuvailevalla menetelmällä tuotetaan tilastotietoja mm. avustusten jakautumisesta erilaisten metsänomistajaan ja metsälöön liittyvien tunnusten mukaan sekä metsänhoitotoimenpiteiden suoritemääristä ja metsien tilasta avustusohjelmien toteuttamisen jälkeen. Toimenpidekohtaiset keskimääräiset kustannukset ja käsittelypinta-alat sekä avustuksen alaisen voimaperäisen metsänhoitopinta-alan osuus antavat yleisluonteisen mielikuvan ohjelman mahdollisesta vaikuttavuudesta. Tämänkaltaiset kuvailevat analyysit ovat osoittaneet Yhdysvalloissa toimeenpannun metsätalouden edistämisohjelman (Forestry Incentives Program) olleen vaikuttavan.

Edellä kuvatun tehokkuustarkastelun kaltaista metsänviljelyn avustusohjelman (Agriculture Conservation Program) evaluointia on suoritettu myös Minnesotan osavaltiossa. Tehokkuustarkastelu edellyttää ohjelman toimenpiteiden kohteena olevien metsätyyppien ja metsänomistajien käyttäytymispiirteiden yksityiskohtaista

analyysia, jotta kunkin osanottajan nettorajahyödyt voitaisiin identifioida. Tällainen lähestymistapa tuottaa tietoa erityisesti ohjelman hienosäätöä varten tai päätettäessä sen jatkamisesta. Menetelmä on osoittanut Yhdysvaltain keskeisimpien metsätalouden avustusohjelmien (FIP, ACP) olleen tehokkaita.

Ekonometrista menetelmää soveltava vaikuttavuusanalyysi on viime vuosina pantu alulle ensin Suomessa ja sittemmin myös mm. Yhdysvalloissa. Näissä tutkimuksissa on analysoitu lähinnä erilaisten avustus- ja neuvontaohjelmien vaikutusta metsätalouden investointeihin ja hakkuisiin. Artikkelissa kiinnitetään huomiota siihen, että ohjelmien vaikutuksia koskevat tulokset eivät aina ole olleet yhdensuuntaisia. Tämä lienee osittain johtunut mallien puutteellisesta spesifioinnista, mm. siitä, että malleihin sisältyvää politiikan tavoitteiden ja keinojen välistä riippuvuutta ei ole vaikuttavuusanalyysin edellyttämällä tavalla täsmennetty.

Eri evaluointimenetelmiä koskevassa vertailussa todetaan, että kullakin kuvatuista lähestymistavoista on omat tavoitteensa. Metsätalousohjelmien tehokkuuden analysointi, joka perustuu metsänomistajakohtaiseen tai osanottajia edustavan otoksen finanssiseen analyysiin aggregoiden tulokset yhteiskunnallisiksi rajahyödyiksi ja -kustannuksiksi, on ilmeisesti yksityiskohtaisin ohjelman nettohyötyjen kvantifioimismenetelmä. Menetelmänä se on kuitenkin kallis ja aikaavievä.

Kuvailevalla menetelmällä pyritään samoihin tavoitteisiin kuin tehokkuuden tarkasteluun tähtäävissä lähestymistavoissa. Tarkastelu voidaan ulottaa ohjelman ja sen kohteen ominaispiirteiden monipuoliseen ja myös alueellisesti laaja-alaiseen kuvailuun. Evaluointimielessä kuvailevan menetelmän tuottamien tulosten informaatioarvo on edellistä vähäisempi. Haittapuolena on se, että ohjelman kohteena olevien metsänomistajien käyttäytymispiirteitä ei tunneta kyllin hyvin. Tämä on rajoite siitä syystä, että metsänomistajien päätöksenteko vaikuttaa ohjelmien nettohyötyihin enemmän kuin metsien eri kasvupaikkojen potentiaalisen rajatuoton vaihtelu.

Ekonometrinen menetelmä soveltuu puolestaan metsätalousohjelmien vaikuttavuuden analysointiin edellyttäen, että politiikan tavoitteet ja keinot pystytään identifioimaan, malli on teoreettisesti oikein spesifioitu ja se perustuu luotettavaan empiiriseen aineistoon.

[1)] Suomenkielisen selosteen on laatinut Ilpo Tikkanen