

## SUBSIDIES AND EFFICIENCY IN FORESTRY CO-OPERATIVES

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### 1. SITUATION OF FORESTRY CO-OPERATIVES IN THE FEDERAL REPUBLIC OF GERMANY

Private forestry in the Federal Republic of Germany mainly consists of small holdings. Out of 534.000 proprietors 97 % own between 0,01 and 10,0 hectare. This category covers 46 % (= 1.4 million hectare) of private woodlands in total.

During the last decades co-operation increased and has been even intensified by recent forest legislation. So nowadays about fifty percent of the small woodland area is managed by voluntary co-operatives.

The main aim of these co-operatives is the improvement of management by trying to overcome the disadvantages arising from small size, from unfavourable location and splitting up as well as from insufficient accessibility and other structural difficulties.

In the smallest properties with extreme unfavourable location even using the potential of the site may be impossible. In general, however, structural difficulties occur in mechanization and economic problems of capacity. In each part of production the combination of input factors has a different optimum. Due to this fact, structural disadvantages are most important in the smallest holdings. Quite obviously there is, however, no exact size of property beyond which structural disadvantages and thereby needs of co-operation will not occur.

The owners interest in co-operation is, last not least, determined by the relative economic importance of the forest revenue within his enterprise. This interest will often

be very little, if forestry contributes to his total income only on a very small scale.

In the Federal Republic of Germany the vast majority of forestry co-operatives is organized as self-regulating association under civil law. This type of co-operative is not a forest enterprise itself, but provides different services for the members and coordinates owners activities. The co-operative therefore gains no profit. The benefits of co-operation are directly earned by each proprietor, who uses the offered facilities according to his own management purposes.

Size of co-operatives differs in a wide range between 800 and 10.000 hectare. Sometimes small community forests join the co-operative, membership of state forests occurs only by exception.

Government forest policy uses co-operatives as a tool to improve the different effects of woodland to the public in general. Therefore special additional grants are given, which may cover parts of the costs of mechanization (up to 40 % of investment) and management. The management grants are at present given in decreasing shares up to 15 years after foundation and may reach between 40 % and 20 % of total overheads. From 1970 to 1978 the average sum of grants was 2.7 mill. DM per year. With 1.5 mill. hectare of co-operative forests this was less than 2 DM per hectare and year.

In most cases professional advice is given to co-operatives by the staff of state forest

services. This advice is free of charge. When the state forester takes over actual forest operations, normally certain fees are charge, which, however, will by no means cover the real costs. This indirect subvention by giving

"technical help" varies a great deal in the different states ("Länder") of the Federal Republic. In all of them, however, the benefit of this indirect subvention exceeds the relatively small direct grants many times.

## 2. ECONOMIC ANALYSIS OF FORESTRY CO-OPERATIVES

### 2.1. Methods

In order to get informations on the efficiency of a forestry co-operative, as a first step one could try to compare the situation before the foundation and afterwards. This attempt, however, has to meet several difficulties. The greatest difficulty of an empirical investigation causes the fact, that the benefits of the co-operative do not occur in its own accounts, but in the balances of the members, who used its services. These members, however, normally do not ordinary book-keeping. In addition to that there are so many of them, that it becomes impossible to judge the success of a co-operative by using the individual results of each members economic activities. Far more, many of the positive effects of co-operation on the actual conditions of the stands will only pay off after several decades. With these longer periods of investigation problems of exact measurement grow, too. In co-operatives running over a longer period already, there may have been changes in objectives, areas and memberships.

Instead of doing this analysis of development, a second method can be used. Here one compares certain characteristics of woodlands belonging to a co-operative with those of non-members. From this comparison conclusions may be drawn on the benefits of co-operation. Doing this, one must keep in mind, however, that co-operatives may influence their surroundings as well. This has been shown in the effects on timber price development, for instance.

Finally, it is very difficult to generalize results gained from existing co-operatives by empirical investigations, as each of them can be regarded as a singular individuum with very specific attitudes.

Quite another approach to estimate efficiency of co-operation can be done by

using model calculations. These should be based on results of empirical investigations, but should only include the main influencing factors. The risk of this method is, that the number of variables may be shortened too much and that the underlying assumptions may be too general.

The research project, some major results of which are reported below, has used a combination of model calculations and field investigations of 20 forestry co-operatives which represented different types of co-operation in all regions of the Federal Republic of Germany.

### 2.2. Results of Model Calculations

Possibilities to improve economic efficiency in small woodlands by means of co-operation depend on starting-conditions (e.g. size of holdings, tree species, age-class-distribution, accessibility and site). The intensity of professional advice is very important, too.

Theoretical calculations on expected improvements in the average property by joining a co-operative comprised both influences on income and expenditure. Three starting-conditions (Type A, B and C) were defined, which differed mainly in average size of holdings as well as actual and potential growth of stands. Efficiency of co-operation was measured by comparison between starting-condition (1), short-term improvement (2) and long-term improvement (3) after foundation of a forestry co-operative.

The most important factor of economic improvement was the increase in revenue. This was reached after a short time by rises of timber prices due to better marketing. In longer terms improvement of timber quality standards and enlargement of supply could be achieved as well. In a co-operative of type

B, which represented an average potential of sites and species (annual cutting rate: 4 m<sup>3</sup>/ha/year) short-term improvements (2) resulted in an increase of annual revenue of + 32 DM/ha (= + 11 %). Long-term improvements (3) led to a better revenue of + 110 DM/ha/year (= + 38 %, see Table 1, 1.6).

Changes in expenditure resulted from additional costs due to intensified silviculture, road construction and management as well as from cost reduction due to rationalized

production. Thus in type B there was only little change in expenditure in total.

Depending on the amount of forest work the owner does himself, the actual income contribution from the woodlands can be increased once more. In the calculation it reached + 259 DM/ha/year after long-term improvements, when 90 % of work was done by the owner (Table 1, 1. 18).

The economic result of a small forest holding in a co-operative will become more

Table 1. Improvement of Economic Efficiency in Small Woodlands by Foundation of a Co-operative, Type B\*)

Variables	Starting-Conditions		Short-term Improvements		Long-term	
	1		2		3	
	DM/m <sup>3</sup>	DM/ha	DM/m <sup>3</sup>	DM/ha	DM/m <sup>3</sup>	DM/ha
<b>Revenue:</b>						
1) Annual Cutting Rate (m <sup>3</sup> /ha)		4,0		4,0		4,5
2) Price of Saw Logs	85		95		105	
3) Price of Pulpwood	50		55		55	
4) Gross Revenue of Timber Production		288		320		398
5) By-Products		-		-		-
6) Total Revenue		288		320		398
<b>Expenditure:</b>						
7) Felling and Logging		162		131		126
8) Afforestation		46		43		43
9) Weeding, Cleaning and Protection		12		24		19
10) Maintenance of Roads		6		9		16
11) Miscellaneous		72		80		84
12) Management of Co-operative		-		9		9
13) Total Expenditure		299		296		296
14) Net Yield (L. 6 ./ 13)		- 11		+ 24		+102
15) Subsidies:		-		7		?
<b>Income, if Part of Forest Work is done by the Owner:</b>						
16) 30 % Own Work		+ 45		+ 84		+154
17) 60 % Own Work		+100		+136		+207
18) 90 % Own Work		+156		+189		+259

\*) Characteristics of Type B: Size of holdings between 5 and 20 ha; mainly farmers: 2/3 soft woods of mostly younger age-classes and with poor thinnings; 1/3 old hard woods of bad quality; annual cutting rate 4 m<sup>3</sup>/ha; most of the timber is sold; insufficient accessibility. Aims of co-operative: road construction, improvement of thinnings, rationalization of production by mechanization, coordinated marketing.

and more attractive as time goes on and investments pay off. In the beginning, however, there will always be a shortage of capital, as the first improvements in timber prices are too small to balance the necessary financial input.

Results of theoretical calculations showed the amplitude of efficiency improvement in small holdings by means of co-operation. In contradiction to the very optimistic prognosis sometimes read, it could be shown, that there were relatively poor results in the beginning. Really evident success could be achieved only in the long-term view by improving quality of stands. Due to this it makes sense, if co-operatives sometimes are not very fond of great investment programs and employment of life-time personal. All these expenditures will pay off not before a very long period.

### 2.3. Investigation of 20 Forestry Co-operatives

The analysis of 20 co-operatives included 63.800 ha and 5.400 owners. 53 % of all holdings were smaller than 5 ha, 34 % had between 5 and 20 ha of woodland. Size of co-operatives varied from 800 ha to 10.000

ha. Number of members per co-operative was between 50 and 650. At a rate of 54 % members were farmers. The possible annual cutting rate was 4,1 m<sup>3</sup>/ha, whereas the actual cutting rate reached only 3,7 m<sup>3</sup>/ha due to bad accessibility. Aims of the co-operatives, defined by statutes, mainly concerned coordination of production, mechanization, material acquisition and timber sales.

The actual activities of the co-operatives were among others measured by means of intensity of professional advice, provided by the state forest services. The staff input per area, which was quite a good indicator of activities, differed considerably due to different emphasis on forest policy in the federal states.

A direct comparison between the results of model calculation and field investigation proved to be difficult. As some of the analyzed co-operatives did not fully use coordinated marketing, their actual economic efficiency was slightly lower than it was supposed to be according to model calculations.

The presidents of the co-operatives were also interviewed on advantages and disadvantages of co-operation. Table 2 shows, that the advantages prevailed. Presidents apparently gave special significance to improvements by

Table 2. Results of an Interview of 20 Presidents of Forestry Co-operatives.

Having joined a co-operative income of members will become higher or lower?	Distribution of statements:										
	no	→ medium → high importance									
	0	1	2	3	4	5	6	7	8	9	10
higher, due to:											
1) short-term increase of revenues	2	2	3	1	-	6	-	2	1	-	3
2) short-term rationalization	3	3	2	2	1	6	-	1	-	-	2
3) long-term increase of revenues	1	1	-	1	-	3	2	4	3	-	5
4) long-term rationalization	1	1	3	5	1	8	-	-	1	-	-
5) subsidies	-	-	-	-	-	1	-	-	-	1	18
lower, due to:											
6) restrictions in doing forest operations themselves	16	3	1	-	-	-	-	-	-	-	-
7) additional costs of management	14	1	2	3	-	-	-	-	-	-	-
8) higher expenditure following intensified silviculture	13	2	4	-	-	1	-	-	-	-	-
9) higher expenditure following higher investments in machinery and roads	14	3	3	-	-	-	-	-	-	-	-

subsidies (Table 2, line 5), although the actual sum of all grants was only 1 DM/ha/year. Quite obviously, forest policy effects of these grants are far greater than their actual contribution to the income of the owners.

In general, subsidization of forestry co-operatives proved to be insufficient. Limitation of grants for first mechanization for instance and decreasing shares in management grants do not take into account long-term production in forestry. Here improvements can only be achieved by permanent subsidies on a higher level.

A discussion of different ways of subsidization showed, that from the micro-economic point of view direct product subsidies of timber production may be more favourable than area-based grants. In addition to that, public investment funds should be given in any case.

### 3. Problems of Macro-Economic Cost-Benefit-Analysis of Subsidies

For several reasons a cost-benefit-analysis of subsidies to forestry co-operatives is very difficult. Using this instrument, development of revenues and costs with subsidization and without it has to be found out and net costs of subsidies had to be calculated. This would only be useful, however, if after certain subsidizations direct changes in revenues and/or costs could be expected. This again could only happen, if there would be a significant influence of subsidization on decision making of individual proprietors. As the total sum of public subventions to forestry co-operatives is very low and a prognosis of timber price development is very uncertain, the computed efficiency improvement on a macro-economic scale would probably be less than the statistical error of the calculations.

A second difficulty occurs, when the situation of small woodlands has to be analyzed as it would be without any subventions. Most probably there would have been no foundation of co-operatives at all without public subsidies. Therefore it would be almost impossible to estimate the theoretical economic development of a single small holding without subvention.

Public funds for forestry co-operatives are

not identical with national economy costs. These are rather defined as quantified changes in factor inputs caused by the subventions. The small amount of subvention, however, will probably not show such effects. Therefore the statement may be justified, that subvention mainly causes changes in income-distribution for the benefit of proprietors in co-operatives, but does not produce national economy costs.

Reductions of expenditure, calculated in the micro-economic analysis, can mainly be regarded as consequences of the existence of co-operatives, but not of their subsidization. Due to this, it can be postulated to subsidize first of all the foundation of co-operatives in particular.

In chapter two of this paper the improvement of timber prices was discussed. This must not be defined, however, as increase of overall national rentability in any case. Increase in timber price will probably result from different influencing factors, which are mixed up. But there is no doubt, that some of them can be regarded to be just changes in distributions of costs between producers and buyers. From this the final conclusion may be drawn, that public subvention of forestry co-operatives mainly causes changes of income-distributions and less changes of factor allocations.

Finally, it seems necessary to check up the instruments of forest policy, whether they meet the special requirements of forestry in general.

There is a number of reasons, why in forestry market mechanism does not guarantee optimal area of woodlands and timber production on its own. Therefore active public influence by means of forest policy is necessary. Whereas in other parts of industry economic policy uses a system of economic incentives and pressures, forest owners are forced to act in accordance to national economy goals by legal restrictions. If this is regarded to be preferable, the economic disadvantages of these restrictions must be compensated.

As result of a discussion of different forest policy instruments a combined system of area-based and product-based subsidies can be recommended. Within this concept, very much higher grants for afforestation are requested. Subvention of co-operatives has

proved to be a very useful tool of forest policy. It should be altered according to the recommendations described above and

should concentrate on really heavy financial incentives to foundations of new forestry co-operatives.

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