

Neighbours beyond comparison?!

Contributions on the influence of the demands of society, restrictions and economic situation on appraisal of forests and management strategies in private and communal forest enterprises in adjacent regions

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ABSTRACT

Germany's state in the very southwest, Baden-Württemberg (BW), is situated at the border to Switzerland (CH). In both countries community forests (BW 39% of the total forest area, CH 66%) and private forests (BW 39%; CH 27%) enterprises play a substantial role in the forest sector. The silvicultural situation is comparable in relevant parts of the countries but the framework set by societal demands, forest policy and the economic situation shows considerable differences.

A survey was carried out among owners of community forests, mixed farm-forest enterprises with up to 200 ha forest in both countries. The survey focused on the restrictions, present situation, attitudes and behaviour in the individual ownership classes. It became obvious that forestry in both regions is almost beyond comparison. Both, the differences between the private forest enterprises and the communities, as well as regional distinctions are statistically significant. The paper focuses on the present use of forests, the restrictions perceived by their owners and gives an overview on the underlying management strategies in terms of structure of the forests, tree species composition and thinning activities. It can be shown that a lack of economic success reduces the general interest in forest management. In BW the economic function is the dominant motivation for the majority of the private owners. The communities emphasize both timber and non-timber functions of their forests. Except for the protection function (avalanches, rockslide) the utilisation and importance of the forest in CH is lower than in BW.

The results of this comparative survey are put into the context of a forest policy framework and the me-dium-term economical situation in the different countries. The interdepen-den-cies between State subsidies, economic success and forest management strategies are discussed. It is shown that the economic functions of forests are still a key-driver of forest activities.

Abbreviations used in the paper:

BW: Baden-Württemberg (Germany)

CH: Switzerland

ALL: All ownership-classes

COF: Community forests

SSFE: Small scale (private) forest enterprises (<200 ha)

GPFE: Greater private forest enterprises (>200 ha)

BÜR: Bürgergemeinde (CH) = Forest in common property

CM I: Contribution margin I = timber price – direct costs for harvesting and extraction

CM II: Contribution margin II = CM I – cost for other silvicultural operations, forest infrastructure pest management

INTRODUCTION

Since World War II forest enterprises in Central Europe made a far-reaching shift from profitable and mostly uninfluenced timber producers towards crisis ridden owners of an almost public good, requested to accomplish a wide range of ecological and demands of society (Oesten and Roeder 2002). It is a widely discussed question, which are the key factors that influence the attitude and behaviour of forest owners. Today forests are in the public opinion not predomi-nately a place where timber is produced. Using different valuation methods Köchli (2006) provides evidence that ecological aspects and the recreation function is prevalent. The question arises whether the increasing societal and ecological demands, the restrictions due to

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these functions are meanwhile a major impediment in the view of the forest owners?

It can be shown that the costs mounted permanently during the last decades. On the contrary the proceeds remained fairly stable, despite the fact that the fel-ling volume increased constantly. This resulted in a critical economic situation for many forest enterprises in BW and CH (Hartebrod and Fillbrandt 2006, Burri 2004). Is the decreasing profitability the factor that matters? Are the forest owners still predominantly timber producers? Or does the “law of locality” in terms of natural, infrastructural and topographic conditions determine forestry in these regions?

A survey carried out in two adjacent regions in different countries offered the possibility to make contributions to these questions on the base of a two-dimensional comparative survey. Two-dimensional in terms of a regional approach, using BW and CH as two regions combined with an assessment in comparable ownership classes in both countries. The comparison between countries focuses on the impact of political, natural and societal framework, the assessment in different ownership types emphasizes the various roles forests play in different property types, as well as typical attitudes and perception of their owners. Figure 1 provides an overview of this two-dimensional approach.

The core of our research was to identify the key drivers and main interdependencies between economic situation, ecological and societal restrictions and forest management.

FRAMEWORK

Forests

Forests play a substantial role in landscape management in both countries. The total area of forest is about 1.3 M ha in BW and about 1.2 M ha in CH. Forest area comprises 39% (BW) and 30% (CH) of the total area. In both countries communal (BW 39% of the total forest area, CH 66%) and private forests (BW 39%; CH 27%) enterprises play a substantial role in the forest sector. The private forest sector is characterized by a large number of forest owners and therefore suffering a tremendous parcellisation. The forests mainly consist of coniferous forests (BW 65%, CH 71%), the stand-volume is, with 367 m³/ha exactly the same and exceeds most countries and other regions in Europe. One relevant distinction is the level of the mean annual increment. In BW the forests reach a very high level of 13.7 m³/ha/a whereas the Swiss forests grow by 9.2 m³/ha/a, due to climatic and other natural conditions (BUWAL and WSL 2006, Kändler et al. 2005, LFI 1999).

Function of the forests

In both countries multifunctional forestry plays a prevalent role due to the high density of population (BUWAL and WSL 2005, LFV 2004). This means that forests are used for economic, social (especially recreation and protection) and ecological purposes. However the significance of the single functions differs. Due to topographic and sociogeographic reasons the protective functions play a very important role in CH. 25% of the forest

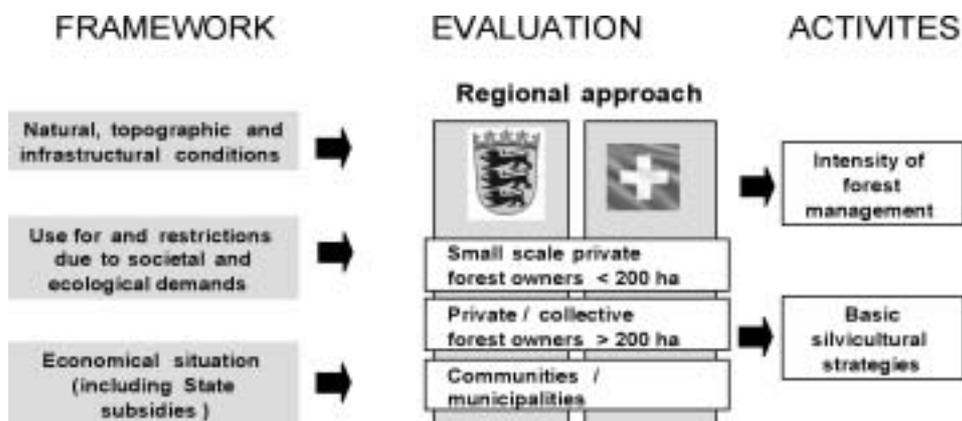


FIGURE 1: Overview on the two dimensional evaluation-design.

area provide direct protection for settlement areas and other infrastructural facilities against natural disasters such as avalanches or rockslide. This function is subordinate in BW. The share with designated protection function is below 1%. Additionally a small part of the forests with soil-protective functions (total share = 17%) is bound to this function. With regard to the recreational use of forest there is an inverse situation. The Swiss forest report relates that there is no relevant public use in 83% of the forest area; only 5% of the area is heavily used (BUWAL and WSL 2006). In BW 27% of the forest area are mapped as forests with notable recreational use. In both countries there is a relevant utilisation of forest for (drinking) water supply (LFV 2004). The share of restricted forests is comparably low (about 2%) in both countries, but in BW a high share is part of landscape preservation areas (31%) or natural reserves (3%).

Economical situation

For decades forest enterprises in BW and CH have been suffering a slow decline of their operating profits. The costs for wages, material and other resources are strongly related to the inflation-rate, whereas the proceeds (90-95% are related to timber sells) stagnate (Hartebrodt and Fillbrandt 2006). Despite the fact that there is a relevant increase of the felled volume per area, the cost-price squeeze results into an increasing economic crisis, temporarily aggravated by storm disasters (see Hartebrodt 2004).

A comparison between BW and CH shows that the economic pressure, which burdens the forest enterprises differs significantly. CM I and CM II (definition see above) are suitable indicators for the economic efficiency of the timber production respectively for the forest enterprises in general. It can be shown (Figure 2) that the CM I in BW is positive in all ownership types. Even the CM II, which covers the direct costs for the forest production (such as regeneration, precommercial thinning, pest management) was mostly positive in the past, except for a few years after severe storm disasters. On the contrary it must be stated that the CM II in CH is negative since the late 80ies. The time series since 1989 of the CM I in CH indicates furthermore that the timber proceeds

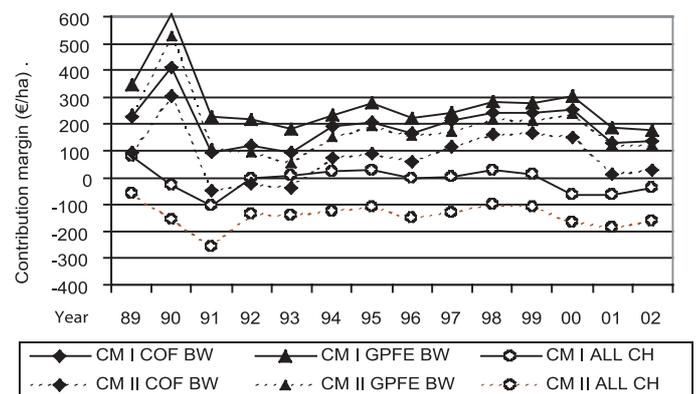


FIGURE 2: Time series of the contribution margins in BW and CH.

were not sufficient to cover the direct harvesting costs in half of the years.

As a result of this situation the amount of State offered help varies between the two countries. Table 1 gives an overview over the amounts of these subsidies in regular times and after storm disasters. Both the amounts per ha respectively m^3 reach an almost three fold rate in CH. Subsidy theory provides evidence that there is a notable trend that subsidy programs became almost irrevocable due to political reasons (Thormählen 1987). This can result in a decrease of self-reliance and economic interest (Kurki 1991). Therefore it must be expected that the subsidy policies have a relevant influence on the attitude of the owners.

The subsidisation of silvicultural and other forest activities is predominant in both countries

TABLE 1: Amount of State offered subsidies in regular periods and after catastrophic events.

Type of subsidy	CH	BW
Different types of subsidies for silvicultural operations and forest investments (BW 97-99, CH 99)	78,04 €/ha	39,00 €/ha
	17,55 €/m ³	4,48 €/m ³
Share of subsidies on the total proceeds 1999 (BW 97-99)	19%	6%
Storm related subsidies after the thunderstorm in 1999	33 €/m ³	11 €/m ³
Amount of state offered business loans after the thunderstorm in 1999	1 €/m ³	0,3 €/m ³

(approximately 80% BW 50% CH). Forest investments, especially for forest infrastructure, play an important role and reach a matchable level of about 20%. As already mentioned the defense against natural disasters plays an outstanding role in CH, therefore 30% of the total amount of State offered subsidies is spent for such purposes.

In a nutshell: The forest owners in CH presently depend more or less on state offered help, whereas forestry in BW is still economically viable, except for the years after severe storm events.

MATERIAL AND METHODS

A survey was performed in different ownership classes in BW and CH. Table 2 gives an overview on the different ownership-types, the population in each class and depicts the formation of the comparison-collectives.

The survey was carried out as a mail survey in most sub-collectives. Only the owners of the smaller private forest enterprises in BW were

surveyed on the base of face-to-face respectively telephone interviews. Holthausen und Baur (2003, 2004) and Hartebrodt and Bitz (2006) provide a more detailed insight into the research material and method.

The statistical significance of the differences was analysed using the Man-Whitney-U-Test, which is suitable for smaller populations. Table 3 provides information on the statistical differences between the single comparison collectives.

RESULTS

Natural and technical constraints

It might be argued that the subsequently described differences are predominately a result of the varying topographic or infrastructural situations in the two regions. In fact must be noticed that BW has in contrary to CH no relevant parts of sub-alpine or alpine forests. Results of the economic monitoring in CH show obvious distinctions (in terms of the economic situation) between the

TABLE 2: Characterisation of the population and formation of comparison collectives.

Characteristics	Switzerland	Baden-Württemberg
	Collective	Collective
Communal forest enterprises with fiscal sovereignty	Political communities	Political communities (>200 ha)
Respondents	79	262
Average size	278 ha	736 ha
Response rate	51%	44%
Small scale forest enterprises	Private forest enterprises (all (size classes))	Private forest enterprises (5-200 ha)
Respondents	300	156
Average size	3,8 ha	29,3 ha
Response rate	45%	75%
Economically oriented greater private or collective owned forest enterprises	“Bürgergemeinden“ Collective forest property without tax-sovereignty	Private forest enterprises >200 ha
Respondents	61	34
Average size	646 ha	1893 ha
Response rate	51%	42%

TABLE 3: Statistical significance of the differences between the corresponding ownership classes in BW and CH.

	SSFE BW-SSFE CH	COF BW-COF CH	GPFE BW-BÜR CH
	Framework		
Topographic and infrastructural situation/constraints	(*)	*	(*)
	Use of different forest functions		
Recreation	**	**	(*)
Protection	*	*	*
Economic weight	**	**	**
	Restrictions		
Recreation	**	**	/
Protection function	/	/	/
Nature protection	(*)	*	*
	Management and results		
Harvesting intensity	**	**	**
Share of mixed stands	*	**	(*)
Regeneration of broadleaf stands	/	**	(*)
Operating results	**	**	**
/	not (statistical) significant	p > 0,1	
(*)	lowly significant	0,1 > p > 0,05	
*	significant	0,05 > p > 0,001	
**	highly significant	p < 0,001	

mountainous and alpine regions (Burri 2004). The perception of the owners however shows only little variation and with regard to the communities unexpected results. 40% to 50% characterize the conditions as difficult or pre-dominately difficult. Only the Bürgergemeinden (BÜR) provide a more positive evaluation. The appraisal of the communities in CH is better than in BW! In general we have, as expected, more difficult conditions in CH but the difference of mean is limited to 0.2 on the four-point (forced) Likert-scale (Table 4).

Importance of different forest functions

The appraisal of the forest owners concerning the recreation functions meets the results of the national forest inventories (LFV 2004, LFI 1999). The use of the forests for recreational purposes in BW is significantly more intensive, except for the GPFE and BÜR. A comparison between the ownership classes reveals the outstanding role of the recreation function in communal forests (COF BW, COF CH, BÜR CH). There is a lower use for recreation in the smaller forest properties (Table 5).

TABLE 4: Appraisal of the topographic and infrastructural framework of the forest enterprises.

		SSFE BW	SSFE CH	COF BW	COF CH	GPFE BW	BÜR CH	ALL BW	ALL CH
		(%)							
Simple	(4)	15	12	3	11	9	8	9	10
Predominantly simple	(3)	39	32	37	41	38	25	38	33
Predominantly difficult	(2)	37	33	41	28	44	35	41	32
Difficult	(1)	9	19	18	16	9	30	12	22
Mean (4-point Likert-Scale)		2.6	2.3	2.3	2.4	2.5	2.1	2.4	2.2

TABLE 5: Intensity of use for recreational purposes.

		SSFE BW	SSFE CH	COF BW	COF CH	GPFE BW	BÜR CH	ALL BW	ALL CH
		(%)							
High	(4)	16	10	45	32	25	43	29	28
Medium	(3)	28	17	46	33	44	40	39	30
Low	(2)	35	31	9	28	28	15	24	25
Insignificant	(1)	20	40	0	5	0	2	7	16
Mean (4-point Likert-Scale)		2.4	1.9	3.4	2.9	2.9	3.3	2.9	2.7

TABLE 6: Intensity of use of the protection function.

		SSFE BW	SSFE CH	COF BW	COF CH	GPFE BW	BÜR CH	ALL BW	ALL CH
		(%)							
High	(4)	2	3	2	17	3	33	2	18
Medium	(3)	2	7	15	11	6	13	8	10
Low	(2)	7	15	36	33	28	13	24	20
Insignificant	(1)	90	75	47	37	63	40	66	51
Mean (4-point Likert-Scale)		1.2	1.4	1.7	2.0	1.5	2.4	1.5	1.9

It can be shown that there is a heavier use of the protection function¹ in CH. Especially the share of enterprises in CH which states a high importance of this function is at least twice as high compared to BW, in COF CH and BÜR it reaches a ten fold rate (Table 6).

Asking the owners about the economic weight of the forest income it becomes obvious that forests in BW still have a relevant economic function for their owners (Mean 3.2). Not less than one half of the interviewees perceive a notable significance in

BW, for the owners of larger private estates (GPFE BW) it is the predominant sphere with about 80% underlining the economic function. In CH the economic dimension has lost its importance for the most part of the owners of smaller forest private forest enterprises and the communities. Only in the so-called Bürgergemeinden, which are not allowed to impose taxes, forests have kept their economic importance (Table 7). In general it can be stated that the economic importance is much lower (Mean 2.3) than in BW.

TABLE 7: Economic weight of forest income.

		SSFE BW	SSFE CH	COF BW	COF CH	GPFE BW	BÜR CH	ALL BW	ALL CH
		(%)							
Important	(4)	36	7	25	11	79	32	47	17
Moderately important	(3)	41	14	30	13	15	30	29	19
Little importance	(2)	21	44	38	54	6	23	22	40
Unimportant	(1)	3	35	7	21	0	10	3	22
Mean (4-point Likert-Scale)		3.1	1.9	2.7	2.1	3.7	2.7	3.2	2.3

Restrictions

The perception of restrictions due to the use of forests by the public for recreational purposes again corresponds with the results of the nationwide inventory and the use of forests in the individual country. The owners of the smaller private estates mostly assess no relevant restrictions due to recreational use. In both countries this function causes notable restrictions in the communal forests. About one third of greater private forest estates esteem a notable influence but the share of enterprises suffering high restrictions is irrelevant and comparable to the smaller private properties (Table 8).

The distinctions between the ownerships types are more relevant compared to the (not significant) differences between the countries. The communities and greater private properties perceive medium or high restrictions but with about 20% it is no overarching impediment (Table 9).

The differences between the restrictions resulting from requirements for nature conservation are more relevant in BW. About one third of the communities and more than 40% of the GPFE state relevant charges and restrictions. This level is in CH significantly lower. In both countries the smaller private forest enterprises are more or less un-influenced (Table 10).

TABLE 8: Restrictions due to recreational use.

		SSFE BW	SSFE CH	COF BW	COF CH	GPFE BW	BÜR CH	ALL BW	ALL CH
		(%)							
High	(4)	3	2	14	9	3	5	7	5
Medium	(3)	15	5	30	21	30	24	25	17
Low	(2)	41	22	46	25	58	41	48	29
Insignificant	(1)	41	70	10	45	6	29	19	48
Mean (4-point Likert-Scale)		1.8	1.4	2.5	1.9	2.2	2.1	2.2	1.8

TABLE 9: Restrictions due to the protection function.

		SSFE BW	SSFE CH	COF BW	COF CH	GPFE BW	BÜR CH	ALL BW	ALL CH
		(%)							
High	(4)	2	1	3	11	3	14	3	8
Medium	(3)	2	2	16	12	22	12	13	9
Low	(2)	15	11	39	25	19	33	24	23
Insignificant	(1)	81	85	42	51	56	41	60	59
Mean (4-point Likert-Scale)		1.2	1.2	1.8	1.8	1.7	2.0	1.6	1.6

TABLE 10: Restrictions due to nature conservation.²

		SSFE BW	SSFE CH	COF BW	COF CH	GPFE BW	BÜR CH	ALL BW	ALL CH
		(%)							
High	(4)	1	3	7	9	12	5	7	6
Medium	(3)	5	5	26	14	32	16	21	12
Low	(2)	28	13	47	42	47	47	41	34
Insignificant	(1)	66	77	20	33	9	33	31	48
Mean (4-point Likert-Scale)		1.4	1.3	2.2	2.0	2.5	1.9	2.0	1.7

Forest Management and its economic results

In BW there is a wide consensus concerning continuous thinning and harvesting activities. More than 80% of the interviewees indicate that they maintain a continuous forest management. The level in CH is significantly lower. Less than half of the enterprises state that there is a continuous management of the stands. The share of respondents stating that the harvesting activities are at least partially continuous reaches only approximately two thirds in CH (Figure 3).

The share of mixed stands shows stronger distinctions between the individual ownership types. There is no general trend in the individual countries. The share of private enterprises (SSFE, GPFE, BÜR) with predominantly mixed stands is about 10% higher in CH. There is an inverse ratio in the communal forests. About 60% of the communities in BW have predominantly mixed stands, the Swiss communities below 40% (Figure 4).

It can be shown that this is not only a result of forest history because the results concerning the present regeneration activities confirm this result. There is a higher relevance of the enterprises, which presently emphasize the regeneration of broadleaf dominated stands in the private forests of CH. The significance of broadleaf regeneration is higher in the baden-württembergian communal forests.

The appraisal of the expected operating results (within a five-year period after the survey) provides evidence that there is a wide difference between countries and ownership types. In general it can be said that the owners in BW make more positive evaluations. Two thirds of the private owners (SSFE and GPFE) expect positive future results. The communities in BW expect worse operation results but nevertheless one quarter expects positive and almost two thirds at least a break-even result. In CH not more than 10% of the enterprises expect positive results, about 40% expect a break-even result – with little variations between the ownership classes (Figure 5).

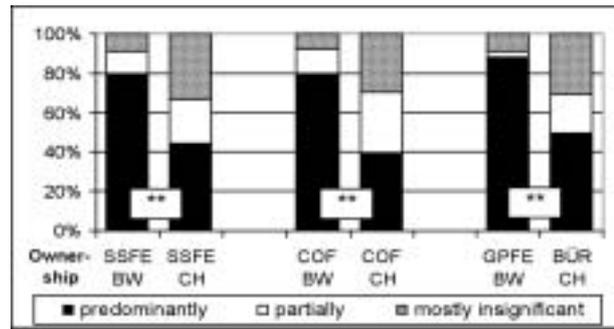


FIGURE 3: Share of enterprises with continuous timber harvesting.

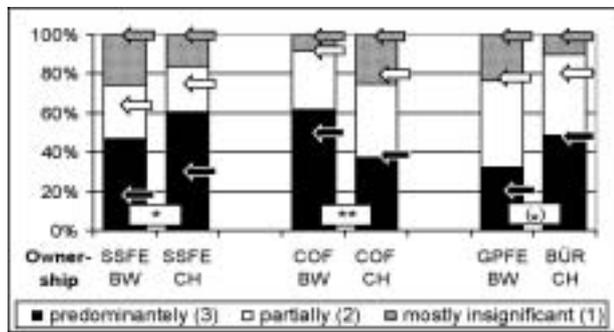


FIGURE 4: Share of mixed stands³ and share of regeneration⁴ with broadleaf stands.

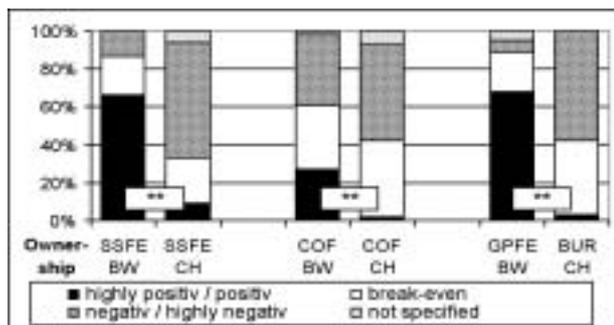


FIGURE 5: Expected operating results in different ownership classes.

DISCUSSION

Natural and silvicultural framework

The framework only partially provides reasons for differences concerning attitude and behaviour of forest enterprises in the two countries. The size of the enterprises differs to a greater extent but considering average size it can be stated that this difference is only relevant in SSFE (average size: 4

ha CH, 30 ha BW). This corresponds with general findings that the impact of the size class on attitude, behaviour and economic results is subordinate (Selter 2006). On one hand the influence of the growth rate on the operating result is given (Hartebrodt et al., 2005). At first sight this results in a relevant disadvantage for Swiss Forestry. On the other hand it must be noted that only 70% of the annual increment is harvested in CH. Therefore it is obviously not the potential growth percent that presently limits a heavier use of forests. With regard to the tree species composition, which shows a strong relationship to the operating results it can be demonstrated that BW and CH are widely comparable. An outstanding role plays the evaluation of the topographical and infra-structural framework of the individual enterprises. The difference between the single comparison collectives and the two regions is very low. A conclusion is that the natural, topographic and infrastructural framework cannot be identified as a key-driver for the attitude and behaviour of forest owners.

Use of non timber functions and their restrictions

The use of the forest for recreation is relevant in both countries. There is a correlation between ownership class and intensity of use for these purposes. As expected the recreation function is concentrated in communal forests. Despite the fact that there is a relevant use of forests the results provide evidence that the restrictions perceived are much lower (difference of mean between use and restrictions: CH - 0.9, BW - 0.7) compared to the use of forests (compare tables 5 and 8). The restrictions in SSFE are negligible; only the communities in BW state relevant restrictions. On average there is a trend towards heavier implications due to recreational purposes in BW. This corresponds to the results of the nationwide forest inventories in the individual regions (LFV 2005, LFI 1999).

As expected the use of the protection function is more relevant in CH (1.93) than in BW (1.46) but less important compared to the recreation function. The use for the protection function is low in BW and in SSFE in CH. COF and especially BÜR in

CH note a heavier use. The restrictions due to this forest use are equally low in both countries (BW 1.58, CH 1.64), in SSFE they are insignificant.

Additionally the role of restrictions due to nature conservation has been assessed. This kind of restriction is more relevant in BW (2.03, CH 1.73). Again there is low impact on SSFE in both countries. The impact on communities and greater private estates is higher. The GPFE in BW highlight this restriction.

The role of societal demands is widely discussed within the representatives of private and communal forest owners. In fact the results show that the owners realize a notable but not a dominant influence of both, use and restrictions related to societal and environmental demands. There is a higher relevance for communal forests but the differences between the countries are lower than between the ownership types. With regard to the comparison between adjacent regions it is an unexpected fact that restrictions are esteemed being more relevant in BW. A ranking of the appraisal of the various types of restrictions (Recreation, Nature conservation, Protection) shows an almost equivalent ranking in CH (Re: 1.78, Na: 1.73, Pr: 1.64) whereas the owners in BW emphasize the restrictions due to recreation and classify the protection function as relatively insignificant (Re: 2.17, Na: 2.03, Pr: 1.58).

The perception of restrictions due to non-timber functions can be used as one explanatory factor for the different role of communal forests but it provides only weak explanation for the differences between the two regions. On one hand the set of use and restrictions varies between the two countries but on the other hand there is no general trend that can explain the differences in terms of intensity of forest management between BW and CH.

Economic situation and expectation

The differences discussed above showed in most cases a stronger relationship to ownership-classes than to the region. With regard to monetary factors it becomes obvious that the differences are mainly related to the spatial affiliation. The time-series of CM I and CM II illustrates that there is a stable

difference since more than a decade. Forestry in BW is still economical viable and all the operational forest activities can be covered with the timber-proceeds. A detailed analysis of the individual ownership classes in BW leads to the conclusion that the situation in COF is worse compared to the GPFE and SSFE. However it was only the CM II in COF was negative for 3 of 14 years. Despite the fact that the COF in BW have the worst results it becomes visible that in CH direct harvesting costs (CM I) were not covered in years after storm events (90-92; 2000 et seqq.; see Figure 2). The situation in CH is therefore more crucial compared to the worst situation in BW.

This leads directly to the forecast of the operating results. As mentioned above the majority of the private forest owners in BW expect still positive results in the future (2.53, 2.52⁵). The influence of the results in the recent years is visible in the COF BW. Despite the fact that it is much better than in CH the difference between the private forest owners in BW shows that the worse economic situation in communal forest decreases the expectations significantly (1.866). After more than one decade of negative results in CH an overarching share of the enterprises have negative expectations (1,37 to 1,43⁵). The belief in a viable forestry is lost.

The interpretation of the economic weight of forestry on the whole income underlines the findings. Within the group of SSFE the different size of the enterprises must be taken into account, but the tremendous difference cannot be explained only with the size of the enterprises. The results in the communities and greater private estate underline this finding. The share of the forest income in most of the communities does not exceed 1-2% of total communal budget in both countries. Despite the fact that the 'true' monetary importance (in terms of percentage of the entire budget) is low, the appraisal of the Swiss communities underlines the change of view with regard to the economic dimension of forests.

In a nutshell: The tremendous differences between the countries concerning several economic indicators must be identified as a key-driver that influences attitude and behaviour of forest owners.

Implications on forest management

The results are discussed with regard to a continued forest management and the attitude towards basic silvicultural strategies.

It can be shown that the distinctions between the regions are decisive. In BW is a wide consensus for a continuous timber harvesting in all ownership classes. The nationwide forest inventory provides evidence that in BW the degree of utilisation of the annual increment reaches 95%. In addition it could be shown that this harvest focuses on assortments, which find an open market (Hartebrodt and Fillbrandt, 2005) whereas the potentials in hardwood-assortments are underused. Thus timber demand can be identified as one key-driver as long as timber harvesting is profitable (positive CM I). In CH the permanent deficits reduced the intensity of forestry significantly. On the long term the maintenance of forestry is obviously strongly related to an economic viability.

On the contrary the implication on the basic silvicultural strategies is lower. A result was that there are distinctions between the property types, but it was not possible to derive a common trend related to the spatial affiliation. The survey includes several questions concerning basic silvicultural strategies (e.g. type of thinning, vertical structure of forests). There are some partially significant differences between the single comparison collectives. It was not impossible however to identify a uniform trend, which can be used to derive relevant differences in silviculture or offers hints for relevant differences. A comparison between the present tree species composition and the present regeneration activities can be interpreted as a hint that silviculture follows traditional patterns. A conclusion is that the kind of forest management has not changed until now but the decreasing activity will take influence on the structure and vitality of forests.

FACTORS THAT MATTER – A CONCLUSION

In terms of statistical significance the figures and tables above support the thesis that forestry in CH and BW are beyond comparison. Beside the differences between the countries the relevance of

the individual criteria must be analysed. Table 11 gives an overview on both appraisal in the countries and ownership-classes and the importance of the factors.

It is obvious that neither the differences nor the appraisal of the topographic and infrastructural constraints can be used as explanatory factors for different attitudes and behaviour. There are no relevant distinctions between the regions and the owners.

In general the societal use and the restrictions due to the different functions are not suitable to explain the relevant differences with regard to intensity of forestry between the two regions and the whole set of different uses and restrictions. Despite the fact that there is a relevant discussion on societal constraints it can be shown that they are mostly insignificant for the owners of smaller private forest. In forests located close to settlement areas there is relevant use of recreational purposes and notable but not far reaching restrictions. The relevant difference between the communal forests and the private forest owners indicates that the perception of public forests should be influenced

by the higher use for recreational purposes. The role of the protective function in CH fortifies additionally the loss of the economic function that could be derived for the communal forests in BW and CH.

It is the economic dimension that shows the most relevant differences between the two countries and the different ownership classes. Compared to the SSFE, GPFE and BÜR the COM the economic importance and the future expectations are worse. Even in the COM there is a difference between BW and CH; therefore it can be stated that the lower level is related to the ownership type. Beside the fact that the private forest owners in general give more positive evaluations it must be stated that the differences in the past have resulted in an overarching decrease of the relevance of the economic dimension in CH. The economic dimension influences the perception and behaviour to a greater extent compared to the other functions. In view of the intensity of the forest management there is a considerable overlap between the appraisal of the economic dimension and the intensity of forest management in terms of frequency of thinning-operations, commercial

TABLE 11: Overview of the differences of mean between BW and CH and the different ownership classes.

Abbreviations: UR = Use for recreation, RR = Restrictions due to recreation, UP = Use for protection, RP = Restriction due to protection, RN = Restriction due to nature conservation; EW = Economic weight, EX Economic expectations, ST significance of timber products, IH Intensity of harvesting, CH = Commercial harvest; BL Broadleaf Regeneration, MS Mixed Stands, TB from below; OL = Importance of one layered stands

Evaluations based on a four point Likert-scale: ++ high, + medium, - low, -- insignificant (four point Likert-scale);

Evaluations based on a three point Likert-scale: C predominately/positive, = partially significant/break even, D mostly insignificant/negative

		SSFE					GPFE/BÜR					COM					ALL				
Topographic and infrastructural constraints	BW	+										-									
	CH	-										-									
Use and Restrictions	BW	UR	RR	UP	RP	RN	UR	RR	UP	RP	RN	UR	RR	UP	RP	RN	UR	RR	UP	RP	RN
	CH	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	+	-	-	-	-
Economic situation and expectation	BW	EW		EX			EW		EX			EW		EX			EW		EX		
	CH	+	↓	-	=		++	↓	+	=		+	=	-	?	+	=	-	=		
Intensity of forest management	BW	ST	IH	CH	ST	IH	CH	ST	IH	CH	ST	IH	CH	ST	IH	CH					
	CH	↓	+	↓	↓	++	↓	↓	++	↓	↓	++	↓	↓	++	↓					
Silvicultural strategies	BW	BL	MS	TB	OL	BL	MS	TB	OL	BL	MS	TB	OL	BL	MS	TB	OL				
	CH	=	=	=	=	=	=	=	=	↓	↓	=	=	=	=	=	=				

harvesting and share of stands treated regularly. A continuous forest management is more or less strongly related to the possibility of meeting economic success with these activities. Even a higher subsidisation in CH was not able to prevent this decline of the timber-function of the forests in CH. A continued economic crisis is therefore suited to endanger all forest functions that are closely related to continued tending and harvesting activities. Despite the fact that the obsolescence of the forests is considered a relevant risk for the protective function in CH and therefore more crucial in CH, the rational awareness of the need of forest activities cannot bridge the gap resulted by permanent deficits.

The kind of forest management is on the contrary not deducible from the economic sphere. In terms of the mean of the evaluations all indicators received an ambiguous appraisal across the regions and ownership types (share of mixed stands, share of broadleaf, importance of antiquated thinning from below, share of one layered stands). From this it follows that there is no relevant impact on the silvicultural strategies related to the indicators described above.

From this it follows that forest policy should emphasize measures improving economic viability, such as developing new timber markets and improving the forest structures in order to reduce the operating cost, more than the subsidisation of silvicultural measures.

Decision making in forest is not monocausal. There are important interferences between the single components. Nevertheless the findings gathered from the two dimensional comparison between BW and CH provide evidence that the role of the economic success on the forest management is still dominant. At the bottom of the heart forest owners are still timber-producers. The role of the forest budgets in the communities is subordinate indeed. The societal demand of forest functions and even an expectable threat of protective function are not strong enough to preserve a constant level of forest treatment. The halo-effect of the former economic function is still given. In terms of an active forest management and the forest functions related to the timber-function BW and CH are really beyond comparison.

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Notes

- 1 Protection against (e.g.): avalanches, landslide, rockfall, noise and climate.
- 2 Restrictions due to nature protection (e.g.): restrictions in nature reserves, landscape conservation areas, EU-framework directive flora-fauna-habitat.
- 3 At least two species with less than 80% of the stand area.
- 4 The arrowheads indicate the share of stands with broadleaf regeneration.
- 5 Three-point Likert-scale ! (3.0 to 2.5 = positive or highly positive; 2.49 to 1.5 = break even; 1.49 to 1.0 = negative or highly negative).