

Multifunctional forestry practices as a land use strategy to meet increasing private and public demands in modern societies

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ABSTRACT: The present distribution of forests and the degree of their transformation by man are the results of natural factors and cultural development. The limit between forested areas and open spaces, as well as differences between intensively used forests and those showing small or no traces of human intervention, is determined by social needs and values, economic opportunities, and political regulations. Forests are currently perceived by the population as physical and social spaces profoundly influenced by timber use and forest management. Their social and political significance is in full evolution. The multiple demands on forests in a rapidly evolving economic, social, and political environment require maintaining a high level of forest management standards and a flexible adaptation of multiple-use forestry to the complex interactions between the private and public sectors.

Keywords: forestry development; multifunctional land use; environmental perception; nontimber benefits; forest policy

Natural environmental conditions and cultural development processes determine the spatial distribution of forests and at what intensity the forest vegetation has been influenced by human activity. This applies to forests that have been exploited for hundreds of years as well as to wooded areas that, to all appearances, have been barely touched by man. The reasons behind the actual delimitation of the forest and of open spaces are manifold: for instance, a particularly high value given to forests for economic, social, and cultural reasons or, conversely, the lack of economic interest that was attributed to their use in the past. Differences between intensively exploited areas and those showing few apparent human interventions depend on social values and needs, economic potential and political regulations. In general all forests, including those considered to be forests close to the natural state, have been, are, and will remain spaces influenced and used by man.

This paper analyses forestry development as a result of successive and superimposed societal processes. It accentuates the importance of forests as a local environment, a renewable resource, a liberating space one can personally identify with, and a representation of the space perceived as natural

or at least close to nature. The observations deal principally with forests in Central Europe shaped by man over a very long period. They are based on literature sources showing the evolution of forestry over time as well as on recent empirical studies of people's attitudes and perceptions regarding forests. Among the reference texts and collections of articles giving information on the condition of forest use and management in a historical development perspective, one may cite ARNOULD et al. (1997), BECHMANN (1984), CAVACIOCCHI (1996), CORVOL (1987), DEVÈZE (1965), HARRISON (1992), HASEL (1985), HAUSER (1972), HILLGARTER and JOHANN (1994), VON HORNSTEIN (1951), KÜSTER (1995, 1998), MANTEL (1990), SCHMITHÜSEN (2003a, 2005a) and SEMMLER (1991).

Heading for sustainable forest production

The varied landscapes found in Europe and the successive forms of forest uses observed during different historical periods indicate the diversity and intensity of multiple needs; they also demonstrate the importance of spiritual values and of social and political realities. Some changes resulting from past

human interventions appeared over a relatively short period of time, and their consequences for the extent and composition of forest stands rapidly became clear. Other changes, often those with the heaviest impacts, came to light indirectly, and their effects could be appreciated only after long periods. The alternating processes of reduction and expansion in forest cover modified the limits between forests and open space. In regions under intensive cultivation, as well as around large towns and in the periurban space, forests now occupy only a small part of their initial range. On the other hand, in mountain regions and in the Alps, the forest has remained or has again become a primordial element. In these regions it determines to a considerable extent the economic and social potential as well as the specificity of the landscape. The traces of earlier settlements and abandoned farms reveal the dynamics of needs and values that determined the actual distribution of forests.

Manifold uses of the forest have followed and often superseded each other in the course of centuries. Forests have been and still are local resources complementary to agricultural and pastoral production, energy and raw material resources, and the foundation of modern forestry and wood-processing industries. Use and management of the natural potential of forests have made possible many economic and social activities, which in return have shaped the landscape to a large extent. Thus, European forests bear witness to cultural processes and developments, and they show evidence of the impact of numerous and constantly changing human needs. The evolution of forest cultivation and sustainable wood production was dealt with by ALLMANN (1989), BRANDL (1970, 1987), GREWE (2002), HASEL (1985), HAUSRATH (1982), MANTEL and PACHER (1976), MANTEL (1980, 1990), RUBNER (1967), SCHENK (1996), SCHMIDT (1997), SCHULER (1977), SEELAND (1993), SELING (1997), SELTER (1995), SIEFERLE (1982) and STUBER (1996).

Public provisions referring to forest uses over more than one generation are probably among the oldest forms of long-term environmental and natural resource policy. Customary law, already codified in the first half of the 14th century, regulated forest uses in accordance with the demands and options of their times (MANTEL 1990). As early as in 1295, a local rule of Landau (Palatina) provided that wood cut in the area be available for the local inhabitants. The *Frankenspiegel*, which chronicled the laws that were customary around 1330, stipulated that fellings be done moderately and without devastation. Similar principles were expressed later on in the local laws

of many villagers' associations, convents, municipalities, and towns. Use regulations explicitly prohibited the felling of fructiferous trees and species that were important for local wood supply. Forests surrounding settlements were intended for local users only and were subdivided into annual felling units. After logging, such units were protected against grazing until regrowth was ensured.

During the 15th and 16th century, wood supplies from yet unexploited forests could not meet the growing needs for domestic fuel, construction, salt production, and metallurgy any more. An unprecedented increase in demand led to high prices for regionally and internationally traded logs and sawn timber, with repercussions in many parts of Central Europe. As a consequence, the essential conditions for a more stable forest regime were established between the 17th and 19th centuries.

Step by step, policy and law introduced principles of renewable natural resource use as we understand them today (ZÜRCHER 1965). The term *sustainable* was used as early as in 1713 by von Carlowitz, who worried about maintaining mining activities and wrote (translation by the author) "The greatest art, science, diligence and institution of these countries will rely on the manner in which such conservation and growing of wood is to be undertaken in order to have a continuing, stable and sustained utilization, as this is an indispensable cause without which the country in its essence cannot remain." In 1804, Georg-Ludwig Hartig formulated the principle of sustainable forestry in its classic intergenerational perspective, remarking in his textbook *Taxation of Forests* (translation by the author): "It is not possible to think and expect sustained forestry if the wood allocation from the forests is not calculated according to sustainability ... Any wise forest direction consequently needs to tax [assess] the woods as high as possible, but aiming at using them in a way that the descendants can draw at least as many advantages as the now-living generation appropriates." In 1841, Carl Heyer referred to the techniques of sustainability of wood production in saying that a forest is "managed in a sustainable manner if one takes care of the regeneration of all logged stands in order to maintain the soil that is destined to forest production." By 1850, one could say that most forest areas had come under some form of long-term forest production system.

The continuity and increase of wood supply required considerable private and public efforts and investment, but that long-term investment could not be obtained without security of forest tenure. Establishing the formal aspects of forest ownership

rights is probably the most significant contribution of forest laws adopted during the 19th century. Generally, the laws tended to restrict or abolish usufruct rights and transform collective tenure into clearly defined private and public landownership. Private property rights were legally registered, and forests still under collective tenure were divided among the users. In other cases communal and state forests were maintained or newly created. Quite often a combination of private and public tenures developed, characteristic of the prevailing ownership of forests in most European countries. The laws defined the landowner's wood production and management rights in using the forest as a productive asset for generating profit and income. They also determined responsibility for maintaining collective uses in the public interest, such as access to forests and protective values in the mountains, which were important to a large part of the population.

The transitions to dependence for energy on mineral coal in the 19th century and fossil fuel in the 20th century had major consequences. The diminishing pressure on wood as an energy source radically modified the conditions under which forests would be used for the industrial and economic expansion of a country. This has been a decisive element in turning forestry into a modern sector of the economy, functioning according to the principle of sustainable management of a renewable resource. The methods for putting sustainable wood production into practice developed from scientific models that allowed the intensity of felling to be adjusted to the long-term production potential of forest stands and sites. These models were applied over increasingly large areas. In regions where oak and beech forests dominated, the coppice-with-standards system was a typical example of systematic management on a large scale. This approach combined production of firewood from new sprout shoots with production of construction timber from trees retained over several cycles of firewood harvests. The coppice-with-standards silvicultural system, developed in the 16th century, still constitutes an important method of management and is used, for instance, in France. In contrast, numerous forests in Germany and Switzerland where the system was once practised were converted into high forest from the middle of the 19th century onward.

More important, however, was the regeneration of forests over large areas and the management of uniform stands. In the plains and foothills, the introduction of sustainable wood production during the 19th century quite often favoured stands with predetermined periods of rotation, allowing regene-

ration of clearcut areas. Seeding of conifers and large plantations of spruce or pine permitted the afforestation of exploited and devastated surfaces where natural regeneration was difficult. In general, conifers were systematically favoured because the thinning and final felling of even-aged stands allowed a rapid increase in wood production to meet economic demands. In the Alps and, to a lesser extent, in other mountains of Central Europe, the practice of selective logging was combined with natural regeneration. Today these practices have evolved toward various forms of silviculture that are "close to nature," such as selection forests.

Multiple private and public demands towards forests in modern societies

What forests mean at the present time to the population, landowners, and specific user groups has become an interesting and topical subject of research (BRAUN 2000; CORVOL et al. 1997; KALAORA, POUPARDIN 1979). Empirical investigations of the perceptions and attitudes of people regarding forests and forest management reveal the evolution of forests' social significance. Researchers have studied the perceptions and attitudes of the population at the national, regional, and local scales (JENSEN, KOCH 2000; OESTEN, ROEDER 1995; ROCEK 1999; SAEFL 2000; SCHMITHÜSEN, KAZEMI 1995; WILD-ECK 2002; WILD-ECK, ZIMMERMANN 2000; ZIMMERMANN et al. 1996). Other studies deal more specifically with the expectations and behaviour of visitors to forests reserved for leisure and recreation (ELSASSER 1996; KALAORA 1981; LOESCH 1980; NIELSEN 1992; SCHMITHÜSEN, WILD-ECK 2000). On the whole, the studies analyzing the attitudes and purposes of citizens, owners, and users of forested areas have begun to influence management and politics (JACOBSEN, KOCH 1995; JENSEN 1993; ROCEK 1998; SCHMITHÜSEN et al. 1997; TERRASSON 1998).

The findings confirm, first of all, that the forest remains a usable and productive part of man's environment for most people and that its management is notably conditioned by economic preferences. If wood formerly constituted an indispensable source of energy and a major construction material, it is now replaceable, from a technological point of view, with fossil fuels and alternative materials. Its use depends on how it compares in national and international competition. However, because it is a renewable resource with a largely neutral carbon dioxide production cycle, today wood production is also an essential political option in the context of protecting the environment and addressing climate change problems.

The results of the empirical studies show further that forests have acquired a new and more global meaning in modern society, going beyond their role as a productive and usable resource. For a growing part of the population, forests represent a space accessible to the public for recreation that is different from the other transformed areas. At the same time, forests are more and more identified as a natural environment, perceived by many people to have small or no human influence. They represent the free interplay of natural forces, in contrast to inhabited and intensively cultivated areas. This new development reflects the needs and preferences of contemporary society and the desire of an increasing urban population for recreation in natural surroundings. It also reflects people's concern over the impending threats to the environment and biodiversity and their sensitivity to global phenomena. And it reflects the individual values of many people for whom the forest represents a place for meditation, reflection, and freedom. The wish to preserve the forest, a symbol of nature, is expressed in demands for limiting forest exploitation and protecting areas in a close-to-natural state. For many people, the protection of environment and landscape has become a major criterion for judging overall performance in forest management.

The surveys confirm the importance of the social amenities provided by urban forests and two important perspectives on green spaces within and around towns: first, forests suffer less from outside influences and can counterbalance and compensate for intensively developed areas, and second, forests offer a space permitting a greater liberty of movement and more spontaneous activities than the other parts of urban landscape. The motivations of survey respondents vary according to individual preferences and their social and economic status, but many emphasize that the forest is a place where one may walk, practise various sports, study nature, or breathe and relax; it is also a place where one feels happy and can rest from daily stress. The responses underline the importance of the forest as a place where one can withdraw and express one's love of nature, as a quiet place for personal reflection, and as a realm of physical and emotional sensations. Although visitors to the forest come for many reasons, the significance of emotional, spiritual, and mystical values is growing.

In Switzerland the mountain forest is considered by almost everyone as a natural area and an element in environmental protection (SCHMITHÜSEN et al. 2000a). To the same extent, it is considered a place for recreation, an element of the landscape,

and a renewable resource for wood production. The respondents say that the importance of forests as a natural environment and an accessible place of freedom determines the priorities they give to management and forestry activities. Silvicultural care and regeneration, as well as repairing damage caused by natural disasters, are considered by more than 90 percent of respondents as important or very important. Activities aiming to protect or restore flora or fauna receive the same high priority.

The available information highlights the often contradictory expectations and demands surrounding forests and forestry management. For town dwellers the forest represents, above all, a favoured area for leisure and relaxation. Inhabitants of mountain regions see it as protection against natural dangers and as a tourist attraction. Forest owners, farmers, and industry see it primarily as a source of revenue from harvesting wood. For one part of the population the forests are unique, and the necessity of conserving them predominates. Another part considers the economic aspects of wood production providing employment and a source of revenue most important. If the conflicts generated by land use were previously at the fore, today the very purpose of the forest is at the core of debates about man's relationship with his environment (SCHMITHÜSEN et al. 2000b, 2005b). The fundamental concepts of forest management are now the subject of political debates and of the rapidly changing legislation. In the face of ever-more pressing demands for environmental protection and conservation of biodiversity on a large scale, it is not the principle of sustainable wood production that is in question but certain forestry practices judged incompatible with sustainable development. From this point of view, a forest economy capable of taking into account profound currents of opinion in our society will benefit from the approval and acceptance of the population.

Multifunctional forestry practices as a land use strategy to meet increasing societal demands

Sustainable development starts from the principle that the present level of consumption and its effects on the environment must respect an equilibrium that makes the necessary space for manoeuvring for future options. A sustainable use of natural resources is thus linked to concrete economic and technical conditions and depends on fundamental human perspectives and social norms at the same time. Sustainability does not express an intention for the use of resources; it rather represents what people and social and political communities recognize as worth saving

and managing responsibly. Openness and flexibility in reacting to changing societal needs and values, understanding of the ecological, social and economic drivers determining their political relevance, and transparency in negotiations and decision making are the necessary ingredients in managing renewable natural resources in a sustainable way.

In this context one has to judge the importance of multifunctional forest management practices as a land use strategy capable of meeting divergent societal interests, supporting forestry practices acceptable to different social groups, and remaining consistent with the principles of sustainable development. Rational and economically feasible wood production remains the prerequisite for an expanding European wood-processing sector. Thanks to new production technologies, the sector competitiveness in world markets increases. Wood production and the use of wood products imply a largely neutral production and consumption cycle with regard to emissions of carbon dioxide. Expanding the forest and wood product sector is an essential option in the context of environmental protection, climate change, and maintenance of the renewable resource base (THORØE et al. 2004). Accumulating additional biomass under good forestry practices and by afforestation is an important political requirement for implementing the Kyoto Protocol.

The meaning of sustainable forest management thus expands from its primary focus on wood production to include a wide range of different combinations of forest uses meeting economic needs and opportunities as well as addressing dynamically changing social and cultural values (SCHMITHÜSEN, SEELAND 2006). In a modern business management-oriented definition, as formulated by SPEIDEL (1984), sustainable forestry means the ability of landowners and forest enterprises to produce wood, to care for infrastructural services, and to provide environmental services for the benefit of present and future generations. It means maintaining and creating the entrepreneurial conditions necessary for a permanent and continually optimal fulfilment of economic and extraeconomic needs and goals. Sustainable forestry addresses the time perspective (permanent and continuing), the kinds of activities (maintaining and creating), the objectives (needs and goals), and the qualifying criteria (optimal fulfilment).

Management practices that correspond to the needs and values of modern societies take into account the forest as a multifunctional resource, the specificity of a wide range of ecosystems, the need to maintain biodiversity, and the economic and social development potential of forests in rural and urban

areas (BAUER et al. 2004; BOURIAUD, SCHMITHÜSEN 2005). The issues at stake are meeting local, national, and increasingly international environmental demands, securing the long-term availability of raw materials and energy, and providing specific combinations of goods and services commensurate with the sustainable resource potential of a given forest site. Close-to-nature forestry practices are an important land management strategy that contributes to maintaining biodiversity, ecosystems and diversified landscapes. It favours flexible and long-term production cycles, offers attractive areas for recreation and leisure activities, and leaves options for future uses and developments. In relying on natural site factors, close-to-nature forestry combines economic necessities with multiple social and environmental requirements more consistently than do other management approaches.

The increasing private and public demands for forest protection and management make it necessary to redefine the roles of the private and public sectors, to use economic models taking into consideration multiple outputs from forestland, and to develop an equitable and effective balance between management responsibilities and the benefits that accrue to the stakeholders (LAZDINIS et al. 2005; LE MASTER et al. 2005). Cross-sector policy linkages and multisector policy networks are an indispensable requirement for managing forest ecosystems and landscapes in a sustainable manner (FAO 2002, 2003; SCHMITHÜSEN 2003b). Private enterprise and public policies, as much as private and public investment, need to be coordinated so that natural resources are used more efficiently on a landscape scale.

Multifunctional management of forests on a landscape scale facilitates decision-making processes and provides a political platform for arbitration and conflict resolution between the demands of landowners and forest managers on the one side, and the wide spectrum of demands from other forest users and environmental groups on the other side. Multifunctionality as a leading principle in forestry development implies a combination of private management goals with public policy objectives, acknowledges the necessity of balancing private and public interests, and fosters the elaboration of workable arrangements for landowners facing public demands. It allows for realistic financial arrangements to provide a wide range of forestry outputs based on forest owners' income from goods and services, contractual financial contributions from specific user groups, and public compensations and investments made at different levels of the political community. The recognition of joint management

responsibilities between the private and the public sector requires a shift from governmental and hierarchical regulatory systems to negotiations among stakeholders with complementary and/or conflicting societal needs and values.

CONCLUSIONS

During the last two centuries sustainable forest management has made great progress, thanks to the efforts of forest owners, professionals, and scientists. Step by step, it has integrated increasing societal demands into current management practices. To assess the present and future options in management of forests, one has to be aware of the historical context. Shaped by the past, today's forest stands offer multiple alternatives for satisfying economic and social demands, and multifunctional management will allow further options and a different development potential for future generations. The knowledge of how the modern forest economy evolved, focusing primarily on sustainable wood production, quite often contrasts with the significance our largely urban population places on the forest of today. It is essential to understand today's needs and values and to grasp the economic utility and social significance of forests in modern societies.

Public intervention implies a complex balance between political objectives and instruments, between desired benefits and the necessary financial resources to obtain them, and between the mix of desired forestry outputs and possible cost-sharing arrangements to produce them. New ways of implementing public policy programmes based on target-oriented outputs and contractual arrangements are necessary to improve the efficiency of the public sector and to link commitments and required resources more consistently. The diversification of demands on forests, profound changes in the relationship between the government and citizens as well as structural limitations on financial resources are decisive factors that determine the range of possible management options. Cooperation and coordination between key actors and institutions in public policy, as well as a rational basis for using scarce public funds to foster multifunctional forest resource development, are essential.

Marketable products and services can be financed from market proceeds. Public goods and services for which no markets exist or for which none can be developed, for whatever reasons, need public investment or must be financed by the direct beneficiaries. Democratic decision making and equal consideration of economic, social, and environmental goals

determine the modern institutional framework for forest protection and forestry development. The level of integration between environmental, social and cultural requirements and efficient economic productions processes is the benchmark for modern forestry. Legal and economic instruments balancing rights and responsibilities between forest owners and other stakeholders interested in sustainable land management are indispensable for generating an optimal combination of private and public benefits from adaptive multifunctional forest management practices.

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Received for publication January 2, 2007
Accepted after corrections February 2, 2007

Polyfunkční lesnická praxe jako strategie využití krajiny pro uspokojení rostoucích potřeb veřejnosti v moderní společnosti

ABSTRAKT: Současné rozmístění lesů a úroveň jejich změn způsobených člověkem jsou výsledkem přírodních faktorů a kulturního vývoje. Hranice mezi zalesněnými a nezalesněnými oblastmi stejně jako rozdíly mezi intenzivně obhospodařovanými lesy a lesy s malými nebo žádnými stopami lidského zásahu jsou určovány společenskými potřebami a hodnotami, ekonomickými příležitostmi a politickými regulacemi. Lesy jsou v současné době chápány lidmi jako fyzický a sociální prostor, podstatně ovlivněný využíváním dřeva a lesním hospodářstvím. Jejich společenský a politický význam se rychle vyvíjí. Polyfunkční požadavky na lesy v rychle se vyvíjejícím ekonomickém, sociálním a politickém prostředí vyžadují udržování vysoké úrovně a pružnou adaptaci polyfunkčního lesního hospodářství na složité vztahy mezi soukromým a veřejným sektorem.

Klíčová slova: vývoj lesního hospodářství; polyfunkční využívání krajiny; environmentální pojetí; nedřevní užitky; lesnická politika

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