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A REVIEW OF THE DEVELOPMENT OF LEGISLATION
FOR SWISS MOUNTAIN FORESTS

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For hundreds of years, the people of the Swiss Alps have been aware of the importance of their forests for protecting people and property and providing a reliable source of wood. Over the past century, these forests have gained additional importance as an integral part of the landscape which is essential for tourism (Price, 1987). This paper reviews the development of legislation for the management of the forests of the Swiss Alps and suggests some possible future developments. While much of the discussion considers the Swiss mountain forests as a whole, examples are drawn from three mountain Cantons (Bern, Graubünden, Valais) where applicable. An expanded version of this paper, presenting local studies of the past, present, and future position of forestry in the Swiss mountain economy, has recently been published by Price (1988). A

1. Early communal regulation

The first phase of regulation relating to the forests of the Swiss Alps extends from the 14th to the early 19th century, and is characterized by orders made at the communal level. The most common form of order, dating from 1339, was the Bannbrief, which prohibited or limited certain or all uses in specific areas of forest (Bannwald) owned by the commune. Eventually, over 300 Swiss forests were subject to Bannbriefe. For some of these forests, wardens (Bannjwarte) were employed to enforce the orders; the first in 1530 (Tromp, 1980b).

In spite of the recognition of the societal importance of the forests and growing numbers of regulations, the increasing food requirements of the population, from the 15th century onwards, led to extensive grazing in, and clearing of, the forests of the Alps. Timberline was lowered by 200-300 metres (Langenegger, 1984), some high valleys were entirely deforested, and attempts at reforestation were rare and generally unsuccessful (Tromp, 1980a). By the mid-16th century, a permanent wood deficit had developed, and the scope of local regulations expanded to limit sales, consumption and export of wood and wood products. Throughout the Alps, such measures had doubtful success, since policing was inefficient (Tromp, 1980a) and huge quantities of wood were used for fuel, construction, and in agriculture.

The consumption of wood from the Alps continued to increase not only in Switzerland, but also in neighbouring countries as populations expanded and industrialisation developed in the 17th, 18th, and 19th centuries (Auer, 1956). The export of wood was

facilitated by the many rivers flowing through the Alps and out of Switzerland, and provided an income to forest owners who often lived in cities outside the mountains (Schuler, 1984). At the same time, the inhabitants of the mountains were reduced to using peat, and even dried manure, for fuel (Ott, 1974). Throughout this period, natural disasters, particularly floods, increased in number and severity (Tromp, 1980a).

2. Early cantonal regulation

By the early 19th century, an awareness of the importance of retaining forest cover in the Alps had begun to develop. In part, this was a general consciousness, deriving from the loss of forests and forest functions described above. It was fostered by early exponents of the science of forestry, mainly trained in Germany (Hagen, 1974); there was no training in forestry in Switzerland until 1855 (Schuler, 1984). This awareness was heightened by a number of natural disasters, particularly in the 1830s. The second phase of policy development, marked by regulation at the cantonal level, starts in the early 19th century. However, there had previously been some wider-scale regulation. For instance, forest orders were made in 1592, 1725, and 1758 in Bern, which was then an independent state. The orders were intended to encourage maintenance of the forest area, new planting, and reforestation (Fankhauser, 1893). In 1848, the Confederation of Switzerland was founded, and the first constitution gave competence over the forests to the Cantons. This phase of cantonal regulation extends to 1876, when the first federal forestry law was passed after the 1874 revision of the constitution, described below.

The first Canton to take over general jurisdiction for the forests from the Communes was Valais, whose early forestry legislation was compiled by Perrig and Fux (1945). In 1803, considerable restrictions were placed on the cutting of timber, and the cutting of small trees and the export of wood were banned. This was followed by the 1826 law "on the protection and improvement of the forests", in which the Communes were encouraged to plant trees and provide protection from avalanches and flooding; the Canton made available financial assistance for the protection of roads. The 1827, 1829, 1832, and 1836 laws, on the sale of forests and the cutting, transport and export of wood, gradually increased the level of cantonal supervision of forestry and wood exports. These laws limited volumes of timber that could be cut, turned into charcoal, transported on the Rhone, and exported. By 1850, it had become apparent that, without a forest service, the existing forestry legislation was rather ineffective (Wuilloud, 1981). Consequently, the existing legislation was superseded by a general forestry law, placing all forests under cantonal jurisdiction and establishing a department of forestry, consisting of forest inspectors. Communes were required to employ forest guards, whose appointment had to be approved by the Canton. In 1873, a new forestry law was passed,

extending the previous law and creating the post of cantonal forest inspector above the regional inspectors.

In Graubünden, the development of early policies is described by Rageth (1983). The first cantonal forestry regulations date back to 1822, when the Canton empowered itself to arbitrate complaints about deforestation. In 1827, the export of wood was prohibited, and the Canton took over competence for harvesting permits from the communes. In 1836, all forests in the canton were divided into one of two classes. Those in the first class were important to protect roads and prevent flooding; a permit was required for clearing, and reforestation was mandatory. In 1839, the Canton passed its first forestry regulations and appointed a forest inspector and two regional foresters; a bailiff was to be appointed by each Commune. In 1858, a second set of cantonal regulations came into existence, placing all forests under cantonal jurisdiction, and dividing the canton into forest districts.

In Bern, a number of forestry commissions were appointed and various orders passed in the early 19th century. Early forestry legislation is described by Fankhauser (1893). The first forestry-related law of Canton Bern, relating to the redistribution of property, dates from 1840. In 1841, the cantonal government divided the canton into six regions, with foresters in charge of each, overseen by a forestry superintendent. This was the first time that all of the forests of the canton came under a unified administration. Between 1846 and 1893, a number of laws relating to forestry were passed. These laws related to the organization and funding of the forestry administration, the preparation of management plans and the maintenance of the forested area. The latter law, passed in 1860, required that if forests were felled, an area of equal or greater size had to be reforested in compensation. Applicants who could not do this had to pay for the afforestation of an area of cantonal land nearby.

3. The early evolution of national policies

The first attempt at national-level regulation occurred during the short-lived Helvetic Republic (1798-1803), when forestry was put under central direction, and each Canton was required to make a forest inventory (Grossman and Krebs, 1965). Subsequently, responsibility for forestry reverted to the Communes and, as forest management became a political issue, the Cantons took over jurisdiction as described above. However, under the terms of the 1848 constitution, the Confederation had competence to establish training in forestry and undertake public works (Tromp, 1980a).

The third phase of development, marked by the evolution of overall policies for the mountain forests, begins with the founding of the Schweizerische (Swiss Forestry Association: SFA) in 1842. This phase thus overlaps with the

second half of the phase of cantonal regulation described previously. The members of the SFA soon decided that cantonal regulation was not going to be adequate to ensure the future of the mountain forests, and thus turned their attention to federal policymakers. Thus, one of the earliest products of the SFA was its 1856 report to the Federal Council (Bundesrat), describing the dangers of mountain deforestation for water supplies and soil stability. The report also proposed that surveys of mountain forests should be prepared by cantonal forest services (where these existed), and in other cantons by a group of experts (Tromp, 1980a).

In 1858, the Bundesrat, sponsored a survey of the conditions of the mountain forests, which was made by two hydrological engineers, a geologist and two foresters. One of the latter was Elias Landolt, the President of the SFA and the first professor of silviculture in Switzerland. After three summers of fieldwork, Landolt published the forestry report in 1861. It is a measure of its general interest that, a year later, the original 360-page report was condensed to a 63-page version for general consumption (Tromp, 1980a). The main findings were as follows (Schoeffel, 1978; Tromp, 1980a):

- there is a direct relationship between deforestation and the irregular discharge of rivers;
- because the source areas of the most important rivers are in the mountains, mountain deforestation affects the whole country;
- the forests were overused: annual utilization was 32 per cent greater than increment;
- the forests had lost their resistance to avalanches and rockfall because of uncontrolled cutting;
- the treeline had been lowered, and regeneration of stands, particularly at high altitudes, was no longer guaranteed because of excessive and unauthorized grazing;
- cantonal forestry legislation and manpower were insufficient to provide adequate management
- the beauty of the landscape is affected by deforestation;
- for the economic survival of communities and industries, and also for the best possible uniformity of river discharge, improved forest management, resulting in a sustained supply of timber and firewood, is vital. Necessary changes cannot be brought about solely by prohibiting wood exports.

The accuracy of some of these findings was emphasized in 1868, when very severe floods caused over 14 million francs in damage and 50 deaths. More than three million francs were donated, both in Switzerland and abroad, for the restitution of damages, of which one million was designated for a special fund for preventive measures (Hagen, 1974). Protective construction and afforestation projects had already been started in 1866 by the SFA, with assistance from Communes and the federal government. Experience gained from these projects provided the basis for the SFA's application to the Bundesrat, in 1869, to develop fundamental principles for maintaining mountain forests and

watercourses, since the existing cantonal legislation was inadequate to fulfil this function (Schuler, 1984).

In 1870, in accordance with the constitutional competence of the Confederation for public works, this application resulted in the creation of the post of construction inspector in the federal Department of the Interior. This individual was responsible for projects in the Rhine, Rhone, and Jura basins, the SFA's construction projects, and the management of the special fund set up after the 1868 disasters. In 1871, channel alterations and construction relating to mountain streams, and the afforestation of their catchment areas, were declared to be public works of federal interest, and an annual sum of 100,000 francs was set aside for these purposes (Hagen, 1974).

In the same year, the SFA applied to the Bundesrat to include an article concerning forestry and hydrological engineering in the "high mountains" (Hochgebirge) in the federal constitution, specifying federal superintendence over these activities. The proposal was adopted in 1874, as article 24 of the revised constitution passed in that year. At the instigation of the experts who drafted the constitutional amendments, a federal forest inspectorate was created in 1875, affiliated to the federal Department of the Interior. Once federal responsibility for mountain forestry had been defined, the SFA submitted a draft Forest Police Law to the Bundesrat. The use of the word "Police" refers to federal superintendence of forests in the public interest, which may interfere with individuals' privileges and property. The objective of the law was the creation of a healthy, resilient and, as far as possible, continuous mountain forest, to prevent damage from avalanches; protect settlements, transport routes and cultivated land from rockfall and landslides; avoid soil erosion; and regulate water flows (Schoeffel, 1978).

4. Federal superintendence of the mountain forests

Fifteen months after the SFA's draft had been proposed, it was passed as the 1876 Forest Police Law. This was not the first forestry protection law in the Alps; others had been passed in Bavaria and Austria in 1852 (Mayer, 1982), and France in 1860 (Douguedroit, 1981). Thus, the fourth phase in the development of policy begins in 1876 and extends to the present. The essential difference between this phase and the phase of cantonal regulation lies in article 24 of the constitution. While the Confederation has overall competence to define general principles for forest matters, the day-to-day administration of forestry remains a cantonal concern (Zimmermann, 1984).

4.1 Federal legislation

The most important themes of the 1876 Forest Police Law, which placed the mountain and pre-alpine forests under federal superintendence, and which remain in the current law, are as follows:

- forests are classified into protective and non-protective, according to their functions. While this separation was assigned to the cantons, the Bundesrat withheld the right to examine and approve these decisions. All mountain forests are now classified as protective;
- the total forest area must not be decreased without cantonal consent; felling in protective forests requires a special permit from the Bundesrat;
- cleared and logged areas must be reforested; alternatively, a corresponding area, nearby, must be afforested;
- on specified areas within protective forests, rights to additional uses (particularly grazing and the collection of forage), where these are responsible for the deterioration of forest condition, may be regulated, and at times discontinued or completely abolished;
- to improve forest condition, the activities of state, communal, and corporation forests are to be regulated through the introduction of management plans and on the basis of sustained yields which may not be exceeded without cantonal permission;
- afforestation of bare land to create protective forest can be demanded by cantonal or federal authorities; private land can be appropriated for this purpose;
- all forests must be surveyed;
- redistribution of use or property rights in state, communal, and corporation forests, and the sale of these forests, are prohibited.

In brief, although the Confederation is empowered by article 24 of the constitution to regulate forestry as a whole, federal legislators limited themselves to issuing generally binding rules for forestry, retaining competence to review certain cantonal decisions, but leaving the Cantons considerable autonomy in regulating forestry management. The distribution of responsibilities between the Confederation and the Cantons is discussed in detail by Bloetzer (1978). The Law emphasized the conservation and improvement of the protective function of the forests, particularly against flooding and avalanches. While the law's scope, particularly with reference to protective forests, made major inroads into the principles of private land ownership, it received relatively little opposition. This can be attributed to the widely-recognized importance of maintaining forests in the public interest (Schoeffel, 1978).

It is also quite possible that there was little resistance to the Law because its implementation was left to the Cantons. The Law contained few specifics regarding the financial support of mountain forestry. The exceptions were for reforestation and afforestation; in all cases, work had to be undertaken by Cantons

and approved by a federal forest inspector before the federal government would transfer subsidies to the Canton. Thus, although the Bundesrat promoted forestry, it provided few incentives. Also, the restriction of federal superintendence to only the forests of the "high mountains" presented problems which had been pointed out before article 24 had been introduced into the constitution: it was difficult to define the "high mountains", and many of the Mittelland's Cantons had inadequate forestry legislation in spite of similar conditions to those in the Alps; forest management should be national, rather than regional, in scope (Bloetzer, 1978).

In 1884, three Cantons presented a memorial to the Buyndesrat, asking for financial support for forestry projects in the Jura, which was not covered by the Forest Police Law. This was followed in 1886 by a petition to revise the Law. In response, the Bundesrat ordered the forest inspectorate to investigate the condition of the Jura forests; the study was expanded in 1887 to the Mittelland's forests at the urging of the SFA. Also in 1886, a commission of the Nationalrat (National Council) had found that conditions in the mountain forests were generally similar to those reported to Landolt in 1861. Thus, the 1876 Law had not had its intended results; the Commission recommended that it include greater federal regulation, and be made applicable to all the Swiss forests in order to guarantee water flows as well as preventing floods. This required another amendment to the constitution, removing the specificity of article 24 to the "high mountains". This amendment was introduced in 1892 and passed in 1897 (Bloetzer, 1978).

In 1902, a new Forest Police Law was passed (Schoeffel, 1978). While the principal themes of the 1876 Law remained, the new one:

- stated federal responsibility for the wages of forestry personnel and for forest surveys;
- provided federal financial support for forest management through grants for access roads in public protective forests;
- encouraged consolidation of private forests; and
- required Cantons to bring their forestry legislation into agreement with federal legislation, to submit legislation to the Bundesrat for approval, and to develop forest services.

This Law provided a greater emphasis on the use and management of the forests than its 1876 predecessor, with far greater support from the federal government. It remains the basis for the management of the forests of the Swiss Alps.

4.1.1 The Forest Police Law: revisions and regulations

Since 1902, there have been a number of partial revisions of the 1902 law, many of which have affected mountain forestry. These include:

- the 1923 resolution, which gave responsibility to the Cantons for permitting clear-felling;
- the 1929 law, which 1) raised federal compensation to the

owners of forests subject to property restrictions and 2) specified limits for federal grants for access roads and other wood transport facilities. Provision of these grants was linked to cantonal grants;

- the 1945 law, which extended regulations for the consolidation of private forest lots so that public forests could also be included in the process. Previously, only jointly-owned lots had been eligible;
- the 1951 law, in which increased federal grants for afforestation and construction in avalanche hazard zones and protecting transport infrastructure were made available, tied to the provision of cantonal grants;
- the 1953 law, which cancelled federal grants for the wages and insurance of forestry personnel; Cantons became entirely responsible;
- the 1955 law, in which assistance was provided for measures to protect forests from damage and diseases dangerous to the public. To encourage the establishment of protective forests, financial support was given for fencing and other measures to protect plantations from grazing animals. Seeds and plants to be used in existing forest and to create new forest were restricted to those of known provenance which were suitable to the site;
- the 1969 law, which revised the conditions for federal grants for afforestation and the construction of control structures, access roads and other wood transport facilities;
- the 1971 law, which delegated jurisdiction for clearings in protection forests up to 30 ares in area to the Cantons, which also had to develop guidelines for dealing with such applications.

The first regulations pursuant to the Forest Police Law came into operation in 1903; the most recent major revision was in 1965. The regulations have three main components: means for implementing the general requirements of the Law, regulation of specific activities, and legal definitions. The first consider such subjects as education, defining forest functions, and regional division of the forests. The second include reforestation, control of game populations, protection against disease and pests, and construction. Of the many legal definitions, one of the most important is that for protective forest: "... of importance for the gathering and supply of water, the cleansing of air, the recreation and health of the population, and landscape protection". This broad definition, reflecting the changes in attitudes to the forests to be discussed below, is much wider than in the Law: " forests located in the catchment areas of mountain streams, as well as those which through their location are able to afford protection against damaging climatic influences, avalanches, rock- and ice-fall, landslides, and extreme water-levels". Since 1965, there have been some minor revisions to the regulations. Most of these, including the most recent (1985), are with respect to federal contributions for education and training, as well as forestry activities, including afforestation, control structures, access development and consolidation.

4.1.2 Other federal legislation affecting mountain forestry

Activities in the mountain forests are also considered in the federal civil and penal codes. Of particular importance is article 699 of the civil code, which guarantees access to all forests. Forestry is also the specific subject of various additional pieces of federal legislation:

- 1956 resolutions and orders. These give the forest services jurisdiction over imported seeds and plants, to avoid disease;
- 1969 law on investment credits for mountain forestry. This provides for no- or low-interest loans to improve the conditions of public and private forestry enterprises through planning and rationalization. Such loans can be applied to the residual costs of subsidized forestry projects as well as to the purchase of vehicles, machines and other equipment;
- 1984 resolution on grants for extraordinary measures against forest damage. This provides for federal grants, linked to cantonal grants, for measures to protect forests against the effects of air pollution, diseases and pests. The transport and harvesting of affected wood are both included, as is the removal of trees downed or broken by natural hazards.

In addition to the legislation described above, there are a number of federal laws which tangentially affect forestry:

- 1916 law on the utilization of water power. Article 22 requires that natural beauty is to be maintained, and that disturbances to the landscape from the construction of water works must be non-existent or minimal;
- 1925 law on hunting and bird protection. Forestry officials are obliged to maintain a population of game animals which is healthy and adapted to local conditions. If there is a surplus which might cause severe damage to the forest, the population must be reduced;
- 1966 law for nature protection and national preservation. When fulfilling federal duties, such as granting clearing licenses, the Confederation is obliged to consider the landscape, and can grant up to 50% of the costs of preserving worthy landscapes. Natural landscapes can be acquired or protected by creating reserves through agreement or even expropriation;
- 1971 law on the protection of waters from pollution. Applications for clearing permits must be reviewed to determine if surface or sub-surface pollution will result from proposed activities;
- 1974 law on investment assistance for mountain areas. This law applies to investments for the development of infrastructure, e.g. traffic access; grants for forest access projects can be provided. The aim of the law is to improve the conditions of life in mountain areas through directed investment assistance to Communes, public corporations and individuals;
- 1979 law on regional planning. In the development of regional plans, one of the fundamental considerations is that forests must fulfil their functions.

Most of these laws have not had a great influence on mountain forestry except in the case of applications for clearing permits. As discussed by Price (1988), the 1925 law has not prevented the expansion of game populations to a level where they cause severe damage to the forest. The 1974 law has had some effect in providing financial support for forestry, but most of the aid has gone to improving the infrastructure of settlements (Guller, 1986).

4.2 Cantonal legislation

In accordance with the requirements of the 1902 Forest Police Law, all Cantons now have forestry legislation. However, the pace of development of new legislation varied greatly. For instance, while Canton Bern passed an overall forestry law in 1905, and Canton Valais in 1910, Canton Graubiinden did not have a forest law until 1963. In the meantime, forestry was guided by a series of regulations passed in 1877, 1886, 1899, 1905 and 1942 (Rageth, 1983). The most recent forestry law for Canton Bern dates from 1973; Canton Valais passed a new law in 1985.

The primary objectives of the existing forestry laws are the preservation of the forests and the improvement of protective functions. However, there is a marked diversity in the additional primary objectives. For instance, the Graubiinden law further stresses that, within the restrictions of the primary objectives, the forests must be managed so that yields increase. In contrast, the later laws specify the encouragement of good management and the improvement of welfare functions as additional primary objectives. The Valais law has a much wider range of primary objectives than the others, including both "increasing the potential yield of the forests" and the "maintenance and preservation of the cultural landscape and a healthy environment". To a certain extent, the diversity of objectives reflects the federal nature of Swiss government. However, they may also be viewed as responses to changing economic conditions and attitudes towards forests in recent years.

5. Changes in federal legislation

A complete revision of the 1902 federal Forest Police Law has been discussed for decades (e.g., Bavier, 1943; Wandeler, 1985). As many authors (e.g., Jungo, 1969; Schoeffel, 1978) have noted, this law is principally concerned with the preservation and protection of the forests, rather than their management to ensure that they fulfil their diverse functions. This is why it is a Forest Police Law, rather than merely a forest law. The reasons for the emphasis of the law are clear; it was drafted in reaction to the conditions of the forests in the middle of the last century.

Many of the problems described by Landolt in 1861 have returned - if they ever disappeared - but often for different reasons (Price, 1988). Three of Landolt's general conclusions are worth considering. First, that the forests had lost their resistance to avalanches and rockfall because of uncontrolled cutting; annual utilization was a third greater than increment. At present, a similar problem is evident, but a major reason is that utilization is only 60% of increment (Rechsteiner, 1982). Both then and now, the preponderance of a limited number of age/size-classes and the lack of regeneration lead to a decreased ability of the forests to withstand exogenous stresses (Ott, 1972). Second, that regeneration of stands, particularly at high altitudes, was no longer guaranteed as a result of unauthorized use "(i.e., overgrazing). The same problem exists, but a major cause, rather than livestock, is excessive populations of game animals which have not been kept to suitably low levels, combined with inadequate maintenance of the forests (Ott, 1978; Nold, 1983). Third, that the forests were under-managed, partly because the Cantons had insufficient forestry manpower; this is still true (BAF, 1985; Moser, 1985). In addition, the existing level of access to the mountain forests is generally inadequate (Ott, 1984); large areas are inaccessible by any means, using current technology (e.g., Spinatsch, 1983; Stauffer, 1985).

Thus, while the Forest Police Law has succeeded in one of its primary aims - the maintenance of the forest area of Switzerland - the long-term provision of forest functions is still not guaranteed, although federal and cantonal regulation of, and subsidies for, forestry have increased substantially over the past century. While there are many reasons for this, discussed above, the critical one is that neither federal nor cantonal legislation specifies that forests must be managed at the minimum level which is vital if they are to provide their functions in the long-term. Consequently, there is *no* way for members of the cantonal forest services to persuade forest owners to do anything in their forests unless it can be shown that the protective function of these forests is directly endangered; for instance, by the likelihood of a widespread epidemic of bark beetles or because trees have been damaged or killed by avalanches, windstorms or other factors. Since nearly all forestry operations result in deficits (Ley, 1982; KOK, 1984; Tschannen and Barrand, 1985), forest owners are clearly not going to cut or remove trees if the only beneficiary is a nebulous "public". Similarly, they are not going to invest in new roads, plant trees, or undertake any maintenance if they see no likelihood of a return on these investments or of a rise in the price of wood in the foreseeable future.

The two primary goals of new legislation, therefore, must be to assure the minimal level of management necessary for the forests to fulfil their functions in the long term, and to provide assistance so that forest owners do not suffer financial hardship in undertaking activities which are in the common interest. These goals are implicit in the proposed forest law, whose objectives

are: to preserve the forest in its area and spatial distribution; to encourage its natural vitality and its diverse functions - protection, welfare and wood production - including support for the forestry industry; and to support measures to protect living space from natural hazards (Wandeler, 1986).

The new legislation should provide a means to manage the forests of Switzerland as a whole, and funding should be prioritized according to the importance of particular actions in the public interest. The level of federal funding should take into account both the financial capabilities of the owners of the forests under consideration and of the respective Cantons. The national forest inventory (Mahrer and Vollenweider, 1983), completed in 1985, provides the baseline data for initial prioritization, and must be regularly repeated in a monitoring process to provide an ongoing evaluation of the locations where management actions are most important. While autonomy of decision-making is undoubtedly important in a federal society such as Switzerland, changes in policy and legislation are clearly needed to stimulate and assist improved forest management and maintenance in the forests which are vital for the future of the communities of the Swiss Alps.

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