

ENVIRONMENTAL CONTENT OF FORESTRY EDUCATION IN EUROPE

PEITSA MIKOLA

Department of Silviculture, University of Helsinki
Unioninkatu 40 B, SF-00170 Helsinki 17, Finland
Helsingin yliopiston metsätieteellinen laitos

SELOSTE:

YMPÄRISTÖNSUOJELU EUROOPAN METSÄOPETUKSESSA

I CLASSIC FORESTRY EDUCATION

Traditionally, European forestry education has strongly emphasized environmental conservation. In all European countries the first forest administrations primarily were established to protect forests against uncontrolled cutting, clearing, grazing and other destructive uses. Consequently, forestry professionals were trained for this task. The great pioneers of forest education, such as H. Cotta and G. L. Hartig in Germany, were silviculturalists.

Silviculture, with its biological fundamentals, was the backbone of the first forestry curricula in European universities. Thus, when forestry education was started at the University of Helsinki in 1908, the two first professorships were in silviculture and forest mensuration and management, whereas professorships in forest economics and technology were established several years later. At many other universities forestry education developed in a similar manner.

Sustained yield as a governing principle of forest management has always been an axiom for foresters, and particularly for teachers at forestry schools. The forester's ethic condemns other kinds of management.

Forestry education reflects the needs of society. After the industrial revolution, rapidly growing forest industries needed ever increasing amounts of wood raw material. The satisfaction of this need was the responsibility of practising forestry and increasing emphasis in forestry education was thus laid on timber production, not only on the basis of sustained yield but also on efforts for progressively raising yields.

Consequently, from the late decades of the last century until the middle of this century forestry education in European universities, at least in heavily forested countries, has mainly contained subjects dealing with timber production. Silviculture, forest protection, and management aimed solely at production of raw material for wood-using industries; harvesting technology and economics of timber production have gained in importance during this time. Under these circumstances the other functions of the forest were, to a great extent, forgotten. Nevertheless, forestry education never forgot its conservation principles, i.e. sustained yield and preservation of soil productivity.

II THE CHALLENGE OF MODERN SOCIETY

With the rapid technical and economic development of recent decades, two phenomena have developed which strongly affect the environmental content of forest education.

1. The role of forests and forestry in society is changing. Besides wood production, the protective and recreational functions of forests have grown in importance. It must be pointed out, however, that the importance of wood production has not decreased; on the contrary, society needs more wood raw material now than ever before, but the protective and recreational functions of forests have gained still more importance and, thus, the relative importance of wood production has somewhat decreased. Since wood production and forest recreation represent different interests and require somewhat different forest management, heated conflicts have occasionally arisen between recreationists and foresters who have received the classic training oriented towards economic timber production. Ironically, the main task of foresters was initially to protect forests against the public, but today it sometimes seems as if the public would like to protect forests against the foresters.

The changing pattern of forest functions must be considered in relation to the development of forestry education; in other words, forests should be managed for multiple use with wood production generally being the primary use. Forestry schools have therefore to train competent professionals for this task.

2. In forestry itself, modern technology has caused great changes which, besides rationalization of operations and intensification of wood production, may have undesirable side-effects in or outside the forest and contain environmental risks. Mechanized wood harvesting and various silvicultural operations, such as forest fertilization and chemical pest control, are examples of this development. When these modern techniques are taught in forestry schools, their ecological foundation must be clarified and their influences on the environ-

ment, as well as on other forest uses, have to be considered properly.

Forest industries, pulp and paper industry in particular, often cause serious pollution of air and water. The forest industries and their respective educational requirements are, however, left outside of this review.

The changing role of the forests is also clearly visible in recent legislation. In almost every European country forest policy and legislation is under revision. New laws on forestry and environmental conservation have been passed recently in several European countries. In other countries such laws are in preparation. Whilst previous laws usually aimed at protection or improvement of existing forest resources, the new laws are based on multiple use principles aiming at the preservation of a certain type of scenery or providing recreational facilities for the public. Special laws have also been passed or are in preparation for the control of pollution. These laws also affect forestry operations. As a whole, the public interest in environmental problems has grown tremendously, especially as a result of the European Conservation Year 1970 and the United Nations Conference on Environment, held in Stockholm, Sweden, in 1972. Numerous international conferences on related subjects, on environmental education for instance, have been held since then.

Forestry, of course, has responded to the challenge of society. As examples, I recall two recent meetings at which the relationships between forestry and environment were discussed. These meetings were (1) the joint FAO and ECE «Symposium on forests and wood: their role in the environment» at Interlaken, Switzerland, in 1975, and (2) the joint FAO and IUFRO meeting under the heading «Ways and means of reconciling silvicultural and operational methods in modern forestry» in Oslo, Norway, in 1976. I shall make further references to the proceedings of those meetings.

III THE ROLE OF THE FORESTER

A forester is a servant of society. His role in modern society was defined in the conclusions of the Interlaken symposium as follows: «Because of the nature and extent of the resource and the goods and services it provides, the forest has a unique and immensely important contribution to make to man's material welfare and the quality of life. *The forester has the responsibility for managing the forest in such a way that society's demands for the goods and services from a given resource are provided in the combination which best meets those demands.* He must also act as protector of the forest, so that the demands of one

generation are not met at the expense of another's and that the health and vitality of the forest are maintained in perpetuity. He must, accordingly, have the authority and *professional competence to achieve these difficult tasks*, as well as the necessary political support.»

Forest education should therefore give to the student the professional competence to fulfill the tasks of a forester, as defined above. What the environmental content of forestry education should be depends to a great extent on local conditions, i.e. on the forest use pattern in a given country and the demands and expectations of society.

IV FORESTRY CONDITIONS IN EUROPEAN COUNTRIES

European countries differ greatly from each other in respect to their forest conditions. The forests' and forestry's roles in society differ accordingly. As extreme but representative examples we can take the densely populated industrial and agricultural countries of Central Europe, such as Hungary or the Netherlands, and on the other hand, the heavily forested countries of Northern Europe, like Finland and Sweden, where forests cover more than half of the land surface and the national economy greatly depends on their wood production. The forest area per inhabitant and the relative importance of forest production in national economy largely determine the primary uses of the forests. In industrial countries with dense population, the protective and recreational functions of forests have a great importance and often are given priority in management, whereas in sparsely populated and heavily forested countries production is usually the primary goal of forest management and protection or recreation are regarded as primary uses in only relatively small areas. It has been estimated, for instance, that in Hungarian forests, which occupy about 13 % of the area of the country, 10 % are protected as nature preserves, whilst recreation is the primary use in 20 % of the forest area. In the remaining 70 %, wood

production is considered as the primary use (de COULON & MADAS 1976).

In Finland, a heavily forested country, recreation can be considered as the primary use on less than 2 % of the forest area, and scientific reserves and protection forests adjacent to the northern tree-line constitute about 8 %, whereas about 90 % of forest area is used primarily for wood production.

Even in such a densely populated industrial country as the Federal Republic of Germany with a forest area of only 0.13 ha per inhabitant, according to SCHMIDT-VOGT (1977) forests which are reserved primarily for protection or recreation or other special purposes, only constitute about 10 or 20 % of the forest area, whereas the remaining 80 or 90 % are managed primarily for timber production. Thus, although recreation and other non-production uses of forests today are much discussed by the public and foresters, the production of raw material still has and will also have in the future a high priority in the management of major part of forests even in the most densely populated European countries. Because of their special functions and central location near population centres, protection and recreation forests generally need more attention per areal unit than economically managed production forests.

We have to remember, however, that

virtually all European forests are multi-purpose forests and all the three functions have to be considered in their management at the same time; priorities only vary depending on local conditions and the needs of society.

In this connection we also have to consider the differences which occur between different European countries with regard to public access to the forests. In North European countries, Common Right has traditionally prevailed, which means that the public has free access to all forests, even the picking of berries and mushrooms

V ENVIRONMENTAL CONTENT OF FOREST EDUCATION

The above review broadly answers the question concerning what the environmental content of forest education should be. I now review to what extent the present forest curricula in this respect correspond to the needs of modern society. For this purpose, an inquiry was sent to a few university teachers representing different geographic conditions. Answers were received from the University of Freiburg, University of Madrid, and the Swedish College of Forestry.¹⁾ The author is, of course, most familiar with the forestry education at the University of Helsinki.

This review mainly deals with university education. However, it is also applicable to schools of lower level.

The environmental content of forest education can be divided into two broad fields:

- 1) The ecological basis and environmental influences of various forest operations.
- 2) Forest management for non-production uses.

In both fields university curricula include:

- a) basic courses, obligatory for all forestry students,
- b) optional courses, and
- c) advanced courses for higher degrees.

¹⁾ The kind cooperation of Prof. Helmut Schmidt-Vogt, Prof. Manuel Prats and Prof. Lars Kardell is acknowledged.

is free. Under such conditions all forests are open for recreation, and people mostly satisfy their needs for recreation in forests where timber production usually is the primary use. In many other countries, again, most production forests are closed to the public and, consequently, all the recreational use is concentrated into special recreation forests. Under these circumstances, of course, the management of forests for recreation deserves more attention than in countries where the Common Right prevails.

1. *Courses in environmental subjects.* A university curriculum usually contains a general course in «Environmental conservation», which is obligatory for all forestry students. This course includes, in the first place, environmental legislation, i.e. legislation on nature conservation, pollution control, protected species, national parks, outdoor recreation, waste disposal, etc. Other subjects in the course include landscape planning, management of recreation areas, and the theory of conservation. At the University of Freiburg those subjects are included in obligatory courses of «Land management» and «Land legislation».

The length of the general course at the University of Helsinki is two hours weekly in one semester, i.e. altogether about 26 lecture hours. At the Swedish College of Forestry there is a 3-week concentrated course.

After this obligatory basic course, some universities offer an optional advanced course in conservation and related subjects.

Land use planning is an independent subject at many universities, which can be either obligatory or optional for forestry students.

A professorship in land use economics was established at the University of Helsinki a few years ago; this subject is optional for forestry students.

Wildlife management in the field has generally been the responsibility of foresters

and is included in forestry curricula, which usually also include fishing and fish water management to a certain extent.

With increasing tourism and recreational use of forests, tourism administration has been added to the forestry curriculum at some universities.

2. *Training of specialists.* Conservation officials, e.g. national park administrators or provincial conservation inspectors, very often have their basic training in forestry. Because of the limited number of such posts, however, forestry schools usually can not give special training for very specific fields. The standard forestry curriculum, supplemented by some optional environmental courses, gives an adequate basic training to students who then can obtain specialization through practical work and advanced studies, sometimes even abroad.

3. *Environmental content of forestry subjects.* As was pointed out before, the basic approach to forestry education is environmental, i.e. conservation and the rational use of a renewable resource for the satisfaction of the needs of society. It is, therefore, not possible to distinguish the environmental and «non-environmental» content of forestry education. However, some general trends can be noticed in the recent development of curricula.

Silviculture. In spite of the diversification of the forestry profession, silviculture still constitutes the central core of forestry education. Along with the increasing use of forests for recreation, a new subject, silviculture of recreation forests, has been added to the curriculum and the content of silviculture has been modified to better correspond to the needs of multiple-use forestry.

Silviculture has adopted new intensive techniques, such as artificial drainage, mechanical soil preparation, fertilization, chemical pest control, tree breeding, exotic tree species and large scale artificial reforestation. The effects of these techniques on the environment and other uses of forest, e.g. hydrology, wildlife, the berry crop, and aesthetic attractiveness, need particular consideration in the teaching of silviculture.

Afforestation is commonly used as a tool for soil conservation and erosion control, particularly in Southern Europe, as well as for control of avalanches in mountainous countries. These activities, both their techniques and ecological principles, belong essentially to the silviculture course.

Forest management. The multiple-use approach has been generally adopted in the teaching of forest planning and management. Some universities offer special courses in the management of recreational forests.

Forest economics. A difficult problem for economists is the measurement of the recreational, social and protective values of forests and the comparison of them with the material production of the forest. Although this problem is still largely unsolved, all the different values are considered in the courses in forest economics.

Forest technology. Technical developments have caused the greatest changes in forestry and, accordingly, the new techniques fill a major part of the courses in forest technology. The economics of timber harvesting are usually the driving force behind mechanization, although some social factors often work in the same direction. Against these powerful influences environmental aspects may be disregarded. In forestry practice the long term goals of silviculture and land management and the short term goals of economical harvesting may conflict. This is reflected in forestry education. Although the environmental effects of operational techniques are not neglected, they certainly deserve still more research and stronger consideration in forestry education. In this connection, the importance of training skilled machine operators, for instance, should be stressed.

Basic subjects, such as soil science, hydrology, meteorology, ecology, botany, zoology and genetics, which are regarded as environmental subjects, constitute about one fourth of the university forestry curriculum and, thus, greatly contribute to the environmental content of forestry education.

VI PROSPECTS FOR THE FUTURE

On average, the environmental content of forestry education at European universities is relatively satisfactory, at least at those universities from which information was obtained. Graduating students have the basic knowledge for the protection, management and rational use of one of the most valuable renewable resources on earth.

At the same time, however, the content of forestry education is rapidly changing, along with developing legislation and the changing needs of society. Forestry curricula in many universities are being revised. In general, the environmental content of

forestry curricula is increasing; for instance, the strengthening of teaching staff is planned in the ecological basis of forestry or in the non-production uses of forests, or in both of these subjects.

Evidently there will be a continuous need for the revision of the content of forestry education. A curriculum which today is up to date may, in a few years, be inadequate to meet the needs of the society of that time. The rapid change of society, with all its technical, economic and social implications, calls for the continued education of forest professionals at all levels.

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Metsäopetuksen tehtävä on kouluttaa pystyviä ammattimiehiä yhteiskunnan palvelukseen. Opetuksen sisältö ja eri alojen painotus riippuu siitä, mitä yhteiskunnan tarpeita metsät tyydyttävät ja millaisia odotuksia niille asetetaan. Tarpeiden ja odotusten muuttuessa tulee myös metsäopetuksen sisällön vastaavasti muuttua.

Metsien säilyminen ja suojelu sekä tuotannon jatkuvuus ja kestävyys ovat aina olleet johtavia periaatteita eurooppalaisessa metsäopetuksessa. Kasvava puun tarve sekä tuotannon taloudellisuus ja nopea tekninen kehitys painottivat 1900-luvun puolivälissä taloustieteen ja teknologian osuutta metsäopetuksessa. Viime vuosikymmeninä on taas tullut voimakkaana esiin uusia näkökohtia - metsien ympäristönsuojelullinen merkitys ja lisääntyvä käyttö virkistystarpeiden tyydyttämiseen - jotka vastaavasti on otettava huomioon metsien hoidosta ja käytöstä vastaavien ammattimiesten koulutuksessa.

Metsäopetus Euroopan yliopistoissa ja myös alemman tason kouluissa sisältää kahdenlaisia ympäristönsuojelullisia aineksia, nim.

1. metsänhoidollisten ja muiden metsissä suoritettavien toimenpiteiden ekologiset perusteet ja vaikutukset,
2. metsien hoito ja käyttö suojelu- ja virkistystarkoituksia varten.

Kummassakin ryhmässä esiintyy kolmenlaisia oppikursseja:

- a. kaikille pakollisia peruskursseja,
- b. vapaaehtoisia erikoiskursseja,
- c. korkeampiin arvosanoihin vaadittavia erikoiskursseja.

Varsinaisten ympäristönsuojelukurssien lisäksi ympäristönsuojelun aineksia sisältyy metsätieteiden moniin perustieteisiin, kuten kasvi- ja eläintieteeseen, ilma- ja maatieteeseen jne. sekä varsinaisiin pääaineisiin, ts. metsänhoitoon ja metsätalouden järjestelyyn sekä metsätaloustieteisiin ja -teknologiaan.