

# The Future of Traditional Coppice Forests in Europe: Lessons Learned and Actions to be Taken

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Coppice forests are a result of human land use decisions and efforts to make the best use of a given eco-physical situation. Typical for coppice management is the intensive and continuous interaction with the existing forest resource, using their natural dynamic development to fulfil actual and future needs of rural societies for wood and non-wood products. Today, coppice forests in Europe represent a substantial natural resource in both forest area and wood production, but are also unique ecosystems with specific biodiversity features and heritage values.

The multitude of results of our coppice related research efforts reveal that it is impossible to give singular, uniform answers to the questions

of how traditional coppice forests have developed, how they should be sustainably managed in the future and how they should be addressed at a European scale in forest and land use policy. Not only the eco-physical conditions, but also the historical developments and the socio-economic framework today is so diverse, that strict guidelines would not be feasible or appropriate.

Despite this diversity, some generalizations can be made on different situations of coppice in Europe and how they could develop in the future. Furthermore, due to their neglect in the past decades, it is also necessary to support coppice on a political level; some options for such support will be touched upon here.

## COPPICE IN EUROPE: PAST, PRESENT AND FUTURE DEVELOPMENTS

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Since coppice forests are results of human decisions and interventions, their actual status and their role in the future can only be understood and discussed with a close look to their development in history, which is embedded in and closely linked to their respective socio-economic environment. When analyzing and comparing the development and the actual status of coppice forests and the related issues between European countries and regions, there seem to be some broad similarities in historical developments that have led to the differences in the current situations. The following four situations describe these developments, underline the coppice-related challenges of the present and formulate consequences and visions for the future.

### 1. Coppice forests resulting from traditional small-scale rural societies and economies

#### Historical development and current status

Household wood use in rural societies was the starting point of active coppice forest management in nearly all European countries. After clearing natural forests for farming, cattle grazing and housing, coppice management was introduced on the less fertile or difficult to access former natural forest areas surrounding the settlements, and intensively practiced to supply local communities with wood for energy, a variety of tools and non-wood products. Initially, in many cases these coppice forests were owned and managed by the community, with individual ownership developing later on.

This small-scale pattern of management and utilization of coppice forests was abundant until recently in quite a number European countries and regions, typically where there was a low degree of urbanization and industrial development, low incomes, primarily from agriculture, and poor public infrastructure. Even today, there are hot spots of actively practiced coppice management that can be identified in South-East Europe and in the Mediterranean countries, but, in many cases, the recent socio-economic developments there too result in a decreasing need and interest in active coppicing. Consequently, vast areas of coppice forests throughout Europe are no longer managed as coppice, resulting in neglected, overaged, and in many cases unstable broadleaved (oak, hornbeam, sweet chestnut, etc.) forests of low productivity.

### Options for the future

#### Conservation and re-vitalization of active coppicing

In rural regions where coppice is still (or has been until recently) actively practiced by small-scale forest owners, who are often part-time farmers, it may be advisable to improve the circumstances that encourage the owners to continue with the traditional coppice forest management. This could result in positive short- to medium-term environmental and economic effects, while being less costly than conversion.

One inevitable precondition is the improvement of the existing, in most cases poor forest infrastructure (forest roads and strip roads). Technical and financial support from the public to make the related investment feasible is necessary. Furthermore, small-scale harvesting technology adapted to the specific conditions of coppicing has to be developed and introduced to facilitate the labor intensive and dangerous forest work in coppice. Finally, the development of local and regional markets for energy wood and other wood and non-wood products typical

for coppice is a prerequisite for a successful revitalization of coppice forest management with positive effects for small-scale owners and their communities.

Successful examples of such a re-vitalization policy can be studied in a number of regional initiatives, for example in England and northern Italy.

#### Conversion to high forests

Since high forests deliver wood products, namely logs, that have a higher appreciation and price on the markets, conversion to high forests using the same or alternative tree species is an ecologically and economically viable option, especially on more productive sites and easy terrain. However, with significantly longer rotation periods than coppice (50 to 100 instead of 20 to 30 years), it is likely very difficult for small private owners and rural communities to afford the initial investments in silviculture without the help of subsidies. Furthermore, barriers such as forest infrastructure (roads) and fragmented ownership patterns must be improved to make conversion effective. National and EU-wide programs offering financial support are therefore necessary to initiate these conversion efforts. In the long term, newly established high forests can create an improved wood supply and better income in rural areas, both of which are explicit objectives of national and European policy.

In Central Europe (e.g. France, Germany, the Netherlands and Belgium) a state-subsidized conversion policy was successfully introduced in the 1950s, which has resulted in significantly fewer abandoned and less productive coppice forests in those countries. In other European countries, such as Romania, the conversion of coppice to high forests with the objective to increase productivity and value is prescribed and enforced by forest laws, resulting in a low proportion of coppice forests.

## 2. Coppice forests resulting from early industrial development

### Historical development and current status

Due to their specific biological characteristics and management features, coppice forests show a high productivity, especially during the first two to three decades of rotation. Consequently, they provide a substantial amount of wood within a short time, even if only as small dimensioned shoots.

Early industries such as mining, iron melting, steel forging, leather tanning, as well as glass, pottery and porcelain production, relied entirely on wood or wood products as a resource for their energy needs and processing requirements. Their high demand for wood first resulted in over exploitation of the surrounding natural forests. Subsequently, to secure supply, coppice systems were established on extended areas and utilized sustainably in short rotation cycles. This was organized by the industries, which often also owned the forests.

Only after fossil coal became widely available and could be transported with the newly installed canals or railway systems did the industries' demand for wood gradually drop, until wood was replaced completely towards the middle of the 20<sup>th</sup> century. In parallel, many coppice forests were converted to high forests, frequently supported by direct (financial) or indirect (technical support, tax relief) subsidies. This happened, for example, in Germany, Belgium and England in the 1950s. In other regions, e.g. Tuscany or central France, large areas with overaged coppice forests still exist.

### Options for the future

These coppice forests are less fragmented than rural small-scale coppice forests, are often situated on easier to access terrain and have basic infrastructure, so conversion to high forests is one, but not the only option.

With regard to EU, national and regional political objectives to reduce the dependency on fossil energy, modern wood energy systems supplied by coppice forests can be a viable option with positive effects that are achievable in a shorter timespan compared to conversion. To support this option, modern specialized harvesting and logistic systems must be developed and introduced, and up-to-date power plants with conversion technology (furnaces) with low emissions are a must for long-term success. Since wood based energy systems typically release a substantial proportion of thermal energy, it is furthermore crucial to have year-round demand for heat close to the power plant; this could be agricultural or industrial customers. It is obvious that such complex energy systems require support for the investment and the initial operational phase. A combination of traditional coppice forests and “new” short rotation coppice energy plantations, established as “green field” land use activities on marginal agricultural soils, could increase both energy wood supply and productivity.

Similarly, the utilization of coppice and new short rotation plantations as a source of raw material for upcoming bio-economy projects is politically favorable, but, realistically, a longer-term project.

## 3. Coppice forests as a protective element of landscapes and in rural civil engineering

### Historical development and current status

Following the widespread abandonment mentioned in the last two situations, some coppice forests were converted to high forest, but this took place most frequently on easy to access, productive sites. Other vast areas were simply neglected, which has resulted in an abundance of coppice forest on steep or otherwise difficult terrain. Such landscapes are often prone to soil erosion, landslides or avalanches. Other

cases in which coppice grows in a vulnerable situation are parallel to infrastructures (roads, waterways, railway and power lines) or close to housing areas. Since traditional coppicing only allows the growth of small shoots above ground, but with a deep root system, actively managed coppice forests effectively protect the soil and the surroundings in such situations. If coppicing is abandoned, which is now often the case, trees become older and larger, while their root system tends to decay. This diminishes the protective function of these coppice forests over time, representing an additional risk.

### Options for the future

In the vicinity of endangered landscapes and infrastructures, critical areas where coppice forests are necessary for safety reasons should be mapped and identified as protective coppice forests, and actively managed accordingly. Location, size, frequency and intensity of the periodical cuts should be prescribed to optimize the protective function. The related costs will be typically much lower than those of “artificial” civil engineering alternatives and are to be covered by the public or the institutions responsible for the infrastructures and their safety.

## 4. Coppice forests becoming a rarity: conserving hot spots of biodiversity and valuable cultural heritage

### Historical development and current status

In areas of Europe where most coppice forests have been successfully converted to high forest in the past century or two, the scarcity of coppice forest management has led to an awareness for their unique biodiversity compared to high forest, as well as attention for their importance as a part of cultural heritage.

In terms of biodiversity, actively managed coppice forests result in specific eco-physiological conditions that are caused by the continuous and massive human interventions and usually

lead to a very different ecological situation than high forest management. The periodical removal of canopy cover creates excellent growing conditions for light demanding species. The small-scale pattern of cuts with distinctively different tree coverage results in edge effects, which also favors otherwise rare species. Coppice forests on poor soils are particularly likely to have a great natural biodiversity. Overaged coppice forests tend to gradually shift to a more homogenous horizontal and vertical structure, through which they lose this specific diversity. In addition, abandoning the frequent removal of large parts of the above ground biomass when harvesting results in more fertile soil conditions, which can hinder certain species rich biotopes. These effects are even more pronounced if coppice forests are converted into high forests.

Concerning cultural heritage, it is clear from the previous historical descriptions that coppice forests were a typical element of rural landscapes throughout Europe. Shifting land use patterns, temporarily changing between field crops, pasture and coppice trees, were quite common. The daily life of our ancestors was closely linked to the intensive management of coppice forests and the utilization of the various products and services they provided. The introduction and cultivation of vineyards was, for example, closely linked to coppice forests, which provided the necessary poles, but also the wood for barrels. Basket making or tanning leather are other examples of how closely craftsmanship and coppice utilization were linked.

### Options for the future

In countries and regions where coppice forests currently represent a very small proportion of total forest coverage, coppice should be “protected”, which means actively managed, in order to meet biodiversity targets. This is especially important for coppice forests on

poor sites. Somehow this seems contradictory to normal conservation policies, which usually aim at minimizing or excluding human interventions to protect the ecosystems in question. In the framework of EuroCoppice, an analysis of European Natura 2000 legislation and practice clearly revealed that the special case of coppice forests must be addressed in a specific way to ensure that coppice related biodiversity can be maintained in the future.

To preserve or to revive coppice forests and their active management, and to include the

follow up utilization of selected products into integrated demonstration projects, would also contribute to preserve cultural heritage. Especially young people from urban areas could be informed and educated about the life of their ancestors and how they sustainably made use of the existing natural resources of their environment. Integrated coppice projects could also be an instrument to revive traditional craftsmanship and to stimulate rural tourism, which would contribute to the stability of rural communities.

## ACTIONS TO SUPPORT COPPICE FOREST MANAGEMENT

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Coppice is the oldest form of systematic utilization of natural forest ecosystems by humans throughout Europe and beyond. It provided for centuries a broad array of products, energy and services to rural communities, in most cases on a sustainable basis. Thus, coppice related traditions are deeply rooted in the common European history of land use and the respective knowledge and skills are a valuable part of European heritage.

Coppicing as a low input management concept is productive and aimed at an early yield of biomass. It allows a flexible orientation of forest production and products to the current needs of society and the economy. Coppice as an ecosystem is stable, resilient and adaptive to environmental impacts including climate change effects, and as a reservoir of biodiversity, giving a home to many rare and endangered species.

Due to changing market demands combined with the lack of adapted infrastructure and technology for their management and harvest, coppice forests have been neglected or even converted to high forests within the past decades. Cheap fossil resources and urbanization have contributed to this development, with a different pace and intensity throughout Europe.

To recognize the cultural heritage, preserve the valuable and unique coppice flora and fauna, benefit from the resistance and resilience of coppice forests in the context of climate change and to make use of this valuable natural and sustainable bio-resource for current and future industrial applications, actions to support coppice forest management must be taken on the European level, supported and supplemented by harmonized national activities, with emphasis on the following four domains:

### Data collection and analysis

Coppice forests are not systematically addressed in national or EU-statistics and definitions and data are unclear or missing. Therefore, important information is not available, making it difficult to develop and implement targeted harmonized policies. It is thus strongly recommended, that guidelines for Forest Inventories, National Forest Programs and coppice forest related data in environmental databases are amended and updated with clear definitions of coppice relevant information and guidelines on how to collect, analyze and present the respective data on both national and EU levels. The terms and definitions elaborated and presented in this volume “Coppice Forests in Europe” may be useful for the design and implementation.

## Research & development and education

During the collaborative work on coppice forests, it became obvious that research on coppice issues has not been a priority and has even been neglected in the agendas of national and international research on forests for many decades. Mainstream forest research is focused on high forests and their related issues. Practical knowledge and experience on coppice forest management on the regional and –in some cases– national level still exist, but this is not compiled systematically and is often not published in internationally accessible formats.

An analysis of curricula on a professional and academic level shows that coppice issues are neglected or even completely missing in education and training programs as well.

It is therefore strongly recommended that coppice related issues be explicitly addressed in EU-wide calls for R&D projects in the framework of, for example, Horizon 2020, INTERREG, LIFE and LEADER programs in the areas of forestry, landuse, rural development, bioenergy, nature conservation, biodiversity, climate change and sustainability.

## Legislation

An analysis of the relevant official legal and policy documents on EU and national level revealed that coppice related issues are not adequately covered. In many cases, clear legal definitions are missing or contradictory, laws concerning forestry and nature conservation are not harmonized, just to mention some shortcomings. These undermine a harmonized development of the natural resources, for both utilization and protection.

It is therefore necessary that –in close connection with the first action, “data collection and analysis”– the relevant official documents are revised and amended.

## Structural funds

The analysis of the current situation and of the future options for coppice forests in Europe clearly shows that, in most cases, positive development over the medium-term perspective will be unlikely without initial financial, technical and institutional support from EU structural funds.

This is particularly the case for large, neglected areas of coppice that dominate rural areas. Infrastructure and business development, as well as market access must be supported to enable the rural population to manage their coppice forests with the perspective of economical sustainability.

For situations in which coppice is marginal, it should be protected and conserved for nature conservation and biodiversity, as well as cultural heritage value. Financial support from EU structural funds may be necessary to reach these objectives.

## Conclusion

Since coppice-related issues and challenges are frequently cross sectional, touching on more than one single aspect or discipline, it is necessary to have a common understanding and integrated policy approach for the future management of these forests. They should be developed sustainably, encompassing a number of EU areas of policy, namely: Agriculture and Rural Development; Environment; Energy; Climate Action; Employment, Social Affairs and Inclusion; and Eurostat-European Statistics.

To put this vision into practice, officials, researchers and stakeholders are encouraged to read the articles of this volume and take advantage of the facts and findings presented.

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