

# Ancient Values and Contemporary Interpretations of European Forest Culture - reconsidering our understanding of sustainability in forestry

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## ABSTRACT

Through generations, forests have played an important role in the perception of nature and life by humankind. This ancient relationship of man to forests and trees can still be seen in many traditional cultures, while in modern society and the life of urban people it is often pushed back into subconsciousness.

The general view on forests and forest utility is dominated by an economic perspective, although contemporary forestry in Europe has become multipurpose, and the understanding of sustainable forestry includes more than the sustainable yield of wood alone. Ecological and social functions such as nature protection and recreation have been added to the productive function, and the perception of forests by society has become broader. This change in the use of forests as environmental resources has been encouraged by a change in the social organisation and land ownership in many European countries that has resulted in a shift towards private small-scale forestry. Nevertheless, many decisions made by forest policymakers and private forest owners are still made in relation to the economic framework that the different forest functions provide. The cultural and spiritual functions of forests are often neglected in the ongoing discussion of sustainability in forestry, but this discussion cannot be successful if purely based on economics. We consider it therefore necessary to be more conscious about the cultural and spiritual functions of forests in the understanding of sustainable forestry.

In this paper, we define different forest functions and values. We want to emphasize the

importance of the cultural and spiritual functions of forests in human life and ask to reconsider our understanding of sustainable forestry.

## INTRODUCTION

Forests play a fundamental role in human culture and represent an important environmental resource for mankind. The close connection between human culture and its development on the one hand and forests on the other hand can be seen in the many different functions that forests have fulfilled and still fulfil in human societies. With the development of civilisation and the increasing demand of wood by the growing population, a scientific approach to forest management evolved. Forest use in Europe focussed for a long time primarily on optimal yield and maximum economic gain (Burschel and Huss 1997). Thus, the productive function of forests was clearly dominating, and the understanding of sustainability was restricted to wood supply. The awareness of the ecological and protective functions of forests that was developing later on resulted in the first approaches to nature-near forestry (Dengler 1930). Since the end of the last century, ecological principles have been included and taught in forest management (Schütz 1990). Within the last decades, forestry has become much more multipurpose with regard to management practices and the use of forests as natural resources. Sustainability in forestry includes nowadays not only the sustainable yield of wood supply, but also the use of all other forest goods and services (Wiersum 1995). The importance of forests for life quality and health is appreciated, the ecological stability of forest is worried about, and social

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functions are taken into consideration in addition to pure economic aspects (Larsen 1995; Fabbio et al. 2003; Piussi and Farrell 2000).

However, in this ongoing debate of sustainable forestry, it becomes more and more obvious that these three dimensions – economic, ecological, social - are not sufficient to explain the total value and utility of forests. It seems necessary also to reinforce the ancient cultural and spiritual bond that exists between forests and mankind in order to strengthen peoples' awareness of their dependency on nature. This would also be in accordance with the Forest Principles that were stated on the United Nations Conference on Environment and Development (UNCED) in Rio in 1992. In the 'Statement of Principles for Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests' the appropriate use of forests is defined as:

*Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. [...]*  
(UNCED 1992)

Thus, both cultural and spiritual needs of mankind are mentioned in the Forest Principles, but they are not amplified in the list of examples, e.g. in terms of the cultural heritage connected to forests or single sacred trees.

The question we want to address in this paper is why the cultural and spiritual role of forests in human life should be considered in the sustainable use and management of forests and the validation of forests as environmental resources. Our objectives are to draw attention to the role of ancient forest values in our present perception of forests in Europe. Based on a literature review, we define different forest functions and their role in the use of forests. Thereby, we hope to open up a discussion about the cultural and spiritual values of forests and their role in forestry, society and a sustainable life style.

## FORESTS AS AN ENVIRONMENTAL RESOURCE

An environmental resource is defined as a part of nature that is considered as useful or valuable for humankind (Mather and Chapman 1995). Furthermore, it can be explained as the function which a thing or a substance may perform (Zimmermann 1951). Hence, any part of nature can become a resource when people perceive it as having utility or value, and any change in cultural or societal trends can create new environmental resources that provide new possibilities for profit and capital or increase life-quality.

Consequently, the use of forests as an environmental resource and the function that forests perform in human society change with the needs and perceptions of people. This phenomenon can currently be observed in European forestry. It can partly be attributed to social changes due to urbanization and rural development (Hoogstra et al. 2004), partly to an ongoing change in land ownership with an increase in private small-scale forest owners (e.g. Kvarda 2004). These developments give space for a use of forests in more than only strictly productive and economic ways. Furthermore, the awareness of the importance of forests as functioning ecosystems (Bieling 2004) and their role in human health and life quality has been increased (Papageorgiou et al. 2005). This awareness is reflected in the decisions made by forest policymakers and private forest owners and the way forests are utilised, managed and last but not least revered: new perceptions of forests as an environmental resource have developed. Numerous studies have investigated how the values and attitudes of non-industrial and private forest owners towards their forests affect the management of forests (Lönnstedt 1997; Karppinen 1998; Hognl et al. 2005; Kurttila et al. 2001). Forest utility is no longer restricted to the supply of traditional forest goods and services. For example nature based forest management seeks to maintain the biological and geochemical integrity of the forest ecosystem along with a continuous timber production. It illustrates well the interweaving of different forest functions in contemporary forestry.

## FOREST FUNCTIONS AND FOREST VALUES

### Forest functions

In the discussion of contemporary forestry and the development of sustainable forestry, the multi-resources of forests and their multi-functionality are often emphasised, and the validation of forests is based on them (Führer 2000). The function of a forest should be understood as the role that it fulfils in a natural ecosystem or in the life of human beings. However, the assignment of forest functions is often arbitrary and different in different contexts. Traditional forest management distinguished mainly between the productive and non-productive function of forests, where the non-productive function typically includes the protection of biodiversity and watersheds and the role of forests in carbon sequestration. In a broader context the non-productive function could also mean the protection of the living environment in general, thus including life quality and people's health. FAO defines 'designated functions of forests and other wooded land' in the Global Forest Resource Assessment 2005 as the purpose that is assigned to a piece of land either by legal prescriptions or by the land owner (FAO 2004). These designated functions comprise conservation of biodiversity, production (both wood and non-wood forest products), protection of soil and water, social services (e.g. recreation, tourism, education and/or conservation of cultural/spiritual sites), and multiple purpose when all functions are represented in an equal way.

With other words, the function of a forest can be defined rather specific as the main objective that a forest owner has with the management and use of a forest area. In the discussion of the role of forests in human society and their sustainable use and management, it is however helpful to group the different functions into related fields. This is often done as the productive, protective and service function. With regard of the aims of a sustainable development of forests stated in the UNCED Forest Principles (UNCED 1992), we include in the following description also economic, ecological, social, cultural and spiritual aspects.

### *Productive and economic functions*

The productive and economic functions of forest embrace the management of forests for the use of forest products in order to create income. The general view on forestry is still dominated by this economic perspective, and the primary function of forests, including small-scale forestry of private forest owners, is often primarily seen as that of a main or additional source of income. However, the way in which forests may act as a source of income has changed. It is no longer only timber production or the production of other wood products that is considered. Non-wood products as well as services in terms of tourism, recreation and nature protection have become part of it as well (e.g. Kline et al. 2000a). What way of creating income is valued higher by a forest owner may depend on his or her attitude towards forests and the type of ownership.

### *Social function*

The social function of a forest is often also referred to as socio-economic function (e.g. Führer 2000). Thus, it is closely related to the productive function of a forest. It describes mainly how the forest can have a direct impact on processes or structures in the human society, e.g. by increasing employment in the forestry sector or in tourism and recreation in a rural region. A social function can also be understood as the positive effect of human welfare. Forests as recreational areas may contribute to a healthier society and thereby reduce the costs for the treatment of illness and increase the life quality and productivity of the society.

### *Protective and ecological functions*

The protective and ecological functions differ from the previous mentioned forest functions as they are not solely related to human-oriented factors, but also to intrinsic values. They describe primarily the protection of natural ecosystems, their habitats and biodiversity. However, the protection of ecosystems and watersheds does also affect human welfare by protecting other environmental resources such as air, soil and water. Past and present deforestation in many areas of Europe has

resulted in enormous problems with soil erosion and degradation (EEA 2000), thus forests are not only important in the context of carbon sequestration and climate change, but also soil conservation. Management practices of the private forest owner can have a major influence on the ecological health of an area or the restoration of habitats (e.g. Kline et al. 2000b) and they can have ecological implications of harvesting non-timber forest products (Ticktin 2004). The willingness of private forest owners to work with sustainable and nature based forest management is therefore asked by forest policymakers (Bieling 2004). Consequently, protective and ecological functions can be linked to both the social as well as productive functions,

#### *Cultural and spiritual functions*

The cultural and spiritual functions of forest are comprised of traditional or special values that are connected to places or trees and the spiritual bonds and history that link human culture and religion to forest and trees. While cultural functions are easily linked to 'special' places, the spiritual function is a more abstract human value that is often held subconsciously or consciously expressed in a different way e.g. by showing emotional to forestry issues. The cultural and spiritual functions are rarely mentioned in comparison to the other forest functions. This is partly because they are more intangible, but also because it is difficult to express these values in monetary terms, despite the fact that for generations forests have played an important role in the human perception of nature and life (Flasche 1994). This ancient relationship of man to forests and trees can still be seen in many traditional cultures, although in modern society it is largely unconscious or sublimated, we choose rather to see economic or amenity values or express concern about ecological issues.

#### **Forest values**

The importance of a forest and its functions can be validated by its monetary or/and non-monetary value. Thus, the term forest value does not only cover the economic value of a forest. It also includes intrinsic values, i.e. non-anthropogenic

values based on the inherited right of life forms to exist. Furthermore, forest values can be related to cultural heritages and spiritual relations to a place or a tree. Thus, forest values are not only important in an economic context, but also in philosophy in the treatment of ethics. In the FAO definition of forest values, the spiritual and cultural values are included in the indirect use-values, which are distinguished from the direct use-values of forests (Kengen 1997). Direct use-values are associated with benefits obtained from a consumptive use of forest products as well as other non-consumptive uses, e.g. recreation and education. In contrast, indirect use-values are values associated with the protective function of the forest (soil, watershed, habitat, biodiversity, carbon storage) and aesthetic, cultural and spiritual values.

Especially in the discussion of sustainable forestry it is important to recognise that the value of a forest is far more than the economic value or direct use value. Consequently, this discussion cannot be successful if purely based on economics. Nevertheless, in forestry validation is far too often restricted to the economic function. For example the success or failure of many projects in forestry in rural development is primarily seen in relation to the economic framework that the new forest functions provide. This is despite the fact that many of the new forest values are difficult to validate through orthodox economics, they are meta-values which we need to define more appropriately.

## **FOREST AND TREES IN RELIGIONS**

### **Frazer's 'The Golden Bough' and the Classical authors**

By publishing 'The Golden Bough' in 1890, Sir James Frazer brought ancient animist rituals to the attention of a British public more accustomed to worthy tomes concerned with matters other than those of an anthropological nature. His focus on the role of the sacred oak grove in ancient Europe came at a time when the UK had been 'manufactory to the world' for over a century and forest cover was depleted to around 4% of land area; scientism, the steam engine and economic theory drove Britain. In 1804 William Blake had

railed against ‘the dark satanic mills’ in his poem ‘Preface to Milton’ & his call ‘to build Jerusalem in England’s green & pleasant land’ gave permission for a generation of painters & poets to explore romantic lost landscapes & concepts of rural idylls such as those painted by the symbolist Samuel Palmer. However, William Turner’s 1834 painting ‘The Golden Bough’ recalled a dark myth from Europe’s past which alluded to human sacrifice for appeasement of the Gods of the natural world. The painting depicts the sacred grove of Diana Nemorensis next to Lake Nemi where, an ancient legend has it, that the priest of the grove (Rex Nemorensis) was always a runaway slave, who having slaughtered his predecessor, awaited his turn to suffer the same fate.

James Frazer had collected and recorded myths, folktales and rituals from across the world at a time when cultural changes were accelerating because of industrialisation, urbanisation and imperialism.

His collation and comparison of these stories with the works of the Classical historians revealed remnants of ancient animist rituals from a pre-Christian Europe. Frazer was especially compelled by the historical and etymological evidence for tree worship amongst peoples of Indo-European origin; he was one of several authors who have, in commenting on ancient Celtic culture, quoted Pliny’s account of the link between Druids and oak trees:

*The Druids - that is what they call their magicians – hold nothing more dear than mistletoe and a tree on which it is growing, provided that it is a ‘robur’ (hard-oak). Groves of hard oak are chosen even for their own sake, and the magicians perform no rites without using the foliage of those trees, so that it may be supposed that it is from this custom that they get their name of Druids, from the Greek word meaning ‘oak’; but further, anything growing on oak trees they think to have been sent down from heaven, and to be a sign that the particular tree has been chosen by God himself. (Pliny)*

Frazer also makes the case for associating the Greek god Zeus with the Roman god Jupiter & the Celtic god of the oak. The Welsh Celtic name for oak, derw (suffixed or prefixed to many Welsh

place-names) is related to the Greek drus or drys, from which we get druid & dryad. (Johns, C.A.)

Frazer links oak worship & fertility (from rain) with the Teutonic god of thunder Donar or Thunar, the Norse god Thor & the Baltic god Perkunas or Perkons. According to old German laws, the punishment for harming an oak was:

*the culprit’s navel was to be cut out & nailed to the tree ...& he was to be driven round and round the tree till all his guts were wound about its trunk...the life of a man for the life of a tree. (Frazer J.)*

The Slavs’ god Perun was associated with oak worship and thunder:

*At Novgorod there used to stand an image of Perun in the likeness of a man with a thunder-stone in his hand. Procopius (Greek historian and secretary to Belisarius) tells us that the Slavs believe that one god, the maker of lightning, is alone lord of all things and they sacrifice to him oxen & every victim”. (Frazer J.)*

Oaks were sacred to Perkons, the Lithuanian & Latvian god of thunder, lightning & rain; perpetual oak-wood fires were kept burning in his honour. The most famous of his shrines was at the sacred grove of Romova:

*Where there was an oak of extraordinary size & its branches so dense & diffusive, that neither rain nor snow could penetrate through them. (Gardner, J)*

The catholic clergyman Fabricius noted in 1610 that during a drought, the Latvians would worship in thick forests on hills & sacrifice a black calf, a black goat & a black cock. They lit a fire, drank beer & poured it on the fire for the Thunder-god. (Frazer J.)

The description of the sacred grove of Massalia, now Marseille, by the Roman poet Lucan gives us an impression of the awe and fear which these places inspired in the Romans:

*A grove there was, untouched by men’s hands from ancient times, whose interlacing boughs enclosed a space of darkness and cold shade, and banished the sunlight far*

*above. No rural Pan dwelt there, no silvanus, ruler of the woods, no Nymphs; but Gods were worshipped there with savage rites, the altars were heaped with hideous offerings, and every tree was sprinkled with human gore. On those boughs birds feared to perch; in those coverts wild beasts would not lie down; no wind ever bore down on that wood, nor thunderbolt hurled down from the black clouds; the trees, even when they spread their leaves to no breeze, rustled of themselves. Water also fell in abundance there from dark springs. The images of the Gods, grim and rude, were uncouth blocks formed of felled tree trunks. Their mere antiquity and the ghostly hue of their rotten timber struck terror....The people never resorted there to worship at close quarters, but left the place to the Gods. (Lucan)*

### The forest or oak as metaphor

The economic role of the forest since the onset of industrialisation in Europe and America has focussed the study of forestry within silvicultural and wood sciences, eclipsing the important spiritual or metaphorical role identified by Frazer; however, later scholars working in other fields have continued the study, reinforcing many of the themes encountered in *The Golden Bough*.

Miranda Aldhouse-Green, one of the better known scholars of Celtic religion and myth in Britain has clearly stated that;

*Sacred groves, trees and images of wood played prominent, complex and interrelated symbolic roles in the cosmologies and vanished mythologies of late pre-Christian Gallo-British societies. (Aldhouse-Green)*

The same statement would be true of the pre-Christian Baltic and Slavic societies. The association of oak with the sky-Gods or thunder-Gods such as Perkons and Perun in Eastern Europe also occurs within the Gallo-British and Gallo-Roman cultures of Western Europe with their worship of Bel or Belenus, the Gallic equivalent of Jupiter, interestingly the similar Old Irish word *Bile* means sacred tree. One image of Belenus from Haute-Marne, France, depicts him holding

lightning in one hand and a spoked wheel in the other. The wheel and swastika as solar metaphors are recurrent images from across Europe and are also associated with tree worship e.g. on altars from Goudex, Haute Garonne and Ilheu, Hautes-Pyrenees in France (Aldhouse-Green). Arguably, the wheel motif could be said to have survived into the Christian era as the 'wheeled-cross' encountered on several Celtic crosses from Western & Northern Britain e.g. the Margam cross from South Wales. 19th century writers such as Vallencey even linked the ancient Middle Eastern solar deity Baal with Belenus. There is a bas-relief image of Baal carrying an axe in one hand and lightning in the other taken from the South West palace ruins of Nimroud (Layard).

## ANCIENT VALUES IN CONTEMPORARY FORESTRY

The proliferation of multifarious NGOs with remits to study and report on the many types of ancient semi-natural forest across Europe certainly suggests the attribution of special values, even if those values are presently defined within the scientific or social milieu rather than the numinous.

There has been considerable re-evaluation of the role of the veteran oak and remnants of Atlantic oak coppices in the British landscape by the likes of 'Countryside Commission for Wales' and 'English Nature'. At Savernake Forest and The New Forest in Southern England many oaks have been identified by organisations such as The Woodland Trust as being over 1000 years old, indeed it is often claimed that Britain has more ancient oaks than anywhere else in Europe. This has been explained by the early availability of coal easing pressure on the forest as a fuel resource, but again this is an economic argument framed within the perceptions of an industrial society. It could be justifiably argued that persistence of ancient values might also be at work in the land of the ancient Britons. In Wales 'Coed Cymru' has attempted to re-establish the economic role of native forests in rural Wales in order to diversify the declining upland agricultural industry. Although this project has had relatively little economic impact in comparison to the contribution of coniferous plantation forestry and its downstream industries,

there is now a widespread awareness of the special value of the native deciduous forests of Wales. The high cost of extracting and processing under-managed hardwoods from small remote sites has proved to be a considerable barrier to utilisation of this resource especially when the timber is marketed in competition with cheaper, higher quality material from France and Germany. The question here might be whether value can be added through the increased awareness of the numinous value attributable to oak grown in those 'special' forests of the Celtic margins of Europe. Certainly the recent growth of the Irish economy can be partly attributed to the clever positioning on the global stage of traditional Irish products such as 'Guinness' through the promotion of special, traditional, perhaps even mythic Irish values.

Contemporary references to the ancient rituals are not unknown e.g. in the conclusion of Coppola's film 'Apocalypse Now' we glimpse a copy of The Golden Bough amongst Kurtz's books before he is assassinated in similar fashion to that described in the Rex Nemorensis myth; we are compelled to re-examine that myth.

## **CULTURAL FOREST FUNCTIONS IN HUMAN CULTURE**

In all cultures, the productive forest function in terms of providing fire wood, char coal, timber, and material for tools has probably been as old as the cultural and spiritual functions in terms of forests being a sacred place or a tree being a religious symbol (Perlin 1991; Flasche 1994). The exploitation of sacred forests was restricted and felling of sacred trees forbidden, because they were considered as being related to Gods, like for example the oak was related to the Nordic God Thor. Although many of the religions that have celebrated a relation to some tree species are ancient and their rites forgotten at present time, there can still be found a 'special' connection between human beings and trees, tree species and forests; a connection that needs to be considered more consciously in aiding the more complete understanding of our use and perception of forests. While the productive function of forests has led to an extensive exploitation of forests and deforestation, the cultural and spiritual functions

may have saved many forests for being overexploited by humankind (Farell et al. 2000). As history has shown, the impact of these forest functions is, however, seldom balanced. In the ongoing discussion of a sustainable use of forest resources it seems worthwhile to consider the cultural and spiritual functions of forests more than is presently the case.

## **CONCLUSION**

Tree veneration and more especially, oak worship by pre-Christian Indo-European tribes have been well documented by eminent scholars; a complex cosmology has emerged whereby the oak was directly linked with the solar deity, the thunder Gods and sacred fires. The persistence of the mythology to the present day can be traced, indicating our (perhaps unconscious) need for a more complete relationship between forest and contemporary developed society. It is surely arguable that a new, fuller understanding of both our ancient and present relationship could aid the implementation of regulatory structures utilised for management of our forest resources.

We suggest that the cultural and spiritual needs of people have to be considered more consciously in the context of forestry and that this would help to achieve a sustainable use of forests resources together with a positive development of human society. People need again to become aware of the basic role(s) of forests in their life. Increasing this awareness will change life-style in a positive way and lead to a higher life-quality, e.g. through better understanding of the fundamental role of the carbon cycle in everyday life. It may also help to strengthen the personal connection to a forest and thereby support the protection of forest areas, habitats, and biodiversity. Thus, we claim that the cultural and spiritual functions of forests should be included more consciously in the understanding of sustainable forestry. Including the cultural and spiritual aspect in forestry may not only help to protect cultural history, but at the same time be useful in the marketing of various forest products, thus reinforcing economic diversification.

## REFERENCES

- Aldhouse-Green, M. 2000. Seeing the Wood for the Trees. University of Wales, Aberystwyth, 23, 12.
- Burschel, P. and Huss, J. 1997. Der Weg zum Wirtschaftswald. In: Grundriß des Waldbaus. Pareys Studentexte 49, p.15-19.
- Bieling, C. 2004. Non-industrial private-forest owners: possibilities for increasing adoption of close-to-nature forest management. Eur. J. Forest Res. 123, 293-303.
- Dengler, A. 1930. Waldbau auf ökologischer Grundlage. Berlin: P. Parey.
- EEA 2000. Down to earth: Soil degradation and sustainable development in Europe – a challenge for the 21st century. European Environment Agency, 2000. Environmental issue report no 16, 32. pp.
- Fabbio, G., Merlo, M. and Tosi, V. 2003. Silvicultural management in maintaining biodiversity and resistance of forests in Europe – the Mediterranean region. J. Environ. Manage. 67, 67-76.
- FAO 2004. Global forest resources assessment update 2005 – Terms and definitions (final version). Forestry department, Food and Agricultural Organization of the United Nations, Forest Resources Assessment Programme, working paper 83, Rome 2004, pp. 10-12.
- Farrell, E.P., Führer, E., Ryan, D., Andersson, F., Hüttl, R. and Piussi, P. 2000. European forest ecosystems: building the future on the legacy of the past. For. Ecol. Manage. 132, 5-20.
- Flasche, R. 1994. Forest and tree in the religions. Forstwiss. Centr. Bl. 133, 2-11.
- Frazer J. 1932. The Golden Bough. Macmillan, 160, 110, 161.
- Führer, E. 2000. Forest functions, ecosystem stability and management. – For. Ecol. Manage. 132: 29-38.
- Gardner J. 1857. The Faiths of the World. Fullarton. Vol. 7. 554
- Johns, C.A., 1919. The Forest Trees of Britain. SPCK, 4.
- Hoogstra, M.A., Schanz, H. and Wiersum, K.F. 2004. The future of European forestry – between urbanization and rural development. For. Pol. Econ. 6, 411-445.
- Hogl, K., Pregernig, M. and Weiß, G. 2005. Who are Austria's Forest Owners? Attitudes and Behaviour of Traditional and New Forest Owners. IUFRO symposium "small-scale forestry in a changing environment, May 30-June 4, 2005, Vilnius, Lithuania. 1-13.
- Karppinen, H. 1998. Values and objectives of non-industrial private forest owners in Finland. Silva Fennica 32(1), 43-59.
- Kline, J.D., Alig, R.J. and Johnson, R.L. 2000a. Fostering the production of non-timber services among forest owners with heterogeneous objectives. Forest Science 46(2), 302-311.
- Kline, J.D., Alig, R.J. and Johnson, R.L. 2000b. Forest owner incentives to protect riparian habitat. Ecol. Econ. 33, 29-43.
- Kengen, S. 1997. Linking forest valuation and financing. In: Unasylva, FAO (Food and Agricultural Organization of the United Nations), no. 188, vol. (48) – Funding sustainable forestry.
- Kurttila, M., Hämäläinen, K. Kajanus, M. and Pesonen, M. 2001. Non-industrial private forest owners' attitudes towards the operational environment of forestry – a multinomial logit model analysis. For. Pol. Econom. 2, 13-28.
- Kvarda, M.E. 2004. 'Non-agricultural forest owners' in Austria - a new type of forest ownership  
Forest Policy and economics 6 (5): 459-467.
- Larsen, J.B. 1995. Ecological stability of forests and sustainable silviculture. – For. Ecol. Manage. 73: 85-96.
- Lönnstedt, L. 1997. Non-industrial private forest owners' decision process: a qualitative study about goals, time perspective, opportunities and alternatives. Scand. J. For. Res. 12, 302-310.



- Lucan. Pharsalia III lines 399-453; trans. Duff, J.D., 1927 *Lucan The Civil War*. Cambridge, Mass. pp. 142-7
- Mather, A.S. and Chapman, K., 1995. *Environmental Resources*. Pearson: Singapore, p.1
- Papageorgiou, K, Kassioumis, K., Blioumis, V. and Christodoulou, Ath. 2005. Linking quality of life and forest values in rural areas: an exploratory study of stakeholder perspectives in the rural community of Konitsa, Greece. *Forestry* 78, 485-499.
- Perlin, J. 1991. *A Forest Journey – The role of wood in the development of civilisation*. Harvard Press, 445 pp.
- Pliny, *Natural History* XVI, 95. Trans. H. Rackham, *Pliny Natural History*, 549.
- Puissi, P. and Farrell, E.P. 2000. Interactions between society and forest ecosystems: challenges for the near future. *For. Ecol. Manage.* 132, 21-28.
- Schütz, J.P. 1990. *Sylviculture. 1. Principes d'éducation des forêts irrégulières et mélangées*. Presses polytechniques et universitaires romandes, Lausanne, 178 pp.
- Ticktin, T. 2004. The ecological implications of harvesting non-timber forest products. *J. Appl. Ecol.* 41, 11-21.
- UNCED 1992. Non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests. Principles/Elements 1. (b). In: Report of the United Nations Conference on Environment and Development. Rio de Janeiro, 3-14 June 1992. A/CONF.151/26 (Vol. III), Annex III. <http://www.un.org/documents/ga/conf151/aconf15126-3annex3.htm>
- Wiersum, K.F. 1995. 200 years of sustainability in forestry: lessons from history. *Environ. Manage.* 19, 321-329.
- Zimmermann, E.W. 1951. *World resources and industries*. New York Harper & Row