Rehabilitation of coppice *Quercus frainetto* woods (9280) and *Quercus ilex* woods (9340) to high forests

AFTER LIFE CONSERVATION PLAN

Holy Community of Mount Athos
December 2006
Rehabilitation of coppice *Quercus frainetto* woods (9280) and *Quercus ilex* woods (9340) to high forests

**Project location**
Mount Athos, Greece

**Project start date:**
01/10/2003

**Project end date:**
31/12/2006

**Total Project duration (in months):**
39 months

**Total budget**
1,942,100 €

**EC contribution:**
971,050 €

Conservation Plan for the after-LIFE period
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TABLE OF CONTENTS

PREFACE.......................................................................................................................... 1
1. INTRODUCTION ........................................................................................................... 2
2. THE PROJECT ............................................................................................................... 4
3. THE FUTURE OF THE PROJECT ............................................................................... 7
4. FOLLOW-UP PROJECT NEEDS .............................................................................. 8
AFTER LIFE CONSERVATION PLAN
“REHABILITATION OF COPPICE QUERCUS FRAINETTO WOODS (9280) AND QUERCUS ILEX WOODS (9340) TO HIGH FORESTS”

PREFACE

This report constitutes the last deliverable of the LIFE-NATURE project «Rehabilitation of coppice Quercus frainetto woods (9280) and Quercus ilex woods (9340) to high forests», and has been prepared according to the relevant requirements of the EU Commission as shown on the formal site of the Commission. It describes the current situation of the area, including an assessment of it, as well as future conservation and management needs in the area.

The report should be viewed alongside the final report, in order that the need for financial support to continue the project work is manifested.
1. **INTRODUCTION**

The Mount Athos or Holy Peninsula or Athos occupies the eastern peninsula of the three peninsulas of Chalkidiki; the latter is a prefecture in North Greece. The total area of the Peninsula is about 34,020 hectares.

The lack of intensive grazing in the region and of intense manhood interventions had as a result the natural growth of vegetation, the protection of the region from erosion and the growth of mature and remarkable forests of chestnut, holm oak, Hungarian oak and pine and of large areas with bushes and scrubland (from *Erica spp* and *Arbutus unedo*). The area is not easily accessible. Narrow valleys, which are developed mainly in the eastern side, are suitable for cultivation with traditional methods. The flora and the fauna of the area is exceptionally remarkable, rendering the region of Athos place with high ecological, biological and cultural value.

The exploitation of forests began the time of the first settling of monks in Mount Athos. Initially, but also up-to-date, thinning aimed at the production of timber for covering needs in heating, restoration of Monasteries and other historical and religious buildings. In the old days, due to the lack of mechanically-driven means and equipment for thinning but also the lack of roads the necessary timber for covering the above needs - mainly for heating - came, preferably, from forests close to the Monasteries and cloisters. With improvements achieved in the last fifty years, such as opening of roads and modern thinning equipment, the exploitation of forests were also intensified and extended in more distant areas from Monasteries, especially in forests covered with chestnuts, where more intensive and systematic exploitation is being applied. This led to the differentiation, mainly in terms of the structure and constitution of forests of Mount Athos, from forests with two dominant types to coppice forests, in their entirety. The reasons for intensifying forests’ exploitations during the last fifty-year period are explained later.

The kinds of flora of the area do not seem to face particular threats, since many plants grow in inaccessible sites of Mount Athos. Regarding the fauna of Mount Athos, the way forests are currently structured decreases suitable places for the nesting needs in particular of the bird fauna. Generally although there is rich
variation in the Mount Athos' ecosystems through the centuries, the Peninsula of Athos still remains a dynamic and productive ecosystem with ecological value.
2. **The Project**

In 2003, the EC has approved the pilot application of thinning inventions in high forests of Hungarian Oak (*Quercus frainetto*) and Holm Oak (*Quercus ilex*). The project’s budget was 1,942,100 € (50% EC co-funding), the final beneficiary was the Holy Mount Community of Agion Oros and project partner the Hellenic Biotope - Wetland Centre. The Ministry of Agriculture and Food had contributed 20% of the total project budget (388,420 €). The project activities included:

- Technical study for the rehabilitation of the habitats of Hungarian Oak (*Quercus frainetto*) and Holm Oak (*Quercus ilex*).
- Training of forest workers and of the monks responsible for forest management.
- Installation of a system to monitor progress of tree knots treated with thinning inventions.
- Application of selective thinning invention methods in woodcutting at selected areas of the Hungarian Oak (*Quercus frainetto*) and Holm Oak (*Quercus ilex*) habitats; to-date, these areas have been managed as high forests. This activity (Activity D) was piloted in 500 hectares of the above kinds of forests in the Mount Athos peninsula and was concluded in November 2006 with great success. Information on the project was widely disseminated to almost all monasteries of the Mount Athos Community and their monks participated in the training, while 15 monasteries offered their forested areas for the pilot implementation of the project.
- Dissemination and public sensitization activities on the project and on the natural environment of Mount Athos, include the organization of an one-day conference, the publication of a leaflet and a Guide for thinning inventions in the Mediterranean Basin, as well as the creation of a website and the production of a movie documentary.
- Administrative support for the project.

All planned activities have been implemented until December 2006, which was the official end-of-project date. Although all project activities have been successfully implemented, the need to continue the thinning inventions and generally the sound
management of natural resources remain, hence careful consideration is necessary to find ways to continue the interventions. To better understand these needs, one should know some general characteristics of the Holy Mount Community. The Holy Mount Community is neither a profit-making nor a non-profit making body, neither a governmental nor a non-governmental body. The monks have a unique goal, which is to get freed from passions and enlightened by the Holy Spirit, and to unify with God. In the framework of this effort they also offer themselves to hosting visitors, support people in trouble, offer job opportunities, offer financial support whenever is possible and pray for all the mankind.

The above tasks require the minimum distractions and daily matter thoughts, and as such the very first founders of the Holy Monasteries, who were Byzantine Emperors, have it so arranged that the monks would have the necessary resources in order to dedicate themselves in their demanding mission.

They took measures such as: a/ sponsoring the construction and maintenance of buildings, b/ donating agricultural and forest land outside the Holy Mount peninsula (the so called “Metochia”) in order to cover expenses and c/ tax relieves.

It has been observed that whenever one of the above measures is made redundant, this results to serious fiscal shortages that are usually compensated through the commercial exploitation of forests.

For example, during the previous century’s upheavals and continuous wars (1st and 2nd World War, Minor Asia disaster), Mount Athos did not have financial support by the Greek State or other countries of the same faith, due to the communist regimes, which resulted in the inability to maintain buildings and hence to their damaging. Also, the expropriation of the land owned outside the Mount Anthos peninsula (metochia) because of the refugee problem, deprived the Holy Community from their resources. As a result, they had to make excessive, at case, use of the forest resources, which led to adverse impacts on the environment (unnecessary commercial routes and roads, soil degradation, diseases such as Entothia Paracitica etc).

Another example: during the ottoman occupation heavy taxation was forced upon the Holy Monasteries which resulted to “economic suffocation” and other interrelated problems stemming from economic shortages.
In this context it becomes clear that the above support measures are substantial and essential for continuing the impacts of this ambitious project. It was stressed by Monk Grigorios Grigoriatos during the one-day conference organized in the context of the project, that the relaxation of one of the three measures may disrupt the project, which is certainly undesirable and as such it has been highlighted in the conference.

Moreover, given the keen interest of the Holy Community of Agion Oros, the continuation of the thinning inventions in the oak forests would be very beneficial provided that: a) the above-mentioned conditions are met, and b) the financial resources are secured. In particular, procedures involved in the thinning invention methods have proved in practice both time- and cost-consuming, because on the one hand, work progress is slow, and on the other hand, the production is small and without much use or economic value. Also, productivity of forest workers is low, because of the steep grounds and mountains, the dense vegetation and the demands for fine and qualitative work associated with the selective thinning inventions. The low productivity combined with the low economic value of wood products from either young forests, or in the case of mature forests, production which is dispersed and hence uneconomic to collect and move with traditional transport means (donkey-mules), led to the following conclusion: the rehabilitation of the forests to high forests, in particular for kinds of forests with low production in terms of economic value, is a perfect means for the protection, as well as the ecological and aesthetical upgrading of the environment which, however, bears a high cost. Who is going to cover this cost and on the grounds of what compensational benefits?
3. **The future of the project**

After the successful completion of the “Rehabilitation of coppice Quercus frainetto Ten. woods (9280) and Quercus ilex woods (9340) to high forests” project, new interventions and actions have to be drawn, in order to secure the results from the first intervention as well as to promote the appropriate actions to fulfill the final goal of the project.

The main goal of the project is to gradually restore, as possible, the primitive scenery of Mount Athos in the area of broadleaves and deciduous oak and ilex forests. Forest accessibility has already been achieved from the first interventions implemented, especially in the areas where non accessible coppice bush and forests of broadleaves exist; without adverse impacts in the environment as well as the reduction of inflammable biomass and the decomposition speed up of organic matter. While, there are already indications for increase in the population of the ground vegetation raise and the number of species.

The continuation of thinning inventions is a focal point for the achievement of the initial goal, while the environmental conditions in Mount Athos require that these actions are repeated every 7 to 10 years.

Essential requirement for the continuation of thinning inventions is their financing. A brief economic documentation related to this necessity is included in the next chapter.
4. **FOLLOW-UP PROJECT NEEDS**

In this chapter the needs of the Holy Mount Community after the project implementation are included. These needs are divided to three main parts: administrative, management and economic needs.

**I. Administrative needs**

- Conduct of a Special Environmental Study for NATURA 2000 area
- Establishment of a NATURA 2000 management agency
- Secure the operation of the management agency for the first five years
- Preparation of an integrated operational plan for the whole area of Mount Athos.

**II. Special management needs**

- Continuance of thinning inventions in the areas where the project was implemented
- Implementation of thinning inventions in a wider area of Hungarian oak and Holm oak forests in Mount Athos
- Surveillance and control of the areas where thinning invention methodology has been implemented
- Maintenance of the project’s website

**III. Financing**

- Preparation of a special plan for securing economic resources and financing

The financial terms regarding the application of thinning inventions in Hungarian oak (Quercus frainetto) and Holm oak (Quercus ilex) forests in Mount Athos are presented below. The financial calculations have been made through the piloting of thinning inventions during the implementation of project activity D. The results of the activity were presented in the final conference on the 28th of September 2006.

Thinning invention procedures has proved to be time and money consuming. The same product is produced for each and every thinning procedure. The main aim of the project was not only the production of forest products but also the
protection and rehabilitation of the area. The production was rather small and with not any significant usage and money value. The wood cut from young forests was thin trunks (up to 8cm) as well as branches that were left aside and should be left for ecological reasons in the thinning area. In areas were thick trees existed, the wooden volume produced was so small and dispersed that its collection to the forest road and its transportation to the Monastery for energy use or its sale as firewood was costly. At the same time, the sale price for the firewood is less than the transportation cost.

The economic analysis is based on data taken from the management plan of the Iviron Monastery. According to this survey, for knot 1a for which thinning inventions were accomplished during the project, the following data are available:

- Average timber-stock per knot: 130 m³/Ha or
- Average timber-stock per knot: 13 m³/1000m²
- Volume increase on top: 1,46 m³/year/Ha
- Knot age: 60 years
- Proportion m³ / ton: 1:1

The sale price in the area of Mount Athos for firewood is 0,0587€/kg or 58,7€/tn. Thinning cost for firewood production is equivalent to 60% of the total gross revenue.

If the specific knot was thinned by deforestation (thinned by 100% of the wood capital) in order to cover the Monastery’s needs, gross forest revenue would be 13tn/1000m²*58,7€/tn=763,10€.

Thus, the net forest revenue would be 763,10€ - 60% (763,10€)= **305,24€**.

The particular knot was thinned by positive selection according to the thinning invention procedure followed by the project (Activity A1). 25% of the wood capital was removed. The product produced from wood cutting (firewood) was left in the thinning area for environmental and economic reasons as its transportation was deemed costly. Several economic offers were obtained for the transfer and removal of the products, which proved that the cost of the above tasks would be equivalent to the value of the products.
The average thinning cost for the specific knot, through invention procedures and according to the data collected through the project, was 316€/1000m².

In conclusion, if the Iviron Monastery, the same applying to the other Monasteries, had followed invention procedures in knots with the same characteristics as the studied one (1a), the total environmental cost would be: 316€/1000m² (thinning cost) + 305,24 (loss of thinning profit) = 624,24€/1000m².

A thinning invention procedure is not a static phenomenon but a continuous method of forest cultivation. The time needed for the repetitive interventions for this particular species is 10 years, mostly for mature knots, according to the situation analyzed above. Therefore, Iviron Monastery will have to intervene in the same area after 10 years, using invention procedures for the knot cultivation of 1a. By that time, the area will have had the following characteristics:

- Average timber-stock per knot: 140 m³/Ha or
- Average timber-stock per knot: 14 m³/1000m²
- Volume increase on top: 1,2 m³/year/Ha
- Knot age: 70 years
- Proportion m³ / ton: 1:1
- Considering that thinning cost as well as the proportion of profit/gross revenue, remains the same (in absolute values)

The gross forest revenue for thinning deforestation in ten years will be:

14 tn/1000m² * 58,7€/tn = 821,80€.

The net forest revenue of the Monastery will be:

821,80€ - 60% (821,80€) = 328,72€.

**Total environmental cost:** 316€/1000m² (thinning cost) + 328,72 (profit loss by thinning) = 644,72€/1000m².

The thinning invention cost, in terms of the cost born to each Monastery of Mount Athos, is too high both for expanding the invention processes in other areas and for continuing the specific cultivation method in areas where thinning inventions were piloted through the LIFE project.
Conclusion: The will of the Holy Monasteries of Mount Athos to continue the thinning invention activities in the Holm oak and Hungarian oak forests, on the model adopted by the LIFE project, is a fact.

Nevertheless, it is apparent that the work can continue only with the financial aid from another project.

The tables from the above mentioned analysis are illustrated below:
### 1ST INTERVENTION (CASE OF H.M. IVIRON)

<table>
<thead>
<tr>
<th>Data</th>
<th>Quantity</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest productivity (knot 1a)</td>
<td>130</td>
<td>m³/Ha</td>
</tr>
<tr>
<td>Forest productivity (knot 1a)</td>
<td>13</td>
<td>m³/1000m²</td>
</tr>
<tr>
<td>Knot Age</td>
<td>60</td>
<td>years</td>
</tr>
<tr>
<td>Proportion m³ : tone</td>
<td>1 to 1</td>
<td></td>
</tr>
<tr>
<td>Net profit of thinning / Gross product profit</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Value of hungarian oak / holm oak products sales</td>
<td>0.0587</td>
<td>kg</td>
</tr>
<tr>
<td>Value of hungarian oak / holm oak products sales</td>
<td>58.7</td>
<td>tones</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Work</th>
<th>Forest Productivity (m³/1000m²)</th>
<th>Rate of timber harvest (%)</th>
<th>Product crop (%)</th>
<th>Value of Hungarian oak / holm oak products sales</th>
<th>Gross revenue</th>
<th>Thinning expenses</th>
<th>Thinning profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear cutting in the 100% of the area</td>
<td>13</td>
<td>100%</td>
<td>100%</td>
<td>58.7</td>
<td>763.1</td>
<td>457.86</td>
<td>305.24</td>
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<tr>
<td>Inversion thinning in the 100% of the area</td>
<td>13</td>
<td>25%</td>
<td>0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-316</td>
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<table>
<thead>
<tr>
<th>Thinning cost €/1000m²</th>
<th>Income loss €/1000m²</th>
<th>TOTAL</th>
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<tr>
<td></td>
<td></td>
<td>316.00</td>
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</tbody>
</table>
### AFTER LIFE CONSERVATION PLAN

"Rehabilitation of coppice Quercus frainetto woods (9280) and Quercus ilex woods (9340) to high forests"

#### 2nd Intervention (Case of H.M. Iviron) in 10 years

<table>
<thead>
<tr>
<th>Data</th>
<th>Quantity</th>
<th>Measure</th>
</tr>
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<tr>
<td>Forest productivity (knot 1a)</td>
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<td>m³/Ha</td>
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<tr>
<td>Forest productivity (knot 1a)</td>
<td>14</td>
<td>m³/1000m²</td>
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<tr>
<td>Knot Age</td>
<td>70</td>
<td>years</td>
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<td>Proportion m³ : tone</td>
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<tr>
<td>Net profit of thinning / Gross product profit</td>
<td>40%</td>
<td></td>
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<td>Value of hungarian oak / holm oak products sales</td>
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<td>tones</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Work</th>
<th>Forest Productivity (m³/1000m²)</th>
<th>Rate of timber harvest (%)</th>
<th>Product crop (%)</th>
<th>Value of Hungarian oak / holm oak products sales</th>
<th>Gross revenue</th>
<th>Thinning expenses</th>
<th>Thinning profit</th>
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<tbody>
<tr>
<td>Clear cutting in the 100% of the area</td>
<td>14</td>
<td>100%</td>
<td>100%</td>
<td>58.7</td>
<td>821.8</td>
<td>493.08</td>
<td>328.72</td>
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<td>Inversion thinning in the 100% of the area</td>
<td>14</td>
<td>25%</td>
<td>0%</td>
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<td>0</td>
<td>0</td>
<td>-316</td>
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<tr>
<th>Total Environmental Cost of inversion thinning</th>
<th>Thinning cost €/1000m²</th>
<th>Income loss €/1000m²</th>
<th>TOTAL</th>
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<tr>
<td>316</td>
<td>328.72</td>
<td></td>
<td>644.72</td>
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"Rehabilitation of coppice Quercus farnietto woods (9280) and Quercus ilex woods (9340) to high forests"

<table>
<thead>
<tr>
<th>MANAGEMENT NEEDS</th>
<th>RESPONSIBLE BODY</th>
<th>POTENTIAL FINANCING AUTHORITY</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. ADMINISTRATIVE NEEDS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elaboration of Specific Environmental Study for the NATURA 2000 area</td>
<td>Holy Community of Mount Athos</td>
<td>Hellenic Ministry for the Environment, Physical Planning and Public Works Self-financed</td>
<td>The study has been completed on October 2006</td>
</tr>
<tr>
<td>Composition of the Management Agency of the NATURA 2000 area</td>
<td>Holy Community of Mount Athos</td>
<td>National and European funds Self-financed</td>
<td>Should be established during 2007</td>
</tr>
<tr>
<td>Assurement for the first 5-years operation of the Agency</td>
<td>Holy Community of Mount Athos</td>
<td>National and European funds Self-financed</td>
<td>It is necessary for the right operation of the Agency</td>
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<tr>
<td>Elaboration of an integrated Business Plan for the entire area of Mount Athos</td>
<td>Holy Community of Mount Athos</td>
<td>National funds Self-financed</td>
<td></td>
</tr>
<tr>
<td><strong>II. SPECIAL MANAGEMENT NEEDS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuation of the inversion thinning in the area where the project has been implemented</td>
<td>Holy Community of Mount Athos</td>
<td>National and European funds Self-financed</td>
<td>The 500 hectares, where the inversion thinning has been implemented, constitutes the 5% of coppice woods of Mount Athos; The Holy Community of Mount Athos willing to continue the inversion thinning in that areas</td>
</tr>
<tr>
<td>Implementation of inversion thinning of coppice woods in the whole area of Mount Athos</td>
<td>Holy Community of Mount Athos</td>
<td>National and European funds Self-financed</td>
<td>The Holy Community of Mount Athos willing to implement the inversion thinning to the rest (95%) of coppice woods</td>
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<tr>
<td>Monitoring and control of the areas where the method of inversion thinning has been implemented</td>
<td>Holy Community of Mount Athos</td>
<td>National and European funds Self-financed</td>
<td>EKBY intend to continue the monitoring of the areas where the inversion thinning has been implemented</td>
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<tr>
<td><strong>III. FINANCING</strong></td>
<td></td>
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</tr>
<tr>
<td>Syntaxis of specific programme for the assurance of economic funds and financing</td>
<td>Holy Community of Mount Athos</td>
<td>National funds Self-financed</td>
<td></td>
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</tbody>
</table>
**STRENGTHS**
- Restricted rules for buildings, constructions etc
- Lack of industry
- Limited and focused economic activity
- Controlled number of visitors
- Tradition in sustainable management of the resources
- High environmental awareness of the monks
- High respect of the environment
- Lack of landmines, grazing

**WEAKNESSES**
- Lack of a Operational Plan covering all the area
- Time consuming procedures due to area’s topographic conditions
- Weakness of investments in the environment because economic difficulties and hospitality of many pilgrims
- Due to lack of systematic economic exploitation of Mount Athos, minimal revenue for the Holy Monasteries is observed

**OPPORTUNITIES**
- Elaboration of the “Special Environmental Study”
- Creation of managing agency for the area
- Increased funding opportunities through EU and national funds

**THREATS**
- Possible abandonment of the protected areas policy agenda
- Natural catastrophes (forest fires, diseases)