



Forestry Department

Food and Agriculture Organization of the United Nations

Forest Genetic Resources Working Papers

State of Forest Tree Genetic Resources in Albania

by

Maxhun Dida

General Directorate for Forestry and Pasture

Tirana

2003

Forest Resources Development Service
Forest Resources Division

Working Paper FGR/62E
FAO, Rome, Italy

Disclaimer

The Forest Genetic Resources Working Papers report on issues and activities in related to the conservation, sustainable use and management of forest genetic resources. The purpose of these papers is to provide early information on on-going activities and programmes, and to stimulate discussion.

The designations employed and the presentation of material in this publication do not simply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Quantitative information regarding the status of forest resources has been compiled according to sources, methodologies and protocols identified and selected by the authors, for assessing the diversity and status of genetic resources. For standardized methodologies and assessments on forest resources, please refer to FAO, 2003. *State of the World's Forests 2003*, and to FAO, 2001. *Global Forest Resources Assessment 2000 (FRA 2000)*. FAO Forestry Paper No 140. Official information can also be found at the FAO Internet site (<http://www.fao.org/forestry/Forestry.asp>).

Comments and feedback are welcome.

For further information please contact:

Pierre Sigaud, Forestry Officer (Forest Genetic Resources)
Forest Resources Division
Forestry Department
FAO, Viale delle Terme di Caracalla
00100 Rome, Italy
Fax: + 39 06 570 55 137
Email: pierre.sigaud@fao.org

For quotation:

Dida, M. 2003. *State of Forest Tree Genetic Resources in Albania*. Forest Genetic Resources Working Papers, Working Paper FGR/62E. Forest Resources Development Service, Forest Resources Division. FAO, Rome (*unpublished*).

TABLE OF CONTENTS

1. INTRODUCTION.....	1
2. STATE OF FOREST RESOURCES.....	1
2.1 MEDITERRANEAN SHRUB	1
2.2 OAK WOODLAND	1
2.3 BEECH FORESTS.....	3
2.4 MEDITERRANEAN FIR	4
2.5 ALPINE ZONE.....	4
3. CONSERVATION IN PROTECTED AREAS.....	4
3.1 EXISTING SYSTEM OF PROTECTED AREAS	4
3.2 REPRESENTATIVE NETWORK OF PROTECTED AREAS	5
3.3 IMPLEMENTATION AND LAW ENFORCEMENT	6
4. CONSERVATION IN SEED STANDS AND MANAGED FORESTS	7
4.1 CONSERVATION IN SEED STANDS.....	7
4.2 <i>IN SITU</i> CONSERVATION OF STANDS OF OAK AND BEECH	7
5. VALUE, USE AND THREATS TO PRIORITY TREE SPECIES.....	8
5.1 VALUE AND USE OF IMPORTANT SPECIES	8
5.2 LEVEL AND NATURE OF THREATS TO IMPORTANT TREE SPECIES	9
5.3 PRIORITY SPECIES FOR CONSERVATION, IMPROVEMENT OR SEED PROCUREMENT	10
6. INSTITUTIONAL AND LEGAL FRAMEWORK.....	12
6.1 GENERAL BACKGROUND	12
6.2 DECENTRALISATION AND DEVOLUTION.....	13
7. ECONOMIC AND SOCIAL CONTRIBUTIONS OF FOREST RESOURCES.....	14
7.1 ECONOMIC CONTRIBUTIONS	14
7.2 AFFORESTATION EFFORTS AND MEASURES TO CONTROL EROSION.....	15
8. CONCLUSIONS AND RECOMMENDATIONS	17
LITERATURE AND REFERENCES	18
APPENDICES	21
APPENDIX 1. LIST OF ABBREVIATIONS AND ACRONYMS	22
APPENDIX 2. SEED STAND LOCATION BY SPECIES	23
APPENDIX 3. CONSERVATION NETWORK OF BEECH GENETIC RESOURCES.....	25
APPENDIX 4. CONSERVATION NETWORK OF OAK GENETIC RESOURCES	26

Tables and Figures

TABLE 1. NATURE NATIONAL PARKS IN ALBANIA.....	5
TABLE 2. CURRENT AND PROPOSED PROTECTED AREAS IN ALBANIA.....	6
TABLE 3. VALUE AND USE OF IMPORTANT SPECIES.....	8
TABLE 4. LEVEL AND NATURE OF THREATS TO THE INTEGRITY OF SPECIES/POPULATIONS OF IMPORTANT SPECIES AND THREAT INDEX	9
TABLE 5. LIST OF PRIORITY SPECIES FOR CONSERVATION, IMPROVEMENT OR SEED PROCUREMENT.....	10
TABLE 6. INFORMATION ON FOREST HARVESTING ACTIONS (2001-2002).....	15
TABLE 7. AREA OF PASTURES, THEIR STRUCTURE AND CAPACITY	15

1. INTRODUCTION

Albania is a small mountainous country with a population of 3.3 million and a surface area of 28 748 km². A great variety of microclimates is present in Albania, due to the two contrasting types of predominant climate, the Mediterranean and the central European, with their intervening transitional zone. This, coupled with wide differences in geological substratum, altitude, and topography, and varied origin of species, makes for a great diversity in plant communities. A variety of habitats and vegetation types are found within the country, including alpine and sub alpine mountain ecosystems, Mediterranean shrubs, grassland and marshland, streams and rivers, lakes and reservoirs, coastal lagoons, sand dunes and psammophilous vegetation, river delta, rocky coastal and marine ecosystems.

The forests constitute about 36 percent of the total land area, pastures 16 percent, agricultural land 24 percent and other lands 24 percent. The main forest species are oaks, beech, black pine, etc. The country has five forest types: Mediterranean shrub, oak woodland beech forests, Mediterranean fir and alpine zone.

These woodland types contain about 3 250 native vascular plant species distributed in 165 families and about 910 genera, i.e. about 30 percent of the approximately 11 600 European species (Paparisto, 1989). About 450 Albanian plant species are found only on the Balkan Peninsula, 27 species are endemic to Albania and 180 species are subendemic to Albania, Yugoslavia and Greece. Many species have important medical, industrial, alimentary and decorative uses and are therefore of economic value as well.

2. STATE OF FOREST RESOURCES

2.1 Mediterranean shrub

Mediterranean shrub, found mainly in the southern mountain region, consists mainly of evergreen shrubs (e.g. *Quercus ilex*, *Q. coccifera*, *Arbutus unedo*, and *Myrtus communis*), deciduous shrubs and Mediterranean trees.

2.2 Oak woodland

Oak woodland, found above the shrub zone, is composed of oak or mixed forests of oak, hornbeam, black pine, chestnut, ash, maple and linden.

There are 12 oak species in Albania, distributed over almost all the Albanian territory: *Quercus ilex* L. (holly oak), *Q. coccifera* L. (kermes oak), *Q. calliprinos* Webb, *Q. macrolepis* Kotschy-Vallonea, *Q. trojana* Webb (Macedonian oak), *Q. robur* L. (common oak), *Q. frainetto* Ten. (Hungarian oak), *Q. cerris* L. (Turkey oak), *Q. pubescens* Wild. (pubescent oak), *Q. virgiliana* Ten., *Q. petraea* Mattuschka (Lieb) (chestnut oak), and *Q. dalechampii* Ten. (Mitrushi, 1955; Paparisto 1989).

Oak forests represent an important natural forest resource in Albania not only because they occupy a large area, 336 800 ha, i.e. 31 percent of all forest area (Forest and Pasture Research Institute FPRI, 2001), but also because they represent an important source of timber, providing 19 percent of the total. Oak forests are also valued for the high nutritive value of their leaves and acorns for cattle, especially during the winter.

The multiple uses of oak forests and the deforestation caused by clearing land for agriculture have caused their massive degradation, the reduction of biodiversity and severe soil erosion. Oak forests in Albania are managed in two ways: high forests and coppice. In general, about 74 percent of oak forests are coppice and 26 percent high forests. There is also some oak areas under mixed management (FPRI, 1999).

The structure and distribution of these forest units are briefly described here. In the Balkan region, most of these oak forests have been destroyed or degraded to become woodlands known as Shibliak, as a result of illegal cuttings or overgrazing. *Quercus pubescens* forests are well distributed in Albania, generally in the central and southern part but, as in most of the Balkans, they are rather degraded. In general, this species is associated with other oaks such as *Q. cerris* and *Q. frainetto*. Other trees typical of these forests are *Carpinus orientalis* Miller, *Ostrya carpinifolia* Scop., *Sorbus domestica* L., and *Fraxinus ornus* L., while the understorey is characterized by *Rosa sempervirens* L., *Amelanchier ovalis* Medicus, *Cotinus coggygia* Scop., *Spartium junceum* L. and *Pistacia lentiscus* L.

Quercus frainetto is the most common oak species in Albania, especially in the districts of Tropoja, Kukes, Peshkopi, Mat, Kruje, Tirana, Librazhd, Skrapar and Permet. Phytosociological interpretation of these forests is very difficult due to the important changes in their floristic composition. *Q. frainetto* grows in a phytoclimatic area of mixed deciduous broadleaved communities; it never forms pure oak forests. Characteristic or indicator plant species of the Quercion frainetto alliance are: *Q. frainetto*, *Q. cerris*, *Rosa arvensis*, *Carex caryophylla*, *Silene viridiflora*, *Galium mollugo* and *Symphytum bulbosum*. (Mitrushi, 1955).

In Albania, *Quercus cerris* has a diverse ecology and is distributed from 100 to 1 200 m above sea level, between the Cemi Stream in the northern part and the Vjosa River in the southern part of Albania, forming pure or mixed forests with *Q. petraea* (Matt.) Liebl., *Q. frainetto* Ten., *Sorbus torminalis* (L.) Crantz and *Carpinus betulus* L. (Vangjeli, 1999).

Quercus trojana in Albania is more common in the Mediterranean regions, up to 800 m above sea level, such as in the Rrenc Mountains and in the Kashnjet, Librazhd, Gjirokaster, Korca and Erseka districts. *Q. trojana* is found in mixed forests with *Q. pubescens*, *Q. cerris*, *Carpinus orientalis* and *Fraxinus ornus*. The more common species in the understorey are *Coronilla emerus*, *Colutea arborescens*, *Pistacia terebinthus*, *Pyracantha coccinea* and *Juniperus oxycedrus*. The herbaceous layer is dominated by *Alyssum murale*, *Silene italica*, *Geranium sanguineum*, *Cistus incanus*, *Satureja juliana* and *Helianthemum nummularium* (Vangjeli, 1999).

Quercus petraea forests are distributed all over Albania, but occur more often in northern and central Albania. In general, they are found in the upper oak zone forming small forests along cool valleys, on northern exposures and in the submontane beech zone, on eastern and southern exposures, 550-800 m above sea level (Mitrushi, 1955).

In Albania, especially in the northern part, the area of *Quercus ilex* is very fragmented and no stands of significant size are found, except in some small isolated areas such as Ksamil, Karaburun and Shushica Valley.

The shrub layer is characterized by *Pistacia lentiscus* L., *Buxus sempervirens* L., *Rhamnus alaternus* L., *Arbutus unedo* L., *Phillyrea latifolia* L., and *Erica arborea* L. The herbaceous layer includes L., *Viola alba* Besser, *Rubia peregrina* L. and *Asparagus acutifolius* L. In the past, *Q. ilex* was widely distributed in the Mediterranean belt. Today it is very rare because of over cutting and is classified as an endangered species (Red Book, 1995). It is important, therefore, to include this species in protected areas and approve measures for its development and protection.

Quercus macrolepis Kotschy forms important forests in Albania, up to 800-900 m above sea level, mainly in Southern Albania, between Konispol and Vlora Bay. It is found in pure and mixed forests. These forests colonize deep alluvial soils, with a humid and warm microclimate.

Generally the understorey belongs to the Quercion ilics and Oleo-Ceratonion associations. The phytosociological classification of *Q. macrolepis* forests is rather difficult as a result of changes of the natural vegetation structure which, in many cases, has become heavily degraded, tending towards the formation of *Phlomis fruticosa*. The vegetation of *Q. macrolepis* forests is generally quite sparse, with wide clearings.

Quercus robur L. does not play an important role in Albania compared with that in other European countries and especially those of Central Europe. In fact, this species is mostly found in areas with mild climate and in alluvial or deep soils, which corresponds with the area of the Alno-Quercion roboris association. As a result of reclamation and of other agricultural interventions, *Q. robur* is endangered almost to extinction (Red Book, 1995). The alteration to the vegetation structure has been so great that only scattered trees remain as proof of the former existence of forests in this very interesting region of Albania. Depending on the substrate it is possible to distinguish two different types of vegetation that are included in the Aceretosum tatarici and Caricetosum remotae subassociations. Due to the extremely endangered status of this forest type, it is very important to create the conditions for its regeneration in the future, with the objective of creating a *Q. robur* dominated forest, which is the most valuable forest of these environments (Red Book, 1995).

2.3 Beech forests

Beech (*Fagus sylvatica*) is the most common tree species in Albania. Beech forests occur at 800 to 1 600 m elevation in northern Albania, from 1 000 to 1 800 m in the middle part of the country and from 1 200 to 1 900 m in the southeastern part of the country. They provide important wildlife habitats for various sensitive species such as bear, wolf, fox, wild boar, marten and lynx.

The beech forests are at 42°39' at the north and 40°6' at the south, 19°30' at the west and 20°55' at East of Albania. In terms of area, the beech forests in Albania are the second largest. They are the most important for wood production. Beech is found in two areas of Albania: the hill zone and the mountainous Mediterranean zone. In the Mediterranean zone the beech is mixed with black pine (*Pinus nigra*). The main important mountainous Mediterranean zone is in the north at Vermoshi, Qafa e Bozdovecit, Fushe zeze, and Theth, etc. The beech is commonly mixed with fir (*Abies alba*), Rrobulli (*Pinus heldreichii*), or Arneni (*Pinus peuce*). The pure beech forests are mainly in the eastern areas.

The beech forests in Albania are at 900 to 1 700 m elevation, with oaks, chestnut, and black pine at the low level, and pastures and *Pinus heldreichi* at the higher level. The soil is mainly acidic or neutral, and most sites receive 2 000 to 2 500 mm/year of rain.

2.4 Mediterranean fir

Fir (*Abies alba*) replaces beech forest in the southern part of the country, where it is found only in Bredhi i Sotires and Bredhi i Hotoves at elevations of 1 000 to 1 700 m.

2.5 Alpine zone

Mountain pine occurs above the beech and fir forests under conditions of hard climate and poor soils, at elevations of 1 600 to 2 100 m in the north and from 1 700 to 2 300 m in the south. The three main species are *Pinus leucodermis*, *P. peuce* and *P. heldreichii*.

The other main species of the alpine zone are *Juniperus communis*, *Sorbus aria*, *Pinus mugo* var. *mughus* and *Salix reticulata*.

3. CONSERVATION IN PROTECTED AREAS

3.1 Existing system of protected areas

Biodiversity conservation and management in protected areas are keys to enhancing Albania's biodiversity. Protected areas are critical for the conservation of wild flora and fauna, in the long term, they might become a major repository of natural ecosystems. Although the protected areas network is not intended to protect and conserve specific forest tree species or their genetic variability, it is a first and important step towards a more sophisticated forest genetic resources *in situ* management programme.

Albania contains extensive areas covered by vegetation, but the number of undisturbed areas is relatively small. The six first National parks were established by decree in 1966.

TABLE 1. NATURE NATIONAL PARKS IN ALBANIA

Nr	Name of nature National park	Area/ha	Region	Year of establishment
1	Mali I Dajtit	3 300	Tirana	1960,1966
2	Thethi	2 630	Shkodra	1966
3	Lura	1 280	Diber	1966
4	Pisha e Divjakes	1 250	Lushnje	1966
5	Llogara	1 010	Vlore	1966
6	Bredhi I Drenoves	1 380	Korce	1966
7	Lugina e Valbones	8 000	Tropoje	1996
8	Mali I Tomorrit	4 000	Berat	1996,1940
9	Bredhi I Hotoves	1 200	Permet	1996
10	Qafe Shtama	2 000	Kruje	1996
11	Zall Gjocaj	2 000	Mat	1996
12	Parku I Prespes	4 000	Korce	1999
13	Butrinti	2 500	Sarande	2000

As shown in Table 1, until the 1990s, protected areas in Albania were small in number and size. They were largely limited to three IUCN categories of forest ecosystems: forest National parks (category II), nature monuments (category III) and game/hunting reserves in categories A and B (category IV). Protected areas represent 10.37 percent of the total forest cover and 3.9 percent of the total area of Albania.

3.2 Representative network of protected areas

A number of initiatives have been launched since 1991 to upgrade the limited protected area system and help the country fulfil its international goals and commitments, especially towards a closer integration with the European Union and in the framework of the Convention on Biological Diversity. These initiatives include: a national ecological survey, a new classification system for protected areas, adopting the IUCN typology and a proposed representative network of protected areas (1996).

The national ecological survey completed in 1995 was aimed at identifying potential sites for designation of protected areas. Although only a small part of Albania's Forest Fund (9 percent), the forest units in the survey play an important role in enhancing forest biodiversity: some areas are national and/or regional biocentres (core areas), and others are part of national and or regional biocorridors. The recommendations on protected areas were prepared in the context of a larger set of recommendations on biodiversity protection and management throughout Albania, of which the ecological study area is but a part.

The survey proposed establishing or expanding protected areas using six IUCN (Ecological Survey in Albania, 1997) management categories, including strict nature reserves/scientific reserves (category I), national parks (category II), nature monuments (category III), species and habitat management area/managed nature reserve (category IV), landscape protected area (category V), and multiple-use management areas/resource reserve/interim conservation unit (category VI).

According to the ecological survey study the six IUCN management categories were adopted for the sites most important for, and representative of, the country's natural and biodiversity heritage. The draft proposal took into account existing protected areas, as well as those proposed and approved under the ecological survey. It aimed to ensure adequate legal protection and, thereafter, appropriate management for the most valuable and representative natural and semi natural ecosystems, habitats, and landscapes in the country in order to guarantee Albania's landscape and biodiversity heritage. The RNPA (Representative Network of Protected Areas) proposal was an important step towards building the country's Econet. The area proposed for protection (some 10 percent of Albania's territory) was considered the minimum necessary to preserve the country's biodiversity. (see Table 2).

TABLE 2. CURRENT AND PROPOSED PROTECTED AREAS IN ALBANIA

Management category		Current protected areas		Proposed protected areas		
Number	Name	Number	Surface area (ha)	Number	Surface area (ha)	Reserve corridor (km)
<i>I</i>	Strict name reserve/scientific reserve	4	14 500	12	16 040	2
<i>II</i>	National park	11	25 860	7	100 000	-
<i>III</i>	Nature monument	1	4 360		358	-
<i>IV</i>	Managed nature reserve species and habitat	26	42 940	9	16.650	44
<i>V</i>	Landscape/seascape protected area	3	2 550	17	120 400	145
<i>VI</i>	Protected area of multiple use/resource reserve	4	18 245	3	12 400	-
-	Protection status to be determined	-	-	4	35 900	-
All		49	107 455	52	301 748	191

The addition of the proposed new areas would increase the total protected area from 107 455 ha to 301 748 ha (Table 2). The area of National Parks would increase from 25 860 ha to 100 000 ha although the number would be reduced from 11 to 7. Under these conditions the area of protected forest could be 10.9 percent of the total area.

First steps are being taken through pilot projects in one or two key areas, such as Karavasta Lagoon (financed by EU Phare) and Dajti National park (financed under the Forestry Project of the World Bank).

3.3 Implementation and law enforcement

Since 1991, parliament has approved several laws that directly or indirectly addressed environmental, conservation, and landscape protection issues, including laws on land distribution, compensation, environmental protection, physical planning, forest and forestry police, pasture land, wildlife and hunting, fisheries and aquaculture, protecting medicinal and aromatic plants, priority tourism development zones and protecting water resources.

According to activities organized during 1999-2000 and the achievements of a small project entitled “Existing Conditions in the protected areas proposed under the Albania’s Forestry Project”, (Albanian Society for the Protection of Birds and Mammals ASPBM, 1999) almost all of the areas assessed were maintaining their values and features relatively well, based upon which they had been designated protected areas.

This is mainly explained by the fact that the pressure of human activity on the forest in the south of Albania has been noticeably reduced owing to the emigration of the locals to Greece and other countries, and the abandonment of villages towards the main urban centres of Albania.

Some progress to enforce the protection law and the decision of the national government by local and district forest authorities is also to be mentioned. Generally there is a low level of public awareness on the environmental issues. The attitude of local communities is still not very supportive to nature conservation. This is partly because of the very difficult economic situation in the surrounding villages and the lack of assistance by the state to the villagers’ day-to-day life.

The difficult access to the protected areas, due to poorly maintained roads (except for Dhrovjan nature monument), is a limiting factor to better control and administration of the protected areas and sustainable use of their resources. There are very few visitors to these protected areas, and there are no direct incomes generated by tourism and recreational activities in the visited areas. There is a management plan for Dajti National park and last year a new one for Prespa park in Korca at the border of Albania, Greece and Macedonia.

4. CONSERVATION IN SEED STANDS AND MANAGED FORESTS

4.1 Conservation in seed stands

The Ministry of Agriculture and Food (MoAF) in Albania supported the Forest and Pasture Research Institute in the project concerning the ‘Evaluation of seed orchards for some of the main species in Albania and proposal for measures to improve them’ (FPRI, 2002).

Seed stands for the main forest tree species have been established to provide reliable reproductive materials. These stands are located in areas shown in Appendix 2.

The FPRI is working to monitor and improve some seed stands because during the latter years of the decentralization period in Albania, there was much damage caused by illegal cutting.

Appendix 3 and 4 show informations about genetic resources of beech and oak in Albania.

4.2 *In situ* conservation of stands of oak and beech

In the framework of the European Network on Forest Genetic Resources (REFORGEN), a number of activities have been undertaken to identify important oak and beech stands for genetic conservation. See Appendix 3 and 4 detail such information.

5. VALUE, USE AND THREATS TO PRIORITY TREE SPECIES

5.1 Value and use of important species

According to Table 3, showing the value and use of 35 Albanian species, 31 of them are very important for current socioeconomic reasons and for of them are species of unknown value, given the present state of knowledge and technology in Albania. The table shows that 24 species are used for timber production, three are important for fuelwood or charcoal, five are used for non-wood forest products, one is used for paper, six for fodder and two for agroforestry systems. Most species (28) play an important role in soil and water conservation.

TABLE 3. VALUE AND USE OF IMPORTANT SPECIES

Species name	Value code*	Present, future or potential use**												
		ti	po	wo	nw	pu	fo	fd	sh	ag	co	am	xx	
<i>Abies alba</i>	1	+										+		
<i>Aesculus hippocastanum</i>	3													
<i>Betula pendula</i>	1	+										+	+	
<i>Corylus colurna</i>	1			+							+	+		
<i>Fagus sylvatica</i>	1	+		+	+							+		
<i>Fraxinus angustifolia</i>	1											+		
<i>Fraxinus excelsior</i>	1	+		+								+		
<i>Juglans regia</i>	1							+			+	+		
<i>Juniperus communis</i>	1				+							+		
<i>Juniperus oxycedrus</i>	3				+							+		
<i>Juniperus foetidissima</i>	3				+							+		
<i>Picea abies</i>	1	+										+		
<i>Pinus halepensis</i>	1	+										+		
<i>Pinus heldreichii</i>	1	+										+		
<i>Pinus nigra</i>	1	+			+							+		
<i>Pinus peuce</i>	1	+												
<i>Pinus pinaster</i>	1	+												
<i>Pinus sylvestris</i>	1	+												
<i>Populus tremula</i>	1	+					+							
<i>Quercus frainetto</i>	1	+							+			+		
<i>Quercus ilex</i>	1	+										+		
<i>Quercus robur</i>	1	+										+		
<i>Quercus coccifera</i>	1	+										+		
<i>Quercus calliprinos</i>	1	+										+		
<i>Quercus macrolepis</i>	1	+							+			+		
<i>Quercus trojana</i>	1	+							+			+		
<i>Quercus cerris</i>	1	+							+			+		
<i>Quercus pubescens</i>	1	+							+			+		
<i>Quercus virgiliana</i>	1	+										+		
<i>Quercus petraea</i>	1	+							+			+		
<i>Quercus dalechampii</i>	1	+										+		
<i>Taxus baccata</i>	1												+	
<i>Tilia platyphyllos</i>	3											+		
<i>Tilia tomentosa</i>	3												+	
<i>Ulmus laevis</i>	1											+		

*Value

1: Species of current socio-economic importance; **2:** Species with clear potential or future value; **3:** Species of unknown value given present knowledge and technology.

**Utilization

ag: agroforestry systems; **am:** amenity, aesthetic, ethical values; **co:** soil and water conservation; **nw:** non wood products (gums, resins, medicines, dyes, tannins, etc.); **fo:** food; **fd:** fodder; **po:** posts, poles, roundwood; **pu:** pulp and paper; **sh:** shade, shelter; **ti:** timber production; **wo:** fuelwood, charcoal; **xx:** other.

5.2 Level and nature of threats to important tree species

There are 12 species in Albania in ecogeographic zones that threaten the integrity of the species. *Aesculus hippocastanum* was classified as extinct with a value of five on the threat index scale; *Quercus robur* and *Taxus baccata* also have a threat index of five, and eight species are classified as endangered species with a threat index of four (see Table 4).

TABLE 4. LEVEL AND NATURE OF THREATS TO THE INTEGRITY OF SPECIES/POPULATIONS OF IMPORTANT SPECIES AND THREAT INDEX

Species in ecogeographic (or geneecological) zones	Reserves, natural area	<i>In situ</i> conservation stands, managed forests, unmanaged forests and plantations	Villages fields, homesteads	<i>Ex situ</i> conservation stands	Experimental field trials	Degree of threat index
<i>Quercus robur</i>	+					Probably extinct/ 5
<i>Betula pendula</i>	+					Endangered/4
<i>Quercus ilex</i>	+					Endangered/4
<i>Juglans regia</i>			+			Endangered/4
<i>Fraxinus excelsior</i>	+					Endangered/4
<i>Juniperus communis</i>	+					Endangered/4
<i>Juniperus oxycedrus</i>	+					Endangered/4
<i>Picea abies</i>	+					Endangered/4
<i>Pinus peuce</i>	+					Endangered/4
<i>Tilia platyphyllos</i>	+					Endangered/4
<i>Taxus baccata</i>	+					Probably extinct/5
<i>Aesculus hippocastanum</i>	+					Extinct/5

Source: **Red Book**, 1995. Threatened and rare plant species of Albania.

Threat index on a scale of 1 to 5

1=implementation/enforcement of regulations probable, and regulations scientifically sound. Low level of threat.

2, 3, 4=intermediate between 1 and 5.

5=implementation/enforcement of regulations unlikely, or threat severe with high probability of genetic degradation or loss. High level of threat.

During the last 40 years, about 300 000 ha of oak forests have been cleared for agricultural and pasture land. Natural alpine pastures have been damaged by planting potatoes and in the chestnut zone, oak species were cleared and replaced by forage for sheep. On the other hand, during the last 3 years, farmers refused about 60 000 ha of cleared forest land because of low agricultural productivity (Dida, 1996).

The abandonment of lands has many ecological consequences such as soil erosion, loss of plant and animal biodiversity and damage to landscape in mountain and tourist areas. Exploitation and overgrazing without clear technical criteria has decreased the productivity of oak forests to 1.2 m³/ha/year. It is important to study the degradation processes under these conditions, to identify means of rehabilitation and to improve the ecological potential of these habitats. So far there has been no conservation programmed for oaks in Albania, but at least two species (*Quercus ilex* and *Q. suber*) need conservation and rehabilitation projects.

High forests are generally less damaged, due to their distance from urban areas, while coppices are more degraded as a result of overharvesting and overgrazing. In the past, oak forests were simply exploited for timber and cut irrationally, without any consideration for regeneration. Currently their rehabilitation is being examined, through the study of climatic, soil and geographic factors, which will be closely linked to the identification of the silvicultural measures to be undertaken.

There are no *ex situ* conservation programmes reported in Albania, nor tree breeding activities, either in traditional programmes or in biotechnologies (FAO, 2003b).

5.3 Priority species for conservation, improvement or seed procurement

Table 5 shows a prioritized list of species for conservation, improvement and seed procurement, six of them are important for industrial wood production, two for non-wood forest products, one for fuelwood and two for other uses. For all of those species for which conservation is a priority, there is a need for more biological information such as natural distribution, taxonomy, genecology, phenology, etc. On the other hand, for eight species there needs to be an evaluation and for 12 of them there needs to be conservation “*in situ*”. Of these, four species are endangered species and need to start action with the highest priority for conservation and for the other eight species there needs to be provenance trials, with highest priority and with immediate effect.

TABLE 5. LIST OF PRIORITY SPECIES FOR CONSERVATION, IMPROVEMENT OR SEED PROCUREMENT

SPECIES	End use				OPERATION /ACTIVITIES								REMARKS/ Rating	
	W	NW	FW		E/C		Evaluation		Conservation		Germplasm use			
	1	2	3	4	5	6	7	8	9	10	11	12		
<i>Aesculus hippocastanum</i>				+	+									E/1
<i>Betula pendula</i>	+				+		+		+					PVT/1
<i>Picea abies</i>	+				+		+		+					PVT/1
<i>Pinus halepensis</i>	+				+		+		+					PVT/1
<i>Pinus heldreichii</i>	+				+		+		+					PVT/1
<i>Pinus peuce</i>	+				+				+					PVT/1
<i>Pinus sylvestris</i>	+				+		+		+					PVT/1
<i>Quercus ilex</i>		+			+		+		+					PVT/1
<i>Quercus robur</i>		+			+				+					E/1
<i>Quercus macrolepsis</i>			+		+		+		+					PVT/1
<i>Taxus baccata</i>				+	+				+					E/1
<i>Tilia platyphyllos</i>				+	+				+					E/1

See next page for legend.

Legend

End uses

1. Industrial wood (logs, sawn timber, construction wood, plywood, chip and particle board, wood pulp etc.)
2. Industrial non-wood products (gums, resins, oils, tannins)
3. Fuel wood, posts, poles (firewood, charcoal, round wood used on-farm, wood for carving)
4. Other uses, goods and services (food, medicinal use, fodder, land stabilization/amelioration, shade, shelter, environmental values)

Exploration and collection

5. Biological information (natural distribution, taxonomy, genecology, phenology etc.)
6. Collection of germplasm for evaluation

Evaluation

7. *In situ* (population studies)
8. *Ex situ* (provenance and progeny studies)

Conservation

9. *In situ*
10. *Ex situ*

Reproductive use

11. Semi-bulk/bulk seedlots, reproductive materials
12. Selection and improvement

Remarks

- PVT Provenance trials
PGT Progeny trials
CLT Clonal trials
SO Seed orchard
E Endangered at species or provenance level
MPTS Multi purpose tree species

Rating

For columns 1-4: as appropriate

For columns 5-11:

1. Highest priority, action should start, or be continued, with immediate effect
2. Prompt action recommended, action should start within next two biennia
3. Action required in the next five years

6. INSTITUTIONAL AND LEGAL FRAMEWORK

6.1 General background

Forest administration is going through a reform and the process will be in line with Albania's overall social and economic development. The Directorate General of Forests and Pastures (DGFP) is the institution responsible for the management and development of the forests and pastures sector. DGFP is under direct control of the Minister of Agriculture and Food. In addition to its budget, the DGFP uses the revenues generated through the sale of timber and other forest-related activities, to fund the management of forests and pastures, afforestation efforts and actions against erosion, building of forest infrastructure, etc. In 2002, a pilot regional directorate was established and a few more regional directorates over the District Forest Service will be established in the near future.

There are two laws, namely the Forest act and the protected areas act, which are used to enforce sustainable management of the country's forest genetic resources. Forest species are managed according to the forest law of 1992. However, the forest and pasture strategy indicates that about 40 percent of Albanian forests should be transferred to local communities. Oaks cover about 80 percent of these areas. Some non-governmental organizations (NGOs) are actively involved in forest matters and they also lobby the government to put conducive policy framework in place. In cooperation with the Ministry of the Environment, FAO, and various NGOs, DGFP has set up working groups to revise the forest legislation and the strategy for the development of the forestry sector.

A strategy for the development of forests and pastures sector has been developed by the General Directorate of Forests and Pastures (DGFP, 1998). It was designed to guide the development of activities in the forests and pastures sector in order to obtain an optimal contribution of this sector in the overall growth of the country's socioeconomic level and sustainable development. Now DGFP is trying to implement the new strategy to visualize forests as having more of a public function than an economic one and to protect the environment.

Given the rather specific transition of Albania, which is characterized by a number of developments, challenges and opportunities, the strategy is expected to have a substantial impact on administration, growth, development, management, protection and investments in the sector.

The on-going Forestry project of the World Bank (1996) has three main objectives in Albania:

- restore degraded state-owned forest and pasture areas and promote their sustainable use;
- promote conservation of natural forest ecosystems;
- take the initial steps in the transition of the forestry and pasture sector to a market economy, separating commercial from regulatory functions and establishing mechanisms for self-financing of the commercial activities.

6.2 Decentralisation and devolution

Approximatively 50 percent of the country's population is living in rural settlements (ten years ago this figure was 70 percent). This has created very strong relations between the community and forests. For several years, forests have been the main source of their employment and income. But at the same time, this has put a very high pressure on forests that in many cases have suffered unlimited use and degradation. Also, the difficult socio-economic conditions of populations in these areas are another factor that has contributed to such degradation.

All of the forests and pastures of the past were state property before the 1992 decentralization period in Albania. There are now state forests, communal forests and private forests. According to the Directorate General of forestry and pastures data, at the end of 2001 the country had 1 050 000 ha of forests split into 845 650 ha of state forests, 193 860 ha of community forests and 11 540 private (DGFP, 2001).

The process of restitution of forests and pastures to previous owners began after 1996. During 1996, several additions and amendments were approved for the recognition of private ownership and restitution of private forests and pastures according to the law No. 7699, dated 21.04.1993 "on the compensation in value or in kind of agricultural land, pastures, meadows and forestland ex-owners".

These amendments and additions have completed the necessary legal framework. The above law does not provide for the physical restitution of forests, forestland, pastures and meadows within the priority areas for the development of tourism and in the protected areas, as specified in the law, and limits up to 100 ha the forest area that can be returned to ex-owners. According to information from DGFP, ex-owners have received 10 000 ha of forests and 28 537 ha of pastures, up until the year 2001.

During the transition to the market economy, forest harvesting and wood processing industries went through a number of fundamental changes. State forest harvesting enterprises and almost all wood processing industries were privatized and are now operating in their respective fields of activity. Also, the marketing of wood has been liberalized. Under the DGFP, a commission has been set up to be in charge of issuing licenses to private companies undertaking activities in the sector of forests and pastures. Most of the licensed companies employ a small number of people and possess some equipment that used to belong to state forest harvesting enterprises. Because the vast majority of private companies own minimal equipment, and it is of an obsolete technology, they are producing negative impacts on the forest environment.

The decentralization of forest and pasture management aims at accomplishing the transfer of forests and pastures in use to 256 communities and municipalities by the year 2004. Of the approximately 1 million ha of forests and 400 000 ha of pastures, approximately 400 000 ha of forests and 240 000 ha of pastures, will be transferred to the communities and municipalities. The goal of the decentralization of forest and pasture management is to:

- curb further degradation and ensure the overall development of forests and pastures through the participation of communities, municipalities and villages in their protection, improvement and sustainable development and consequently in environmental protection;
- increase the benefits to communities and villages from the management of these natural resources.

Until 2002, the transfer of forests and pastures involved 56 communities with a total area of 250 000 ha forests and 40 000 ha of pastures. Respective management plans have been worked out for all communities that have received forests and pastures under their management. The process of transferring forests and pastures to the rest of the communities, along with the development of respective management plans, is expected to be completed by the end of 2004. Transfer of forests and pastures, financed by the Forestry project and USAID, has been completed for 115 communities.

Information on policy and institutional aspects of forest policy changes in Albania is available at <http://www.albania-agroweb.net/al-fornet/default.htm>.

7. ECONOMIC AND SOCIAL CONTRIBUTIONS OF FOREST RESOURCES

7.1 Economic contributions

Social contributions of forest resources are many and very difficult to isolate from the economic contributions and are dealt with together.

In March 2002, auctions of standing timber were held in 19 districts. Out of 135 422 m³ put up for auction (61 343 m³ timber and 74 079 m³ fuelwood), 55 733 m³ was sold (20 490 m³ timber and 35 243 m³ fuelwood). That is 41 percent of the volume put up for auction. The amount put up for auction in March 2002 was 84 percent of the volume put up in March 2001. A sharp rise in the volume of fuelwood sold occasioned the increase in the combined volume by a factor of 1.82 with respect to March 2001 sales. The volume of thin wood offered was 9 741 m³ and the volume of medium thick wood was 51 602 m³. The volume of timber sold was made up of 2 853 m³ thin wood and 17 637 m³ medium thick wood. The maximum volume of wood sold was 10 681 m³ and the minimum volume was only 141 m³. Sales of 11 districts were within the range of 2 776 to 5 411 m³. March 2002 sales amounted to 39 601 072 Leke. Sales of 13 districts were within the range of 2.5 to 5 million Leke.

The economic contribution of forest genetic resources is not easy to quantify. Some of the benefits are directly realized from exploiting the resources while other benefits are from related enterprises such as ecotourism, non-wood production, etc.

Activities planned under forest management plans included the approval of 11 management plans, whose preparation had started in 2000, the preparation of management plans for 11 forest management units, whose contracts were awarded in August 2001 office work for 11 forest management units, whose contracts were awarded in November 2000, were completed and are awaiting approval.

Timber is sold through open auctions organized at district level where all interested companies licensed by the DGFP participate. The main auction for the sale of standing timber is organized during August every year. The District Forest Service, based on the annual allowable cut, management plans and situation of forest infrastructure, announce the forest plots and the timber volume available for sale, once they receive approval from DGFP. Before starting work, buyers have to prepare a plan for forest harvesting, which will include an environmental impact assessment. Table 6 provides information on timber sales during the period 2001-2002.

TABLE 6. INFORMATION ON FOREST HARVESTING ACTIONS (2001-2002)

Item	Unit	2001		2002	
		Offered	Sold	Offered	Sold
Timber					
Total conifers	m ³	49 081	12 947	41 499	3 563
Total hardwoods	m ³	109 156	21 793	45 548	20 582
Total		158 237	34 740	87 047	24 145
Firewood					
Total conifers	m ³	15 083	2 636	21 009	276
Total hardwoods	m ³	198 422	75 146	71 687	41 375
Total		213 505	77 782	92 696	41 651

7.2 Afforestation efforts and measures to control erosion

Between January and December 2002, afforestation was carried out on an area of 475 ha. An area of 2 033 ha was subject to improvement. Works related to erosion control amounted to 2 849 m³ and 61 water points were built or repaired.

The total pasture area at the moment is estimated at 413 500 ha. About 60 percent of pastures have been transferred in use to communities, following the decision of the Council of Ministers No. 700, dated 23.10.1995, while the rest, mainly summer pastures, is under the DGFP's administration. The current pasture land is insufficient to feed the livestock, which has grown considerably in number. The rest of the feeding needs are met through grazing in forests and through the collection of fodder from certain species of trees. The status of pastures, composition and grazing capacities are presented in detail in Table 7 (source: Directorate General of Forests and Pastures–DGFP).

TABLE 7. AREA OF PASTURES, THEIR STRUCTURE AND CAPACITY

Pastures	Area (ha)			Grazing capacity (1000/heads)		
	Total	Summer	Winter	Total	Summer	Winter
State pastures	143 676	110 963	32 713	632	484	148
Communal pastures	241 333	163 823	77 510	769	504	265
Private pastures	28 537	15 249	13 288	88	53	35
Total pastures	413 546	290 035	123 511	1 489	1 041	448

Activities on pastures are focused on building water points in order to use their whole grazing capacity.

Forest use and management is carried out according to the annual allowable cut that results from the management plans. Forest management aims, in addition to harvesting of the annual allowable cut, to ensure natural regeneration and preservation of biodiversity. Due to the difficult terrain on which forests are located, harvesting is carried out mainly through shelterwood cutting with three to four stages, aiming at natural regeneration and preventing desertification. Management plans determine the annual allowable cut according to the principles of sustainable management and foresee other care-taking works like thinning, sanitary pruning, etc.

Forest utilization plans are developed by the District Forest Service, according to the annual allowable cut and forest infrastructure (roads). These plans are subject to DGFP's approval. Timber is sold through open auctions where private companies licensed for forest harvesting participate. Forest harvesting is organized according to the forestry year that starts on October 1 and ends on September 30 of the following year.

Due to limited financing, the work on forest protection against pests and diseases is focused mainly on monitoring the phytosanitary situation. According to the monitoring data over several years, pests and diseases affect about 135 000 ha every year (or 13 percent of the country's forest area). The most problematic are pine disease and beech disease which cause most of the damage to forests. To combat these, Albanian forestry needs much more financial support.

Protection of fauna and hunting are two of the main responsibilities of the DGFP. Following the law on fauna protection and hunting, every year the District Forest Service will prepare the inventory of animals and fowl and set the annual hunting quota for the allowed species, which are subject to DGFP's approval.

The increased number of wolves and foxes will have a negative impact on the number of game animals.

Hunting is organized on a contractual basis between the DGFP and the National association of hunters and sport fishermen and other companies that are licensed for tourism-related hunting. The national quotas for tourism-related hunting are usually calculated at 10 percent of the approved national quota for game hunting.

During the period January to October 2001 there were 3 444 cases of violations (connected to illegal cutting) with a total value of 279.3 million Leke, of which only 42 cases have been acted upon.

Factors that have contributed to the reduction of illegal cutting compared with previous years are: the improvement of cooperation within inter-ministerial groups, the improvement of equipment and motivation of the forest police and the increased awareness of communities to take on more responsibilities in forest management.

8. CONCLUSIONS AND RECOMMENDATIONS

Albania is a country rich in forest resources but they have to be managed in a sustainable way in order to provide higher output in the country's economy. Much more work is necessary to:

- apply the national action plan, criteria and indicators for sustainable management and protection of forests based on the resolutions of Ministerial Conferences for the Protection of Forests in Europe process <http://www.mcpfe.org/>;
- facilitate international support for the sector by allowing interested development partners to see how their resources can and will be used to best advantage;
- enable capacity building of public forestry sector staff so they can see themselves as part of the overall efforts towards the development of the sector;
- overcome uncertainty among the private sector that might otherwise stifle positive investment decisions for sector participants who will feel more secure in practising the conservation and wise management of their forest and pasture resources.

International cooperation, especially through EUFORGEN, has helped integrate Albania in forest genetic diversity conservation and use programmes, and identify priority species for conservation, tree improvement and seed supply. According to the list of priority species for conservation, improvement or seed procurement, six species are important for industrial wood production, two for non-wood production, one for fuelwood and two for other uses, goods and services. For all of those species that are a priority for conservation, there needs to be more biological information such as natural distribution, taxonomy, genecology, phenology, etc.

An evaluation is needed for eight species and conservation *in situ* is needed for 12 species. Four species are endangered and action needs to start with the highest priority given to their conservation. For eight species there needs to be provenance trials carried out with the highest priority and with immediate effect.

Demarcation of borders of the seed parcels and protected areas and making them known to the local community, is an important step that should be taken by the forestry authority.

In order to attract visitors and improve public relations, some environmental events should be arranged relevant to the protection status of the National parks, for instance at Dajti park. The preparation of laws and regulations is necessary, for the use of the National parks by people, and these should be based on international experience.

LITERATURE AND REFERENCES

Cited references

Albanian Society for the Protection of Birds and Mammals (ASPBM) and World Bank. 1999. *Existing Conditions in the Protected Areas* proposed under the framework of the Albania's Forestry Project. Tirana.

Dida, M. 1996. *Abandoned lands and conservation strategies for their rehabilitation. Soil Resources in Albania.* Kamza, Albania.

DGFP. 1998. *A Strategy for the Development of Forests and Pastures Sector.* Tirana.

FPRI, IBR, MNS. 1997. *Ecological Survey of High Forests of Albania.* World Bank, Washington, United States.

FAO. 2003a. *State of the World's Forests,* Rome.

FAO. 2003b. *Status of agricultural biotechnology and biosafety in selected countries of the Balkans, the Caucasus and Moldova.* FAO Research and Technology Development Service and FAO Regional Office for Europe, Rome.
<ftp://ftp.fao.org/sd/SDR/SDRR/REUBIOSAFETY4-2.doc>.

Mitrushi, I. 1955. *Druret dhe Shkurret e Shqiperise (Trees and shrubs of Albania)* Instituti i Shkencave (Albanian Academy of Science). Tirana. (In Albanian).
<http://www.fao.org/DOCREP/004/Y2316E/y2316e0d.htm>

MoAF. 2002. *Annual Report,* Tirana.

Paparisto, K., Demiri, M., Mitrushi, I. & Qosja, Xh. 1988. *Flora e Shqiperise (Flora of Albania).* Albanian Academy of Science, Tirana.

Red book, 1995. *Threatened and rare plants species of Albania.* Albanian Academy of Science, Tirana.

Vangjeli, J. 1999. *Te dhena biosistematike mbi speciet gjetherenese te gjinise Quercus L. ne Shqiperi.*BSHN, 2.

World Bank. 1996. *Albania Forestry Project.* Staff appraisal report, Report No. 15104-ALB. Agriculture and Urban development Operations Division, Central Europe Department, Europe and Central Region.
http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&eid=000009265_3970716150121

Further information about Albanian forest resources

Dano, K. 1996. Genetic resources of some important forest tree species and their conservation. Ph.D. Thesis. Agriculture University of Tirana. 131 pp. (In Albanian).

Dida, M., Paule, L., Gomory, D. & Starja, K. 2002. *Genetic diversity and differentiation of European beech (Fagus sylvatica L) populations from Albania; Symposium of population and Evolutionary Genetics of Forest trees*, Slovakia.

Dida, M. 1999. *Dushqet ne Shqiperi*, Tirana.

Dida, M. 2000. *Mediterranean Oaks Network; country reports*, Albania.

Dida, M., Ducci, F. and Zeneli, G. 2001. Black pine (*Pinus nigra* Arn.) resources in Albania, Forest Genetic Resources No. 29, pp 43-46. FAO, Rome.

DGFP. 1999, 2000, 2001, 2002. *Fondi Pyjor*, Tirana.

FAO. 1991. *Increasing Forest Development, Albania*. Terminal Statement, Report No. FAO-FO-TCP/ALB/8851, Rome.

IBR & MNS. 1999. *Convention on Biological Diversity*. National Report Biodiversity Strategy and Action Plan. The National Environmental Agency (NEA), Tirana.
<http://www.biodiv.org/doc/world/al/al-nr-01-p1-en.pdf>

FPRI. 1953, 1968, 1985. *Inventari I Pyjeve*, Tirana.

FPRI. 2002. *Identifikimi i grumbujve pyjore per prodhim fare te zgjedhur per llojet pyjore kryesore te vendit*”, Raport shkencor i vitit 2002, Tirana.

Websites

Directorate General of Forest and Pastures.

<http://www.dppk.net/>

EUFORGEN European Forest Genetic Resources Programme.

<http://www.ipgri.cgiar.org/system/page.asp?frame=programmes/grst/FGR/home.htm>

FORNET - Institutional aspects of forest policy.

<http://www.albania-agroweb.net/al-fornet/default.htm>

Ministerial Conferences for the Protection of Forests in Europe process.

<http://www.mcpfe.org/>

APPENDICES

Appendix 1. List of abbreviations and acronyms

FAO	Food and Agriculture Organization of the United Nations
FC	Forestry Commission
NGO	Non-Governmental Organization
SNR	Strict Natural Reserve
DGFP	General Directory for Forests and Pastures
FPRI	Forest and Pasture Research Institute
MoAF	Ministry of Agriculture and Food
IBR	Institute of Biological Research
MNS	Museum of Natural Sciences

Appendix 2. Seed stand location by species

Source: FPRI, Scientific Report (2002)

Species	County	Stand location
<i>Abies alba</i>	Bozdovec (Korce) Hotove (Permet) Llogara (Vlore) Sotire (Gjinokaster)	Lugina e Vermoshit 103 (Shkoder) Cerem Dragobi 87-88 (Tropoje) Lumi I Gashit 89b (Tropoje) Lure (Pk) 6-32 (Diber) Rajce 64-65 (Librazhd) Zheje 80 (Gjinokaster) Germenje Shelegur 40 (Erseke) Lukove 51a-52b (Gramsh)
<i>Fagus sylvatica</i>	Shkoder Tropoje Kukes Diber Mat Puke Pogradec Librazhd Korce Erseke	Lugina e Vermoshit 53 a,53ab-Shkoder, Fushe zeze 39b-Shkoder, Thethe-Shkoder, Cukal 1-20-Shkoder; Cerem-Dragobi 87,88,89-Tropoje, Curraj i eperm 97a-Tropoje, Nikaj Mertur 10,11a-Tropoje, Lumi i Gashit 89b-Tropoje; Tej Drinit bardhe 140,141-Kukes, Zhuri i pllahun 32a-Kukes; Lure (PK) 1-32-Diber, Liqeni i zi 4a-22b-Diber; Iballe 35,36a-Puke Qafeshtame-Kete 24,34,35-Mat, Isuf Emin Plloca 23,24-Mat; Dajt 36,37-Tirane Bize 95-98-Tirane Qarrishte 96-112-Librazhd, Rajce 64a65a-Librazhd Dardhe-Xhyre 28a,29b-Librazhd Lepush 69ab,70a-Librazhd, Stravaj 20,21a-Librazhd; Bishnice 17ab-Pogradec, Guri i Nikes 8,9-Pogradec; Perparimaj-85-88-Korce; Tomorr-Berat; Orgocke 69,60-Erseke
<i>Pinus halepensis</i>	Kukes Diber Tropoje	Surroj 73ab-Kukes; Lure 69a,73a,74a-Diber. Cerem-Dragobi 86-88-Tropoje; Valbon-Cerem 186-19d-Tropoje, Valbon-Dragobi 47a,48d,52bc-Tropoje, Lumi i Gashit 89b-Tropoje
<i>Pinus heldreichii</i>	Kukes Diber Erseke Shkoder Gramsh	Gjalice e Lumes 9a-14 (Kukes) Lure (PK) 1-32 (Diber) Tomorr 9a,16b (Berat) Germenje 64 (Erseke) Fushe e zeze 33c (Shkoder) Sogor-Grabove 20-30 (Gramsh)
<i>Pinus nigra</i>	Lure (Diber) Balgaj (Mat) Llogara (Vlore) Voskopojë (Korce) Terbunë (Puke) Gramsh Erseke	Lure I 139ab (Diber) Lumi i bardhe 6-8 (Puke) Tuc 61-64 (Puke) Kodrat e Pukes 6 (Puke) Perparimaj-Dardhe 197-198 (Korce) Dushku i Bulcarit 52-55 (Gramsh) Rove 21 (Gramsh) Germenje 36 (Erseke)

Species	County	Stand location
<i>Pinus peuce</i>	Tropoje Diber Kukes Gramsh	Cerem-Dragobi 89-Tropoje; Lure (Pk) 20-32-Diber; Arren 1a,2ac-Kukes; Strelc 93b-Korce; Lukove 112ab-113b-Gramsh
<i>Pinus spp.</i> (Other Mediterranean Pines)	Golem (Durrës) Pishe Poro (Fier) Lushnje	Pisha e Divjakes (Lushnje)
<i>Quercus spp.</i>	Kukes Shkoder Puke Mirdite Librazhd Korce Gramsh Durrës Permet Lushnje	Shllak 1 23a,32,59-Shkoder Gomsiqe 74-84-Shkoder; Tej Drinit bardhe 136,137-Kukes Goske 25ac-Kukes; Iballe 16,17-Puke; Qafemolle 16-Mirdite; Stravaj 85,86-Librazhd Lepushe 72a-Librazhd Rajce 17,18-Librazhd; Gorice 75-92-Korce; Orgocke 67a,68a-Erseke; Katerlis 59,60-Gramsh Kurraten 2-10-Durrës; Dhrovian 59,60-Delvine; Hotove 26-Permet Gjeneruke 38-40-Lushnje

Appendix 3. Conservation network of beech genetic resources

Nr.	Region/forest unit	Parcel	Longitude	Latitude	Area (Ha)	Altitude	Conservation area category
01	SHKODER						
	Lugina e Vermoshit	53 a	19°40'00"	42°40'10"	33	1500	RNI
	Lugina e Vermoshit	53 ab	19°40'50"	42°34'00"	41	1500	RNI
	Fushe Zeze	39 b	19°34'45"	42°24'00"	20	1500	RNI
	Theth	-	-	-	50	1300	II
Cukal	1 deri 20	19°45'10"	42°09'00"	500	1400	RNI	
02	TROPOJE						
	Çerem Dragobi	87, 88,89	19°47'00"	42°31'00"	122	1300	RNI
	Curraj i Eperm	97 a	19°56'00"	42°21'00"	40	1100	RNI
	Nikaj Mertur	10, 11 a	19°51'00"	42°14'25"	75	1100	RNI
Lumi Gashit	89 b	20°05'00"	42°31'00"	30	1500	RNI	
03	KUKES						
Tej Drinit te Bardhe	140, 141	20°27'00"	42°10'00"	80	1100	RNI	
04	DIBER						
	Zhuri i Pllahut	32 a	20°12'50"	41°41'30"	34	1400	RNI
	Lure (PK)	1 deri 32	20°10'15"	41°43'00"	300	1000-	II
Liçeni i Zi	4 a deri 22 b	20°21'10"	41°26'00"	57	1700	RNI	
1300							
05	PUKE						
Iballe	35, 36 a	20°02'50"	42°11'00"	48	1000	RNI	
06	MAT						
	Qafe Shtame-Kete	24	19°56'10"	41°27'10"	29	1200	RNI
	Qafe Shtame - Kete	31 deri 35	19°5'500"	41°31'10"	57	1200	RNI
Isuf Emin Pllaçi	23, 24	20°15'00"	41°23'00"	20	1500	RNI	
07	TIRANE						
	Dajt	36, 37	19°58'00"	41°21'15"	74	1300	II
Bize	95 deri 98	20°08'00"	41°20'30"	47	1400	RNI	
08	LIBRAZHDI						
	Qarrishte	96 deri 112	20°26'30"	41°15'10"	124	1400	RNI
	Rajce	64 a, 65 a	20°24'00"	41°10'00"	77	1500	RNI
	Dardhe_Xhyre	28 a, 29 b	20°25'10"	41°05'30"	112	1500	RNI
	Lepush	69 ab, 70 a	20°20'00"	41°03'30"	25	1100	RNI
Stravaj	20, 21 a	20°22'30"	40°56'00"	42	1200	RNI	
09	POGRADEC						
	Bishnice	17 ab	20°25'00"	40°54'00"	43	1700	RNI
Guri i Nikes	8, 9	20°31'10"	40°57'30"	72	1300	RNI	
10	KORÇE						
Perparimaj	85 deri 88	20°50'00"	40°32'50"	81	1500	RNI	
11	BERAT						
Tomorr	9 a	20°09'00"	40°43'30"	30	900	RNI	
12	ERSEKE						
Orgocke	69, 60		-	50	1000-	RNI	
						1200	
	TOTAL				2313		

Appendix 4. Conservation network of oak genetic resources

Nr	Region/forest unit	Parcel	Longitude	Latitude	Area Ha	Altitude	Conservation area category
01	SHKODER Shllak 1 Shllak 1 Gomsiqe	23 a, 32 59 74-84	19°35'20"	42°07'00"	40	600-700	RNI
			19°36'00"	42°08'20"	35	700	RNI
			19°38'15"	42°08'20"	284	500	RNI
02	KUKESI Tej Drinit te Bardh Goske	136, 137 25 ac	20°25'00"	42°02'20"	82	900	RNI
			20°09'00"	42°05'00"	20	600	RNI
03	PUKE Iballe	16, 17	20°01'15"	42°12'25"	27	1000	RNI
04	MIREDITE Qafmolle	16	19°52'00"	41°417'00"	42	300	RNI
05	LIBRAZHD Stravaj Lepushe Rajce	85, 86 72 a 17, 18	20°22'20"	40°58'10"	50	870	RNI
			20°29'00"	41°01'15"	23	1000	RNI
			20°33'00"	41°08'10"	59	1300	RNI
06	KORÇE Gorrice	75-92	20°54'00"	40°55'20"	280	1000- 1300	RNI
07	ERSEKE Orgocke	67 a, 68 a	20°25'00"	40°23'30"	52	1000	RNI
08	GRAMSH Katerlis	59, 60	20°05'30"	40°50'00"	54	700-900	RNI
09	DURRES Kuraten	2-10	19°35'00"	41°35'00"	100	150	RNI
10	DELVINE Dhrovjan	59, 60	20°11'00"	39°54'00"	50	200	RNI
11	PERMET Hotove	26	19°24'00"	40°21'50"	24	1000	RNI
12	LUSHNJE Gjeneruke	38-40	19°34'00"	40°58'30"	50	80-120	RNI
	TOTAL				1382		