

## Towards a coordinated development of the forest in Maamora (Morocco)

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**Interest of the Subject:** The topic of great interest for the national public education in Morocco and the international community because it addresses an issue from a forest which is considered the largest cork oak forest plains in the world but unfortunately who knows many difficulties for the rescue and conservation. Also, it is time that senior officials out of their ivory tower and think about the role of the forest in the socioeconomic development of local people and maintaining quality environment. The article starts after a diagnosis of the situation with a few suggestions to consider in the design of any development strategy that would save the forest of Maâmora foundering.

### Summary

The forest of Maâmora is considered the largest lowland oak forests in the world, it covers an area of 133.500 ha including 60.000 ha of cork oak (*Quercus suber*) pure. It is a recreational space for the population of major urban areas and the main source of income for public users, whose needs are growing more and more (300.000 inhabitants).

The rapid and uncontrolled growth of urban areas around the forest has helped in so short a time frame for development of land speculation in favor of forest areas of Maâmora. Despite efforts by the government for the preservation and conservation of this forest degradation continues to worry.

Because of its importance, and in addition to the effects of repeated droughts in recent years which have had serious consequences. The Maâmora is under intense pressure. These result in degradation resulting from human action, through deforestation, overgrazing, fuelwood collection, combined with water stress due to recurrent droughts, and pest attacks. The rescue of the forest has become a top priority and is still subject to vigorous action in time and space and in particular the duration of local development and improving conditions and living standards of coastal population's users.

**Keywords:** Forest, Maamora, Drought, Population, Misusers

## Maamora (Fas) Ormanının Planlı Gelişimine Doğru

### Özet

Maâmora Ormanı dünyanın en büyük düz arazi meşe ormanı olarak kabul edilmekte olup, içerisinde 60.000 ha saf *Quercus suber* (Mantar Meşesi) ormanlarının da bulunduğu toplam 133.500 ha'lık bir alanı kaplamaktadır. Bu orman büyük kentsel alanlarda yaşayanlar için bir rekreasyon alanı ve ihtiyaçları günden güne artan 300.000 civarındaki yerel halk için de gelirin ana kaynağını oluşturmaktadır.

Ormanın etrafındaki kentsel alanların hızlı ve kontrolsüz gelişimi kısa bir zaman dilimi içerisinde Maâmora orman alanları ile ilgili arazi spekülasyonlarının büyümesine neden olmuştur. Hükümetin koruma yönündeki çabalarına rağmen ormanın bozulması devam etmiştir.

Ciddi sonuçlara neden olan ve son yıllarda tekrar eden kuraklıkların etkileri nedeniyle bu konu oldukça önem kazanmaktadır. Maâmora yoğun bir baskı altında bulunmaktadır. Bu durum, insan faaliyetleri (ormansızlaşma, aşırı otlatma, yakacak odun eldesi), kuraklıktan kaynaklanan su stresi ve böcek saldırıları sonucunda ormanın bozulmasına yol açmaktadır. Zaman ve alan açısından etkin bir aksiyona konu olan ormanın kurtarılması özellikle lokal gelişim ve sahil nüfusu kullanıcılarının şartlarını ve yaşam standartlarını yükseltme sürecinde en önemli öncelik olmaya başlamıştır.

**Anahtar Kelimeler:** Orman, Maamora, Kuraklık, Populasyon, Suistimalciler

### Introduction

The geostrategic position between the Mediterranean in the north Atlantic Ocean to the west and south the Sahara and the great altitudinal and climatic variations in Morocco provides rich and diverse forest

ecosystems covering an area of 9 million hectares including 5,8 million forested, or 8% of the country.

Because of its important role in protecting the environment and the fight against desertification, forestry Morocco participates

in socio-economic development of rural populations. Indeed, this sector generates an annual value of around 500 million Euro users the benefit of people who represent nearly half the rural population. Eight to ten million working days are generated per year, equivalent to 50.000 permanent jobs. In addition, the forestry sector is contributing up to 30% of the needs of timber and Industry (600.000 m<sup>3</sup>/year), 18% of the national energy balance (11 million m<sup>3</sup>, down 4 million tones of -oil), 4% of world supply of cork (150.000 quintals / year) and 17% of the needs of livestock (the equivalent of 15 million quintals of barley).

However, despite sustained efforts for the conservation and development of forest resources, forest ecosystems are subject to constraints related to socioeconomic conditions of rural poor economic order and climate related to the arid climate and climate change. This results in negative consequences at local, regional and national (loss of water resources, soil erosion, desertification ...).

Morocco's rural population accounts for about half (49%) of the total. Nearly 80% live mainly from agriculture, livestock and forestry. The natural environment should play an important role concerning:

- ✓ soil conservation and regulation of water regime;
- ✓ timber production (wood and cork, bark and tan) and non-woody (herbs and medicinal mushrooms, fodder, etc.).
- ✓ improving living conditions of rural populations;
- ✓ protection of environmental factors and conservation of biodiversity.

In this regard, the Moroccan forest has many advantages with an area of 9 million hectares of high biodiversity, its impact on the socio-economic development, and support it means for agriculture.

Among the noble species of Morocco, the cork oak has a place and plays a major role. Indeed, the cork oak is a species endemic in Mediterranean climate, especially on the Atlantic coast of Morocco, Portugal, South of France to the Bay of Biscay. In Morocco, the cork oak forests extend in the north-west, from the coastal plains into the Central Rif and Middle Atlas. Formerly,

the cork oak in Morocco occupied considerable areas (Boudy, 1950).

Despite their importance, cork oak forests are under severe constraints. These result in dieback and degradation resulting from human action, through land clearing, overgrazing, fuelwood collection, combined with water stress due to recurrent droughts and pest outbreaks, including defoliators (*Lymantria dispar*) and pathogens (*Hypoxylon mediterraneum*).

For his role in the social, economic and environmental forest of Maâmora represents the largest lowland oak forests in the world, it covers an area of 133.500 ha, 60.000 ha of cork oak (*Quercus suber*) pure. It is, first, a recreation area of prime importance for the population of large urban agglomerations (Rabat, Salé, Kenitra and Khemisset) with about 2 million inhabitants, and, secondly, the main source of income users for a population of about 300.000 inhabitants, whose needs are constantly increasing.

The forest of Maâmora (Figure 1) has been the subject of several development plans, programs, research and development, partnership projects, but it does not benefit from its rightful place normally on the national forest plan. Despite efforts by the government for the preservation and conservation of this forest degradation continues to worry.

Structural elements of ecology, technology management, law and regulation, economics and sociology, the management of space by the rural population, are the basis of current issue Maâmora.

The richness and diversity of flora make this forest includes a set of ecological systems to multiple uses, such as production of cork and wood, background, recreation, use of hunting resources, the activities and harvesting of various products such as honey, mushrooms, etc.. It operates primarily as a large area of farming and offers many opportunities.

Consultation with the massive rural population of users surveyed (men and women), initiated the organization of communities, and all potential partners operating in the forest, and can lead to a real concerted diagnosis and definition of real inventory.

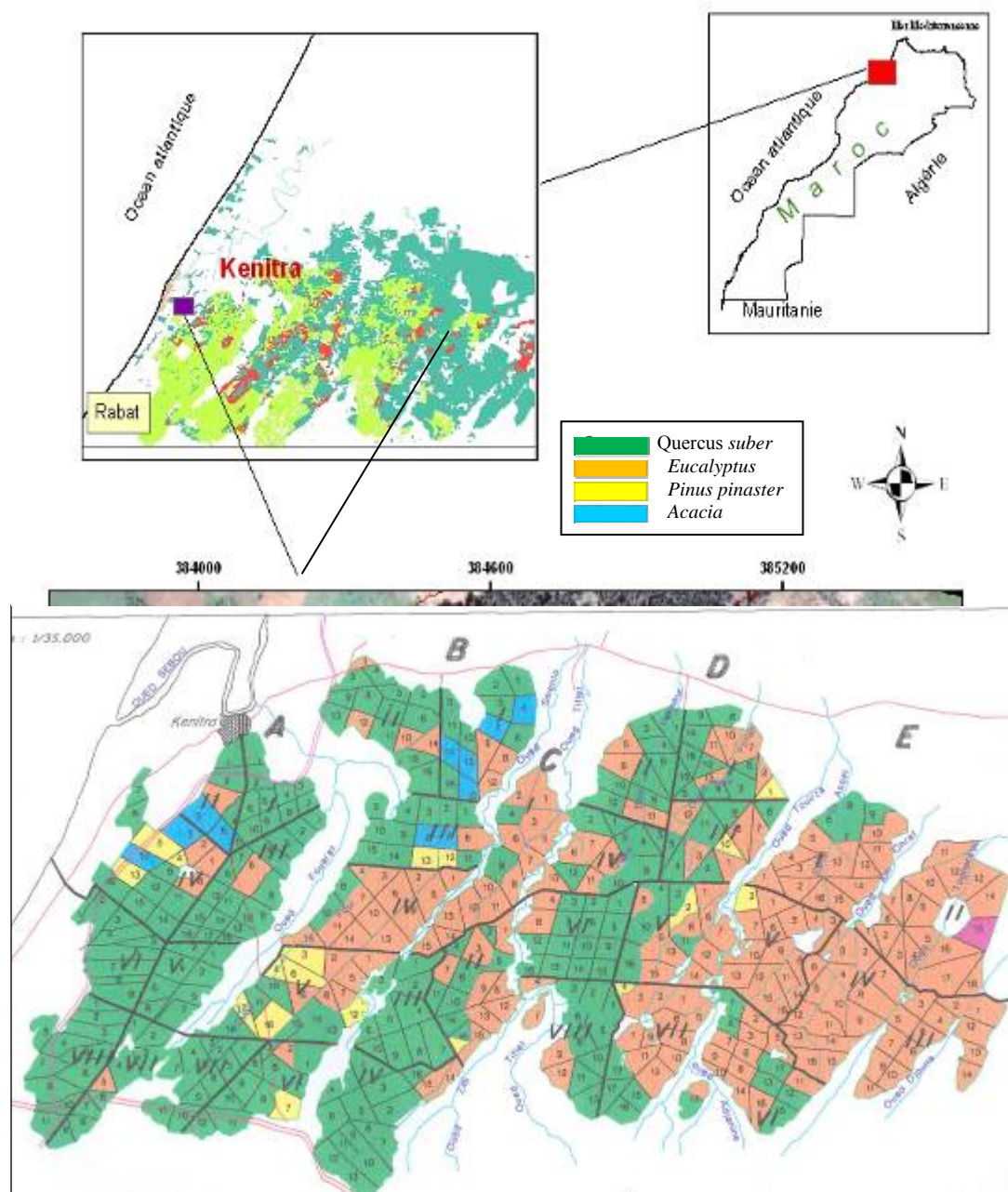


Figure 1: Location of the forest in Morocco Maamora

### I- Socio-economic importance of Maâmora

This socio-economic importance emerges through the following indicators:

- Recipes Forest: 60 million dirhams<sup>a</sup> (annual average)
- Wood industry: 300.000 m<sup>3</sup> (85% of national production) mainly for eucalyptus pulp.
- Liège: 6.000 tons (47% of national production)

- Firewood: 600.000 m<sup>3</sup> / year (87% of the needs of the area). The amount of firewood collected illegally by users is not accounted for and represent a sizable portion.
- Forage Production: UF 24 million / year to 250.000 head of sheep and beef (75% of the needs of livestock area)
- Non-wood products: mushrooms, lichens (30 tons / year), medicinal

<sup>a</sup> Dirhams = currency of Morocco (1Euro = 11 Dirhams)

- plants and tannin (5.000 tonnes / year), honey (1.000 tonnes / year)
- Employment in rural areas: 300.000 workdays per year.  
 These products are mainly mobilized by:
  - Forestry companies;
  - Operators of timber;

➤ And forestry cooperatives.

The forest of Maâmora continues to deteriorate over the years by numerous assaults anthropozoogènes (course, crime ...) which are growing more and more. It is therefore urgent to ensure its conservation and development.

The forest of Maâmora is considered the **largest cork oak forest plains in the world**, it covers an area of 133.500 ha including 60.000 ha of cork oak pure. It is a recreational space for the population of large urban agglomerations (Rabat, Salé, Kenitra and Khemisset), and the main source of income for a user population (300,000 inhabitants), whose needs are growing more and more. Because of its importance, the Maâmora is under intense pressure. These result in degradation resulting from **human activity**, urbanization progress, drought, fires and pest attacks. As a guide, the surface of the cork oak forest decreased from 133.000 ha to 60.000 ha between 1951 and 2000 an annual loss of more than 1600 ha / year. Adding to this chaotic and continuous development of tourist visits of up to 30.000 visitors each week during the critical period and over 3.000 vehicles dispersed haphazardly in the forest). **The bioclimate** who reigns over this forest type in the subhumid and semiarid west central and east.

## II - Issues in the forest of Maâmora

### 1 - The regression of the cork oak forest

The history of this forest reminds us that the problem of its reconstruction and regeneration of cork oak is not new. It dates back to the early century. Indeed, the successive periods of drought experienced by Maâmora throughout its history, the downward trend in rainfall since 1910 and the absence of natural regeneration, has led the Forestry Administration, between 1920 and 1951, to undertake an extensive

rejuvenation program of cork oak by coppicing on a significant portion of the forest.

Faced with this situation, the administration has given this special attention cork oak forest in the implementation of three development plans in 1951, 1972 and 1992. The inventory conducted in 1992 in the forest of Maâmora showed that the area in cork oak has fallen by about 40% between 1951 and 1992 (Table 1).

Table 1: Evolution of forest area in Maâmora

Forestry Training	Area (hectares)			
	1951	1972	1992	2006
<i>Quercus suber</i>	100 000	87 000	60 000	64 450
<i>Eucalyptus</i>	31 000	38 000	53 000	48 140
<i>Acacias</i>	00	1 000	5 500	5 604
<i>Pinus pinaster</i>	1 000	6 000	12 500	13 806
<i>Other species</i>	1 000	1 000	2 000	1 500
<b>Total</b>	<b>133 500</b>	<b>133 500</b>	<b>133 500</b>	<b>133 500</b>

The decline of the area of cork oak in favor of more productive breeds and best meet the needs of the Moroccan economy (*Eucalyptus*, *Pinus pinaster* etc.) causes a further degradation of remaining stands of oak and cork when subjected to increased pressure from grazing and other levies.

In terms of density, there is a sharp reduction ensouchement, due to the pressure on its ecosystems. Indeed, the class of density less than 100 stem/ha currently represents 47% of the area of the cork oak forest, while it represented only 12% in 1951 (Table 2).

Table 2. Evolution of the density in stands of cork oak (*Quercus suber*) since 1951 Maâmora

Class density	1951		1972		1992	
	Area	%	Area	%	Area	%
< 100 stem /ha	12000	12	55000	63	28000	47
100<density<200	28000	28	18000	21	16000	27
> 200	60000	60	14000	16	16000	27
<b>Total</b>	<b>100000</b>	<b>100</b>	<b>87000</b>	<b>100</b>	<b>60000</b>	<b>100</b>

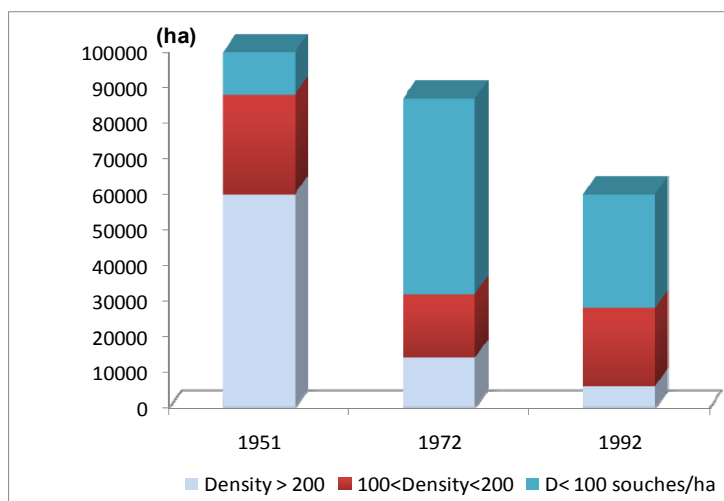


Figure 2. Fall of the density of the cork oak forest Maâmora

### 2 The decline of cork oak

The cork oak is today undeniably withering covering large areas. The stands most dying lie mainly in the semiarid, and the figures show that the decline 10-44% of trees are affected by the cantons.

In addition to causes related to drought, exacerbated by the addition of pumping groundwater for irrigation and water supply of cities (wadi Fouarat example), it should include other agents aggravating the situation: attacks insect defoliators (*Lymantria dispar*) and fungi (*Hypoxylon mediterraneum*), pruning trees, overgrazing and foremost, as disappearance of woody undergrowth (broom, gorse, cysts dum, etc.).

### 3 The imbalance of age

In addition to the damage caused by the decline, the imbalance of age is very apparent, which gives the appearance of cork oak forest trees aged. Beyond the ecological imbalance and dendrometric linked to this condition, the economic consequences may be disastrous in the medium term. In the very short term considerable areas of cork oak should be regenerated (over 2,000 hectares per year).

### 4 The difficulties of regeneration

Given the state of old growth forests, regeneration by coppicing, conventionally used in the past, is no longer recommended. The debate on regeneration is all the difficulties in obtaining natural regeneration, or installs a successful planting. The main causes of failures are overgrazing of forests, the presence of white grubs (larvae of beetles) who settled in the taproot of young plants for food, the modest recovery of the plants on poor soils which dry up suddenly with the arrival of summer. These problems have been the subject of much research since the fifties, without a satisfactory solution has been found (Belghazi et al., 2001).

However, views are consistent on how it should be developed for regeneration by planting natural or artificial (adequate soil preparation, choice of seed tassels on sites well identified enclosure strict, very early and regular meetings, or watering). It should be noted that successful regeneration can be achieved only through a sustained effort over several years.

### III - Causes of deterioration of the cork oak forest of Maâmora

The main factors of degradation of this forest are related to human pressure chronic Maâmora. This pressure has resulted in a deterioration and an increasing deterioration of the cork oak forest which:

**-The criminal charges of wood:** These samples, almost generalized, are practiced by most households. All needs for firewood and charcoal population are met from the forest and began the enormous capital on foot. Other criminal charges are intended for sale to meet the needs of local households.

**-Population growth** has increased the number of users and, thereby, the pressure on the forest. Indeed, the riparian population has seen its numbers double in the space of 23 years from 1971 to 1994 from 212 000-420 000, or an average annual growth of 4%, which far exceeds the national average . This is one of the causes of the explosion of levies on the forest.

**-Overgrazing:** Grazing livestock in the forest, composed of heads of sheep (200.000 head) and cattle (50.000 head) stays all year in the forest. Pastoral care may be supported by the forest is excessive. The presence of livestock, often in association between users and non-users, so many year-round in the forest, preventing any possibility of natural regeneration, by compaction of soil, consumption of acorns and browsing of some seedlings have managed to germinate.

**-The topping and pruning** is the practice of topping and lopping for feeding livestock during lean periods and scarcity, affects more than one third of the trees. In times of drought, this practice is widespread throughout the forest. These practices anarchic cause injury, lead to physiological stress and predispose stands to parasites that lead inevitably to the decline and death of trees.

**-The collection of acorns:** Collecting acorns for feeding livestock, for sale for human consumption because the acorns are acorns Maâmora (variety "bales"), is practiced by most households. This crop, which adjoins the total production of the forest, is often sold along the roads, cities and the souks. The rest is consumed by residents and their livestock. The process of

shaking down for an early crop of acorns, causing injury and promotes decay and the installation of fungi.

**-Harvesting Cork:** Cork harvest performed by an unskilled labor leads to injuries that weaken trees and lead to their decline.

**-Public infrastructure and urbanization:** Its proximity to major population centers, the forest of Maâmora is considered a land reserve, easily mobilized to meet the need for expansion of these towns and villages. For example, the highway Rabat-Tangier had chipped a large area of forest. The successive expansion of settlements reached more natural resources in the forest of Mamora, which is one of the examples that reflect the deterioration of the ecological balance of natural resources suburban or simply destroyed.

**-The soil and climatic factors:** The drought in recent years, erratic rainfall and deficit, combined with their effects and those of the nature of the sandy soil of the Maâmora often exacerbate the situation.

**-Lack of supervision of users:** The route of cattle in the Maâmora is no limitation of the load. Safeguarding the cork oak forest is essential to pass through coaching and the organization of users, as provided by law.

#### Evolution of the forest and investments

The forest of Maâmora, located in bioclimatic subhumid to semi-arid, is the limit of the range of natural corks. This location, on the margins of its range, makes the forest particularly susceptible. Factors that threaten to halt this fragile ecosystem are, in addition to the recurrent drought that has become a structural phenomenon: overgrazing, topping the gathering of acorns, levies criminal Wood, lack of regeneration cork oak, the lack of management of users and pest attacks succeeding the long and frequent droughts that weaken the trees. It is true that times have been found after vegetative rainfall in recent years, but many trees can be considered as definitely dead.

This fact is a source of ecological imbalance in the forest. The losses are estimated Maâmora over 1000 hectares per year. His weakness is misleading, it covers a degradation that has reached such a degree that his rehabilitation now seems very

difficult and long. Not under control, the external factors of degradation have made it difficult to plan implementation of successive development of the forest. This would result in the degradation of environmental degradation and biodiversity, siltation of infrastructure and agricultural lands, economic loss both to the local community and the nation.

This apparent evolution of natural and physical factors, linked to practical adaptation patterns of land management, has prompted people to rethink their mode of operation and management of production systems. Such recovery has affected various areas, such as livestock, agriculture, operating practices of small products (acorns, mushrooms, etc. ...).

However, this mutation may not be sustainable since the dependence of production systems vis-à-vis this forest area is very large and cannot be sustained in the absence of the forest.

#### **IV- Consequences of the degradation**

Social pressure is the determining factor in the process of progressive degradation of Maâmora. The consequences resulting from the amplification of this phenomenon can be summarized as follows:

**Economic loss:** The decline of this forest will have serious consequences on the regional economy (shortfall of rural communities, loss of jobs ...) and national (weakening of the industrial related to cork, loss in foreign currency).

Lack of regeneration and artificial regeneration is more learned and the future of this forest has become a concern of all stakeholders.

**Erosion and soil degradation:** At the current rate of degradation of soils Maâmora be threatened by erosion.

**Sanding:** The disappearance of vegetation cover will lead to silting phenomena due to the nature of the sandy Maâmora and threaten infrastructure and existing settlements.

**Rural Exodus:** Qualified as a reserve fodder, energy, and generating employment, its disappearance will cause the harsh environment and thus a migration to large

cities with all the consequences that arise socially.

**Deterioration of the environment:** In fact, the Maâmora constitutes a reserve of rich flora undeniable, a green lung for the surrounding towns and a large recreation area. Its destruction will lead to a deterioration of quality of life of citizens.

#### **V- Towards a coordinated development plan for Maâmora**

The development of a strategy for development and preservation of Maâmora must be based on a basic observation that guides all of his approach: despite the current situation of overexploitation of natural resources, and threats of desertification, the process is not irreversible, and it is possible to reverse it. However, the physical degradation and physiognomic forest stands is a very advanced stage, and the threshold of no return is approached in many situations.

The strategy for rehabilitation and development of this heritage to arrest the process of regressive evolution of the natural resources of the oak forests, restoration and development of natural ecosystems should necessarily passing through the actions of local development and improvement of living standards of people in different rural communities.

Recognizing the importance of this ecosystem, the government has undertaken measures to safeguard their operations by investing in the development and protection.

However, the development of the forest of Maâmora can be considered separately from its socio-economic development, which constitutes a fundamental support for local development and use of forest resources and natural biodiversity of the region. Furthermore, man is the key to any development program.

As required by the Dahir of 20 September 1976 on the participation of the population development of Forestry Economy, actions will be undertaken in the organization of users. To minimize and mitigate the adverse effects of criminal charges of wood, and by encouraging the establishment of forest cooperatives multiservice.

Moreover, in addition to actions aimed forest reconstitution and preservation of

forest resources Maâmora, any strategy of development and conservation of the forest must initiate and provide for implementation by adopting a participatory approach, partnership and collaboration, a number of measures to improve production systems (agriculture, livestock, pastoralism, etc.), the development of rural infrastructure and community facilities, and promotion income generating activities (beekeeping, rabbit farming, handicrafts, medicinal and aromatic plants). Similarly, it is necessary to organize users into cooperatives federated into economic interest groups and rethinking popular participation in development of forestry in perspective to benefit the people misusers forest revenues to encourage them to support sustainable development of forest resources.

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