

# PARTICIPATORY FOREST MANAGEMENT: ANALYSIS OF THINNING OPERATIONS IN PARTNERSHIP WITH LOCAL ORGANIZATIONS (GREEN OAK FOREST IN WESTERN MIDDLE ATLAS, MOROCCO)

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**Abstract-** After the failure of various programs based on the technocratic management approaches, development operators have proposed a pilot project applying a participatory approach that ensures the harmonious and sustainable development while preserving the ecological potential of the natural ecosystems. The development project and protection of forests in the Ifrane province is the first project that have been initiated immediately after the definition of the National Forestry Programme, for an ambition to reverse the degradation process of forests in the Ifrane province while ensuring an integrated rural development. Among the actions carried out by the project, the initiation of a contracting process with local associations whose result was the signing management agreements for local association's territories. This study has aimed the analysis the experiences of the participatory forest management in the case of Ifrane province. We tried to assess the economic benefits of green oak coppice thinning operations, assigned to local associations. First, we analyzed documents concerning the forestry projects. Then a non-directive survey was applied with a sample of 42 peoples of household chiefs concerning the three territories of local associations: Ait Hammad ribaa under the Tizguitte rural administration, El Hajjaj under the Dayet Aoua rural administration and SEHB Lagnam under the Tigrigra rural administration. The results have identified a close dependence of the three territories to the forest resources. Their total annual consumption of firewood is estimated at 2298.5 cubic meters per year, an average of 11 t / household / year. In addition, forest areas have relatively high coefficients of overgrazing that is about 48.62% for the local association El Hajjaj and 64.65% in local association SEHB Lagnam. The operation of green oak thinning had a good impact on the lives of the population. It covers 63% for firewood needs and in terms of free and legal fodder units for cattle has offered by the foliage of oak stems has been cut for beneficiary households. The operation of thinning generated for the three local associations: a monetary contribution of firewood is estimated to 96 000 Euros, whether an average intake of 684 Euros/ household. The contribution of a feeding leaves value is 1474 Euros that is very useful during winter period.

**Keywords** –: Middle Atlas, participatory management, local associations, green oak, coppice

## 1. INTRODUCTION

In Morocco, green oak forests considered as a salvation for the rural population are almost all in the coppice state. These multifunctional forests are currently subject to high anthropogenic pressure: the illegally cuts for firewood and topping trees for feeding herds are almost daily practice in cold periods.

Anxious to preserve and promote forest ecosystems the forestry department adopted in more than a decade, a new forest policy that gives great prominence to users and local communities, while encouraging a participatory approach based on the achievement of plans collaborative planning, taking into account the various components of forest management. The participatory approach that has become fact; is one of the great principles to apply success actions according to the current development strategies. Such an approach would build on accountability and the involvement of various actors in the process of programming, implementation, monitoring and evaluation of development activities.

Ifrane province that contains a forest estate with a total area of 114, 619 ha, includes significant green oak forests and the largest Mediterranean cedar forest constitutes a part of

world heritage. These forests also include the pinewood (*Pinus pinaster Sol. Var. Maghrebiana*) known in the Mediterranean level and are one of the best green oak forests of the country with 38,698 hectares.

In the current context characterized by strong socio-economic conditions binding, these forests are facing serious difficulties. They are particularly under increasing human pressure and uncontrolled, led mainly by illegal harvesting of wood and overgrazing by herds that hamper the renewal of natural resources and induce degradation of biodiversity. The main constraints identified in this province concern mainly:

- The illegal harvesting of firewood whose people demand exceeds the potential production of forests in the province;
- The toppings practices on cedar trees, oak, Juniperus and other shrubs are used in times of fodder shortage to feed the herds;
- The settlement of rural people in the mountain forest and the abandonment of transhumance practices and Agdal (grazing restriction for 4 months from March to July), etc, have led to overgrazing rangeland resources. In these forests, currently the stocking rate exceeds by three to five times the potential production.

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The issues related to sustainable development of mountain areas, imposed a profound reflection on the victors change that can improve the living conditions of rural populations, and thus to influence the trend of degradation and lead to conservation and sustainable management of natural resources.

The forest management and protection project of Ifrane province is part of this process and is the first project initiated immediately after the definition of the National Forest Strategy, with the aim of reversing the forest degradation, while ensuring an integrated rural development meeting the socio-economic priority needs of the people of this region. The active involvement of the local population is one of the most interesting points of the project. The project opted for the local organization of the according the territories managed by each community (user association). This type of organization allows marrying the customary organization of local communities "the Jmaa" that enabled a balanced and rational management of natural resources since a long time (HCEFLCD/ SOGREA, 2004). This participation allowed leading to agreements between the forestry department and user associations that engage both parties, thus leading a better respect of preserved areas. Forest users have benefited from an improvement in their living conditions through basic infrastructure, tracks and water points but mostly direct revenues generated by thinning the green oak forest, which is among the most interesting actions concerted management contracts established with user associations.

This study aims to:

- Assess the role of forests in the in people's lives in terms of fire wood and fodder production;
- Quantify the firewood quantities and fodder provided by the thinning of oak coppice,
- Assess the impact of thinning products on the local economic of rural people.

## II. MATERIALS AND METHODS

### ➤ Materials

Ethnically, the study area includes four fractions organized in three local associations whose demographic characteristics as shown in Table 1.

**Table 1. Social Framework of studied local associations**

Ethnic groups	Aït Hammad Ribâa	El Hajjaj	Aït Yahya Ou Alla	Aït Hammou ou Bouhou
Associations	Aït Hammad Ribâa	El Hajjaj	Sahb Laghnam	
Inhabitants	2 866	2 482	4 353	4 024
Households	482	469	846	732
Average of persons/ household	5,9	5,3	5,1	5,5

The target populations is represented by local associations created in 2006-2007, as part of partnership agreements with the communities users established at ethno-spatial scale unit for the integrated management of natural resources. The choice of this study area is done according to the following principles:

- The area is considered as priority in the province, given by the importance of the forests on economic and biodiversity planes;
- This area present the challenges for the rational management of natural resources (overgrazing, excessive harvesting of firewood ...)
- The facilities of contracts between the forestry department services and local users through local associations.

On the natural plane, the study area is in the tabular Middle Atlas, characterized by:

- A humid and sub-humid Mediterranean climate, cold to fresh according to Emberger methods (Emberger 1955). The precipitation in the snow form is irregular and may reach in Ifrane 30 to 50 days (Achehboune, 2006).
- A carbonated substrate upon which are developed the fersialitic red soils, fersialitic brown and dolomitic para rendzinas.

### ➤ Methodology

The target population consists of the three local associations mentioned above. The methodological approach is based on two tools for analyzing impacts and benefits of coppice thinning operations in partnership with users;

• **Participatory workshop Approach:** this approach has been adopted for Associations bureau members. A workshop guide is established before to get the maximum informations.

• **Semi-structured interviews approach:** this approach has been adopted for local managers and for the sample of association members. The guide focused mainly on issues relating to the management of excluded areas of grazing that starting with the contracting process with users and profits from coppice thinning operations (leaves and firewood). The organization of the strata and the sampling distribution made under a proportional optimal allocation as illustrated in Table 2.

**Table 2. Sampling plan**

	Number of participants per strata (Nj)	Number of interviewed persons (nj)
Association Ait Hammad Ribâa	30	9
Association El Hajjaj	50	15
Association Sehb Laghnam	60	18
<b>Total</b>	<b>N = 140</b>	<b>n = 42</b>

The information was collected using a semi-structured interview guide whose the questions were chosen in an explicit way for:

- Quantify the wood and leaf biomass generated by thinning operations of green oak coppice;
- Assess the economic contribution of the thinning of green oak coppice to beneficiaries.

**Table 4. Monetary value of participatory thinning products**

	Ait Hammad Ribâa	El Hajjaj	Sahb Laghnam	Total
firewood (Euros)	20 120	34 490	41 190	95 800
fodder (Euros)	756	3 71.7	3 46.5	1 474.2
Total amount (Euros)				97 274.2

### 3. Results and Discussion

#### ➤ Firewood and fodder harvested by thinning out operations

The analysis of the survey forms used to assess the quantities of firewood consumed by association and per household (Table3). To highlight the harsh cold in the province, the consumption of firewood has been evaluated by period (cold and rest of the year). The results of interviews give also the quantities harvested from thinning operations that implemented on participatory approach. By this way, the forestry department carried out a free silvicultural treatments and local population the local population gets firewood legally and free.

**Table 3. Average consumption of firewood per household and by association**

	Ait Hammad Ribâa		El Hajjaj		Sahb Laghnam	
	Cold period	Rest of the year	Cold period	Rest of the year	Cold period	Rest of the year
Average consumption per day /household (Kg)	45	22	43,5	25	40	20
Average consumption per year (t/household)	11,370		11,775		10,200	
Total harvested of thinning operations per household (t)	7		5,9		7,5	
Part of firewood harvested through thinning operation (%)	62		50		74	
Average part (%)	62					

The thinning operations of green oak coppice provide to local populations significant quantities of firewood and fodder. The thinning operations carried out per local associations are two times for Ait hammad Ribaa et Sahb laghnam and one time for the other association.

#### a) Firewood

Although the dimensions of the stems covered by thinning operations should not exceed a circumference of 20 cm, the energy value is quite appreciable. The estimation of these products taken by the three associations is about 7 tons, 5.9 tons and 7.5 tons, respectively for Ait Hamad Rbiaâ, El Hajjaj and Sahb Laghnam associations. It follows then; the rate of coverage of firewood needs by thinning operations is around 62%, who is very interesting.

#### b) Fodder

At the feed level, green oak leaves are in mountain regions, constitutes a welfare for livestock in winter. Taking account of bibliographical works and investigations in the field (Hcefld/Sogreah 2004), forage values generated for the three associations benefit are about 3024, 1487 and 1386 unit fodder, respectively for Ait Hamad Rbiaâ, El Hajjaj and Sahb Laghnam associations.

#### Economic Impact of thinning out on local populations

The economic benefits of participatory thinning operations for user populations are evaluated basing on the average prices of firewood and barley. Assuming that a 1kg of wood and barley is respectively 0.25 and 0.1 Euros, monetary values of pruning products as shown in Table 4.

The vital interest of the participatory thinning for local users remain in the important contribution on firewood needs and on fodder needs during autumn and winter period. If their silvicultural interest is provided as is advocated in all forestry works (Lanier 1994, Boudru 1989), this operation which comes expensive for forest managers (approximately 500 Euros per hectare), is almost never practiced by the forestry department. The new approach of participatory arrangements involving people in this kind of treatment is doubly pay because it is addresses both the forestry concern and to the immediate interests of the local people.

### 4. CONCLUSION

The thinning operations of green oak coppice regarded by foresters as a silvicultural treatment that has a great importance to conduct a good education for young oak coppice. Their excessive cost has not always facilitated their execution. The new strategy of development has found the right solution for this kind of treatment where various actors, managers and riparian population found their benefits. In the forests of the Ifrane province, this study highlights the importance of participatory thinning for people and forest management. Their contribution in the rural economy is very interesting.

To better carry out the thinning operations, and ensure proper silvicultural treatment of green oak forests in the Middle Atlas, it is recommended:

- To promote and develop collaborative partnership management of silvopastoral resources;
- Building capacities of leadership and people practicing thinning operations;

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