

## **Protection of the Natural Resources in Marginal Areas and Sustainable Rural Development in Northern Lebanon**

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### **Abstract**

The mountain area of Akkar is the richest region of the country in natural resources, yet it is the least developed rural area in Lebanon. Degradation of these resources arises from 1) deforestation through charcoal production, 2) goat grazing of the native vegetation and 3) degradation of the cultivated soil resulting from the abandonment of the terraced land. The paper investigates the reasons behind resource problems in the marginal area of Akkar and examines the socio-economic impacts of the Cedar reserve that exists in a different northern area. It focuses on a benefit-cost analysis concerning the use of Akkar's natural resources. Data was collected from 75 farming families distributed in 15 villages in Akkar's mountain area. Another survey covered 96 tourist samples selected randomly in the Cedar reserve. The benefits from deforestation and grazing activities were calculated and compared with the benefits that could be obtained by a potential alternative. It was found that the protection of Akkar's natural resources from unsustainable uses through creation of reserves would contribute to the welfare of the local communities and would lead to sustainable rural development.

### **Introduction**

The mountain area of Akkar is the richest region of the country in natural resources, yet it is the least developed rural area. These resources encompass forests, bush lands, natural habitats for endemic plants and terraced agricultural land. The area is characterised by its scenery and wildness. Deforestation in public lands occurs illegally through charcoal production. The uncontrolled and excessive grazing of the native vegetation by goats reduces the potential of regeneration of the flora and affects the seed production of numerous endemic plants and their natural habitats. Soil degradation of the terraces occurs as a result of the abandonment of the cultivated land. The paper examines an alternative of using Akkar's natural resources in a sustainable way based on the Cedar reserve existing in another northern area. It deals with the impact of this alternative on rural development and the well being of the rural communities.

### **Objectives and Methodology**

The primary data was collected from two types of surveys. A farm-household survey covered 75 farming families distributed in 15 villages in Akkar's mountain area. The selection of the families was done according to the following activities or problems: 1) deforestation for charcoal production, 2) degradation of the terraced cultivated land and 3) goat grazing. The sampled families were then classified in three farming systems, those are: the farming system with charcoal production (n=24), with unused agricultural land (n=25) and with goat keeping

(n=26). Data of this survey referred to the agricultural year 1995-1996. The second one is the tourist survey. It covered 96 tourist samples selected randomly in the Cedar reserve in the summer of 1996.

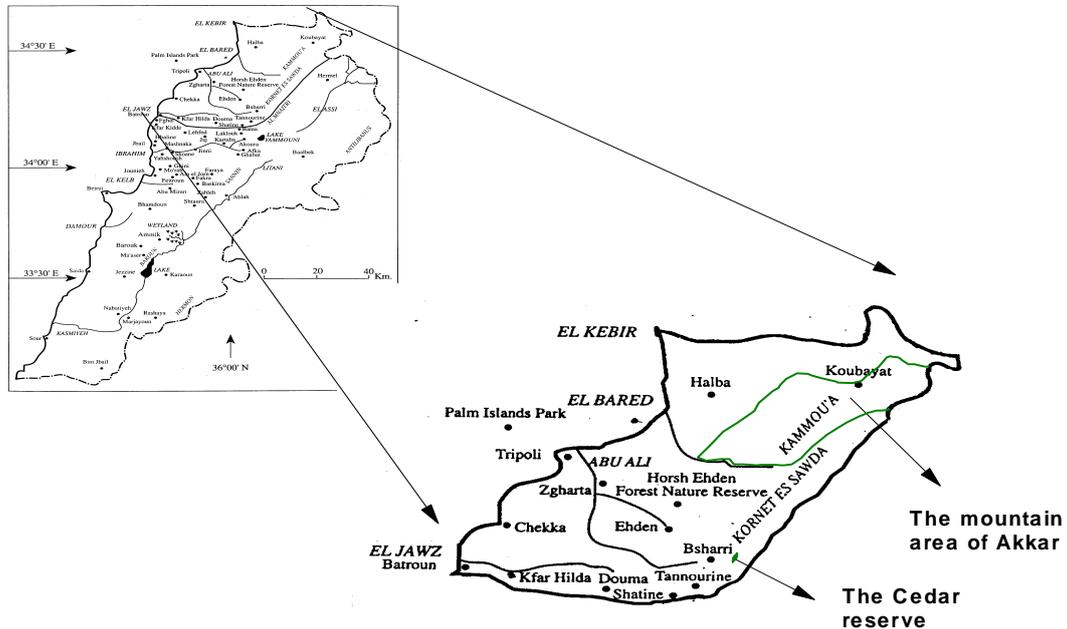


Figure 1. Map of Lebanon showing the two study areas in the northern province

From the general concept of the study (figure 2), focus in this paper will be on the investigation of the reasons behind the behaviour of Akkar's rural communities regarding the use of the natural resources. The socio-economic impacts of the Cedar reserve will be analysed. Benefits that could be obtained by a potential use of the resources through tourism in the marginal area of Akkar will be calculated and compared to the actual ones.

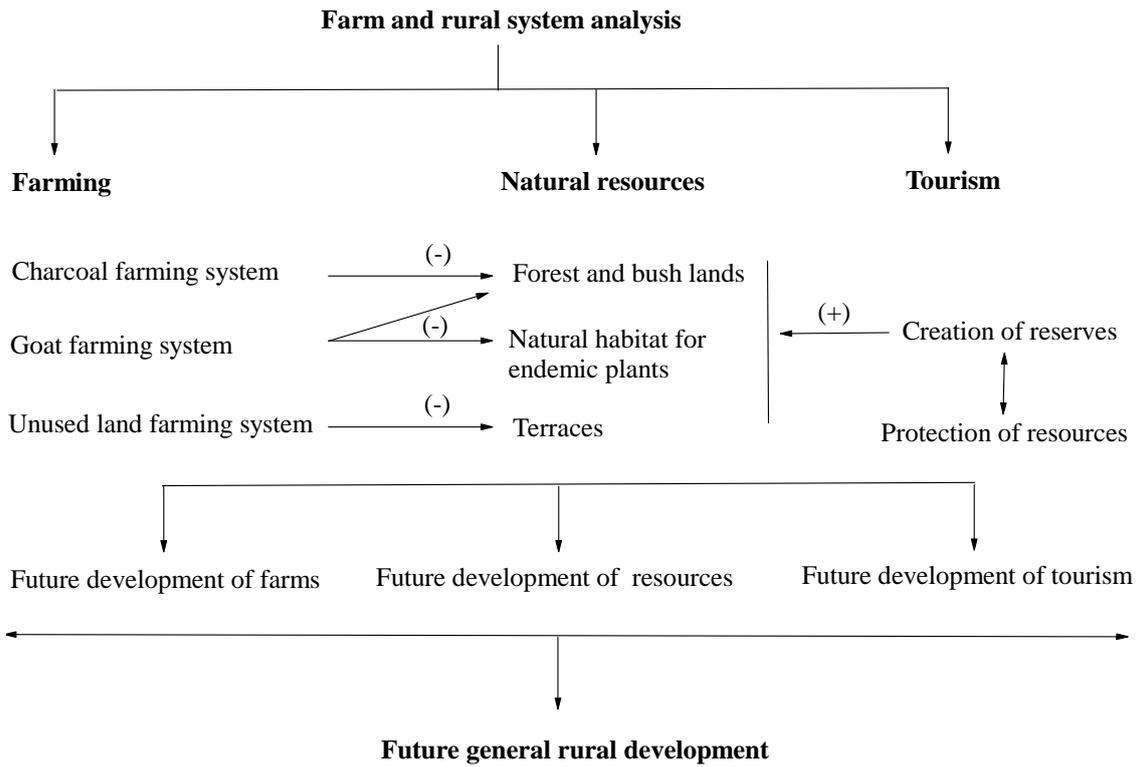


Figure 2. General concept of the study

### Family Income Analysis

Off-farm activities are the basic source of family income in the charcoal and unused land farming systems while these are of a little importance in the third system (Figure 3).

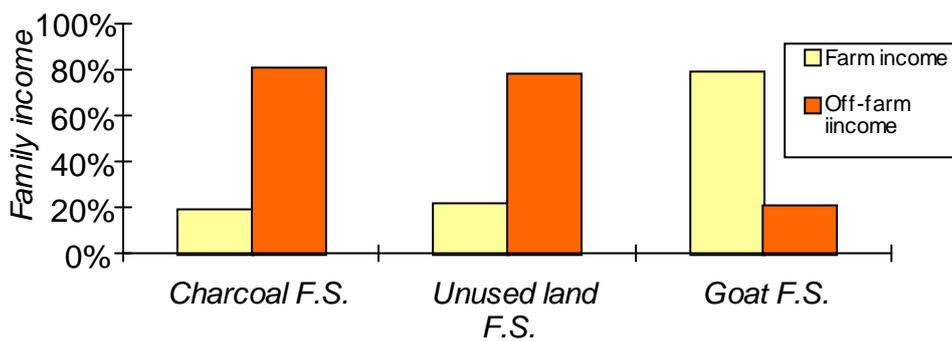


Figure 3. Composition of the family income in the mountain area of Akkar (1995-1996)

Work as a daily paid labourer is the source of about one third of the off-farm income in the charcoal farming system (figure 4). This daily work is not readily available with certainty due to competition from foreign workers. This, in addition, leads to low wage rates. Salaries from employment contribute to around 50% of the family income in the unused land farming

system in comparison to around one third in the charcoal farming system and 10% in the third system. Employment ensures the family income and maintains its living standard since it is a sure source of cash compared to the work as a labourer. The army is responsible for at least 70% of the employment income in the three systems, which indicates a low diversification in the employment sources. This fact could be related to the low educational level in the study area.

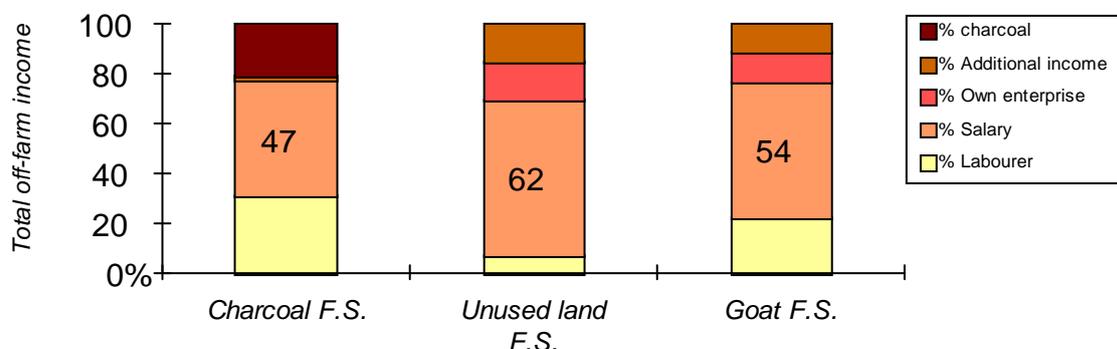


Figure 4. Off-farm income composition, Akkar, 1995-1996

Table 1. Cash balance and family income figures in U.S. Dollars, Akkar, 1995-1996

	Cash balance	Farm income	Off-farm income	Family income
Charcoal farming system	321	1,505	6,467	7,972
Unused land farming system	1,503	2,283	8,073	10,356
Goat farming system	-1,67	5,982	1,578	7,56

### Cash Flow Analysis

The cash balance is highest in the unused land farming system while this is negative in the goat farming system (Table 1). This could be explained by the ability of this system to convert the livestock capital into cash according to its needs. In the charcoal farming system, the cash balance figure is positive. Without the cash inflow resulting from charcoal activities this figure would be - \$917. This indicates the importance of these activities in maintaining the living standard of the families which is already at a low level.

Cash from employment is not enough to play this role in the charcoal farming system as opposed to the case in the unused land system.

In the charcoal farming system, an average of 5% of the off-farm cash inflow is used to cover the farm cash deficit (Figure 5), while in the unused land farming system the contribution of the farm to the total net cash inflow is of a very little importance (2 %).

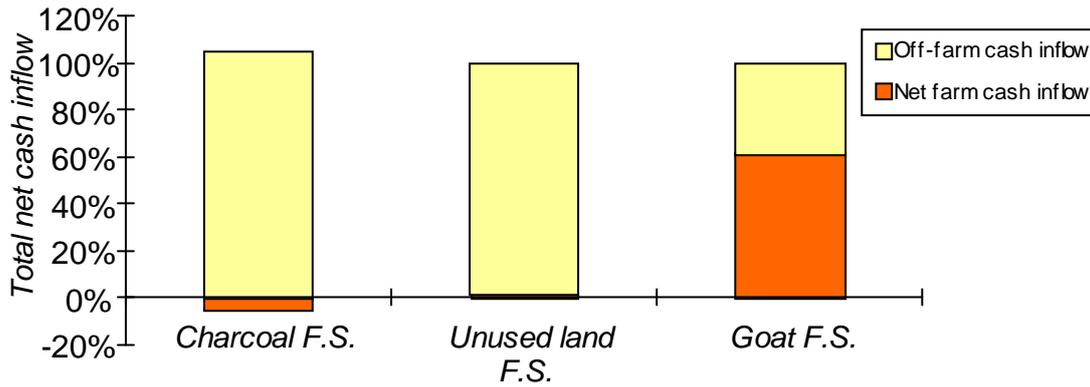


Figure 5. Importance of the net farm cash inflow<sup>52</sup> in Akkar, 1995-1996

These figures indicate one of the reasons responsible for the abandonment of the terraced cultivated land that leads to degradation of terraces and soil erosion. The weak markets for agricultural products seem to play an important role in this context. The high contribution of the net farm cash inflow (61%) in the goat farming system is related partly to the low fodder costs since the free grazing of the native vegetation is the main source of goat feeding.

### Tourism Component

The capital Beirut contributes more than half of the tourists visiting the Cedar reserve (Figure 6). The average expenditure per tourist per trip (1 to 3 days) in the reserve zone (within a radius of 24 km from the reserve) is approximately \$26.

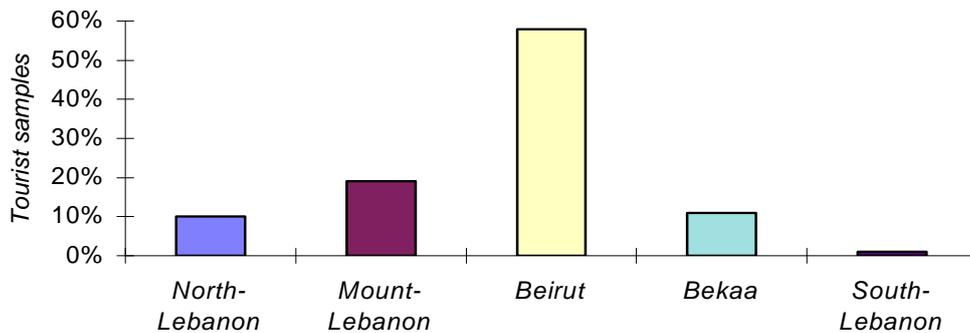


Figure 6. Provincial origin of the sampled tourists in the Cedar reserve, 1996 (n=96)

The distribution of this sum is shown in figure 7. Its aggregate to the estimated 87,500 tourists who visited the Cedar’s reserve between May and November 1996 amounts to \$2,275,000.

<sup>52</sup> The net farm cash inflow is the total farm cash inflow minus the cost of production.

The existence of the Cedar reserve has a positive impact on the creation of new sources of off-farm income that could be summarized (based on figure 7) in two categories:

- Employment in the reserve itself (guides and guardians paid from the entrance donations), in the restaurants and hotels (within a radius of 24 km from the reserve).
- Sales of souvenirs in numerous kiosks owned by the villagers near the reserve.

In addition, the reserve creates a new market for agricultural products sold by the farmers themselves along the road leading to it.

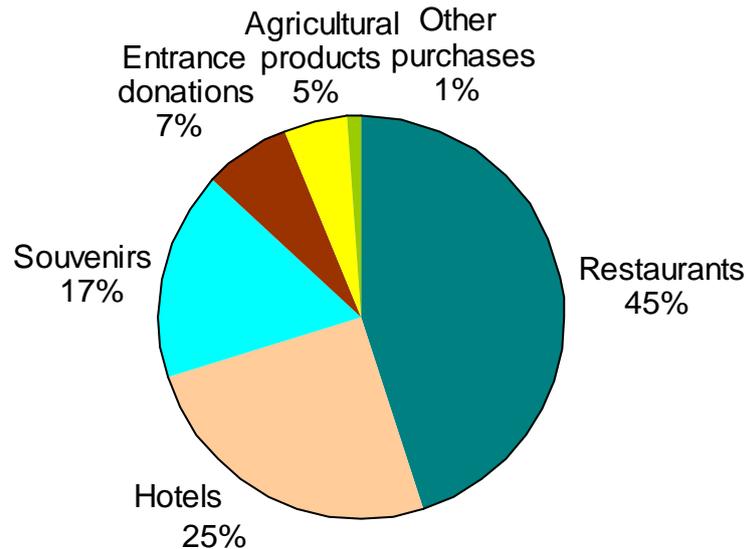


Figure 7. Distribution of tourists' expenditures in the Cedar reserve zone, 1996 (n=93)

### Benefit-Cost Analysis

An initiation for a benefit-cost analysis concerning the reservation of Akkar's natural resources will be carried out. In this assessment the terraced cultivated land, seen in this paper to be a component of the natural resources, will be evaluated aesthetically as a part of the general landscape of the area.

The benefits of the creation of reserves include both use values and nonuse values. The primary use values of a reserve are for tourism and research. One of the most important nonuse values is the existence value (Kramer, 1994). The estimation of the existence value seems to be very complex. It is also argued that it is principally wrong to put a monetary value on this (De Groot, 1994). The potential benefits from tourism in the mountain area of Akkar are drawn from the tourist survey in the Cedar reserve.

The costs include direct and indirect costs. The direct costs arise from land acquisition, unless the land is already under government ownership as in the case of this study where the reserves (or parks) when created, will be, national reserves. Other costs encompass hiring reserve personnel, visitors' facilities and other infrastructure such as pick-nick and camping places.

Indirect costs are thought of as opportunity costs that are the benefits foregone by proceeding with the reservation. These benefits result from the actual use of Akkar's natural resources by the rural communities through charcoal and grazing activities.

Given the large array of benefits and costs associated with the creation of a park or a reserve, performing a complete accounting job in a benefit-cost framework is a monumental task (Munasinghe 1992, cited by Kramer 1994). Focus will be on the estimation of the direct benefits (potential benefits from tourism) and the indirect costs (opportunity costs).

### **Potential benefits:**

Firstly, the contingent valuation method was used in the tourist survey in an attempt to derive the potential benefits that could result from the reservation of Akkar's natural resources. This method uses survey techniques to establish the value of goods and services that are not exchanged at markets and therefore have no prices associated with them (Kramer, 1994). It works by directly soliciting from a sample of people what they are willing to pay (elicitation of "bids") for some change in provision of a good or service or to prevent a change and/or what they are willing to accept to forgo or tolerate the change, in a hypothetical market (Pearce, 1994). Strategic bias occurs when respondents believe that the bids will not be collected. They are then more likely to overstate their true values (Bickmore, 1994).

To avoid such bias, the question of the contingent valuation method was formulated in terms of whether the respondents are willing to visit natural reserves in the mountain area of Akkar in case of their creation, if they were asked to pay the same amount of money they paid in the Cedar reserve (as entrance donation). That means a discrete choice or close-ended question was used with a conservative design (since the amount asked was the same that the respondents have paid). In other words asking the Cedar reserve's visitors about their willingness to pay to protect nature in Akkar and then how much (open-ended question), would involve a high risk of bias and would lead consequently to unreliable conclusions.

If the response was affirmative (all the sampled tourists gave a positive answer), the interviewees were subsequently asked about their motivations to make such visits. The basic motivations were enjoying and appreciating nature as well as the need to get away from the cities and the discovery of a new area. Other reasons were related to the encouragement of the reserves, the way of life of the rural communities living near the reserves, the ecological education of the children and finally the scientific interest.

The average willingness to pay per tourist (which is the average entrance donation paid in the Cedar reserve) is \$1,76. The aggregation of this average to the estimated 87,500 tourists who visited the Cedar's reserve between May and November 1996 amounts to \$154,000. This is the potential benefit of the creation of reserves in the mountain area of Akkar, drawn from the contingent valuation method. This amount should be considered as a minimum being the result of a conservative design.

Focus was on the willingness to visit reserves in the mountain area of Akkar, in the case of their creation, because the idea was whether it is possible to consider the Cedar reserve's visitors potential visitors of Akkar's reserves. Willingness to make these visits and the magnitude of tourists' expenditures that reflect their true abilities to pay were the key elements.

The respondents did not give importance to the second part of the question that was the request for payment to visit the reserves. The financial situation of the tourists coming mostly from regions which are seen to be rich areas (Beirut and Mount-Lebanon, figure 6) could explain this attitude. For these reasons, one can assume that the Cedar reserve's tourists would be able, when visiting Akkar's reserves, to spend at least the same amount of money they did in the Cedar reserve zone (\$26 per tourist).

Under this assumption, the calculated expenditures of \$2,275,000 could be considered as the total potential benefits to the mountain area of Akkar from preserving its natural resources.

It is also assumed that the existence of restaurants, hotels and kiosks for souvenirs is a result of the creation of the Cedar reserve.

This value of \$2,275,000 is a minimum estimate due to the following:

- It does not include the cash inflow from visitors renting chalets in the Cedar reserve zone. The survey calculated an average expenditure of \$928 per family during an average period of 40 days.
- The mountain area of Akkar disposes of 10,000 ha of forests and bush lands (FAO, 1984) which is 1000 times larger than the Cedar reserve. This indicates that it can offer a broad spectrum of nature-related activities to the Cedar reserve's tourists according to their motivations mentioned before. This would result in more cash inflow to the area.
- The mountain area of Akkar is reduced to a single reserve and the benefits were calculated based only on the Cedar reserve's visitors.
- In the calculation of the potential benefits, only one of the use values of reserves (tourism) was considered. In addition, nonuse benefits were not taken into account.

### **Opportunity costs:**

The actual benefits from the use of Akkar's natural resources result from the following activities:

- Deforestation of the public forests to make and sell the produced charcoal: The average income from charcoal activities calculated per household in the year of 1995-1996 in the charcoal farming system is \$1339. The survey estimated the number of households performing charcoal activities to be 192. Aggregating the average charcoal income to this estimate will account to a total annual value of \$257,088. This value represents the income losses of charcoal producers associated with the creation of reserves.
- Free grazing of the native vegetation on public land: The survey estimates 10,000 goats (1996) in the mountain area of Akkar. The fodder for these goats consists almost only of native vegetation. The benefits from this activity could be evaluated by calculating the fodder costs that goat keepers would have to pay in stationary husbandry to maintain the flocks in the same conditions as if the animals were grazing the native vegetation.

It is assumed that the daily need of a goat in a stationary husbandry under these conditions is 1 kg straw and 0,2 kg concentrate, the aggregated quantity will be 3650 tons of straw and 730 tons of concentrate per year with a monetary value of \$715,376. This estimate could be considered as the value of the benefits foregone by loosing the access to the native vegetation.

The sum of the benefits resulting from these two activities amounts to \$972,464 that could be considered as the benefit from the actual use of the forests and native vegetation in the mountain area of Akkar (for the year 1995-1996). In calculating these benefits, the costs of resource degradation such as biodiversity losses and erosion are not taken into account. By leaving out the natural resource losses as a cost that has to be considered in the calculation of the benefits, the value of \$972,464 should be considered as a maximum estimate.

A complete benefit-cost analysis concerning the reservation of Akkar's natural resources could not be accomplished, since black boxes concerning appropriate procedures for estimating the indirect benefits and the direct costs are still to be explored.

Nevertheless, compared with the opportunity costs, the calculated potential benefits are more than double. This ratio 2:1 should be considered for the reasons mentioned above as a minimum.

Limiting the benefits of the reservation only to the results of the contingent valuation method, the ratio will be 1:6. Within a long-term development vision, the sustainable use of Akkar's natural resources through creation of reserves could be considered a better alternative than the actual use.

### **Conclusion**

The total potential benefits that could result from the tourists' visits to the Akkar's reserves when created, exceed those obtained from the actual activities ( $2,275,000/972,464= 2,3$ ). In calculating the benefits obtained from charcoal production and grazing, the costs of biodiversity losses and other consequences such as erosion are not taken into account. For this reason the actual benefits (opportunity costs) are considered as a maximum estimate.

Traditional economic benefit-cost analysis for natural resources is seen to be problematic, since many of the benefits that could result from the preservation of these resources are not traded at formal markets. This indicates, besides the other reasons mentioned before, that the calculated potential benefits are a minimum estimate. According to above, the figure of 2,3 should be considered as a minimum.

Black boxes concerning the appropriate procedures for the estimation of indirect benefits and direct costs associated with the creation of reserves are still to be explored in order to assess a complete benefit-cost analysis of the reservation of Akkar's natural resources.

In investigating the reasons behind the natural resource degradation, it was revealed that the charcoal activities are carried out in order to cover the cash deficit in the family. Without these activities, the cash balance of the family would be negative. Employment is of considerable importance in maintaining the living standard of the families in the unused land farming system. That could explain the reasons for not having charcoal activities in this system.

The negative or very small positive contribution of the farm in the total cash inflow could explain one of the reasons behind the abandonment of the cultivated land. Based on the tourists' impact in the Cedar reserve zone, the creation of reserves in the mountain area of

Akkar is expected to generate considerable employment opportunities for the rural communities and a new market for the agricultural products.

The employment would improve and sustain the living standards of the families. That could be reflected in the ceasing of charcoal activities. The new markets for agricultural products would improve the farm cash inflow and the phenomena of the abandonment of the agricultural land would be reduced. Goat keepers would draw benefits that could exist partly through the increasing demand for goat meat because of the increasing number of restaurants or through employment of members of the family. They would be able then to afford the purchase of fodder for at least some parts of the year. This would reduce the pressure on the native vegetation.

One can conclude that the protection of Akkar's natural resources from unsustainable uses through the creation of reserves will lead to the sustainable flow of cash to Akkar's poor rural communities from other rich areas of the country. This will result in sustainable rural development specially through generation of employment opportunities and activation of the agricultural sector.

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