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## **Conservation by cultivation: Linkages between an endangered endemic fir (*Abies guatemalensis* Rehder) and peasant economies in the Guatemalan Western Highlands<sup>1</sup>**

### *Introduction*

As one of the components of the project “Sustainable greenery production – an innovative tool for improving rural livelihood and rescuing endemic conifers in Central America”, this proposal aims at exploring to what extent an endangered endemic fir (*Abies guatemalensis* Rehder) plays a role within local peasant economies and can be properly preserved and harvested by means of taking the first steps for the implementation of a conservation-by-cultivation strategy. Such a concern stems from the need to provide local markets in Guatemala with sustainably produced Christmas trees, and eventually greenery pieces, of good quality. By doing so, the conservation status of the species might be significantly improved as arguably rural villages can benefit directly from its use.

### *Research questions*

- What's the role of *A. guatemalensis* within the local peasant economies in its natural distribution area?
- Can those collective schemes be functional for communal plantations management as well?
- Would new forestry activities, such as Christmas trees plantations' establishment, further or tackle existing patterns of collective action?

### *Hypotheses*

- Small farming systems in the study sites have incorporated both direct and indirect benefits from the use of *A. guatemalensis*. However, market driven policies such as the increasing demand for greenery and Christmas trees have pushed this species into the verge of extinction. Livelihoods assets in this context can only be enhanced sustainably by strengthening local capacities for land stewardship and local enforcement of adequate rules and regulations, and by adjusting national legislation to local realities.
- Current collective schemes along the study sites are threatened by top-down market driven national legislation on natural resources, and the promotion of communal plantations for Christmas trees production entails the start of entrepreneurial associations, whose structure vary considerably from those already existing in the area.

### *Background*

The region known as Western Highlands in Guatemala comprises the Departments of Totonicapán, Quetzaltenango, Huehuetenango and San Marcos according to the National Council of Protected Areas<sup>2</sup>. This proposal aims at looking at rural villages in three of them, being the latter the only one not looked at due to logistic constraints. Peasant economies in this region rely on family labour and a number of attributes such as access to land, production of staple foodstuff, firewood availability, and off farm occasional employment and they cope with widely generalised poverty and extreme poverty conditions. In spite of these constraints, some local peasant communities have managed to look after their forest lands, including those where *A. guatemalensis* occurs naturally. However, certain conditions such as poaching of branches, over grazing, forest fires, land use change, land tenure and unsustainable practices for forest harvesting have led to an alarming rate of extinction for this species which accounts for losses in the order of 75% to 97% of the natural coverage in specific areas over a period of 25 years (López et al., 1999). As a result, national legislation has gotten stricter as to allowing any

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<sup>1</sup> Pablo Prado, USAC/KVL

<sup>2</sup> CONAP. 2005. Personal communication

greenery trading in the area and ancient practices such as roof tiles crafting are no longer encouraged, although research in this field suggests that illegal harvesting practices do take place currently (Gómez, 2004). However, there is a long tradition of indigenous conservation and forestry practices among the K'iche' and Mam peoples<sup>3</sup>, which is embedded in a clearly defined set of customary rights and practical rules enforced by community leaders (Grünberg, 2003).

Even though major studies have been carried out in regard to the set of local rules and regulations that govern *A. guatemalensis* stands, little is known about the role of this species within the local peasant economies. On the one hand, there seems to be an association between the rate of deforestation, and therefore extinction for the species, and two variables, namely: social cohesion and land tenure. On the other hand, national legislation seems to have had a negative impact as to the way in which this species was deemed by local communities. If having a tree of a "protected" species was to cause problems with the forestry authority, then it would be obvious to get rid of it and use that land for growing something less troublesome<sup>4</sup>.

International interest on this species survival has acquired resources to foster forest lands conservation by means of promoting sustainable plantations of *A. guatemalensis* in order to provide local markets with an alternative source of greenery and Christmas trees for decoration purposes. However, local peasants were not sufficiently consulted about this idea. It is yet to be confirmed that this novel "crop" is accepted to be used as a component of otherwise typically subsistence farming systems. As a matter of fact, some field trials for Christmas trees production have been spotted in the area, and from those a feasibility assessment can be carried out. Larger producers of this species report acceptable levels of profitability when grown as monoculture in areas no smaller than four hectares<sup>5</sup>. However, the Western Highlands are characterized by a pattern of smallholding Mayan agriculturalists, where according to the most recent Agricultural Census (INE & MAGA, 2004) the holding size average is 1.5 hectares. Even so, a deeper understanding on how this species fits into the local farming systems and what role it plays in terms of improving rural livelihoods will most likely benefit both future research and field work.

Recent research projects have addressed the contribution of *A. guatemalensis* to local economies (Martínez, 2003; Gómez, 2004) and have concluded that environmental services such as carbon sequestration and water infiltration outnumber the benefits traditionally obtained by the extraction and sale of forest products such as firewood, timber and game. Nevertheless, these approaches have considered an aggregation of forestlands and therefore the role of this species within local peasant economies is not sufficiently made explicit, above all, in terms of this species share in local income levels. Setting up a Christmas trees plantation might be an alternative for peasant families in this region for enhancing their assets and consequently improving their wellbeing. At the same time this practice might deter poachers from penetrating protected areas and cut off branches during sensitive seasons for natural regeneration, as local markets would be sufficiently supplied.

### *Theoretical framework*

Forestry policies in developing countries have not helped the poor. In fact, during and following colonisation government led forestry practices hurt them. Efforts to promote subsistence oriented forestry during the 1980's did help alleviate poverty, but to a very limited extent. Their contribution was therefore marginal. However, forests serve several purposes for rural livelihoods. They can be subsistence safety nets, sources of cash income, capital assets and employment sources (Scherr *et al.*, 2004; Arnold, 2001). It has been widely argued how poor human communities harm forest ecosystems (Arnold, 2001) but research evidence suggests that both wealth and poverty impose similar threats upon these (Angilsen & Wunder, 2003). Nevertheless, current economic conditions are even harsher than those prevailing three decades ago for forest dwellers and peasants living at the forest fringes. For this proposal the type of forest related people seems to be that of *poor farmers and landless families* within the *farming communities drawing upon the forest* proposed by Byron & Arnold (1997). They have also been characterised elsewhere and fall in two categories, namely: (i) marginal agriculture of

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<sup>3</sup> Maya descendant indigenous groups that dwell in the area

<sup>4</sup> Elías, S. 2005. Personal communication

<sup>5</sup> Estrada, R. 2005. Personal communication

basic grains in combination with off farm temporal employment, and (ii) marginal agriculture (Ordóñez *et al.*, 2001)

According to Rubio (2001) the Latin American peasantry<sup>6</sup> has gradually stopped being exploited as the neoliberal order facilitates its exclusion, rather than its exploitation, by three leading forces, namely: (i) financial speculation, (ii) agriculture multinational corporations, and (iii) state of the art technology. This statement stems from the class-based theory about poverty, which seems to have been overcome by current empirical-based consensus (Angilsen & Wunder, 2003). This raises the debate as to whether poverty should be alleviated or eradicated from society. The former constitutes the mainstream school of thought, and for that the “trickle down” effect seems to suffice. However, distributional aspects do play a central role in natural resources such as land as argued by Griffin *et al.* (2002), since high levels of concentration lead to inefficient allocation patterns. Moreover, it has been demonstrated by GDP figures how regions like Latin America have become poorer despite of their *per capita* income’s increments during the last decade, i.e., economic growth does not necessarily entail poverty reduction in the absence of even distribution of wealth (WRI *et al.*, 2005).

Since we are looking at subsistence farming systems it is necessary to bear in mind the implications of forest income share. Hyde & Köhlin (2000) point out how the time a household devotes to collect forest goods is more economically valuable than the wage their labour would earn in an alternative employment, and less valuable than the market price for that particular good. They come up with the most rational economic behaviour from the neoclassical viewpoint. Social forestry practices are more likely to be successful where highest forest income shares are to be found. Hence, the definition of “forest” is to be revised in light of local conditions as it entails a social construction that echoes a dominant group values and perceptions (Contreras, 2001).

#### *Sampling and data collection*

A representative sample of communities that are engaged somehow in *A. guatemalensis* production and/or conservation has been made across the Western Highlands on the grounds of the non probabilistic intentional sampling technique (Hernández *et al.*, 2001) based on their willingness to participate in the interviews and meetings. BSc students have been appointed at each site so as to provide permanent following up and help train local enumerators.

Representative samples of households have been calculated in each village according to standard statistical procedures based on time and workforce availability. Questionnaires will be prepared on the grounds of the Poverty and Environment Network (PEN) proposal and a small group of enumerators are being trained in the use of them so as to minimize errors during field work. These instruments should include questions that do not require long-term and detailed memory, in order to be answerable with a high level of accuracy in less than 60 minutes per household (Campbell, et al., 2002). Selected households will be visited every third month until four visits are completed. Initial and final questionnaires will be completed with intermediate ones where fluctuations due to seasonality will be captured for further analysis. Sampling figures are shown in Table 1.

**Table 1. Sampling figures for the households survey**

Municipalities	Villages	Hamlets	Inhabitants (1)	Average family size (2)	No. of households (1)/(2)	Theoretical sample size	Field sample size	Definite field sample size
Cabricán	El Cerro	El Cerro	1650		235	66	57	44
		Quiquibaj	601		85	24	21	16
	La	Las	1720		245	68	59	45
Todos Santos <sup>7</sup> Cuchumatán	Ciénaga	Ventanas						
	El	El Rancho	NA <sup>8</sup>	7	79	22	19	15
	Rancho							
		La Ventosa	NA		66	18	16	12
	Puerta		NA					11

<sup>6</sup> By peasantry is meant those “...households which derive their livelihoods mainly from agriculture, utilize mainly family labour in farm production, and are characterised by partial engagement in input and output markets which are often imperfect or incomplete” (Ellis, 1993).

<sup>7</sup> As information on number of households is available there was no need to use the average size as in the previous cases

<sup>8</sup> For this cases, the number of households was directly obtained from municipal records

	del Cielo	Chalwitz		59	16	14	
		Los Chales	NA	34	9	8	6
		Los Ramírez	NA	38	11	9	7
	Tuicoy	Tuicoy	NA	22	6	5	4
		Chichim	NA	56	16	13	10
		Buena Vista	NA	32	9	8	6
Totonicapán	Panquix	Chuiguarabal	315	45	13	11	8
	Others						15
<b>Total</b>				<b>996</b>	<b>278</b>	<b>240</b>	<b>200</b>

#### Main methods for data analysis

Once the households have been visited, collected data will be used to calculate the forest environmental income share (Vedeld *et al.*, 2004) with emphasis on *A. guatemalensis*.

This information will allow for estimating the following conceptual relationships:

$$\text{Absolute Forest Income} = f(\text{Absolute Income})$$

$$\text{Relative Forest Income} = f(AI)$$

$$\text{Forest Income Share} = f(AI)$$

$$AFI_{A. guatemalensis} = a(AI) + b(AI)^2 + u$$

#### Time frame

	F	M	A	M	J	J	A	S	O	N	D	Jn 07 →
V1 H1Q1												
Q2												
Q3, A g questions												
V2 H2 Q4												
Writing up												

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