CHAPTER ONE

INTRODUCTION

TREE GROWING IN AGRICULTURAL LANDSCAPES: SMALLHOLDER TREE GROWING FOR SUSTAINABLE RURAL DEVELOPMENT AND ENVIRONMENTAL CONSERVATION AND REHABILITATION

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The state of forest resources in countries world-wide has reached a critical point; never before have forest ecosystems been so greatly and rapidly affected by human activities as during last decades. Large stretches of the world's forests, that have served in the subsistence and development of humankind, have been converted to other uses particularly agriculture or are severely degraded. The net change in total forest between 1990 and 2000 approximates a loss of 9.4 million ha y-1 world-wide, leaving 3,682 million ha of natural forest and 187 million ha of forest plantations in the year 2000 (see table 1). Most of these losses (14.2 million hectares y-1) occurred in tropical countries due to deforestation and land use conversion (FAO 2001) and contributed to the unequal distribution of forest resources over the different continents (see figure 1).

Figure 1: The distribution of remaining forest resources (in percentage of total land area) in countries world-wide (FAO 2001)

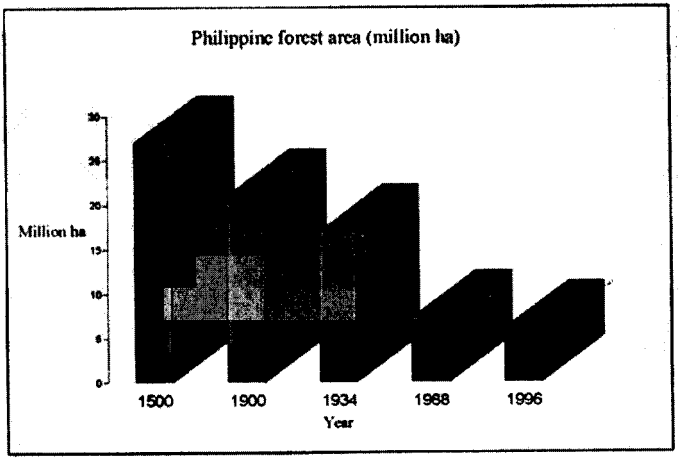
Table 1a: Forest area by world region 2000 (FAO 2001)

Region	Land area million ha	Total forest (natural forests and forest plantations)				Natural forest million ha	Forest plantation million ha
		million ha	percent of land area	percent of all forests	net change 1990-2000 million ha/year		
Africa	2,978	650	22	17	-5.3	642	8
Asia	3,085	548	18	14	-0.4	432	116
Europe	2,260	1,039	46	27	0.9	1,007	32
North and Central America	2,137	549	26	14	-0.6	532	18
Oceania	849	198	23	5	-0.4	194	3
South America	1,755	886	51	23	-3.7	875	10
World total	13,064	3,869	30	100	-9.4	3,682	187

Note: changes are the sums of reported changes by country.

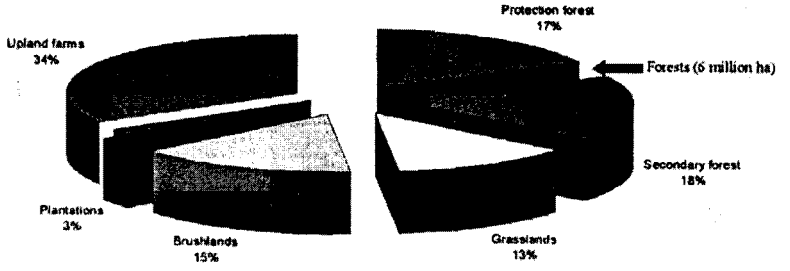
Table 1b (see below) shows the distribution of forest resources in Southeast Asia for the year 2000. Also within this region, remarkable differences in forest area occur. Whereas countries like Indonesia and Malaysia have still more than 50 percent of their land area under forest, the Philippines has, aside from Singapore, the relatively smallest part under forest: 19.4 percent of the country's total land area. Like Myanmar, it lost 1.4 percent of its forest area between 1990 and 2000, the highest rate of forest reduction in Southeast Asia. Figure 2 shows an even much more pronounced decrease in Philippine forest area for the period before 1990, particularly between the 1930s and 1980s when the forest area dropped from about 17 to 6 million ha due to large-scale logging. Although nowadays 15.9 million ha of land is categorized as forest land based on a Philippine land cover classification system, figure 3 shows that in fact only 6 million ha (or 35 percent) are indeed under forest cover, the remaining being open land (brushland, grassland or upland farms, and some plantations).

Figure 2: The significant decrease in forest area (in million ha) between 1500 and 1996 in the Philippines (Lasco this volume; Forest Management Bureau 1998)



In addition to declining forest areas, the areas suitable for the production of food to meet present and future demands of a growing world population are dwindling as well. Mainly marginal lands remain, aside from the fertile lands that traditionally have been utilized for various forms of crop cultivation. Consequently, agricultural intensification is currently being practiced in many parts of the world in order to increase crop production and provide food security for present and future generations. However, agricultural intensification has not automatically led to sustainable forms of land use; on the contrary, it has been accompanied by serious forms of land degradation, particularly in the developing world where roughly one quarter of all farmland has been degraded (Garrity 2004). Farmland is affected by soil nutrient depletion and soil physical degradation due to repeated cultivation and harvesting practices without applying fertilizers or manure. The much needed farm inputs, or fallowing time, for restoring the soil are lacking whereas the knowledge on alternative, cost-effective methods of sustainable land use is limited. Agroforestry systems have been promoted as sustainable systems of land use for quite some time (Young 1997) and their role in poverty alleviation is regaining wider recognition, although smallholder tree production is still inadequately quantified. Yet, the implementation of tree-based farming systems still faces controversy, given for example their contested role in providing profits to farmers under present conditions of increasingly competitive world markets. Whereas a small number of tree crops (e.g., coffee, cacao, tea) played a critical role in setting off economic growth in Southeast Asia during past three decades, at present there is a need to broaden the array of tree products delivered to global markets by developing countries given the current overproduction and decreased profitability of the few traditional tree crop commodities (Garrity 2004).

Figure 3: The distribution of the different land use systems over land classified as forest land in the Philippines (Lasco and Pulhin 2000; FMB 1996)



Open areas = 10 million ha

The urgency to stop, or at least control, the destruction of remaining forests and look into a wide spectrum of solution-oriented measures of sustainable land use has nowadays been recognized as crucial to our survival. This recognition has triggered projects and programs on forest conservation, reforestation, and agroforestry aimed at the integration of trees in denuded, agricultural landscapes.

WHY A PANEL ON TREE GROWING IN AGRICULTURAL LANDSCAPES?

Trees outside the forest (i.e. trees established mostly on farmlands and built-up areas) both rural and urban, play an important role as a source of wood and non-wood forest products. Communities that do not have easily access to forests increasingly diversify their production and protect their land by maintaining various tree systems on their farms. In Kerala for example, the most densely populated state of India, a study revealed that trees outside the forest account for about 90 percent of the state's fuel wood requirements. Of the 14.6 million cubic meters of wood produced per year, an estimated 83 percent was derived from homesteads (house compounds and farmlands), 10 percent from estates and only about 7 percent from forest areas (FSO 1998 in FAO 2001). Trees may thus relieve the pressure on remaining forest resources and at the same time restore and safe-guard ecological and socioeconomic sustainability in agricultural landscapes. However, not much is known about the dynamics of trees on farmlands and their corresponding contribution to the production of wood and other products and services. Although the multipurpose trees-outside-forest resource is widespread and promoted by various institutions engaged in agroforestry and tree plantations, its significance is unclear due to its absence from most official statistics.

Table 1b: Forest resources and management in Southeast Asia (FAO 2001)

Country	Land area	Forest area 2000					Area change 1990-2000		Volume and above-ground biomass (total forest)		Forest under management plan (total forest)	
		Natural forest	Forest plantation	Total forest								
	000 ha	000 ha	000 ha	000 ha	percent	ha/ capita	000 ha/ year	percent	m³/ha	t/ha	000 ha	percent
Brunei	527	439	3	442	83.9	1.4	-1	-0.2	119	205	-	-
Cambodia	17,652	9245	90	9,335	52.9	0.9	-56	-0.6	40	69	-	-
East Timor	1,479	507	-	507	34.3	0.6	-3	-0.6	79	136	-	-
Indonesia	181,157	95,116	9,871	104,986	58.0	0.5	-1,312	-1.2	79	136	72	-
Laos	23,080	12,507	54	12,561	54.4	2.4	-53	-0.4	29	31	-	-
Malaysia	32,855	17,543	1,750	19,292	58.7	0.9	-237	-1.2	119	205	14,020	73
Myanmar	65,755	33,598	821	34,419	52.3	0.8	-517	-1.4	33	57	-	-
Philippines	29,817	5,036	753	5,789	19.4	0.1	-89	-1.4	66	114	6,935	120
Singapore	61	2	-	2	3.3	n.s.	n.s.	n.s.	119	205	2	100
Thailand	51,089	9,842	4,920	14,762	28.9	0.2	-112	-0.7	17	29	-	-
Viet Nam	32,550	8,108	1,711	9,819	30.2	0.1	52	0.5	38	66	-	-
Total Southeast Asia	436,022	191,942	19,972	211,914	48.6	0.4	-2,329	-1.0	64	109	-	-
Total Asia	3,084,746	431,946	115,847	547,793	17.8	0.2	-364	-0.1	63	82	-	-
Total world	13,063 900	3,682,722	186,733	3,869,455	29.6	0.6	-9,391	-0.2	100	109	-	-

Many large-scale reforestation projects have been implemented to address the deforestation issue since the early 1900s. However, the rate of success among these projects has been less than expected, and as a result, the rate of reforestation has been lagging far behind the rate of forest loss. For example in the Philippines where reforestation started already in 1916, about 70,000 ha of land had been successfully reforested during a seventy-one year period (1916 to 1987) when the average rate of deforestation was estimated at 100,000 ha per year (FMB 1988; Pasicolan 1996).

Since the introduction of agroforestry in the 1970s, tree growing by smallholders has likewise been proposed as a means to combat deforestation and promote sustainable land use. In addition, it has been promoted as an effective instrument in the fight against rural poverty. However from the start of its promotion, smallholder tree growing has received considerably less attention from the (less-) developed and scientific worlds, when compared to large-scale tree planting and reforestation. More recently, with the expansion of cultivated areas in many regions of the world, the awareness is mounting that lands controlled by smallholders are of increasing importance in both sustainable food production and safeguarding environmental services, such as, biodiversity conservation and carbon sequestration. They more and more determine the environmental, economical and ecological value of the landscape. Whether smallholder tree growing does indeed make a difference, and if so, to what extent it contributes to sustainable development and environmental protection and conservation, needs further investigation.

Natural forests are increasingly protected, which has lead to a ban on logging and restrictive use of natural forest products in countries like Thailand and the Philippines. Smallholders are therefore in search of alternative sources of tree products and ways of integrating trees into their farming systems. Moreover, it is expected that, with mounting population and land shortage, the number of farmers with smallholdings will continue to increase in the near future.

The panel on tree growing in agricultural landscapes was set up to realistically assess, the status of smallholder tree growing in countries like the Philippines. To what extent have trees been integrated into smallholder farming systems and what evidence do we have that such systems lead to sustainability and enhanced livelihoods? Where is the concept exceptionally promising, and where should we admit its failure? How can we ensure successful implementation of different tree-based farming technologies in terms of adoption, impact on livelihoods and environmental impacts? In short, is smallholder tree growing a viable strategy for sustainable development in rural areas?

THREE PANEL THEMES

The questions raised in the discussion above have resulted in the formulation of three panel themes, as outlined below.

Smallholder on-farm tree growing for rural development

This theme explored smallholder tree growing and associated systems of product processing as means to improve rural livelihoods. What kind of tree based farming systems can we distinguish and how do these compare to other types of land use in terms of profitability? To what extent can smallholder rural processing be implemented as a way to raise the value of tree products? In this context, also experiences with public-private partnerships have been discussed.

Smallholder on-farm tree growing for sustainable land use

Agricultural intensification has presented countries like the Philippines with substantial environmental problems over the past decades. Farmers experience a decrease in soil fertility and are forced to apply growing quantities of chemical fertilizers, pesticides and herbicides in order to sustain their cash crop yields. With increasing awareness of farmers' struggle to maintain adequate yields, initiatives have been undertaken, by both government and non-governmental organizations, to promote more sustainable land use. Smallholder tree growing has been considered as one of the most promising technologies. Yet, it is still unclear whether tree growing has been practiced in such a way that all aspects of sustainability have been met. What is farmers' perception about (newly introduced) tree-based farming systems and to what extent, and under which conditions, have they indeed adopted such systems? What methods of scaling up of smallholder tree growing have been successful and what knowledge and communication gaps do still exist?

Smallholder on-farm tree growing for biodiversity conservation and other environmental services

The on-going disappearance of large stretches of forests threatens biodiversity and the natural environment in general throughout the Philippines. In order to conserve remaining forest, protected areas have been established worldwide. Yet, in recent years, the growing of trees in agricultural areas has become an additional focal point for safeguarding the environment and its services. However, various questions remain to be answered. To what extent do smallholder tree based farming systems indeed contribute to environmental services like biodiversity conservation, carbon sequestration and watershed protection? What are the most optimal systems, and to what extent do these systems meet the needs of both smallholders and society in general? How can we reward smallholder tree growers contributing to environmental conservation and sustainability that serve society as a whole?

PANEL ORGANIZERS AND PARTICIPANTS

The panel was hosted by Isabela State University Cabagan campus and co-organized with the World Agroforestry Center of the Philippines (ICRAF). The organization of the panel was also an activity conducted within the framework of the Junior Expert Program funded by the Ministry of Foreign Affairs in the Netherlands. The latter program formed an extension of the Cagayan Valley Program on Environment and Development within two specific fields of research, i.e., agroforestry and indigenous people. A total of twenty-four participants, coming from the Philippines, Indonesia, Malaysia, Sri Lanka and the Netherlands, joined the panel.

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