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Farm Forestry to Alleviate Poverty? Findings from Three Differently Developed Rural Economies in Central Laos

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Abstract

The socio-economic development of largely subsistence-oriented rural areas is a prominent policy objective in Laos. Whereas in the surrounds of major urban centres and regions with favourable infrastructure and market access a dynamic industrial and service sector have emerged, most of the countryside remains economically undeveloped.
Cultivation of commercial tree species is acknowledged as a successful option to diversify farm production, to generate supplementary financial income and thus to include rural populations into the market economy. The Government of Laos promotes private afforestation through allocation of permanent use rights of degraded forestlands to individual households, as well as the recognition of private ownership of the plantations.
The study analyses socio-economic prerequisites for and obstacles of farm forest establishment at individual farm-household level employing the Farming Systems Research Approach. Three villages that differ with regard to their socio-economic development and that represent semi-subsistent, semi-commercialised and fully commercialised economic contexts, respectively, were investigated.
The explorative field research followed a specifically elaborated mix of methods. Empirical social research tools such as interviews and observation were conducted to collect primary data sets of 73 peasant households.
The study revealed that farm forest establishment largely is determined by customary land claims. Households that are traditionally deprived of access to land resources benefit from farm forestry in circumstances only of abundant, yet unclaimed land reserve.
Under semi-subsistent conditions, farm forestry plots are mainly established by well-off households that have a minimum level of land, labour and capital resources at their disposal. In the commercialised village, tree planters typically belong to the medium population stratum, whereas well-off households primarily derive their livelihood from profitable off-farm employment and less from farm activities. In general, farm forestry failed to address the needs of the poorest households.

2 Background and Aim of the Study

With the promulgation of the New Economic Mechanisms in 1986 and the corresponding legal and regulatory framework in the 1990s, the government of Laos started to transform the country's centrally planned economy. Although industrialization and commercialization increasingly contribute to the gross domestic production, Laos still is one of the economically least developed countries in Southeast Asia. The annual per-capita gross domestic product (purchasing power parity) accounts for only US$ 1720 (World Bank 2004). The agricultural sector produces more than half of the economic output and remains the backbone of the national economy. It provides employment for more than 80% of the Laotian citizens.

So far, economic development is largely limited to the vicinity of the capital town of Vientiane and the plain of the Mekong River. Advantageous agro-geographic conditions and favourable infrastructure and market access have promoted agricultural intensification in this region. External technology input and investments have led to the emergence of an industrial and service sector, and created a dynamic and largely monetary economy in the surrounds of the capital. Yet, in most rural areas, the economy remains substantially undeveloped. Remoteness, deficient physical infrastructure and poor capital accessibility represent only some of the obstacles for economic growth. Large parts of the population still depend upon subsistence agriculture and are excluded from the merits of the economic upswing.

Reducing the regional dualism and economic disparity remains one of the outstanding challenges in Laos. The inclusion of rural areas into the market economy is defined as a prominent policy objective. Intensification and diversification of agricultural primary production is acknowledged as being the base of economic development of these regions.

Towards this aim, cultivating commercial tree species is one widely acknowledged option to diversify peasant farm production. As examples of *Tectona grandis* growing farmers in northern Laos show, farm woodlot management has the potential to significantly contribute to income generation and livelihood improvement of the rural households (Xayvongsa Lampoune 2001). Additionally, farm forestry reduces the demand for timber and fuelwood from natural forest reserves and serves to reforest and rehabilitate degraded forestlands.

Despite these widely acknowledged potentials, on-farm tree growing is a relatively uncommon activity in most regions of the country to date. The government of Laos has introduced a number of pilot schemes to develop and to test appropriate instruments and technologies to promote peasant afforestation. These schemes partly are supported by international donor organizations and aimed to be scaled up to district levels.

This study was undertaken to investigate constraints on farm forest establishment at individual farm-household level in three selected pilot schemes, and to relate the findings to the different levels of socio-economic development of the study villages in central Laos.

3 Methodology

The study was conducted as an explorative field research that follows the principles of the Case Study Approach (Yin 2003). The research is based upon a combination of qualitative and quantitative data collection and analysis and involves both village and household levels of assessment.

The Farming Systems Approach constitutes the analytical frame for the investigation. Exploratory farm surveys were conducted to derive a guiding model of the farm system for in-depth socio-economic analysis (Figure 1).

Sources: after Beets (1990:163); FAO (1997:13) (modified)

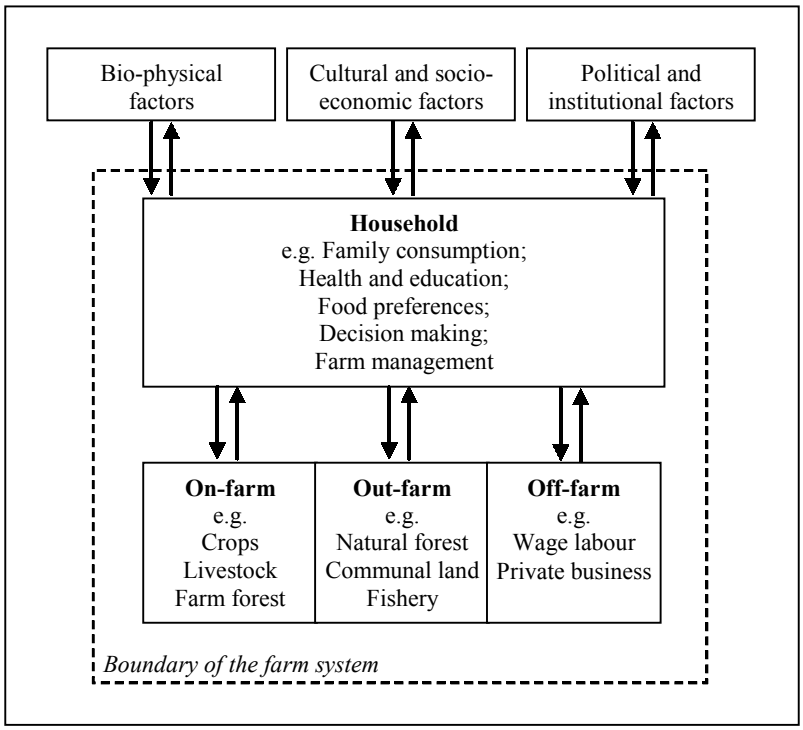


Figure 1: Idealized model of a peasant farm system

According to this model, the farm system is assumed as being composed of the 'on-farm', 'out-farm' and 'off-farm' sub-systems. While the 'on-farm' component refers to customarily claimed or legally acknowledged private land property of individual households, the 'out-farm' sub-system relates to natural resources that are utilized without being under the exclusive claim of individuals. The 'off-farm' sub-system comprises alternative income-generating activities.

Secondary data was drawn from a variety of sources, including topographical and thematic maps of the study sites, published and unpublished literature such as statistics, legal provisions, research reports, project documents, reference books and others. Primary socio-economic data was obtained by utilising a mix of tools that included exploratory and in-depth surveys of 73 households, as well as problem-centred expert interviews, group interviews and field observation. A semi-structured questionnaire was developed based upon the information acquired during the explorative research phase, and pre-tested and adapted prior to the survey. The questionnaire was composed of open and closed questions and involved rating and ranking procedures also. A probability sampling was applied based upon the stratification of the village population in tree planter and non-tree planter households, as well as according to wealth groups. Case studies of individual households were finally conducted to deepen the understanding of predominant livelihoods. The combination of multiple research tools and data sources served the purpose of triangulation of measures and methods.

4 Study sites

The three study villages are located within a region that is commonly referred to as central Laos (Figure 2).

Source: NAWACOP 2003 (modified)

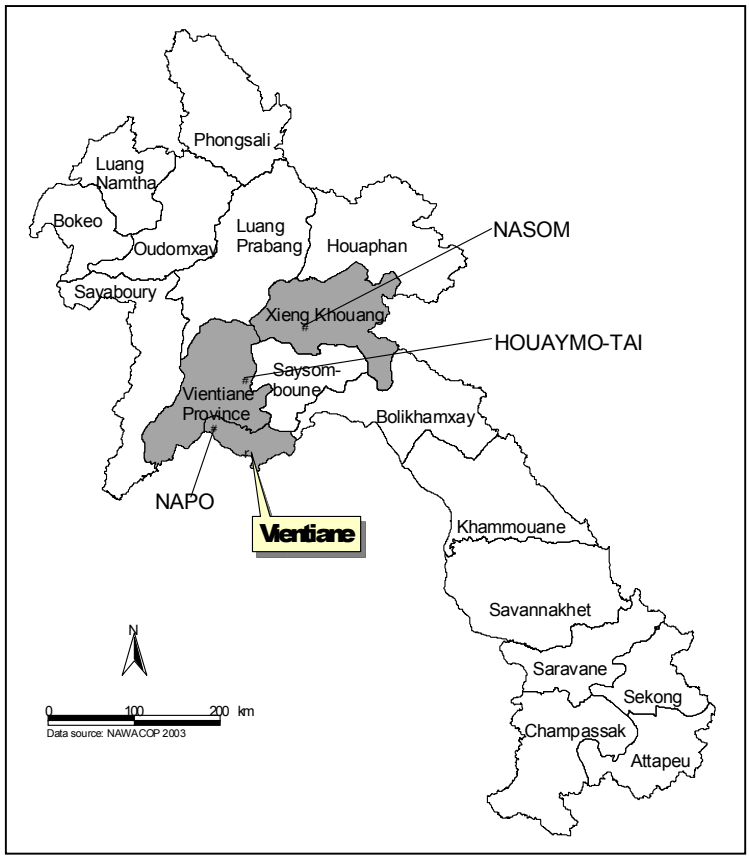


Figure 2: Administrative map of Laos and location of the study sites

The selection of the case study sites aimed to cover a variety of bio-physical and socio-economic conditions. According to the logic of theoretical replication (Yin 2003), each case represented a unique setting that varied from the other cases with regard to pre-defined key criteria, such as the potential of arable land, the abundance of natural forest resources and the socio-economic development of the village (Table 1).

Among the three study sites, the village of Nasom is the most disadvantaged and of semi-subsistent character. Although poor soil fertility and mountainous climate limit agricultural production, subsistence farming and livestock rearing represent the predominant livelihood strategies. The villages' remote location and poor access road infrastructure restrict linkage to market places as well as the opportunities for off-farm employment.

Houaymo-tai village is the economically and commercially most developed village among the study sites. The village is located on an arterial traffic route and is easily accessible. Its location facilitated the installation of basic infrastructure, such as electricity supply, and creates diverse opportunities for off-farm employment. Numerous villagers sell goods or offer services to travellers that pass the village. The availability of public transportation increases villagers' access to markets as well as to paid employment in the region. Rough terrain conditions seriously limit the availability of arable land.

Napo village represents the intermediate context. Its villagers possess favourable access to markets and wide opportunities for off-farm employment due to the proximity to the capital town. Favourable natural conditions in the Mekong plain and extensive land reserve support agricultural production. Rice cropping is the major farm activity and yields considerable surplus that is sold to the capital city.

Each of the study villages is located within the working area of one internationally supported natural resource management project. Since the 1990s, these projects have promoted the establishment of farm forests and provide technical advice and/ or seeds, seedlings, fencing materials etc. to the peasant households. Meanwhile, the projects have reached their final phase or were terminated already.

Table 1: Bio-physical and socio-economic characteristics of the study villages

Village / Variable	Nasom	Napo	Houaymo-tai
Location	Xieng Khouang province, Phaxay district; 250 km NE of Vientiane	Vientiane municipality, Sangthong district; 80 km NW of Vientiane	Vientiane province, Vangvieng district; 100 km N of Vientiane
Major landscape	Upland plateau ('Plain of Jars')	Alluvial plains of the Mekong river	Foothills of the mountainous uplands
Predominant actual vegetation	Grasslands/ Pasture [d]	Degraded forest, crown cover <20% [e]	Bushy fallow vegetation with *Imperata spec.* [f]
Internationally supported project/ operator	NAWACOP (Nam Ngum Watershed and Conservation Project); GFA Terra Systems (Germany)	PROFEP (Promotion of Forestry Education Project); German Technical Cooperation	FORCAP (Forest Conservation and Afforestation Project); Japan International Cooperation Agency
Abundance of and access to natural forest	**Low**	**Very high**	**Very low**
Avg. size of production forest [ha/capita]*	0,42 [d]	3,17 [b]	0,07 [f]
Avg. size of conservation forest [ha/capita]*	0,95 [d]	2,44 [b]	0,59 [f]
Potential for permanent agriculture	**Low**	**High**	**Very low**
Avg. size of agricultural land [ha/ capita]*	1,41 [d]	0,88 [b]	0,09 [f]
Agro-ecological limitations	Low yields due to poor soils and mountainous climate [a]	Tillage restricted during dry season due to semi-humid climate [b]	Rough terrain, soil erosion; deteriorated sites due to past shifting cultivation [c]
Socio-economic and commercial development	**Semi-subsistent**	**Semi-commercialised**	**Commercialised**
Roads, accessibility	Unpaved road to neighbouring villages (6 km) that has all-weather road access	All-weather roads to neighbouring villages	Asphalted National Route 13 passes through the village; public transportation
Markets	Market in one neighbouring village held twice per week	small number of minor trading activities in one neighbouring village	Small shops and trading activities in the village; daily market in one neighbouring village (1 km)
Types of off-farm employment	Wage labour on other villagers' farms during agricultural peak season; handicraft; governmental employment (teachers)	Temporary employment in enterprises in Vientiane; handicraft; fieldwork during peak seasons; governmental employment (teachers)	Construction enterprises, trading and service businesses within the village; cement factory and construction companies nearby; governmental employment

* Average per-capita figures calculated from the village land use planning and number of village population. *Sources: [a] Carson (1995); [b] PROFEP, FoF (2000); [c] JICA, MAF (1998); [d] NAWACOP (2003); [e] PROFEP, FoF (2003); [f] JICA (1998)*

5 Results

The analysis employs a comparison between households that practise farm forestry ('tree planters') and households without tree growing activities ('non-tree planters') to identify the constraints on farm forest management at farm household level of assessment.
The selected variables to characterize both of the population strata, as well as the results of the survey are presented in Table 2. Since on-farm tree growing was introduced only recently in the villages, the adoption process of farm forestry is not yet completed. This fact results in a comparatively inhomogeneous composition of the population strata and explains the lacking statistical significance of some findings.

Table 2: Socio-economic characteristics of tree planter and non-tree planter households

Variables	Village	Nasom		Napo		Houaymo-tai	
	Stratum / Indicators	TP* (N=15)	NP* (N=10)	TP (N=12)	NP (N=11)	TP (N=10)	NP (N=15)
Social status	Age of household head [years]	43,3 (9,43)	41,6 (16,63)	44,8 (12,16)	32,6 (9,40)	47,8 (12,21)	37,3 (12,78)
	% of immigrated households	0	20,0	25,0	63,6	0	26,7
	% of households classified as "poor"/ "wealthy"	20,0/ 13,3	30,0/ 0	25,0/ 33,3	81,8/ 0	10,0/ 0	13,3/ 0
Land availability	Farm size [ha/capita]	0,43 (0,17)	0,30 (0,18)	1,41 (0,64)	0,98 (0,73)	0,71 (0,57)	0,53 (1,03)
	% of legally recognized land	86,3%	74,8%	96,1%	61,0%	41,7%	34,3%
	Size of permanent rice paddies [ha/capita]	0,23 (0,088)	0,19 (0,099)	0,29 (0,217)	0,12 (0,121)	0,08 (0,089)	0,01 (0,026)
Rice sufficiency	Annual rice (in)sufficiency [kg/capita]	+97,7 (124,4)	-16,4 (111,5)	+359,4 (233,5)	+245,2 (293,2)	-119,2 (69,2)	-154,3 (66,2)
Labour availability	Household work force [persons]	4,7 (1,21)	3,2 (1,20)	4,6 (1,69)	2,9 (1,04)	4,5 (1,13)	3,6 (2,18)
	Annual amount of hired labour [man days]	6,5 (20,85)	0,0 (0,00)	73,8 (137,9)	10,1 (12,98)	35,4 (57,43)	17,8 (61,62)
	Average monthly workload per capita [man days]	15,5 (4,33)	14,2 (5,82)	13,0 (5,97)	12,7 (6,25)	13,8 (4,75)	16,2 (8,83)
	Seasonality of workload** [man days/ capita]	488,5 (114,20)	372,2 (157,69)	437,3 (116,19)	378,7 (142,21)	195,3 (70,56)	172,4 (54,80)
Farm performance	Return on on/out-farm labour [000 Kip/man day]	19,4 (11,63)	15,2 (7,99)	14,9 (8,35)	13,9 (14,23)	14,6 (8,67)	12,3 (43,65)
	Return on off-farm labour [000 Kip/man day]	12,0 (13,92)	7,3 (9,41)	15,3 (11,31)	27,3 (27,16)	8,1 (14,61)	18,2 (17,36)
	Return on total labour [000 Kip/man day]	18,9 (11,11)	15,2 (7,99)	14,8 (7,19)	15,2 (10,65)	16,8 (7,03)	18,5 (12,08)
Income availability	Annual net income [000 Kip/capita]	2113 (1092)	1453 (764)	1558 (1095)	1226 (758)	1863 (799)	1928 (859)
	Contribution of off-farm activities to total income [%]	7,8	3,7	21,0	38,4	28,0	65,4

*TP=tree planter; NP=non-tree planter; ** Sum of positive differences of monthly workloads from the average. Shaded fields indicate statistical significance at the 0.05 level. *Source: Field research (2003)*

Tree planter households were found to generally be well established. Juvenile households of household heads below 30 years of age that often face resource limitations are under-represented among this stratum. Furthermore, tree planters comprise a smaller proportion of socially less regarded immigrant households and more often are regarded as being "wealthy" in the villages of Nasom and Napo. On the other hand, observation from Houaymo-tai suggests that most affluent households are not involved in farm forestry in this village.

It was found that tree planters generally hold larger farms and in addition enjoy higher legal security of the landholdings. Due to the larger size of permanent paddy fields, tree planters also produce more rice per capita than non-tree planter households. Rice insufficiency represents a major constraint on farm forest establishment for non-tree planter households in the semi-subsistent economy of Nasom. The economic and commercial development of Houaymo-tai, in contrast, has reduced the dependence of both population strata on subsistence rice production, since foodstuff is readily obtainable from the markets.

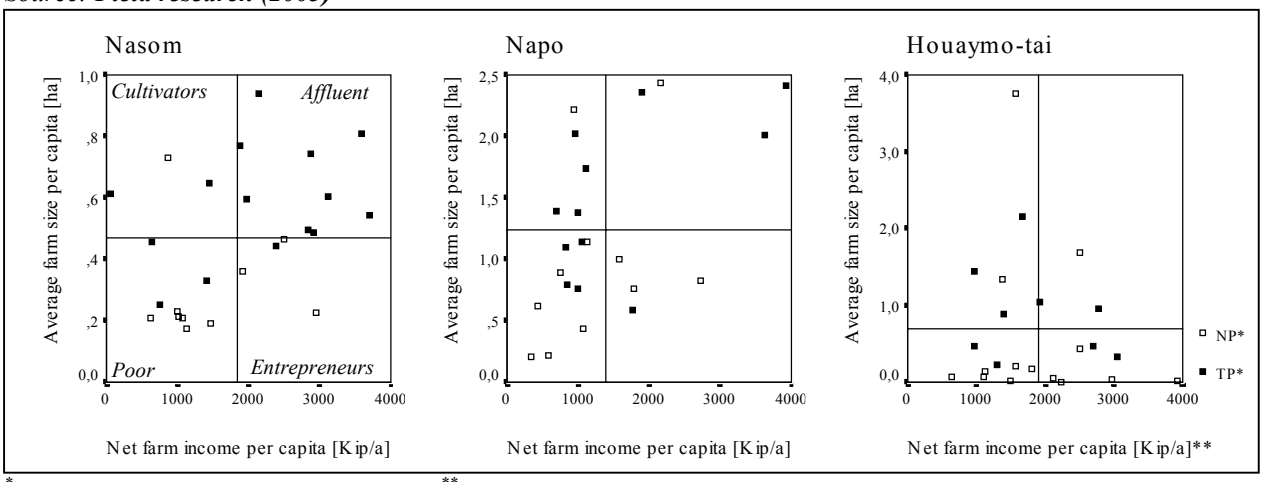
Their smaller household size and lower age of the children of non-tree planter households result in a household work force of only approximately 60% to 70% in Nasom and Napo villages, and of 80% in Houaymo-tai as compared to the tree planters. At the same time, non-tree planters employ less external labourers and cannot fully compensate for temporary labour shortage during agricultural peak seasons. Furthermore, the household case studies revealed that non-tree planters frequently suffer from physical overstrain and exhaustion due to low-yielding farm activities and inefficient farm equipment.

Due to their larger farms, tree planters perform a higher monthly workload than non-tree planters in Nasom and Napo villages. In Houaymo-tai, however, non-planters spend more time on work due to the predominance of off-farm employment as an alternative to farming among these households that often requires them to work overtime and, in addition, does not show the distinct off-season relief as farm work usually does.

Due to their privileged access to productive paddies and the adoption of improved technologies (e.g. fertilizer, motor-driven machinery), tree planters generally derive higher returns on their agricultural on-farm and out-farm labour. Yet, non-tree planters obtain higher returns on off-farm labour from profitable employment opportunities that have emerged in Napo and Houaymo-tai. In these two villages, most off-farm employment is even more profitable than farming and households that mainly rely on these activities generate highest returns on total labour.
Increasing availability and profitability of off-farm employment as a result of economic and commercial development reduce the significance of agricultural production both in terms of sustenance and farm income. As a consequence, the difference between tree planters' and non-tree planters' annual net income decreases along the gradient of economic development from Nasom to Napo, and non-tree planters derive even higher annual income in the economically most advanced village of Houaymo-tai.

With regard to resource endowment in terms of farmland and annual net farm income, four categories of households can be distinguished: a) Households whose annual net income and farmland per capita both are lower than the average of the village (so-called "Poor"); b) Households of above-average income and land resources ("Affluent"), c) Households that derive above-average income from below-average land resources ("Entrepreneurs"); and d) Households with below-average farm income despite their above-average land resources ("Cultivators"). Figure 3 presents the distribution of tree planter and non-tree planter households in these categories.

Source: ***Field research (2003)***



*TP=Tree planter, NP=Non-tree planter; **two outlying cases excluded. The reference lines denote the average values for both strata.
Figure 3: Land resources and income of tree planter and non-tree planter households

The differences are statistically significant for the tree planter stratum of Nasom, only. Nevertheless, the Figure illustrates that the size of available farmland strongly influences farmers' decision to afforest, as tree planters are generally under-represented among the "Poor" and "Entrepreneurs" clusters that both are characterised by below-average access to farmland. In the semi-subsistent context of Nasom village, the cluster of "Affluent" households is exclusively composed of tree planters pointing at the importance of sufficient farm income to allow for farm forest establishment in this socio-economic context. In the commercialised village of Houaymo-tai, in contrast, the "Entrepreneurs" and "Affluent" categories comprise a relatively high proportion of non-tree planter households with access to profitable off-farm employment. In all three villages, however, tree planters are under-represented among the "Poor" category. Table 3 summarises the categorisation of tree planter and non-planter households.

Table 3: Categorisation of tree planter and non-tree planter households

Farm system characteristics	**Level**	**Socio-economic context**		
		Semi-subsistent	Semi-commercialised	Commercialised
Farm size and Extent of on-farm/ out-farm activities	Low	NP*		NP
	Medium		NP/ TP	TP
	High	TP*		
Farm income and Extent of off-farm activities	Low	NP		
	Medium		NP/ TP	TP
	High	TP		NP

*TP=Tree planter, NP=Non-tree planter *Source: Field research (2003)*

Within the semi-subsistent context, farm forestry plots are mainly established by well-off households that have a minimum level of land, labour and capital resources at their disposal. In the commercialised village, tree planters typically belong to the medium population stratum, whereas well-off households primarily derive their livelihood from profitable off-farm employment and less from farm activities. In general, farm forestry failed to address the needs of the poorest households.

6 Conclusions and Recommendations

The study has illustrated that the households' dependency on agricultural farm production generally decreases with the economic development of a region. Due to profitable employment in the secondary and tertiary economic sector, some farmers have reduced the scope and intensity of their farm management. Farm forestry, as well as other land uses that require low labour input, will increasingly be regarded as a type of land utilization alternative to tillage in the future.

However, the socio-economic analysis has revealed that farm forestry tends to manifest the existing socio-economic dissimilarities among the households in economically less developed contexts. In the largely primary production based villages of Nasom and Napo, farm forestry predominantly benefits population strata with above-average access to land that goes along with household wealth and high social status. In Houaymo-tai, in contrast, household wealth and social status are largely independent from access to land resources, but influenced by type and availability off-farm employment. Farm forestry mainly addresses medium population strata in the economically and commercially developed situation of this particular village.

The research has revealed that current schemes to promote farm forestry fail to actively include and benefit the poorest households. So far, mainly above-average population strata establish and manage farm forests. Due to the crucial importance of poverty alleviation for sustainable natural resource management it is recommended to identify suitable changes and adaptations in the present extension approaches to improve the poor households' participation in farm forest establishment.

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