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# DEPENDENCE ON FOREST PRODUCTS BY PEOPLE LIVING AROUND PROTECTED FORESTS IN THAILAND : SUSTAINABLE RELATIONSHIP OR FOREST-ECOSYSTEM DESTRUCTION?

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## ABSTRACT

Forest-ecosystem disturbance caused by non-timber forest product (NTFP) harvesting by local people is a controversial issue. Conflicts between local people and the government due to NTFP collection, occur in several protected forests in Thailand. The main purpose of this study was to explore people's collection and use of NTFPs at 2 sites; site 1; consisted of 4 villages in the buffer zone of a protected forest, and site 2 was a village adjacent to a reserved forest. Additionally, institutional arrangements were also investigated. The results indicate that some NTFPs, i.e. various types of mushroom, bamboo shoots and *Phak Wan* (*Melientha suavis* Pierre) are popular and heavily collected by local people. Thus the degree of forest-ecosystem disturbance may be beyond the natural carrying capacity, particularly for highly priced products . To minimise the negative effects on forest ecosystem disturbance due to NTFP collection, co-operation from local people is imperative. Management techniques that utilise the insights gained from community-relation programs such as those at Site 2, are also needed. Above all, officials should have a positive attitude towards the villagers' livelihood. Flexibility in dealing with local people is also considered important.

## INTRODUCTION

People's dependence on forest products has been evident world-wide especially in tropical developing countries, as tropical rain forests offer a great variety of valuable resources either in a timber or non-timber form. This links closely to the well-known global problem of deforestation. There is general agreement that between 76,000 and 92,000 square kilometres of forest are eliminated each year, and that at least a further 100,000 square kilometres are grossly disrupted annually (FAO and UNEP, 1982; Hadley and Lanley, 1983; Melillo et al., 1985; Molofsky et al., Myers, 1980, 1984). Thailand has one of the poorest records of deforestation. Terrestrial and mangrove forests have been dramatically cleared within the last few decades (Senana-rong, 1994 and Jarupphat, 1996).

Forest encroachment and conflicts between local people and the government have been reported in several protected forests (Kanja-naphan and Khao Sa-ad, 1995) Loebenstein, Trux and Welte, 1993), have suggested that proper management of buffer zones around protected areas seems a plausible tool to not only alleviate deforestation problems but also to maintain a sustainable relationship between human beings and forest ecosystems. The main of the current study is to explore people's collection and use of NTFPs. The intensity of harvesting activities and institutional arrangements related to these activities were investigated.

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## SITE DESCRIPTIONS

This study was undertaken in 2 sites. Site 1 was composed of 4 villages in the buffer zones of the protected forest in the north-west of the central region of Thailand. Site 2 was a village adjacent to a protected forest in the north-eastern region of the country. In general, the 2 sites share some common features: 1) both are located in or nearby dry dipterocarp forests, 2) village dwellers have moved to the sites from other rural areas either within the province or from other provinces, 3) the main occupation of the villagers is farming, 4) a popular secondary occupation among the local people during the dry season when the villagers are free from farming work is construction work in the larger towns, and 5) the common reason for moving to live in the current village was to find land for farming.

## RESEARCH METHODOLOGY

This study employed both qualitative and quantitative research approaches. The qualitative methods used in this study were in-depth interviews and direct observation. The 5 selected villages in the study were visited initially by the researchers with 5 aims.

First, to introduce themselves to key persons in the areas, such as kamnan (head of sub-district), village heads, some village committee members, government officials working in or taking care of the villages under study, monks (if available) and some well-informed villagers.

Second, to use the in-depth interview technique to gain a basic idea of how local people live in their everyday life.

Third, particular aspects of their livelihood associated with the main purpose of the study were explored.

Fourth, to identify key informants whom the researchers and their assistants would approach during their qualitative data collection. More key informants, however, could be identified later on by the "*snow ball*" technique in which one informant refers the researchers to other informants.

Fifth, to set up logistic preparations for research assistants, e.g., find hosts for research assistants who would stay with them for about a month in each village.

During the stay, these assistants' main function was to gain an insight into not only the villagers' everyday life, but also their livelihood affecting forest resources around their communities. Most of the data gleaned was undertaken through in-depth interviews. Note taking and audiotape recording were also applied.

Using the same agenda in the 5 villages under study, in-depth interviews were undertaken by the researchers during a series of visits. The agenda covered the following issues: village history, socio-economic and demographic characteristics of the villages, non-timber forest product collection and use. Sorting, coding and categorising were applied for qualitative data analysis.

In terms of quantitative methods, a survey technique was employed. Target population in this study was the household heads in the villages under study. Through a block-wise random sampling technique, a sample was drawn from roughly 30 percent of the total households in each village under study, 162 in Site 1 and 58 in Site 2. To facilitate sampling procedures, sketch maps of the villages under study were used. Showing household locations, the maps were prepared by research assistants working in the villages. From each block (an area surrounded by roads or paths) 30 percent of the households were randomly selected. Where the household head was not available or too old, to be interviewed a well-informed household member was selected.

Based on the qualitative data gained from the 5 villages under study and a literature review, a structured questionnaire was designed. Two pre-tests were undertaken in 2 villages with socio-economic characteristics and livelihoods similar to those in the selected study area. After the pre-tests, the original questionnaire was revised.

It should be noted here that this study does not intend to provide a high level of accuracy of any quantity or price involved. The quantification of NTFPs collected was extremely complicated due to some reasons. First, the accuracy of either the quantity or the price of NTFPs collected highly depended on the respondents' memory which could be widely distorted. In this study, the researchers asked the respondents to recall how much NTFPs they had collected within the last year, and how much they had earned from them. Two, to estimate the quantity of NTFPs collected is very difficult, thus, ranges were often given by the respondents. Third, the prices of NTFPs fluctuated widely. In general, the respondents tended to give "best prices" they could earn from the collected NTFPs. Consequently, the quantities and prices presented in this study are estimates derived with a few limitations as mentioned above.

Eight interviewers were recruited for a quantitative data collection survey. A 1-day orientation was arranged for these interviewers. The main purpose of the orientation was to clarify the main purposes of the study, the purpose of each question, as well as to freshen up interviewing techniques of the prospective interviewers. An interviewing practice was also arranged among the interviewers. The quantitative data were analysed through SPSS PC+ (Statistical Package for Social Science).

## NON-TIMBER FOREST PRODUCT COLLECTION AND USE

This section is composed of 4 sub-sections, and investigates how the villagers in the villages under study make use of non-timber forest products. Through the use of structured interview form, the study focused on the quantity of NTFPs collected and their use. The first sub-section gives a general view of the whole study area, the second and third focus on Site 1 and Site 2 respectively. Popular non-timber forest products collected in the areas are discussed. The fourth sub-section deals with non-timber forest products collected in minor quantities in the study area. It should be noted here that comparisons of amount of any products collected from Site 1 and Site 2 should be interpreted carefully. This is because many more households in site 1 (162 households) were involved in the survey, compared to those in Site 2 (58 households).

### 1) Non-timber forest product collection and use: A general view of the study areas

Up to 81 % (177 households) of the 220 households studied in the 2 sites are involved in collecting non-timber forest products. Some collected just 1 type, while others collected several types. The households make use of the non-timber forest products either for subsistence or as a source of cash. Only 43 households do not reportedly collect non-timber forest products. In Site 2, all 58 households studied collected non-timber forest products, while 74% (119 households) of those in Site 1 did so. The non-timber forest products collected included: 1) mushrooms, 2) bamboo shoots, 3) (edible) leaves, roots and flowers, 4) wood (for charcoal), 5) wild vegetables, 6) wild animals, 7) fish, and 8) others, e.g., orchids and fruits.

### 2) Non-timber forest product collection and use in Site 1: Popular non-timber forest products

The most popular non-timber forest product collected in this area was bamboo shoots. Ninety seven percent (116 out of 119 households) of the households involved in non-timber forest product collection reported harvesting bamboo. During May to December, the bamboo shoots collected in this area weighed up to 18,092 kilograms

a year. Thirty-eight households out of all of those collecting bamboo shoots reported that they consumed about 2,570 kilograms of the shoots, the rest were for sale. The villagers either sell the bamboo shoots themselves (for 3-4 baht[2] per kilogram), sell to local merchants (3-5 baht per kilogram), or sell to the merchants in town (4-10 baht per kilogram[3]). The estimated income from bamboo shoots earned by the respondents was approximately 70,000 baht a year. "*Ruak*" (*Thyrsostachys siamensis*) is the most popular bamboo shoot collected in the area. Over 1,200 kilograms of this species was collected annually by the respondents for either household consumption or sale. The income generated from this particular type of bamboo shoot was estimated at around 40,000 baht a year.

In addition to bamboo shoots, wood (for charcoal) and mushrooms are the other non-timber forest products collected, although to a lesser degree, by the households in Site 1. Over 90% of those households involved in non-timber forest product collecting reported that they collected wood and/or mushrooms. The respondents collected up to 44,000 kilograms of broken or dry wood annually. Most of the respondents make charcoal from the wood for household consumption. Two households reported that they sold up to 1,300 kilograms of charcoal, and earned around 1,000 baht a year from this activity. Most of the households (41 households) reported that they collected "*Mairuam*" (*a mixture of different woods*) e.g., Pradu (*Pterocarpus macrocarpus*), Maka (*Sindora siamensia*), Salao (*Lagerstroemia tomentosa*), Tabak (*Lagerstroemia cuspidata*) and Toom-kwao (*Mitragyna brunonis*). Quantification of each type of wood was, however, very difficult.

Most of the households in Site 1 collected a particular type of mushroom known locally as "*Het Cone*" (In terms of quantity, however, the mushroom collected by the respondents in Site 2 is 2.5 times more than that collected here). Eighty-two households of the 93 that collect mushrooms in Site 1, collect *Het Cone* ranging from 0.5 to 100 kilograms per household per year. Only 120 kilograms of the total of 663 kilograms of mushroom collected was for household consumption, the rest for sale. Thirty households in this area either sell the mushroom themselves, sell to local merchants, or to merchants in town. The latter purchase over a half of *Het Cone* collected by the households. In total, the households make around 54,600 baht a year from selling *Het Cone* at 100-200 baht per kilogram. The earnings vary from 200 baht to 12,750 baht per household per year. The *Het Cone* season here was reported to start in September (1 month earlier than Site 2) and last until November.

**3) Non-timber forest collection and use in Site 2: Popular non-timber forest products**

Mushrooms were the most popular non-timber forest products collected within the area. Eighty six percent (50 out of 58) of the households interviewed collected mushrooms. Thirty households of those households collecting mushrooms collected *Het Cone*. Mushrooms can be collected year round, but the best months are October and November. This is because *Het Cone* the most favoured and highly priced mushroom, is available at this time.

In total approximately 3,153 kilograms of various types of *mushrooms* were collected by the respondents annually. Some collected mushrooms only for household consumption, while others collected both for consumption and sale. Almost all households collecting *Het Cone* (29 of 30 households) sold the mushroom. Unlike the collectors in Site 1, almost all of the mushroom collectors here sell the mushrooms themselves along the roadside. Mushroom prices vary widely

[2] 1 US $ is approximately 36.5 Thai baht.

[3] Difficulties were encountered in quantifying wood for charcoal. In this study, the amount of wood collected for charcoal making was roughtly calculated by multiplying charcoal weight (in kilograms) by 5.

from 10-400 baht per kilogram, depending on the type of mushroom.

It is estimated that 2,370 kilograms of mushrooms were collected annually for sale by the respondents. The earnings are about 202,400 baht a year. Over a half of the mushrooms collected (about 1,680 kilograms per year) are *Het Cone*. A relatively small portion of *Het Cone* collected is for household consumption (520 kilograms), about 1,160 kilograms are sold for 122,700 baht.

Comparing to other mushrooms, *Het Cone* is the most expensive. Its best price could range from 50 baht to 80 baht per krathong[4]. It is customary in this area to sell mushrooms by the krathong, rather than by the kilogram. The best price of *Het Cone* would cost around 400 baht per kilogram. Thus, *Het Cone* provides the best income for the people, in comparison to other non-timber forest products available in the area. This is why the mushroom is so popular and almost all households are involved in collecting it.

Wood collecting (for charcoal) is the least popular activity in Site 2. Only 3 households reported collecting. The first household collected approximately 10 kilograms of Rung (*Shorea siamensis*), while the second collected Hiang (*Dipterocarpus obtusifolius*), Pradu (*Ptermac*), Maka (*Sindora siamensia*), Toomkwao (*Mitragyna brunonis*) and Yang (*Dipterocarpus altus*). These 2 households made charcoal just for household consumption. The third household collected 250 kilograms of Teng (*Shorea obtusa*) to make charcoal for sale from which it earned around 700 baht a year.

**4) Other non-timber forest products collected in the study areas**

In addition to mushrooms, bamboo shoots and wood for charcoal, some other non-timber forest products were collected in the area under study, these included wild vegetables, i.e., Phak Wan (*Melientha suavis* Pierre), wild animals, insects and orchids. This sub-section focuses on these resources.

**4.1 Phak Wan** (*Melientha suavis* Pierre)

Phak Wan is the most popular wild vegetable collected by the villagers in both study areas. Sixty-nine % (82 out of 119) of the households involved in collecting NTFPs at site 1 and 57 % (31 out of 58) collected Phak Wan. Phak Wan, is the fourth most popular product in Site 1, the first three most popular products are bamboo shoots, mushroom, and wood. At Site 2 only mushrooms are more popular than Phak Wan.

The Phak Wan season is normally from February to April. Only the very young tips of the vegetable are picked. When old, the Phak Wan trees can be over 2-metres tall. In these cases, Phak Wan collectors climb up the tree to collect the leaves. While on the tree, the collectors put the leaves into their shoulder bags or baskets. During an in-depth interview with a Phak Wan collector in Site 2, an irregular case was reported. Around 3 years ago, while picking the leaves on the tree, an 11-year old boy fell from a Phak Wan tree, hurt himself badly, and died at a hospital. This illustrates that even children are involved in collecting Phak Wan. Old people also collect the leaves.

Respondents in Site 1 collected approximately 890 kilograms of Phak Wan, whilst in Site 2 only 530 kilograms was harvested. Tips were sold for between 10-300 baht per kilogram at Site 1 and for between 50-250 baht per kilogram at site 2. In total 19 households at Site 1 gained 34,500 baht a year from the sale of Phak Wan. Whilst at Site 2, 12 households gained around 63,000 baht annually from the sale of Phak Wan. It is noted that the average price of Phak Wan in Site 2 (120

[4] "Krathong" is a container made of a board leaf of "Ploung" (*Dipterocarpus tuberculatus*). This type of tree is easily found in the area. A krathong roughly contains 10 mushroom.

baht per kilogram) was much higher than that in Site 1 (40 baht per kilogram). This was due to the better quality of Phak Wan in Site 2. The villagers in Site 2 collected only very young tips (3-4 inches long), while those in Site 1 collected older tips (6-8 inches long). The younger tips are normally considered better quality, thus better priced. Most respondents at Site 1 sold the tips to merchants in town while those at Site 2 sold the tips themselves. Phak Wan was consumed within the households at both Sites, however the majority was sold.

Other wild vegetables were also collected by some of the villagers and respondents in Site 1 collected 1-10 kilograms of each of the following species; Phak Nam (*Lasia spinosa* Thwaites), Chaom (*Acacia pennata* Linn), and about 60 kilograms of Phak Bung (*Ipomoea reptans* Poir) annually. All of these vegetables were for household consumption. Respondents in Site 2 collected about 6 kilogram of Phak Gude (*Diplazium esculentum* Swartz) and the same amount of Phak Nam (*Oxalis corniculata* Linn) a year.

**4.2 Wild animals**

Relatively fewer households in both areas reported that they were involved in hunting wild animal (25 from 119 households in Site 1 and 3 from 58 households at Site 2). Squirrels, Tree Shrews (*Tupaia glis*), Ground Lizards, wild rats, birds, barking deer (*Muntiacus muntjak*), rabbits and bamboo rats (*Rhizomys*) were reportedly trapped or hunted by the villagers in both areas for household consumption. An in-depth interview with a male food vendor in Site 2, confirmed that a squirrel could be sold for 20 baht. He also said that the meat tasted very good. In total, 78 squirrels, 68 tree shrews, 75 ground lizards, 50 birds, 69 rats and 8 bamboo rats were reportedly hunted by the respondents at Site 1 a year, while 30 rats, 10 tree shrews, 9 squirrels, 2 rabbits and 1 barking deer were hunted annually at Site 2.

**4.3 Stems and flowers**

Eighteen households in Site 1 reported that they collected 3 types of stems and flowers. Five kilograms of Krabook (*Amorphophallvs campanulatus*) and 10 kilograms of Krateu (*Zingiber zerumbet* Smith), were both collected for household consumption. Approximately 40 kilograms of Krajeao (*Curcuma sessilis* Gage) (with edible flowers) was collected, fifty percent of which was sold at 8 baht per kilogram.

It was reported that very few households in Site 2 collected stems and flowers. Only 3 respondents reported collecting Krabook (*Amorphophallus campanulatus*) (with edible succulent stems), and Krajeao (*Curcuma sessilis* Gage). Ten and 3 kilograms were harvested respectively a year. It was also reported that all Krabook collected was for sale at 8 baht per kilogram, Krajeao was just for household consumption.

**4.4 Insects**

Eight households in Site 1 reported they collected insects and ant eggs for consumption at home, about 4 kilograms were collected a year. No respondents at Site 2 reported collecting insects.

**4.5 Orchids**

Four households in Site 1 and two in Site 2, reported collecting not more than 10 orchid plants for decoration, none were for sale.

**4.6 Fruits**

Makampom (*Phyllanthus emblica* Linn), Makok (*Elaeocarpus hygrophilus*), Matoom (*Aegle marmelos* Linn), Mafai (*Baccaurea sapida* Muell.) and Samor (*Terminalia chebula* Retz.) were fruits collected in Site 1. Takor (*Schleichera oleosa*), Makampom, mangoes and jackfruits were collected at Site 2.

## INSTITUTIONAL ARRANGEMENT

In-depth interviews as well as direct observations by the researchers during fieldwork revealed that the people in Site 1

and Site 2 had different practices of NTFP collection. Those in Site 2 were more careful when collecting NTFPs, i.e. mushrooms and Phak Wan, as illustrated in an interview with a woman in Site 2 collecting mushrooms.

*The villagers here are aware of the value of mushrooms. We are so lucky to live here, the land is plentiful with various kinds of mushrooms. People elsewhere even from other provinces come here for mushrooms in the season.... We never use knives or any metal containers when collecting mushrooms. The metal equipment will destroy mushroom sources. No mushroom will grow again where you have used metal equipment...Those outsiders who come for mush-rooms here don't care at all; what they want is as much mushrooms as possible. We always ask them not to use any metal equipment around here.*

This view was confirmed by interviews with other mushroom collectors in the village. Avoiding the use of metal objectives is a common belief and practised in this area. Although, it was not possible prove this belief scientifically, it demonstrates that the villages value their mushrooms and wish to conserve them. In contrast, such careful mushroom collecting was not reported in Site 1.

The people in Site 2 also pick Phak Wan carefully. Information from direct observations by the researchers as well as that from in-depth interviews indicates that the people here try not to harm the trees while picking the edible tips. No branch cutting or tree burning is practised, even though some people in rural areas believe that such practices could accelerate and increase Phak Wan's production. Several villager's explained that the authority who takes care of the forest asked them not to engage in such practices because they were not only unlawful, but also would not yield more or faster Phak Wan tips. Although cutting the branches of or deliberate burning of Phak Wan trees for better yield, was not observed in Site 1, at least 2 fresh tree trunks were found by the researchers in a forest a few metres from a nearby road. According to a couple of informants, the trunks with around 1-foot diameter, may have been felled for their edible leaves. "*The wood of such trees is too soft to be used as timber*", said an informant. Four months later, the researchers revisited the site and found the trunks still left where they had been before. The informant might be true.

It should be noted that at Site 2 it is not only the local people's belief that helps conserve forest ecosystems, but also how the government officials relate to the local people. During field work, the researches were often told by the people in Site 2 that those government officials made it clear to them that even though it was not allowed by law to collect any forest products in the protected forests, the government unit in charge of the forests allows the villagers to make use of some NTFPs, i.e. mushrooms and Phak Wan as far as they do not do the following.

1) destroy experimental sites obviously marked in the forest,
2) cut branches or trees of Phak Wan or any other trees,
3) light fires especially to burn Phak Wan trees and
4) hunt for any animals.

If the rules are broken, no villagers will be allowed in the protected forests.

The director of the government unit in charge of the forests in Site 2 elaborated that his reason for allowing the local people to collect NTFPs in the protected forests in that mushrooms and Phak Wan are plentiful in their seasons. These products are an important source of income to the poor people. It is obvious that some villagers quit their regular jobs during the mushroom and Phak Wan seasons to earn their living by collecting these NTFPs. A 36-year-old man related that "*my income from mush-room last year was over 20,000 baht. It was*

*good enough to fix my house and spend for my child's schooling cost*". The director also added some positive effects of allowing the villagers to make use of the NTFPs,:

*If we make them (local people) understand the rules clearly and promise not to break the rules, it is unlikely that the impact of collecting mushrooms and Phak Wan is significant in terms of forest ecosystem disturbance. So far, they have behaved quite well. No fire has been reported in these forests for years. In fact, these people are very helpful as forest-fire watchers. They understand well that we are kind to them, thus they are willing to help us in taking care of the forests from which they can earn their living.*

In-depth interviews with the villagers as well as those key informants in the study areas indicate that the villagers in Site 1 and Site 2 have different attitudes towards the government officials and rangers. A more positive attitude was observed in Site 2. The director as well as deputy directors of the government unit in charge of the forests in Site 2 revealed that it is the unit's policy that maintaining a good relationship with local people is imperative. An annual party for the villagers in Site 2 has been held at the station for years. The gathering is a good opportunity for both the authorities and the villagers to exchange their ideas on various issues including those about the station's policy on allowing local people to make use of forest products under particular conditions, and other everyday matters. This helps create a better understanding among the government officials and local people. Other activities that help support a positive attitude toward the station as well as the forests include: 1) annual luncheon party held at the local primary school in Site 2. Food, drinks and gifts are provided to school children by the station, while the parents also join the party, and 2) in the dry season, it has become routine for the station to provide drinking water using large water-trucks to nearby villages as requested. This has been practised for years. As a result, not only good co-operation by local people in terms of forest ecosystem protection was achieved, but also the forests around Site 2 have been free from forest fires for nearly 10 years. This is exceptional. Compared to other dry dipterocarp forests throughout the country. Forests around Site 1, face serious forest fires problems yearly. The damage caused by months-long forest fires in Site 1 in the dry season 1998 were inconceivable. It was found in this study that nearly all villagers in the 4 villages under study in site 1 believed that the cause of "*forest fires*" was not natural but human-made. As reported by the respondents in Site 1, and agreed by the authorities, forest fires are related to human activities such as burning for good wild vegetables, and easier hunting. The report also reflects that hunting in protected forests still occurs. It might be true, then, to say that "*if you can keep people, you can keep forests*", as expressed by the director of the Environmental Research Station.

A negative attitude towards the government officials was found among the local people in Site 1, in spite of some public participatory activities such as forest-fire extinguishing training programmes held by the authority for local people. The villagers were afraid of being removed from their villages, as some villagers said that they had been threatened by the officials. Thus, these people, to some extent, have developed a negative attitude towards authority. Living in fear, the villagers want to make their villages to be seen as "*well settled*" by growing fruit trees, building more permanent houses, and even building a primary school in a village under study. The people believe that "*well-settled*" villages are unlikely to be expelled by the authority.

In conclusion, institutional arrangement could play an important role in protecting forest ecosystems especially in protected forests. This study indicated that a more

understanding, flexible and insightful approach proved to be more effective than on inflexible and unfriendly approach.

## IMPLICATION AND CONCLUSION

In conclusion, it is evident that some non-timber forest products are still popular, and heavily collected by local people in the study areas. Thus, the degree of forest-ecosystem disturbance might be beyond the natural carrying capacity especially when the products are valuable in terms of cash and people are not aware of conserving their forest products. Mushrooms, bamboo shoots and Phak Wan are good examples for this. Nevertheless to contain the negative effects on forest ecosystem disturbance through human-related activities, co-operation from local people is imperative. To gain good co-operation, understanding is needed. Thus, management techniques relying on insightful community-relation programs are of great importance. The officials involved should realise that making use of non-timber forest products is vital not only for the subsistence of local people, but also for their source of income. Above all, the officials should have a positive attitude towards the villagers' livelihood. Flexibility in dealing with local people is, however, considered important in order to make dependence on forest products by human beings a sustainable relationship instead of forest-ecosystem destruction

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