



SLUSE JOINT COURSE

**USE, ROLE AND POTENTIAL OF THE FOREST IN THE
LIVELIHOOD STRATEGIES IN WANG NAM KHIAO,
THAILAND**

**THEMATIC COURSE: INTERDISCIPLINARY LAND USE AND NATURAL
RESOURCE MANAGEMENT (LFKK10246U)**



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ABSTRACT

The creation of national parks and biosphere reserves in Thailand might promote the goal of conservation but, in some cases, neglect the livelihoods of rural households if their needs are not considered in the design and implementation of these forest policies. To avoid conflicts, more research is therefore needed to understand the role of forest products in maintaining or improving the livelihoods of rural households (HHs), and to learn if alternative livelihood strategies to collection of forest products could compensate for former income.

Our research study was conducted in Northeastern Thailand, in Nakhon Ratchasima Province during nine days in February-March 2018. The aim of the study was to identify the use, role and potential of the forest in the livelihood strategies of the people living in the village Wang Nam Khiao (WNK). First, we investigated what characterized the access to forest products, and how the access was mediated. Second, we investigated what income sources were important for the villagers, here including the role of forest products. In addition, we examined the villagers' dependency to forest products and their rationales behind their collection, including how land tenure arrangements impact the extent to which they practice this activity. Finally, we investigated how ecotourism could be an alternative livelihood strategy in the future.

The research questions were analysed by applying several analytical frameworks, such as forest environmental income, including non-timber forest products (NTFPs), Livelihood Framework, theory of access and institutions. Data was obtained through both quantitative and qualitative methods. We found that the access to Thap Lan National Park (TLNP) and Sakaerat Biosphere Reserve (SBR) differed greatly through formal and informal arrangements. In the National Park (NP), relations between the villagers and the TLNP law enforcers seemed well functioning. In SBR on the other hand, a conflict over access to forest products was exemplified. Collection of forest products was not the main source of income for most of the HHs surveyed, but was still important to a certain extent, especially for land less HHs. The forest had different functions such as *gap-filling*, *safety net* or *poverty prevention*. We found that the villagers had many rationales for collecting forest products, both economic and cultural. In a perspective of future sustainable livelihoods around the forest, opportunities such as forest conservation through better harvesting management and ecotourism were explored, and further research would be needed to fully measure the impacts on the villagers' livelihoods of such alternatives.

Keywords: *Thailand, Nakhon Ratchasima Province, Thap Lan National Park, Sakaerat Biosphere Reserve, livelihoods, forest products, NTFP, access, dependency, rationales, ecotourism*

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ABBREVIATIONS

Abbreviation	Name/term
HH	Household
NCPO	National Council for Peace and Order NCPO
NP	National Park
NTFP	Non-timber forest product
PRA	Participatory Rural Appraisal
PA	Protected area
RFD	Royal Forest Department
SBR	Sakaerat Biosphere Reserve
SERS	Sakaerat Environmental Research Station
SSI	Semi-structured interview
TLNP	Thap Lan National Park
WNK	Wang Nam Khiao

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INTRODUCTION

Thailand has experienced severe deforestation since the 1960's. It is estimated that between 1961 and 2005, the total forest coverage in Thailand decreased from 53.3% to 31.5% (Roberts, 2016). Precise numbers on deforestation today do not make consensus due to political and methodological differences (Leblond & Pham, 2014). In the 1980's there was an increasing environmental concern about forest degradation (Gebremeskel & Demessie, 2011). These concerns led to new policies such as the National Forest Policy, that aimed at conserving at least 25% of the national forest and keeping 15% of the forest for economic use (Gebremeskel & Demessie, 2011). The effort to conserve the forest seems to be a general popular discourse across the politics of modern rulers in Thailand. The current military junta; the National Council for Peace and Order (NCPO), has since its *coup d'état* in 2014, promised to increase the forest area in Thailand to 40% over the following 10 years. Furthermore, orders by NCPO were issued to evict 'criminal encroachers' from the protected areas (PA) in order to end deforestation (Gershkovich, 2014). According to the Food and Agriculture Organization of the United Nations, logging is acknowledged to be one of the factors that increase deforestation. However, it is only one out of many causes and not necessarily the most critical. Nevertheless, logging continues in the forests of Thailand even though it was banned in 1989 (FAO, 2006). Generally, around the highlands of Southeast Asia, when policies aimed at conserving or restoring forest areas are made, a narrative about forest communities being forest destroyers exist - the criminal encroachers. In Thailand, the 1961 National Forest Park Act and the 1964 National Reserve Act are examples of such policies and government discourses that affect forest communities that used to live inside or around these areas (Gershkovich, 2014). This discourse, that people and forests are mutually exclusive, implies that forest dwellers must be evicted without considering their traditional use and dependence of NTFPs. In other words; the policies aimed at conserving the forest might contradict and deprive the livelihoods of communities living inside or around these forests (Roberts, 2016; McLean & Straede, 2003).

Since the forest is an important source of income, both for subsistence and cash, for many rural households in the Global South, it should not be neglected in the policies aiming at conserving forests (Byron & Arnold, 1999; Angelsen & Wunder, 2003). The World Bank (2004) estimates that about 1.6 billion people rely directly to some extent on forest resources, such as timber and NTFPs, to sustain their livelihoods (Byron & Arnold, 1999). Since many rural households depend on forest resources, access to these resources are crucial. The creation of PAs might promote the goal of conservation but, in some cases, neglect the livelihoods of rural households if their needs are not considered in the creation of such PAs. By comparing two PAs, Albers & Grinspoon (1997) have shown how enforcement of conservation policies benefits more from, what they describe as a cooperative management approach, compared to restrict policing activities. The inclusion of local people in the management, where needs of the people are negotiated to balance the conservation goals, has shown to be of less economic expense for the reserve managers. The approach has also proved how local people's dependence on the extracted resources decreases. Here, the expensive policing where access to PAs are restricted, might protect the core areas of these. However, as Albers & Grinspoon have showed in Khao Yai NP, this approach has resulted in agricultural

encroachment and over-extraction of some products in the outskirts the NP. Furthermore, when access to forest products is lost, people might have to find other income sources in terms of alternative livelihood strategies. Ecotourism might be such an alternative (Sims, 2010).

Problem statement:

The creation of PAs in Thailand might promote conservation but, in some cases, neglect the livelihoods of rural households. To both achieve conservation and sustain rural people's livelihoods, more research is needed to understand the role of forest products in maintaining or improving the livelihoods of rural households (HHs). In addition, it is important to investigate how other livelihood strategies could be an alternative to collection of forest products. The aim of our study is therefore to identify the use, role and potential of the forest in the livelihood strategies in Wang Nam Khiao (WNK).

Research Questions:

1. *What characterizes WNK villagers' access to forest products, and how is this access mediated?*
 - 1.1 How are the regulations in Thap Lan National Park and Sakaerat Biosphere Reserve enforced and maintained?
 - 1.2. How would the villagers prefer the forest to be regulated?

2. *What role does the forest have in the villagers' livelihood strategies in WNK?*
 - 2.1. Which income-generating activities do the villagers consider important for their livelihood?
 - 2.2. Which forest products are collected from the forest, when, where and for what purpose and how does that differ between household?
 - 2.3. What are the rationales behind the collection of forest products for different households, and how do they depend on this livelihood strategy?
 - 2.4. How do land tenure arrangements impact the extent to which the villagers collect forest products?
 - 2.5. How is the status of the forest products perceived by the villagers?

3. How could ecotourism be an alternative livelihood strategy for the villagers of WNK in the future?

STUDY AREA

Wang Nam Khiao

The village of WNK is located inside Nakhon Ratchasima Province, in the Northeastern region of Thailand. Inside the province, WNK is situated in Wang Nam Khiao District in the sub-district Udom Sap. WNK is one of the 17 villages in the sub-district, and it is the most populated village with 323 HHs (Udom Sap sub-district statistics, 2016).

WNK is located in the Sankamphaeng mountain range, whose climate is tropical savannah (Köppen classification) with the dry season from November until April, being divided in a cold season from November to February and in a hot season during March and April. The remaining months constitute the monsoon or rainy season.

One of the main land use in WNK is agriculture. There can be found several crops, such as paddy rice, cassava, sugarcane, and maize (corn), but also land bounded for fruit or vegetable production (Treue, 2018).

Protected Areas

Around WNK, two PAs can be found: Thap Lan National Park (TLNP), covering 2,236 km² (Cohen, 2014) and Sakaerat Biosphere Reserve (SBR), covering 1,732 km² (Waengsothorn, 2017). Both PAs are constituted by different habitats such as dry evergreen forests, dry dipterocarp forests, mixed deciduous forests, bamboo forests, savannas or shrub land (Ongsomwang & Srisuwan, 2012; Waengsothorn, n.d.; Waengsothorn, 2017).

In TLNP, the 1950s logging concessions in the forest were granted by the Royal Forest Department (RFD), until 1973, when it was declared a national forest reserve. Nevertheless, these concessions lead to the clearance of large extensions of forest that allowed villagers to move inside and to grow crops (Cohen, 2014). Therefore, to protect its high biodiversity, TLNP was established in 1981, banning agriculture inside and the extraction of forest products and mineral resources (Sims, 2010). However, TLNP was established over numerous hectares of agricultural land. These areas are considered conflict zones (Appendix A), as agriculture is illegal inside NPs of Thailand (Sims, 2010). However, in 1998 a cabinet resolution about “Land and Forest Management” was passed allowing villagers who already had land, before the establishment of the NP, to practice agriculture (Praiwan, 2015). TLNP is formally divided into three zones depending on the accessibility. First, the *Intensive use zone* where recreation activities are allowed as it is bound to receive tourism. Second, the *Outdoor recreation zone* where general access is allowed but not camping. Third, the *Strict Nature reserve zone* where the access is limited to research activities and always subject to prior permission from the NP authorities (Appendix A).

SBR was established in 1976 after the foundation of the Sakaerat Environmental Research Station (SERS) in 1967. Before the establishment of SERS, encroachment and illegal logging had reduced

the size of these forested areas. After its establishment, all the settlements inside were relocated, allowing the RFD to carry out restoration measures in the degraded areas (Trisurat, 2010). In 2000 the Man and Biosphere Reserve committee decided to establish a zoning in the SBR. The reserve was divided into three zones which restricted the access to its natural resources in different manners (figure 1): The *Core zone* of 59.05 km² (3.41%) which consists of highly protected ecosystems; the *Buffer zone* of 112.87 km² (6.52%), in which non-extractive activities take place, such as research, monitoring, training and education; and the *Transition zone* 1,559.76 km² (90.07%) where hunting is not allowed.

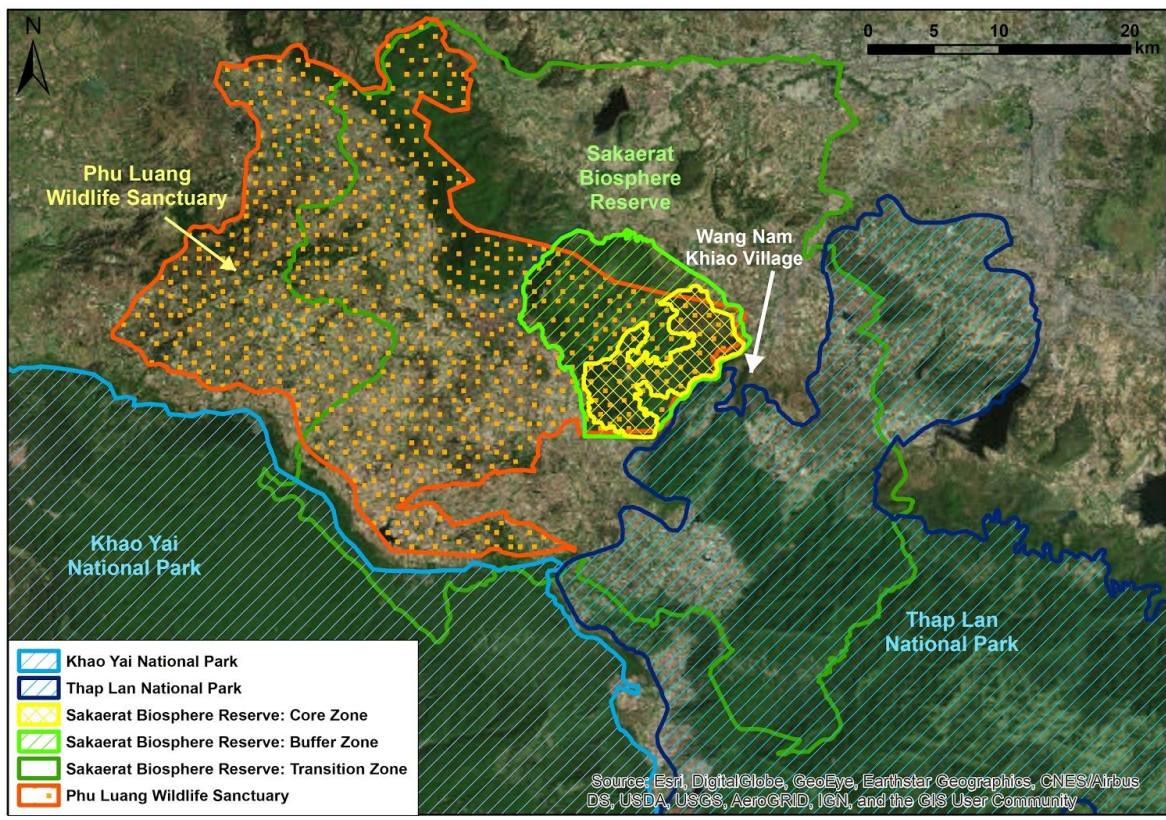


Figure 1. Map of protected areas around Wang Nam Khiao district.

Analytical Framework

Forest environmental incomes

The interest in measuring the effect of *forest environmental incomes* and more specifically, NTFPs for sustainable livelihood strategies has been on the development agenda since the mid-80's (Belcher et al., 2005). *Forest environmental income* is here defined as the income “*in cash or in kind*” from wild or non-cultivated natural resources extracted from forests (Angelsen et al., 2014, p. S14; Sjaastad, 2005). Indeed, several case studies mention the importance of this under-researched source of income, especially for the rural poor (Angelsen & Wunder, 2003; Belcher et al., 2005; Delang, 2006; Shackleton & Pandey, 2014).

Livelihoods

Livelihoods, as defined by Chambers & Conway (1992, p. 1) is understood as “*the capabilities, assets, and activities required for a mean of living*”. Ellis (2000) specifies that the different types of *assets* will determine the options that people have to pursue different livelihood strategies. The assets are divided in five capitals:

1. *Natural capital* can be characterized as natural resources
2. *Social capital* is defined by the relationship individuals have between each other which they can take advantage of to improve their livelihoods
3. *Financial capital* refers to financial stocks
4. *Physical capital* is understood as physical possessions and land improvements
5. *Human capital* refers to human characteristics such as education, health and experience that are susceptible to influence work force or labour

Ellis' livelihood framework (Ellis, 2000) also gives importance to access and context that determine *livelihood strategies*. These *livelihood strategies* are the ensemble of activities that a household will use to secure its future income (Ellis, 2000). Among them, *livelihood diversification* (diverse portfolio of activities) has often been cited as one of the livelihood strategies used by rural families to improve their living conditions (Ellis, 1998).

Access

Inspired by Ribot & Peluso (2003) who define *access* as “(…) *the ability to benefit from things*” (2003, p.155), we settled on their analytical frame in which property, illicit actions, and entitlement relations as well, are given attention. Thus, by access to forest products we aimed at identifying the mechanisms, where access to - as the ability to benefit from - forest products are gained, maintained and controlled. Access will also be analysed in context of the presence of the two PAs surrounding the studied village.

Institutions

Institutions are also closely related to access to resources as they can be understood as “(...) *systems of established and prevalent social rules that structure social interactions*” (Hodgson, 2006, p.2) with the role “(...) *to regulate behaviour through constraining actions that would otherwise maximise self-interest at the cost of social co-operation*” (Jakimow, 2013, p.497). Examples of these institutions can be formal like laws, property rights such as land tenure arrangements or trade authorities (Ellis, 2000). Informal institutions on the other hand can be represented by social constructions such as gender, corruption, governance (Jakimow, 2013).

Among them, *land tenure* will be explored as a possible rationale to livelihood strategies. As defined by Ashley (2016, p.153), Land tenure is a “ (...) *complex social institution which governs the relationship among people with regard to assets such as land, water bodies and forests.*” These dynamic relationships define the Use, the Control and the Transfer or Rights by individual or governments (Ashley, 2016). Accordingly, tenure security is likely to influence individual smallholders' livelihood strategies (Ellsworth, 2002; Panichvejsunti et al., 2018).

Both the focus on access and on the types of institutions is important to understand what factors are mediating the access to natural resources for the communities depending on it (Scoones, 1998).

NTFPs

According to Delang (2006), non-marketed NTFPs have been given too little attention, when estimating the economic value of these products for the people who collect them. The idea that NTFPs are just “(...) *food for the poor*” (Delang, 2006, p.70) underestimates their actual importance in sustaining the livelihoods of the collectors who consume them. Thus, the ignorance of the importance of NTFPs in the livelihood strategies of rural populations gives a misleading impression on the economic importance of NTFPs. It also gives an underestimation of the subsistence value, ie. the estimated monetary value of self-consumed products or substitutes if they were bought in the local market (Chibnik, 1978; Delang, 2006). On the other hand, authors like Angelsen & Wunder (2003) argue forest products are not usually the main income sources of poor HHs, but they can have important *gap filling* or *fall back* functions. NTFPs are not part of regular income contributions, but benefit unevenly over time. NTFPs produce low returns and are often primarily used for subsistence and to fill the income gaps. Forest products seldom provide the volume the HHs consume but is widely used to increase the seasonal flexibility of rural livelihoods and cover seasonal shortfalls, and emergencies (illnesses in the HH, draught etc.). It is one of the several safety nets available for the poor HHs.

Angelsen & Wunder (2003) state, “*There is a empirical evidence on the positive link between rural poverty and NTFP dependence*” (p.21).

Though the roles of *safety net* and *support to current consumption* are widely accepted in the literature, debate remains concerning the third function of forest income for rural livelihoods, namely: *pathway out of poverty* (Vedeld et al., 2007) which is defined as

“(...) forest products provide a way to increase household income sustainably either through a “stepping out” strategy (accumulation of capital to move into other activities) or a “stepping up” strategy (intensification and specialization in existing activities)”
(2001 in Vedeld et al., 2007, p.871).

On the other hand, Angelsen & Wunder (2003) draw upon the conclusion that: *“While the woodlands are important as a security (...) we found no evidence that they are able to lift people out of poverty”* (Campbell et al., (2002) in Angelsen, 2003, p. 25). This affirmation is likely to be understood as NTFPs preventing poverty by *“maintaining a minimum standard of living”* for HHs (Angelsen & Wunder, 2003, p.2).

Therefore, our research focusing on NTFPs will analyse the role of contextual factors such as institutions and access in livelihood strategies for a rural community in Northeast Thailand.

METHODOLOGY

Questionnaires

Through questionnaires, we aimed at obtaining an overview of the villagers' different livelihood strategies. We wanted to understand the different income-generating activities and their relative importance.

The questionnaires were orally performed using face-to-face interviews with the help of one or two interpreters. The questionnaires lasted on average 20 minutes. The information gathered from the questionnaires was useful to select households for semi-structured interviews later in the week. It also served to select some of the households we invited to the focus groups and PRAs sessions and to select the households we followed inside the forest for tracking and participant observation. 32 questionnaires were completed during six days.

Four additional questionnaires were conducted with households collecting forest products to find participants for our in-depth methods. These were not included in our statistics since they were found through targeted sampling.

Interviews

Following the same major themes, we prepared different interview guides that fitted the following informants.

- The headman of WNK
- Official from TLNP
- Official from SBR
- Official from the sub-district office
- Representatives from four HHs in WNK

Each of the four HHs selected represented different preferences of income-generating activities with different rationales: The first HH selected had pointed forest products out, as the income source they depended most on, but this income source was one of the few they had. Another household represented the opposite; a HH that had a high diversified income, but that consciously chose not to collect forest products - hereby a non-existing dependency on forest products. The third HH selected depended to some extent on forest products, but had a quite diversified income portfolio. The fourth HH selected explained that they were highly dependent on forest products, yet with many other income activities. Furthermore, two unstructured interviews were conducted during tracking.

Tracking and participant observation

Participant observation was carried out by joining the villagers on their usual route to collect forest products. This we define as *tracking* and the aim was mainly to answer questions regarding the *de facto* access to forest products. The route was tracked with a GPS device and imported into the

computer to create maps in Geographical Information Systems (GIS). In addition, by applying participant observation during the tracks, we hoped to obtain data regarding: what forest products they collect, how and where. Moreover, the tracks gave us greater insight into the everyday lives of the villagers, by getting an embodied experience by walking with the villagers and participating in collecting forest products.

The HHs were selected from our questionnaires, both from the random sampling and snowball sampling, and had forest products as an income source. We did five intentional tracks: track 1-3 were conducted the same day, and track 4 and 5 were conducted two days later to ensure further data quality. Track 3 and 4 were with the same HH, but were tracks in two different areas. We conducted unstructured interviews while tracking with two of the HHs, and semi-structured interviews (SSI) with two other HHs before going into the forest.

Participatory Rural Appraisal (PRA)

A PRA composed of a seasonal calendar and a participatory forest collection mapping session was conducted. Nine HHs participated and were divided into two groups according to the order of arrival. The HHs were selected based on the questionnaires, choosing only the ones that collected forest product.

The aim of the PRA was to obtain information about collection of forest products from the villagers. In the seasonal calendar participants could choose among several stickers that represented the different products that can be collected in the surrounding forests. The participants could glue these stickers on the 'seasonal calendar' (Appendix B): on the months and seasons they collected the corresponding forest products - putting more or less stickers depending on their quantity.

Participatory mapping of their collection of forest products consisted of showing two sets of four aerial photographs at two different scales, which served the participants as a base and as a reference. On the maps, they drew with colour markers, the routes and areas they considered as relevant for the collection of forest products. Moreover, areas that fell outside the limits of the printed maps were identified on a digital map with the help of the research assistants.

Focus group

We conducted focus groups to gain information on the villager's use of the forests; which products they collect, why they choose to collect forest products, their access to the forest and their opinion on the sub-districts future ecotourism plans.

The participants for the focus groups were selected on the criteria of having collected forest products as one of their income-generating activities. The eight villagers participating in the mapping exercise were divided into two groups for the focus group: one group with the villagers who were most outgoing and active (group 1) and another group with those who were more shy and passive (group 2). There were two interpreters, an interviewer, a note-taker and four villagers participating in both groups. Both focus groups were conducted at the same time in the same room.

Presentation to villagers

On our last day of field work, we invited the villagers for a presentation. This was done to present our results for the community and to get feedback from the villagers. The villagers we did interviews and tracks with were informed about the presentation by phone calls, though unfortunately not all our participants could be reached. All the villagers were also invited by the headman over the village speaker but only a few showed up. We had prepared some illustrations and graphs on posters from the data obtained by our different methods. The presentation started by presenting the different results we obtained, to the attendees. At the end of the meeting, we gave the villagers the opportunity to ask us questions if they had doubts about the results we presented. Afterwards, we also asked questions to the villagers about information we wanted to clarify.

RESULTS

1. What characterizes WNK villagers' access to forest products, and how is this access mediated?

1.1. How are the regulations in TLNP and SBR enforced and maintained?

At our focus group session, all our participants answered yes when asking if the villagers' access to the forest were restricted. In some areas of SBR and in TLNP, the villagers explained that some products were not allowed to be collected (Appendix C). During our SSI with the village headman of WNK, he specifically mentioned that TLNP was a forest where “*not even a leaf can be collected*” (Appendix D). The villagers seemed to be aware of this legislation in TLNP, but openly admitted their collection of forest products within the NP. During the focus group, they stated that a good relationship to the rangers of TLNP was present, in which the rangers permitted the villagers to collect certain products, such as mushrooms and Pak Wan (*Melientha suavis*) - an evergreen tree that can reach 10 meters of height (Kerr, 1931). The official of TLNP confirmed this finding and explained that according to the Acts, nothing was legal to be collected, but that they permitted the local villagers to collect products, such as mushrooms, wild plants and fruits. An “informal bufferzone” close to the borders of TLNP permitted such an “agreement”. The TLNP official further explained that:

“Villagers are not allowed to collect forest products for selling but only for subsistence. Sometimes they can collect to sell but not a large amount. They asked first for permission to do so and the application of the law is flexible with them as it is considered a sustainable practice. The permission is asked to the closest ranger office, and they can control who collects because they know who lives in the villages. National park officers don't want people from other villages come to collect forest product.” (Appendix A)

Most of those we interviewed during our focus group and SSIs stated things to be different in SBR than TLNP. Accordingly, they explained that the access to SBR was more restricted than to TLNP. In SBR people had experienced being chased away by rangers when collecting in the forest. In other cases, rangers or researchers from the reserve did not even salute them or introduce themselves, respectively, when meeting villagers. Others claimed that when the villagers occasionally went to SBR to discuss the rules, they would not talk to them. This perceived non-constructive relationship with SBR and the more restricted access to it was paradoxical. When interviewing the official of SBR (Appendix E), it was clear that in some areas of the reserve, people were in fact allowed by law to collect products such as wild plants and mushrooms, compared to TLNP where nothing, by law, was allowed to be collected. We later understood that the laws, and the enforcement of laws, not only were different between TLNP and SBR, but that the boundaries of the different PAs were also overlapping (figure 2).

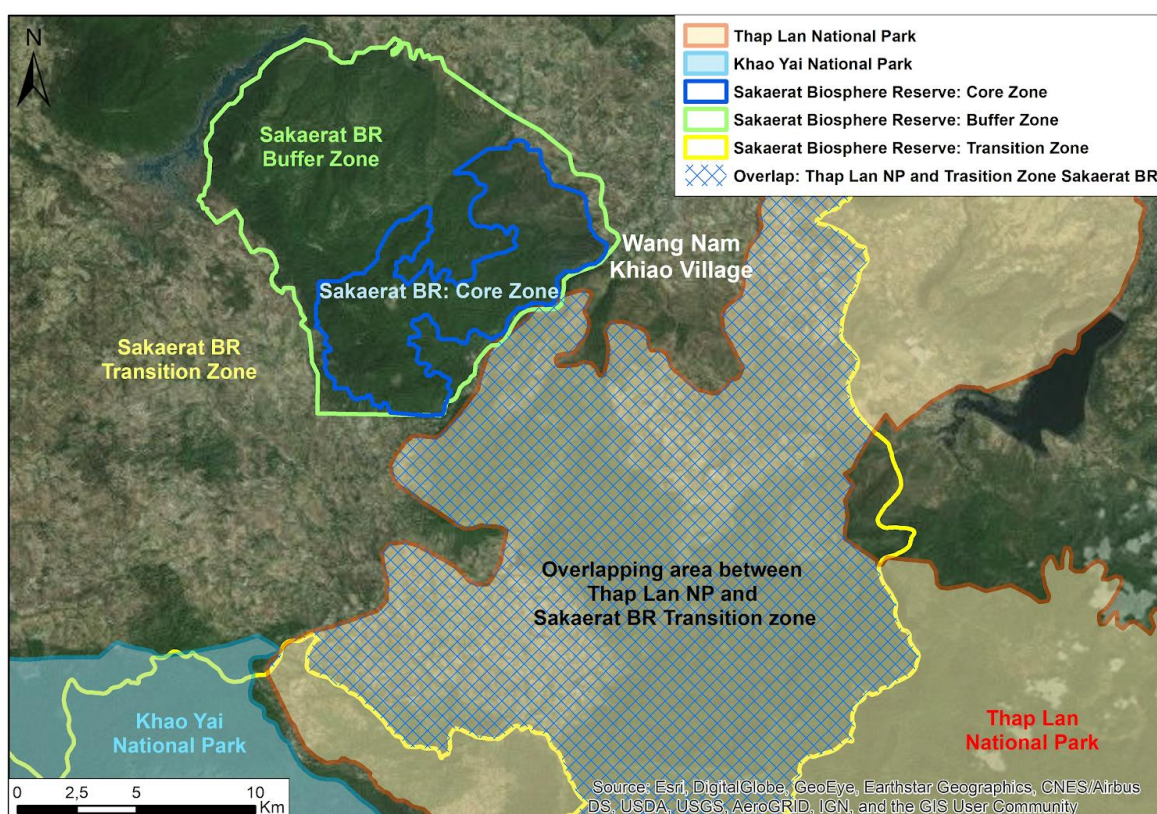


Figure 2. Map of segregation of the protected areas around WNK

Figure 2 illustrates how SBR was divided into three zones with different laws accordingly: *The core zone* - nothing was allowed to be collected. *The buffer zone* - collection of plants and mushrooms was allowed, but not animals. *The transition zone* - where many villages are located. Hunting here was still illegal. Figure 2 also illustrates how the transition zone overlaps with TLNP, and illustrates that WNK is located both in the transition zone and the buffer zone. On figure 2 it is also clear that agriculture is part of this transition zone and part of TLNP. We wondered whether the villagers of WNK were in fact aware of this division of the reserve, and that they were living inside it. On the last day of our fieldwork we presented our findings for the villagers. Here one villager said that he did not know about the division of the reserve, and he did not know that in some areas they were in fact allowed to collect certain products. He would like the director to come and specify these rules. Moreover, according to the officials from TLNP and SBR, both institutions held meetings every month in the villages. The official of SBR explained that many villagers, about 20, came to these meetings to discuss the management of the reserve. However, during our focus group, many participants said that they were not aware of these meetings and others said that the headman of the village attended meetings. Overall it appears that the villagers of WNK did not think that their relationship to SBR was well-functioning. Nonetheless, while doing a track with a villager, she mentioned that the restrictions in SBR were quite new and that in the past the rangers were not as strict. The new rules, she said, were communicated at a meeting by officers from SBR in the village (Appendix F).

At our PRA session we asked the villagers to show where they enter the forest. Based on this information, we constructed a map with all the areas mentioned (figure 3). Figure 3 shows, by the villagers own explanations, that they enter the TLNP and the core, the buffer and the transition zone of SBR.

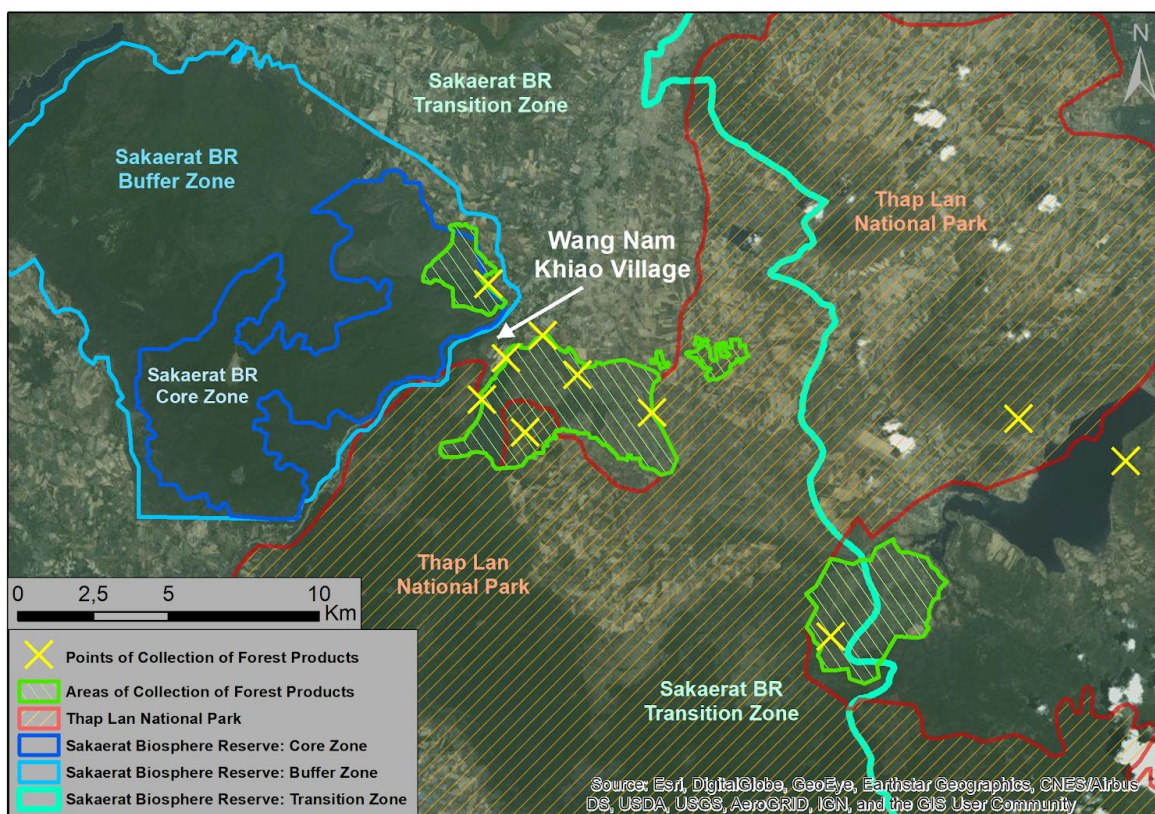


Figure 3. Map of areas of collection of forest products. Results from the PRA.

1.2 How would the villagers prefer the forest to be regulated?

According to the villagers at our focus group and SSIs, a new law established about 10 years ago made some of the villagers’ actions illegal. The villagers would like the access to the forest to be as it was before this law was passed. According to the official of SBR, a law in 1994 made it illegal to collect forest products in the core zone. Due to the language barrier and time constraints we were not able to investigate this law. It is possible that this was the law the villagers referred to.

The villagers from the interviews claimed that the new rule was established to stop hunting and logging. Thus, they made the rules more strict. Some said at the focus group that they would not accept hunting, and that they would like it to be punishable by prison. An ID-card system was also an idea mentioned by a villager, to be able to identify the local villagers, and to give only them permission to collect products.

2. What role does the forest have in the villagers' livelihood strategies in WNK?

2.1. Which income-generating activities do the villagers consider important for their livelihood?

The data collected in the questionnaires was used to investigate which income-generating activities the respondents consider as most important for their livelihoods. The results in this section are based on questions regarding their dependence on different income activities and the time they spend on these activities.

Figure 4 illustrates the income-generating activities the HHs depend the most on. 47% of the respondents replied that 'employment' was the income activity they were most dependent on. The activity they were secondly most dependent on was 'remittances' and 'small business' with 13 % each. The third income activity was 'shop' and 'agriculture' with 9 %. The income activities the HH's allegedly depended the least on were 'government support', 'small business and employment' and 'forest products', each of them only making up for 3 % of all the responses in the questionnaire.

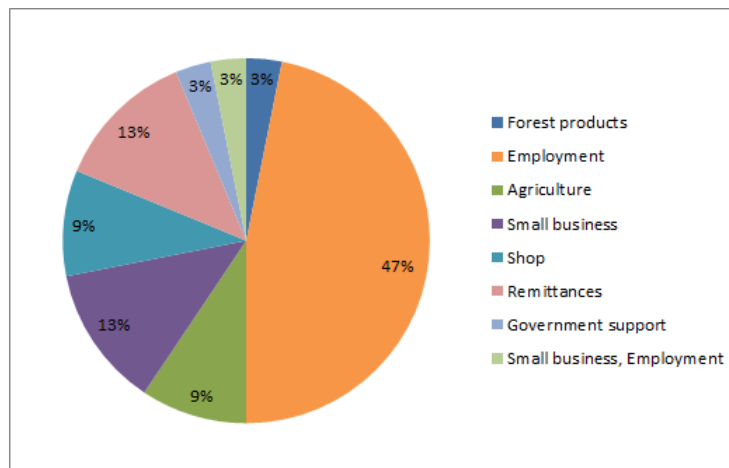


Figure 4. The income-generating activities the HHs depend the most on.

Figure 5 illustrates how the HHs ranked their dependence to different income-generating activities. Indeed, looking at the rank 'forest products' took in terms of dependency, only one HH mentioned this strategy as the activity they depended most on. The number of HHs using this strategy increased as it decreased in importance for the second (two HHs) and third activity (five HHs). The one unique HH that had forest collection as a main source of income only had government support as another income source to sustain their livelihood.

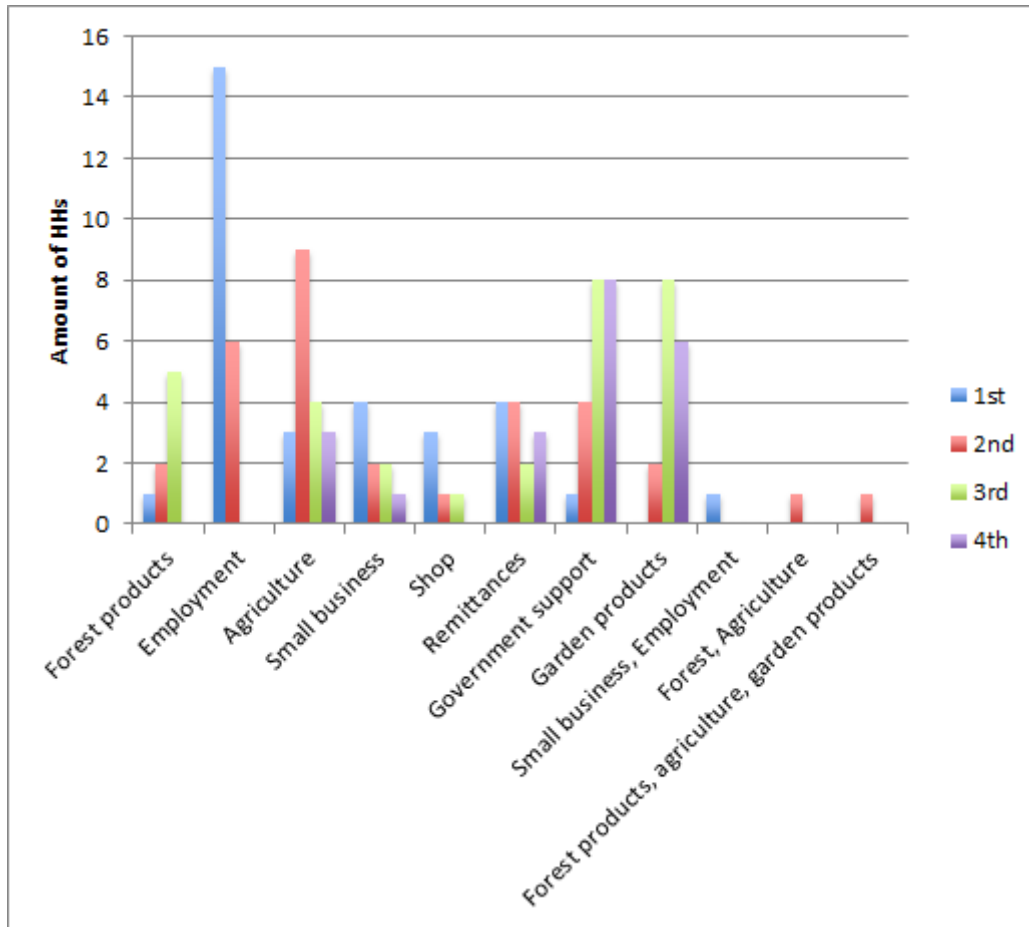


Figure 5. The income activities the HH's are dependent on ranked 1st, 2nd, 3rd

From the data collected in the questionnaires we were able to calculate the average amount of income-generating activities the respondents in the village had. There were nine income-generating activities categorized, whereas it was found that HHs whom collected forest products on average had five different income sources and the HHs who did not collect forest products had on average four income sources.

2.2 Which forest products are collected from the forest, when, where and for what purpose and how does that differ between household?

The data obtained from research methods during fieldwork (interviews, PRA and questionnaires) showed that a variety of products are collected from the forest by the villagers of WNK. Besides, villagers expressed during PRA (harvesting calendar) that forest products are collected through the year depending on the season, although in the months of December and January almost no products are found. Common products are mushrooms, ants' eggs, frogs and wild plants.

A high diversity of forest products: 20 species of 16 different genus, was reported to be collected (Table 1). Most of these species are very popular for their edibility. The villagers interviewed told us that their first interest in collecting these species was for selling the products directly in the near

markets, or to middlemen. Even though legislation dictates that villagers can only harvest forest products for their own consumption (Appendix A), the products could be found easily in the markets nearby. Other than for eating, species like *Neyraudia sp.*, is used for making handicrafts such as brooms.

Table 1: Species collected by the villagers of WNK.

Type	Thai name	Common name (English)	Scientific name	Use
Mushrooms	เห็ดเผาะ	Hygroscopic earthstar	<i>Astraeus hygrometricus</i>	Human consumption
	เห็ดโคน	-	<i>Termitomyces fuliginosus</i>	Human consumption
	เห็ดตะไคล	Brittlegills	<i>Russula delica</i>	Human consumption
	เห็ดน้ำหมาก	Vomiting russula	<i>Russula emetica</i>	Human consumption
	เห็ดน้ำแป้ง	-	<i>Russula alboareolata</i>	Human consumption
	เห็ดระโงก	-	<i>Amanita princeps</i>	Human consumption
	เห็ดห้าพระ	-	<i>Mycoamaranthus cambodgensis</i>	Human consumption
Amphibians	อึ่งอ่างบ้าน	Banded bullfrog	<i>Kaloula pulchra</i>	Human consumption
	อึ่งเท้า	Blunt-headed Burrowing Frog	<i>Glyphoglossus molossus</i>	Human consumption
	กบหนอง	Grass frog	<i>Fejervarya limnocharis</i>	Human consumption
Insects	แมงอีหนู	Doodlebug	<i>Melolontha malaccensis</i>	Human consumption
	ไข่มดแดง	Weaver ant	<i>Oecophylla smaragdina</i>	Human consumption
Wild plants	ผักหวาน	Pak wan	<i>Melientha suavis</i>	Human consumption

	ปอบิด	Indian screw tree	<i>Helicteres isora</i>	Medicinal purpose
	กระเจี๊ยว	Siamese tulip	<i>Curcuma alismatifolia</i>	Human consumption and decoration
	นกกั๊กอกเขา	Short Spathe Voodoo Lily	<i>Amorphophallus brevispathus</i>	Human consumption
	หญ้าพง	Broom Grass (Ya pong)	<i>Neyraudia sp.</i>	Handicrafts (brooms)
	ไม้ไผ่	Bamboo	Various species	Human consumption

Nevertheless, some species stand out as more popular among the villagers (Figure 6). Pak wan, a very common vegetable whose young shoots, leaves and inflorescences are cooked and used in soups or curry dishes (Kerr, 1931).

Other wild plants are the Siamese tulip (*Curcuma alismatifolia*) whose inflorescences and flowers are edible as a vegetable, but also used for decoration; the Short Spathe Voodoo Lily (*Amorphophallus brevispathus*) whose young peduncles are edible. Bamboo species are also consumed, although only their shoots are eaten in the region. The herb *Helicteres isora*, whose fruits are consumed and sold in the markets due to its medical effects against diabetes (Chakrabarti et al. 2002).

Among wild mushrooms, villagers harvest up to seven different species for food. For example, brittlegill (*Russula delica*) is very appreciated because of its high economic value in the markets in comparison with other species. Other mushroom species that can be considered of high value are *Astraeus hygrometricus* and *Termitomyces fuliginosus* as they are more difficult to be found in the forests (Subansenee, 1995).

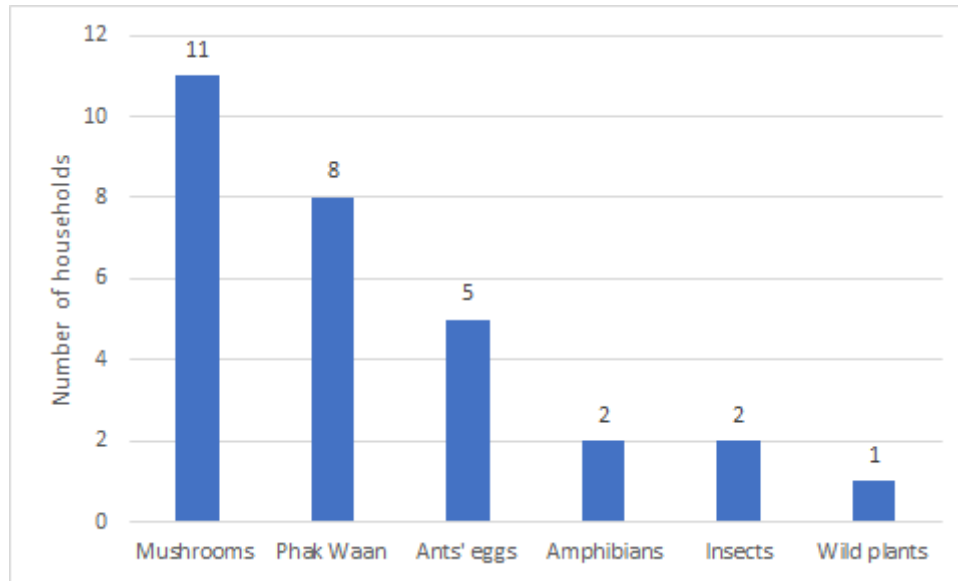


Figure 6. Number of households collecting forest products. Results from the questionnaires (n=32).

From a SSI, (Appendix G) we learned that, in order to sell mushrooms at high prices, it is important for the villagers that mushrooms have not bloomed yet, as they think their taste will be better, and thus their price will be higher on the markets. This determines for some HHs if the mushrooms will be sold or used for own consumption. Besides, figure 6 shows that from our questionnaire sample, mushrooms stood out as the most popular product collected.

Insects are also used for food, such as the adult's stages of the doodlebug (*Melolontha malaccensis*) (Mitsuhashi, 2016), or the eggs, larvae and pupae of the weaver ant (*Oecophylla smaragdina*). During participant observation we found that ants' eggs are harvested by the villagers using long sticks with a bucket at the tip to reach the nests that hang from the trees. The nests are punctured and shaken to provoke the eggs to fall inside the bucket (picture 1 & 2). Afterwards it is taken to the ground where cassava flour is added to repel the adults, as their bite can be painful, but also to divide them from the eggs. The eggs are then transported in a bucket, which sometimes contains water. It should be noted that, in this region, even though adults are not consumed, they are consumed in other areas of Thailand.



Picture 1 and Y2: Left, collection of ants' eggs from ants' nests. Right, cassava flour to separate eggs from the adult ants.

Three species of Amphibians are collected from the forests surrounding WNK: the Banded bullfrog (*Kaloula pulchra*), the Blunt-headed Burrowing frog (*Glyphoglossus molossus*) and the Grass frog (*Fejervarya limnocharis*). These species are protected by the regulations of the surrounding PAs. However, we observed that some of these frogs were sold on the side of the road next to WNK (picture 3).



Picture 3: Bullfrogs sold by the road 304.

Results from the seasonal calendar (figure 7) showed that the season influenced collection of forest products. For example, mushrooms are collected only during the rainy season, from May to November, having their peak of abundance in June, July and August. Other products that are only harvested during monsoon are the amphibians, but ranging only from May until August, even though sometimes they can be found out of season after periods of rain. Similarly, bamboo shoots

are collected from July to September, Siam Tulip from May to September and Short Spathe Voodoo Lily from May to July. During the rainy season other products are also found. In the dry hot season, Pak Wan is collected from February until April, while ants' eggs are only collected during February and the beginning of March. The season for insects takes place in the transitions between the dry and wet season, from March until July. Regarding the dry cold season, the availability of products decreases and the time spent on collecting forest products decreases. Yet, during this time, some HHs focus on making handicrafts, for instance brooms made from collected grass.

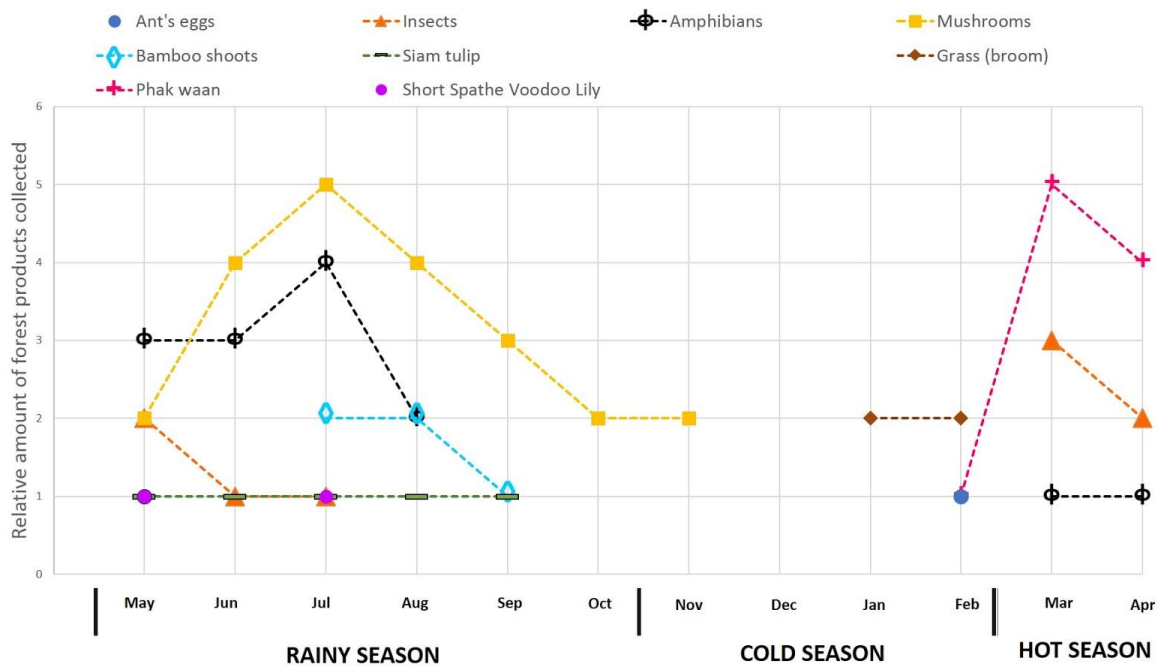


Figure 7. Seasonal calendar of relative amount of forest products according to forest products collecting households in Ban Wang Nam Khiao. Results from PRA conducted March 7, 2018.

All these mentioned products are collected by the villagers of WNK in the surrounding forests, but in some cases the villagers travel up to 50 kilometers away from the village. Most common areas are the Phu Luang forests, the southeast of SBR, TLNP and the surrounding forests, and the forests around Mun Bon Reservoir. Areas where villagers said during our PRA they collect forests products are shown in figure 3. Figure 8 shows the trackings we made with the villagers.

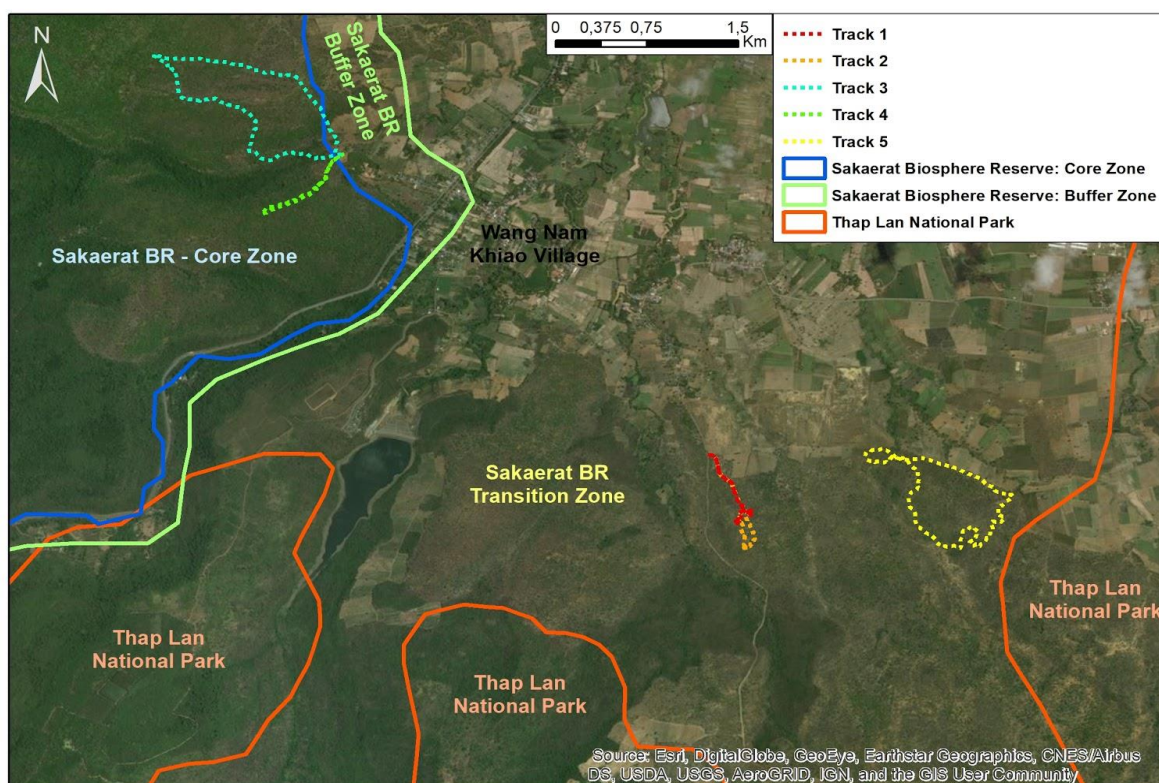


Figure 8 - Map of trackings made with villagers during collection of forest products.

In addition, we found that even though some HHs are specialized in one or two products, the villagers tend to collect the same products. We also noticed that the differences and specialization in certain products between households was dependent on their preferences and knowledge about forest products. This observation became more evident while observing the participants at the PRAs session. Indeed, when discussing where to place the forest products on the seasonal calendar, not everyone had a say for every product. One lady seemed particularly knowledgeable about mushrooms' ecology. When starting the calendar with three other members, they all mentioned that though they knew people in the village collected ants' eggs, they personally did not.

2.3. What are the rationales behind the collection of forest products for different households, and how do they depend on this livelihood strategy?

During our SSIs, unstructured interviews and focus groups, we asked the interviewees hypothetical questions regarding how their livelihoods would be affected if they suddenly lost access to the forest or the forest disappeared, and they would have to find alternative income sources. In addition, the rationales behind this livelihood strategy were also obtained from these interviews.

Generally, the interviewees stated that the forest is very important for generating an income to the family. Most HHs explained that if they suddenly did not have access to the forest, it would have a negative impact on their livelihood. They would not be able to generate enough income to support their families and sustain their livelihood. One woman said that “[she] couldn't live any more”, if

she could not collect forest products (Appendix G). Another interviewee stated that she could still generate an income from agriculture, but that the family would suffer from a decrease in income. Most villagers explained that it would be difficult to find other income sources to sustain their livelihood, since many of them are too old, low educated and/or too sick. For example, one woman said that she “*would be in big trouble because [she] will have nothing [job] else to do*” (Appendix G). In addition, an interviewee explained that income from forest products can help sustain their livelihood in periods with low income from other sources. Furthermore, one interviewee explained that she was currently employed, but when she will become too old to work, she will return to collecting forest products. Another interviewee explained that when she could not find a job due to her low education she began collecting forest products, and today this was still her main source of income.

We found several rationales for collecting forest products. The first reason relates to lifestyle, in which some respondents told us they had been practicing this activity since their childhood and it was a livelihood strategy preferred among other ones: “*Nothing would be as good as collecting forest products*” (Appendix C). The second reason was related to the relatively low investment cost of this income-generating activity in comparison with other income sources. For example, one participant told us that “*[they] don’t have to invest anything, like agriculture where you would need fertilizer ...*” (Appendix G). A third reason was the security where forest products can be an income opportunity in case of failure of other activities such as low yields for agriculture. A fourth reason mentioned was the supplementary income that this activity provided for the families. Another reason was that it was not only a supplementary, but also a way to spend time on another activity *just like a hobby*, when the main income source activity was done. The last reason mentioned was that collecting products required less time and physical work, and one can make money fast through selling the products on the market, especially in comparison with other activities, such as agriculture.

Regarding the rationales for *not* collecting forest products, the villagers mentioned they were not going into the forest because they either lacked time or they thought it was “too much hard work” for the money received at the end, contradicting previous statement from forest products collectors. Two of the villagers were even amused by our questions.

2.4. How do land tenure arrangements impact the extent to which the villagers collect forest products?

During our SSIs, unstructured interviews and focus groups, we asked hypothetical questions regarding the villagers’ use of forest products and land ownership. This was done to investigate if there was a relationship between collecting forest products and land tenure.

Our questionnaires showed that 42 % of the HHs who collected forest products owned land, in contrast to 70 % of the HHs who did not collect forest products (figure 9). These data indicate that HHs that collect forest products are less likely to possess land than HHs who do not use the forest. In addition, the HHs who did and did not collect forest products had respectively 3 and 6 rai

calculated as the median. Hence, even though some of the HHs that collect forest products did possess land, they had less land than the non-collecting HHs (figure 10 and 11).

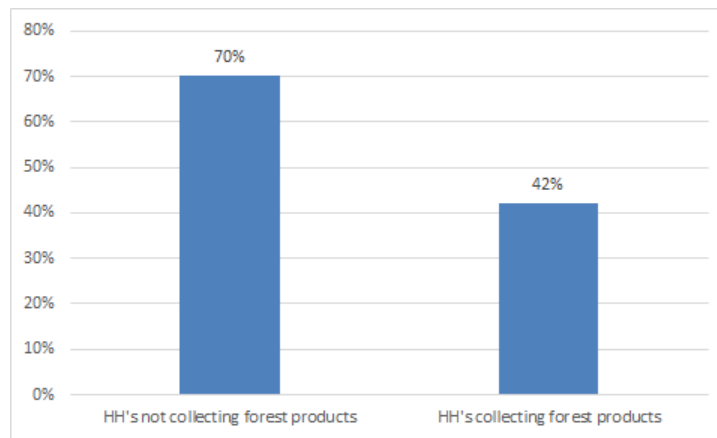


Figure 9. Percentage of HHs collecting and not collecting forest products who possess land.

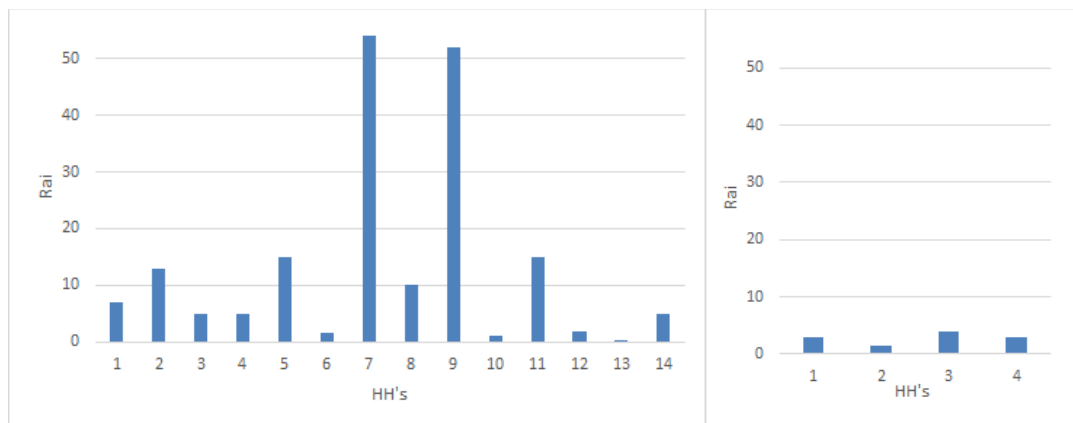


Figure 10 (left): Number of rai of the land possessed by HHs who did not collect forest products
 Figure 11 (right): Number of rai of the land possessed by HHs who collect forest products. (Only four HHs are included in the figure since this information was not obtained for the fifth HH).

Regarding land titles, the HHs collecting forest products only had Sor Por Kor, in contrast to the HHs who did not collect forest products, which had mixed land titles including SP4-01 (Sor Por Kor 4-01), Chanote, SK1 (Sor Kor 1), PBT5 (Por Bor Tor 5) and NS3K (Nor Sor Kor 3) (see Appendix H for descriptions of the different land titles). Hence, it may indicate that having a secure land title has an impact on the villagers' use of the forest.

We received various answers when asking if the interviewees would continue to collect forest products if they had more land. Some HHs said that they would still collect forest products because it was an opportunity to generate an income almost all year around. Some explained that when they did not have any agricultural activities they had spare time, in which they could then go to the forest. Others explained that they would still collect forest products, but only for their own consumption, and not for selling. One interviewee explained that she would still use the forest if she had more land, because it was what she was used to. Another interviewee also explained that his agriculture was unstable, with the yields varying from year to year. By the explanations we received

from the HHs, it appeared that it was quite dependent on people’s preferences and unstable agriculture. Furthermore, the village headman explained that the HHs who possess little or no land more likely to collect forest products.

When asking if the interviewees would still use the forest if they had Chanote, we received less various answers. Some interviewees explained that if they had a secure land title, they would not collect forest products anymore. Other interviewees said that they would still collect to generate an extra income, but not to the same extent as now. One interviewee who already had Chanote said that if she did not have a secure land title she would go to the forest more often. It then appears that it does make a difference whether or not a HH have a secure land title for their choice of collecting forest products.

2.5 How is the status of the forest products perceived by the villagers?

Out of the 12 HHs collecting forest products in our questionnaires, nine answered that they observed a decrease in the availability of forest products. Six of these HHs have mentioned a decrease in mushrooms (table 2). A decline in amphibians has also been observed. The application of chemicals in the agricultural fields close to the forest edge has been mentioned as perhaps one of the reasons for these decreases. Only one HH observed an increase in the forest products, such as trees and mushrooms.

According to those interviewed, the decrease in forest products was mostly due to the presence of collectors from other villages. Another consensus was reached as most interviewees said that forest fires were beneficial for Pak Wan, but not for the mushrooms. Talking with the officials in both PAs, we learned that forests fires were a forest management strategy controlled by the parks officers but that some fire were also possibly started by the villagers. During our fieldwork, we noticed both traces of recent fires, but no one seemed to really know who started them.

Table 2. Perceived change of forest product availability (number of times cited by the 12 household interviewed).

	Decrease (-)	Increase (+)
Mushrooms	6	1
Amphibians	3	
Pak Wan	4	
Wild vegetables	1	
Trees		1
Ant’s eggs	1	

Two species of mushrooms (*Astraeus hygrometricus* and *Termitomyces fuliginosus*) have been mentioned several times by the villagers as almost disappearing from the forests during the last few years.

3. How could ecotourism be an alternative livelihood strategy for the villagers of WNK in the future?

In this section we investigate the possible establishment of ecotourism in WNK. The results that are conducted from the interviews with the villagers, key informants and from the focus groups will be presented.

In the interview with the official from the sub-district office, we were informed about an existing aim to involve all the villages in the sub-district in ecotourism. The officer explained how this project would help attract more tourists to the area. The project would involve homestays, forest walks, tours on sufficiency economy farms, wildlife watch, etc. However, they were still waiting for governmental support to progress with the project. It came to our attention in the interviews and PRA that not all the villagers had heard of the ecotourism project. In February, a meeting was held between some of the villagers and officers in the sub-district, where they were informed and introduced to ideas for ecotourism. The information from the meeting had been spread throughout WNK, but apparently did not reach the whole community.

In the interviews with the villagers, there was a general perception that ecotourism could have a positive effect on the village. A respondent argued that it would be good for the development of the village to get involved in tourism, and another argued that it would increase the villager's income. However, there were respondents that had a negative perceptions on how ecotourism could affect the forest. A respondent argued that ecotourism would benefit the village but the activities could impact the forest. Where another respondent stressed that it could “(...) *destroy the forest and cause pollution*” (Appendix G).

Most of the respondents were interested in participating in ecotourism and suggested they could sell souvenirs: fruits, food (sticky rice-cakes), desserts and handcraft (brooms). Other respondents were interested in teaching how to make brooms, and giving tours in the forest or sufficiency gardens. A respondent from the focus group expressed how ecotourism would be a positive livelihood strategy for their HH, because it generated an income and it would be an enjoyable activity to take tourists into the forest other than just to collect forest products.

Some of the respondents saw limitations with engaging in ecotourism. Three respondents from the focus group did not wish to engage in ecotourism activities due to their inability to speak English, which would make home-stay and other income activities difficult due to language barriers with foreign tourists. However, the same respondents expressed how it would be positive for the next generation to have ecotourism in the village, since it could create employment opportunities. Two

respondents did want to engage in ecotourism activities, but did not wish to do home-stay as they felt it was too private to host people in their home. Two respondents expressed their concerns with limited capital to build on their land or having a land title that they could not build on, and one of these respondents felt it would be difficult to teach or show his agriculture due to tourist could spoil his crops.

A respondent argued that ecotourism would change the livelihoods of the villagers. This was based on her assumption that she would go less to the forest, as she would be occupied with a new livelihood strategy of selling products to tourists. Two respondents assumed that they would not collect forest products if they were involved in ecotourism, as they expected ecotourism to sustain their livelihood. Another respondent expected to earn a larger income from ecotourism. However, there was a single respondent who would still collect forest products if she was engaged in ecotourism because she enjoys spending time in the forest.

DISCUSSION

Access

The villagers' statements about their access to the forest exemplify the importance of not only focusing on property or laws, but looking at illicit actions and relations as well. Since access according to Ribot & Peluso (2003) is a matter of property, and since property evokes some kind of *socially acknowledged and supported* claims or rights, one must also tend to carefully examine the existing rights of access to a certain area or product.

Though these rights associated with law, custom and convention are not always equivalent, it is important to focus on things that may be illegal under state law, but accepted or permitted as a convention for certain people. This we learnt by examining the relationship between TLNP and the villagers of WNK, where access to products such as mushrooms or wild plants were permitted by the officials. The assistant of the head of TLNP expressed to us that this flexibility was to improve the relationship with the villagers, since the officials wanted to achieve a win-win situation for both parts. When rangers allowed the villagers to collect some products, the villagers would help the rangers to look out for people from other villages collecting products that they are not allowed to. In contrast to TLNP, in SBR a conflict between the reserve and the villagers was present. Here, villagers had experienced being chased away for collecting products such as mushrooms - a product they were permitted to collect in TLNP. This conflict happened even though official legislation permitted villagers to collect certain products in certain zones of SBR. This we understood as a lack of communication between the different actors. Another example of lack of communication is the fact that many villagers collected frogs in both SBR and TLNP. Though no frogs according to the two respective officials could be collected, people did it anyway and told us openly. They seemed to do it as if it were legal, where some of them sold the frogs on the roadside. We understood these acts not as direct or conscious violation of law. The case seemed more to be that the villagers did not find collection of frogs as applicable to the hunting category. Nonetheless, if part of the objective behind forest conservation is to maintain or improve the relationship to local villagers, are these law enforcers not responsible for informing the villagers clearly about laws and conventions? We can at least argue that the ambiguous situation with frogs and the unclear boundaries between TLNP and SBR reflect the complexities and difficulties for ourselves as researchers, but as well for the villagers, to accurately comprehend the policies and law enforcements of the area they live in. Different policies and management of two different institutions; a reserve and a NP that, in some areas, overlapped, was indeed paradoxical. This case is an example of what Ribot & Peluso (2003) describe as ambiguities within laws, customs, and conventions:

“Sometimes new policies or laws do not clearly delineate all the powers associated with particular rights; conflict ensues over the resolution of these ambiguities. An example is found in those systems of joint resource management where the boundaries of rights and access are not clear” (p.163).

These conflicts might be solved by either a change in the way of how these laws were enforced, or by simply informing the villagers of the actual laws. The villager stating that he did not know SBR

was divided into zones, and that he actually was allowed to collect certain products in certain zones, would benefit a lot from simple information about how and where to access the reserve. This was also what he asked for at our presentation in the village. Informing further about laws and conventions would also be in the interest of the reserve, if one wants people to act accordingly to these. We must conclude that in the case with SBR, it seems like local people are not thought of as important actors in the politics of forest conservation. This confirms Roberts' (2016) point about when policies aimed at conserving forest are implemented; the livelihoods of local communities might be deprived or neglected. Furthermore, this ignorance of the local population is contradictory since biosphere reserves, according to UNESCO, should encourage active community participation and has several goals such as: *"To engage in research, monitoring and learning activities related to conservation and sustainability and share knowledge, locally, nationally and internationally"* (Rainforest Partnership, 2016). This also corresponds to what Albers & Grinspoon (1997) suggest: (...) *"cooperative policies may diffuse the tension between PA managers and local people that is caused by the people's loss of historical rights to resources in the PA."* They furthermore suggest that improving the villagers possibility to benefit from PAs, could reduce degrading activities on the forest. These findings suggest that SBR could achieve a lot by changing their management policies and, maybe, include the villagers in these. However, there is a hope that the relationship between the reserve and the villagers might improve in the future due to changes in the administration.

Moreover, PAs influence the areas the villagers choose to collect forest products. For instance, from our results it was noticed that the great majority of times the villagers go into dry deciduous dipterocarp forest. This may be because the understory in these forests is open and it is usually burnt by forest fires (Wikramanayake et al. 2018), making this type of forest more accessible to villagers. Another reason might be that other habitats around WNK, such as dry evergreen forests, have more restricted access as most of them fall inside the core zones in the PAs.

Conservation in protected areas

One of the roles of the establishment of PAs is to foster conservation of species inside them (Sims, 2010). Nevertheless, in WNK, the people consuming forest products inside them seemed to have observed a decrease across the years for certain species. From a conservation perspective, it is important to understand the long term effects of harvesting NTFPs, as it may alter the forest structure, composition and possible regeneration of the forest (Ticktin, 2004). From a livelihood perspective, reduction of species can also have a negative impact for villagers depending on them as it could lower their future income sources.

Regarding the perceived decrease of amphibians, some villagers have mentioned anthropogenic threats like application of pesticides in the fields nearby their habitat as a possible cause of this decline. Though this could be a possible explanation, examples of intensive local consumption having a negative impact on the conservation of amphibians have been found (van Dijk *et al.*, 2004; van Dijk & Chan-ard, 2004).

Even though strict laws in PAs, such as banning the collection of forest products, should influence villagers to reduce forbidden activities, it may also lead to villagers undertaking clandestine activities due to a higher demand of less available products (Albers & Grinspoon, 1997). For example, officials from TLNP and SBR told us that they are aware of poachers inside both PAs, and they mentioned the severe problem of the logging of Siamese Rosewood (*Dalbergia cochinchinensis*). People from the villages around and from other places go inside both PAs to cut this tree, with high value wood to sell on the Thai and Chinese black market (Appendix A; Appendix E).

Dependency and rationales

Our data indicates that HHs lacking *human capital* do not have other alternative employment opportunities to collecting forest products. Many HHs described themselves as too old, sick and/or low educated to be employed. Hence, this indicates that some of the villagers of WNK depended to some extent on collecting forest products to sustain their livelihood. Moreover, it shows how a lack of access to assets, such as education, affects people's livelihood strategies.

Following the analytical concepts of Angelsen & Wunder (2003), in some cases, the forest had a *safety net* function when the villagers suddenly found themselves with no other options. In these situations the villagers could collect forest products to generate an income. In other cases, the forest had a *gap filling* function, when filling income gaps during the year or when the villagers had spare time. In addition, forest products also supported current consumption as a supplement income. Overall, it appears that in WNK there is not one single answer to how the forest sustain people's livelihood.

Byron & Arnold (1999), also presents a typology that recognizes various relationships of people to forest and forest products, including economic, social and cultural dimensions. Several of the villagers of WNK used the forest for economic reasons to generate an income, but for some it was also a matter of culture; they had been collecting forest products their whole life and would continue to do so, even if they had more agricultural land. This is also argued by FAO (1995:237), that state that "*cultural factors play a key role in affecting people's' actions, and need to be understood by development planners interventions*". Hence, it is important to understand all the different dimensions the forest has in the people-forest relationship. Furthermore, we also found that the villagers go to the forest because it requires a relatively low investment. This is also argued by Angelsen & Wunder (2003:21) who state that one of the reasons that poor HHs collect NTFPs are because it requires "*low capital and skill requirements*" and there is an "*open or semi-open resource access*". Hence, the rationales behind collecting forest products in WNK are not one or the other; it may be a combination of reasons, including social, cultural and economic factors.

Byron & Arnold (1999) argue that poor farmers and landless HHs are likely to rely highly on the forest as a source of income, and for them the forest is particularly important as a safety net. In addition, they argue that HHs may depend on forest income when "*crop yields have been poor, and other sources of income are not available*" (Byron & Arnold, 1999, p.799). Furthermore, they state that activities, such as craftwork, which may not have high skill and capital requirements of entry, is also something rural poor may turn to in the absence of other employment opportunities. We see all

these types of HHs in WNK: the landless HHs depending on forest income, farmers using the forest due to unstable agriculture and the HHs specializing in making brooms and coffee bags. It therefore appeared that there was a relationship between the possession of land, land titles and the collection of forest products. The wealthier HHs, who possessed more land or had Chanote, sometimes had forest products as their main income, though they were not as dependent on it, since they could fall back on other income sources.

Overall, our data indicate the importance of NTFPs, as a natural asset, in sustaining people's livelihoods.

It was not always clear if both the wealthy and less wealthy HHs in WNK depended on the forest. We were told and observed that several types of HHs collected forest products, though we found that it was mainly those who did not possess land nor had a secure land title. We did not have the means and time to stratify the villagers in wealth categories, though this would have given us data on which types of HHs depend on the forest and how.

Will the villagers depend on the forest in the future? It was clear that the younger generation was higher educated than the older generation and therefore more likely to be employed. Some HHs also received remittances from their children. In the future the younger generation may therefore not depend on forest products to the same extent as the older generation. However, collection of forest products could continue to function as a 'safety net' for the younger generation and could be used as an alternative livelihood strategy if necessary.

With more time we would have investigated how the establishment of TLNP and dispossession of land had affected the livelihood strategies of the villagers in WNK, and how they were compensated.

In WNK the forest had a *safety net* function for many HHs, which prevented them from falling deeper into poverty when they did not have other livelihood opportunities. However, it appears that collecting forest products do not lift the villagers out of poverty, but help them maintain a minimum standard of living. However, poverty and livelihood strategies are dynamic (Waleign *et al.*, 2017), and we were not able, due to time constraints, to investigate this fully.

Vedeld *et al.* (2007) argue that HHs that are more dependent on forest products tend to be more diversified. However, we did not find a big difference between the HHs collecting and not collecting forest products.

Livelihood alternatives

There has been an increasing concern about the local socioeconomic impacts of PAs (Sims, 2010). PAs impose constraints on resource use and if these rules are followed it could reduce local incomes, however: "*Protected areas might generate a new tourism sector, direct employment in protected areas, or new infrastructure investment by central governments*" (Sims, 2010, p.6). Sims

(2010) finds that PAs have contributed to economic development and reduced poverty, but also argues that it they may increase the overall local inequality.

The establishment of ecotourism in WNK invites the villagers to engage in new innovative opportunities, as they have suggested: selling products, teaching handcraft or establishing tours in the forest and village. By offering environmentally sustainable products or services, the villagers have the opportunity to receive voluntary trademarks of eco-labeling and certification, which would enable them to charge a price premium and reach new markets. This could encourage locals to operate businesses in a compatible way with biodiversity conservation (Rode *et al.*, 2016).

Most of our respondents interested in ecotourism expressed how they would not collect forest products if they worked with ecotourism, as they presumed it could generate a large income. However, the villagers expressed their concerns about not having the adequate land title, financial capital and/or educational skills to develop larger projects within ecotourism. Nevertheless, some would have the opportunity to work in employment of these projects. The benefits of the larger projects would then primarily go to the potential wealthier investors (foreign actors, wealthy Thai investors etc.), as they would have higher funds to establish resorts or other investment project. To benefit the local community an ‘ecological’ tax on ecotourism activities in the PAs could be implemented (Rode *et al.*, 2016). However, this could also create limitations for the small-scale actors whom are interested in engaging in ecotourism. Another alternative could be an implementation of fees or charges for tourists that use or have a consumption of goods, services or activities associated with the natural environment. All of the taxation would have to be managed locally and not from the central state for it to directly benefit the local community (Rode *et al.*, 2016).

The implementation of ecotourism could be to improve the trust and collaboration between the park management in the PAs and the villagers of WNK. The project could be beneficial for both villagers and the PAs and promote forest conservation. However, the sub-district official stated that they were waiting for the government to support the ecotourism project. For those whose land was dispossessed when TLNP was established, this could be an alternative livelihood strategy for them. However, if the cost-benefits from ecotourism are too low, then it may not counterweight for the lack of compensation for their land. Furthermore, it may not be the current older generation that would benefit the most from ecotourism, as it is yet to be implemented. Instead, it could be an opportunity for the younger generation, who may then never be as dependent on collecting forest products as their parents have been.

Discussion of methods

In this section it is discussed how the different challenges encountered during fieldwork have influenced the data collected.

In our questionnaires, we had some questions that were formulated in a way, which did not allow the villagers to respond to what was more to our interest. The questions “*Has the household always lived in this village?*” and “*Has the household been evicted?*” were understood by the villagers as the land they lived on and not their agricultural land. Since their households had not been relocated

or evicted they answered no, even though many villagers' agricultural land had been relocated to WNM where they already lived. This we did not realize until the last day in the field. Therefore, we lost significant information about the dispossession of land. We missed a chance to look into a possible change in the villagers' livelihood strategies caused by the dispossession of agricultural land. Other data we obtained from the questionnaire we decided not to include here, because of the little analytical substance they provided. This was because we made the mistake of not to pilot test the modified questionnaire.

Regarding the first two tracks, we did not quite obtain all the information we wanted. This problem was due to not communicating clearly with our interpreters and not being explicit about our definition of a "track". This misunderstanding indicates the importance of being clear on definitions beforehand with the translators and not implicitly thinking they know what you mean. The third track was not done with the usual route of the household because it was too late during the day. Consequently, the last two tracks we arranged by explicitly making sure that we wanted to do a usual track. However, the villagers usually go to many different places, sometimes further away. Hence, the tracks done only showed a few of the places where they collect.

For the participatory mapping, the accuracy of the routes cannot be considered reliably, as it was noticed that the participants found it difficult to use the maps we had printed. Consequently, the obtained data during the mapping can only indicate in which areas the villagers said they go to collect forest products, but not the specific routes they usually follow. Besides, for the seasonal calendar, it should be noticed that the extent of forest products collected can only be understood in relative terms in comparison with other months, seasons, and products, and compared between the villagers whom participated in the PRA sessions. However, while comparing the different data from the two PRA sessions, they did in fact correspond to each other with the high and low seasons of the respective products.

The division of groups was not optimal as in group 2 one villager was answering on behalf of all the participants in the group. This issue was solved after stressing to the interpreters to direct the questions more to the shy participants. An issue of practicality made it difficult to register all the answers of the participants, due to having two interpreters in the groups translating answers of different participants at the same time. Consequently, it would have been better with one interpreter to obtain all the information. Time also became a challenge towards the end of the focus groups, as when group 1 finished their focus group, group 2 was only half way through the interview guide. This forced group 2 to finish quicker, thus they did not have enough time to discuss some of the last questions in depth. This could have been solved if the focus groups had not been conducted in the same room.

We acknowledge that doing fieldwork with interpreters have greatly impacted the outcome of the data. Crucial information has definitely been lost in interpretation. This has something to do with the ability to properly interpret from Thai to English, but also that we from the University of Copenhagen, and our Thai-interpreters from Kasetsart University, do not always have the same perceptions on the notions we used when talking with our informants. We imagine that this obstacle

might as well have influenced the ways in which our Thai-interpreters from urban Bangkok interacted with the rural population. However, the level of the interpretations was indeed very high, and without this our research would not have been possible. In fact, by having interpreters with us during the interview sessions gave us time to both reflect, and to take notes, to what the informants said on the field site. Moreover, even though some informants managed to speak some English, we still preferred to use our interpreters, since their English level often was lower.

The fact that we did not interview any rangers from neither TLNP nor SBR is regretful. This source would have given us crucial information regarding access to the PAs. We only talked with villagers who used the forest, and with officials who enforce the rules. Interviewing the rangers as mediators between different actors in a conflict over access, would have benefited our research substantially.

It is important to emphasize that we did descriptive statistics on the data from our questionnaire, though statistics significance was not tested.

CONCLUSION

Access to forest products in the PAs around WNK is gained, maintained, and controlled through ambiguous, overlapping laws and conventions. The access to forest products depends on how laws are enforced by the respective institutions. We learned that the law enforcers from TLNP tend to bend the official rules when needed, and hereby allow the villagers to collect certain products. On the other hand, in SBR there is a lack of communication between the officials and the villagers. This is contradictory since in certain zones of SBR, people are by law allowed to collect certain products. This conflict over access to forest products seems to be a matter of misguidance or lack of information about laws and conventions. It illustrates what can happen when two institutions are established independently but with overlapping boundaries. In addition, it illustrates how different actors can influence the way official rules are enforced and how this affects the benefits of local populations.

Forest products were not the main income for many HHs, though it was still an important income source. Some villagers were quite dependent on forest products, since they did not have other opportunities. The forest had a *gap filling* function, a *safety net* function, supported current consumption or was a supplementary income source, and for few HHs it was the main income. The villagers had different rationales for collecting forest product. For almost all households collecting forest products it was for economic purposes, but for some it had a great cultural value.

Furthermore, we found that land tenure arrangements influenced the way villagers use the forest. Many of the HHs that collected forest products did not possess land, and those who did mainly had insecure land titles.

To achieve the goal of conservation and to make sure that the villagers can sustain their livelihoods in the future, it was important to assess the state of the forest, such as decreases of certain species. Many mentioned factors such as use of pesticides, presence of forest fires or overconsumption by both local and other villages could be affecting the forest.

Ecotourism may be an alternative to collecting forest products for the villagers. Yet, it may not be the older generation that would benefit the most from ecotourism, as it is yet to be implemented. Instead, it could be an opportunity for the younger generation, who may then not be as dependent on collecting forest products as the older generation, since the younger generation is more educated, which provides more opportunities. Nevertheless, it is uncertain how ecotourism will affect the village in the future and how much the village would actually benefit. However, if ecotourism is created and implemented through cooperative management approaches, the villagers might depend less on forest resources and therefore foster forest conservation.

For future research it would be interesting to investigate the future dependency of forest products in the village. If the younger generation is more educated and more likely to be employed, they may not collect forest products as an income source. This could mean that the conflicts over access will gradually disappear in the future. In addition, it would be interesting to investigate how the loss of land in TLNP has affected the villagers' livelihood strategies.

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APPENDIX A - SSI THAP LAN

We are Master students from the University of Copenhagen. We are here to study the importance of forest products in the households in Ban Wang Nam Khiao. The data collected will be analyzed and presented in a final report. My name is _____ and I will be asking the questions. This is _____ and they will take notes.

1. We would like to know the **reasons behind the establishment** of the National Park (NP) (What year?)
23th December 2524 (1981)

Reasons:

- **Having Endangered species and protect them. High biodiversity**
- **Because it's the plate of 3 rivers. Mun river, Bang Pakong river and Lam Plai Mat stream. NP as a water source**
- **Beautiful views**

- 1.1 What are the main **objectives** of the NP? What are your role/responsibilities?

Objectives: To protect Natural Resources in this area and to work for the villagers to live happily together.

Roles: To protect nature, to control illegal activities, to study and to do research.

Recreation and learning place.

- 1.2 Have the objectives of the NP changed since it was established? How?

They have not changed.

2. Under what **act/plan** is the NP regulated?

Different acts.

1. **Forest Act, B.E. 2484**
2. **National Reserved Forest Act, B.E. 2507**
3. **Animal Reservation and Protection Act, B.E. 2535**
4. **Other related acts and laws**

- 2.2 Can you explain us how the NP is governed? Is it ruled by a local head? Does it have autonomy? Governmental? Financed by the government? Sub-district?

They get budgets from the government. To make decisions they need first their permission.

There are several positions in Bangkok, from the Minister downwards. The lowest position is ranger. They are controlled by 20 Ranger offices around the NP. The rangers are people from the surrounding that know well the villagers. The positions are the following:

- Ministry of National Resources and Environment
- Department of National Parks, Wildlife and Plant Conservation
- National Park Office
- Protected Areas Regional Office
- National Park Section
- Thap Lan National Park (250 officers in Thap Lan)
- Thap Lan National Park Management Area 1 (5 Areas in Thap Lan, 8 heads)
- Thap Lan National Park Protection Unit (20 Units in Thap Lan) → 120 Rangers in Thap Lan, each unit has around 7 rangers

3. Were villagers inside and around the NP involved in the **process of the establishment**?

Some fought against the NP but the majority agreed. In the process there was negotiation with the headmen of the villages, headman of sub-district, village philosopher around where people could put comments regarding the establishment.

3.1 How was the establishment welcomed by the villagers both inside and around the NP?

There were both agreed and disagreed villagers, but most of villagers agreed with the establishment.

3.2 Do you know how was it welcomed by the people of Ban Wang Nam Khiao (Udom Sap) specifically?

In Ban Wang Nam Khiao there were many groups but they kind of agreed as they have spent most of their lives in the forest.

3.3 Are the villagers inside and around the NP benefiting from the NP? How does the NP influence their livelihood?

Villagers are not allowed to collect forest products for selling but only for subsistence, sometimes they can collect to sell but not a large amount. They asked first for permission to do so and the application of the law is flexible with them as it is considered a sustainable practice. The permission is asked to the closest ranger office, and they can control who collects because they know who lives in the villages. National park officers don't want people from other villages come to collect forest product.

Forest products which are allowed to be collected:

- Mushrooms
- Fruit
- Vegetables
- Cutting tree and timber are restricted

Other benefits:

- Villages, especially young villagers can be a guide in the national park
- Forest Protection Volunteers (Ro So To Po, รอสอโตโป.) (Free volunteer, but the villagers who participated will be given the flag from the Queen of Thailand (about encouraging).

4. We would like to know if the NP is spatially **structured in different zones** in terms of accessibility and rules regarding the use of the forest, e.g. buffer zones or transition zones.

a. **Intensive use zone:** camping allowed. Shops and offices inside. Attractions.

b. **Outdoor recreation zone:** Camping not allowed, but access is allowed. Attractions.

c. **Strict nature reserve zone:** Access only for research and with prior permission from the NP.

d. **Conflict zone*:** Areas with agriculture inside the National Park (only in the buffer areas), following cabinet resolution that allow people to live and practice agriculture temporarily until the new cabinet resolution comes into action.

4.1 Can you explain us which are these areas and according to which **criteria** the national park was divided into these zones?

Criteria: 1) If a forest is considered attractive 2) Depending of the biodiversity (general principle) and the ecology 3) Geography

4.2 Was the creation of the zones top-down or participatory?

Top-Down

5. Is **agriculture** in any of the zones allowed? How was this different from before the establishment of the NP?

It is an illegal practice and its existence inside the NP is temporary until a new cabinet resolution is sanctioned. It is allowed to apply fertilizers and it can be applied any type of agriculture, not necessarily organic or sustainable.

They prepare events e.g. mini-marathon, inside the NP to collect funds that will be used to compensate peasants if their crops are damaged by fauna, as long as they do not harm the animals. Each case though will be evaluated by the personal of the NP. The compensation depends of the type of crop, age of the crops, opportunity cost, and the extension affected. No damage to livestock has happened.

It is important to notice that this is an informal arrangement and it is inside the law.

If eventually villages from these agricultural areas are reallocated, the land will be restored (naturally and applying measures e.g. plantations) and classified as one of the other 3 zones.

5.1 How are the villages in the northern part affected by being located inside the NP?

Sometimes big fauna comes to the fields and destroy the crops.

6. Which kind of **measures/activities** do you apply to conserve the NP? E.g **controlled burning**, clear cuts, restoration etc.
- **Control forest fire: Fires are illegal if done by the villagers. Officers set fires in Deciduous Dipterocarp Forests (DDF) to get rid of the biomass (dead leaves) that could provoke big uncontrolled fires.**
 - **Creating/maintaining areas inside near the border of the NP but inside, where forest animals can graze, prevents fauna going beyond the forest boundary into the villages.**
 - **New Patrolling plan, using GPS, ENCAP camera, Camera trap**
 - **Reforestation (by forest officers, each forest officer does many duties)**
7. Is it allowed to **collect products**? If yes, please explain which, when, how, in which quantities and by whom.

It is permitted but not legal according to the acts.. It is not permitted to collect timber, even if it is for charcoal (dead trees). There exists an informal buffer zone in around the borders of the NP where it is flexible to collect. But they are allowed to collect forest products in any zone of the NP except the restricted area, as long as it is close to the boundary

People will help the rangers to protect the forest from people of other villages...

7.1 Does the legal collection of forest products from the NP have a **negative impact** on other species? **The collection of forest products affects in both ways, negatively and positively. Positively specially for the mushrooms, because the more you collect the more you help the spores to disperse, and accordingly the more mushrooms that will be available in the next season.**

8. What **measures** do you carry out to **control people's access** to and use of the forest?

8.1. Does it happens that people break the law e.g. by collecting forest products illegally?

They have cameras installed to capture both wildlife and illegal activities.

They use aerial photograph from a helicopter. When villagers claimed that they lived there (in conflicted areas) before the national park was established, the national park will use the aerial photograph of the particular areas in the past to verify whether they actually lived there.

They have drones.

They have rangers armed with guns to protect themselves from wildlife and poachers. 120 rangers. if they caught someone poaching they will get them to the police.

If people break the law they get a warning and if they break the “law” again they get a fine, which depends on the crime. Also, it only goes to court if the crime is cutting down trees, but it is the head of the ranger who decides to take it to court or not.

The rangers are mainly locals who rotate between different zones.

The most severe problem is deforestation, especially of Siamese Rosewood or Thailand Rosewood (*Dalbergia cochinchinensis*). It started with the people from the villages around but now people from other places come to the forest to cut rosewood. The extracted rosewood is traded especially in China. Here it is sold for 300 Bahts/kg (only for cutting and carrying/bringing the woods from the forests) and in the black market could reach 3000-6000 Bahts/Kg. If rangers confiscate timber they will use it to construct new building for the government, e.g. national museum, but it never would be sold.

9. Can you tell us about specific **conflicts** between the conservation of the national park and the villagers around? Are these still present?

He could not mention any conflicts that he knew of.

Regarding the reallocation of the villagers, the government will give them 15 Rai somewhere else.

Interviewee said the opposite, people are even happier with the NP as they got new infrastructure e.g. irrigation and electricity.

10. Why would **tourists** like to come visit Thap Lan? What are the highlights of the NP?

Waterfall, weather (low temperature), views, study about nature. Most of the tourists come from Thailand.

10.1 Who is involved in the ecotourism in Thap Lan?

The entrance to the NP is free. People pay for the tents and in the cafeterias. Money is sent to the government and then it is distributed among all the NPs.

10.2 How are the villages of the northwestern part affected by these attractions?

They get benefit from the selling of fruits, e.g. strawberries, passion fruit, mangos etc., and other local products, e.g. preserved mushroom.

Students work as guides.

Villagers are employees in the resorts.

People get benefits from organic agriculture.

10.3 Does the northwestern part of the NP have enough infrastructure (trails, observatories, interpretation centres...) to receive tourists?

Poorly prepared to receive tourists. If they wanted to build new infrastructure the process would start with a survey, then a meeting with the head of the village and then brainstorm solutions, as a part of a participation process.

11. Can you show us a **map** of the NP? (where are the borders?)

11.1 May we receive such a map? (hard and/or soft copy)

We took picture of a big printed map hanging on the wall, as well as received a soft copy on the computer, where it is possible to see the boundaries of the park.

- Forest Act: http://www2.austlii.edu.au/~graham/AsianLII/Thai_Translation/Forest%20Act.pdf
- National Reserved Forest Act: http://www2.austlii.edu.au/~graham/AsianLII/Thai_Translation/National%20Reserve%20Forest%20Act.pdf
- Animal Reservation and Protection Act: http://thailaws.com/law/t_laws/tlaw0317.pdf
- Name of zones in the National Park in Thailand: <http://park.dnp.go.th/file/เขตการจัดการ.pdf>

APPENDIX B - PRA SESSIONS

Location: Community house in the village

Time: 17h00 but really started at 17h20

I) Seasonal calendar

- Identified new products that they collect
- Identified the seasons more clearly and in relative quantities
- Identify different HHs: that they collect different products, e.g. grass, ants egg. (specialisation)
- Group 2 lived on the same street
- Identify seasons for different mushroom species
- Pakwan is not collected during the rainy seasons due to insects
- Are there more products or do they collect more?
- Hot (dry) season: from march to mid-may
 - Insects
 - Ant eggs
 - Pak wan
 - Pak wan can be collected until April (incl.) with a peak in abundance in April. In the firsts weeks of May Mushrooms and Insects can be collected.
- Rainy seasons: Mid-may to october
 - Bullfrogs: high seasons is from May and August
 - Bamboo shoots: high seasons is July and August
 - Mushrooms: low season from november-january. Perhaps high season June. High price for mushrooms in july and august.
 - Konjac
 - Bullfrogs
 - Tulip
 - Insects
 - In the beginning of Rainy season bullfrogs can be found and they last until July (icl.) Mushroom season starts in June (possibly May) and they are available during the entire rainy season (until November incl.) Regarding insects, their season lasts only the month
- Cold season
 - November-december is low season, hence they make hand craft.
 - There is a shortage in the products available in the forest. Mushrooms can be found in November, and Pakwan in February while in December and January nothing is collected.

II) Mapping

Group 1

Map 3:

3 households

One household does the Purple track but also does the blue track

Both tracks are main tracks for the villagers

Yellow: forests surrounded by agriculture in between → collect pak wan and mushrooms

Map 4:

2 households

Pink track: Goes in Thap Lan side and sometimes also collects by the dam. Can spend half a day to collect forest products.

Red: only picked mushroom → 500m from the temple (in Sakaerat area)

Group 2**map 1:**

People in the surroundings of the village go into the forest (“buffer zone”) to collect NTFP but it seems that they do not really enter the NP. They enter the forest 2 km in the direction southeast where it is just about not the NP. Besides they use the forest 4 km² south east.

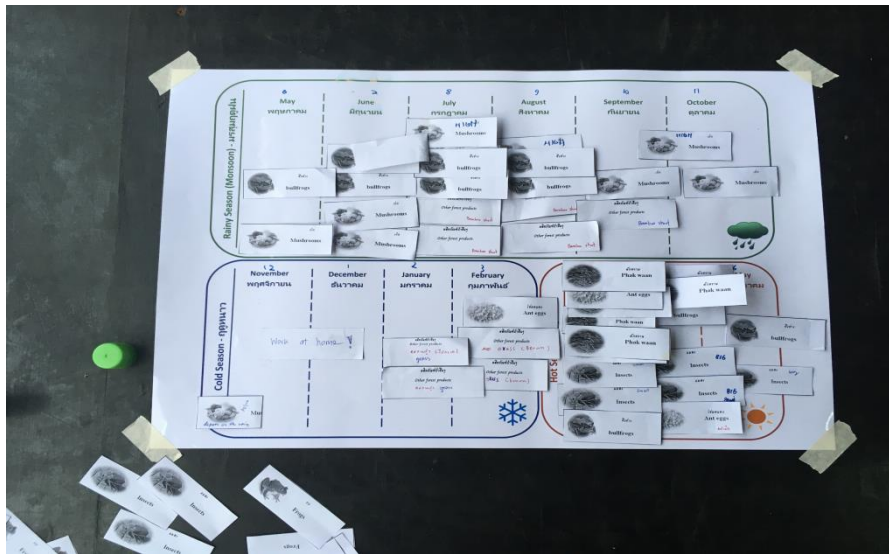
Map 3:

They go more east to another forest, on the other side of the road. (Thap Lan side) → Maybe the side Pablo and Sabrina team went tracking on Monday.

Map 4 :

They go into Sakareat, 4.8 km² the area of collection. Same situation for several household living on the same street.

In other areas further from the village it seems that they enter the agricultural area (village area) - still illegal but accepted because they were declared a national park. They were criminalized. They go even 50 km away (1h by car) east to collect forest products.



Results of seasonal calendar



Participants at the PRA session: Seasonal Calendar



PRA session: Seasonal Calendar

APPENDIX C - FOCUS GROUP

Group 1 (louder people)

Group 2 (calm people)

Similar answer in both group

Rationales behind livelihood strategies

1. How long have you been collecting forest products? How did you begin? (Family related?)
They all said many years ago. Family related, when they were young.
They were all very young and then they realized they could sell the product. They learnt from their families and they will keep on teaching their children. 1973 (man), 1982 (ladies).
2. Why do you choose to collect forest products?
They don't have anything to do. They can spend half a day and get a lot of money out of it (profitable).
3 women, since they don't have high education, no opportunities and no skills. The man, since he was doing agriculture, he had spare time (hobby). The young people also do it to earn extra money (50 baht)
3. Which forest products do you consider most important?
Mushrooms because of the high price and the delicacy (taste). Not everyone knows the good spots.
Everything
4. Do you mainly sell or consume the collected products?
They didn't agree: Both.
Mainly sell. Consume a little.
5. Where do you sell the products? (In the house, to a middle man or at the market?)
To middle men, that then sells on the road
6. What characterizes the people who collect forest products? (old or young? rich or poor? why?)
Everybody (really insisted on it) → but later on talk about people with less land)
Everybody does it. Rich: only eating. And the poor both selling and eating.
7. Which income-generating activities do you prefer? (maybe another than forest products) Why?
Forest products. If they could, they would do it the whole year. They don't need to invest and earn quickly money.
For 1 woman and man, they cannot tell but for two old women: had agricultural land inside Thap Lan. But then they had to give it back so they had to change livelihood strategies.
8. Do you think that future generations will continue to collect forest products? Why?
Sure!
Yes. Even if they have stable job, they think that people will still go when they have free time. Right now, students are going into the forest on weekends (Friday- Sunday) and go to the blue shirt lady to get baskets.

Access to the forest

1. Is your access to the forest? Is it limited? If so - how? (both in the Biosphere Reserve and in Thap Lan)
It is limited. Illegal in the reserve but they still do it. In another forest (sup tao) they are allowed to go in and collect.

They said that before, villagers from other villages were coming into the reserve so that made a lot of people inside. The access was restricted and no one was the officially allowed to go in and collect forest products. The former director was very very strict. If one of his rangers saw them with products, they would chase and throw the collected products. The villagers from ban Wang Nam Khiao tried to make a deal to only allow them but the director did not agree. The new director (monthly 6 months old) pretends not to see them (allow if discreet)

2. What products are you allowed to collect in the forest?
Allowed to collect everything BUT not from sakaerat.
Everything if it's for own consumption but in Thap Lan it's "okay" for both.
3. What products are you not allowed to collect? Does this restriction depend on the season? Why do you think it is so?
No hunting and no wildlife
4. Who is allowed to collect forest products?
No one
5. How is your relationship to the forest rangers? Do you talk with them?
They do talk to the rangers. Do not have relationship with them. The villagers go to the research station to talk about the rules but the people from research station don't want to talk to them.
Negative feeling with people from the reserve (everyone: rangers,director, researchers). Don't like their attitude. Even the researchers (foreigners) that come to the research don't introduce themselves to the village. "Not even Hello". Positive about Thap Lan.
6. Do you have a meeting every month with the officials from Thap Lan NP regarding the rules? How is this meeting beneficial for your use of the forest?
No
Know that the information goes through the headman
7. How would you like the access to the forest to be? What rules should be applied to the use of forest? (regarding access and collection of products).
They would like to be as it was 10 years ago. But still think that hunting should be illegal. Like they are doing now but legally allowed. If someone hunts → should go to jail.
Only villagers from ban Wang Nam Khiao
8. Imagine a different access to the forest, e.g. depending on season. How could that be executed and regulated?
Same to number 7. Not hunting allowed. It should be regulated by JAIL.

Land

1. If your household was in possession of more land. How would your relation to the forest and forest products be? Would it be different? Why?
They would still go even if they had more land.
They would still go because it an opportunity to get an income all year around, as agriculture is a demanding process and you only get benefits sometimes (1, 2, 3... times a year). The man in the group (106) chooses to go into the forest because he has extra time. The woman said they need the income from the forest.
2. What if your household were been given Chanote (secure land title)?
If they had secure land they would not go into the forest, even if they had 1 Rai.

Forest status

1. What is your perception of the status of the forest today? Is it degrading or is it conserving it self/people conserving it? Why?

It is a good idea to collect the mushrooms as it is helping the forest. People are helping with the conservation of the forest. They did not agree on if it's conserving or degrading the forest. The man thinks the fire destroys the forest, but collecting forest products does not impact the forest.

2. What activity do you think has the most degrading impact on the forest? Why? (Fire?)

They do not agree if the fire is natural or not.

There is no more ants' eggs 1-2 months because of the fire, but it is good for pak wan. It would be okay if it was not fire. They shouldn't do it every year but it is necessarily to burn down the forest every 2-3 years because the natural fires would create a big fires. Regarding hunting they hypothesis that some people could use fire to clear dense vegetation to spot the animal, and also gathers the animals in one place → for hunting. Sometimes fires are started in other villages and then they reach the forest next to Wang Nam Khiao.

3. What about agriculture around and inside the forest? with the use of pesticides?

10 years ago there was livestock inside the reserve, it was allow fo the cattle to graze inside.

Now it is not allowed on the reserve side, but on Thap Lan there is still allowed and it fosters the growth of mushrooms.

They said no.

4. What about the forest fires. What do the fires benefit? Beneficial for what products?

Answer number 2. It was benefiting pak wan.

They do not agree. One said it was degrading the forest.

5. Who makes the fires? And why?

Answered above.

6. Do you think that the current amount of forest products being extracted from the forest has an impact (on the forest)?

Answered above.

Dependency

1. What would happen to your livelihood if your access to the forest would end? (both in terms of forest degradation and different laws - *de facto y de jure*)

It would be difficult to find other occupation.

One of the woman said the livelihood would decrease resulting in not enough money to support the family. There was not an agreement with the others.

2. Are there different income activities that could support your livelihood? If one could be imagined...

Nothing would be as good as collecting forest products.

They would not be able to find one as they are very old. There is no other strategy for empty months. One was employed right now, but when she will be too old she could go back to collect forest products.

Ecotourism

We have been told that the sub-district wants to do tourism in all the villages in the near future (homestay - staying with local families, tours ect.). - *Here thai interpreters should be very aware of how they explain tourism. What do we mean by ecotourism?*

1. Are any of you involved in this project? Would you like to participate in planning this project?

Disagreement among the participants: Some of them have been in a meeting (last month) where the officers of the sub district gave them ideas about ecotourism. They all said yes to participate in ecotourism.

They said they have no idea about it but it would be a good idea. One of them was very excited about the project. Other said could not be a great idea because the land they have is insecure and they could not build any resort on it.

2. What impact do you think this tourism will have on the village as a whole? (economy, livelihood strategies...)

Positive in general (for the women).

Two women would like to sell souvenirs. One of them have taken some courses teaching young people to make brooms. The man wanted to start a sufficiency garden. The impact would be positive.

3. How could this impact your lifestyle or livelihood?

It could probably replace forest products because the tourism would imply less work.

4. What kind of attractions related to tourism do you think you could do?

No one would like to participate because they don't speak English so they wouldn't be able to communicate with the tourists. They didn't want homestay because of privacy for both foreigners and thai. If the government were to build some tourist attraction it would be good for the next generation. The ladies would be ready to teach and sell handicrafts and to make brooms. But the man thinks it would be difficult to teach or show how he does agriculture because tourists could spoil his crops.

APPENDIX D - INTERVIEWS WITH THE HEADMAN

I) Unstructured interview with WNK headman

Date: Friday March 2,

Time: late afternoon

Location: at the headman's house, "meeting table". We were the 6 students + Natthanon (also helped with translation + taking pictures) + Dr. Chachai (taking pictures) + the driver

- 345 households
- 1165 people
- Jobs/occupation in the village:
 - 10% are government officers (teachers, policemen, etc.)
 - 30% are farmers with land
 - 60% collect from the forest on top of other activities → they have no land → they are employees
 - (according to the headmen: "there is a season for farming, after, they can go to the forest")
- For the farming activities:
 - In this village, people grow the rice twice a year because they have access to the reservoir
 - They grow a lot of sugar cane (takes 12 months to grow)
 - Cassava (takes 12 months to grow)
 - Rice (takes 145 days to grow)
 - Maize (takes 145 days)
- Collection of forest products:
 - Mushrooms, wild vegetables (people use the stem to cook), some insects
 - The products are both for selling and own consumption:
 - People sell seasonal plants
 - They sell on the road
 - Sell in a market 10km or 40 km from the village
 - Every Monday And Wednesday there is an evening market in the village
- There are rules in the forest:
 - In the National park, you cannot collect anything: "not even a leaf"
 - In Sakaerat: it is allowed to collect fruits and vegetables but not IN the reserve, only along the road.
- History: There is nobody now displaced from Thap Lan in the village

II) SSI with WNK headman

Note-taker: Note-taker	Location: At the house of the headman - “meeting table”
Interviewer: Esben	Permission to record: Yes ___x___ No _____
Interviewee: Village headman	Anonymity: Yes _____ No _____x__

Personal

- How long have you lived in Ban Wang Nam Khiao?
He was born in the village
- How long have you been the headman of Ban Wang Nam Khiao?
8 months - through election

History of village

- Can you tell us about the origin of the village?
**Wang Nam mean “big pond” and Khiao means something with “green color”
The village was established in 1957**
- Can you explain the overall history of the village? Eg. events that have had an impact in the village?
He could not mention any big events, but it was like the translators and village headman did not understand the word “event”.

Governance of village

- Can you explain about your responsibilities and your role in the village?
His responsibilities are to take care of the village. He will talk with the police or government officials if something is wrong. In addition, he has to attend funerals and events, resolve small conflicts.
- Can you tell us about the financial support from the government that you distribute? Who receives the money and why?
The government support is from the sub-district office. There are 3 kinds:
 - **Handicapped**
 - **Elderly (+60)**
 - **Welfare card: for households earning max 30.000baht pr. Months. One can have a welfare card when one turns 18 years. However, you cannot have a welfare card if you have a secure land title. The amount people receive each month depend on their income - if you earn 30.000 bath you receive 200 baht in welfare.**

Wealth in village

- Can you tell us what categorizes poorer and wealthier households in the village? What are their income sources and how do they differ?
**He describes Wang Nam Khiao as “quite poor”, due to a small amount of land.
He explained that the village is stratified - that some households a more wealthy than others.
What categories the less wealthy/more wealthy households are:**
 - **Land - do they have more or less?**
 - **House - is it made of bricks or wood?**
 - **Do the HH have a motorcycle or car?**

- **Says it does not matter what land title they have**
- **Both rich and poor collect forest products → depend on personality**
- **No perception of people collecting forest products as being poor HHs**

Forest Products

1. In comparison to other villages why do many households collect forest products? (Underlying reasons)
 - Depend on people's health**
 - Other villagers around Wang Nam Khiao also collect forest products**
 - If there wasn't a forest people would have to work in factories.**
2. What categorizes the households collecting forest products compared to other households in the village?
 - The first HH we visited categorized a "typical" forest-dependent households (pineapple lady)**
 - Little land depend on forest**
 - The older people who can not get a job in the factory.**
 - Low education.**

APPENDIX E - SSI SAKAERAT BIOSPHERE RESERVE, NOTES OF PRESENTATION

Interview with an official at the SBR and some info coming from powerpoint presentation

About the Reserve

Ministry of science and technology began the Sakaerat Biosphere Reserve, NOT the forest department.

Thailand Institute of scientific and technical research

UNESCO - (SERS)

The research station was established in 1967

1976 was approved by UNESCO as First Man and Biosphere Reserve in Thailand.

Natural world heritage Khao Yai and Thap Lan

The Biosphere Reserve is under the Department of National Parks, Wildlife and plant conservation.

National Reserve Forest Act of 1964

There are two forest types in the biosphere reserve: Dry evergreen forest and dry dipterocarp forest.

The Area

In 2000 → SBR divided the reserve into three zones - core, buffer and transition/

The reserve overlaps Thap Lan and Khao Yai.

Core zone: everything illegal to extract.

Buffer zone: No hunting, but you can pick up plants and mushrooms. No frogs or insects, no agriculture.

Transition zone: no hunting. People live in this zone.

Maybe in 1994 (not sure) they changed the law to no more collection in core zone. Before it was legal. They have made plantations, in which it is legal for everyone to collect mushrooms.

AIMS

The Biosphere Reserve aims to promote sustainable use of biodiversity and conservation.

Mission:

- Forest protection, under the national reserve forest (act 1964)
- Support biological and environmental research

Fires

Normally they burn every year the forest in some areas in order to avoid wildfires, but yesterday some others (or was it a wildfire???) putted on fire themselves.

Also because of so much rain last year, they didn't find it necessary to burn the forest.

Another reason to burn the forest is, that if you don't, the ecosystem will change.

Another rationality (for villagers or other) for burning down the forest could be to make the forest thinner.

Maybe to make it easier to do hunting / he guesses.

Illegal activities

Siamese rosewood is one of the most threatened species, and the one with most conflict, since it is the most wanted wood on the market - very valuable, very expensive. Export mainly to China. DIRECTOR: It is the same people that collects mushrooms that tell others where the rose wood is - he claims.

Punishment for cutting down rose wood is two years prison or big fines.

You can sell a big rosewood tree for 10.000.000 baht.

Also, hunting the wild boar is another problem. They use traps.

They have installed cameras that they have borrowed from Thap Lan.

They have 2-3 illegal cases a year. He says that it is also villagers who do it.

He said that the biggest challenge is to protect the rosewood.

Finance

The reserve is financed by the government with 3.500.000 baht pr. year (2018 budget)

Local contact

Local meetings are taken place with people from the villagers. Continue with meetings every months.

Many, at least 20 people come.

They have 7 rangers to protect the area and the rose wood.

However, it could be that villagers are not aware of the fact that they live in a transition zone.

He said that villagers come to him to complain about the rules of the forest. But that overall SERS have a good relationship with the villagers.

Climate change

Climate change is also a challenge.

Fire

- The fire was not planned yesterday
- Fires are necessary to maintain the ecosystem → 14m trees
- The people burn it because they want better accessibility to the forest

The forest

- Siamese Rosewood → biggest wood in Thailand → have problems with people steals
- Royal forest department
- transitions zones
- Not hunting protected species
- UNESCO required that they make zones but they don't follow them
- The last director said that they in 1994 changed the rules for collecting in the research area (because it is a research area there should be more rules)
- 2-3 cases in a year of arrests because of illegal collection
- Opened the area for people to collect mushrooms
- People collect other illegal things than the wood (animals)
- Last oct → threatened of Siam wood → people stole
- Meetings with villagers → head of the village has a meeting and reports to the village
- Rangers + borrowed cameras to keep an eye on people (for the wood)
- wood → 23 people to cut down the tree (illegally rosewood)
- 2 years in jail or 100.000 fine
- 10.000.000 baht for one big tree - can make on the big market
- Big rosewood in the forest
- It is for self consumption they hunt meat in the forest → find many traps in the forest
- La nina → lots of rain last year

Ecotourism

- 1000 people a year come and visit the research center for ecotourism (tours...)
- Villagers are included by fx teaching how to make brooms + mats

APPENDIX F - UNSTRUCTURED INTERVIEWS

I) Track Lady Unstructured Interview Notes

We previously went to do a questionnaire with her on Sunday.

There, we learned that even though her husband had a “stable” job, forest products were still placed on the second rank for her household income source. We also learned that she was actually going often to the forest.

- **When she started the second track: she told us that usually, when she goes into this side of the forest, she had to be silent because usually there are officers in this part of the reserve and no one is allowed. People need a permit to circulate in this area. She brought us on her most common route**
- **The forest we went in was quite “bushy” → lots of vegetation, up to the knees**
- **The new area where we crossed was less bushy. We could see trace of an old fire.**
- **In the new area after the road, the lady was afraid her dog would be shot by the rangers if they come with her. Usually, she wouldn't bring them.**
- **She also knew that they were really forbidden (even with flexible laws, she was okay to go in but dogs no) -- conscious that they could bring disease or hunt actual wildlife**

In the new area we were walking in a sort of a path

- **Since no one is really allowed, few people go there and she knows the best spots**
- **Even though she knows a few officers in the reserve, she usually hides (bent herself when collecting)**
- **She believes that fire is beneficial for *pak wan* and trees but not mushrooms**
- **She also said that it was good for the forest that there was a fire every year so that it allows to “clear a bit “ (not so much leaves and trees) the forest**
- **She started collecting mushrooms since her daughter was born (37 years) → since her education was low, she couldn't really find job in a factory or anywhere so she started getting to the forests to get some more income.**
- **She believes that there is the same amount of mushrooms than in the past but what have changed is the number of people collecting it..**
- **Before, she didn't have to be quiet to go into the forest. Only recently that they reinforced the rules and restricted the access. → in the past, she was making more money because of a more opened access**
- **4-5 years ago, her husband also helped but now he is working**
- **She believes the last fire inside the reserve area occurred in 2015**
- **Fire impact (negatively = decreasing) *pak wan*, mushrooms and also other trees**
- **Quality of *pak wan* is the same in both areas visited but first allow *pak wan* to grow taller**
- ***Pak wan* will grow more around big trees and tertiary**
- **Last GPS point = limit where she goes: after that, vegetation is even more “bushy” + less *pak wan* and too messy**

- (story on the side: her family used to have land but then her grandmother gave her land to the temple. In this area, it is possible to collect and sell pak wan but the benefits must go back to the temple
- She thinks tourism would be a good thing for the village as it will give steady jobs

II) Unstructured Interview - Tracking man

M: 62 - Grade 4 - Collects forest products

F: 51 - Wife - Grade 4 - Collect forest products (Head of house)

M: 30 - Son - Grade 1 - Employed in construction

F: 17 - Daughter - School

F: 12 - Niece - School

- There has not been a decrease in products but more people from other villagers are collecting the products = pakwan and ant eggs, which he is unhappy about
- No increase in any products
- No one told the rules to them
- Who decides who can use the forest: Nobody can tell each other to use the forest → everybody is allowed
- He started going into the forest 30 years ago
- Wife always lived in this village but he moved to village to be with her - moved from Prajin Buri

Allowed in the forest

- 40 years ago they could cut trees, orchids and hunt but not anymore
- If they hunt in the forest they will be arrested by the forest department → not often this happens
- They made this law because it was decreasing
- They don't break the law in this village
- They can go in all forests → but not collect in the national park, there they can do nothing
- The people inside the village help the reserve things → telling on the people to the forest department office
- They have easy contact with the forest office → they drive by his house everyday → from Thap Lan national park

The type of people who collect

- It's a personality thing to choose to do forest collection and not about wealth
- Old people who are collecting and not so many young
- Many with mushroom → 80 %
- Few with ant eggs + pakwan → 30 %
- Agriculture → 60 %
- Only 3 households collect char coal → make little money from it → it is the poor households (only do it 2-3 months a year)

APPENDIX G - SEMI-STRUCTURED INTERVIEWS (SSIS) FOREST

I) SSI household #1

	Translator: Catey
Note-taker: Esben	Location: HH 56, at the house
Interviewer: Sabrina	Permission to record: Yes____x__No_____
Head of household: Yes	Date and time: 08-03-17, 16:00

Overall objective: *To investigate the importance of forest products in the livelihoods strategies of the villagers in Ban Wang Nam Khiao*

Personal information

Age: 62

Have you always lived in Wang Nam Khiao?

She used to live in Sakaerat sub-district, but moved to Ban Wang Nam Khiao when she was 3 years old.

Income

1. What is your relationship to your sisters house? (Do you share income?)

Yes, they sometimes, but not always, they do share income. E.g. if they go together to the forest they share the harvest or if they sell it they will divide the income.

2. What income sources do you have in your household? (*income meaning both for consumption and for cash*)

Garden products: bananas

Forest products: Mushrooms and Pak Wan

Thai massage

Government support

Remittances From son

a. Why do you have those income sources?

Does not have land. Too old to be employed, high blood pressure and diabetic.

b. What do you earn on the different income sources per month?

Garden products: Tamarind 700?baht? a year? Brother does bananas, but 70 years old.

Forest products: 1000-2000 baht/month

Thai massage: 1200 baht the months she does it. She does not do it all months.

Government support: 600 baht/month

Remittances: 1000 baht 2-3 months a year

Collection of forest products

1. Who taught you how to collect forest products? Have you done it all your life?

Her mother taught her since she was a child.

2. What products do you collect? (why those products?)

Mushroom and Pak wan. She does not collect any animals because she didnt like to kill the animals, nor insects. "If you kill an animal it'll cry". She have always only collected these products.

3. What forests do you go to to collect?

Suan Phu Luang , Kau Phu Laung, Than Lap, Sakaerat

4. Do you usually collect or sell the forest products? Why?
She consumes more than she sells, but depends e.g if the mushroom is in “bloom”. If the mushroom has “bloomed” it does not taste as good and the price is low so she will rather consume it. In contrast, when the mushroom has not “bloomed” it taste better and have a higher price, hence she will rather sell it.
5. To whom do you sell? (middle man? Price? - Please explain the value of each product)
She sells to a middle woman. She has always done that. The middlewoman then sells the products by the road. When asked why she did not sell it by herself without a middle woman, she replied that she does not like the cars and she is too old to carry it all.
6. How much do you earn by selling forest products per month? (*specific products? In what months? E.g. if bullfrogs then compare the seasons - january with august*)
**Mushrooms: between 70 b/kg (low price e.g. when in bloom or high season) - 250 b/kg (high price e.g. when not in bloom or low season). The middle man sells when in bloom for 300b/kg, and when not in bloom for 300-400 b/kg but sometimes up to 800b/kg.
Pak Wan: between 10 b/kg (very low price, here she would rather eat it herself) - and 350 b/kg (high price). Middlemen sell it for 500 b/kg**
7. How would you characterize your dependency on forest products? (in relation to other income sources)
Going to the forest makes her happy, she loves nature and it is good for her health.
8. What would happen if you were not able to go to the forest (e.g. no forest, restrictions or other)
She says, she would be in big trouble because she will have nothing else to do/other opportunities. She explains that she is too old, low educated, weak and have diabetes, hence a factory would e.g. not hire her.
9. What income source do you prefer? Why?
She would prefer to do hand craft at her house, but she can not afford to buy the equipment she needs. She knows have to do coconut leave brooms.

Access

1. How is your access to the forest? What rules are there?
Rides motorbike to a forest close to the dam. Allowed to collect mushrooms, is allowed to collect everything
2. Can you explain your relationship to the forest rangers (from Thap Lan and Sakaerat Biosphere Reserve)
-Do you talk with them? **She says that they have a good relationship and that they do talk**
3. Do you remember how the access was in the past? What happened with the rules of the forest use 10 years ago? What changed?
New rules → villagers from other places cut down the trees and hunted wildlife, therefore they made the rules more strict. 10 years ago she went to Sakaerat, but not anymore.
4. How do you want the access to the forest to be? How do you want the forest to be regulated? Why?
Regulated → would prefer if access to the forest (around the village) was only allowed for villagers of Wang Nam Khiao. ID-card system to show it. And if other villagers wanted to collect they would have to give their ID-card to the ranger and after they are finished collecting they will show the ranger what they have collected and if he approves he will give them back their ID-card.

Land

1. Do you own land? What land title? **No**
 - 1.1 *If no*, would having land influence your collection of forest products? Would you collect less/stop collecting? why?
**She says that if she had land, she would still go to the forest, but only for own consumption, not to sell. She explains that it is because it taste good.
We asked her if it would make a difference whether it was Sor Por Kor or Chanote and she said no.**
 - 1.2 *If yes*, would having more land make a difference regarding your collection of forest products? Why?

1.3 If yes, would having secure land (Chanote) make a difference regarding your collection of forest products? Why?

Eco-tourism

We have been told that the sub-district wants to do tourism in all the villages in the near future (homestay - staying with local families, tours ect.). - *Here thai interpreters should be very aware of how they explain tourism. What do we mean by ecotourism?*

1. Have you heard about ecotourism? Are you involved?

No, she has not heard about it.

2. Can you explain how you imagine ecotourism would impact your livelihood? (good/bad? why?)

She thinks it would be good for the community to engage in tourism. She wants the village to develop.

3. Would you like to participate in these ecotourism projects? **Yes**

4. What kind of attractions do you think you could do?

She would sell garden products and handmade desserts and food.

5. If you engaged in ecotourism how do you think it would influence your use of the forest?

Yes, she says that if she could live of tourism she would not go to the forest.

Thank you for participating yesterday and today. We really appreciate it. We will like to invite you for Saturday where we will present our result for the village.

Extra notes:

Her education is grade 4. She has two sons who both have an under-bachelor. One of the sons live in Bangkok and one works as a mechanic.

There are 3 people in her household: Herself, her mother and her brother.

The income-generating activities she is doing, she had done her whole life.

II) SSI household #2

	Translator: Tan
Note-taker: Yaser	Location: HH 155, at the house
Interviewer: Helene	Permission to record: Yes_____x___No_____
Head of household: No	Date and time: 08-03-17, 17h12

Overall objective: *To investigate the importance of forest products in the livelihoods strategies of the villagers in Ban Wang Nam Khiao*

Personal information

Age: **49**

Have you always lived in Wang Nam Khiao?

Yes

Income

1. What income sources do you have in your household? (*income meaning both for consumption and for cash*)

a. Why do you have those income sources?

Garden products: For self consumption

Agriculture: It is easy because she has a knowledge about it

Forest products: Because it is easy, and she doesn't need to invest anything in collecting forest products.

Brooms (Handcraft):

b. What do you earn on the different income sources per month?

Garden products: Generate 1000 baht per month

Agriculture: Generate 6000 per month (4100 from corn)

Forest products:

- Pak wan gen. 2666 in four months.
 - Ants eggs gen. 15000.
 - Bullfrogs gen. 7000-8000 in 2-3 months.
 - Bamboo shoots for her own consumption.

She showed us a picture with a little amount of mushroom: Mushrooms for 6000-7000 baht take usually 2 hours to collect them. Because she need to dig deep under them.

Brooms (Handcraft): it's only the beginning so don't know yet

Government support: 200 baht per month.

Remittances: 2000 baht per month.

Collection of forest products

1. Who taught you how to collect forest products? Have you done it all your life?

She learned to collect forest products when she was young by her parents.

6. What products do you collect? (why those products?)

Ants eggs

Mushrooms

Bullfrogs

Pak wan

7. What forests do you go to to collect?

She usually go to three mountains (sakaerat, thap lan, and sab tao).

She spend usually 6 hours every time she go to collect forest products.

8. Do you usually collect or sell the forest products? Why?

Both : first The market opened 32 years ago. At first she was selling forest products at the market, but now middle come to her home

a. To whom do you sell? (middle man? Price? - Please explain the value of each product)

Ants eggs: 400 baht for middle man. 500 baht selling by herself.

Mushrooms: 250 baht for middle man. 500-600 baht selling by herself.

Bullfrogs: 250 baht for middle man. 350 baht selling by herself.

There are 2-3 middle men buying forest products from her.

9. Why she decided to use a middle man?

It's easy for her to stay at home and sell the products to middle man.

10. How much do you earn by selling forest products per month? (*specific products? In what months? E.g. if bullfrogs then compare the seasons - january with august*)

Mushrooms highest price is in April before the festival, price per kg. is 300 baht. In low season the price is 70-130 baht. The price depends on many different factors. For example for **highest price in April before the festival ...**

- Bullfrogs highest price in March 200-230 to middleman, 350 herself.

- Pak wan highest price is 350.

- Ants eggs highest price is 400 for hall season.

11. How would you characterize your dependency on forest products? (in relation to other income sources)

The importance of forest products for the household is making money. Also, you don't have to invest anything (like agriculture where you would need fertilizer for ex.)

12. What would happen if you were not able to go to the forest (e.g. no forest, restrictions or other)

She couldn't live any more.

13. What income source do you prefer? Why?

1 - Forest products (She doesn't have to invest anything in collecting forest products.)

2- Making brooms

3- Government support

4- Garden

14. What about the next generation?

Yes, but less than us. They will work more in the factories.

Access

1. How is your access to the forest? What rules are there?

It is easy to enter the forest. It is not allowed to collect anything in the forest. (In the three mountains is not allowed to collect forest products.) But OK for wild plants and mushrooms (not hunting, no animals, no charcoal, no wood). This woman says that she still collects bullfrogs .

2. Can you explain your relationship to the forest rangers (from Thap Lan and Sakaerat Biosphere Reserve)

• **Sakaerat has rangers and barriers. "Sakaerat is very strict and set rangers to check..."**

• **Thap lan no rangers or barriers.**

• **Subtao has just rangers.**

a. Do you talk with them? (What happens when you meet them)

They check for animals in her bags and basket and let her pass, and she collects bullfrogs at night when the rangers are sleep.

Her relationship with rangers is good.

Most of rangers are not from the village, from different places.

3. Do you remember how the access was in the past?

a. What happened with the rules of the forest use 10 years ago? What changed?

In the past the villagers could collect animals, but not any more because the forest products are decreased.

4. How do you want the access to the forest to be? How do you want the forest to be regulated? Why?
She prefer the old rules, but she understand the new one.

Land

1. Do you own land? What land title? **Ye , Sor Por Kor, The size is 10 RAI**
1.1 *If no*, would having land influence your collection of forest products? Would you collect less/stop collecting? why?
1.2 *If yes*, would having more land make a difference regarding your collection of forest products? Why?
If she has more land she will still go to forest, even if she has 100 RAI
It is something she has been doing for many years, and she used to do.
1.3 *If yes*, would having secure land (Chanote) make a difference regarding your collection of forest products? Why?

If she has secured land she will still go but less, because she could maybe generate more money.

Eco-tourism

We have been told that the sub-district wants to do tourism in all the villages in the near future (homestay - staying with local families, tours ect.). - *Here thai interpreters should be very aware of how they explain tourism. What do we mean by ecotourism?*

1. Have you heard about ecotourism? Are you involved?

Yes, through words of mouths she heard

2. Can you explain how you imagine ecotourism would impact your livelihood? (good/bad? why?)

Positive because it's making money.

Negative because it could destroy the forest by other, and causes pollution.

3. Would you like to participate in these ecotourism projects? What kind of attractions do you think you could do?

Yes, she will sell forest products to the tourists (stands next to the tourist attractions). Teaching broom making. She said that her household members would like also to engage in ecotourism.

4. If you engaged in ecotourism how do you think it would influence your use of the forest?

She would go less to the forest because she will be busy (selling) in this ecotourism project

III) SSI household #3

Note-taker: Esben	Permission to record: Yes _____ No _____
Interviewer: Sabrina	Anonymity: Yes _____ No _____

Overall objective: *To investigate the importance of forest products in the livelihoods strategies of the villagers in Ban Wang Nam Khiao*

Income

1. What income sources do you have in your household? (*income meaning both for consumption and for cash*)
 - a. Why do you have those income sources?
 - b. What do you earn on the different income sources per month?
 - **Garden products: both for consume and cash-income. Earns 1-2000 b/month on bananas and mango**
 - **Agriculture: Rice - 50.000 b/year**
 - **Cassava - 50.000 b/year**
 - **Forest products - 20.000 b/month. Also for consumption**
 - **Government support 600 B/month**
 - **Remittances: 5.000 B/month**
 - **Daughters employment: 5.000 b/month**

Collection of forest products

1. Who taught you how to collect forest products? Have you done it all your life?
Started to collect 10 years ago by herself. She can earn more on these products, compared to to rice/cassava → the prices on rice and cassava er falling.
2. What products do you collect? (why those products?)
Forest products:
Mushrooms - 300 bahts/kg
Bullfrog - 100 b/kg (she collects 2-3 times per month during season, 10 hours a night)
100 kgs pr night.
Ants egg - 500-1000 b/kg
→ GOOD money on these products.
3. What forests do you go to to collect?
4. Do you usually collect or sell the forest products? Why?
 - a. To whom do you sell? (middle man? Price? - Please explain the value of each product)
 - b. How much do you earn by selling forest products per month? (*specific products? In what months? E.g. if bullfrogs then compare the seasons - january with august*)
5. How would you characterize your dependency on forest products? (in relation to other income sources)
Very important to her. Cannot live without the forest. Important income source, not hard work.
6. What would happen if your were not able to go to the forest (e.g. no forest, restrictions or other)
If no forest she could still do agriculture, but would have less income.
7. What income source do you prefer? Why?
Preferably the forest. Less effort - more money.

Access

1. How is your access to the forest? What rules are there?
She goes no further than to the mountain "----" because it is far. She goes 50-100 kilometers from the house.

She cannot take: turtles, ground lizards, threeshoes, wild cocks.

“Same rules at the reserve” - she is allowed to take the bull frogs.

2. Can you explain your relationship to the forest rangers (from Thap Lan and Sakaerat Biosphere Reserve)
 - a. Do you talk with them?
Does not talk to the rangers. She does not see them neither. Never.
3. Do you remember how the access was in the past?
 - . What happened with the rules of the forest use 10 years ago? What changed?
Never heard about the rules changed.
4. How do you want the access to the forest to be? How do you want the forest to be regulated? Why?
The rules are good as they are now.

Land

1. Do you own land? What land title?
Chanote - secure.
2. *If no*, would having land influence your collection of forest products? Would you collect less/stop collecting? Why?
With different land title, she would go more often.
3. *If yes*, would having more land make a difference regarding your collection of forest products? Why?
With more land she would still go to the forest, still same purpose.
4. *If yes*, would having secure land (Chanote) make a difference regarding your collection of forest products? Why?
Got her land from her husbands parents. Has always been chanote.

Eco-tourism

We have been told that the sub-district wants to do tourism in all the villages in the near future (homestay - staying with local families, tours ect.). - *Here thai interpreters should be very aware of how they explain tourism. What do we mean by ecotourism?*

1. Have you heard about ecotourism? Are you involved?
Yes, about a meeting that happened 2-3 days ago.
2. Can you explain how you imagine ecotourism would impact your livelihood? (good/bad? why?)
Maybe more income.
3. Would you like to participate in these ecotourism projects?
 - a. What kind of attractions do you think you could do?
Would sell food, sticky rice-cake etc.
4. If you engaged in ecotourism how do you think it would influence your use of the forest?
Would still go to the forest to collect and sell. Cannot think of bad things, only good things → more income. Would use the forest even though she did not live here.
Relationship to the forest:
She enjoys, but does it for the money! But also to kill time. She likes the forest. She would not go to the forest only to collect for consumption though.

APPENDIX H - LAND TITLES

Tenure Security	Property	Rights	Document	Number	Characteristics	Delivered by
SECURE	Private	- Use - Control (sell) - Inheritance	Chanote/Nor sor si (4)*	NS4	Real Land Title deed	Land department: <i>Provincial Land Office</i>
			Nor Sor Saam (3)	NS3	Land Title deed	Land department: <i>District Land Office</i>
			Nor Sor Saam (3) Gor	NS3G	Land Title deed deed similar to NS3	
			Nor Sor Saam (3) Khor*	NS3K	Land Title deed similar to NS3 but more recent.	
			Sor Kor 1	SK1	Survey determined by new aerial photography 1/5000 Land Possession Certificate	
					Historic type of land title → possibility to change it to Chanote or NS3K	
TEMPORARY	State	- Use - Inheritance	Nor Sor Song (2)	NS2	Certificate of temporary use of land	Land department: <i>District Land Office</i>
			Sor Tor Kor/Gor (1)	S.T.K.1	Permit of utilization document in national conservative forest area	Royal Forest Department
			Kor Sor Nor (3)	KSN3	Certificate of utilization in land settlement cooperative area	Cooperative Promotion Department
			Kor Sor Nor (5)	KSN5	Certificate of utilization in land settlement cooperative area	
			Sor Por Gor 4-01*	SPG 4-01	Certificate of utilization in land reform area Only agricultural lands	<i>Agricultural Land Reform Office</i>
UNSECURE		- Use	Por Bor Tor 5*	PBT5	Evidence of occupying land by tax payment	<i>Recorded by Village headman</i>

APPENDIX I - SEMI-STRUCTURED INTERVIEWS (SSIS)

NON FOREST HHS

	Translator: Katie, Tan & Jah
Note-taker: Stephanie & Pablo	Permission to record: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Interviewer: Stephanie & Pablo	Anonymity: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

Income sources

1. Ask about their income sources:

i- Garden products (Mango, dragon fruit, banana, fish, tamarind, coconut, roseapple, pomelo) → 4

When did your household start producing garden products?

4-5 years ago

Why did they choose to collect these specific types?

To eat and sell

Is it for your own consumption or to sell?

a. If sell, where do you sell it?

At the workplace (university). From Monday to Saturday.

ii- Agriculture (rice)→ 5

When did your household start the rice production? ***By October November they will have the products. 4 months taking care of the rice.***

5.2. Why did they choose to harvest rice?

You cannot grow other crop but the rice because of the type of soil.

5.3. Is it for your own consumption or to sell?

For own consumption.

iii- Employment (Daughter works at bank, husband works in village)

When did your daughter start working in the bank? ***2-3 years ago***

a. What is her education? ***BSc in Management***

b. Why did she choose this income source?

What does your husband do in the village? ***He works as a mechanic in the washing machine shop.***

a. Has your husband always worked in the village? And why?

He started transporting people 10 years ago

iv- Small business (washing + transportation)

Washing:

Her husband knows a lot about washing machines. This business gives them high income. The way it works is that people pay with cash in the washing machines, and the price depends on the amount of clothes.

Transportation:

Her husband is the driver of the business and transport the same people everyday (Mon-Sat)

These people pay per month.

Forest products

(Notice that they laughed when we asked them about Forest Products)

1. Are there many households in the village that collect forest products? (procent?)

She doesn't know as she goes to work.

2. In your opinion, what characterizes people that collect forest products? (young or old, rich or poor?).

The people without land → as they can't do agriculture.

a. Why do you think people in this village choose to collect forest products?

Same as answer 2.

3. Why do you choose not to collect forest products?

She doesn't have time → only one day off a week. And it is hard work. "It is not her cup of tea"

4. Has someone in the household collected forest products in the past? **No**

a. Has any of the previous generations in their families collected forest products? **No**

b. If yes, which kind? And why did they stop?

5. Would you consider to collect forest products if one or some of your income sources disappear? **No**

6. If you had less or no land would you then consider collection of forest products? **No, as she is not used to the forest.**

7. Do you access or use the forest for any purposes? **Yes, in her leisure time for small trips.**

Eco-tourism

We have been told that the sub-district wants to do tourism in all the villages in the near future (homestay - staying with local families, tours ect.). - *Here thai interpreters should be very aware of how they explain tourism. What do we mean by ecotourism?*

1. Have you heard about ecotourism? Are you involved?

- **She hasn't heard about ecotourism**
- **Village may benefit the village but the forest and nature may decrease because of the tourists.**
- **She may sell her garden products from her house to the tourists. She is not interested in doing homestay as her home is a private place only doing fruit sale.**

2. If you were engaged in tourism do you think it would influence your use of the forest? How?

No, as her legs are not good so she would not use the forest.

We asked about her daughter: He daughter does not use (collect) the forest because of her education.

If there came more tourism her and her daughter may sell garden products and souvenirs from their household for the tourists.

3. (If they do not have any relations the forest.) Do you think tourism could make you start any new projects in the forest?

Asked after: Is it mostly the poor or the richer households that collect forest products? (it was rephased in the interview)

It is mostly the poorer families as they don't have an education so they can't work in the factories or in other employment. Also maybe because of people going to the forest find this a good activity as it can be good for doing exercise for example.

APPENDIX J - PARTICIPANT OBSERVATION NOTES

Track and participant observation from Wang Nam Khiao to forest, 05-03-2018

Pablo's notes and observations:

- Dry-deciduous dipterocarp forest (i.e. *Shorea siamensis*).
- The collected ants eggs and pak wan (only fresh shoots). For the ant's eggs they use a stick with a cone-shaped recipient with a filter. After collecting the ants they add flour to repel the ants and keep the eggs (also larvae). They leave the nests that are too high. The season for ant's eggs is from February till April. The ants can be sold too, as they are eaten wrapped into banana leaves, but is not a common thing in this Sub-district.
- They collect bullfrogs only in rainy season.
- It was common to collect orchids for selling (decoration), but now it is forbidden because of human pressure. Orchids season is monsoon. The rule is respected.
- Observation: several paths in the forest. It seems to be used of more than just this household.
- Trash in the forest.

Sabrina and Stephanie notes and observations:

- Tree stumps - some few households cut the old trees down to make charcoal (apparently illegal but only the poor households do it, small profit)
- During the year they collect ants egg, mushroom, insects, Pak wan, frogs
- For the track they collected ants egg and pak wan
- They went once a day, 6 hours a day, 7 o'clock in the morning
- Seasons: ants egg are dry season"
- Not season for pak wan - season starts in march
- We were in Khao Pradu forest
- Egg ants used for soup and and fried eggs, they eat only the ants with wings
- No specific tree species for the ants egg, but only on soft leaves to build their nest
- 400 baht for a kilo of ants egg
- 2-3 months, february-march
- Many villagers come to this forest
- The flour is cassava starch, tapioca flour
- Many different types of mushrooms in the forest
- They collect a minimum of 0,7kg - 2kg a day pr. person/family
- Ants eggs are "decreasing" due to people coming from other provinces - the profit is high
- February to march there are forest fires, but they do not know why
- They walk usually a minimum of one kilometer
- They both consume and sell
- Pakwan: 1 kg is 350 baht, but prices are changing
- They know it's illegal to kill wildlife such as deer and rabbits
- They collect insects (Maeng Ki Nun, Chak Ka Chan) in the night - Best after forest fires
- Tauts in the rainy season and after it rains
- Son and San, 55 and 48 years old. Son had 7 people in the household and San has 4 people in the household. They have always lived in the village
- They both do agriculture, they share the land. The younger owned it - Sor por kor, 9 rai, Corn and cassava.
- They only sell the products (raw material), they do not produce something with it and then sells.
- They make brooms for an additional income. They both buy and collect the grass 50/50. People order the brooms and last year it made more than the agriculture, but that varies yearly.
- They go to many different forests
 - Sap Tao
 - Nong Kradueng
 - Khao Rai (Not NP) in Sakaerat

- Pa Tio'
- Khao Bong
- Khao Phra Yai
- Khao Chong Maeo
- Forest products are the most important source of income.

Helene and Yaser:

- Took us to a place where she usually does not go, because it was too late
- The daughter said that you should be quite (did not say why) when entering the forest in this areas
- Mostly looking for Pak Wan, because it's the season
- In other seasons they collect mushroom and frogs
- Mushrooms are also collected by people from other villagers. The daughter would like to have that you should have a card that gave you permission in certain forests due to competition.
- Some people sleep in the forest in the mushroom season
- She says that the forest fires are for stimulating the pak wan and preserve the fire (is that the real objective) and the fire is once a year, but she does not know who makes them. (A little bit confusing/weird, for whom was she talking? If she doesn't know who makes them, then how does she know the objective)
- Prices: 1 kg pak wan is 300-400 small leaves, takes half a day to one day to collect and the price is 350 baht. However, when it's rare the price can go up to 850 baht.
- We saw trees that were burned with some sprouts and some that were too burned (dead).
- Eucalyptus field where it was clear that had just been a fire. Maybe the fire were not controlled.
- Dry forest with rocks and no leaves on the floor.

APPENDIX K - QUESTIONNAIRE GUIDE

Introduction

We are Master students from the University of Copenhagen. We are here to study the importance of forest products in the households in Ban Wang Nam Khiao. The data collected will be analyzed and presented in a final report. The questionnaire will take between 15-20 minutes.

My name is _____ and I will be asking the questions. This is _____ and they will take notes.

GPS-point: X_____Y_____	Translator:
Questionnaire number:	Location:
Note-taker:	Anonymity: Yes_____No_____
Interviewer:	Date and time:
Interviewee:	Head of house:

1) Household

1. What is your name and age?
2. Are you the head of this house?

Please tell me the ages of everyone living in this household:

Age	Sex	Relationship to the interviewee	Educational level	Occupation

(Two-Way Table) Casley & Kumar 1988

2) Income sources:

2.1. We are now interested in your household's income sources. By income source, we mean both activities that you do for own consumption in the household, and products you sell in the market.

Please say yes or no to the following income activities:

2.1.1. Garden products

If yes, which kind of products:

2.1.2. Agriculture

If yes, which kind of crop:

2.1.3. Forest products

If yes, which kind of products:

2.1.4. Employment

If yes, which kind of employment:

2.1.5. Small business (handcraft or homemade food products)

If yes, which kind of business:

2.1.6. Government support
If yes, which kind of support:

2.1.7. Shop
If yes, which kind of shop:

2.1.8. Remittances (explain as money transfers from relatives)

2.1.10. Other

If other _____

2.2. Which of these activities that you said yes to, does your household depend most on?

- 1st _____
- 2nd _____
- 3rd _____
- 4th _____
- 5th _____

2.3. We are now interested in the amount of time you spend on these activities in a year. How many months do you spend on the following activities during a year?

- a. _____ 1 2 3 4 5 6 7 8 9 10 11 12
- b. _____ 1 2 3 4 5 6 7 8 9 10 11 12
- c. _____ 1 2 3 4 5 6 7 8 9 10 11 12
- d. _____ 1 2 3 4 5 6 7 8 9 10 11 12
- e. _____ 1 2 3 4 5 6 7 8 9 10 11 12

3) Household location

3.1. Has the household always lived in this village? Yes _____ No _____

If no:

3.1.1. When did the household move to this village? (what year approximately) _____

3.1.2. Where did the household live before? _____

3.1.3. Has the household been evicted? Yes _____ No _____

4) Land

4.1. Does this household possess land beyond this house? Yes _____ No _____

4.2. With _____ or Without _____ documentation?

4.3. What kind of land title? (*Don't mention options just cross off*)

Secure

NS3K (Nor Sor 3 Kor) _____

Temporary

STK1 (Sor Tor Kor 1) _____

SP4-01 (Sor Por Kor 4-01) _____

KSN3 (Kor sor Nor 3) _____

KSN5 (Kor sor Nor 5) _____

Insecure

PBT5 (Por Bor Tor 5)

Other _____

Don't know _____

4.4. Size of the land _____ Don't know _____

5) Forest status

5.1. Of the forest products you collect, have you noticed changes in the amount available in the forest?
Yes _____ No _____

5.1.1. *If yes:*

Has the amount of products in the forest increased? _____ or decreased? _____

5.1.2. Which products have:

Increased _____

Decreased _____

5.2. Are there any products you cannot find anymore?

5.2.1. *If yes:*

Which products _____

6. Thank you for your participation. Is it possible to contact you in the following days for an in depth-interview? Yes _____ no _____

If yes, what is your phone number _____

Notes:

APPENDIX L - LIST OF METHODS

The Method	Number of the conducted units
Questionnaire	38
Semi structured interview	8
Unstructured interview	2
Focus group	2
Participatory Rural Appraisal (PRA)	2
Tracking & Participant observation	5
Mapping	2

APPENDIX M – DATA MATRIX

Objective	Research Questions	Sub-questions	Data required	Method	Equipment	Challenges
The aim of our study is to identify the use, role and potential of the forest in the livelihood strategies in Ban Wang Nam Khiao.	What characterizes Ban Wang Nam Khiao villagers' access to forest products, and how is this access mediated?	How are the regulations in Thap Lan and Sakaerat enforced and maintained?	Data on implementation of forest access and regulations Data on legal and practical (<i>de jure</i> and <i>de facto</i>) access	Interviewing (key informants and selected households) Tracking and THEN mapping Participant observation Focus group	Interviewguide Focus group guide Paper Pen Recorder Batteries GPS Batteries	Language/translation difficulties Norms and customs that can limit the data possible to collect Lack of time to collect data Difficulty in understanding legislation - and the difference between law and practice
		How would the villagers prefer the forest to be regulated?	Data on villagers preferences on forest regulation	Interviewing (key informants and selected households) Focus-group	Interview guide Focus group guide Paper Pen Recorder	

	What role does the forest have in the villagers' livelihood strategies in Ban Wang Nam Khiao?	Which income-generating activities do the villagers consider important for their livelihood?	Data on the different income-generating activities the villagers do	Questionnaires with households in the village	Questionnaire guide Paper Pen
		Which forest products are collected from the forest, when, where and for what purpose and how does that differ between household?	Data on which forest products the villagers collect Data on the purpose (cash or subsistence) of the collected forest products Data on where the villagers collect forest products Data on when forest products are collected	Tracking and THEN mapping Participant observation Interviewing (key informants and selected households) Mapping PRA with selected participants Focus group A seasonal mapping PRA	Interviewguide Seasonal mapping guide Paper Pen Recorder Batteries GPS Batteries Post-its Maps + stickers

		<p>What are the rationales behind the collection of forest products for different households, and how do they depend on this livelihood strategy?</p>	<p>Data on the reasons the villagers collect forest products</p> <p>Data on how the villagers perceive their dependence on forest products</p>	<p>Focus group</p> <p>Interviewing (key informants and selected households)</p>	<p>Interviewguide</p> <p>Focus Group guide</p> <p>Paper</p> <p>Pen</p> <p>Recorder</p> <p>Batteries</p> <p>GPS</p> <p>Batteries</p>
		<p>How do land tenure arrangements impact the extent to which the villagers collect forest products?</p>	<p>Data on land titles and land tenure</p> <p>Data on income sources/ (cash and subsistence)</p> <p>Data on the distribution of agriculture land</p>	<p>Interviewing (key informants and selected households)</p> <p>Questionnaire</p> <p>Focus group</p>	<p>Questionnaire guide</p> <p>Interviewguide</p> <p>Focus group guide</p> <p>Paper</p> <p>Pen</p> <p>Recorder</p> <p>Batteries</p> <p>GPS</p>

		How is the status of the forest products perceived by the villagers?	Data on the decrease or increase of forest products	Questionnaire with households in the village Interviewing Observations	Questionnaire guide Interviewguide Paper Pen Recorder Batteries GPS
	How could ecotourism be an alternative livelihood strategy for the villagers of Ban Wang Nam Khiao in the future?		Data on income sources/ (cash and subsistence) Data on the possible plans of ecotourism Data on the villagers perception of ecotourism	Interviewing (key informants and selected households) Focus group	Focus group guide Interviewguide Paper Pen Recorder Batteries