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Trade in Natural Resources in Stung Treng Province, Cambodia: An assessment of the wildlife trade



Sarinda Singh, Ramesh Boonratana, Mark Bezuijen and Sok Ko

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TRADE IN NATURAL RESOURCES IN STUNG TRENG PROVINCE:

**An assessment of wildlife trade in the Cambodia
demonstration site of the Mekong River Basin Wetland
Biodiversity Conservation and Sustainable Use Programme
(MWBP)**

**Prepared by TRAFFIC Southeast Asia - Greater Mekong Programme
for the Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme
(MWBP)**

**Sarinda Singh, Ramesh Boonratana, Mark Bezuijen and Sok Ko
August 2006**

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ABBREVIATIONS AND ACRONYMS

ADHOC	Association for Development of Human Rights in Cambodia
CEPA	Culture and Environment Preservation Society
CI	Conservation International
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DC	District Capital
DFID	Department for International Development
DoE	Provincial Department of Environment (of the Ministry of Environment)
IUCN	The World Conservation Union
KHR	Riel - Khmer Currency (USD1 = KHR4,080, May 2006)
Lao PDR	Lao People's Democratic Republic
MP	Military Police
MRC	Mekong River Commission
MWBP	Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme
PC	Provincial Capital
PFA	Provincial Forest Administration
PFO	Provincial Fisheries Office
PPA	Participatory Poverty Assessment
TSEA	TRAFFIC Southeast Asia
UNDP	United Nations Development Programme
UNODC	United Nations Office on Drugs and Crime
USD	US Dollars
WCS	Wildlife Conservation Society
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

As a contribution to the Mekong River Basin Wetland Biodiversity Conservation and Sustainable Use Programme (MWBP), field studies were conducted in the MWBP demonstration sites of Cambodia and Lao PDR to investigate trade in natural resources. This report summarises findings from the Cambodian demonstration site in Stung Treng Province.

The aim of the field study was to provide an overview of natural resource trade, including fish, wildlife (terrestrial and aquatic vertebrates aside from fish) and non-timber forest products (NTFPs). The MWBP is founded on an integrated approach to natural resource management, as it seeks to incorporate needs for biodiversity conservation with the promotion of sustainable use that supports local livelihoods. Thus, the study sought to highlight the varied economic, ecological and social factors that influence trade dynamics in the MWBP demonstration site.

Participatory methods were used to collect information from seven villages and nine camps in the demonstration site, as well as from local urban markets, in order to identify the types of natural resources being traded, trade routes and trends in trade over time. In addition, information on regulations and current management practices was collected from government offices in the Stung Treng provincial capital.

The results demonstrate the critical importance of trade in natural resources for rural livelihoods. Of all reported income sources, only trade in natural resources was reported across all villages to be important for the livelihoods of most households. Reliability in supply and market demand, along with flexibility in use, were key characteristics of natural resources that were preferred trade items. Trade in fish and wildlife is long-established and very active, so it is not surprising that this makes the most important contributions to the local economy. In comparison, trade in NTFPs appears to be largely emergent for villages in the demonstration site.

Villagers consistently reported fish as being the most important type of natural resource for consumption, exchange, and income-generation. Trade in monitor lizards and turtles was also locally significant, while their use for consumption has declined. Given the impacts of trade on consumption patterns, it is not surprising, therefore, that while trade in natural resources is incredibly important for local livelihoods, unregulated trade is also regarded by officials and villagers as an issue of concern.

In Stung Treng, 12 globally threatened wildlife species and 22 CITES-listed species were observed in trade during the field studies. As market demand and market access are key determinants of trade patterns, ongoing road improvements in Stung Treng Province have had a noticeable effect on trade in natural resources in the demonstration site. The prices, volume and diversity of natural resources being sourced from the demonstration site for trade purposes have, by the accounts of villagers, traders and officials, all increased in recent years. As construction of additional roads and bridges in Stung Treng is completed in the coming year, it can be expected that the trade-driven pressures on natural resources in the demonstration site will continue to intensify.

Recent amendments of relevant laws have improved the regulatory framework regarding natural resource trade, and provincial authorities do regard this as an important issue. However, uncertainties and contradictions persist in both implementation and enforcement, as they do in policy. Interventions must ensure that local communities with limited economic opportunities are able to secure their natural resources for long-term benefits. Village-level interventions are appropriate for some trade issues, but there must be corresponding action to control the activities of outsiders, as well as interventions aimed at local, domestic and international markets in order to ensure the effectiveness of management and the sustainability of trade in natural resources.

1. INTRODUCTION

The Mekong River Basin Wetland Biodiversity Conservation and Sustainable Use Programme (MWBP) of the United Nations Development Programme (UNDP), IUCN - The World Conservation Union and the Mekong River Commission (MRC) seeks to promote the conservation and sustainable use of wetland biodiversity. There is wide recognition that a challenge for such integration is trade in natural resources. Trade in aquatic and terrestrial animals and plants is an important component of rural livelihoods in the demonstration sites where MWBP is working, yet unregulated and unsustainable trade has also been identified as a major threat to biodiversity in the Greater Mekong Region (Nooren & Claridge 2001; WCS 2004; World Bank 2005; see also Robinson & Bennett 2000).

Socio-economic development in China, Thailand and Viet Nam has seen increasing affluence resulting in increased demand and ability to purchase natural resources (World Bank 2005). As natural resources in consumer countries have declined over recent decades, valued products have been increasingly sourced from neighbouring countries, including Cambodia and Lao PDR. Plans for socio-economic development often envisage an increase in regional trade as a means to achieve poverty alleviation goals¹. Thus, it is likely that trade in natural resources will continue to expand.

These issues are particularly critical in MWBP demonstration sites in Stung Treng Province in Cambodia and Attapeu Province in Lao PDR. Both demonstration sites are characterised as less-developed but resource-rich areas within their respective countries. Stung Treng and Attapeu are also becoming increasingly connected with regional trade through improved transport networks. Hence there is a need for a greater understanding of the dynamics of trade in order to develop appropriate interventions that allow management actions to contribute to the integration of sustainable resource use and biodiversity conservation.

In Cambodia, recent studies indicate the importance of natural resources for rural livelihoods. Given that 85% of the total population and 90% of poor households reside in rural areas (IUCN & Action Aid 2003), the importance of natural resources translates into a priority for both national development and poverty alleviation. The rural economy is highly reliant on forest as well as wetland resources that complement outputs from agricultural production (Vantomme *et al.* 2002; IUCN & Action Aid 2003; Tola & McKenney 2003; Chong 2005; Try & Chambers 2006). Yet many types of natural resources are in decline, precipitated by over-harvesting as well as habitat loss and environmental degradation. Eventually the decline of these natural resources will negatively impact local livelihoods as well as the national economy.

Figure 1: Map of MWBP demonstration sites.



Source: MWBP (<http://www.mekongwetlands.org/>)

¹ The most significant in the region is ADB's Greater Mekong Subregion (GMS) program (<http://www.adb.org/gms/>).

The MWBP demonstration site in Stung Treng, located in the northern portion of the Mekong River up to the Cambodian-Lao border (Figure 1), is one of three Ramsar wetlands areas in Cambodia. The Ramsar Convention on Wetlands is an intergovernmental treaty which provides a framework for national action and international cooperation for the conservation and sustainable use of wetlands and their resources².

A recent situation analysis (Try & Chambers 2006) provides a comprehensive overview of the social and environmental characteristics of the site. The Ramsar site encompasses a 37km stretch of the Mekong River and areas up to 500m away from the river (Figure 2). This includes 21 villages with a population of 2,375 families or over 13,000 people (*Ibid.*). The demonstration site is rich in natural resources, hosting seasonally flooded forests, forested islands, seasonal wetlands and deep pools, which all contribute to significant biodiversity. Yet it is important to note that villagers living in the demonstration site also often collect natural resources from nearby areas that are outside the Ramsar boundaries. A recent Participatory Poverty Assessment (PPA) reports that about 90% of the population in Stung Treng Province live along watercourses, with capture fisheries providing their major protein source (IUCN & Action Aid 2003). The collection of diverse types of natural resources for trade supports rural livelihoods in the demonstration site and can be particularly important for poorer households (IUCN & Action Aid 2003; Chong 2005). This field study was developed to further explore the importance of natural resources for local livelihoods and trade in Stung Treng.

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The Mekong River in Preah Rumkel commune



Villagers at a camp along the Mekong River

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² See <<http://www.ramsar.org/>>.

The objective of this field study was to provide an overview of trade in natural resources in the MWBP demonstration sites in Cambodia and Lao PDR³. In the context of this study, 'natural resources' refers to fish, wildlife (terrestrial and aquatic vertebrates aside from fish) and NTFPs (non-timber forest products). This overview explores the patterns of resource extraction and trade in animals and plants used for exchange and income-generation, while recognizing their potentials importance for also meeting subsistence needs. While the primary focus is on the Ramsar site, a broader view is used to document trade, as villagers in the site may collect natural resources from and sell to areas which are outside of the site boundaries.

[illegible]

Source: MWBP (<http://www.mekongwetlands.org/>)

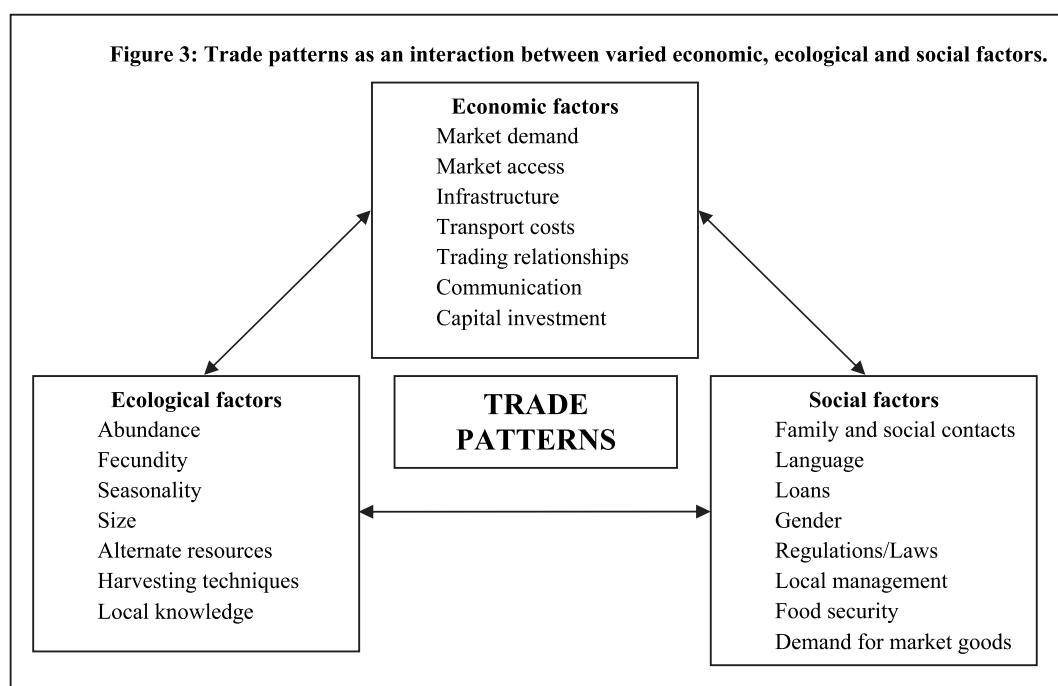
Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme

3. METHODOLOGY

3.1. PARTICIPATORY LIVELIHOODS APPROACH

Field surveys, each of two weeks duration, were conducted in Stung Treng Province in October 2005 and May-June 2006. The first survey, led by a biologist, emphasised trade in wildlife, while the second survey, led by an ethnoanthropologist, emphasised trade in fish and NTFPs. The aim of this report is to provide an overview of trade in natural resources in Stung Treng, with a focus on the demonstration site, summarising findings from both surveys. Additional detailed information on natural resources observed or reported in trade with local as well as scientific names, use of natural resources and derivatives, prices in different locations, trade destinations, harvesting methods, products observed in markets and restaurants, and other information is provided in the appendices and also in separate reports arising from the first survey (Boonratana *et al.* 2005; Bezuijen *et al.* 2005).

Given that a primary objective the MWBP is the integration of biodiversity conservation and sustainable use through targeted demonstration sites, a livelihoods approach was considered the most appropriate research framework for this report. Reflecting this integrated approach, trade in natural resources is recognised as an outcome of varied economic, ecological and social factors (Figure 3, adapted from the DFID Sustainable Livelihoods Framework).



Using a participatory approach, a flexible variety of structured, semi-structured and informal survey and interview methods were used to collect data about trade in natural resources. Participatory assessments draw upon the knowledge of local people who use natural resources on a regular basis and thus also accord due regard to local values and interpretations of resource use (Chambers 1994). In addition, participatory approaches allow the collection of information that cannot be obtained through direct observations because of time constraints.

Prior to initiating field surveys, the lead researcher spent time with the survey team in Attapeu PC providing training regarding the objectives and methodology to be used. A summary of the field surveys is provided in Table 1 with further details on the methodology in the sections below.

Table 1: Summary of the field surveys on trade in natural resources in Stung Treng Province.

Survey	Dates of field survey	Focus*	Data sources	Survey team
First survey	06/10/05 - 18/10/05	Wildlife, markets and restaurants	Group discussions in villages, interviews with government officials and traders, market surveys, restaurant surveys.	5 people
Second survey	18/05/06 - 01/06/06	Fish and NTFPs, camps	Focal group discussions in villages, surveys of camps, interviews with key informants (e.g. village traders, village headman), interviews with government officials and traders.	2 people

* Although this reflects the primary focus of each survey, both also collected significant additional information on trade in natural resources.

3.2. DATA COLLECTION IN VILLAGES AND CAMPS⁴

The first survey utilised a semi-structured questionnaire (see Appendix 1) with groups of around 10-20 villagers. A wide range of villagers were involved in these discussions, including women and men, elderly and young, those in formal positions (e.g. village chiefs, commune council representatives, community forestry representatives), as well as those who regularly collect or trade natural resources (e.g. hunters, fishers, village traders).

The second survey drew on the initial survey instrument, but with a focus on fish and NTFPs and a smaller survey team, the approach shifted to smaller focus group discussions and semi-structured interviews with key informants (between 1-10 people; see Appendix 2). A key technique used was to first allow villagers to identify those natural resources they considered important for the local economy, then to focus the discussion on collecting more detailed information on each of the resources identified.



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Participating in a focus group at Chham Thom village

In addition to these semi-structured approaches a range of information was collected during both surveys through casual conversations, daily interactions and observations while staying in the villages. Given the interest in aquatic resources, the second survey also used opportunities that arose to collect information from camps in the demonstration site that were involved in fishing activities.

3.3. DATA COLLECTION IN TOWNS AND MARKETS

Semi-structured interviews were conducted in Stung Treng PC with a range of government officials (Provincial Forest Administration Cantonment, Stung Treng District Military Police, Provincial Bureau of Economic Police, Provincial Department of Environment, Provincial Department of Fisheries), NGOs (ADHOC, CEPA) and where possible, traders in natural resources. These interviews aimed to collect information about patterns in trade of natural resources as well as improve understanding about current regulations and management (see Appendices 1 and 2). During the first data collection period, the use of a larger survey team also enabled comprehensive surveys to be conducted in markets, jewellery stores, restaurants and boat landings in Stung Treng PC. The second survey collected additional observations at these and other locations in Stung Treng PC. Both survey teams also collected information on trade in natural resources at the Veun Kham (Lao PDR) - Veun Khao (Cambodia) border crossing.

⁴ For simplicity this report uses the term 'camp' as most residences visited were temporary fishing camps. A minority however, were semi-permanent residences where agriculture (e.g. rice production, livestock raising, garden produce cultivation) as well as fishing and other livelihood activities were conducted.

3.4. SITE SELECTION

The villages that were the focus of this work were selected by the MWBP provincial programme office on the basis of:

- (i) their location in the MWBP demonstration site;
- (ii) their reported roles in trade in natural resources;
- (iii) logistics (e.g. seasonal access, time availability).

A total of seven villages located in Thalaborivat District were surveyed (Table 2). In addition, nine camps located in Koh Sneng and Preah Rumkel communes were surveyed, their selection being opportunistic.⁵

3.5. SCOPE AND LIMITATIONS OF STUDY

This report and the field study it was based upon sought to explore the trade in natural resources within the study area as fully as possible. However, particular factors which limited the extent of the data that could be collected must be recognized. These were as follows:

- Changes in methodology between the first and second surveys prevent temporal comparisons, though limited verification through cross-referencing the results from both surveys is possible.
- Opportunities for external verification of villagers' reports were limited, particularly with regard to topics such as species identification, trends in abundance and trends in trade (e.g. trade volumes).
- Also related to species identification was the lack of involvement of a biologist with specialized knowledge of invertebrates and plants.
- Trade in wildlife is widely recognised as illegal, and this is likely to have influenced the reliability of the information provided.
- The time available precluded a detailed, comprehensive account of trade in natural resources and also may have missed some important but seasonally dependent⁶ or spatially dependent patterns⁷.
- The fieldwork targeted the source-end of trade networks; often the final destination of natural resources could not be determined and limited information was collected on the demand-side of the trade.
- Greater emphasis was given to covering diverse types of natural resources that display varied trade patterns, which may have resulted in a compromise on detail in some cases.
- A focus on trade means this report does not provide a comprehensive approach to rural livelihoods⁸.
- Use of natural resources by outsiders could not be fully assessed as surveys were primarily with villagers.

3.6. OTHER ISSUES

Prices in this report are primarily given in US Dollars. The exchange rate as of May 2006 was 4,080 Khmer Riel (KHR) to 1 US Dollar (USD).

⁵ By the time of the second survey in May-June 2006, many of the temporary fishing camps on islands had been, or were in the process of being, abandoned by their occupants as water-levels rose and they were inundated. Fishing camps located near villages were also often unattended during the day.

⁶ For example, bird egg collection and fishing of the CITES-listed *Probarbus jullieni* (Baird 1994).

⁷ O'Talas stream was the most important area not visited because of low water levels preventing access at the time of the survey in May 2006.

⁸ Often it is the better-off households who are more involved in trade by virtue of the labour and capital investments they have available. Poorer households may have different approaches to resource collection and use (e.g. Chong 2005; Meusch *et al.* 2003).



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The Mekong River in Preah Rumkel commune

Table 2: Locations surveyed in Stung Treng

District	Commune	Village
Samakhixai	-	Thmei
Thalaborivat	Koh Sneng	Koh Sneng
		Chham Thom
	Preah Rumkel	Krala Peas
		Veun Sein
		Koh Langor
		Prum Krom

4. RESULTS

4.1. TRADE AND LOCAL LIVELIHOODS

4.1.1. OVERVIEW

In the Stung Treng demonstration site, while there is substantial diversity in livelihood strategies within and between villages (IUCN & Action Aid 2003), trade in natural resources is an important part of rural livelihoods. Villagers report various sources of income, including: (i) collection and/or trade in natural resources, (ii) hired labour, (iii) government jobs, (iv) sundries sales and (v) sales of agricultural produce (e.g. rice, livestock, vegetables; see Appendix 3). However, the latter four income sources are significant for a minority of households in the demonstration site.

Of all reported income sources, only trade in natural resources was reported across all villages to be important for exchange and income generation in nearly all households. In addition, animals - aquatic and terrestrial - were considered more important overall than plants for local trade. This was largely because of the significance of fish; villagers consistently reported fish as being the most important type of natural resource, both for consumption and trade.

Nearly all villagers stated that rice production is more important to their livelihoods than collection or trade in any type of natural resource, including fish. The only exceptions were a minority of full-time fishers and fish traders in various villages and camps who ranked fishing and/or fish trade as more important than rice production. Villagers reported that the collection and trade in natural resources - especially fish - usually becomes more important after the harvest of rice (approximately December/January) and before the next planting (approximately May/June)⁹. Villagers' collection of natural resources would also be influenced by other factors such as seasonal changes in abundance and migration patterns (see Baran 2005). Fishing and trading of fish were also important coping strategies when other previously available natural resources were lost (Box 1), when rice crops failed and during illness.

There are distinctions between natural resources that are important for consumption (e.g. food, construction, medicine, torches, basket weaving) as well as trade, and those that are mainly traded and rarely consumed locally. In the demonstration site, there are some natural resources in the latter category (e.g. *phset su khrom* mushroom, *Vomica* nuts), but they tend to be less abundant; hence they are collected infrequently and less important for the local economy¹⁰. Given this pattern, it can be concluded that trade in natural resources from the demonstration site will affect the well-being of villagers not only through impacts on income-generation but also through impacts on consumption patterns. A villager's decision to exchange or sell (rather than consume) various types of natural resources is dependent on a number of ecological, economic and social factors and the way these factors interact in a given context (Box 2).



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Fishing camp along the Mekong River

Box 1: Resilience in diversity

In Chham Thom village, soft resin (yang oil) tapping for sale to traders from Stung Treng PC was an important source of income until 2000-01 when a logging company, Pheapimex Company, cut most of the resin trees. Nearly every family owned and used between 50-250 resin trees. Compensation was paid to villagers by the company, but it was only USD1.2/tree, paid only for some trees and only to some families. At current prices this represents an opportunity loss of USD900 per household per year (assuming resin production of 30L per tree per year, with 150 trees per household and a price for resin of USD6 per 30L).

Villagers said that forest resources had previously been the most important natural resources for them, but after the resin trees were cut then fish became more important. Of all NTFPs, however, resin trees were still considered to be the most important. The head of the community fisheries described the decline in village livelihoods as a decline in available income, saying, "...before when we had resin we could ask for 5,000R per family for the pagoda and some would even pay 10,000R. But now most families only give 3,000R." The village chief explained how livelihoods are now more difficult, noting that "...in the past we could collect resin or go fishing but now we can only fish..."

⁹ The exceptions to this pattern, such as seasonally-available resources (e.g. *Vomica* nuts in February-March), are less significant trade items overall.

¹⁰ Soft resin was previously more abundant and an important trade item in a minority of surveyed villages (see Box 1).

Box 2: Complex interactions determine local trade patterns

While resources with very high value are typically sold, for other resources ranging from low to high value an array of factors determines local trade decisions. For instance, one villager in Koh Langor explained how they would eat the ratsnake they had just caught because it was small and already dead (photo right). If it were larger and still alive, they might have taken it to sell at Veun Kham. Yet the decision whether to sell at Veun Kham was also dependent on other reasons for going there, such as having other items (e.g. fish) to sell, petrol prices and how urgently money was required.



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A dead ratsnake at Koh Langor village

Given the impacts of trade on consumption patterns, it is not surprising then that while trade in natural resources is incredibly important for local livelihoods, unregulated trade is also regarded by villagers as an issue of concern. For instance, villagers in the demonstration site often attribute declines in fish catches to increased trading in fish, sometimes specifically identifying large-scale trade to foreign countries as the key concern.¹¹ A frequently heard comment was that *"now fish have a price,"* so more people fish for trade and this has contributed to fish declines. Villagers also attribute unsustainable harvesting of natural resources for trade, such as cutting *Vomica* trees in order to harvest the nuts, to lack of regulations or enforcement.

Unsustainable harvest of natural resources for trade is also a major concern for provincial government authorities (Box 3). While subsistence and income-generation do not have to be incompatible goals, in the absence of appropriate management systems subsistence needs can be compromised by the use of resources for trade.

4.1.2. CAMPS

During the 2006 survey, nine camps in Koh Sneng and Krala Peas communes were visited. A summary of the information collected from these camps is provided in Table 3. Most camps were established by local villagers for the purpose of fishing in the dry season, which runs from approximately January until July. Fishing was for local consumption, for processing to store and later consume during wet season and for trade. Fish were usually sold to village traders who came to the camps. The camps that used methods to catch larger quantities of fish (e.g. fixed-seine net) fished more continuously and sold their fish at Stung Treng PC; these camps always included families who came from other districts.

Box 3: Illegal fishing methods and fish trade

In the mid-1990s Stung Treng Province was a relatively remote and less populated area with a reputation for fishing using bombs (Baird 1993). In 1995 one official estimated 100 bombs being used per day.

The provincial governor of Stung Treng explained the current situation, *"[n]ow few people fish illegally...mostly businessmen and middlemen...they are only thinking about the short-term benefit"*.

Table 3: Summary observations and reported activities at nine camps visited in Koh Sneng and Preah Rumkel communes (May 2006).

Activity	Fishing	9 camps
	Agriculture	2 camps
	Collect NTFPs/wildlife	0 camps
Social context	Total # families	18 families
	Families per camp	1- 6 families
	From a different district	2 camps
	Resident all year	3 camps
	Resident in dry season	6 camps
Fishing	Average fish catch (kg/day/family)	1-5kg (3 camps) 35kg fixed seine net (1 camp)
	Sell fresh fish	9 camps
	Sell processed fish	4 camps
Trade location (some sell at >1 location)	Stung Treng PC	2 camps
	Veun Kham	2 camps
	Trader comes to camp	8 camps
	Village fish trader based at camp	1 camp

¹¹ Villagers in the demonstration site and government officials in Stung Treng PC also link fish declines to changes in fishing methods (e.g. more nylon drift nets, illegal fishing methods) and population increases. Whether or not fish stocks are actually declining or if these statements reflect declining catch per person as more people fish is uncertain (see Baran 2005; Bush & Hirsch 2005; MRC 2003).

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Fish being dried by the sun at a camp

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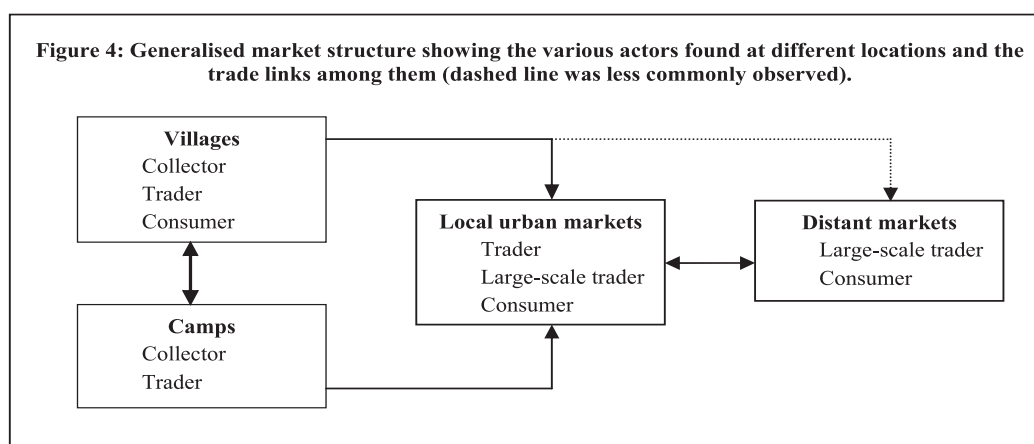


Fishing camp along the Mekong River

4.2. OVERVIEW OF TRADE NETWORKS

Trade in natural resources is recognised as the act of exchange, here specifically the exchange of natural resources for money or other goods. Thus, trade involves people who collect and sell natural resources (collector), those who buy and sell natural resources (trader) and those who buy and consume natural resources (consumer). Trade in natural resources from the demonstration site in Stung Treng Province follows varied routes and patterns of exchanges. A generalised market structure is proposed based on the trading patterns observed during the fieldwork (Figure 4), and more detail on the actors based at each of the locations is provided below.

The main local urban markets for the demonstration site are Stung Treng PC and the market settlement of Veun Khao-Veun Kham at the Cambodian-Lao border, while there are also distant markets in other provinces of Cambodia or in foreign countries. Stung Treng PC and Veun Khao-Veun Kham are the primary locations for traders in natural resources who source directly from the demonstration site. Thus, the trade networks represented here do contrast with the administrative perspective on local, domestic and international trade (see section 4.3.)¹². While natural resources originating from other locations may also be traded through Stung Treng¹³, the focus of this report is on natural resources sourced from the demonstration site.



(i) Collectors: Collectors in the demonstration site usually collect natural resources in the vicinity of the village. While fishing camps may be further from the village, and wildlife are typically distant (up to 20km away), these are still usually within the same commune. More distant locations prompt overnight trips (2-10 nights). Livelihood activities integrate the collection of natural resources

¹² For example, from a perspective of a villager trading natural resources in Preah Rumkel commune, selling domestically to a large-scale trader in Phnom Penh represents accessing a distant market, while selling internationally to Veun Kham (in Lao PDR) represents sale to a local urban market.

¹³ For example, wildlife from Virachey National Park in Rattanakiri Province (Boonratana *et al.* 2005) and soft resin from Preah Vihear (Tola & McKenney 2003) are both traded through Stung Treng Province to Viet Nam.

with other needs; for example, fish processing may be done at fishing camps, multiple types of forest resources are typically collected at the same time (e.g. honey, resin, mushrooms, wildlife), and resin collectors may make flammable torches as they collect resin. Most villagers in the demonstration site are collectors of various types of natural resources. A number of residents from Stung Treng PC also collect natural resources from the demonstration site. Villagers who collect natural resources may permanently, temporarily or occasionally take up trading depending on other livelihood aspects (e.g. having enough labour for rice production), resource availability and trade conditions. As one village fish trader explained, *"I never only traded fish, I just did when there was a good price. When the price was bad I quit and did other things..."*

(ii) Traders: Village traders purchase natural resources from collectors in their own village, from those in nearby villages or from known collection hubs (e.g. village traders go to fishing camps and O'Talas stream to buy fish). Generally it is a one-way flow of natural resources from villagers (collectors or village-traders) to traders in local urban markets. Traders from local urban markets generally do not go to villages to purchase fish and wildlife, as villagers (collectors and village traders) take to sell to them. The pattern for NTFPs is similar though more varied (see section 4.5.). Traders, both those in villages and local urban markets, may give credit or loan equipment to trading partners from whom they purchase natural resources (see section 4.4.).

(iii) Large-scale traders: Large-scale traders are based in local urban markets and supply distant markets. Some villagers in the demonstration site sell directly to large-scale traders in local urban markets and infrequently to those in distant markets.

(iv) Consumers: Trade between village traders and village consumers occurs for all broad types of natural resources, though the distinction between trade and gift exchange is not always clear (Box 4). In contrast, there were no reports of village collectors from the demonstration site selling directly to consumers in local or distant locations. Thus, while there is not always a clear flow, the relationships between collectors and traders are critical to ensuring supplies of natural resources reach many of the final consumers.

4.3. TRADE ROUTES

4.3.1. TRANSPORTATION

Various factors influence market access including transportation, information and trading relationships. This section focuses on transportation, while recognising the importance of additional factors (Box 5). The two modes of transportation that allow villagers in the Stung Treng demonstration site to access markets are river and road. Both modes provide access to all three types of markets

- local, domestic and international. Transportation by river has been the dominant mode and is still the main network linking the demonstration site to local urban markets, domestic (Stung Treng PC to the south) and international (Veun Kham to the north). While recent and ongoing road construction is starting to alter some of the trade flows, the effects have yet to be fully realised. For both river and road transportation, investments in capital (e.g. boat, motor) and operational costs (e.g. petrol) can be key factors determining trade patterns. For instance, all village fish traders interviewed during the field study owned a motorboat.

Box 4: When is 'trade' actually 'trade'?

Low-value and locally abundant resources (e.g. fish or mushrooms during the wet season) are often 'shared' (Khmer: *jaiy*; Lao: *hpan hay*) between family and close friends. While this sometimes involves an exchange for money, there is usually little or no profit made. Village and town residents may also 'request' (Lao: *khor*) a friend to collect certain animals like macaques or Hill Mynas from the forest to keep as a pet, repaying with a gift.

Villagers do not appear to regard either of these instances as 'trade,' even though they sometimes involve the exchange of natural resources for money. This is because the purpose is not income-generation but rather the exchange of gifts between family and friends.

Box 5: When is a village fish trader like a stockbroker?

There is a village trader from Preah Rumkel commune who says he started trading fish more than 10 years ago, beginning as a fisherman and expanding to trading when a trader from Veun Kham loaned him money to buy a motorboat. He also trades opportunistically in other natural resources.

Preah Rumkel received mobile phone coverage 2 years ago. Since then, this trader has been able to keep abreast of price trends in Stung Treng PC, Pakse (Lao PDR) as well as Veun Kham, calling regular trading partners in the different locations to compare prices and arrange deals. The example of this trader demonstrates that information and trading relationships can also be key determinants of market access.

(i) River: The Mekong River has long been the main mode of transport, allowing villagers in the demonstration site to reach traders in Stung Treng PC, Veun Kham and *vice versa*. Among villages in the demonstration site, only about 27% of households own motorboats; however, borrowing from family or friends (paying for petrol only) is common (Table 4). Villagers in Koh Sneng commune rely solely on private boats for their transport. In contrast, villagers in Preah Rumkel commune have various options, as some local residents have in recent years purchased and begun operating passenger and cargo services between Preah Rumkel-Veun Kham and Stung Treng PC¹⁴.

Table 4: Boat transportation in the Stung Treng demonstration site.			
Boat type	Purchase cost (USD)	Number owned locally* (%HH)	Travel from Preah Rumkel to Stung Treng PC (USD)
Paddle boat (no motor)	\$80	728* (37%)	-
Small motorboat (9-10m long)	\$500	511* (27%)	Borrow, pay petrol only
Medium motorboat (13-15m long)	\$1000	2 (in Preah Rumkel)	\$2.50/passenger
Speed boat (6m long)	\$2800	9 (in Preah Rumkel)	\$5.00/passenger
*Source: CEPA. Indicative figures only, data from 2005 for 17 villages in Koh Sneng, O'Svay and Preah Rumkel communes (total of 1925 households). MWBP demonstration site includes an additional 4 villages in Samakhi commune.			



Boat building at Koh Sneng village



Fishing in Preah Rumkel commune

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(ii) Road: A major issue for the demonstration site and Stung Treng Province most broadly is the ongoing construction of National Route Number 7 (locally known as the 'ASEAN road'). This road, including a bridge over the Xekong River and complementing the current road upgrades between Stung Treng and Kratie, is being improved by the Chinese government in an aim to improve market linkages between China and southeast Asia. Construction is expected to be completed by late 2007. The local effects of Route 7 on transportation are already apparent - in 2006 three passenger vehicles owned by local residents in the demonstration site began operating, connecting O'Svay with Veun Kham and Stung Treng PC. Also in 2006, three passenger vehicles started operating in the dry season between Preah Rumkel and Stung Treng PC¹⁵. The road improves linkages between

Box 6: Where there is transport there is trade

Motorboats: Over the last five years, more villagers in Preah Rumkel have purchased their own motorboats. This has made them less reliant on village fish traders; villagers now often take their fish to sell directly to traders at Veun Kham. So while fish trade is reported to have increased over time, the number of village traders has declined.

Speedboats: About 3 years ago, very large cargo boats (c.20T capacity) which had been used to ship goods (e.g. timber, rice) between Stung Treng PC and Preah Rumkel-O'Svay-Veun Kham started to be replaced by smaller boats (c.600kg capacity) with more powerful motors. The use of multiple small boats was considered more convenient than using a single large boat; it is also more difficult to manage and regulate. For instance, speedboats, while usually transporting passengers, have also become associated with the unregulated transport of high-value fish and wildlife from Stung Treng PC to Veun Kham, as well the transport of illegal drugs travelling in the opposite direction (UNODC 2002).

Airplanes: Until recently, military-operated civil flights operated twice per week from Stung Treng PC to Phnom Penh. Every flight reportedly transported wildlife and high-value fish to be sold in Phnom Penh or sent on via plane to China. These flights were discontinued after speedboats were introduced in 2002; now, however, speedboats travel this route much less due to significant improvements in Route 7 during 2005.

¹⁴ Speedboats and passenger boats from Preah Rumkel commune reportedly do not stop at other locations.

¹⁵ Villagers in Preah Rumkel may drive their own boats to O'Svay and catch the passenger vehicle from there. However, the limited amount of luggage that can be taken by passengers means that boat transport is still the main mode for trading large quantities of goods.

the demonstration site and domestic as well as international markets, which will undoubtedly facilitate increased transportation of goods by vehicle rather than boat¹⁶, as well as specifically stimulate additional trade in natural resources (Box 6).

4.3.2. MARKET DEMAND

Market demand that stimulates trade in natural resources in the Stung Treng demonstration site operates at various spatial scales. For convenience these are separated here into the local, domestic and international:

(i) Local market demand: Trade to other locations within Stung Treng Province, primarily Stung Treng PC. Within Stung Treng PC, there are complex flows of natural resources among village traders, town traders, market sellers, restaurants and large-scale traders.

(ii) Domestic market demand: Trade to other locations within Cambodia, primarily Phnom Penh (Route 7 via Kratie and Kompong Cham Provinces).

(iii) International market demand: Trade to foreign countries, primarily Thailand (via Veun Kham in Lao PDR or Preah Vihear Province) and Viet Nam (via Route 78 to Ban Lung in Rattanakiri Province, then Route 19 to Viet Nam¹⁷; via Siam Pang District; or via Kompong Cham Province and/or Phnom Penh).

The types and amounts of natural resources traded to each of these markets and the factors that affect trade patterns are diverse and variable; however, a general trend is that the major markets are quite consistent, for natural resources as well as other legal and illegal products (UNODC 2002). The relative importance of different forms of market demand varies depending on the type of natural resource (see sections 4.4.-4.6.). For some resources, these major markets may not be the final point of consumption but rather the point up to which traders in Stung Treng Province are involved¹⁸. Also, it must be recognised that Stung Treng Province is both a source of natural resources and transport node for natural resources sourced from elsewhere.

As indicated earlier, the distinctions among local, domestic and international trade are not always clearly demarcated. This is especially the case for villagers in Preah Rumkel commune, for whom the cost of travel to Stung Treng PC in money and time far exceeds that associated with travel to the market settlements of Veun Khao-Veun Kham at the Cambodian-Lao border¹⁹. Some small villages on islands in Preah Rumkel lack sundries stores, meaning that Veun Khao-Veun Kham is where they go to sell fish in order to buy salt and other basic food items. Motorboats are now also making it unnecessary for villagers to rely on village traders to sell natural resources at the border and are increasingly selling some resources directly to Lao traders. Thus, villagers' sales of natural resources at Veun Kham represent trade fuelled by international market demand, yet Veun Kham is also one of the main local urban markets for villagers in the demonstration site.

¹⁶ Villagers in Preah Rumkel report navigational difficulties in dry season boat transport when water levels are low, whereas road access would be convenient year-round.

¹⁷ Direct routes from Stung Treng to Viet Nam, particularly via Siam Pang District (which has boat and motorbike access only), are long and difficult. There were reports that Viet Nam may fund road improvement to Ban Lung in the future.

¹⁸ For example, soft resin sent to Stung Treng PC often goes to Kompong Cham and then probably on to Viet Nam; very high-value fish sent to Phnom Penh may be exported from Phnom Penh to Singapore, South Korea or China; Long-tailed Macaques are exported to Viet Nam and elsewhere.

¹⁹ Villagers report that a small motorboat from Preah Rumkel to Stung Treng PC uses 10L petrol whereas travel to Veun Khao-Veun Kham takes only 3L (in May 2006 petrol was USD0.76/L in Stung Treng PC).

4.4. FISH

4.4.1. OVERVIEW

Fish are considered by villagers in the demonstration site to be the most important natural resource for trade, above all other aquatic resources and above forest resources (NTFPs and wildlife). The estimates of total fish catch (Table 5) provide an indication of the scale of this activity in Stung Treng. They also demonstrate how the catch is increasing over time, a result of consumption by an increasing population as well as increasing trade in recent years. While other aquatic resources such as molluscs (e.g. snails, shellfish), crustaceans (e.g. crabs, shrimp), amphibians and aquatic plants may be commonly used for subsistence and thus very important for food security and nutrition (see Meusch *et al.* 2003), these other resources are rarely traded in the demonstration site; when they are traded, it is usually limited local trade (e.g. sale within one's own or neighbouring village)²⁰. Collection of some aquatic resources (e.g. frogs) is concentrated in paddy fields, but the vast majority come from the Mekong River and its tributaries. Thus, this section will focus on fish, although additional information collected on other aquatic resources is provided in Appendix 11.

A comprehensive assessment of trade volumes is beyond the scope of this study, as it would require longitudinal observation in given locations with sufficient focus on a particular subset of natural resources (see Phonvisay 2003; Tola & McKenney 2003). However, some estimates of fish trade volumes in Stung Treng can be calculated on the basis of interviews with villagers, traders and officials (Table 6). This demonstrates the importance of fish trade in Stung Treng, as well as the differences in scale among the different types of traders.



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Selling fish at the main boat landing in Stung Treng PC

Table 5: Estimates of total fish catch in Stung Treng Province

Year	Total catch (Tonnes)
2000	1024
2001	1234
2002	1257
2003	1483
2004	2129
2005	3490
Source: Stung Treng PFO, estimated from household surveys.	

Table 6: Volume of fish trade, based on interviews and reports from traders in four villages (Koh Sneng, Chham Thom, Krala Peas, Koh Langor) of Stung Treng Province and nearby camps in the demonstration site (May-June 2006).

Location	Trader type	Number of traders/companies	Fish volumes reported	Estimated trade volume (T/yr)*
Stung Treng PC	Large-scale traders	c.5-8	Trade: 500-100 kg/day	990
	Market sellers	c.20 regular, c.50-100 occasional	-	-
Surveyed villages and camps	Seine net licensee	1	Trade: 50-100kg/trip, 3 trips/week	7
	Village traders	>11 regular, >5 occasional	Trade: 75kg/trip, 3 trips/week	115
	Collector-traders	Many villagers	Catch: 1-20kg/day	-
* Assumes that large-scale traders trade fish everyday in the wet season and four days per week in the dry season. (For seine net licensee, see Box 12.) Assumes 16 village traders, trading three days per week in the wet season and once per week in the dry season. All values were derived from interviews, not actual observations, and are therefore likely to be underestimate actual volumes in trade.				

²⁰ High-value aquatic animals like soft-shell turtles are considered with wildlife, since most information on them was collected when discussing wildlife rather than fish and other aquatic animals.

A common comment made by villagers was that they need to sell fish in order to buy their basic necessities (e.g. salt, chilli, MSG)²¹. Fish were therefore the natural resource that was consistently considered to be most important for both subsistence and trade. As villagers in Koh Sneng village asserted, *"[f]ish are our occupations! If we do not have fish, then the rice is not tasty; we are still hungry... We can not eat beef more than three or four times, then it is smelly; we want to eat fish...if I am sick I sell fish to buy medicine... We eat with fish and we sell with fish!"*²² Hence, fish constitute a central component of villagers' livelihoods.

Two aspects that emerged as a reason for the importance of fish for villagers' trade activities are their reliability and flexibility. The year-round abundance of fish relative to other animals, their seasonally predictable migration patterns and the steady market demand together ensure that fishing can provide a reliable, though variable, stream of income. In addition, the diversity of ways in which fish can be used is not matched by any other type of natural resource. Fish can be consumed or sold either fresh or preserved (fermented, salted or dried) (Box 7). The storage of fish - either alive²³ or processed - gives villagers even more options regarding trade. For instance, prices are lower during the wet season migration.²⁴ Therefore, villagers who trade dried fish usually catch or buy fish in the wet season when they are abundant and cheap, then store them until the dry season to sell when the price is higher.

Box 7: Flexible fish.

A group of village traders in Krala Peas related why they usually only traded fish. In 2002, some village-traders started selling an edible mushroom (*het phor*), since fish traders at Veun Kham were buying them. In 2003-04, many tonnes of mushrooms were sent from Rattanakiri Province to Veun Kham, and village traders stopped trading the mushrooms as they were not as abundant in Stung Treng. In 2005, huge shipments of mushrooms from Rattanakiri were for an unknown reason not bought by Lao traders, and the Rattanakiri traders had no option but to throw them away, losing a lot of money in the process. After relating this event one villager-trader explained, *"...mushrooms are not as good as fish; if you can not sell mushrooms then they are just wasted, but you can always use fish to make fermented fish..."*

4.4.2. TRADE PATTERNS FOR FISH

(i) Types of fish

Thirty-eight fish species were observed in trade during the first survey (see Appendix 11). Villagers' decision-making about how to use fish they caught was highly dependent on both the type and size of fish. A common comment was, *"[w]e sell large fish and eat small fish,"* or, as one man said, *"[i]f we get large fish we never eat it, we only sell"* (see Meusch *et al.* 2003; Singh *et al.* 2006). 'Large fish' in the urban markets usually referred to those fish weighing more than 3kg, this being the size required by Lao traders at Veun Kham (Phonvisay 2003). However, 'large fish' did have alternate definitions depending the species and context.²⁵

Some fish frequently reported by villagers as being important for the local economy and most commonly observed recorded in trade in the demonstration site are presented in Table 7 (see Appendix 12). It must be noted that trade prices,



Morulius chrysophekadion (trey ka ay) caught at Koh Sneng village

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²¹ This comment also appeared to be used to emphasise small-scale fish trade as practiced by most households, in contrast to the large-scale fish trade of the smaller number of village traders.

²² Meusch *et al.* (2003) demonstrate the nutritional significance of socio-cultural beliefs regarding consumption of aquatic resources in neighbouring areas of Lao PDR.

²³ Fish (and other animals) may be kept alive, for example by storing high-value fish in the river for a few days until there are enough to justify the expenditure on petrol to travel to a local urban market to sell.

²⁴ Villagers reported two main seasonal fish migrations: one around May to July when fish move into the streams to spawn, and again in November to January when the fish migrate downstream.

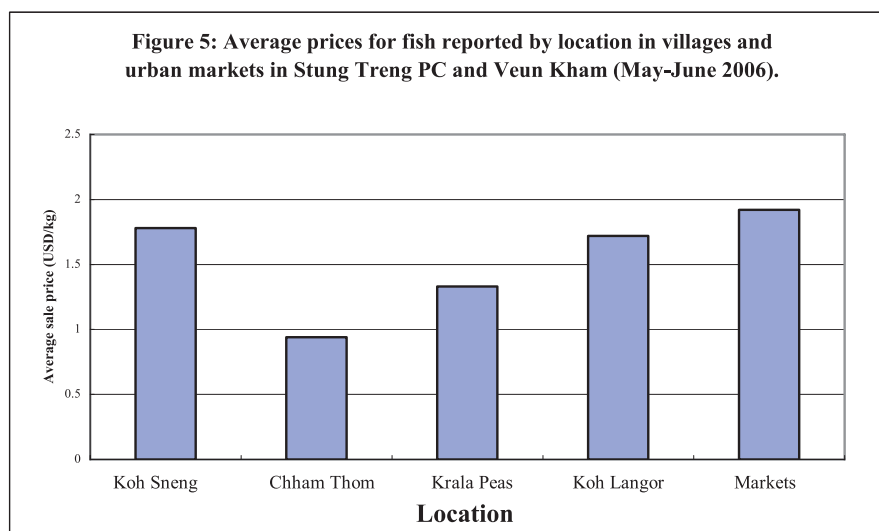
²⁵ Fish traders in the demonstration site often only bought 'large fish,' explaining this to mean fish larger than 1kg. However, 'large fish' for some species (e.g. *Kryptopterus* spp. and *Micronema* spp.) refers to those larger than 200g.

especially for higher-value fish, are very much size-dependent. Lower-value fish include common species of medium size (e.g. *Morulius chrysophekadion*, *Hysibarbus* spp.), as well as small-bodied species (e.g. *Henicorhynchus siamensis*, *Paralauca harmandi*). Some high-value fish like *Pangasius sanitwongsei* (up to USD5/kg in villages May 2006), *Notopterus notopterus* (up to USD6/kg October 2005) and *Probarbus jullieni* were infrequently mentioned as being important for the local economy, possibly due to the timing of the surveys²⁶. The most expensive fish species reported in this survey was the endemic²⁷ *pa si ie* (*Mekongina erythrospila*), which can be sold in Stung Treng PC for USD10/kg if larger than 1kg. Villagers typically associated higher-value fish with fishing areas in the southern end of the demonstration site, in particular O'Talas stream and other areas of Koh Sneng commune.

Table 7: Relative values of fish reported as traded in Stung Treng (May 2006).

Fish type	Khmer name	Scientific name	Selling price (USD/kg)
High-value ↑ ↓ Low-value	<i>pa si ie</i>	<i>Mekongina erythrospila</i>	1.00-10.00
	<i>trey ka shaa</i>	<i>Hemibagrus</i> spp.	
	<i>trey kes</i>	<i>Kryptopterus</i> spp., <i>Micronema</i>	
	<i>trey pro pruy</i>	<i>Pangasius sanitwongsei</i>	
	<i>trey khae</i>	<i>Bagarius</i> spp.	
	<i>pa va</i>	<i>Bangana behri</i>	0.25-1.00
	<i>trey ka ay</i>	<i>Morulius chrysophekadion</i>	
	<i>trey chhipin</i>	<i>Hysibarbus</i> spp.	
	<i>trey ruam</i>	Small mixed species	
	<i>trey riel</i>	<i>Henicorhynchus siamensis</i>	

The trade prices for fish also vary by location, with lower average prices in villages (USD1.44/kg) compared to local urban markets (USD1.94/kg) (Figure 5, see Appendix 12). Villages that were relatively more involved in fishing (e.g. Koh Sneng, Koh Langor) reported higher average prices compared to villages that were less involved in fishing (e.g. Chham Thom). While these figures cover sources of variation in pricing (e.g. size, season), they are also indicative of the pricing differential that relates to market access. Market access includes material (e.g. transportation, equipment) as well as non-material (e.g. social contacts, information) aspects (see Bush 2005).



Prices and trade destinations for processed fish are shown in Table 8 (see Appendix 13). It must be noted that prices vary depending on the size and species of fish as well as the processing method. Yet there is an apparent trend that prices for the same type of processed fish are higher in

²⁶ Large individuals of these species are only seasonally available during a few months of the year. For instance, some village traders reportedly go to O'Talas stream to buy fish in November-December, a main migration time and source for *Probarbus jullieni* (Baird 1994). The expensive *pa si ie* was also reported to be traded mainly in the same months.

²⁷ Restricted to Stung Treng Province and also the mascot for the province, honoured by its statue above a fountain near the main boat landing.

markets than villages or camps. Processed fish are important for subsistence needs, and most households would process fish for their own consumption, particularly fermented and salted fish. For dried fish, however, the higher value means that these are more often produced for trade to local urban markets.

Table 8: Processed fish traded in Stung Treng (May 2006).				
English name	Khmer name	Location	Price (USD/kg)	Trade destinations
Fermented fish	<i>pra hop</i>	Stung Treng PC market	0.75	Stung Treng PC
		Preah Rumkel commune	0.25	Local trade, Veun Kham
Salted fish	<i>pra ok, trey ju</i>	Stung Treng PC market	2.50	Stung Treng PC
		Koh Sneng commune	0.75	Local trade, Stung Treng PC
		Preah Rumkel commune	0.40-0.60	Local trade, Veun Kham
Dried fish	<i>trey nyiet</i>	Stung Treng PC boat landing	1.10	Stung Treng PC
		Stung Treng PC market	2.50 - 5.00	Stung Treng PC
		Koh Sneng commune	1.00-1.25	Local trade, Veun Kham
		Preah Rumkel commune	1.00-1.25	Veun Kham
Smoked fish	<i>trey jaa</i>	Preah Rumkel commune	1.25-3.50	Local trade, Veun Kham

(ii) Trade routes for fish

There were no confirmed reports of fish traders from Stung Treng PC or Veun Khao-Veun Kham who go to villages or camps to buy fish. Fish trade in the demonstration site is thus reliant on fishers and village-traders who take fish to the local urban markets. While fish traders may go from Preah Rumkel to Koh Sneng commune to buy fish, the reverse does not happen, as villagers report that there are more and larger fish in Koh Sneng commune.²⁸ At the Lao-Cambodian border villagers prefer to sell fish at Veun Kham (Lao PDR), rather than Veun Khao (Cambodia) (Box 8). There were some reports that villagers are meant to sell fish to Khmer traders at Veun Khao and then Lao traders come and buy from them. Local people note that this extra link in the trade network often reduces the price that sellers receive,²⁹ thus making a direct sale to Lao traders preferable. During the field survey very limited fish trade was observed at Veun Khao (only one trader who bought fewer than 15 fish in one hour), whereas there was considerable activity at Veun Kham (two very larger traders and numerous smaller traders who purchased directly from Khmer fishers). Fish is usually transported by boat to Veun Kham. While village traders may have ice boxes, these are only used to store fish at the village; fish are transferred to rice sacks or baskets for transport.

In the demonstration site villagers report that high-value fish are generally sold to traders at Veun Kham and Stung Treng PC, with the majority going to the former destination. The main market demand driving this trend comes from Thailand, with fish transported from Veun Kham to Pakse (Champassak Province, Lao PDR) and then into Thailand (Ubon Ratchathani).³⁰ Some fish traders from Vientiane (Lao PDR) also go to Veun Kham to purchase high-value fish there. Loans between village traders and Lao traders were frequent (Box 9). The 'internationalisation' of fish trade in the demonstration site was apparent in the diverse currencies used. Villagers involved in trade quoted trade prices for fish (and other animals) in Khmer Riel, Lao Kip as well as Thai Baht and readily converted between them.

²⁸ An important buying point is O'Talas stream, which is actually the border between the two communes. Village traders did not report buying fish from the rich fishing grounds between Koh Sneng and Chham Thom villages, this appears to be mainly residents from Stung Treng PC who sell fish there.

²⁹ Studies on resin trade in Cambodia indicate a similar trend of additional costs being passed onto village-collectors, thus creating a barrier to pro-poor trade (Tola & McKenney 2003).

³⁰ Studies in Lao PDR have demonstrated its primary role as a transit country (Phonvisay 2003).

Fishers and fish traders explained how they usually take large, higher-value fish to sell at Veun Kham, as the prices there are higher than in Stung Treng PC.³¹ As one fish market-seller in Stung Treng PC said, *"...if the fish is more than three kilogrammes, then people send it to Lao PDR... We usually only buy 'smaller mixed species' to sell here..."* In Koh Sneng and Preah Rumkel communes, this comment was echoed. Only relatively small amounts of certain high-value fish, most notably *pa si ie*, are sent to Stung Treng PC for final consumption in Phnom Penh. As one provincial fisheries official said, *"...pa si ie is very expensive, it is only for rich families."* Provincial fisheries officials also reported that previously some fish were sent from Stung Treng PC to Rattanakiri Province, since there are fewer fish available there, and prices are higher.³²

While most villages reported few outsiders coming to their areas, the main exception was the rich fishing ground between Koh Sneng and Chham Thom villages, where five to ten boats were continuously using very long (c.500m) floating seine nets, and one family had a licence to use a fixed-seine net. Their origins were unknown, but villagers confirmed they were not locals because of the large, covered boats they were using. Apparently they mainly catch small fish that are used in fermented fish paste (e.g. *Henicorhynchus siamensis*, *Paralauca harmandi*), which they sell at the main boat landing in Stung Treng PC. A villager in Koh Sneng said, *"...they usually come between March-June. Fishing is their occupation, they make USD400-500 and then return home..."* Outsiders also go to fish at O'Talas stream (north of Chham Thom village) to take advantage of the November-December downstream migration.

A ban on any fish export from Stung Treng Province in May 2006 (see section 4.4.3.) reportedly led to an increase in the amount of large fish being sold at Stung Treng PC, as noted by town residents. While some villagers in the demonstration site were aware of this recent ban, many were not. Apparently the increase in large fish in Stung Treng PC was not due to any significant changes in fish trade in the demonstration site, possibly due to the recency of the ban and its limited enforcement thus far. This is particularly the case at the Cambodian-Lao border, where the market at Veun Khao had actually expanded significantly between the October 2005 and May 2006³³ survey team visits.

Box 8: Background on Veun Khao (Cambodia) – Veun Kham (Lao PDR)

In Preah Rumkel, villagers reported that fish trading across the Cambodian-Lao border quickly recommenced in 1979 after the exit of the Khmer Rouge and the return of people to their villages. Fish trading was initially based at Don Saddam in Lao PDR, commencing due to local rice shortages. Khmer fishermen initially bartered fish for rice, changing to fish trade involving money around 1981 (see Baird 1993; Try & Chambers 2006). Fish trade shifted from Don Saddam when Veun Kham was established about a decade later; Veun Khao was then established around 2003, about 500m downstream of Veun Kham but on the Cambodian side of the border. Despite the establishment of Veun Khao, fish trade still appears to be firmly concentrated at Veun Kham.

Box 9: Loan arrangements

Entry into local fish trading is often contingent upon receipt of loans from traders at Veun Kham. Five of the seven village traders who replied to queries about loans said that they had initially or still sometimes did receive loans from Lao traders in Veun Kham. Ice boxes used to store fish cost between USD40 (100L) and USD130 (250L), a considerable expense beyond the means of many villagers. Some villagers reported that over USD250 (TBH10,000) could be borrowed from Lao traders at Veun Kham. Ongoing operational costs for petrol, ice and other equipment such as weighing scales are also significant. All village traders queried reported that they also give loans to fishers for fishing gear, mostly nets, and petrol. No one reported receiving loans from traders in Stung Treng PC.

The 'domestic' and 'international' loan arrangements are similar. Interest-free loans are arranged at the beginning of the season/year, with the seller (fisher or village trader) committing to only selling to the buyer who gives the loan (village trader or Veun Kham trader) until the end of the year/season or until the loan is repaid. The selling price is the same with or without a loan; the loan acts to ensure a regular supply. These arrangements are similar to loans for soft resin in Cambodia (Tola & McKenney 2003). Trading relationships are usually not family-based but rather friendships based on proximity and familiarity. These relationships are facilitated by the fact that most village traders speak both Lao and Khmer.

³¹ For example, one fish trader in Koh Sneng village said that if 'mixed fish' sell in Veun Kham for USD1.25/kg, then the price in Stung Treng PC will only be USD0.85/kg. 'Mixed fish' is a common designation for smaller fish sold as mixed species (Khmer: *trey ruam*; Lao: *pa luam*). This may include species that are sold separately if they are large individuals.

³² Whether some fish are destined for Viet Nam via Rattanakiri is unknown, though officials considered this unlikely.

³³ This expansion was in the number of market stalls (though many were not operational when observed in May 2006), as well as new police checkpoints supported by UNODC.

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Village trader at Koh Sneng village
packing fish to take to Veun Kham



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Khmer fishers selling fish to Lao
traders at Veun Kham

(iii) Trends over time for fish trade

Most villagers report fish as declining in abundance and size, though the diversity was usually reported as being the same as the past. Declines in capture fisheries were commonly attributed to human population increases, new fishing methods and equipment (nets, motorboats, illegal methods) that have a higher catch per unit effort (Box 10), and the growing fish trade. As one villager commented, *"[i]n the past it was easy to fish; now it is difficult...people then did not sell fish. Now people are fishing to sell."* This comment was repeated by many including provincial fisheries officials who noted that, *"...many people depend on natural resources to get money...it is the main income for people."*

While fish abundance was often, though not always, reported as declining, trade in fish is said to have increased in the last five years. Both the number of traders looking to buy fish in local urban markets as well as the number of villagers looking to sell fish has apparently increased over time. However, this general increase in fish trade does not translate into an increase in all aspects of trade. For instance, the head of community fisheries in Koh Sneng village said that, *"...there was less trade in the last 5 years because there are less fish. In the past traders would buy 800kg in two to three days but in 2005 maybe they would only get 50-100kg per trip..."* He explained how the number of village-traders who were totally reliant on fishing and fish trade (i.e. had no rice production) had declined from ten households between 1983-93 to only two households now. However, in Preah Rumkel a decline in the number of village-traders was linked to the increase in ownership of motorboats and increase in fishers selling directly to Lao traders rather than a decline in total trade volume.³⁴

Village traders in Preah Rumkel noted that prices for high-value fish have been relatively stable over the last five years (though they fluctuate seasonally), but profit margins have been reduced because there are more buyers now. While it is difficult to decipher cause-and-effect relations in such broad trends, it appears that market demand for fish has increased as has the number of people directly involved in fish trade. As to whether fish stocks for most species have significantly declined, this is uncertain given that the total fish catch in Stung Treng has been consistently increasing over time. Instead, it may be that the average catch per fisher has declined as

Box 10: New harvest methods and trade

About 1km downstream of the town centre in Stung Treng PC, villagers are catching large amounts of one species of small-bodied fish (*Paralabuca harmandi*). The fish are sun-dried and sold to a trader who comes from Lao PDR. They use an oil bought from Phnom Penh (made from *Henicorhynchus siamensis*) to attract the fish which are simply scooped out with baskets. People said they learnt this method from Vietnamese fishers. About 10 households in the areas started doing this 5 years ago when the Lao trader came looking for families interested in this activity. Though production is higher in the dry season (being dependent on sunlight), these households fish all year and do not do any rice production. The household income would be about USD8,300/yr (selling for USD0.86-2.2/kg, drying 30-60kg/day, with 1kg fresh fish = 0.3kg dried fish). In 2006 three people in the village started trading the oil locally, as more people are using this fishing method (selling a total of c.12T/month at USD0.5/kg). One woman explained, *"...since starting this business we have enough money to buy rice and petrol; it is a good livelihood."*

³⁴ One village trader in Preah Rumkel described his declining returns from fish trade in relation to increasing costs for petrol, saying that previously 1kg was equivalent to 2L of petrol but now 3kg of fish must be sold to buy just 1L of petrol.

more people are now fishing and fishing for trade as well as subsistence (MRC 2003).³⁵ This highlights the need to clarify the overlap between biological assessments and livelihood assessments of capture fisheries in the Mekong Basin (Bush & Hirsch 2005).

Another trend in fish trade has been the emergence of trade in small-bodied fish in the last two to five years. While trade in medium-sized and smaller individuals of higher-value fish is long established, small-bodied fish were previously not bought by Lao traders. Thus, a village-trader in Koh Sneng explained how the price for higher-value fish had been stable over the years, whereas the price for small fish (mixed species and small-bodied fish) had doubled since 2000. Reports from Stung Treng PC and fishing camps confirm this trend. This new demand for small-bodied fish may be linked to declines reported in Lao PDR, particularly for the small fish, *Henicorhynchus siamensis*, which is important for making fermented fish paste.



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Seine net used near Chham Thom village

4.4.3. REGULATIONS FOR FISH TRADE

The 1987 Fisheries Law provides some guidelines on current management,³⁶ with key issues being:

- (i) Illegal fishing methods (e.g. poison, bombing, blocking streams)³⁷
- (ii) Protected species³⁸
- (iii) Size of net³⁹ licensee
- (iv) Closed season (1 June - 30 September) when only subsistence fishing is permitted.

Box 11: Need for inter-agency cooperation.

In the mid-1990s a fisheries official was based at Veun Kham to monitor fish trade occurring there. This posting was discontinued as police at the border allow fish trade for 'personal benefits' whereas fisheries officials may be attempting to stop the trade. Fish traders report that they continue to pay 'taxes' to police for the export of fish at Veun Kham. Similarly, in Siam Pang District border police charge Lao people from Attapeu Province USD2/day to fish in Khmer waters (see Singh *et al.* 2006) unknown to the PFO. If different government agencies do not work together regulations regarding fisheries have minimal if any impact. An official explained how there are only six fisheries staff for all of Stung Treng Province, "...we need to work with the police because there are not enough people to manage the whole area...we need to collaborate".

The major policies relating to fish trade in Stung Treng implemented after adoption of the 1987 law include:

- **1999:** Introduction of licensing system - for any export of a fish larger than 2kg a licence must be obtained from the Ministry of Commerce.
- **1999-2000:** Two companies (Sombo Malin Import Export Co. Ltd. and Try Pheat Co. Ltd.) obtained licences to export fish from Stung Treng (each estimated to have exported at least 50T/yr⁴⁰). Export of high-value fish from Stung Treng PC to wholesalers and/or import-export companies in Kompong Cham Province and Phnom Penh.
- **2003:** Veun Khao was established at the Cambodian border - fish trade is intended to pass through Veun Khao and then on to Veun Kham, rather than directly to Veun Kham.

³⁵ The concern would then be whether total catches have exceeded maximum sustainable yields (see Baran 2005).

³⁶ A new fisheries law was proclaimed in May 2006. In addition, a restructuring to establish a Provincial Department of Fisheries Administration (equivalent to PFA) was recently announced. The impacts of these changes on fish trade, if any, are as yet unknown.

³⁷ Most people reported a decline in illegal fishing, but no records have been kept. Methods most commonly reported in the demonstration site were blocking streams, electro-fishing and bombs. There is also administrative complexity, as police have responsibility for bombs, DoE for poisons and PFO for electric-fishing and blocking streams.

³⁸ 'Red line' species include only three very large and expensive fish species (*Pangasianodon gigas* (Giant Catfish), *Probarbus jullieni*, and *Catlocarpio siamensis*), as well as some aquatic reptiles (e.g. crocodiles) and mammals (e.g. dolphins). All are protected from any form of use. 'Green line' species include an unknown and unlisted number of 'endangered' or 'rare' species commonly seen on posters but not specifically listed in the 1987 law (according to the Provincial Department of Fisheries).

³⁹ There is a large discrepancy between policy and practice. The 1987 law only allows nets up to 10m long; the 2006 law increased this to 50m. (The stipulated hole size is between 0.25 - 1.5cm.) Villagers' nets in demonstration site are usually 20-30m; people coming from town to fish near Chham Thom and Koh Sneng use nets up to 500m long.

⁴⁰ Based on estimates from PFO of 500-1000kg/day, every day in the wet season, 4 days/week in the dry season. However, it should be noted that other estimates of fish trade provided by this office seemed to be considerable underestimates, based on the amounts observed during this survey.

- **2004:** Ministry of Agriculture, Forestry and Fisheries banned the transport and trade of fish. Companies in Stung Treng closed official operations but were rumoured to continue unofficially.
- **2006:** In May 2006, a ban on export of fish from Stung Treng Province was issued by the Provincial Governor to ensure that there is sufficient fish for local consumption and so that local prices are reduced.

Regulations regarding trade in fish are generally unclear and inconsistent. There is a lack of clear distinction between domestic and international trade. For instance, the 1999 licensing system was sometimes reported as referring to international trade only, yet both of the licensed companies in Stung Treng sent fish to other provinces of Cambodia rather than directly to foreign countries. The 2004 ban on fish trade also did not specify the types of trade or scale of commercial operations that were being prohibited.

Box 12: Licensed seine fishing, local trade and local fish declines.

In the rich fishing grounds between Koh Sneng and Chham Thom, one household uses a very large (500m long) fixed-seine net (Khmer: *ourn*) in the open season. The net far-exceeds the lengths stipulated in the 1987 (<10m) and 2006 (<50m) fisheries laws. The family moved there 10 years ago and requested permission from the PFO as well as district and commune levels to use the seine net, reportedly paying an annual tax of USD50 to provincial, district and commune authorities. Only two households in Stung Treng Province currently have licences to use this fishing method. They also plant swidden fields and raise livestock in the same area, only occasionally visiting their home village.

The main catch is small, low-value fish which are sold to a fish trader in Stung Treng PC. During the eight months of the open season, they go to Stung Treng PC three times per week, taking 50-100kg of fish per trip. (By comparison, fishers in neighbouring villages report catches of 1-20kg/day.) This reported fish catch equates to a total of 7,200kg/year with a price between USD0.13-0.38/kg, meaning an average income of at least USD1,800/year.

They also make about 7 pots (c.35kg) of fermented and salted fish each year, consuming 2 pots themselves and selling the remainder, meaning an additional income of USD131/yr (USD0.75/kg). In the last 3 years, they noted an increase in the price of fish. Small fish previously were only a tenth of the value they now reach, an increase in demand that they related to an increasing population in Stung Treng PC.

Neighbouring villagers have complained to the PFO about declining fish catches due to this fishing method (Try & Chambers 2006), and the fisheries office indicated that the licence will probably not be granted in 2007 because of these repeated concerns.

Enforcement of policies, particularly in areas distant from Stung Treng PC, has been minimal, partly due to limited staff capacity and limited inter-agency cooperation (Box 11). Research in Lao PDR concerning fish traded from Cambodia demonstrates that changes in regulations in Lao PDR may prompt shifts in the pattern of legal trade but not substantially alter the overall trade flow (Bush 2004). It can be assumed that a similar trend prevails on the Khmer side of the border. This is particularly the case as regulation has tended to follow an approach of 'licensing' certain fishing practices, even where these contravene legal regulations (Box 12 and Box 13).

Box 13: Illegal fishing methods prompted by trade.

O'Talas stream has long been recognised as an important area for aquatic and forest resources in the Ramsar site (Try & Chambers 2006; Baird 1994). The stream is an important spawning ground for fish and also supports many terrestrial animals in the surrounding hills and caves.

Provincial fisheries officials express desire to protect the area. Yet villagers recall how a license was given by the provincial authorities to block the stream excluding all local use until 1999. Now about 50 households from Koh Sneng and Preah Rumkel communes have moved to O'Talas to fish and do swidden fields. Some households from Preah Rumkel have even deserted paddy fields in their own village to make this move reportedly because "...they make more money". About 10 households also go to O'Talas only to fish.

O'Talas area is associated with illegal fishing methods such as use of nets and traps to completely block the stream, which are used at night. Fishers take large amounts of high-value fish (50-100kg) to sell at Veun Kham. For example, one husband and wife from Preah Rumkel reportedly caught over 70kg of fish (mostly *trey kes jum rou*) in 2 nights fishing at O'Talas. They were said to have sold the fish to a Lao trader at Veun Kham for a total of USD156.

Other challenges also exist. For example, the 'taxation system' is of a relatively informal nature, making transparency difficult. Thus village fish traders reported that taxes paid at the border usually varied, rather than being based on a specific percentage or quantity. Villagers also suggested that some of the fishing methods deemed illegal were still able to be continued by those with access to the necessary equipment (e.g. police with access to bomb material). Whether or not this has actually occurred in the demonstration site, the perception of uneven enforcement exists and creates challenges for future efforts.

4.5. WILDLIFE

4.5.1. OVERVIEW

The most commonly reported and observed types of wildlife in trade were reptiles and mammals. Some birds were reported by villagers to be important for villagers' trade (e.g. Hill Myna) and/or as food (e.g. Jungle Fowl, Thick-billed Green Pigeon) but only infrequently observed in market surveys. While trade in invertebrates (e.g. insects, arachnids) does occur in Stung Treng PC, these were never reported by villagers in the demonstration site as being important for the local economy. Thus, this section focuses on reptiles, mammals and birds (also see Appendices 4-5, 8-11 and 14).

The opportunistic nature of harvesting varied animal and plant resources together makes it difficult to generalise across different resource types. For example, villagers reported that they may make trips specifically to collect NTFPs like resin, honey and beeswax or *Vomica* nuts, but they would also look out for turtles and monitor lizards at the same time. As one wildlife collector in Chham Thom said, *"[w]e do not go out to hunt wildlife, we just collect it when we see it; all households do this, but we only get a small amount."* However, it does appear that some types of wildlife are more consistently important than NTFPs, even though collecting a particular NTFP may be identified as the reason for making a trip. This was apparent in the consistent importance of particular animals (e.g. turtles and monitor lizards), whereas the type of NTFP that prompted a trip to the forest varied depending on the village, household and season⁴¹ (see section 4.6.). The importance of these animals as well as wild boar and muntjac was most apparent in villages that had forest areas nearby, all of which were villages on the mainland (Chham Thom and to a lesser extent Krala Peas, Prum Krom and Veun Sean).

Wildlife makes other important contributions to village livelihoods aside from local trade. Collection of wildlife and other forest resources was in some villages reported as an important coping strategy during times of rice insufficiency, and wildlife is also consumed by villagers in the demonstration site, though less frequently than fish. Villagers in Koh Sneng reported eating wildlife *"about once or twice a month"* compared to fish which is eaten *"every day."* Even in Chham Thom, which had the most forest area close to the village, villagers stated that fish were still more important for food, saying, *"...if we eat meat too often then it is not tasty but if we eat fish all the time then it is still tasty!"* In Preah Rumkel villagers explained that for wildlife meat, *"...the price has increased a lot; now we do not eat it, we only sell it"* (Box 14).

Box 14: Pangolin over-harvest and ongoing market demand.

Pangolins have become symbolic of the over-harvest of natural resources that can be driven by market demand. Villagers in Preah Rumkel said *"...now pangolins are finished, it is forbidden to collect them. But they are very valuable..."* Similarly, a wildlife collector in Koh Sneng explained how all wildlife have declined in abundance, but especially expensive animals like pangolins. He said that he has only caught three pangolins in the last five years; if he does catch one, he sends it to Stung Treng PC straightaway to sell.

While the relative importance of wildlife to overall livelihoods was not assessed, it appears to be most significant for exchange and income generation rather than for meeting subsistence or food security needs. In addition to impacts on local livelihoods, many of the globally-threatened species reported from the demonstration site are wildlife, so declines in these types of animals represent a significant concern for biodiversity conservation.

4.5.2. TRADE PATTERNS FOR WILDLIFE

(i) Types of wildlife

Twenty-four wildlife species were observed in trade during the first survey (see Appendix 11). A summary of reported trade volumes and prices for wildlife is provided in Table 9 as well as the most significant species for trade (see Appendices 4 and 5). This demonstrates the large levels of wildlife trade, especially considering that the volumes are likely to be underestimated.⁴²

⁴¹ If the resin trees had not been lost, this trend may have been different.

⁴² This is due to villagers' possible concerns about reporting their trade in wildlife, as well as the difficulty of gaining estimates of volumes. Many more species were reportedly traded, but villagers' could not provide volumes (see Appendix 4).

Table 9: Summary of wildlife trade reported from four villages in the demonstration site (Krala Peas, Veun Sein, Chham Thom, Thmei) and by government officials for Stung Treng Province (September-October 2005). Wildlife shaded in grey were reported by villagers as being most important for trade.

Animal type	Species	IUCN Red List*	CITES*	Villages		Officials	
				Annual trade volume**	Price (USD)	Annual trade volume**	Price (USD)
Reptiles	Bengal Monitor <i>Varanus bengalensis</i>			60 animals + 110kg	1.50-2.00/ kg	1,000kg	1.00-4.50/ kg
	Water Monitor <i>Varanus salvator</i>		II	105kg	0.75-1.00/ kg		1.00/ kg
	Elongated Tortoise <i>Indotestudo elongata</i>	EN	II	125 kg	1.25-2.50/ kg		
	Hard-shell and soft-shell turtles			c.12 animals + 100kg	0.75-2.00/ kg	1,000kg	1.50-2.00/ kg
	Rat Snake spp. <i>Ptyas</i> spp.			70 kg	1.25-2.00/ kg		
	King Cobra <i>Ophiophagus hannah</i>		II	20 animals + 40kg	5.00-10.00/ kg	400kg	15.00-30.00/ kg
	Cobra spp.			30 animals			
	Monocellated Cobra <i>Naja kaouthia</i>						15.93/ kg
	Python spp.		II	c. 45 kg	2.00-3.75/ kg		
	Reticulated Python <i>Python reticulatus</i>		II	40 kg	1.50/ kg, skin only 3.75/ 10 cm		7.35/kg (animals 1.5-2kg), 3.70/kg (animals 2.5kg)
	Asiatic Rock Python <i>Python molurus</i>	NT	II	10 kg	skin only 3.75/ 10 cm		
Mammals	Wild Boar <i>Sus scrofa</i>	LC		c.500kg	0.63-1.50/ kg		4.90/ kg
	Red muntjac <i>Muntiacus muntjak</i>	LC		c.100kg	0.50-1.25/ kg		2.45/ kg
	Sambar <i>Cervus unicolor</i>	LC					2.45/ kg
	Bengal loris <i>Nycticebus bengalensis</i>	DD	II	7 animals	2.50/ animal		
	Pygmy loris <i>Nycticebus pygmaeus</i>	VU	II	5 animals			
	Long-tailed Macaque <i>Macaca fascicularis</i>	NT	II	15 kg			
	Malayan Pangolin <i>Manis javanica</i>	NT	II	8 animals	32.50-37.50/ kg	300 kg	35.30/ kg
	Squirrel spp.			100 animals	0.38-0.63/ animal		
	Giant Flying Squirrel <i>Petaurista elegans/petaurista</i>			7 animals	7.50/ animal		
	Common Palm Civet <i>Paradoxurus hermaphroditus</i>	LC		c.50 kg			
	Large Indian Civet <i>Viverra zibetha</i>	LC		5 kg			
	Owston's Palm Civet <i>Chrotogale owstoni</i>	VU		2-3 kg			
	Civet spp.			2-3 kg			
	Small Asian Mongoose <i>Herpestes javanicus</i>	LC		2-3 kg			
	Banteng <i>Bos javanicus</i>	EN		1-2 animals	2.25/ kg		4.40/ kg
	Douc langur <i>Pygathrix nemaeus</i>	EN	I				0.85/forearm, 1.70/thigh
Birds	Hill Myna <i>Gracula religiosa</i>	LC	II	126 animals	15.00-31.25/ animal		20.00/ animal
	Red Junglefowl <i>Gallus gallus</i>	LC		20-30 animals	0.75/ kg		
	Green peafowl <i>Pavo muticus</i>	VU	II	2 animals	7.50/ tail feather		
	Coucal spp. <i>Centropus</i> spp.	LC		20 animals			
	Alexandrine parakeet <i>Psittacula eupatria</i>	LC	II	c.650 animals	0.25-1.50/ animal		
	Thick-billed Green Pigeon <i>Treron curvirostra</i>	LC		100 animals			
	Dove spp.			130 animals	0.38/ animal		

* For explanations of threat and protected categories see IUCN (2006) and CITES (2006).

** Villagers reported trade volumes sometimes by number of animals and sometimes by weight so a total figure is not calculated. In addition, villagers reported trading other species but could not provide estimates of volume.

Where data are available for the same species, a comparison of data reveals that trade prices are often lower when reported by villagers than by officials (e.g. King Cobra, muntjac, Sambar; Table 9). This is probably due to the lower prices offered for wildlife in villages compared to local urban markets. This price differential is what acts to channel market demand from urban areas to more remote locations that actually source the wildlife for those markets.

The data collected on trade volumes are limited, as villagers' estimates refer to both numbers of animals and weights. Variable weights among species and individuals mean that these data are not comparable quantitatively. In addition, trade volumes often could not be provided for all species that were reportedly traded, meaning that a summary will underestimate total volumes. Yet the total number of animals reported by the surveyed villages is indicative of the extent of wildlife trade (Table 10).⁴³

A basic comparison of villagers' and officials' estimates can be made using reptiles, as this animal type has the most data and includes animals that are important in trade. Estimates made by officials cover all of Stung Treng Province, including 128 villages (Try & Chambers 2006). If wildlife is traded in volumes similar to those reported in the surveyed villages in just half of the villages in the province, then this equates to over 12,000kg of the identified reptiles being traded each year.⁴⁴ Thus, official perceptions of wildlife trade appear to be a significant underestimate of its actual extent and hence its significance for both villagers' livelihoods and for wildlife conservation.⁴⁵

Table 10: Comparison of trade volumes reported by four surveyed villages in the demonstration site with official figures (see Table 9).

Animal type	Villages		Official
	Weight	# animals	Weight
Reptiles	645kg	122	2,400kg
Mammals	677kg	128	300kg
Birds	-	1053	-



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Lesser Oriental Chevrotain and dried Sambar meat at main market in Stung Treng PC

As mentioned earlier, the wildlife villagers consistently identified as being most important for the local economy were monitor lizards and hard-shell turtles. In Krala Peas, one man asserted, *"monitor lizards and turtles are most important [for the local economy] and the most important are turtles. When I leave the house I always get a turtle; other animals I do not always get."* Another villager noted his perception that these animals were still relatively "easy to catch." As with fish, monitor lizards and turtles had the reliability that insures steady opportunities for trade and makes them most crucial to rural livelihoods. In comparison, very-high value wildlife like pangolins villagers say are *"...very valuable but they are very difficult to find"* and were never reported as being important to the local economy.

Some people also reported wild boars, muntjacs and Sambar deer as being equally important as monitor lizards and turtles. This may be an effect of season, as wild boars were said to be more often caught in traps set around fields close to the rice harvest (October-November). Some wildlife traders also reported that more wildlife meat was available in the early wet season, as animals are said to be more active, grazing on new grass growth. Villagers noted that they would eat smaller individuals but sell the larger ones to village traders (i.e. wild boar, Sambar, muntjac larger than 5kg; monitor lizards, turtles larger than 2kg). Some of these common animals are traded locally from villages that are closer to forest areas to those that rely more on fishing. For example, villagers from Chham Thom sometimes take the meat of wild boar and muntjac to sell in Koh Sneng village.

⁴³ In deriving these numbers, ranges were averaged.

⁴⁴ This estimate from the surveyed villages combines 645kg and 122 animals, assuming each animal weighs 1kg.

⁴⁵ Estimates provided by officials may also intentionally underestimate wildlife trade for various reasons (e.g. curtailing trade may decrease opportunities to collect informal taxes; widespread wildlife trade implies current management by officials is ineffective).

Other wildlife that is traded frequently and considered important for the local economy include King Cobra, ratsnakes, pythons and Hill Myna chicks. Often the trade of these animals is also dependent on whether the animal is alive or dead. Usually collectors will transport the meat of larger animals (e.g. wild boar, muntjac, Sambar), whereas other animals are transported live to local urban markets.

(ii) Trade routes for wildlife

The trade patterns for wildlife are complicated and varied depending on the type of animal involved, the location and the particular person selling. Lower-value wildlife used for food (e.g. wild boar, muntjac, Sambar, monitor lizards) are sold by collectors to village-traders in their own or nearby villages. Villagers noted that they would take high-value wildlife themselves to Stung Treng PC. When taking wildlife to sell in Stung Treng PC, villagers from Preah Rumkel commune would usually go by passenger boat and only take their own motorboat if the animal had a very high price or if there was a large quantity. There were no reports of traders from local urban markets going to villages to buy wildlife. Reportedly, village wildlife traders are often specialists who do not sell other natural resources. Sometimes village traders in fish and NTFPs would trade wildlife opportunistically; this was particularly true if the collector did not have a large enough quantity to warrant the costs of transportation. In contrast, wildlife traders in the local urban markets reportedly always traded in other natural resources (Box 15).

Box 15: Specialist and generalist traders

Village wildlife traders were often reported to only trade wildlife and not fish or NTFPs. In contrast, reports of wildlife traders in towns usually indicated that they are involved in trading a variety of products. For instance, villagers in Preah Rumkel reported that they sell high-value animals to resin traders in Stung Treng PC. Reports of large-scale traders who operated in the past also demonstrate involvement in trading a range of products aside from wildlife. Similarly, major fish traders at Veun Kham were also observed buying wildlife from village traders who came from Preah Rumkel commune. Since trade in wildlife is more opportunistic than trade in fish, the former is often dependent on the trade routes established by the latter. So while 'specialist' wildlife traders do operate, they may be less common than 'generalist' traders in natural resources; this may be particularly true in urban markets.

In Koh Sneng commune, all reports of wildlife trade were directed towards Stung Treng PC. In comparison, reports from Preah Rumkel were more varied, largely an outcome of distance from the provincial town. In Krala Peas villagers reported that they preferred to sell wildlife to traders in Stung Treng PC because they received a higher price there; because of the higher petrol costs they would sometimes sell at Veun Kham (see Nooren & Claridge 2001). A village wildlife trader in the same commune, however, reported that she usually sold to traders at Veun Kham and less frequently to Stung Treng PC, though the reason for this was unclear.

In Stung Treng PC, wildlife used as food was reportedly sourced from Siem Pang⁴⁶ District, with lesser amounts from Thalaborivat, Se San and Siem Bok Districts. As the demonstration site is mainly in Thalaborivat District, it can be concluded that some of the wildlife observed in Stung Treng PC is sourced from there. Indeed, one woman selling wild boar, muntjac and Sambar in a village 3.5km west of Stung Treng PC reported that she regularly purchased supplies from a hunter in Thalaborivat.⁴⁷

The wildlife most commonly observed in Stung Treng PC were wild boar, muntjac, Sambar, Bengal Monitor and soft-shell turtles. Small amounts of these animals were observed at the main market, but wildlife was very rarely observed at the main boat landing, with market traders having their own independent suppliers. The three large restaurants in Stung Treng PC do not purchase wildlife from the market and instead have their own independent sources (see Appendix 9). Thus, it



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*King Cobra sold by Khmer villagers to
Lao fish traders at Veun Kham*

⁴⁶ Virachey National Park appears to be an important source area.

⁴⁷ This meat is used for local consumption in small roadside stalls and private homes.

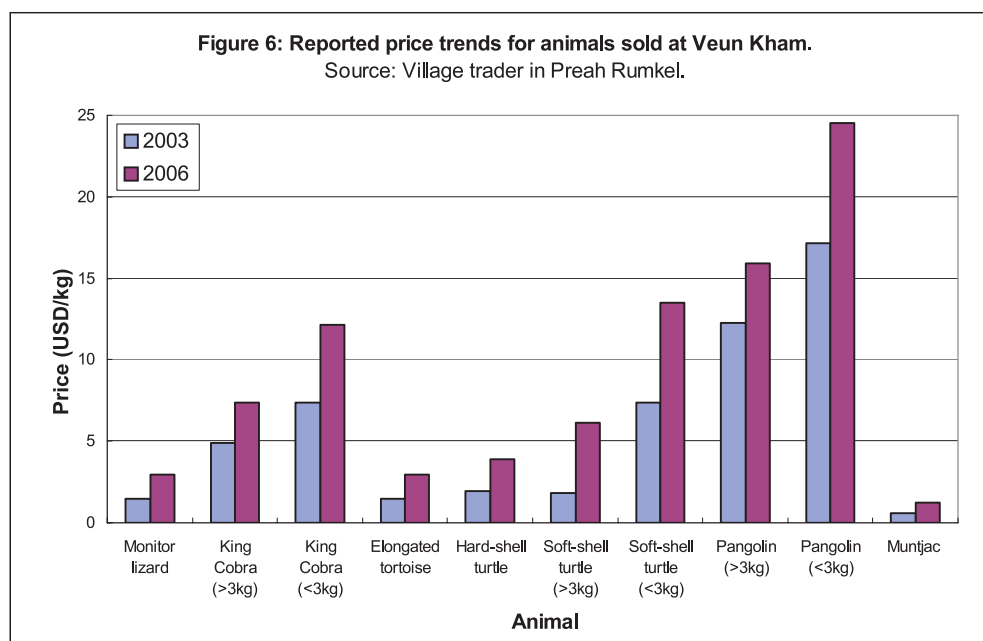
can be concluded that much of the wildlife trade in Stung Treng PC is not conducted openly. Other wildlife products commonly seen in Stung Treng PC included those intended for medicinal use as well as for ornamentation (e.g. dried Pygmy Loris, wild boar tusks, ivory carvings and elephant bone, tiger and bear teeth and claws, deer antlers, wild cattle horns) (see Appendix 8).

In terms of trade destinations, it is likely that wildlife sold at Veun Kham is sent with fish to Pakse. From there, it may be consumed within Lao PDR⁴⁸ or transported onwards to Thailand or Viet Nam. Similarly, some wildlife⁴⁹ that is commonly transported to Stung Treng PC is not actually consumed locally but instead sent on to Phnom Penh, Viet Nam and Lao PDR.⁵⁰ Given that market demand is strongest in China, Viet Nam and Thailand rather than Lao PDR (World Bank 2005; Nooren & Claridge 2001), these can be assumed to be the main destinations.

In contrast to commonly consumed wildlife, high-value wildlife (e.g. pangolins, King Cobra, Hill Myna, Giant Flying Squirrel) were never observed in the main market of Stung Treng PC; they are, however, mainly destined for Viet Nam and Thailand. For instance, it was reported that Vietnamese wildlife traders come to Stung Treng specifically in search of Hill Myna chicks. These traders would likely trade in other wildlife species as the opportunity arose. Some other high-value wildlife that pass through Stung Treng PC, particularly bears and their products, are also in high demand in Phnom Penh. As bears are reportedly not sourced from the demonstration site, it can be concluded that most of the wildlife sourced from the demonstration site is initially destined for Viet Nam and Thailand, with small amounts being consumed in Phnom Penh. Much wildlife initially sent to Viet Nam would be channelled to final markets in China (Nooren & Claridge 2001).

(iii) Trends over time for wildlife trade

Villagers in Preah Rumkel reported that village traders started to buy wildlife over two decades ago, saying, "...it was easy to hunt animals in the forest and easy to sell...but before 1989 there were no buyers."⁵¹ The commune chief of Preah Rumkel noted that wildlife used to be more important for the local economy, but as abundance has declined, particularly in the last 5 years, the importance has waned. Villagers consistently report all wildlife as declining in abundance and increasing



⁴⁸ Wildlife is traded between Cambodia and Lao PDR flowing in both directions however, these are transit countries as the final market is usually China (Nooren & Claridge 2001) and to some extent Viet Nam and Thailand also (Nash 1997; Baird 1995).

⁴⁹ Bengal Monitor, Water Monitor, Yellow-headed Temple Turtle, Elongated Tortoise and Asiatic Soft-shell Turtle.

⁵⁰ Wildlife sourced from other areas of Stung Treng Province may be sent to Stung Treng PC, then to Veun Kham via speedboat.

⁵¹ Villagers' recollection of past years is usually approximate, and dates should therefore be interpreted as indicative rather than exact.

in price in recent years (Figure 6).⁵² Similarly, village wildlife traders report that now fewer people supply them with wildlife, and that collectors have to go further from the village to find wildlife, which makes it a less attractive activity. One village wildlife trader explained, *"A few years ago people would go to the forest, collect wildlife, sell to me and then immediately go out and collect more. But now fewer people are collecting..."*

Villagers attribute declines in wildlife to over-harvesting prompted by trade-driven rather than subsistence-driven hunting by villagers, as well as to outsiders, increases in human populations and widespread use of guns particularly after the war.⁵³ Wildlife declines were sometimes seen as having a negative impact on livelihoods, yet in other cases wildlife declines were interpreted positively. As one villager commented, *"In the past macaques would eat our rice but not now, there are not many left, [so] it is easy to do paddy."*

The very limited information on trade volumes makes it difficult to assess the extent of these reported declines. Furthermore, trade volumes are probably highly variable among villages, households and species. However, wildlife trade does still appear to be widespread. People who collect wildlife often report getting 1-3 individuals of more common species (e.g. turtles, monitor lizards) on every two-day trip, while village wildlife traders report that they still may get an expensive animal (e.g. King Cobra, pangolin) about once a fortnight.

While the market demand for wildlife had been fairly stable, local trade routes are quite variable and adaptive to enforcement activities. For instance, wildlife traders in Stung Treng PC were reported to frequently change venues for storing wildlife and wildlife products. Similarly, transports from Stung Treng PC to Viet Nam (via Rattanakiri) and Phnom Penh travel at predawn, using goods trucks so that wildlife can be better concealed, or using old cars that will be abandoned by the owner if confiscated by authorities. Wildlife traders may also use different agents or middle-persons once the person has been arrested or penalised. In addition, there were reportedly more women traders than men. Other studies in the region have shown that women's involvement in illicit trade may be facilitated by the lower degree of enforcement border authorities apply to women as compared to men (Walker 1999).

4.5.3. REGULATIONS FOR TRADE IN WILDLIFE

The Cambodian Forestry Law was last revised in 2005. This law provides some guidance on the use of wildlife, though inconsistencies and uncertainties remain (Box 16). For instance, Article 99 includes a note that it is illegal to "Hunt, kill, trade, or export rare species" but these 'rare species' are not defined.⁵⁴ While the specifics regarding wildlife trade are currently unclear, trade in wildlife is widely recognised as illegal; this is particularly so for high-value wildlife. While uncommon compared to fish trade, licensing procedures may be used to override other legal instruments that are intended to regulate trade or inform management. Hunting by villagers for subsistence is usually regarded

Box 16: Long-tailed Macaques

Officials in Stung Treng PC noted that the main focus of wildlife trade between 1998-2004 was pangolins, but that in 2005 there had been a major increase in market demand for Long-tailed Macaques. This shift was also reported in other areas of Cambodia (Claridge & Chea Sokha 2006). In 2005, the price at the Vietnamese border for these macaques was said to have increased dramatically, though the reason for this was unknown to Stung Treng officials. While pangolins still had a high price, they were much more difficult to find and so were traded less than macaques. Villagers in the demonstration site reported selling macaques for up to USD70. Reportedly involved in this trade of macaques was a distributor in Kratie Province who had a transport licence granted by the government. While some reports suggested that this distributor had no licence to purchase or collect these animals, others reported that this distributor had a licence to collect 3,000 macaques in Stung Treng "for breeding purposes." Provincial authorities in Stung Treng were very concerned about this trade, since the collection method involved cutting down trees and herding macaques into nets, thus damaging forest areas. The licences were said to have been cancelled in February 2006, yet in the 3 months following that time, more than 3,000 macaques were confiscated by PFA officials.

⁵² The only exception is mice and rats, which have reportedly increased in some areas.

⁵³ Gun collections have been made.

⁵⁴ The preparation of a national list of protected species has reportedly been delayed by the administrative uncertainty of whether PFA or PFO has responsibility for turtles, crocodiles and dolphins.

as permissible, particularly for common species. Unfortunately, some interpretations of government policy are less favourable to rural livelihoods and also impact negatively on conservation goals. For example, a village chief in Preah Rumkel said it was *"forbidden to hunt wildlife"* and that now *"...we cannot eat wildlife because the police will catch us; it is better to sell to Lao PDR!"* If anything, this was the opposite effect of that intended by the law.

Enforcement activities have recently occurred in Stung Treng Province. Table 11 provides a summary of data collected in 2005 (see Appendices 6 and 7). The majority of confiscated animals were reptiles and birds, confirming villagers' reports above of the significance of these animals for trade. The less frequent confiscation of mammals possibly reflects the difficulty of detection.⁵⁵ Of a total of 14 enforcement activities, however, only one resulted in a fine.

Given the overlap between social and professional networks, large-scale traders of wildlife - often prominent themselves - are frequently known to government officials and to others of prominence within the communities. For example, one official was able to identify three Vietnamese and three Cambodians who he believed regularly purchased wildlife from Stung Treng Province. Furthermore, the ability of the police and army to carry guns means that villagers often associate them with wildlife hunting, whether or not this is the case.

This serves to undermine the perceived weight of legal instruments for controlling wildlife (Box 17). Yet some villagers in the demonstration site do also report how laws have recently been more strongly enforced to ensure appropriate resource management. For instance, in Chham Thom villagers reported that fewer outsiders come to hunt in their village area since three years ago, when laws regarding use of all forest resources became stricter.⁵⁶

Box 17: Privileged traders

It was reported that approximately five years ago, there was one major trader in wildlife in Stung Treng PC with official affiliations who reportedly purchased many pangolins, turtles and snakes, as well as NTFPs like soft resin and rattan.

More recently, however, this trader was said to have lost his official position. Some suggested that a failure to pay taxes may have resulted in tensions with authorities.

Relatives of this trader are still involved in the large-scale trade of resin and, reportedly, other high-value NTFPs such as medicinal mushrooms (Khmer: *phset su khrom*; Lao: *het daeng*). Interestingly, villagers in Preah Rumkel reported that they sell high-value animals to resin traders in Stung Treng PC.

Table 11: Summary of enforcement activities reported by WWF and PFA (2004-05) relating to wildlife trade in Stung Treng Province.

Date	Reported enforcement (# activities)		Action taken (# activities)		Wildlife confiscated**			
	WWF- Cambodia	Stung Treng PFA	Confiscation only	Confiscation and fine	# Reptiles	# Mammals	# Birds	Total
February - December 2004	7	-	7	0	0	25	2	27
January - July 2005	3	5*	6	1	167	6	131	304
Total	14*		13	1	167	31	132	331
* Multiple reports considered a single enforcement activity when reported for the same location on the same date. One activity on 16 June 2005 was reported by both sources and only included once in the total.								
** Includes animal parts (e.g. meat) so only indicative of the actual number of animals.								

⁵⁵ For example, the mammals villagers' reported as most commonly being traded (Wild Boar, muntjac, Sambar) are often transported as meat which can be easily hidden amongst other goods rather than live animals as is the case with most reptiles and birds.

⁵⁶ Though villagers also said that there were fewer outsiders hunting because there are less animals left.

4.6. NON-TIMBER FOREST PRODUCTS (NTFPs)

4.6.1. OVERVIEW

A wide diversity of NTFPs are of importance to local livelihoods in the Stung Treng demonstration site. In the surveyed villages, various NTFPs are collected for food, medicines, construction of houses, making implements (e.g. baskets, fish traps), as well as being exchanged or sold. A total of 25 plant forms⁵⁷ were recorded in markets in Stung Treng and six plant forms at Veun Kham during the first survey (see Appendix 11). Yet few NTFPs were consistently reported as being regular trade items or being particularly important for the local economy across many villages or even households. As mentioned earlier, collection of NTFPs was often associated with the collection of wildlife. Collection of NTFPs is strongly associated with different seasons and areas, so collection is more focussed by the households involved in that activity, though opportunistic collection occurs for all types of natural resources. For instance, villagers reported planned overnight resin tapping trips with friends and family, during which they would collect mushrooms encountered along the way. Collection of NTFPs often appeared to be an additional livelihood activity. As one villager in Koh Sneng explained, *"I started [trading resin] because I was looking for things to sell...I have many children so they can do paddy [rice cultivation] while I collect resin with friends..."*. Most NTFPs which were reportedly collected for trade were only available in small amounts and/or at limited times of the year, so that their overall use by villagers for exchange and trade across all the surveyed villages was limited relative to fish and wildlife. This trend was also affected by the fact that market demand for NTFPs, from villagers' perspectives, has been much more variable and unreliable than demand for fish and wildlife (see Appendix 15).

Provincial authorities report that the most economically important NTFP in Stung Treng is soft resin.⁵⁸ Resin and rattan are reportedly sourced from the west bank of the Mekong and mushrooms from the east. Three large-scale traders who operate refineries in Stung Treng PC have recently expanded operations. While some of this resin is sourced from the demonstration site, this appears to be a relatively small amount, particularly since villages that previously had resin trees lost many to logging activities.

Aside from resin, there are a number of mushrooms, nuts, rattan, and bee products collected by a small number of households for trade purposes. When an NTFP was collected in a village, then it was always reported that these resources were collected by fewer than 10 households per village for trade purposes.⁵⁹ That is, there was no type of NTFP that was collected by a large number of households, even though a particular NTFP may be collected in a number of villages. Collection of NTFPs was always based on the mainland, though some villages from islands would collect from mainland areas, particularly near O'Talas stream.



Edible flowers (pak ja huoy) at main market in Stung Treng PC



Soft resin transported to the main boat landing in Stung Treng PC

⁵⁷ Plant products were recorded as 'forms' rather than species, because it was unknown whether seeds, leaves and other plant products on display were from the same or different species.

⁵⁸ Strictly an 'oleoresin', also called 'yang oil,' mainly tapped from *Dipterocarpus alatus* trees (Tola & McKenney 2003).

⁵⁹ However, a majority of households may collect the same resource for subsistence use (e.g. rattan).

4.6.2. TRADE PATTERNS FOR NTFPs

(i) Types of NTFPs

Soft resin (yang oil) is probably the most important NTFP for trade among the surveyed villages. Many villagers in the demonstration site collect, trade locally (i.e. village-village trade) and use resin for boat sealing and repairs. The only villages that reported the collection of soft resin for regular trade with local urban markets were those of Koh Sneng, Chham Thom and Veun Sean, with the former two reporting fewer than five households being involved in this activity and collection being in the vicinity of O'Talas stream. In Koh Sneng and Chham Thom, villagers reported that other households were not involved in resin tapping for trade because of the distance and limited number of trees available that have not yet been claimed by other users.⁶⁰ Areas in the Preah Rumkel commune also reported collection of resin, but this was limited to trade with other villagers for local use, as the majority of easily accessible resin trees were harvested by a logging company about 5 years ago (see Box 1). When soft resin is collected, hard resin (also known as 'damar'; Khmer: *jor tuk*; Lao: *kisii*) may be collected at the same time in small amounts and sold to the same traders who buy soft resin.⁶¹

Large-sized rattan (greater than 5cm diameter; *Calamus rudentum*; Khmer: *pdau dam borng*; Lao: *wai na bong*), which is in demand for furniture making, was reported as collected occasionally in a minority of villages (Koh Sneng⁶², Veun Sean) by a small number of households, with collection being limited by the distances that villagers must travel. The trader comes to the village to collect the cut rattan four times per month between April and June, these being the months when villagers have time spare from agricultural activities.

In mainland villages of Koh Sneng and Preah Rumkel communes, there were reports of traders coming from Stung Treng PC to buy a highly-valued medicinal mushroom (Khmer: *phset so khrom*; Lao: *het daeng*; photo right). This hard mushroom grows on trees and is easily collected year-round, though it is slow-growing. Collection only commenced two years ago but has already finished either because the trader stopped buying (e.g. in Chham Thom), it was all sold (e.g. in Prum Khrom) or because the trees were cut down (e.g. in Krala Peas).⁶³



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High value medicinal mushroom
(*phset so khrom*)

One type of edible ground-mushroom, *Astraeus hygrometricus* (Khmer: *phset phor*; Lao: *het phor*) that sometimes has a high-price in Thailand is occasionally traded from the demonstration site. However, trade levels are small, as the mushroom is only available in limited amounts between May and June. Villagers in Koh Sneng report that "[t]here is only enough to eat, not enough to sell." In addition, market demand for this mushroom changes in unpredictable ways, making it an unreliable trade item (see Box 7; Lao report). Other edible mushrooms are sometimes traded at Veun Kham, but these have a lower value, and trade appears negligible compared to consumption.

Vomica nuts (*Strychnos nux-vomica*; Khmer: *krob sleng*; Lao: *mak saeng*) began to be collected in Preah Rumkel mainland villages in 2003, after traders from Stung Treng PC came to the area looking to buy them. Villagers in Prum Khrom related that nobody had ever collected the nut before

⁶⁰ 'Availability' depends not only on the total number of trees but the spacing. Stands of 10 trees are ideal, whereas trees that are 100-200m apart from each other may be left unused. Apparently villagers in Koh Sneng share resin trees with villagers from Samang on a seasonal basis (see Appendix 15). Tola and Mc Kenney (2003) provide an informative study of resin trading systems in Cambodia, including tenure/ownership issues.

⁶¹ Villagers and traders reported that the best boat sealant is made from soft and hard resin mixed with jute rope or other fibres, so these items are often traded together.

⁶² In Koh Sneng villagers reported that they collect rattan from near Chham Thom village, as there is not much forest area on their island.

⁶³ In the case of Krala Peas, the trader suggested cutting the trees, as the wood is valuable. The villagers cut the trees but left them in the forest during the dry season; all of the wood was burnt before it could be sold.

then, and it was not reported to be traded in Koh Sneng commune. These nuts are only available in February and March of each year. Trade was low in 2006 because villagers had cut down all the large trees in previous years to collect the nuts (see Box 20).

The seed of a tree species highly valued for timber, *Azelia xylocarpa* (Lao: *mak bing*), was collected by villagers in Chham Thom for the first time in 2006. This was said to be bought by the government for use in plantations. Many people collected this seed opportunistically while in the forest, as the price offered was high (USD2.50/kg). Demand for the timber of this species may also be significant in some areas, though this was not ever reported as being sold by villagers.

A small number of households in some villages collect honey and beeswax. Though villagers report that demand for honey is increasing, and the price is relatively high (USD1.75-2.50/L), the available supply is low. Beehives are dispersed in the forest, and it takes time to find them. Furthermore, honey is only available for one month of the year (around March and April). Honey is used as food and medicine, while beeswax is made into candles that are used at the pagoda. Honey and beeswax are mainly sold within the same village or commune due to the limited supply.

Other NTFPs which are used for consumption, such as bamboo shoots, other edible mushrooms and edible flowers (*pak ja huoy*), may be taken by villagers to sell at Stung Treng PC and Veun Kham if they are also taking other higher-value goods (e.g. resin, fish, garden produce) that justify the expense of transportation. The sale prices of these items are generally low.

(ii) Trade routes for NTFPs

Nearly all NTFPs traded from the demonstration site to local urban markets were initially destined for Stung Treng PC. The only exception was the edible ground-mushroom (Khmer: *phset phor*; Lao: *het phor*), which is sold to Lao traders at Veun Kham then sent to Pakse (Lao PDR) and onwards across to Thailand (see Singh *et al.* 2006). Trade in some NTFPs, such as soft resin and honey, was reported to be primarily for local consumption (i.e. within the same village or commune).

Villagers who collect soft resin (Chham Thom) report that they sell to traders who come from Stung Treng PC but that this is infrequent (i.e. twice per year). Resin collectors may also take resin to Stung Treng PC if they need money (e.g. due to rice insufficiency) or if they collect a large amount (approximately 90 litres or more). Interestingly, prices of resin in the village are slightly lower but still dependent on the price of resin in Stung Treng PC, such that as the prices in town increase so do the prices in the village. Large-scale resin traders in Stung Treng PC report that they all send resin to Kompong Cham Province; from there it is most likely sent to Viet Nam (Tola & McKenney 2003). Similarly, high-quality rattan that is collected in Stung Treng PC, mainly from Thalaborivat District, is said to be primarily directed to Viet Nam. For other NTFPs, particularly medicinal mushrooms and nuts, the final destination is unknown (possibly Phnom Penh and/or Viet Nam).

For most NTFPs, it appears that traders from local urban markets go to villages to advertise that they wish to purchase a particular resource and their buying price at that time. Thus, Khmer traders from Stung Treng PC have gone looking to buy resin, rattan, medicinal mushrooms (*phset so khrom*) and *Vomica* nuts, while Lao traders from Veun Kham have gone to



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Bamboo shoots at main market
Stung Treng PC



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Rattan from Thalaborivat District
and stored near Stung Treng PC



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Main boat landing at Stung Treng PC

villages to buy edible mushrooms (*het phor*). They may establish a trading relationship with one collector in the village who will then be like a village-trader and gather that NTFP from all other villagers in their own and nearby villages, so that the trader can more easily collect the product from one location, once there is sufficient quantity to justify transportation costs.

Some of the different types of NTFPs sourced from the demonstration site are sold to the same large-scale traders based in Stung Treng PC. For instance, some villagers in Preah Rumkel confirmed that they sold *Vomica* nuts to two of the main resin traders based in town. Loans between traders and collectors were not reported, though some resin collectors-traders in Koh Sneng said they had declined offers of loans from the large-scale traders in Stung Treng PC.

(iii) Trends over time for NTFP trade

Market demand for NTFPs appears to have only recently reached villages in the demonstration site. Most of the higher-value NTFPs that have ever been collected for trade - medicinal and edible mushrooms, medicinal nuts, seeds of high value trees - only started to be sold by villagers in the last 2-5 years, after traders from local urban markets came looking to purchase these resources. The majority had not ever been collected before, the exception being edible mushrooms, which were also collected for local consumption. When traders advertise that they wish to purchase NTFPs, relatively few households collect unless the price is high, and then harvesting practices can be unsustainable (see Box 19).

The uncertainties associated with the 'new' types of NTFPs at times make it risky for villagers to become involved in this trade (Box 18). With respect to resin, which some villages reported to be the most important NTFP, trade to local urban markets was also limited. For instance, villagers in Preah Rumkel reported that before a logging company cut their resin trees they only used resin locally (e.g. sealing boats, making flammable torches). Similarly, villagers in Koh Sneng commune who had collected resin for many years still report that the majority of their sales are local.

Box 18: The unreliability of trade in medicinal mushrooms.

One villager related her failed attempt to trade high-value medicinal mushrooms (Khmer: *phset so khrom*; Lao: *het daeng*). In 2002, her son-in-law, who lives in Stung Treng PC, met a businessman from Phnom Penh who was interested in buying the mushrooms. The businessman taught him how to identify the mushrooms, and he subsequently taught his mother-in-law. Unfortunately villagers knew that she was new to the trade, convinced her that 'bigger was better' and sold her many 'fake' mushrooms. She lost USD200 when she sent a shipment of 156kg to Stung Treng PC. She found that only 20kg were real; the rest had to be discarded. Since then she and her son-in-law have not traded in these mushrooms or any other NTFP.

One partial exception to this trend of recently-emergent trade was rattan. In Koh Sneng, villagers reported that they had sold rattan since around 1985 to Lao people from Ban Khii Nak⁶⁴ who used it to make furniture. Yet rattan, like other NTFPs, increased in trade only recently as previous sales were small and irregular. In 2004, Khmer traders from Stung Treng PC started buying rattan regularly. While the number of households collecting has increased over time, still only a small number of households (approximately 10) collect it.

4.6.3. REGULATIONS FOR NTFP TRADE

Collection of NTFPs, like wildlife, falls under the jurisdiction of the 2005 Forestry Law. Traditional user rights for NTFPs such as resin, wild fruit and honey are specifically allowed without permits (Article 40). Officials reported that people who purchase NTFPs for the purpose of trade require permits from MAFF and pay royalties/premiums. In practice, only the large-scale traders who export to other provinces appear to be required to obtain permits; those trading in Stung Treng PC do not have these even though provincial forestry officials are aware of their activities. Four large-scale traders in Stung Treng PC have permits for the export of NTFPs.

⁶⁴ Ban Khii Nak was a trade node where traders from Cambodia would deliver high-value wildlife in the late 1990s (Nooren & Claridge 2001; Baird 1995)

The three large-scale resin traders all started refineries⁶⁵ in 2004-06 and each have had permits since then to export 50-100 tons per year. One large-scale trader has also received permits to export rattan, though it was not possible to collect details on this. Some of these large-scale traders also trade in other NTFPs⁶⁶, such as medicinal mushrooms, but they did not report this trade and apparently permits are not required.

The concern regarding trade in NTFPs in the demonstration site appears to be related to issues of tenure. Traditional systems, such as ownership of resin trees by the first person to find and use a tree, do exist, but they are severely undermined by inappropriate logging practices (Tola & McKenney 2003). Other NTFPs that have traditionally not been used lack comparable local tenure systems, and trade-driven demand quickly results in unsustainable harvests (Box 19).

The uncertainty of tenure systems also affects other NTFPs. For instance, a honey collector in Preah Rumkel related how he initially marked trees in the forest that he saw had a beehive. But instead of recognising his claim, other villagers could more easily notice the hive and would instead collect the honey themselves. He said, *"[i]n the past people marked trees using magic to protect the tree; other people would not collect then because they are scared...but not now..."* Now he does not mark the trees where he collects honey, and he does not tell other villagers where his trees are, in effect ensuring his own access by hiding rather than displaying his use.

Uncertain tenure and unclear rights do not usually promote the sustainable use of NTFPs. Unsustainable harvests of NTFPs at levels currently reported in the demonstration site do not necessarily represent a threat to biodiversity, but they definitely undermine potential long-term contributions to villagers' livelihoods.

Box 19: Vomica nut over-harvest.

Historically villagers in the demonstration site did not collect Vomica nuts. In 2003, a trader from Stung Treng PC came to advertise that he wanted to buy the nuts. In Krala Peas, villagers explained how most of the nearby trees (c.150 trees) were cut down, saying *"...if the tree is easy to climb, then people climb it; if people can not climb it, then it is cut down..."* At first the price of the nuts was not high (USD0.37/kg in 2003), and few people collected them. However, the price gradually increased (up to USD1.25/kg in 2006), and now there are not enough available to meet the demand.

Traders from Stung Treng PC reportedly buy Vomica from Veun Kham now. In Prum Krom, the village chief said that after the trader from Stung Treng PC came looking to buy Vomica nuts, then villagers cut down trees to collect all the nuts. He said that fines are not imposed, *"...so people continue to cut the trees...it is a problem because you only have them for one year and then nothing in the future..."*

⁶⁵ The refineries remove water and plant debris from the resin before it is exported (see Tola & McKenney 2003).

⁶⁶ Oftentimes they also run additional businesses, such as trading in scrap metal.

5. CONCLUSIONS

5.1. BIODIVERSITY CONSERVATION

Table 13 provides a summary of the natural resources observed in trade in Stung Treng Province and those reportedly traded by villages in the demonstration site. When results of market observations and villagers' reports are combined, a total of 12 globally threatened species on IUCN's Red List (IUCN 2006) and 22 CITES-listed (CITES 2005) species were identified as being traded. Of the CITES-listed species there were nine mammals, seven birds, six reptiles and one fish.

While timber and wood products were not a primary focus of this field study, the trade in high value timber species, including some globally threatened species, is a significant issue in Stung Treng (Box 20). Fish and reptiles were primarily used for food consumption, whereas the mammals and birds were also traded for ornamental and/or medicinal purposes.

Table 13: Summary of natural resources recorded in trade in Stung Treng Province and at the Veun Kham (Lao PDR) border crossing (September-October 2005).

Natural resource type	Number of species/forms		
	Observed in Stung Treng Province*	Observed at Veun Kham*	Reported by villagers in the demonstration site**
Mammals	17	3	27
Birds	3	1	22
Reptiles	4	0	26
Amphibians	1	0	-
Freshwater fishes	38	9	-
Invertebrates	6	0	-
Plant species/forms	25	6	-
Total species/forms	94	19	-
Globally-threatened species (IUCN Red List)	17	2	13
CITES-listed species	23	2	31

* See Appendix 11.
** See Appendix 4.



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Dried Pygmy Loris and porcupine stomach at main market in Stung Treng PC

For many of these taxa, trade-driven over-harvesting represents their single greatest threat; this is particularly apparent for turtles (Stuart *et al.* 2001). The widespread decline of pangolins as a result of over-harvesting for trade in recent years could be a pattern easily repeated for other species, as demand for wildlife in Viet Nam, China and Thailand continues to drive wildlife trade flows across national borders throughout the region (World Bank 2005).

For example, the CITES-listed species of fish reported in trade was a high-value species usually targeted for trade to distant markets (e.g. Thailand). Although over-fishing may not seem to be a major threat when one considers total fish catch, it may be an issue in key sites and for particular species (e.g. *Probarbus jullieni*; see Baird 1994). In the demonstration site, for instance, illegal fishing methods used at O'Talas stream represent a long-term threat given the importance of this area for fish spawning. So while over-fishing may appear less serious when one considers total fish catches in Stung Treng, it may be an issue in key sites and for particular species (e.g. *Probarbus jullieni*; see Baird 1994).

Although Cambodia has been a member of CITES since 1997 and has recently developed legislation including the aim of wildlife conservation (e.g. Articles 48-51 of the 2005 Forestry Law), enforcement and implementation are still limited (Chuon 2004; WCS 2004). The recent case of supposedly 'licensed' trade in CITES-listed Long-tailed Macaques (Box 16) underscores the need for effective regulatory controls regarding wildlife trade.

Recent developments in Stung Treng Province, particularly improved transportation and market access, appear to have had significant effects on trade in natural resources in the demonstration site (see section 4.3.1.). Villagers note increased trade in fish and wildlife. In addition, an emergent market demand is apparent for high-value timber and NTFPs (Box 20). As construction of roads and bridges are completed in the coming year it can be expected that market demand will closely follow market access and that the trade-driven pressures on natural resources in the demonstration site will intensify.

People reported that regulations concerning various aspects of natural resource management (e.g. illegal fishing methods, trade in wildlife, illegal timber felling) had all become stricter in the last 2-3 years. At that time there were administrative changes that brought the provincial department of forestry under central government control. While this opposes aims to decentralise government authority it was deemed necessary to ensure that national laws are applied and not circumvented by licenses granted at the provincial level. This suggests that the government is making some attempts to improve regulation of trade in natural resources.

5.2. LIVELIHOODS

In the Stung Treng demonstration site, animals were considered more important than plants overall for local trade, with fish unanimously considered the most important natural resource. Trade in fish and wildlife is long-established and very active, so it is not surprising that these make the most important contributions to the local economy. In comparison, NTFPs largely appear to be emergent in trade. While some NTFPs have relatively high prices, demand is variable, and none are widely abundant, so they may be quickly over-harvested. Thus, no NTFP in the demonstration site has yet joined animals - either fish or wildlife - as a consistently important trade item.

It is important to note that much of the fish reportedly traded by villagers in the demonstration site, except those from O'Talas Stream, comes from the Ramsar area. However, according to villagers' accounts, much if not most of the wildlife and NTFPs come from areas farther away from the Mekong River. As such, any management of natural resource use by villagers in the Ramsar site also requires the use of resources in surrounding areas to be taken into consideration.

Villagers' trading patterns strongly reflect resource availability. Villages on islands often have less available forest area, so NTFPs would have to be collected from other areas;⁶⁷ as such, the additional travel involved usually made the collection a less attractive livelihood activity for island villages than for those on the mainland. People in Koh Sneng village explained, "[u]sually if we need money then we fish and sell the fish to buy food, clothes and things. We do not collect forest resources as much because they are further away." Not surprisingly, therefore, villages on the

Box 20: Trade in high value timber.

Of the globally threatened species recorded in the survey, three 'Endangered' tree species (*Dalbergia bariensis*, *D. oliveri* and *Azelia xylocarpa*) appear to be among the most highly traded in Stung Treng PC. These species are used for ornate display carvings and furniture. Timber is locally carved and sent from Stung Treng PC to Phnom Penh and elsewhere. Carvings and furniture reach high prices (up to USD1,500 for sale within Cambodia), and trade appears to be unregulated.

The extent to which this timber is sourced from the demonstration site is uncertain. Villagers in Koh Sneng report their successful intervention with provincial authorities in the illegal harvest of *D. bariensis* from near O'Talas stream in 2004. This illegal collection was allegedly organised by the deputy head of the district police who has since left the province. Collection of seeds of one tree, *Azelia xylocarpa*, was reported from the demonstration site; management of this collection was uncertain.

Box 21: Varying availability of resources

In villages where more forest resources were available nearby, the choice between fishing for trade versus collecting wildlife and NTFPs was often dependent on a household's access to capital – either their own or via loans from village traders. As Chham Thom villagers said, "...people fish if they have the money for equipment; if not they go to the forest..." Thus, while forest resources are overall less important than fish for villagers' income generation, they may be particularly important in some villages for poorer households who are not in an economic position to gain entry into the fish trade.

⁶⁷ For example, the source for villagers in Koh Sneng village who occasionally collected large rattan (Khmer: *pdau dam borng*; Lao: *wai na bong*) to sell is near O'Talas. Similarly, villagers from Koh Langor collect forest resources from forests near mainland villages in Preah Rumkel, either collecting without payment (e.g. grasses for roofing, mushrooms) or requesting permission and paying for the resource (e.g. timber).

mainland that had forest areas nearby, particularly Chham Thom and to a lesser extent Krala Peas, Prum Krom and Veun Sean, considered forest resources more important for the local economy than other surveyed villages (Box 21). This demonstrates the local variability in livelihood strategies among villages in the area.

A general typology of natural resources that are being traded in Stung Treng is presented in Table 12. Natural resources with relatively low market value include small fish, bamboo shoots, some edible mushrooms, frogs and water-snails. While natural resources with low market values (such as small fish, bamboo shoots, some edible mushrooms, and water snails) are traded, as observed in Stung Treng PC markets, factors such as low prices, distance to markets and transportation⁶⁸ costs means these do not form a significant trade item for villagers in the demonstration site - though these resources may still be very important for daily subsistence and/or regularly traded in nearby urban markets.

Table 12: Generalised typology of natural resources.		
	Low-value	High-value
Abundance	Common	Very rare
Collection	Everyday	Very infrequent
Use	Consume	Sell
Price	Low	High
Destination	Local	Distant
Conservation concern	Low	High

At the opposite extreme are resources like very large fish (e.g. *Pangasianodon gigas*) and pangolins. While of very-high value they are so rare as to be collected so infrequently that most villagers do not usually consider them as significant to their everyday livelihoods. At the same time, if such very-high value resources were collected, villagers note they would always sell rather consume these resources.

In between these two extremes lie the items that villagers most commonly identify as important for the local economy. These include medium-value fish (e.g. *Morulus chrysophekadion*, *Hemibagrus* spp., *Kryptopterus* spp., *Micronema* spp., *Bagarius* spp.), the most commonly traded wildlife (e.g. monitor lizards, turtles), and in some villages, NTFPs such as soft resin. These medium-value resources have both reliable availability and regular market demand, ensuring that they are a regular object of exchange for villagers in the demonstration site. While other natural resources, both low and high-value, may be sold to traders at the same time, it is the trade in these medium-value products that most strongly influences villagers' overall livelihood strategies.

This represents a generalisation of a complex situation, as a single type of resource can move along this continuum depending upon various ecological, economic and social factors. Yet this typology highlights a space where efforts to integrate both sustainable use and biodiversity conservation may be best achieved. It is important to note that, as the market economy expands and more natural resources are traded, villagers' livelihoods will be affected not only by increasing income in the short-term but also by long-term impacts on the availability of natural resources critical for meeting subsistence household needs.

⁶⁸ A major consideration often mentioned by villagers is the relatively high cost of petrol.

5.3. GENDER

In the demonstration site, village women collect and trade NTFPs, but they appear to be less involved than men in activities such as wildlife hunting, fishing with nets⁶⁹ and fish trade. For instance, only one village fish trader interviewed was a woman, and she traded together with her husband. This pattern of men predominating in the role of village trader is in stark contrast to the trend in local urban markets, where female traders are much more common than men. Village traders explained the absence of rural women fish traders, saying, *"...it is difficult for women to drive a boat, [so] sometimes a wife will just go with her husband because she is worried he will drink or find a new wife!"* Similarly, in Chham Thom village, where fishing and fish trade are a more recent livelihood option, women said, *"...only men fish, women do not fish!"*

However, villagers more highly involved in fishing were observed to practice less gender demarcated in their livelihood activities. For example, men in Koh Sneng village tend to predominate in fishing activities, except among families involved in fishing and fish trade to the extent of having no rice production. Among these households, husbands and wives tended fish and trade together. It may be that, in the absence of agricultural labour demands, and given the necessity of having more than one person on a fishing trip, further involvement of women in fishing and fish trade becomes possible.

Furthermore, women's involvement in wildlife trade in Attapeu is said to have increased, possibly because enforcement may be less stringent for women than men. As villages in the demonstration site become more engaged with trade, therefore, it is possible that gender roles relating to the collection and trade of different types of natural resources may shift over time, and thus the current urban pattern of women being more highly involved in trade of natural resources may also become more common in villages.

5.4. TRADE PATTERNS

Natural resources that are traded from the demonstration site are directed to local urban markets, Stung Treng PC and Veun Kham, and from there are either consumed or sent on to distant markets in Phnom Penh, Thailand (via Lao PDR) or Viet Nam. The typical trade routes vary among the broad types of resources - fish, wildlife and NTFPs - though there is also overlap due to limited transport options. Figure 7 below summarises the information on trade routes provided in earlier sections (see sections 4.4.2., 4.5.2. and 4.6.2.).

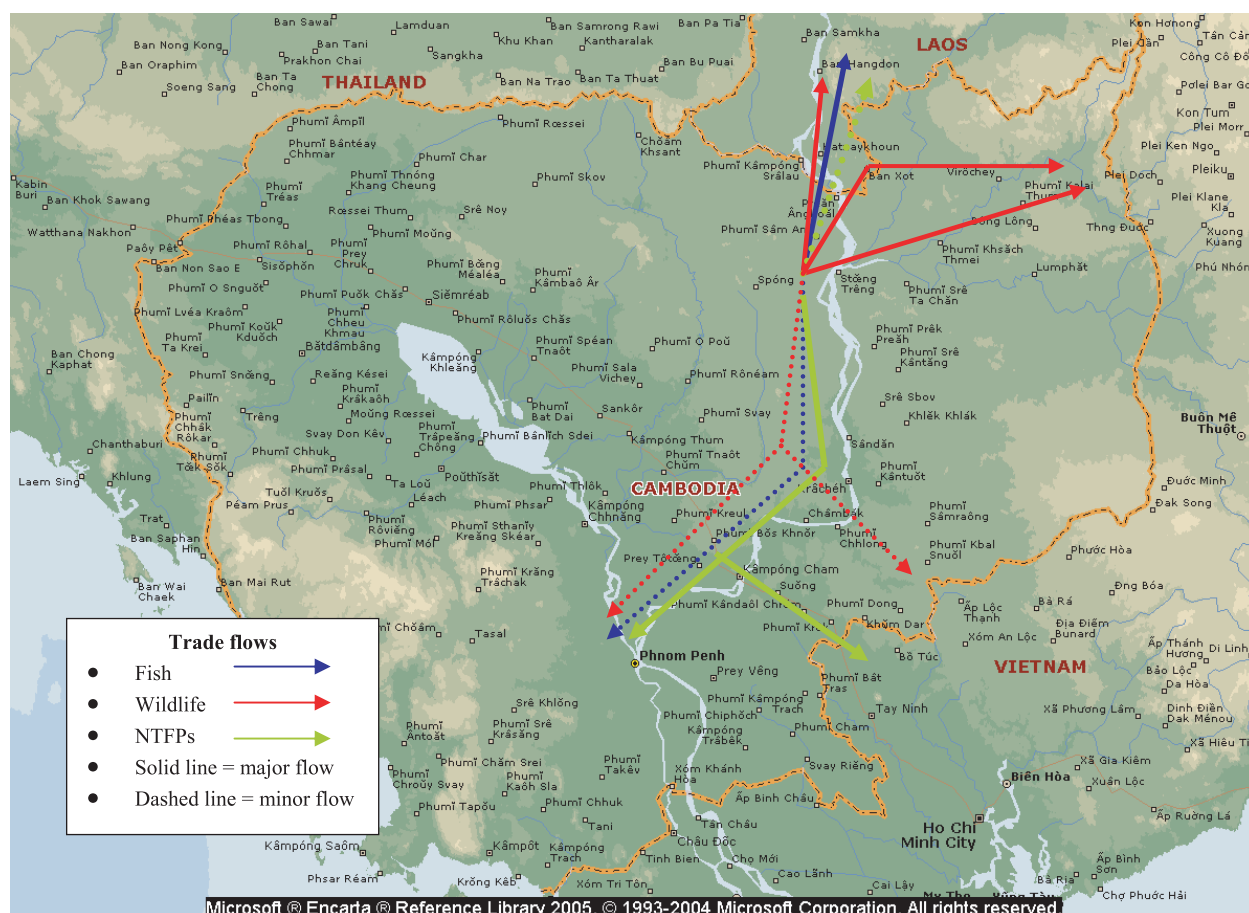
It is important to note that the patterns for trade in natural resources tend to overlap those relating to illegal drug trade (UNODC 2002). While the flows are sometimes in the opposite direction (e.g. illegal drugs moving into Stung Treng from southern Lao PDR, whereas fish are the opposite), the major trade routes and transport methods are similar (e.g. speedboats used to transport illegal goods). This demonstrates that enforcement and regulatory challenges for Stung Treng Province extend beyond the types of natural resources identified in this report.



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Main market at Stung Treng PC

⁶⁹ Nets are the main fishing method in the demonstration site. Women do fish using other methods, but generally this is not for trade purposes.

Figure 7: Common trade flows reported for different types of natural resources from Stung Treng Province.

6. RECOMMENDATIONS

6.1. OVERALL APPROACH

Trade in natural resources in the demonstration site has emerged as an outcome of a complex set of interactions among ecological, economic and social factors. Thus, all these dimensions need to be considered in the development of specific management interventions.

6.2. LICENCES, TRANSPORT PERMITS AND BORDER TAXES

There is a need to re-assess the current system of licences used for the harvest, collection, transport and storage of natural resources. Licences have been issued nationally or provincially for the collection, transport and/or trade of all types of natural resources in Stung Treng Province (see section 4.4.3. for fish, Box 16 for wildlife and section 4.6.3. for NTFPs), usually when high-value natural resources are traded in large volumes. However, such licences (as well as informal taxes) often serve as barriers to pro-poor trade, the sustainable use of natural resources and the efficient generation of national revenue. Licence systems must be carefully considered for each type of resource, and their ongoing use and effectiveness must be monitored. Key issues that require further study include:

(i) Fish: Monitoring the collection of informal fees relating to fish trade at border checkpoints is important if there is to be any management of capture fisheries. This is primarily a concern at the international borders, which are more distant from the provincial centre (e.g. Cambodian-Lao border in Thalaborivat District and Siam Pang District). Studies are required to determine the efficacy of provincial bans on fish export and to develop alternate tools for management that encourage the cooperation of local people and all government agencies.

(ii) NTFPs: The current licence system that is used to regulate NTFP trade provides a useful foundation for the concept of regulating resource extraction. However, a variety of changes are needed to strengthen this system. First, the issue of monopolised quotas should be examined, as it is a potential barrier to pro-poor trade in the region. Furthermore, the current system pays insufficient attention to issues of sustainability, with quotas primarily allocated on the basis of traders' requests and perceived resource availability. Stronger and more consistent monitoring and enforcement of quotas is also needed.

6.3. INTER-AGENCY COORDINATION AND AWARENESS

There is a need for greater coordination and cooperation among the various government agencies responsible for natural resource management and enforcement of regulations. For example, since wildlife and fish are frequently traded along the same transport routes, opportunities exist to increase synergies among agencies by ensuring that both forestry and fisheries officials are aware of relevant regulations concerning trade in wild animals, NTFPs and fish.

Uncertainties and inconsistencies regarding wildlife hunting/use/trade and fish trade have been partly addressed by the recently revised Forestry Law and Fisheries Law, yet ambiguities remain. Government officials stated that continuing low awareness of national trade laws among officials hinders enforcement. In addition, regulations that rely on a clear demarcation of subsistence versus trade-related activities need to be clarified to facilitate consistent enforcement at a local level.

Initial efforts to improve agency coordination and awareness on these issues might include a training workshop involving representatives from relevant agencies at provincial and district levels, as a forum to promote cooperation and information-sharing among agencies with overlapping jurisdictions for managing trade in natural resources, while helping to insure that interventions implemented at the province, district and village level are supported by consistent implementation across the various agencies. Any training should incorporate both relevant national and international regulatory frameworks.

Given that many officials (e.g. police, army) who play a role in managing natural resources have little training related to species identification, illustrated guides of protected species (including photographs with both scientific and local names) could be produced and distributed to government officials, in order to improve capabilities with regard to identifying protected species in trade.

6.4. LOCAL AWARENESS AND ENFORCEMENT EFFORTS

Efforts are needed to increase the awareness among villagers of the legal frameworks regarding natural resources, distinguishing between protected and non-protected species and including both trade and subsistence use. This should be reinforced by the clear and consistent implementation of relevant national and international legislation at a local level. Awareness-raising activities should expressly identify the ways national and international regulatory efforts respond to management concerns voiced by local communities, in order to encourage broader participation and support.

6.5. OFFICIAL DILIGENCE

Although legal frameworks exist for the management of wildlife trade, the use of wildlife as food and ornamentation remains widespread in Stung Treng PC. Government officials are sometimes among those implicated in these practices and in the use of damaging harvesting methods, which creates difficulties for attempts to assert the legal basis for the protection of wildlife in the region. Enforcement is further complicated by social networks which often result in traders (e.g. market sellers, restaurant owners) being closely known by those officials charged with enforcement efforts, thus creating challenging conflicts of interest between personal and professional obligations within these relatively-small communities.

Both awareness-raising and capacity building are needed. In general, government officials, like others, often appear to have limited awareness of the implications of their actions and of the relevant legal frameworks for trade in natural resources. For example, accounts from villagers often suggested that official perceptions of wildlife trade significantly underestimated trade volumes.

6.6. PROHIBITION VERSUS REGULATION FOR FISH TRADE

Despite the announcement of strict bans in relation to fish export, little has been done in terms of implementation, enforcement or incentives. In addition, strict bans have garnered little support from other government agencies, notably the police, with whom cooperation is vital if there is to be any enforcement. In this case, a more moderate approach might be considered - one which recognises the valid concerns associated with the ban on fish export and which also addresses the practical limitations that make such a ban impractical. Further research should be conducted to assess the merits of various mechanisms by which trade can be regulated in the area. Ongoing monitoring at key locations, including local urban markets and boat landings, would complement such research by enabling the effectiveness of policy changes to be properly assessed.

6.7. RESOURCE EXTRACTION BY OUTSIDERS

A key approach to integrating sustainable use of natural resources and biodiversity conservation would be to ensure resource security by protecting the legally or *de facto* recognised rights of local users (e.g. with respect to traditional fishing areas, customary rules regulating the collection of *Vomica* nuts and soft resin). Villagers are more likely to receive the benefits of regulated use and locally enforce sustainable use if they have long-term security. For instance, when villagers have lost resin trees to logging companies, then they become more likely to accept an opportunity to sell the timber of the remaining resin trees if it arises, in order to maximise short-term gains when long-term security is uncertain.

Major related issues include:

(i) Enforcement: In some cases, appropriate laws for natural resource management are already in existence; what is needed is clear and consistent enforcement of these regulations. For example, there is a need for stricter enforcement of the Forestry Law prohibiting the harvest of resin trees and of regulations in the Fisheries Law concerning permitted equipment (e.g. mesh size, length, illegal fishing gear).

(ii) Improve awareness of local rights and capabilities: Instances of villagers protecting their rights (e.g. villagers in Koh Sneng confiscating illegal fishing gear, chainsaws and illegally cut timber) could be used as a basis for building awareness in other villages through inter-village discussions, including the involvement of local officials.

(iii) Camps: Current regulations and policies regarding the establishment of temporary or semi-permanent camps along rivers in the demonstration site are insufficient for effective natural resource management. While camps are mainly occupied by local villagers at present, there are also some recently arrived residents from other districts. As transportation networks are improved in Stung Treng, extraction of natural resources from the demonstration site by people from elsewhere can be expected to expand. Further research, therefore, is required to document trends in the demography of camp populations over time and to assess the impact of these camps on natural resource sustainability. Such information could not only provide a useful baseline but would also help to guide future management interventions.

6.8. MULTI-SITED APPROACHES TO REGULATING TRADE

Interventions that operate at a single level are often insufficient to influence trade. For example, there is a need to combine village-level interventions with corresponding action to influence the activities of outsiders and local, domestic and international markets. This is particularly relevant for wildlife trade. Awareness raising, monitoring and enforcement are all important tools to be used. Key locations include:

(i) Trade nodes or bottle-necks: Stung Treng PC and Veun Khao-Veun Kham are the major trade nodes for the natural resources sourced from the demonstration site and thus should be targeted by interventions. UNODC recently supported the expansion of the Customs Police Office at Veun Kham, so there may exist possibilities for promoting collaboration among officials from fisheries, forestry, and the customs police.

(ii) Trade routes: Transportation of natural resources along Route 7 can be expected to continue to expand as the road nears completion. Interventions such as the establishment of checkpoints along this route would complement those in local urban markets. One potential site is the bridge currently being constructed across the Xekong River, as this road will eventually connect to Veun Khao-Veun Kham. The MWBP may be able to facilitate meetings between relevant government agencies and the construction contractor for this purpose.

(iii) Key fishing areas: Key areas are O'Talas stream and the nearby fishing grounds between Koh Sneng and Chham Thom villages. These are critical to ensuring the sustainability of fish in trade and thus should be targeted by interventions.

6.9. LOCAL LIVELIHOODS

Contributions to local livelihoods are more likely to succeed when based on existing frameworks of knowledge or practice. Key approaches include:

(i) Local management systems: There is a need to assess how NTFP access is negotiated and managed locally. These local approaches should not be supplanted; instead, they could form the basis for officially-recognised systems. An example already exists in the case of Vomicia nuts, where traditional rules concerning the collection of the nuts are now also promoted by district authorities. Further work is needed in this area on products which are facing increasing demand, such as Yang oil.

(ii) Access to market information: Limited access to market information, particularly among the poorer households, tends to consolidate power among those with greater wealth and connections to the urban centre, thus resulting in missed economic opportunities for rural villagers. As such, livelihoods-focussed interventions should seek to help facilitate the flow of such information, identifying and promoting such opportunities where they exist. For example, fish processing, particularly salting and drying, provides an inexpensive and relatively simple means to add value to fish products, while also providing flexibility for storage and alternate use if fish can not be immediately sold.

6.10. MONITORING TRADE

Given the rapid changes that are taking place in the province, as well as the general lack of quantitative information on trends in natural resource availability over time, ongoing monitoring is needed to build on the field surveys. Any temporal changes detected in the trade of natural resources should be fed back into future management interventions and regulatory decision-making

Monitoring should also be used as a tool to build capacity and strengthen management. For instance, maintaining records at the boat landing, markets and Lao-Cambodian border and sharing these among various agencies would help authorities track and respond to trade in natural resources that varies spatially and temporally. Recent and planned rural infrastructure development projects (e.g. road construction) should also take into account the need for monitoring and enforcement mechanisms to be established simultaneously.

Such monitoring efforts should take into account the need to collect varied information at all levels of the trade - village, district and province - and covering both overt and (to the extent possible) more covert trade. For example, below is a possible simple monthly monitoring approach for locations near Stung Treng PC, with the following specific objectives: to record diversity of wild animals

and plants in public markets and shops; to assess quantities of mammals, birds, reptiles, amphibians, and fish species being openly traded; and to monitor simple presence/absence of wildlife meat in local restaurants:

- (i)** Spending approximately four days per month in selected urban sites in Stung Treng;
- (ii)** Monitoring each of the following: Stung Treng town and nearby markets; bus terminal;
- (iii)** Visiting local restaurants to ask simple questions regarding the availability of wild meats, prices and time required to source these dishes.

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APPENDICES

TRADE IN NATURAL RESOURCES IN STUNG TRENG PROVINCE:

An assessment of trade in the MWBP demonstration site in Cambodia

Sarinda Singh, Ramesh Boonratana, Mark Bezuijen and Sok Ko

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August 2006

Appendix 1: Questionnaires developed for the first survey (September-October 2005).

VILLAGE/VILLAGER(S) QUESTIONNAIRE 1: VILLAGE BASICS							
Research team members						Date (D/M/Y)	
Village		District				Province	
GPS position (Lat/Lon)	N	E	Source of power (national grid, micro-hydro, none)				
# of HH now			# of HH 5 years ago		# HH 10 years ago		
Total population now		Year established		Ethnicity (# HH)			
Road access (all-year, dry season, none)				Other access			
Domestic animals				Crops grown			
Total cultivated area			# of landless HH		# of HH in poverty		
Dominant geographic features							
TV, Motorbike, Car, Truck, Hand-Tractor, etc.							
Respondent(s)	Status/Position			Remarks			
Food and income sources	# of HH now	% of HH now	# of HH 5 years ago	% of HH 5 years ago	# of HH 10 years ago	% of HH 10 years ago	
Settled agriculture							
Swidden agriculture							
Government jobs							
Livestock sales							
Sundries sales (retail sales)							
Wild plant (NTFP) sales							
Wild animal (terrestrial or aquatic) sales							
Wild animal (terrestrial or aquatic) for food							
Hired labour							
Other							
# & % of HH with rice insufficiency?			How many months on average?				
Description of main reasons given for rice insufficiency	Description of principle coping strategies						

Of the resources listed, highlight the resource(s) whose scarcity is of the greatest concern to the village (& why this is).

[illegible]

VILLAGE/VILLAGER(S) QUESTIONNAIRE 5: ISSUES					
Research team members		Village		Date (D/M/Y)	
Community Development Issues				# of HH affected	Priority
Resource Use Issues - Rank most important natural resources (wildlife spp , NTFPs, and aquatic resources) for consumption and income					
5 most important terrestrial animal resources?	Why this animal?	Rank importance	Rank importance for income	Other	Value per annum (if app.)
5 most important aquatic animal resources?	Why this animal?	Rank importance	Rank importance for income	Other	Value per annum (if app.)
5 most important plant/ plant product resources?	Why this plant/ plant product?	Rank importance	Rank importance for income	Other	Value per annum (if app.)
Describe any management systems and rules related to the use of above species, if any.					
Describe any community management systems and rules, if any.					
What are the main threats to habitats and wildlife that effect availability and trade?					
What issues/problems do you have with natural resources that impacts your lives?			Recommendations on measures for addressing them		
Any hunting-related mishaps?					
Any villager fined/ arrested for illegal harvest?					
NOTES					

TRADER QUESTIONNAIRE (MIDDLEMEN, MARKET-SELLERS, RESTAURANT-OWNERS)																				
Research team members							Date (D/M/Y)			Market type										
Village/Town	District								Country		Position (Lat/Lon)		N	E						
Respondent (M/F)	Status (seller, middleman, etc.)											How long in business								
Species/products sold	Bred or Wild?	Used for food, medicine, etc.	Cost	Product/ Unit	Season <div>Wet Dry</div>	Volume sold (turnover rate e.g., per week)	Source (hunters, villagers, middlemen, etc.)	Source (location harvested)	Routes used	Transportation mode	Buyer information (who, when, frequency, how, etc.)	Common	Rare	Abundance		10 yr trend (Availability) <div>Increase Decrease Stable</div>		10 yr trend (Demand) <div>Increase Decrease Stable</div>		Remarks
Any items are prohibited by law?																				
Any experience with enforcement agencies? Who? What action taken?																				
Notes																				

[illegible]

[illegible]

Appendix 2: Summary of methodology used to brief team members and guide the second survey (May-June 2006).

Objective

The objective of this survey is to provide an overview of trade in natural resources in the Stung Treng and Attapeu MWBP demonstrations sites. 'Natural resources' includes animals and plants from both aquatic and terrestrial habitats. While collecting information about all natural resources this survey will give particular attention to aquatic resources and NTFPs and to identifying the main trade networks involving natural resources from wetlands.

Methodology

The methodology will use semi-structured interviews in villages in combination with informal interviewing and unobtrusive observations in villages, markets and fishing camps. The questions in each of these locations will be similar but informal interviewing and observations will require some independence in data collection. The questions listed below are intended to provide a general guide to the types of information that is required. Each team member will be required to modify and expand on these questions to suit particular situations encountered in the field.

Villages

- *Common types of natural resources harvested for trade:* What are the common types of natural resources that are harvested for trade? Which are most important for the local economy? Are the resources collected for trade the same as those collected for local consumption? What is the relative importance of the different natural resources that are traded (e.g. aquatic/forest, animals/plants)?
- *Main sources of natural resources that are traded:* Where are natural resources that are important for trade harvested from? This can include specific locations (e.g. near particular villages or fishing camps) and important habitat types (e.g. deep pools, flooded forest, seasonal streams).
- *Harvesting techniques:* What harvesting techniques are used? Are these the same techniques as used in the past? How do these techniques vary between villages or different source areas? Are different techniques used by different groups of collectors (e.g. men versus women, people collecting for subsistence versus people collecting for trade)?
- *Relative importance of natural resources that are traded:* How important is harvesting of natural resources for traded relative to other livelihood activities (e.g. farming, wage labour)? Which are most important, aquatic or terrestrial animals or plants? Is trade in natural resources more important for wealthier or poorer households or in certain villages?
- *Trade patterns:* Where are natural resources sold and to who? What are normal prices for important natural resources? Is there any seasonal variation in this trade? What volumes are natural resources collected and/or traded in? Are natural resources sold alive/as parts/derivatives and is there any local processing (e.g. fish drying, wood carving) of natural resources for trade? How are natural resources transported to traders/markets? What other factors affect the extent of local harvest for trade (e.g. market access, availability of ice and cold boxes, arrangements with bus drivers for transportation, loans and/or provision of equipment by traders outside the village)? What characteristics of natural resources affect the extent of trade (e.g. larger animals sold more than smaller animals)?

- *Regulations governing trade in natural resources:* What regulations govern trade in various types of natural resources?
- Social factors influencing harvest of natural resources: Are there any social factors that influence harvesting patterns? For example, do women harvest some resources more/less than men? Do wealthy households harvest different natural resources compared to poor households? Do wealthy households trade more/less than poor households? Are some villages more involved with harvesting or trading of natural resources?

Camps

- Questions about types of natural resources harvested for trade the same as listed above for villages.
- *Background on fishing camps:* Size and location of fishing camps? Where do people come from and how long have they been setting up camps for? How long do they stay in the camps and how often do they come? Do they come to the same location every year and stay in the same camp for the entire season? What activities do they conduct at the camps? Are any natural resources collected and/or traded? What are the trade patterns and routes? What trends over time are apparent with camps? Do they have any relations with neighbouring villages?

Markets and traders

- *Type of natural resources commonly traded:* What are the most commonly traded natural resources? What are the most valuable or most desired natural resources? Is there any seasonal variation in this trade? What types of resources (e.g. aquatic/forest animals/plants) are most important for trade? What volumes are natural resources collected and/or traded in?
- *Value of natural resources that are commonly traded or valuable:* What are the normal prices for natural resources that are important in trade? What factors affect the trade price of natural resources (e.g. processing, size, sale location, buyer-seller relationship)?
- *Trade patterns:* Where are the main sources and destinations of natural resources that are important in trade and why? What are the modes of transportation? Are there any differences or similarities in trade routes for different types of resources? Have there been any recent or historical changes in trade patterns (e.g. trade routes, major price changes, change in traders, changes in government regulations)? Have there been any major changes in the availability or demand for natural resources?
- *Consumer/Buyer information:* Where are buyers from? How regularly do they purchase natural resources? How do buyers use the resource (e.g. food, medicine, pet, construction, trophies)?
- *Regulations governing trade in natural resources:* What regulations govern trade in various types of natural resources?
- *Social factors influencing trade in natural resources:* How does the price of natural resources in trade vary between different social contexts (e.g. better prices with regular customers/suppliers, loans)? Are there certain times when natural resources are traded more? Are there any social factors (e.g. gender, age, wealth, education, family connections) that influence local trading patterns? How do people initially start trading natural resources?

Officials

- *Type of natural resources commonly traded:* Which government agencies are involved in the regulation of trade in natural resources? What are the roles and responsibilities of each? What are the most commonly traded natural resources? Which are most important for the local, district and/or provincial economy? Are records kept of trade volumes and is there any data available? What are the most valuable or most desired natural resources? What types of resources (e.g. aquatic/forest animals/plants) are most important for trade?
- *Regulations governing trade in natural resources:* What regulations govern trade in various types of natural resources? What issues of enforcement, regulation and management are currently pertinent in the province/district?
- *Trade patterns:* Where are the main sources and destinations of natural resources that are important in trade and why? What are the modes of transportation? Is there any local processing of natural resources? Are there any differences or similarities in trade routes for different types of resources? Have there been any recent or historical changes in trade patterns (e.g. trade routes, major price changes, change in traders, changes in government regulations)? Have there been any major changes in the availability or demand for natural resources?

Additional information

- *Key informants:* In each location attempt to identify and interview key informants including village traders, traders coming from elsewhere, village committee (e.g. village headman, teacher), elders, bus drivers, market managers and so on. The selection of key informants will vary with the specific locality (i.e. village, market).
- *General observations:* Observations of trade interactions and casual conversations will also form an important source of information especially when staying overnight in villages and camps.
- *Survey locations:* Records will be kept of GPS locations of villages and camps as well as local names for camps.

Appendix 3: Comparative profile of villages interviewed in the Stung Treng demonstration site (October 2005).

Village	Krala Peah	Veun Sean	Chom Thom	Thmei
Commune	Preah Rumkel	O' Svay	Koh Snaeng	Samaki
District	Thala Barivat	Thala Barivat	Thala Barivat	Stung Treng
GPS location	N 13° 52' 18.2" E 105° 58' 5.2"	N 13° 46' 45.2" E 105° 58' 51.7"	N 13° 42' 40.1" E 106° 0' 19.9"	N 13° 34' 42.4" E 106° 0' 09.5"
No. of respondents	22 persons (Headman, Community Fishery, Fish/Wildlife Traders, Village Elders, Ramsar Ranger, Village Police, Housewives)	37 persons (Village elders; Community forestry; Community fishery; VDC; PTA; Red cross volunteer; Midwife; Fishery researchers; Human rights; Headman; Ramsar Rangers; Farmers; Housewives; youths)	13 persons (Headman; Elders; Housewives; VDC; Community Forestry & Fishery; Teachers; Fish trader; Ramsar ranger) [NB: this did not include 5 persons from Koh Ky, 6 persons from Koh Snaeng, and 4 persons from Koh Sralou. These villagers participated at the commune leader's instructions – who had apparently misunderstood the written communication]	33 persons (Village Chief; Elders; Community Forestry/Fishery; VDC; teacher; Fish traders; Housewives; Farmers)
Date Interviewed	Oct. 9, 2005	Oct. 11, 2005	Oct. 15, 2005	Oct. 16, 2005
Year established	c. 1910	many many years ago	1962	early 1900s
Dominant geographic features	inundated riverbed forest, dry season & all season islands, deep pools (Veun Bong Lor, Veun Bong Kor, Veun O' Tamplei & Veun O' Talas) all season and wet season ponds, and mineral licks	Deep pools: Veun Phong, Veun Siem, & Veun Krathom; Over 20 mineral licks	Veun Don Katheay & Veun Don Sot (Veun=Deep pools in river)	Deep pools: Veun Sang, Veun Dok, Veun Tatho & Veun Talo
Source of power	1 Generator supplying electricity to 13 families at 7,000-9,000Riel/mo	none	None	none
Ethnicity	Khmer (+1 Kreng family)	Khmer - many can speak Lao	Khmer (some of Lao origin; c. 50% can speak Lao)	Khmer (c. 50% can speak Lao)
Population size	627 persons	192 persons	375 persons	824 persons
No. of families/households now	120 families	37 families/32HH	66 families; 52 HH	147 families
No. of families/households 5 years ago	108 families	c. 27 HH	c. 52 families; 48 HH	c. 135 families

Village	Krala Peah	Veun Sean	Chom Thom	Thmei
No. of families/households 10 years ago	88 families	c. 17 HH	c. 37 families; 27 HH	93 families
Access	Dry season (from Stung Treng PC to Thala Barivat DC, and to Krala Peah only for ox-carts and motorbikes); 2 hours by boat from Stung Treng PC	No road access (foot trail all year); by boat along Mekong River (c. 1.5 h by MWBP boat)	River only (c. 1 h from ST PC by motorized boat)	Dry season [8 km to ST town ferry; 1.5 km to main road (Stung Treng - Dong Kra Lor); Boat - wet season, all year
Domestic animals	Buffalo, cow, pig, chicken, duck, cat & dog	Buffalo, pig, goat, chicken, duck, cat, dog	Buffalo, cow, pig, chicken, duck, dog, cat	Buffalo, cow, pig, duck, chicken, dog
Primary crops grown	Primarily rice, plus varying amounts of lentils, cassava, coconut, bananas, & vegetables	Rice primary; varying amounts of lentil, beans, chillies, pumpkin, tapioca, eggplant	Primarily rice, plus beans, tobacco, bananas, maize, cassava	Rice main; Lentils, Water melons
Total cultivated area (paddy lands)	109 ha permanent + 4 ha swidden	45ha (rice & other crops; 12 ha rice only)	65.25ha	c. 110 ha
No. of landless families/households	none	none	None	1 family - immigrated c. 6-7 years ago
No. of families/households in poverty	15 families	22 HH	c. 50%	80 families
No. of hand-tractors, motorboats, etc.	15 boats fitted with engines	11 engine-powered boats, 3 VCD players	22 boats with engines, 3 VCD players (locally known as karaoke machines)	5 motorcycles, 2 VCD players
Food and income sources				
Settled agriculture	All	13 hh	12 families	All
Swidden agriculture	15 families	20hh	54 families	none
Government jobs	3 persons	2 persons	5 persons	7 persons
Livestock sales	All opportunistically c. 1 animal/year	60% opportunistically 1-2 chickens/annum	All opportunistically	All opportunistically
Sundries sales (retail sales)	3 families	2 HH intermittently	3 families	2 families
Wild plant (NTPF) sales	none??	occasional rattan sale to outside trader	All opportunistically	All opportunistically
Wild animal (terrestrial or aquatic) sales	All opportunistically	80% ; some villagers sell at Veun Kham; trader from ST PC	All opportunistically	All opportunistically
Wild animal (terrestrial or aquatic) for food	All opportunistically	80%	All opportunistically	All

Village	Krala Peah	Veun Sean	Chom Thom	Thmei
Hired labour	11 persons		None	50 persons working for GG World since Aug. 2005 growing Acacia
Other				
No. of families/households with insufficient rice	c. 20 families	28HH	This year 62 families, normally 50%	100%
Average no. of months with insufficient rice	2-3 months/year	3 mos	2 mos	6 mos
Reasons for insufficient rice	Long drought; Severe floods; Rice pests (wild pigs, rats, insects); Lacking draught animals	Long drought; Severe floods; Lacking draught animals; No agriculture specialists	Insufficient cultivation land; Long drought; Floods; Insufficient draught animals; No irrigation; Crop pests (insects, wild pigs, etc.)	Long drought; Poor quality soil for agriculture; Major floods; Crops destroyed by insects & pigs
Principle coping strategies during rice insufficiency	Borrow rice (& return with 'some' interest); Increase harvest and sale of aquatic resources (primarily fish); Livestock & poultry sale; Work as hired labourers	NTPP collection & sale; Wildlife harvest & sale; Fish harvest & sale; Borrow rice from other families & return same amount; Borrow rice from PFD & return 25% extra	Sundries sale; Livestock sale; Sale of plant resources, aquatic and terrestrial resources; Borrow rice (100% interest - borrow 100kg, return 200 kg)	Grow vegetables for sale and for purchasing rice; Fish harvest & sale; Worked as labourers
Community development issues according to priority [1 being most important]	1. Clean drinking water (water during dry season not fit for drinking - buffaloes & general washing) [all households]; 2. Dispensary [all households]; 3. Road access [all households]; 4. Lacking draught animals [15 households]; 5. Toilets (currently has only 30 toilets) [all households]; 6. Hand tractors [all households]; 7. Control/eradicate crop-destroying pests [more than 20 households]; 8. Need classrooms for Levels 3 & 4 (Currently school has classrooms for levels 1 & 2) [all households]	1. Dispensary [All]; 2. Classrooms and teachers for upper primary levels 3-5 [All]; 3. Draught animals lacking [70%]; 4. Drinking water - currently only one well [80%]; 5. Veterinary care for livestock/poultry [All]; 6. Latrines [All]; 7. Loss of community forest [c. 5,000ha of forest lands belonging to 7 villages (2 communes O'Svay & Samakhi) cleared by GG World to grow Acacia (logs taken) [All]; 8. Irrigation (supplying water during draught & draining water during floods) [All]; 9. Road access (12-15 km to main road) [All]; 10. Frequent floods [70%]	1. School for levels 5-12 [All households]; 2. Dispensary [All households]; 3. Road access [All households]; 4. More water pumps established [All households]; 5. Improve rice quality & production [All households]; 6. Veterinary care for domestic animals [All households]; 7. Electricity for night adult classes [25 persons]; 8. Need Funds to relocate village inland due to fear of landslide [All households]; 9. Latrines [All households]; 10. Accommodation for teachers [2 persons]	1. Improve soil fertility & quality/quantity of rice [All households]; 2. Road Access (Construction of Bridges 2 to ST-Dong Kra Lor road, 10 to ST along river bank road) [All households]; 3. Draught animals [All households]; 4. Dispensary [All households]; 5. Clean water [All households]; 6. Irrigation [All households]; 7. Electricity [All households]; 8. School Teachers [2 levels in one classroom (boards at different ends of the room) 1 teacher manages 2 levels simultaneously] [All households]; 9. Satellite TV - for news [All households];

Village	Krala Peah	Veun Sean	Chom Thom	Thmei
Five most important wildlife resources according to overall priority [1 being most important]	1. Bengal monitor; 2. All turtle species 3. East Asian Porcupine; 4. Python; 5. Pangolin	1. Pangolin; 2. Hill Myna (chicks); 3. All turtle species 4. Python & King Cobra; 5. Bengal & Water Monitor lizards	1. Pangolin; 2. Cobra spp. 3. Python; 4. Bengal & Water Monitor lizard; 5. All turtle species	Only for a few families
Five most important wildlife resources according to income priority [1 being most important]	1. Pangolin; 2. Bengal monitor; 3. Python; 4. All turtle species 5. East Asian Porcupine	1. Pangolin; 2. Hill Myna (chicks); 3. All turtle species 4. Python & King Cobra; 5. Bengal & Water Monitor lizards	1. Pangolin; 2. Cobra spp. 3. Python; 4. Bengal & Water Monitor lizard; 5. All turtle species	Only for a few families
Five most important aquatic animal resources according to overall priority [1 being most important]	1. Trey Riel; 2. Trey Chhpin; 3. Trey Sia; 4. Trey Kes	1. All fish spp.	1. All fish spp.	1. All fish spp.
Five most important aquatic animal resources according to income priority [1 being most important]	1. Trey Sia; 2. Trey Kes; 3. Trey Riel; 4. Trey Chhpin	1. All fish spp.	1. All fish spp.	1. All fish spp.
Five most important plant resources according to overall priority [1 being most important]	1. Timber; 2. Nya khao 3. Soft resin (yaang oil); 4. Hard resin (Kisee); 5. Mak saeng	1. Timber; 2. Reeds/grass (for roofing); 3. Soft Resin; 4. Hard resin; 5. Bamboo	1. soft resin; 2. Timber; 3. sabao grass; 4. small rattan; 5. hard resin	No forest resources
Five most important plant resources according to income priority [1 being most important]	1. Soft resin (yaang oil); 2. Hard resin (Kisee); 3. Mak saeng	1. Soft Resin; 2. Hard resin	1. soft resin; 2. hard resin; 3. small rattan sp.	No forest resources
Main threats to wildlife and habitats that affect availability and trade	Hunting for sale not for subsistence; Outsiders from nearby villages harvest resources; Implementation of laws weak	Too many harvesters; too many traders; too many use unsustainable techniques; Loss of forested area to GG World	Increase human population; Illegal fish harvest - some villagers and many outsiders; Illegal timber harvest - some villagers and many outsiders	No forest left - tiny patch of new secondary growth
Issues/problems related to natural resources	Lack of clean water	Crops being raided by pigs; Harvest by outsiders and unsustainable fishing		Illegal/unsustainable fishing by some villagers, outsiders, police & MP
Recommendations to address issues/problems related to natural resources	Establish water pumps	Need more resources for community fishery and community forestry for patrolling; Need organisations to assist with skill and knowledge development to resolve agriculture-related issues		Fishery Dept. should enforce laws on Police and MP, not only on villagers

Village	Krala Peah	Veun Sean	Chom Thom	Thmei
Hunting-related mishaps		In 1984, a 17-year old villager accidentally shot (& killed) by a soldier from another village - mistaken for a peafowl. Soldier was accompanying the 17-year-old on his way to school at Krala Peah; In 2004, a villager shot & killed his own 29-year old brother while hunting for wild pig.		
Villager/outsider fined/arrested for illegal harvest	One villager from Veun Sai crossed L/A/KH border 2-3 days ago - boat & fish confiscated by KH police. KH police resold fish to fish trader.	Early 2005, 2 villagers caught for illegal fishing (using explosives) by border police. The border police confiscated their explosives & guns and fined them 3 million Riel. No documents were signed; In 2004, the Community Forestry intercepted a boat with 1.9 m ³ of <i>Dalbergia bariensis</i> . The offenders, a MP & a boat driver escaped. Verbal reports were made to the MP and Forestry Administration.		
Community-based natural resource management system	Based on national Fishery laws	Outsiders can fish but must follow local rules (Not Implementable); No fishing in conservation pools (Not Implementable); No wildlife harvest (Not Implementable)		
Community management system and rules		Rice bank		

Appendix 4: Volume and value of wildlife species reported harvested/traded in the Stung Treng demonstration sites (October 2005).

Key:

- (?) Provisional; Khmer (KH) and Lao (LA) names reported given in square brackets, when provisionally recorded or species uncertain; Respondents frequently gave species name in Lao
 X Harvested, but volume unknown
 XX Traded, but value unknown
 Vol/yr Approximate volume of products currently harvested in a year (unless indicated otherwise)
 USD 1 KHR 4,260 (Oct. 2005)

Species	IUCN Red List	CITES	Krala Peah		Veun Sean		Chom Thom		Thmei	
			Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)
Bat spp.					X					
Bengal loris <i>Nycticebus bengalensis</i>	DD	II	5 animals				2 animals	10,000/ animal		
Pygmy loris <i>Nycticebus pygmaeus</i>	VU	II	5 animals							
Long-tailed Macaque <i>Macaca fascicularis</i>	NT	II					15 kg			
Silvered Leaf Monkey <i>Trachypithecus villosus</i>	DD	II					X			
Malayan Pangolin <i>Manis javanica</i>	NT	II	4 animals	150,000/ kg	1-2 animals	130,000/ kg	8 kg	80,000/ kg (scales only)		
Siamese Hare <i>Lepus peguensis</i>	LR/LC		X				X		X	
Hare sp. [KH - Tonsay Sleuk]							X		X	
Squirrel spp.			100 animals	1,500/ animal	X	2,500/ animal	X			
Indochinese Ground Squirrel <i>Menetes berdmorei</i>	LR/LC				X		X			
Black Giant Squirrel <i>Ratufa bicolor</i>	LR/LC	II					X			
Giant Flying Squirrel <i>Petaurista elegans/ petaurista</i>			7 animals	30,000/ animal	X	XX	X			
Phayre's Flying Squirrel <i>Hylapetes phayrei</i>					X	XX				

Species	IUCN Red List	CITES	Krala Peah		Veun Sean		Chom Thom		Thmei	
			Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)
Malayan Porcupine <i>Hystrix brachyura</i>	VU		X	XX/ stomach	X	5,000/ stomach about 5 years ago	X		X	XX/ stomach
Hog Badger <i>Arctonyx collaris</i>	LR/LC						X			
Otter spp.		II	X							
Common Palm Civet <i>Paradoxurus hermaphroditus</i>	LR/LC	III	1-2 animals		50 kg		X		X	
Large Indian Civet <i>Viverra zibetha</i> (?) [LA - Hen Faeng]	LR/LC	III			5 kg					
Binturong <i>Arctictis binturong</i>	LR/LC	III					X			
Owston's Palm Civet <i>Chrotogale owstoni</i>	VU				2-3 kg		X		X	
Civet sp. A [LA - Hen dok lau]					2-3 kg					
Small Asian Mongoose <i>Herpestes javanicus</i>	LR/LC	III			2-3 kg		X			
Leopard cat <i>Prionailurus bengalensis</i>	LC	I/II			X					
Wild Boar <i>Sus scrofa</i>	LR/LC		5-6 animals	6,000/ kg	300 kg	3,000/ kg	100 kg	2,500/ kg or 20,000/ animal	X	6,000/ kg
Red muntjac <i>Muntiacus muntjak</i>	LR/LC		2-3 animals	2,000/ kg	X	4,000/ kg	60 kg	3,500/ kg	X	5,000/ kg
Sambar <i>Cervus unicolor</i>	LR/LC		2-3 animals c. 5 years ago		X		140 kg	3,500/ kg about 5 years ago		
Banteng <i>Bos javanicus</i>	EN				1 animal	9,000/ kg	200 kg	2,000/ kg about 10 years ago		
Bird sp. A [LA - Nok Kathie]					X					
Racket-tailed Treepie <i>Crypsirina temia</i>	LC				X	15,000/ animal about 5 years ago				
Red Junglefowl <i>Gallus gallus</i>	LC		20-30 animals	3,000/ kg	X		X			

Species	IUCN Red List	CITES	Krala Peah		Veun Sean		Chom Thom		Thmei	
			Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)
Siamese fireback <i>Lophura diardi</i>	NT						X			
Green peafowl <i>Pavo muticus</i>	VU	II			2 animals	30,000/ tail feather	X	XX/ tail feather		
Chinese Francolin <i>Francolinus pintadeanus</i>	LC						X			
Scaly-breasted Partridge <i>Arborophila chloropus</i>	LC				X		X			
Lesser Whistling Duck <i>Dendrocygna javanica</i>	LC						X			
Garganey <i>Anas querquedula</i>	LC						X			
Great Hornbill <i>Buceros bicornis</i>	NT	I								
Oriental Pied Hornbill <i>Anthraceroceros albirostris</i>	LC	II			X					
Coucal sp. <i>Centropus</i> sp.	LC				20 animals					
Alexandrine parakeet. <i>Psittacula eupatria</i>	LC	II	400-500 animals	6,000/ animal	200 animals	1,000/ animal	X			
Spot-bellied Eagle Owl <i>Bubo nipalensis</i>	LC	II					X			
Thick-billed Green Pigeon <i>Treron curvirostra</i>	LC				100 animals	XX	X			
Dove sp. [LA - Nok Khaau]			30 animals	1,500/ animal	100 animals					
Lapwing sp. <i>Vanellus</i> sp. [LA - Nok Ta-waet]					X					
Kite sp. (?) [KH - Khleng]	LC (some)						X			
Hill Myna <i>Gracula religiosa</i>	LC	II	10 pairs	60,000/ chick	100 animals	250,000/ pair	3 pairs	150,000/ pair		
Common Myna <i>Acridotheres tristis</i>	LC		X							
Heron sp. A [LA - Nok Nyaang]	LC (some)				X					
Bulbul sp. [KH - Popech]	LC (some)				X					

Species	IUCN Red List	CITES	Krala Peah		Veun Sean		Chom Thom		Thmei	
			Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)
Python spp. [LA - Ngu Leuam]		II	2-3 animals	8,000/ kg	40 kg	15,000/ kg				
Reticulated Python <i>Python reticulatus</i>		II					30 kg	6,000/ kg	10 kg	skin only at 15,000/ 10 cm
Asiatic Rock Python <i>Python molurus</i>	NT	II							10 kg	skin only at 15,000/ 10 cm
Rat Snake sp. <i>Ptyas</i> sp. [LA - Ngu Sing Dong]					60 kg					
Common Rat Snake <i>Ptyas mucosus</i>		II					5 kg	5,000/ kg	X	
Indo-Chinese Rat Snake <i>Ptyas korros</i>			X	8,000/ kg			5 kg	5,000/ kg	X	
King Cobra <i>Ophiophagus hannah</i>		II	20 animals	40,000/ kg	30 kg	XX	10 kg	20,000/ kg		
Cobra sp.			30 animals							
Monocellate Cobra <i>Naja kaouthia</i>		II								
Indo-Chinese Spitting Cobra <i>Naja siamensis</i>		II								
Keeled Rat Snake <i>Ptyas carinatus</i>			X							
Puff-faced Water Snake							X		X	
Homalopsis <i>Homalopsis buccata</i>										
Bocourt's Water snake <i>Enhydrys bocourti</i>									X	
Indochinese Water Dragon <i>Physignathus cocincinus</i>					X		X			
Bengal Monitor <i>Varanus bengalensis</i>	I		60 animals	8,000/ kg	80kg	5,000/ kg	30 kg	6,000/ kg	X	6,000/ kg
Water Monitor <i>Varanus salvator</i>		II	X		X	4,000/ kg	5 kg	3,000/ kg	100 kg	2,500/ kg about 5 years ago
Elongated Tortoise <i>Indotestudo elongata</i>	EN	II	30-40 kg	6,000/ kg	80kg	10,000/ kg	10 kg	5,000/ kg	X	5,000/ kg
Asian Box Turtle <i>Cuora amboinensis</i>	VU	II	1-2 animals		X		20 kg	5,000/ kg	5kg	6,000/ kg

Species	IUCN Red List	CITES	Krala Peah		Veun Sean		Chom Thom		Thmei	
			Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)	Vol/yr	Price (in KHR)
Giant Asian Pond Turtle <i>Heosemys grandis</i>	VU	II	10 animals	3,000-4,000/ kg	X					
Malayan Snail-eating Turtle <i>Malayemys subtrijuga</i>	VU	II			X	4,000/ kg				
Yellow-headed Temple Turtle <i>Hieremys annandalii</i>	EN	II	30 kg	5,000/ kg	X	10,000/ kg				
Asian Leaf Turtle <i>Cyclemys dentata</i> complex	NT		X	8,000/ kg	X	10,000/ kg				
Black Marsh Turtle <i>Siebenrockiella crassicolis</i>	VU	II								
Turtle sp. [LA - Tao Kap Nyang]										
Asian Giant Softshell Turtle <i>Pelochelys cantorii</i>	EN	II			X		X		X	
Asiatic Softshell Turtle <i>Amyda cartilaginea</i>	VU	II	20 kg	10,000/ kg	X	5,000.00	20 kg	XX	5 kg	animals weighing 2-3.5 kg sells for 30,000/ kg; and those weighing more than 3.5 kg sells for 3,000/ kg

IUCN Red List Categories (2006):

EX: Extinct
EW: Extinct in the wild
CR: Critically endangered
EN: Endangered
VU: Vulnerable
NT: Near threatened
LC: Least concern
DD: Data deficient
NE: Not evaluated

CITES Appendices:

Appendix I - Lists species that are threatened with extinction; most international trade in these species is prohibited
Appendix II - Lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled
Appendix III - Lists species included at the request of a Party that already regulates trade in the species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation

Appendix 5: Volume and value of wildlife species observed by officials in trade in Stung Treng (October 2005).

Species	Product	Unit Cost (in KHR)	Volume (per annum)	Use	Source	Destination	Remarks
Bengal Loris <i>Nycticebus bengalensis</i>	Live & dried animal			Medicine	Siem Pang (mainly) , Se San, Thala Barivath & Siem Bok Districts	Stung Treng PC	
Pygmy Loris <i>Nycticebus coucang</i>	Dried animal			Medicine		Stung Treng PC, Phnom Penh	
Long-tailed Macaque <i>Macaca fascicularis</i>	Live					Stung Treng PC	
Douc langur <i>Pygathrix nemaeus</i>	Limbs, live animal	3,500/forearm & 7,000/thigh		Food		Stung Treng PC	
Malayan Pangolin <i>Manis javanica</i>	Live & dead animal	140,000/kg	300 kg	Medicine		Viet Nam	
Siamese Hare <i>Lepus peguensis</i>	Live & dead animal			Food		Stung Treng PC	
Giant Flying Squirrel <i>Petaurista</i> sp.	Live & dead animal						
Malayan Porcupine <i>Hystrix brachyura</i>	Meat, stomach			Food, Medicine		Stung Treng PC	
Hog Badger <i>Arctonyx collaris</i>	Fat/oils			Rubbing oil			
Malayan Sun Bear <i>Helarctos malayanus</i>	Live animal			Extract bile for medicine	Stung Treng/Kampong Cham border.	Phnom Penh	Two young animals confiscated
Wild Boar <i>Sus scrofa</i>	Meat	20,000/kg		Food	Siem Pang (mainly) , Se San, Thala Barivath & Siem Bok Districts	Stung Treng PC	
Red Muntjac <i>Muntiac muntjak</i>	Meat	10,000/kg		Food		Stung Treng PC	
Sambar <i>Cervus unicolor</i>	Meat, antlers	10,000/kg		Food		Stung Treng PC	Horns & antlers displayed by store-owners and claim them to be family heirloom, but will replace upon selling
Banteng <i>Bos javanicus</i>	Meat, horns	18,000/kg		Food		Stung Treng PC	
Gaur <i>Bos gaurus</i>	Meat, horns			Food		Stung Treng PC	
Hill Myna <i>Gracula religiosa</i>	Live chick	80,000/chick		Pet		Viet Nam	
Coucal sp.	Dried/smoked animal						

Species	Product	Unit Cost (in KHR)	Volume (per annum)	Use	Source	Destination	Remarks
Asiatic Rock Python <i>Python molurus</i>	Whole animal	30,000/kg for animals weighing 1.5-2 kg; and 15,000/kg for animals weighing 2.5 kg	400 kg	Meat for food, skin for tannery		Viet Nam	
Reticulated Python <i>Python reticulatus</i>	Whole animal	30,000/kg for animals weighing 1.5-2 kg; and 15,000/kg for animals weighing 2.5 kg		Meat for food, skin for tannery		Viet Nam	
King Cobra <i>Ophiophagus hannah</i>	Live animal	65,000-120,000/kg		Blood for medicine		Viet Nam & Phnom Penh	
Monocellated Cobra <i>Naja kaouthia</i>	Live animal	65,000/kg		Blood for medicine		Viet Nam	
Water Monitor <i>Varanus salvator</i>	Whole animal & meat	5,000/kg	1,000 kg	Food		Phnom Penh, Lao PDR & Viet Nam	
Bengal Monitor <i>Varanus bengalensis</i>	Whole animal & meat	5,000-18,000/kg		Food		Phnom Penh, Lao PDR & Viet Nam	
Yellow-headed Temple Turtle <i>Hieremys annandalii</i>	Whole animal, meat, plastron & carapace	6,000-8,000/kg	1,000 kg	Food		Viet Nam, Phnom Penh & Stung Treng	
Elongated Tortoise <i>Indotestudo elongata</i>	Whole animal, meat, plastron & carapace	6,000-8,000/kg		Food		Viet Nam	
Asiatic Softshell Turtle <i>Amyda cartilaginea</i> & other softshell turtle spp.	Whole animal	8,000/kg		Food		Viet Nam, Lao PDR & Phnom Penh	

Appendix 6: PFA wildlife enforcement data for Stung Treng (October 2005).

Date	Species	Quantity	Action(s) Taken
Jan. 15, 2005	King Cobra <i>Ophiophagus hannah</i>	1 individual, 1.5 kg	Items transferred to Wild Aid (Phnom Penh)
	Turtle species	5 individuals, 4kg	
	Malayan Sun Bear <i>Helarctos malayanus</i>	1 individual, 3 kg	
Apr. 30, 2005	Doac Langur <i>Pygathrix nemaeus</i>	3 individuals, 30 kg	Burned by Forest Administration
Jun. 16, 2005	Hill Myna <i>Gracula religiosa</i>	130 individuals	Items transferred to Wild Aid (Phnom Penh)
	King Cobra <i>Ophiophagus hannah</i>	5 individuals, 5.5 kg	
	Python spp. <i>Ptyas</i> sp.	2 individuals, 8.5 kg	
	Bengal Monitor <i>Varanus bengalensis</i>	9 individuals, 25 kg	
	Asiatic Softshell Turtle <i>Amyda cartilaginea</i>	1 individual, 4.5 kg	
	Asian turtle species	9 individuals, 19 kg	
	Elongated Tortoise <i>Indotestudo elongata</i>	17 individuals, 18 kg	
	East Asian Porcupine <i>Hystrix brachyura</i>	1 individual, 7.5 kg; and 3 stomachs	
Jun. 16, 2005	Asiatic Softshell Turtle <i>Amyda cartilaginea</i>	3 individuals, 4 kg	Fines totaling USD 1,119.15 (KHR 4,767,600). Items transferred to Wild Aid (Phnom Penh)
	Asian Box Turtles <i>Cuora amboinensis</i>	3 individuals, 2.5 kg	
	Asian turtle species	57 individuals, 45.1 kg	
	Elongated Tortoise <i>Indotestudo elongata</i>	51 individuals, 81.5 kg	
	Malayan Snail-eating Turtle <i>Malayemys subtrijuga</i>	1 individual, 4 kg	
	Asian Leaf Turtle <i>Cyclemys dentata complex</i>	3 individuals	
Jul. 06, 2005	Banteng <i>Bos javanicus</i>	Fresh meat, 64 kg	Burned by Forest Administration

Source: Stung Treng Forest Administration, 2005

Appendix 7: WWF wildlife enforcement data for Stung Treng (2004-05).

Date	Activity	Species	Quantity	Location	Action(s) Taken
Aug. 01, 2004	Trapping	Eld's Deer <i>Cervus eldii</i>	7	Iy Bu Village, Sesan	Release, Confiscate
Aug. 01, 2004	Hunting		1	Kbal Ormeas, Sesan	No action taken, Confiscate gun
Dec. 1, 2004	Hunting		2	Prey Chas, Trapeang Phy	Confiscate, Contract signed
Dec. 17-31, 2004	Hunting	Primate	13	Kunlorn Yeaysaem, Prey Krala Puss	Confiscate, Contract signed
Feb. 1, 2004	Hunting	Banteng <i>Bos javanicus</i>	1	Cheung Prey Bus Pa, Thala Barivat	Confiscate
Feb. 1, 2004	Trapping	Pigeon	2	Khnach Pa Nong, Thala Barivat	Confiscate
Jun. 1, 2004	Trapping	Elephant <i>Elephas maximus</i>	1	Kunlong Buspa Nong, Thala Barivat	Release, Confiscate
May 1, 2004	Trapping	Pigeon		Khnach Prey Trigel	No action taken, Confiscate
Sep. 19, 2004	Hunting	Red Muntjac <i>Muntiacus muntjak</i>	3	Sre Snok, Sre Puok	Confiscate
Sep. 19, 2004	Hunting	Wild Pig <i>Sus scrofa</i>		Sre Snok, Sre Puok	Confiscate
Apr. 17-30, 2005	Hunting	Banteng <i>Bos javanicus</i>	1	Anlong Bram O Lvea, Sesan	Confiscate, No action taken
Jan. 30, 2005	Trapping	Lesser Adjutant <i>Leptoptilus javanicus</i>	1	Trapeang Chhmie, Siem Pang	Release.
Jun. 16, 2005	Hunting	Elongated Tortoise <i>Indotestudo elongata</i>	51 = 81.50 Kg	Prek Village, Thala Borivath	Confiscate
Jun. 16, 2005	Hunting	Asian Box Turtle <i>Cuora amboinensis</i>	03 = 2.50 Kg	Prek Village, Thala Borivath	Confiscate
Jun. 16, 2005	Hunting	Giant Asian Turtle	57 = 45.10 Kg	Prek Village, Thala Borivath	Confiscate
Jun. 16, 2005	Hunting	Malayan Snail-eating Turtle <i>Malayemys subtrijuga</i>	01 = 04 Kg	Prek Village, Thala Borivath	Confiscate
Jun. 16, 2005	Hunting	Asiatic Softshell Turtle <i>Amyda cartilaginea</i>	03 = 04 Kg	Prek Village, Thala Borivath	Confiscate
Jun. 16, 2005	Hunting	King Cobra <i>Ophiophagus hannah</i>	2 = 3.40 Kg	Prek Village, Thala Borivath	Confiscate

Source: WWF Cambodia, 2005

Appendix 8: Wildlife monitoring at Stung Treng market (October 2005).

Key:
USD 1 KHR 3,260 (Oct. 2005)

Species	Date and Time									
	Oct. 8 0630-0840	Oct. 8 1045-1200	Oct. 8 1500-1630	Oct. 10 1630-1650	Oct. 11 0700-0900	Oct. 12 0520-0640	Oct. 12 0630- 0830	Oct. 12 1700-1720	Oct. 14 1710-1800	Oct. 16 1740-1800
Pygmy Lorises <i>Nycticebus pygmaeus</i>		3 dried individuals at USD 5.87/individual	9 dried individuals	No fresh wildlife products for sale. Only c. 30 vendors, few fish and meat products			4 dried individuals	8 dried individuals		
Lesser Giant Flying Squirrel <i>Petaurista elegans</i>					2 dried individuals					
East Asian Porcupine <i>Hystrix brachyura</i>		5 dried stomachs at c. USD 6/stomach	5 dried stomachs; 1 quill				1 dried stomach			
Bear sp.			26 claws at USD 1.17/claw							
Wild dog sp.			2 teeth							
Tiger <i>Panthera tigris</i>			185 claws; 1 tooth							
Asian Elephant <i>Elephas maximus</i>			300 hairs at USD 0.83/hair; 34 bone fragments at USD 2.35/fragment							
Wild Boar <i>Sus scrofa</i>	indeterminate amount of smoked meat (strips)	2 legs & 5-6 kg meat	175 tusk pieces at USD 0.70/piece						indeterminate amount of smoked meat (strips)	
Deer sp.			3 antler fragments							

Species	Date and Time									
	Oct. 8 0630-0840	Oct. 8 1045-1200	Oct. 8 1500-1630	Oct. 10 1630-1650	Oct. 11 0700-0900	Oct. 12 0520-0640	Oct. 12 0630- 0830	Oct. 12 1700-1720	Oct. 14 1710-1800	Oct. 16 1740-1800
Red Muntjac <i>Muntiacus muntjak</i>			1 pair antlers at USD 9.39/ pair							
Hog Deer <i>Axis porcinus</i>			1 pair antlers at USD 9.39/ pair							
Sambar <i>Cervus unicolor</i>		3-4 kg jerky	1 pair antlers at USD 281.69/ pair						2 kg fresh meat	5-6 kg fresh meat
Eld's Deer <i>Cervus eldii</i>			1 pair antlers at USD 234.74/ pair							
Lesser Mouse Deer <i>Tragulus javanicus</i>	1 dead individual at USD 3.52/ animal									
Banteng <i>Bos javanicus</i>			2 pairs horns USD 37.56/ pair							
Gaur <i>Bos gaurus</i>			2 pairs horns USD 65.73/ pair							
Common Moorhen <i>Gallinula chloropus</i>	1 dead individual at USD 0.70									
Indo-chinese Water Dragon <i>Physignathus cocincinus</i>	1 live individual at USD 0.47									
Bengal Monitor <i>Varanus bengalensis</i>		1 live individual							3 live individuals	
Water Monitor lizard <i>Varanus salvator</i>	1 individual at USD 3.52/ individual							2 individuals at USD 3.52/ individual		
Softshell turtle <i>Amyda cartilaginea(?)</i>						1 dead individual	1 dead individual			

Note:

Oct. 8, 2005 (1500-1630) includes data from jewellery stores located at the market area

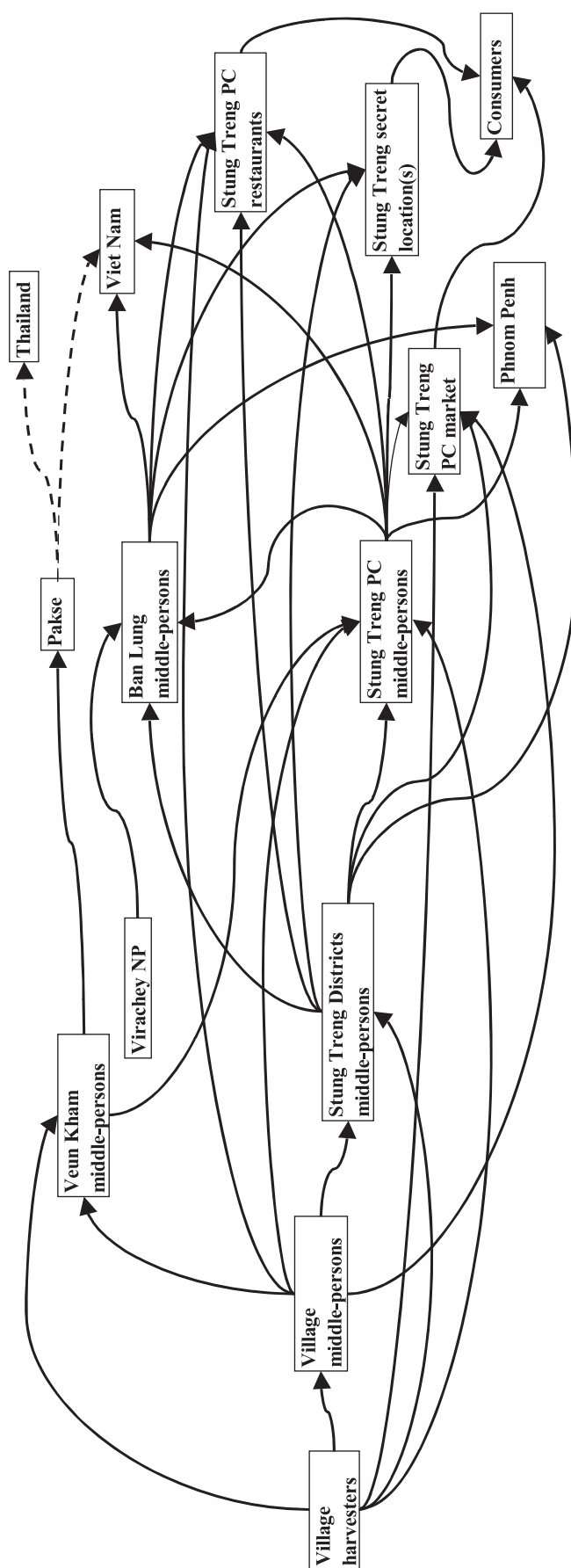
Appendix 9: Restaurants trading in wildlife in (and to/from) Stung Treng Province (October 2005).

Key:

USD 1 KHR 4,260 (Oct. 2005)

Date	Period	Restaurant ID Number	Remarks
Oct. 6, 2005	Lunch	1	Staff reported that wild meat dishes are frequently served.
Oct. 6, 2005	Dinner	2	Staff reported that meat dishes from sambar, wild boar, and Bengal Monitor, are frequently served.
Oct. 7, 2005	Breakfast	3	A middle-aged woman (from a nearby village?) approached patrons at the restaurant and offered six dried Malayan Porcupine stomachs (with contents) for an average of USD 6 per unit.
Oct. 7, 2005	Lunch	3	Staff reported that wild meat dishes are frequently served.
Oct. 8, 2005	Lunch	4	Meat dishes from Sambar and Bengal monitor available.
Oct. 11, 2005	Dinner	3	Only Red Muntjac meat available. The staff reported that the meat arrived at the restaurant in the afternoon.
Oct. 12, 2005	Lunch	5	No wild meat available during visit, but may be ordered in advance. Nevertheless, several bottles of rice wine containing snakes, geckos, scorpions, and herbs were on display. Products were made in Viet Nam.
Oct. 12, 2005	Lunch	3	Meat dishes from Red Muntjac and wild boar available.
Oct. 12, 2005	Dinner	2	Meat dishes from Sambar, Red Muntjac, wild boar, Bengal Monitor, and softshell turtle sp. available.
Oct. 13, 2005	Lunch	3	Meat dishes from Red Muntjac, wild boar and Bengal Monitor available.
Oct. 13, 2005	Dinner	2	Meat dishes from Sambar, Red Muntjac, wild boar available.
Oct. 14, 2005	Lunch	3	Meat dishes from Red Muntjac, wild boar and Bengal Monitor available.
Oct. 14, 2005	Dinner	1	Meat dishes from Sambar and Red Muntjac available.
Oct. 15, 2005	Dinner	2	Meat dishes from Red Muntjac, wild boar and Bengal Monitor available.
Oct. 16, 2005	Breakfast	4	About 5 kg fresh muntjac and wild boar meat (in black plastic bag) brought in by a young man (in mid twenties) on motorcycle at 0702h, and delivered straight to the kitchen. Species confirmed by staff.
Oct. 16, 2005	Dinner	6	Restaurant worker reported that about 50 kg of Sambar is delivered to the restaurant every few days. Most of the meat prepared into jerky, apparently popular 'souvenirs' local among visitors to Stung Treng, and as 'gifts' for Stung Treng residents to bring along on outstation trips.
Oct. 17, 2005	Breakfast	4	About 20 kg fresh Sambar and wild boar meat brought in by the same young man (of Oct. 16th), and delivered in a similar manner. Species confirmed by staff.
Oct. 17, 2005	Dinner	2	Meat dishes from Red Muntjac, wild boar and Bengal Monitor available.
Oct. 18, 2005	Lunch	7	No wildlife served at time of visit, but several trophies on display. Trophies included horns/antlers of Eld's Deer, Banteng, Sambar, Red Muntjac. Two street-peddlers offered deep fried tarantulas that had been de-fanged.

Appendix 10: Flow of wildlife resources from Stung Treng demonstration site (Krala Peah, Veun Sean, Chom Thom & Thmei).



Note: dashed lines indicate possible flow

Appendix 11: Wild animals and plants recorded in trade in Stung Treng (October 2005).

Key to Tables: USD=price per unit (in USD); ATT=Attapu; ST=Stung Treng. IUCN status: E=Endangered; V=Vulnerable; LR=nt-Lower Risk/near threatened. Blank cells indicate the data (e.g. price) was not obtained. **Survey sites. LAO PDR. Attapu Province:** SD-Sanamxay District market; XM-Xaysettha town market; ATT-Attapu town market; BT-Attapu bus terminal. **Champasak Province:** KM-Khinak Market; KF-Khonphaphaeng Falls. **CAMBODIA. VK-Veunkham border crossing. ST-Stung Treng town. FISH VOLUMES** indicate the number of individuals observed or was only recorded as "present" *Gift at an official dinner 30-Sep-05. IUCN Red List or CITES (Appendix I or II) listed species are shaded grey.

No.	Scientific name	Common name (English)	Phonetic name (Lao PDR)	Phonetic name (Cambodia)	IUCN status	CITES App.	Use	Unit	USD		STUNG TRENG MKT 8-12 Oct 2005						ST		VK
									ATT	ST	8-Oct: 1500-1630	10-Oct: 1630-1650	11-Oct: 0700-900	12-Oct: 0630-1700	12-Oct: 1700-1720	Misc obs	Wholesale wood outlet (12-Oct)		
MAMMALS																			
1	<i>Nycticebus pygmaeus</i>	Pygmy Slow-Loris		Ro-nee-pleung	VU	II	Medicinal	Skin					9			4	8		
2	<i>Macaca fascicularis/mulatta</i>	Long-tailed/Rhesus Macaque			LR/Nt	II	Ornamental	Live individual											
3	<i>Manis</i> sp.	Pangolin sp.			LR/Nt	II	Ornamental	Skin	n/a									1	
4	<i>Lepus peguensis</i>	Siamese Hare			LR/LC		Food	Live individual											
5	<i>Callosciurus finlaysoni</i>	Variable Squirrel			LR/LC		Food	Dead individual											
6	<i>Petaurista elegans</i>	Lesser Giant Flying Squirrel					Food	Skin											
7	<i>Hylopetes phayrei</i>	Phayre's Flying Squirrel					Food	Dead individual	0.50										
8	<i>Hystrix brachyura</i>	East Asian Porcupine			VU		Ornamental	Quill					1						
8	<i>Hystrix brachyura</i>	East Asian Porcupine			VU		Medicinal	Stomach (dried)					5		1				
9	<i>Ursus</i> sp.	Bear sp.			VU	I	Ornamental	Claw	1.25				26						
10	<i>Canis?</i> sp.	Canine sp.					Ornamental	Tooth					2						
11	<i>Paradoxurus hermaphrodites</i>	Common Palm Civet			LR/LC	III	Food	Dead individual											
12	<i>Panthera tigris</i>	Tiger			EN	I	Ornamental	Claw					2						
12	<i>Panthera tigris</i>	Tiger			EN	I	Ornamental	Tooth					1						
13	<i>Elephas maximas</i>	Asian Elephant			EN	I	Ornamental	Single hair	0.88				300						
13	<i>Elephas maximas</i>	Asian Elephant			EN	I	Ornamental	Bone fragment (uncarved)	2.50				34						
14	<i>Panthera tigris</i>	Tiger			EN	I	Ornamental	Claw					183						
15	<i>Sus scrofa</i>	Eurasian Wild Pig					Food	Per kg meat	5.00										
15	<i>Sus scrofa</i>	Eurasian Wild Pig					Food	Smoked (strips)		x									
15	<i>Sus scrofa</i>	Eurasian Wild Pig					Ornamental	Tusk					175						
16	<i>Tragulus javanicus</i>	Lesser Oriental Chevrotain		Pjoh/Kran nyai	LR/LC		Food	Dead individual				1							
17	<i>Muntiacus muntjak</i>	Red Muntjac			LR/LC		Ornamental	Antlers (pair)	n/a				1						
18	<i>Cervus porcinus</i>	Hog Deer					Ornamental	Antlers (pair)	10.00				1						
19	<i>Cervus unicolor</i>	Sambar	Khouang Noi		LR/LC		Food	Per kg meat	3.30										
19	<i>Cervus unicolor</i>	Sambar	Khouang Noi		LR/LC		Ornamental	Antlers (pair)					1						2
20	<i>Cervus eldii</i>	Eld's Deer			VU	I	Ornamental	Antlers (pair)	300.00				1				3		
21		Deer sp.					Ornamental	Antlers (fragments)	250.00				3				1		
venders, few fish and meat products for sale. Only ~30																			

22	<i>Bos javanicus</i>	Banteng			EN		Ornamental	Horns (pair)	40.00	2	1
23	<i>Bos gaurus</i>	Gaur			VU	I	Ornamental	Horns (pair)	70.00	1	1
24	<i>Capricornis sumatraensis</i>	Southern Serow			VU	I	Ornamental	Antlers (pair)			
BIRDS											
25	<i>Francolinus pintadeanus</i>	Chinese Francolin			LC		Ornamental	Live individual			
26	<i>Pavo muticus</i>	Green Peafowl			VU	II	Ornamental	Feathers			x
27	<i>Dendrocygna javanica</i>	Lesser Whistling Duck			LC		Ornamental	Live individual			
28	<i>Megalaima lineata</i>	Lineated Barbet			LC		Ornamental	Live individual			
29	<i>Buceros bicornis</i>	Great Hornbill			Nt	I	Ornamental	Casque			
30	<i>Psittacula roseata</i>	Blossom-headed Parakeet			LC	II	Ornamental	Live individual			
31	<i>Psittacula alexandri</i>	Red-breasted Parakeet			LC	II	Ornamental	Live individual			1
32	<i>Columba livia</i>	Rock Pigeon					Ornamental	Live individual			
33	<i>Streptopelia orientalis</i>	Oriental Turtle Dove			LC		Ornamental	Live individual			
34	<i>Streptopelia chinensis</i>	Spotted Dove			LC		Ornamental	Live individual			
35	<i>Gallinula chloropus</i>	Common Moorhen	Mouan		LC		Food	Dead individual	0.75	1	
36	<i>Gallinago</i> sp.	Snipe			LC		Food	Live individual			
37	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle			LC	II	Ornamental	Live individual	7.00		
38	<i>Accipiter</i> sp.	Accipiter sp.			LC (some)	II	Food	Dead individual	0.30		
39	<i>Ardeola bacchus/speciosa</i>	Chinese/Javan Pond Heron			LC		Food	Dead individual	0.50		
40	<i>Urocyssa erythrorhyncha</i>	Red-billed Blue Magpie			LC		Ornamental	Live individual			
41	<i>Dicrurus hottentottus</i>	Spangled Drongo			LC		Food	Dead individual	0.30		
42	<i>Sturnus nigricollis</i>	Black-collared Starling			LC		Ornamental	Live individual			1
43	<i>Acridotheres tristis</i>	Common Myna			LC		Ornamental	Live individual			
44	<i>Gracula religiosa</i>	Hill Myna			LC	II	Ornamental	Live individual			
FISH											
45	<i>Chitala blanci</i>		Krai		LR/Nt		Food	Live/dead individual	2.50	8	35
46	<i>Chitala ornata</i>		Krai				Food	Live/dead individual	0.25	x	15
47	<i>Notopterus notopterus</i>		Tong				Food	Per kg	6.00		
48	<i>Chitala lopis</i>						Food	Live/dead individual		x	
49	<i>Anguilla marmorata</i>						Food	Live/dead individual			
50	<i>Paralabaca typus</i>		Tep				Food	Live/dead individual			
51	<i>Probarbus jullieni</i>	Jullien's Golden Carp	Uun		EN	I	Food	Live/dead individual		x	1
52	<i>Puntipolites falcifer</i>		Sakang	Ta-pun			Food	Live/dead individual	0.13	x	270
53	<i>Puntipolites/Hypsibarbus</i>		Paak				Food	Live/dead individual	0.20	x	100
54	<i>Hypsibarbus malcomi</i>						Food	Live/dead individual			135
55	<i>Poropuntius laeensis</i>		Xei				Food	Live/dead individual			27

[illegible]

98	<i>Varanus salvator</i>	Water Monitor lizard					Food	Live/dead individual	3.5-4.0	3.75	1								
99	<i>Cuora amboinensis</i>	Asian Box Turtle			VU	II	Food	Live individual	0.50										
100	<i>Heosemys grandis</i>	Giant Asian Pond Turtle			VU	II	Ornamental	Carapace											
101	<i>Indotestudo elongata</i>	Elongated Tortoise			EN	II	Ornamental	Carapace											
102	<i>Trionyx/Amysda</i> sp.	Softshell turtle sp.			I/II												1		
AMPHIBIANS																			
103	<i>Hoplobatrachus rugulosus</i>	Field Frog	Kop		LC		Food	Per kg (live)	1.00										
103	<i>Hoplobatrachus rugulosus</i>	Field Frog			LC		Food	Bunch (~20, dried)	0.20										
104	frog sp. (skinned)			Khong khaip kop			Food	Dead individual (skinned)		0.03	160			50	70				
INSECTS																			
105	?	Crickets-large					Food	Per cup (live)								500+			
CRUSTACEANS																			
106	?	Crab		Kdam			Food	Per bag (30-50 crabs)	0.10	0.13	30					220			
107	<i>Macrobrachium rosenbergii</i>	Giant river prawn		Bung khong			Food	Per 100 g		1.75	3								
108	?	Shrimp					Food	Live											
109	?	Watersnail-Type 1 (small)					Food	Per cup	0.10										
110	?	Watersnail-Type 2 (large)					Food	Per cup	0.10		300					1000+			
111	?	Watersnail-Type 3 (orange)					Food	Per kg		0.25						80			
112	?	Freshwater mussel		Krom			Food	Live individual		0.03	5								
TIMBER PRODUCTS																			
113	<i>Dalbergia</i> sp.	Rosewood		Neang Noun	EN/VU		Ornamental	Carving		70-1500	25						x		
114	<i>D. bariensis</i>	Burmese Rosewood			EN		Ornamental			(in above)							x		
115	<i>Azelia xylocarpa</i>	Azelia			EN		Ornamental			(in above)							x		
NON-TIMBER PRODUCTS																			
116	<i>Hibiscus?</i>	Flower-Type 1					Food	Fresh (~10)	0.05										
117	?	Flower-Type 2		Dok Kae			Food	Fresh (~10)	0.05									x	
118	?	Flower-Type 3 (lotus)					Food	Fresh (4-5)					x	x					
119	?	Seed-Type 1					Food	Seedpod (fresh)	0.20										
120	?	Seed-Type 2		Mak ka-tin			Food	Fresh (~12)	0.05								x		
121	?	Seed-Type 3					Food	?	0.05										
122	?	Seed-Type 4		Mak Bok			Food	Fresh bunch	0.05										
123	?	Seed-Type 5 (lotus)		Mak Mua			Food	Seedpod (fresh, 2)	0.10				x						
124	?	Seed-Type 6		Mak Jong*			Food	Per kg	3.00										
				Buak Xin															
125	?	Tree bark-Type 1 (red)		Cam			Medicinal	Fresh strips (~6-7)	0.05							10			
126	?	Tree bark-Type 2 (grey)		Xi Xiet			Medicinal	Fresh strips (~2)	0.05										
127	?	Tree bark-Type 3 (rolled)		Pua ham au			Medicinal	Fresh strips (~14)	0.05							10			
128	?	Tree bark-Type 4 (chips)					Medicinal	Dried (packet)	0.30	0.38	44					76	102		
129	?	Tree bark-type 5 (other)		Mua			Medicinal	Fresh strips (~2)	0.05										
130	?	Tree bark-Type 6 (red strips)					Medicinal	Dried strips (~2)	0.05										
131	?	Dipterocarp resin sticks		Chun lok/priel			Light source	Leaf rolls (7-8)	0.20	0.15	30								
132	?	Root-Type 1 (ginger)					Food	Fresh (per piece)	0.10										
133	?	Root-Type 2 (white, fleshy)		Mak Mat			Food	Fresh (~5)	0.05										

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Appendix 12: Sale price (USD/kg) and market demand for fish in Stung Treng (May-June 2006; 1USD = 4,080KHR).

Scientific names	Khmer name	Lao name	Market demand	Selling prices in Thabakorivat district				Primary trade destination	Sale price at trade destination
				Koh Sneng	Chham Thom	Krala Peas	Koh Langor		
<i>Kryptopterus</i> spp. <i>Micronema</i> spp.	<i>trey kes</i>	<i>pa nang (>200g)</i>	High	1.75 - 2.50		2.50 - 3.75	2.75	Veun Kham	3.00
		<i>pa nang (<200g)</i>			0.63	0.25		Stung Treng PC	3.00
<i>Hemibagrus</i> spp.	<i>trey ka shaa</i>	<i>pa kung (>3kg)</i>	High	2.00 - 2.75	1.75	2.25 - 2.75	2.75	Veun Kham	2.00 - 2.88
	<i>trey ka shaa</i>	<i>pa kung (2-3kg)</i>		1.25 - 2.00	1.25	1.25 - 2.00	1.88	Veun Kham	1.50 - 2.25
	<i>trey ka shaa</i>	<i>pa kung (1-2kg)</i>		1.00 - 1.25		0.75	1.50	Veun Kham	1.00 - 1.50
	<i>pa si ie</i>	<i>pa si ie (>1kg)</i>		5.00 - 7.50			1.25 - 1.50	Stung Treng PC	10.00 (Nov-Dec)
<i>Mekongina erythrospila</i>	<i>pa si ie</i>	<i>pa si ie (<1kg)</i>	High	3.75				Stung Treng PC	2.50
<i>Pangasius sanitwongsei</i>	<i>trey po pruy</i>	<i>pa leum</i>	High	2.50 - 5.00				Veun Kham	
<i>Bagarius</i> spp.	<i>trey khae</i>	<i>pa khae</i>	High	0.63 - 1.00		2.00	1.50	Veun Kham	1.75
<i>Banghana behri</i>	<i>pa va</i>	<i>pa va (>1kg)</i>	Medium	0.25 - 1.00				Veun Kham	
<i>Channa striata</i>	<i>trey rho</i>	<i>pa khor</i>	Medium			0.75		Veun Kham	1.50
<i>Cyclocheilichthys enoplus</i>	-	<i>pa jok</i>	Medium	1.25 - 1.50				Veun Kham	
<i>Hemibagrus nemurus</i>	<i>trey schlang</i>	<i>pa kot</i>	Medium	1.00				Veun Kham	
<i>Belodontichthys dinema</i>	<i>trey khlang hay</i>	<i>pa khop</i>	Medium	1.00				Veun Kham	
<i>Chitala lopis</i> , <i>C.ornata</i> , <i>Notopterus notopterus</i>	<i>trey kray</i>	<i>pa tong (small)</i>	Medium	0.75 - 1.00				Veun Kham	
<i>Cirrhinus microlepis</i>	<i>trey breul</i>	<i>pa phorn</i>	Medium		0.63			Veun Kham	0.88
<i>Morulus chrysophekadion</i>	<i>trey ka ay</i>	<i>pa phia</i>	Low	0.25 - 0.75	0.25 - 0.63	0.38 - 0.60	0.25 - 0.75	Local trade and Veun Kham	0.38 - 1.00
<i>Hysibarbus</i> spp.	<i>trey chhipin</i>	<i>pa paak</i>	Low	0.25		0.60		Local trade and Veun Kham	0.38 - 0.50
<i>Mystus filamentus</i>	<i>trey taniel</i>	<i>pa kha thon</i>	Low	1.00				Veun Kham	

<i>Henicorhynchus siamensis</i>	<i>trey riel</i>	<i>pa soi</i>	Low	0.15 - 0.20					Veun Kham	0.15
<i>Paralaubuca harmandi</i>	<i>trey sleuck reussey</i>	<i>pa teb</i>	Low						Stung Treng PC	0.15
Mixed species	<i>trey ruam</i>	<i>pa luam</i>	Low	0.25 - 1.50		1.25	1.50		Local trade and Veun Kham	1.25 - 1.50
									Stung Treng PC	0.50 - 1.50

Appendix 13: Processed fish traded in Stung Treng (May-June 2006; 1USD = 4,080KHR).						
English name	Khmer name	Lao name	Locations	Price (USD/kg)	Trade destinations	Comments
Fermented fish	<i>pra hop</i>	<i>pa dek</i>	Stung Treng market	0.75	Stung Treng PC	
			Camp 1, near Chham Thom	0.75	Stung Treng PC	Reported to make 7 pots (35L each) per yr, consume 2 pots and sell the others in the dry season.
			Chham Thom	0.50	Local trade	Village fish trade sells when a lot of fish.
			Krala Peas	5.00 /20kg	Local trade, Veun Kham	Slightly higher price in Veun Kham than own village.
			Koh Langor	5.00 / 20kg	Veun Kham	
Salted fish	<i>pra ok, trey ju</i>	<i>pa khem, pa som, pa jao</i>	Stung Treng market	2.50	Stung Treng PC	
			Chham Thom	0.75	Local trade	Village fish trade sells when a lot of fish.
			Krala Peas	10.00 /20kg	Local trade, Veun Kham	Slightly higher price in Veun Kham than own village.
			Koh Langor	6.00 /20kg	Veun Kham	
			Camp 6, Koh Khon Kham	4.00 /20kg	Sell at camp or at Veun Kham	
Dried fish	<i>trey nyiet</i>	<i>pa heng</i>	Stung Treng boat landing	11.25 /10kg	Stung Treng PC	
			Stung Treng market	2.50 - 5.00	Stung Treng PC	Higher price for larger fish. 10kg fresh fish= 1kg dried fish
			Koh Sneng	1.00-1.25	Village trader buys from villagers to sell at Veun Kham	c.10 households make in the dry season for trade.
			Camp 2, Koh Horn Hang	1.25	Local trade	
			Koh Langor	1.00-1.25	Veun Kham	Dry season only when prices are higher.
		<i>pa soi heng</i>	Veun Kham	0.70 / tray	Local and distant trade	Only recently started selling small dried fish.
Smoked fish	<i>trey jaa</i>	<i>pa yang</i>	Camp 5, Koh Khan Keo	1.25	Village trader comes to buy at camp and sells to Veun Kham	Dry season only.
			Krala Peas	1.50-3.50	Local trade, Veun Kham	Slightly higher price in Veun Kham than own village. Higher price for scale-less fish.
			Camp 6, Koh Khon Kham	1.50	Sell at camp or at Veun Kham	

Appendix 14: Wildlife traded in Stung Treng (May-June 2006; USD/kg unless stated otherwise; 1USD = 4,080KHR).							
Animal type	English name	Lao name	Scientific name	Use	Location	Price (USD/kg)	Trade destinations
Reptiles	Rat snake	<i>ngu sing</i>	<i>Ptyas korros</i>	Food	Koh Langor	4.00 (large animal)	Veun Kham
						1.00 (small animal)	
						1.00	
	King Cobra	<i>ngua to ang</i>	<i>Ophiophagus hannah</i>	Food / Medicine	Krala Peas	12.50 (>2kg)	Stung Treng PC, less to Veun Kham
						5.00 - 7.50 (<2kg)	
					Prum Krom	7.35 (>3kg)	Veun Kham
						12.15 (<3kg)	
					Veun Kham	12.5	Pakse
	Python	<i>ngua luam</i>	<i>Python</i> sp.	Food	Krala Peas	2.00	Stung Treng PC, less to Veun Kham
	Bengal Monitor	<i>len</i>	<i>Varanus salvator</i>	Food	Koh Sneng	3.75	-
	Water Monitor	<i>hia</i>	<i>Varanus bengalensis</i>	Food	Veun Kham	2.5	Pakse
						3.75	
	Monitor Lizard	<i>len / hia</i>	<i>Varanus salvator / V. bengalensis</i>	Food	Prum Krom	2.50 - 3.00	Stung Treng PC, Veun Kham, Prum Krom
	Hardshell turtles	<i>taw</i>	-	Food	Krala Peas	2.00	Stung Treng PC, less to Veun Kham
					Prum Krom	4.00	Veun Kham
	Softshell turtles	<i>taw phet</i>	<i>Indotestudo elongata</i>	Food	Prum Krom	2.50	Prum Krom village-trader sells to Veun Kham
					Krala Peas	3.75 (>3kg)	Stung Treng PC, less to Veun Kham
						6.25 (<3kg)	

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Red Muntjac	<i>faan</i>	<i>Muntiacus muntjak</i>	Food	Chham Thom	0.75 - 1.00	Meat sold in Chham Thom and Koh Sneng	
				Prum Krom	1.25-2.00	Veun Kham	
Wild Boar	<i>muu paa</i>	<i>Sus scrofa</i>	Food	Koh Sneng	1.25	Villagers from Chham Thom take to Koh Sneng to sell.	
				Chham Thom	0.75 - 1.00	Meat sold in Chham Thom and Koh Sneng	
Pygmy Slow Loris	<i>ling lom</i>	<i>Nycticebus pygmaeus</i>	Medicine	Prum Krom	2.5	Veun Kham	
				Stung Treng PC	10.00	Stung Treng PC residents	
				Stung Treng PC	-	Vietnam	Consumption of brain of live animal. Company had license from Ministry of Agriculture to collect (DoE director).
Longtailed Macaque	<i>ling hang nyaaw</i>	<i>Macaca fascicularis</i>	Unknown	Koh Sneng	75.00 / animal	-	Still being collected, usually by people from Stung Treng PC in areas near the road, cutting many trees to catch. Recent increase in price (see Box 16).
				Prum Krom	-	-	Owner of two pet macaques refused to sell when offered 15USD. She obtained the macaques by requesting someone in her own village to collect for her.
Tiger	<i>sua khong</i>	<i>Panthera tigris</i>	-		2,000-3,000 for tiger bones		DoE report - have not seen since 1999.
Hill Myna	<i>nok salikaa</i>	<i>Gracula religiosa</i>	Pet	Stung Treng PC	5.00 / animal	Laos, Vietnam offers higher price	DoE report.
Birds							

Appendix 15: NTFPs traded in Stung Treng (May-June 2006; USD/kg unless stated otherwise; 1USD = 4,080KHR).										
Resource type	English name	Khmer name	Lao name	Scientific name	Use	Location	Source location	Price (USD)	Trade destinations	Comments
Resin	Soft resin (yang oil)	jor tuk	nam man yang	Dipterocarpus spp. (mainly D. alatus)	Boat repair, weather-proofing wood. A mixture of hard and soft resin with some fibre is said to make the best sealant. Soft resin oil also used to make flammable torches.	Stung Treng boat landing	Siam Pang, Thalaborivat and Siam Bok districts	6.75 - 7.00 /30L	Stung Treng refineries	Price fluctuates between 4-7.35USD/30L over years (less than other locations, eg. 10USD/30L in Mondikiri province). Resin priced according to quality (low price for very low quality). Three refineries in Stung Treng town (see Appendix 19).
						Stung Treng refineries		2.00 - 7.50 /30L	Kompong Cham province	
						Stung Treng trader		7.50 /30L	Stung Treng PC	
						Chham Thom	Near O'Talas stream, 5-10km away	6.25 - 7.50 /30L	Koh Sneng commune, Stung Treng PC	Only 2HH collect as too far away. Trader first came from town S'ya. Now less resin than before company cut down trees so less villagers collect now. Makes flammable torches and sells locally for 0.10USD each.
	Damar resin (hard resin)	jor jong	kisiti, khi khwang	Parashorea spp.	Boat repair	Koh Sneng	Near O'Talas stream	5.00 /30L	Koh Sneng	Used to sell to village trader for 4USD/30L but people stopped selling to her with better price in town in 2006. Price higher in dry season as less available then.
								6.25- 7.50 /30L	Stung Treng PC	
						Prum Krom	-	-	Stung Treng PC	5'ya company bought all the resin trees and cut them down so there are few left.
						Stung Treng refineries	Siam Pang, Thalaborivat and Siam Bok districts	0.21 /kg	Kompong Cham province	
						Stung Treng trader		0.30 /kg	Stung Treng PC	
						Chham Thom	2-3km away	0.38 /kg	Stung Treng PC	Same buyer as for soft resin. One village trader buys from other villagers.

Mushrooms	Tree mushroom	<i>phset so khrom</i>	<i>het daeng</i>	Grows on the tree <i>Xylia xylocarpa</i>	Medicine	Chham Thom	Area with cave walk away and hills 2hrs (Phnum Kamboun north to Phnum Spung)	0.38 /kg (2005 price)	Stung Treng PC	Many villagers collected opportunistically in 2004-05, c.5HH collected regularly, could collect 5kg/day. Started 2ya when traders came looking to buy. Now do not collect as traders stopped coming when spouse died.
						Krala Peas	-	0.50 /kg	Stung Treng PC	Trader first came in 2004 looking to buy the mushrooms but only a small amount available (collect 1kg/day). The mushroom trader suggested cutting the trees as the wood is valuable, the villagers cut the trees but left it in the forest in the dry season and it was all burnt before being sold.
						Prum Krom	-	-	Stung Treng PC	In 2003 a trader from Stung Treng PC came to buy, only a few HH collected. All sold now, none left.
	Ball mushroom	<i>phset phor</i>	<i>het phor</i>	<i>Astraeus hygrometricus</i>	Food	Krala Peas	-	2.13 - 2.50 /kg	Veun Kham	Lao traders came from Veun Kham in 2003 advertising that they wanted to buy the mushrooms. Only c.10HH in the village collect, more people from nearby island villages (Koh Chatel Toit, Koh Chatel Thom) collect because they have less land and do less agriculture. Never sold in Stung Treng PC, traders from town also take to Veun Kham to sell.
	Mushroom	<i>phset ka ngok</i>	<i>het la ngo</i>		Food	Chham Thom	-	0.50 /kg	Veun Kham	c.3 traders came from Veun Kham in 2004-05 only. In 2005 most HH collected these mushrooms for sale and for food.
	Other mushrooms	<i>phset rongier</i>		-	Food	Chham Thom	-	0.38 /kg	Veun Kham	
				-	Food	Krala Peas	-	0.13 / c.100g	Krala Peas	Sell by small handful.
	Large rattan	<i>pdau dam boring</i>	<i>wai na bong</i>	<i>Calamus rudentum</i>	Furniture	Stung Treng PC	Thalaborivat district	-	Vietnam	Unidentified owner, brought directly across river from Thalaborivat. Only saw lower quality rattan (3-5cm diameter), stored for 1 month at a few houses next to the river (c.2km south of main boat landing), high quality rattan not stored.
	Rattan and bamboo									

**Fruit, seeds,
flowers etc**

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Appendix 16: NTFP traders in Stung Treng (May-June 2006; 1USD = 4,080KHR).										
Trader type	Location	Trader	Products traded	Amount traded	Years of trading	Seller / Collection	Buyer	Trading destination	Transport	Comments
Large-scale traders	Stung Treng PC	A	Soft resin (Yang oil)	Buy c.70T/yr and sell c.50T/yr	2005-2006	Middlemen (from villages and Stung Treng PC) and villagers directly	All sell to same company in Khamphong Chang province	Komphong Cham, probably Vietnam	Truck sent from Komphong Cham province to collect resin. Often the three refineries transport all together.	All have licenses with the provincial DoFA, pay tax of 0.08USD/kg (soft resin, 1L = 0.85kg). Refineries extract water and plant matter from resin. Buy up to four grades of resin but only sell two grades. Trade in dry season mainly. Also trade small amounts of damar resin (hard resin).
		B		Sell c.50T/yr	2005-2006					
		C		Sell c.100T/yr	2004-2006					
		D	Large rattan for furniture	-	2005-2006	-	-	Phnom Penh, probably Vietnam	-	Has license with provincial DFA. Away from Stung Treng at time of survey. West bank of upper Mekong is said to be an important source area. Trade more in wet season.
Town traders	Stung Treng PC	E	Soft resin (yang oil), damar resin (hard resin)	-	-	Villagers	Stung Treng PC residents	Stung Treng PC	Buyers bring to them and sellers buy at their house (near main boat landing)	When interviewed said that they did not trade in other natural resources but village-traders reported selling <i>mak saeng</i> to them.
		F	Traditional medicines including plant and animal products	-	-	Villagers living closed to Stung Treng PC	Stung Treng PC residents	Stung Treng PC	Walking	For some years a person has been offering traditional medicines walking around town. Medicines include plants and forest animal products (eg. horns, bones, bark).
		G	Fish, NTFPs	Vomica nuts: 500kg/yr; Soft resin (yang oil)	-	-	-	-	-	Information on NTFPs reported in 2005. See Appendix 17.
Village collector-traders	Village 1	H	Soft resin (yang oil)	c.5 families all together collect c.600L / 10 day trip, together own >200 trees, c.30 trees / family	2003-2006	Collect from area near O'Talas	Mr Low	Stung Treng PC	Own motor boat to take to town, families take together	Only sell small amounts in village for boat repair. Villagers went to O'Talas stream to negotiate with villagers from Samang village for permission to tap trees that had not yet been claimed. Villagers from Koh Sneng collect in wet season when have boat access to O'Talas whereas villagers from Samang collect only when they can access O'Talas in the dry season, all meet in November to negotiate this change. Samang villagers taught those from Koh Sneng how to tap resin.

Village 2	I		Collects 5L/day and makes 4 torches / day	c.1970s-2006	Collect from south of O'Talas stream, c.8km away	Villagers from Koh Sneng commune and Stung Treng PC traders	Koh Sneng commune and Stung Treng PC (minimum of 90L/trip to pay for cost of petrol)	Sells in own village mostly, occasionally takes to Stung Treng PC to sell to Mr and Mrs Thai Long	Traders from Stung Treng PC come infrequently (2 times/ yr). Price in village depends on changes in the price in town but is always cheaper in village (eg. Price in Stung Treng PC is 1000R/L then he sells for 800R/L). Price increased from 1.75USD/30L 25ya to 7.50USD/30L now. All available resin trees now tapped. Collects small amounts of other natural resources (damar resin, vines, rattan, fruit etc) when in the forest collecting resin.
Village 3	-	Honey, beeswax	Honey: 100L/yr. Beeswax: 50kg/yr	-	5HH collect	Villagers sell to relatives in Stung Treng PC when they order it	Stung Treng PC	-	Send when have at least 20L.
Village 4	J	Vomica nuts	1 T/yr (2003-05)	2003-2006	Preah Rumkel, mostly from Prum Krom and Kralla Peas	Mr and Mrs Thai Long and Mr Low	Stung Treng PC	Hires boat in Preah Rumkel to take to town (pays 10USD/T for petrol).	Only traded a little in 2006 as "when people collect <i>mak saeng</i> they always cut down the trees". Sold rice and tamarind to trader in town who asked her to also sell <i>mak saeng</i> . Total of 4 traders in Preah Rumkel, all started in 2003, some trade up to 3T/yr.
	K		1 T/yr	2002-2006	Preah Rumkel, mainland villages	3-4 traders from Stung Treng PC	Stung Treng PC	Traders come to the village and transport themselves in a 2-storey boat	Villagers in Kralla Peas said they sold the seeds to traders from Prum Krom (3 people) and also from O'Svay commune (2 people). Do not know how the seed is used. Never any trade to Veun Kham.
	L		-	2002	Preah Rumkel, mainland villages	Sent to son-in-law in Stung Treng PC	Stung Treng PC, Phnom Penh	-	Relative sold to buyer from Phnom Penh who met in Stung Treng PC. This trader transported 156kg in 2002 but only 20kg was the high-value mushroom. This trader lost 200USD and never traded again.
	M		Honey: c.250L/yr. Beeswax: 25kg/yr.	2001-2006	Collects himself, c.7HH in Prum Krom collect	Only sell to other villagers	Preah Rumkel	-	Only collect for 1 mth/yr (March-April), stays mostly in the forest (stays 2 nights, returns to village 1 night). When collecting honey also collects wildlife (usually monitor lizards and turtles). Gets 1-3 animals/2 day trip, sells in Prum Krom to wildlife trader.