FORESTS AND THEIR CONTRIBUTION TO LOCAL LIVELIHOODS[1]

Introduction

The role that forests play as a livelihood safety net should not be underestimated, particularly in the context of a changing climate where people's agricultural production is damaged or lost to natural disasters such as flood, drought and pest infestation or livestock succumb to disease epidemics. In such instances people have recourse to forest resources for food, fodder and medicine among many other products. Community Forestry International (CFI) (2006) posits that non-timber forestry products (NTFPs) not only serve as a safety net in times of food shortage, they are also a valuable source of household income and materials. In rural areas forests are an essential source of resources and products that enhance the livelihoods of local communities and indigenous peoples and hence help bolster their resilience to change (FAO 2010).

Forests provide multiple benefits, from the sequestration of carbon as a global public good to critical livelihood contributions for forest users. It is increasingly recognised that forest resources contribute to livelihoods in a variety of ways. Forest goods and services are extremely important in providing food, medicine, fodder, shelter, fuel, timber and building materials. Forest related enterprises such as fuel-wood and charcoal sales,

Forest products: an important livelihood safety net for poor villagers, Sangke Satob commune, Kompong Speu province, 2010

handicrafts and other products made from NTFPs provide cash income. Moreover, the forestry sector provides formal and informal employment and is an important foreign exchange earner. In his trade chain analysis of resin products in Cambodia, Tola (2009) reports that the annual domestic market/ export value of the estimated 11,000–18,0000

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1 This article is prepared by Dr Koy Ra, programme coordinator, and Mr Lonn Pichdara, research assistant, at CDRI. This paper is an extract from "The Value of Forests for Local Livelihoods" (forthcoming) and a Poverty and Environment Network (PEN) working paper (forthcoming).

tonnes of resin collected each year is approximately USD4.7 million to USD7.6 million.

The majority of rural people rely on forest resources to supply their energy consumption needs. Based on the National Strategic Development Plan 2009-2013 (RGC 2010), 73 percent of total Cambodian households were dependent on fuel wood in 2008, dropping to 67 percent in 2009 and 61 percent in 2010. Apart from using wood for fuel, rural people collect timber for construction purposes and harvest many other NTFPs such as bamboo poles, bamboo shoots and wild vegetables to improve their livelihoods as well as to meet their daily consumption needs. Forests play a critical role in ensuring food security for local people, especially for communities located close to the forest. In 2008 the forestry sub-sector contributed 6.9 percent of the agriculture sector's total GDP (Chao 2009).

That forests provide many benefits to local people is well recognised, but because we do not know the value of the resources that local people derive from forests in monetary terms, we do not know the extent to which forests contribute to poverty alleviation. Many studies have been carried out in Cambodia, but these are poorly documented in terms of the direct value of forest resources for local livelihoods. Most study results were generated from snapshot interviews or focus group discussions drawing on participants' recall of information over a whole year, likely leading to omitted, under-reported or duplicated reports on collected forest products. Other researchers have focused on the value of natural resources as a whole to local communities, but few have explored the value of specific forest resources to income at household level. It is therefore imperative to adopt a method for estimating the value of forest products collected by forest users so that the quality of data can be improved and more useful results attained.

This paper results from a study on "Tropical Forests for Poverty Alleviation: From Household Data to a Global Analysis", a collaborative project between the Centre for Forest, Landscape and Planning (S&L) at the Faculty of Life Sciences, University of Copenhagen (KU), the Forests and Livelihood Programme at the Centre for International Forestry Research (CIFOR), the Forestry Research Institute of Ghana (FORIG), the Department de Sociologies at the University of Ouagadougou (DSUO) in Burkina Faso, and the

Figure 1: Study Area
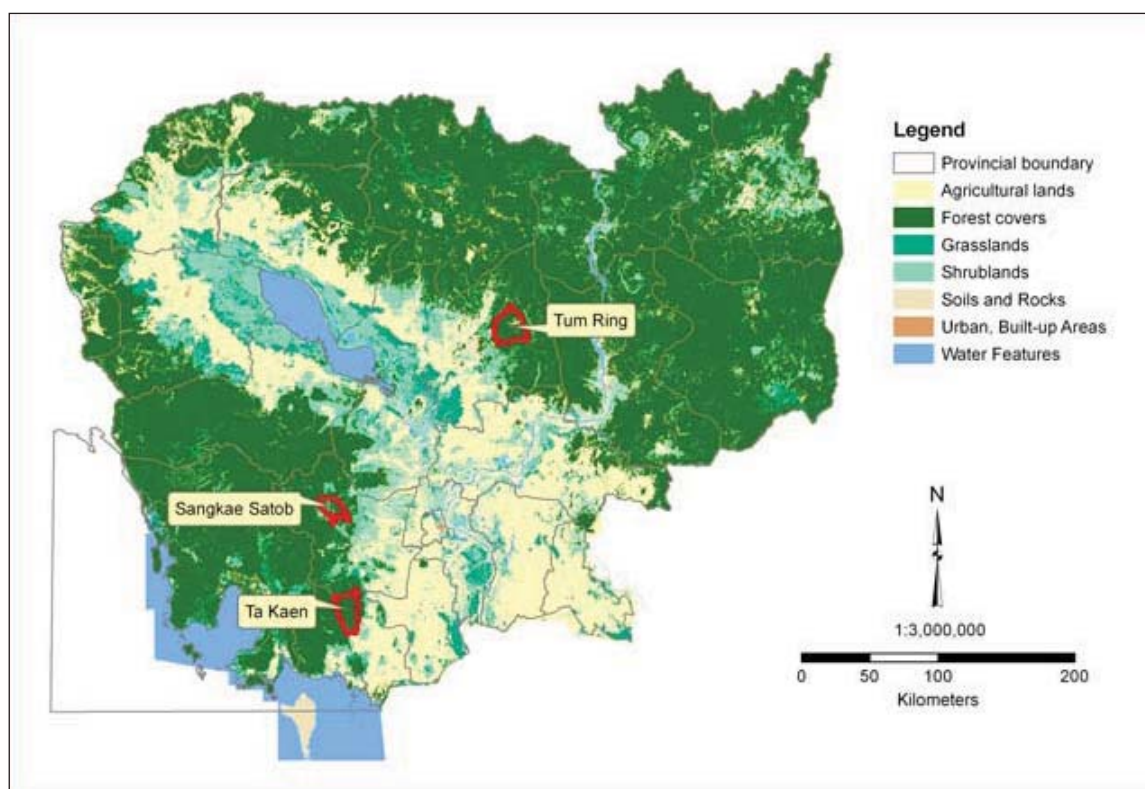
Cambodia Development Resource Institute (CDRI). The project is funded by DANIDA.

This study focuses on 1) the methods for estimating forest product prices, including utilisation and selling, and 2) the contribution of forest income to local livelihoods for poverty reduction.

Method

Study Areas

The study was conducted in 15 villages located in Takaen commune, Kampot province, Sangke Satob commune in Kampong Speu province, and Tumring commune in Kampong Thom province (Figure 1). The main land cover in each commune is briefly described below.

- *Takaen commune:* Major land cover is evergreen, deciduous, and re-growth forest. This area is open to all villagers for accessing forest resources and a section of it is a designated protected area.
- *Sangke Satob commune*: Land cover can be divided into deciduous forest, re-growth forest and bush. Community forestry is established in this commune and the area is part of a protected zone.

Table 1: Value of Forest Goods Collected by Sample Households (riels)

Products	Local unit	N	Min	Max	Mean	S.D.	Technique
Forest products							
Poles	Stick	38	500	45000	5971	8709	Local market
Bamboo	Ox cart	11	3000	120000	43455	40636	Local market
Tree branches	Ox cart	10	5000	50000	24100	17489	Local market
Logs	Stick	108	2000	300000	52847	64476	Local market
Fence posts	Stick	91	250	15000	3095	2598	Local market
Mushrooms	Kg	69	500	10000	3797	2375	Local market
Roots and tubers	Kg	5	2000	10000	5200	3947	Local market
Game - mammals	Piece	47	1000	150000	16362	32644	Local market
Game - reptiles	Piece	41	1000	10000	4598	2584	Local market
Game - insects and worms	Bowl	12	500	3000	1500	826	Local market
Game - amphibians	Piece	13	50	500	242	161	Local market
Palm stem	Stick	38	100	250	201	39	Local market
Palm heart	Stick	36	100	500	265	128	Local market
Bamboo shoots	Kg	295	200	2500	864	577	Local market
Crabs, snails, shrimps and prawns	Kg	80	300	10000	2591	2148	Local market
Fuel wood	Ox cart	668	3000	70000	23154	13533	Substitute
Lianas and vines	Bundle	5	1000	5000	2500	1732	Substitute
Rattan	Stick	12	100	1000	213	255	Substitute
Wild fruits	Bag/sack	5	4000	25000	13800	9203	Substitute
Wild vegetables	Handful	55	200	3000	867	628	Substitute
Medicinal plants	Kettle	19	1000	10000	3716	2776	Substitute
Latex and resin	Kg	11	300	1600	927	410	Substitute
Thatching grass	Ox cart	9	5000	60000	27000	17457	Substitute
Game - birds and bats	Piece	33	1000	30000	4521	7286	Substitute
Processed forest products							
Sawn timber	m3	101	200000	3000000	748515	379294	Local market
Charcoal	Heaps	262	6000	1200000	322389	169047	Local market
Wooden furniture	Piece	22	1500	400000	70295	85903	Local market
Rattan furniture	Piece	10	2500	25000	8800	6,642	Local market
Bamboo furniture	Piece	7	300	15000	5686	5324	Local market
Roofing	Bunch	11	400	1000	664	196	Local market
Bamboo shoots	Kg	10	500	15000	6150	5623	Local market

Figure 2: Total Household Income by Quarter
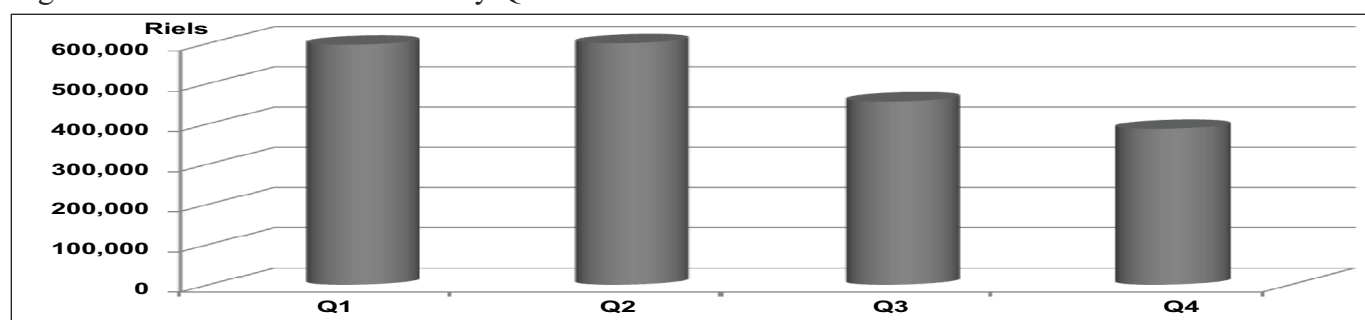
- *Tumring commune*: Land cover is predominantly evergreen, deciduous and re-growth forest. This area underwent major land use change just a few years before our survey with the introduction of rubber plantation.

Household Survey

In order to obtain a good sample and ensure representative and credible results, a total of 600 households, 200 households distributed across five villages in each commune, were interviewed four times in 2008: in January, March-April, June-July and October-November. This was done to create a consistent platform of data collection so as to reduce problems of participants' recall of forest products that they had collected.

Approximately 40 households or 10-30 percent of the total households within each village were randomly selected for interview. This follows the Poverty and Environment Network (PEN) (2007) technical guidelines which stipulate that households must be randomly sampled from the entire population. The selected households were then marked by a yellow sticker on the outside front wall of their house. This enabled the enumerators to find the sample family units more readily in subsequent survey rounds.

PEN Prototype Questionnaire Version 4, which was developed in the English language, was used for the quarterly household surveys – Q1, Q2, Q3 and Q4. The questionnaires were translated into the Khmer language to ensure the collection of high quality data.

Since this survey drew on participants' recall of their income from the forest as well as other forest products for consumption for each quarter of the year, there was also a risk of villagers citing information outside the quarter under review, leading to double reporting. To ensure that only the

income generated within the quarter under review was recorded, the research team cross referenced and validated information collected in the new round with that collected in the previous round.

Estimating the Product Price

The study aims to value all collected forestry products in monetary terms. Therefore, it was important to get the prices of the products from the sample households. The research team prepared three methods to gauge the product prices: local market price, substitute and time value. Local market price was based on farm gate prices i.e. the prices products were sold for: the substitute method used information from the nearby market; while the value of time method was based on the time spent collecting products multiplied by the opportunity cost of local labour.

Results
Forest Product Pricing

Only the local market and substitute techniques could be used to estimate the prices of all forest products (processed and unprocessed). The value of time method, though commonly used to value agricultural practice, was not practical for valuing forestry products in our study sites. The local market technique was used most often to value 71 percent of total forest goods, while the substitute technique was used for the remaining 29 percent (Table 1). Findings show that many different forest (processed and unprocessed) products are collected by the sample households, confirming the very important role of forests in providing and sustaining local livelihoods. Some products such as poles and game-mammals show very high standard deviations. This is because for some items, the product genre is divided into sub-groups to account for differences in quality such as size, species or plant part.

Table 2: Quarterly Household Income by Source (riels)

Income from each environment	Q1		Q2		Q3		Q4	
	Average	%	Average	%	Average	%	Average	%
Forest	74928	13	157948	26	139908	31	117791	30
Agriculture	302468	51	185814	30	41777	9	77279	20
Other environment	21021	4	22961	4	44888	10	41671	11
Other (wages)	198130	33	243034	40	228950	50	150774	39
Total	596547	100	609757	100	455523	100	387516	100

Some products were popular in a particular area only, while others were common in all areas. The top five products most frequently reported were fuel wood, bamboo shoots, charcoal, logs, and sawn timber. Fuel wood and bamboo shoots were commonly collected in all three study sites. Charcoal production and bamboo harvesting for *bang orng* (a special ladder for climbing sugar palm trees) were frequently found in Sangke Satob commune, Kampong Speu province and logs and sawn timber were observed mainly in Tumring commune, Kampong Thom province.
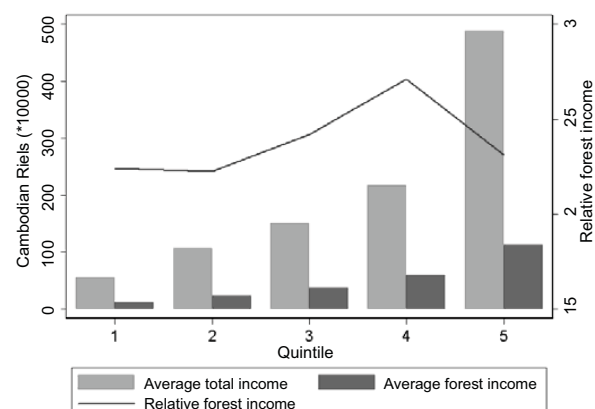
Average Household Income

The results show that the annual income of the surveyed households was 2,049,000 riels (USD506). Bruce *et al.* (2004) report similar average annual household incomes of 2,177,824 riels (USD538)[2] in Kompong Thom and 2,019,952 riels (USD499) in Mondulkiri. However, our research team found that household income fluctuated from quarter to quarter and by season. Households have almost the same earnings of 600,000 riels (USD148) in the first two quarters, which represent the dry season (Figure 2). But income decreased to only 455,000 riels (USD112) in the third and 387,000 riels (USD96) in the fourth quarters, which mostly span the rainy season. Income was low in the third and fourth quarters because farmers spent their time mostly cultivating their own rice, such as preparing the soil, transplanting seedlings, tending their growing crop as well as harvesting. Their activities during this period, however, contribute to their higher income in the first and second quarters.

Forest Income Share of Average Household Income

Total income is obtained from different sources and can be grouped into four main categories: forest, agriculture (crops and livestock), other environment and other (mostly wage labour) (Table 2). Income from agriculture (rice) was the main contributor to total income in the first quarter, accounting for 302,468 riels or 51 percent of the total quarterly income. However, it was found that income from wage labour, with the exception of the first quarter, was the main income source. Income from forest goods was the third main source for all quarters, again confirming the value of forests in income earning and thus their contribution to poverty alleviation. The share of forestry resources to villagers' total income in each quarter ranged from 13 percent in the first quarter to 31 percent in the third quarter.

Analysis of the household income was also done by quintile, with quintile 1 representing the lowest income group. As Figure 3 shows, relative forest income contributed 24 percent to low income households' total income. Medium income households acquired up to 26 percent of their total income from the forest, suggesting this household group is more reliant on income from

Figure 3: Forest Income Share of Total Household Income by Quintile

forest resources than the lower income group. This may be because medium income households have better tools and means for harvesting and transporting forest goods, such as logging equipment, ox or buffalo cart, which enable them to collect larger quantities of forest resources.

The fifth quintile (or the highest income group) and the lowest income group attained almost the same proportion of their total income, around 24 percent, from forest products. The small contribution of forest income to the lowest income households' total income is mainly due to their lack of tools and means of transportation which restricts them to collecting just small amounts of forest products.

Although the highest income group earns almost the same share (percentage) of total income from forest income, in monetary terms, the actual extent to which these households benefit from the forest is greater than the low and medium income household groups. This is because the highest income households have many income sources. These households also have better means of transportation, harvesting tools, and other assets which allow them to benefit more from forest resources.

Compared to Hansen and Neth's study findings in 2006, this study found that households are getting less in terms of value from the forests. Hansen and Neth (*ibid*) report that medium income households were generating about 30 percent of their total livelihood value from non-timber forest products (NTFP), while poor households were getting 42 percent. This could be due to many factors, including changing income sources or declining forest resources.

Conclusion

The value of forest products can be estimated through farm-gate prices and substitute methods. Using farm-gate prices provided a more accurate estimate of the value of forest products while the substitute method gave a rougher estimate.

Valuing the forest resources utilised (selling and consumption) by villagers in monetary income terms is essential if we are to better understand the importance of forest resources for local livelihoods. However, a thorough evaluation would require more time so as to refine the information and data collected by the substitute method. Furthermore, the valuation of forest products through reported local market prices allows us to see the broader picture of forest value that contributes to household incomes, thereby allowing us to estimate the contribution of forest resources to poverty alleviation.

Income from forest resources is a very important source. In this study, forest resources contribute 26 percent of total household income for the medium income household group and 24 percent for the low income group. High income households also acquire around 24 percent of total income from forest resources; however, in terms of actual amount, households in this group gain the greatest amount of benefit from the forest.

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