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Forest Product Sale as Financial Insurance: Evidence from Honduran Smallholders

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How do earnings from the sale of forest products help smallholders cope with unexpected cash needs? This paper investigates the conditions under which forest-dwelling families in the Honduran rain forest turn to forest products given that they often have other means to self-insure against illness, crop loss and other misfortunes. The study suggests that the sale of forest products offers an important fall-back during hard times, and is particularly important for young, land- and labour-poor households who may have few other ways of coping with financial crises. A number of recommendations for conservation and development policy follow from these findings.

Introduction

Why do rural peoples sell threatened forest products, from monkey meat to mahogany? The answer now seems axiomatic: because they are poor. That is, they sell forest products to generate much-needed cash income to buy everyday necessities. Research shows that forest products may offer a particularly important source of quick cash for families facing lean times or in moments of crisis.

But recent research has questioned the degree to which 'poverty' is sufficient to explain everything about the way that smallholders use forest products. For example, studies show that even within seemingly homogenous forest communities, households are remarkably diverse in their pursuits and in their well-being. Further, it is clear that while some families rely heavily on the sale

of forest products like bushmeat, other families rarely set foot in the forest, earning all their income instead from off-farm wage work. So what explains who sells forest products, and when? In particular, which families are likely to turn to forest products as a way to cope with misfortune, and which are not?

The 'safety net' function of the tropical forest has recently received increased attention from policymakers, because it suggests that the sale of forest products can offer a form of financial insurance for smallholders that ultimately increases their long-term livelihood security (Angelsen and Wunder 2003; Brown 2003). Empirical evidence that forest products do play such a role would encourage policies that secure rural peoples' access to forest products. At the same time, such evidence could also underline the disenfranchisement of societies in which misfortune-stricken families must harvest and sell forest goods to survive. To date, however, few studies have specifically tackled this issue.

The research described in this briefing paper was designed to investigate this issue among indigenous Tawahka communities in the rainforest of northeastern Honduras. Three general questions guided the research:

- 1) Within and between forest populations, *which* households are most likely to sell forest products when calamity strikes?
- 2) *When* do households fall back on forest extraction – more in the face of some misfortunes than others?
- 3) How does commercial forest extraction compare with other forms of 'self-insurance'?

Research Framework: A Capitals-based Livelihood Approach

In what follows, methods and analysis are shaped within a 'livelihoods' framework. That is, smallholder production choices (such as the sale of forest products) are analyzed at the household level, and are understood to be the outcome of family members' mobilization of their available assets in response to changing macro and micro-level conditions, including their experience of misfortunes. *Income* is considered a 'flow' measure that gauges a household's relative success at, and/or participation in, different productive activities over a given time period. A household's *wealth*, in contrast, is gauged by the stock of assets that it has accumulated up to the present (many of which result from past

Policy Conclusions

- Commercial forest extraction is just one of many activities – including wage work, agriculture, and business – from which rural smallholders earn income. Conservation interventions must therefore recognize that when some households *do* sell forest products, it not necessarily for lack of income-generating alternatives but because these activities are out of reach due to labour or financial constraints. Until these constraints are overcome, forest resource sale will remain attractive.
- Even small amounts of money earned from selling bush meat or other forest products can make a big difference to some smallholders' ability to weather financial crises. Conservation measures that ban the seemingly petty trade in some forest products therefore risk alienating poor farmers from one source of financial succour in hard times.
- Where restrictions on forest product sale *are* pursued, they are likely to be effective only when they are preceded by actions that reduce smallholders' need to self-insure.
- More research is needed to examine the role of forests in livelihood security over the long term, because there may be a considerable time lag separating a household's financial response to shock and their ultimate reliance on forest products to cover the associated costs.

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investments of income). These assets (or 'capitals') can include physical assets such as land and tools, or human capitals such as education and good health. The composition of a household's assets tells much about the type of activities it is likely to pursue. A family that has invested in a rifle, for example, is much more likely to harvest and sell bushmeat than a family that has invested instead in a herbicide applicator.

This study prioritizes households' asset wealth and their experience of shock as factors influencing whether or not household members sell bushmeat or other forest products, and to what degree they do so. 'Livelihoods'-based approaches have become standard in the exploration of poverty-environment links (e.g., Angelsen & Wunder 2003), and are common in assessments of smallholder coping strategies following different types of shock (e.g. Takasaki et al., 2004).

Tawahka Livelihoods, Honduras

The study is part of a larger research project on forest use by the Tawahka Amerindians in northeastern Honduras (see McSweeney 2004). In this paper, I draw mainly from a 1998 household survey. Analysis and interpretation of the data are informed by the 32 months I have spent in Tawahka communities since 1994.

The Tawahka's five villages are located along the middle stretches of the Patuca River near the Nicaraguan border. This area forms the core of the 2,400 square km Tawahka Asangni Biosphere Reserve (*Biosfera Tawahka Asangni*, or BTA), which was officially ratified in 1999 to recognise the landscape's cultural and biological diversity. The BTA represents only 2% of Honduran territory but contains 90% of its mammal species. To the north of Tawahka territory are indigenous Miskito communities. To the south and west, there is an encroaching agricultural frontier of Spanish-speaking, non-indigenous (*ladino*) farmers. In 1998, about 1,200 Tawahka lived in the reserve. Households had about 8 members each; about 15% of households were headed by single mothers or widows. The population was young (median age about 12).

The Tawahka have much in common with forest-dwelling smallholders world-wide, particularly long-settled lowland societies of the Central and South American tropics. They live in what is effectively a remote, state-owned forest commons, where land and resources are relatively abundant but social service provision is woefully lacking. In 1998, all transportation into or out of the area was by canoe. Communication with the rest of the country was limited to one or two unreliable short-wave radios. Schools in each community offered only about three years of formal education. There were no formal credit or insurance markets and no steady state-run agricultural extension or marketing programs. There was only one government health clinic, and it was chronically undersupplied and only sporadically staffed. There was a mission-run hospital two days downriver by boat and a state hospital that could only be reached by boat and plane.

The Tawahka harvest wild resources for food, construction and some medicinal needs. Game meat and fish provide a vital protein source for villagers. Most game was hunted using dogs; only one in four households owned a hunting rifle or shotgun. Armadillo (*Dasybus novemcinctus*), turtle (various species), crested guan (*Penelope sp.*), paca (*Agouti paca*), peccary (*Tayassu tajacu*), squirrel, and tapir (*Tapirus bairdii*) were among the commonly consumed game species. The most important cultivated foods in caloric terms are plantains, rice, beans, and manioc. Most food was grown in rich riparian soils, and through shifting cultivation of poorer upland soils. In the absence of formal land markets, households accumulated land primarily through claiming and clearing forest. This usufruct system favoured community founders and those with the greatest ability to pay others to clear forest. By 1998, the result was a highly unequal land distribution.

Although their remoteness suggests self-sufficiency, the Tawahka have in fact participated in local, regional, and international markets for centuries. During the study period, their group income profile was highly diversified (Table 1). They sold cacao, surplus food crops, and livestock in well-established regional markets. Wage employment included farm work, domestic work, or professional positions in nursing, teaching, or with a regional NGO. Markets for forest products were informal and largely confined to the lower Patuca basin. The trade in game meat is particularly localized due to perishability, but markets for dried fish, particularly at Easter, are regional. In 1997-98, less than 20% of the groups' aggregate market earnings (i.e., the combined value of cash and barter) came from the sale of forest goods (including sawn wood, thatch, fish and game meat, canoes, firewood, and handicrafts). Of these, the largest share came from sales of dugout canoes, which accounted for 45% of forest-derived earnings in that year. Canoe selling is particularly attractive because it allows households to make a large sum relatively quickly at any time of year; in this regard, canoes compare only to cattle.

For the Tawahka as a group, forest product sale has not been a primary source of market income (although these figures may underestimate the importance of fish and game meat in reciprocal exchanges between households). Further, not *all* households sold forest products in any given year (Table 1). In 1997 - 98, for example, only 62% of households did so, and some families were much more reliant on commercial forest extraction as a source of income than were others. Further, households appeared to move in and out of the sector frequently: those that sold forest products in 1997-98 had not necessarily sold any in previous years.

The diversity of Tawahka production portfolios is motivated in part by the need to ensure some source of income to cover unexpected shocks. There is no doubt that Tawahka households commonly need to raise extra cash in the face of unexpected household misfortune. For example, in caring for a sick family member, Tawahka are typically required to pay up-front for both traditional and modern medical treatment. Illnesses, injury, or childbirth complications that require evacuation to a downriver missionary hospital are particularly expensive. Crop shortfalls due to pests, flooding, and bad weather are not unusual, and typically drive families to supplement their diets with purchased foods.

The question, then, is: to what extent does the experience of misfortune actually stimulate Tawahka households to turn to the forest to cover the associated costs? Which households are most likely to self-insure in this way, and what types of calamity

Table 1: How households earned market income over one year (1997-98) in the Tawahka Asangni Biosphere Reserve, Honduras

Sector	Households responding ^a	Household participation No.	Household participation %
Forest product sale (incl. bush meat, fish, thatch, canoes, poles, timber, etc.)	110	68	61.8
Agricultural product sale	111	82	73.9
Livestock sales	111	65	58.6
Mining (placer gold)	112	21	18.8
Business	109	35	32.1
Agricultural wage work	106	56	53.0
Other wage work	107	74	69.2

Source: Household survey, 1998.

^a Not all respondents answered all questions.

are most likely to drive them to it?

The questionnaire-based survey I conducted in 1998 with 116 Tawahka households (88% of the Tawahka population) was designed to address these questions in two ways. The approaches and related findings are reviewed in turn below.

The Relative Importance of Commercial Extraction as Self-Insurance

To establish a picture of the importance of commercial forest extraction relative to other forms of self-insurance, household heads were asked two open-ended questions. First, they were first asked how, hypothetically, they would pay for four types of increasingly large and infrequent cash needs, ranging from the everyday purchase of salt to payment of a family member's emergency medical evacuation from the village. Their answers varied from selling fish or pawning livestock to selling rifles. Among the respondents who said they would sell forest products, most were willing to trade fish and game meat for salt, but they looked to 'big ticket' items like canoes or lumber to cover emergency expenses. Once I tabulated all responses, however, I found that relatively few households mentioned forest products as a way to cover any given cash need. Most preferred to: a) sell crops (e.g., bean or rice seed), b) borrow money from family or neighbours, or c) look for wage work. In the case of major medical emergencies, over a third of respondents said they would borrow money, and only 12% said that they would sell a forest product.

The Tawahka's answers to these hypothetical questions suggest that commercial forest extraction was only one of many ways that Tawahka families respond to cash needs, and hardly the most common. To get at the motivations behind *actual* sales of forest products, I then asked the 72 households that had sold a dugout canoe sometime in the preceding two years why they had done so. Dugout canoes were chosen because, as a 'big ticket' item, no one had trouble recalling the circumstances of sale. Many respondents reported that they sold the canoe to smooth consumption (usually to buy food, clothing), or to finance a child's schooling or a small business. Almost 20% said that they had sold their canoe to cover medical expenses. Another 20% said that they sold their canoe to pay off debts – including debts incurred during sudden illnesses (Table 2).

Table 2: Why Households Sold Dugout Canoes between 1996-98 (n=74; as % total responses)

To smooth consumption	40.5
-for food and clothing	16.2
-holiday expenses	4.0
-unspecified	20.3
To self-finance	21.7
-children's education	9.5
-acquire tools	6.7
-finance household move	1.4
-capital to set up store	2.7
-invest in agriculture	1.4
To self-insure	18.9
-pay for medical care	
To repay favours and cash loans	18.9

Combined, these answers suggest that although commercial forest extraction was not a prime response to emergencies, *some* forest product sale was clearly being driven (over the short and long-term) by self-insurance motives. To get a better sense of *which* Tawahka households were most likely to sell forest products for this reason, I turned to more detailed survey data in order to develop predictive statistical models.

Household Involvement in Commercial Extraction

The household survey elicited multiple measures of households' demographic composition, production activities, wealth and experience of misfortune. These variables were then used to build two predictive models designed to tease out the key determinants of forest product sale.

The models use two different dependent variables:

- a binomial variable that records whether or not a household sold a forest product in 1997–8.
- a continuous variable of the share of total earnings from forest product sale (i.e., a measure a households' relative involvement in this sector in 1997–8).

Independent variables include:

- Common forms of household shock that were expected to generate an urgent need for cash. These include two measures of epidemiological risk (the number of days that different family members reported losing to illness/injury, which corresponded closely with the severity of the health condition and the need for costly travel and treatment; and the number of deaths in the family in the preceding two years), and one measure of agricultural risk: a household's relative success in the 1997 bean harvest.
- Variables measuring more fixed household characteristics that condition the degree to which households are both susceptible to, and can cope with, these types of shocks. These included measures of households' human, social and physical capital endowments.

Model Results

The first model (a Probit) examined the factors driving households to sell *any* forest product in 1997-8. The model suggested that health shocks had significant, but opposing, effects on whether a household sold forest products or not. That is, the longer that members of the family other than the male or female head (usually children) were ill, the greater the likelihood that someone else in the family sold a forest product in the same year, probably to pay for medicines or other treatments. On the other hand, when a household member died, or the longer the female household head was ill, the likelihood of forest product sale decreased significantly. These latter misfortunes effectively reduce the household labour force, making it more difficult for other members to work off-farm to make money. For example, men are reluctant to leave on long trips when their wife is ill.

The second model (an ordinary-least-squares regression, or OLS) examined a subset of households to explain why some families earned a very high portion of their income from forest product sale. This model indicated that relatively poor bean harvests drove families to compensate with forest-based income activities: for every 4½ kg (10 lbs) fewer beans harvested by March 1997, a household's relative earnings from forest-product sale increased by 10% over the subsequent 12 months.

Both models point to the ways in which household attributes shaped whether a household *needed* the financial safety net of the forest or not. Most tellingly, the first model clarifies the links between household lifecycle and commercial extraction. That is: forest-product sellers were most likely to be young, male-headed households supporting more dependents, living in a relatively low-quality house, and holding little prime floodplain land (but who had some access to nearby male labour in the form of adult brothers). They probably turn to forest product sale because they have little land to buffer agricultural shocks, and lack the assets – such as cattle or tools – that older households can liquidate in times of need. An interesting finding, however, is that while relative land-poverty predicted that a household would sell a forest product (Probit), *increasing* land wealth within the extractor population predicted a *rising* share of earnings from forest product sale (OLS).

Discussion

A number of findings emerge from this study regarding the role of forest product sale in helping families cope with shocks:

- 1) The sale of forest products represents a first response to emergency events for a minority of households. Most would prefer, in the short term, to borrow money, sell stored crops, or do wage work.
- 2) Among the forest products sold to cope with misfortune, bushmeat and fish appear less important than 'big-ticket' items such as canoes or lumber.
- 3) Notwithstanding point 2, the links between forest product sale and safety nets can be indirect, because families appear to be using commercial extraction to reduce debts incurred during emergencies long after the event itself. The one-year time span of this study meant that this link could not be examined more fully.
- 4) Households are discriminating in the activities they choose to engage in to meet different types of cash need. They are more likely to mobilize forest products to pay for misfortunes that do not directly reduce adult labour time (e.g., children's illness or poor harvests).
- 5) The households that are most likely to use forest products to self-insure in this way appear the youngest and/or poorest households (with the exception of single mothers) who have few other in-house means to self-insure.

Ultimately, the research lends empirical support to other studies suggesting that forest products provide rural households with a financial stop-gap that compares to the well-recognised role of forest products in subsistence more generally. The study also suggests that the financial insurance provided by forest products is neither universal nor steady: forest product sale should be considered a very important recourse to *some* forest smallholders at *certain* key times.

Conclusions

This case study speaks to at least three issues of broad relevance to research and practice in conservation and development in biodiverse tropical forests worldwide, and of specific relevance to debates about the trade in bushmeat.

First, it draws attention to the high degree of within-community variation that may thwart the many development interventions that are currently targeted at the community level, such as agroforestry extension programs or NTFP marketing schemes. Within a given community, different families are likely to have very different interests and reasons for involvement in any productive activity. Young households, for example, may only be receptive to short-term income-generating programs like fish farming (which can meet their immediate needs quickly), whereas older families be more likely to invest time and effort in agroforestry projects with longer payoff horizons. To overcome this challenge, practitioners might precede programme implementation with rapid assessments that pay particular attention to variations in household wealth, land ownership and age in order to subsequently target specific household cohorts.

Second, the study speaks to the broader policy issue of commercial forest exploitation by resident smallholders. To date, conservationists worried about market-driven overharvest have pushed aggressively for clauses in protected-area management plans that prohibit the commercialisation of forest products – from bushmeat to timbers – by local peoples (Scherr et al. 2002). This study suggests that such restrictions are likely to be ineffectual as long as they are not preceded by basic improvements in health care, credit provisioning, and crop insurance programs. Without these institutional fall-backs, needy locals – especially poor, young families – will have a compelling argument for non-compliance. Or, if restrictions are too aggressively enforced, vulnerable groups will be alienated from a key source of financial succour in moments

of household crisis. For these reasons, managers need to pay close attention to *why* particular households are selling forest products. When the purpose is to self-insure, managers should strive to find ways to easily allow 'emergency-driven' extractions by local families. If such policies are not operational (especially where they risk being exploited by outsiders), then forestry agents must be prepared to work closely with health personnel and credit providers to offer alternative coping options.

Finally, the study offers some insights into the role of bushmeat in helping households to cope with financial shocks. First, bushmeat did not appear to be particularly important as a way for households to raise cash immediately following misfortune. This result is explained in part by the fact that in eastern Honduras, the bushmeat trade is highly informal and localized. Most fish and meat are bartered among neighbours rather than sold for large sums of cash; they are therefore unhelpful in offsetting financial crises directly. This said, the study indicates that the most common way for many households to meet sudden cash needs is to borrow money from friends and neighbours. These debts are then paid off over time. Based on the author's two-year residence in a Tawahka community, it appears that the provision of game and fish is a preferred means to cancel such debts. In other words, the links between coping strategies and game meat harvest may be delayed and indirect, but are nonetheless important. Empirical confirmation of this role, however, would require longitudinal tracing of what are clearly complex self-insurance strategies. In the meantime, researchers interested in the forest-as-safety-net issue might best begin by thinking of forest products – from bushmeat to canoes – in terms of their role in dynamic safety net *systems*.

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