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Report

Markets Drive the Specialization Strategies of Forest Peoples

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ABSTRACT. Engagement in the market changes the opportunities and strategies of forest-related peoples. Efforts to support rural development need to better understand the potential importance of markets and the way people respond to them. To this end, we compared 61 case studies of the commercial production and trade of nontimber forest products from Asia, Africa, and Latin America. The results show that product use is shaped by local markets and institutions, resource abundance, and the relative level of development. Larger regional patterns are also important. High-value products tend to be managed intensively by specialized producers and yield substantially higher incomes than those generated by the less specialized producers of less managed, low-value products. We conclude that commercial trade drives a process of intensified production and household specialization among forest peoples.

INTRODUCTION

Beginning in the early 1980s, efforts to link conservation and development focused attention on the alarming rates of deforestation. This attention coincided with new commitments to address rural poverty and the recognition that forests can provide multiple products and services. Forest products, especially nontimber forest products (NTFP), were given a high profile at this time because of the perception that forest exploitation for products rather than timber is more benign (Myers 1988). Forest products were also considered more accessible to rural populations, especially to the rural poor (Kumar and Saxena 2002). Recently, more realistic assessments (Peters et al. 1989, Godoy and Bawa 1993, Simpson et al. 1996, Godoy et al. 2000, Sheil and Wunder 2002) have lowered these high expectations of the economic and conservation benefits of forest products. Nevertheless, interest in forest products remains strong. This interest was evident in several recent international meetings that looked at the issue of forests and forest-related livelihoods, including The Role of Forestry on Poverty Alleviation, 4–7 September 2001, Semproniano, Italy; The International Workshop on Forests in Poverty Reduction Strategies: Capturing the Potential, 1–2 October 2002, Tuusula, Finland; and The International Conference on Rural Livelihoods, Forests, and Biodiversity, 19–23 May 2003, Bonn, Germany.

Analyses of the processes and trends that affect the use and management of forest products are essential to guide further conservation and development interventions. So far, however, these analyses have offered contrasting perspectives. Some authors consider the wild harvesting of forest products to be the first step along a domestication-intensification path

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that leads to replacing wild-harvest forests with plantations or to substituting synthetics for forest products (Homma 1992). Other approaches view forest products as part of a diversified household economy (Michon and de Foresta 1997). This approach emphasizes the domestication of landscapes rather than the domestication of species, creating agroforestry systems that occupy an intermediate position between wild-harvest forests and plantations. Finally, some authors stress idiosyncratic, cultural, and opportunity values to advocate the long-term maintenance of livelihoods based on the harvest of wild-harvest forest products (Grenand and Grenand 1996). Many agree that the relationship between people and forests must be considered within the larger context of macroeconomic processes (Angelsen and Wunder 2003). We consider commoditization, i.e., the transition from a subsistence to a market economy, as important to understanding the role, potential, and trends associated with the use and management of forest products. In this paper, we report on a comparative study that analyzes the links between the livelihoods of forest-related peoples and global commoditization processes.

DATA

We looked at 61 cases of the use of commercial forest products and applied a multivariate analysis based on a method pioneered by Ruiz-Pérez and Byron (1999). Each case was defined as the commercial production of one forest product by people who live in a given area and who share common socioeconomic, environmental, and political conditions. Each case was thus treated as an internally homogeneous entity.

Regionally based research coordinators recruited collaborators and selected cases through established networks, referrals from experts, and direct contact with potential collaborators. Regional coordinators attempted to select 20 cases from each region. The selection of cases was based on three main criteria: (1) the forest product had to demonstrate commercial value locally, regionally, or internationally; (2) the production-to-consumption system (Belcher 1998) had to have been researched and documented with significant amounts of information already available; and (3) the overall set of cases had to balance regional coverage and represent a broad range of products, production systems, and uses. In practice, all the cases that met the first two criteria were included. The availability of cases with sufficient pre-existing data was the main limit on the number of cases included in this study.

The final selection of cases included many important case studies of commercially traded nontimber forest products (NTFPs) representing different product types, methods of management that ranged from wild gathering to plantations, and markets of various sizes. Cases were from Asia (n = 21), Africa (n = 17), and Latin America (n = 23). Although the data set is extensive and diverse, it is not a truly random sample. Some conclusions should therefore be interpreted with care. However, the comparable size of samples from each of the three main tropical regions and the fact that the eight main categories of product use do not show statistical differences between regions (X^2 = 14.068, df = 14, P = 0.445) lends support to the robustness of the sample. The table in Appendix 1 lists the case studies by species and location and gives the name of the author of this paper who provided the case.

A stepwise approach was followed for the selection of variables. First, the major categories of factors that characterize a case were identified based on those described by Ruiz-Pérez and Byron (1999). These categories were expanded by incorporating a production-to-consumption perspective (Belcher 1998). Each category was then characterized according to an extended list of attributes. This resulted in 114 variables that describe the geographic setting, the product, the production system, the ecological implications of production, the socioeconomic characteristics of the area in which the raw material is produced, the processing industry and trade, the institutional characteristics of producers, the relevant policies, and the external interventions. Many of these variables were measured or coded in more than one way, resulting in a total of 246 data points. Emphasis was placed on producer households. Where possible, quantitative variables were used. The variables included both current status and trends over the past 10 yr. Cash values were converted to U.S. dollars using official exchange rates and standardized using a purchasing-power parity index. The original list of variables and their definitions is included as Appendix 2. A full description of the approach is provided in Belcher and Ruiz-Pérez (2001).

To harmonize definitions, criteria, and measurements, two workshops were held in each of the three regions for a total of six. The first workshop was devoted to methodological issues, and collaborators discussed the

definitions of variables and the practicalities of data requirements. The second workshop, which took place approximately 12 months after the first, focused on reviewing and completing data for individual cases and on preliminary analyses. Finally, a meeting was held with a subgroup of case authors from the three regions who indicated a strong interest in the analysis; they are among the authors of this paper.

Two main documents were prepared by each case author. The first was a standardized spreadsheet of all variables and a narrative report describing the case. The narrative reports were published in three edited volumes of Asian (Kusters and Belcher 2004), African (Sunderland and Ndoye 2004), and Latin American (Alexiades and Shanley 2004) cases, respectively.

RESULTS

Nontimber forest products in household economic strategies

Economic theory predicts that a shift from a subsistence to a cash economy will stimulate specialization to maximize economic opportunities. The degree of integration into the cash economy should influence production strategies. To analyze these relationships, we used a regression of the total contribution of forest products, i.e., subsistence plus cash, to household income (y) as a function of the percentage of local household income earned in cash (x). An exponential curve proved a good fit ($\ln y = 0.044x$; R^2 0.86, F (1,60) = 368.4, P = 0.000), indicating an increasing contribution of individual nontimber forest products (NTFPs) to the household economy of producers as they move from low to high levels of commoditization.

Cases were then grouped by quadrants (Fig. 1), yielding three case sets. A very similar grouping was produced using cluster analysis. The first set (n = 16) represents cases of a typical subsistence strategy in which a forest product is the main and frequently sole source of cash income for predominantly subsistence livelihoods. We use the term “subsistence” to mean that cash income is used to support current consumption. The second set (n = 31) includes cases of a typical diversified economic strategy in which the household economy is well integrated into the cash economy and the forest product provides only a small proportion of total household income. The third set (n = 14) includes cases involving a typical specialized strategy in which cash-oriented households rely on a forest product as their main source of income. No cases occurred in the fourth quadrant.

We analyzed the relationships between the three categories of cases and all the other variables using bivariate analyses. A Kruskal-Wallis test (a nonparametric test robust to outliers) was used for the quantitative variables (Table 1), and multicorrespondence analysis was used for nominal and ordinal categorical variables (Fig. 2).

In 85% (n = 52) of the cases in our study, average household incomes were lower than the national average. This reflects the lack of economic opportunities available in the case study sites, which are typical of rural areas in developing regions. Within these regions, however, the difference in the average income of households that produce forest products and the local average income is significant (Kruskal-Wallis = 6.717; df = 2; P = 0.035). The ratio of income from households that produce forest products to average local income showed median values of 0.86, 1.00, and 1.11 for the subsistence, diversified, and specialized sets of cases, respectively. This ratio measure can be considered a proxy for the potential income differentiation and development between NTFP producers and nonproducers in the same locality. The data indicate a statistically significant difference in the development potential of the economic strategies of the subsistence (below average income), diversified (same as average income), and specialized (above average income) households.

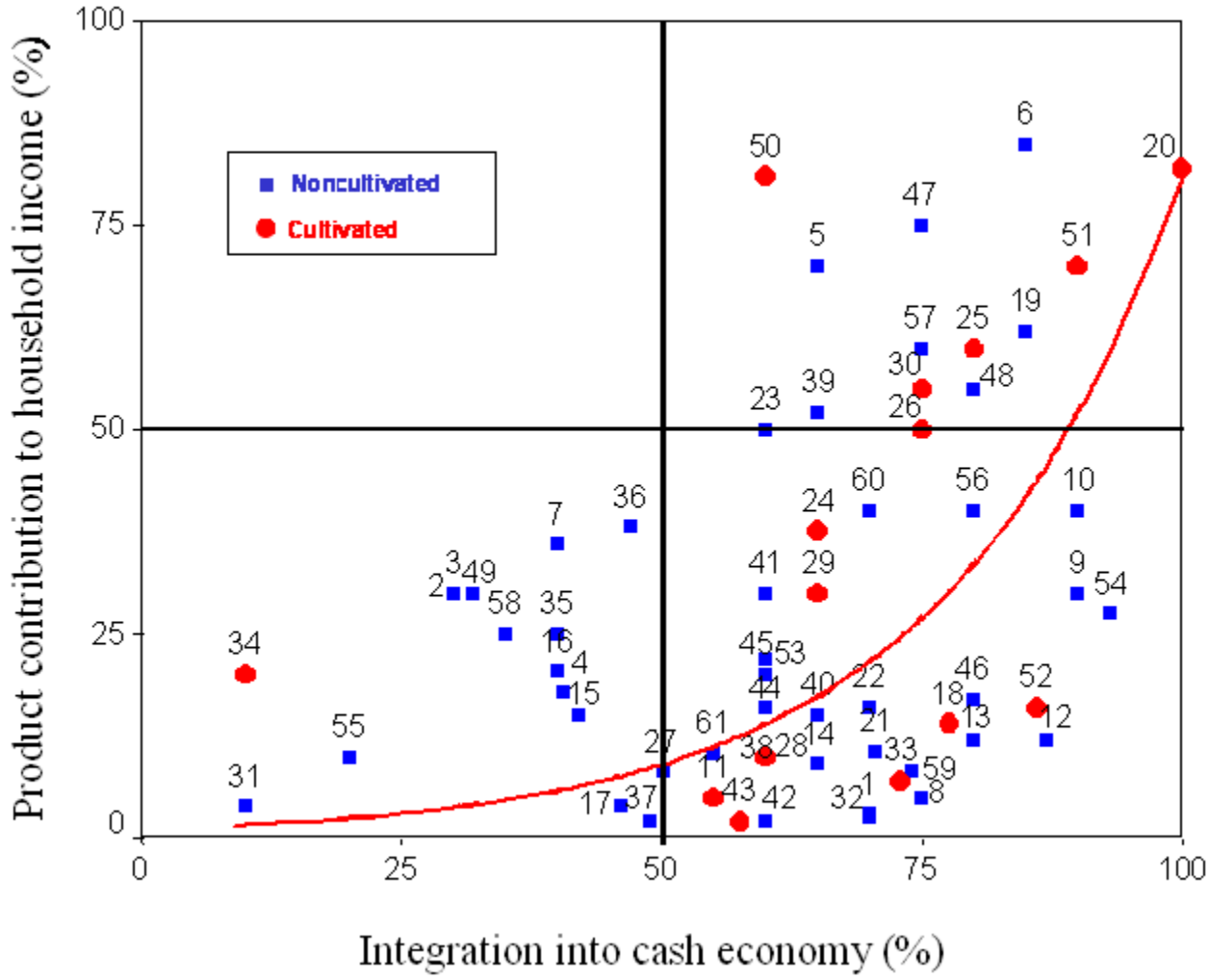
The results (Table 1) characterize each of the household economic strategies in the following terms:

1. The subsistence strategy households harvest NTFPs from wild resources in unmanaged or lightly managed forests. Analysis of the data from the 10-yr reference period shows that increasing numbers of households are involved, increasing amounts of household income are derived from NTFPs, and the resource base is declining. Subsistence-strategy households tend to use a larger number of other NTFPs, mainly for subsistence purposes, than those in the other two case sets.
2. The diversified-strategy households fall between the subsistence and specialized sets of cases in terms of household income, market

size, and NTFP production value per hectare. In the diversified-strategy cases, NTFPs provide additional income to households that earn the bulk of their income from agriculture or from off-farm sources.

3. The specialized-strategy households tend to have higher household incomes, command higher prices for their NTFPs, enjoy a higher trade value for the NTFPs in their area, and get better NTFP production per hectare. In these cases, there is also stability in the NTFP markets, the producers' incomes, and the numbers of households involved in production. They tend to have less product adulteration, a lower incidence of customary rules, and relatively stable populations of the target species.

Fig. 1. A regression showing the change in the amount of household integration into the cash economy (percent of total) with the change in the amount a forest product contributes to household income (percent of total).

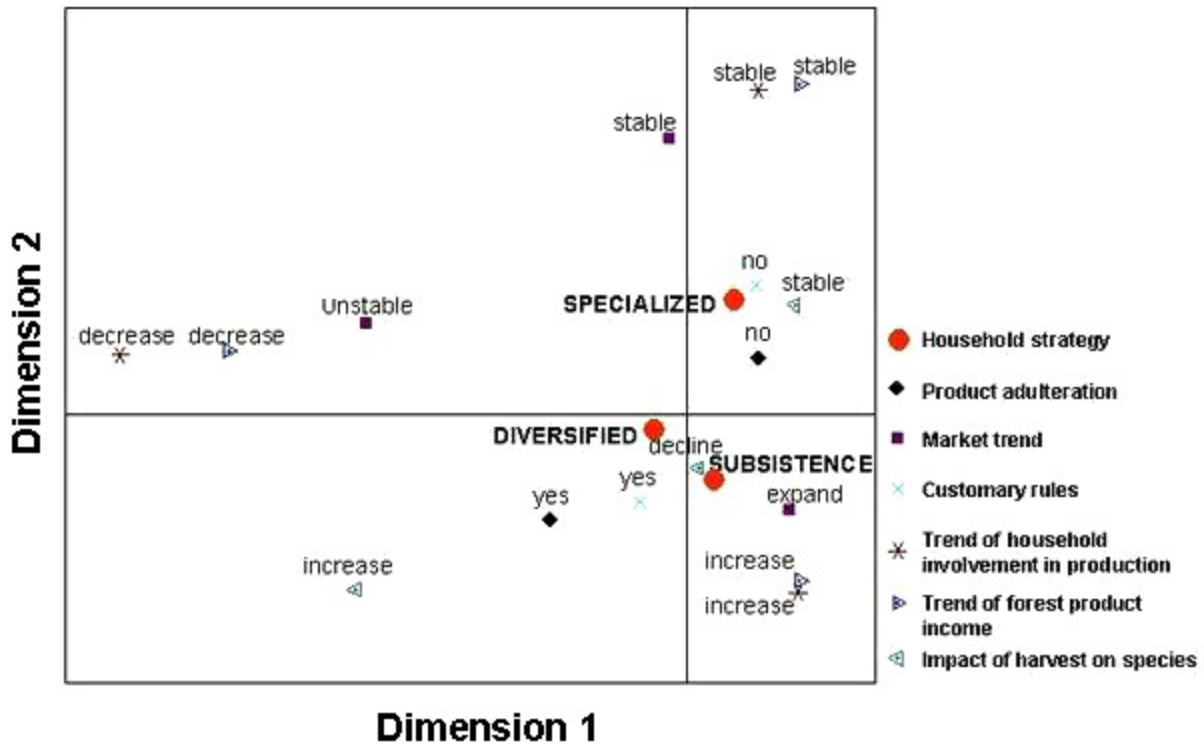


Production options

There are two distinct NTFP production approaches: (1) extraction based on natural regeneration and (2) cultivation in monodominant or mixed forest stands, i.e., plantations or managed forests, in which > 50% of production comes from planted material. We compared groups of cases that engage in these two approaches using Mann-Whitney *U* and chi-square tests for significance. We found that cases that engage in cultivation have higher values for labor, use more intense technology in production, and produce more

per hectare. We also found that the cases that engage in cultivation tend to be strongly associated with private tenure, higher NTFP trade values both locally and nationally, and higher household incomes in absolute and relative terms (Fig. 3). Cases that use cultivation generally enjoy a stable resource base, whereas cases that engage in extraction are frequently associated with declining resources.

Fig. 2. A multiple correspondence analysis of key variables and household economic strategies. Dimensions 1 and 2 account for 34% and 28% of the variance in the model, respectively. The relative closeness of variable positions in the plot reflects their tendency to be associated.



Cultivation becomes the more frequent NTFP production approach as the cases move from being less to more cash-oriented. Cultivation is used in only 6% of the cases in the subsistence-strategy households. However, cultivation is dominant in 29% of diversified-strategy cases and in 43% of cases of specialized-strategy households. An analysis within these latter two groups, in which cultivation is a relatively common practice, provides additional insight into household strategies.

In one subgroup (n = 9) from within the set of cases using the diversified strategy, NTFPs are cultivated as an integral part of overall farming activity. These cases tend to be located in poorer areas in which average local incomes are low. NTFP producer households tend to be wealthier than their neighbors. For the subgroup of cases that do not use cultivation (n = 22), households rely more on off-farm income. Their incomes are equivalent to the local average, and they use wild-harvested NTFPs to help bridge the gap.

In the set of cases that use the specialized economic strategy, a small subgroup uses cultivation (n = 6). In these cases, raw material prices, productivity, household incomes at purchasing power parity, and the ratio of producer to local income all tend to be higher. Household incomes are also higher, approaching the national average. These cases account for a much larger total NTFP trade in the case study area than do

specialized cases that do not use cultivation (n = 8), indicating larger and more developed markets. Wild-harvested products tend to give better but nonsignificant (Mann-Whitney U = 17; P = 0.366) returns per unit of labor, but with less total production.

These findings are consistent with Homma's (1992) economic model showing an evolution toward intensive management and cultivation to meet the demand for NTFPs. However, specialization does not require monoculture plantations. Several of our cases within the specialized strategy set rely on managed-forest systems.

Table 1. Significant associations of key variables with household economic strategies. Values reported are median values. NTFP = Nontimber forest products; Kruskal-Wallis = Kruskal-Wallis nonparametric test (df = 2).

Variables	Household strategy			Kruskal-Wallis	
	Subsistence	Diversified	Specialized	X^2	P-value
Land price at purchasing power parity (U.S.$/ha)	416.8	1195.2	1285.68	5.24	0.073
NTFP producers household income at purchasing power parity (U.S.$/yr)	2575	3119	4575	7.31	0.026
NTFP used by household	8	4	4	15.46	0.000
NTFP producers income to local average	0.86	1	1.11	6.78	0.035
Price of raw material (U.S.$/kg)	0.13	0.36	0.565	7.71	0.021
Value of production (U.S.$/ha/yr)	0.39	1.95	49.11	10.21	0.006
Value of production per person-day (U.S.$)	0.02	0.59	1.08	5.36	0.070
Estimated raw material trade in area (U.S.$/yr)	14,250	20,160	400,000	9.15	0.010

Regional characterization

We also analyzed regional groupings by means of bivariate analyses. Kruskal-Wallis tests for significance were used for quantitative variables (Table 2), and multicorrespondence analysis was used for nominal and ordinal categorical variables (Fig. 4). The observed regional differences are the result of contrasting environmental and socioeconomic conditions.

Fig. 3. A comparison of variables from cases involving nontimber forest product (NTFP) production in cultivated forest (n=16) versus non-cultivated forest (n=45).

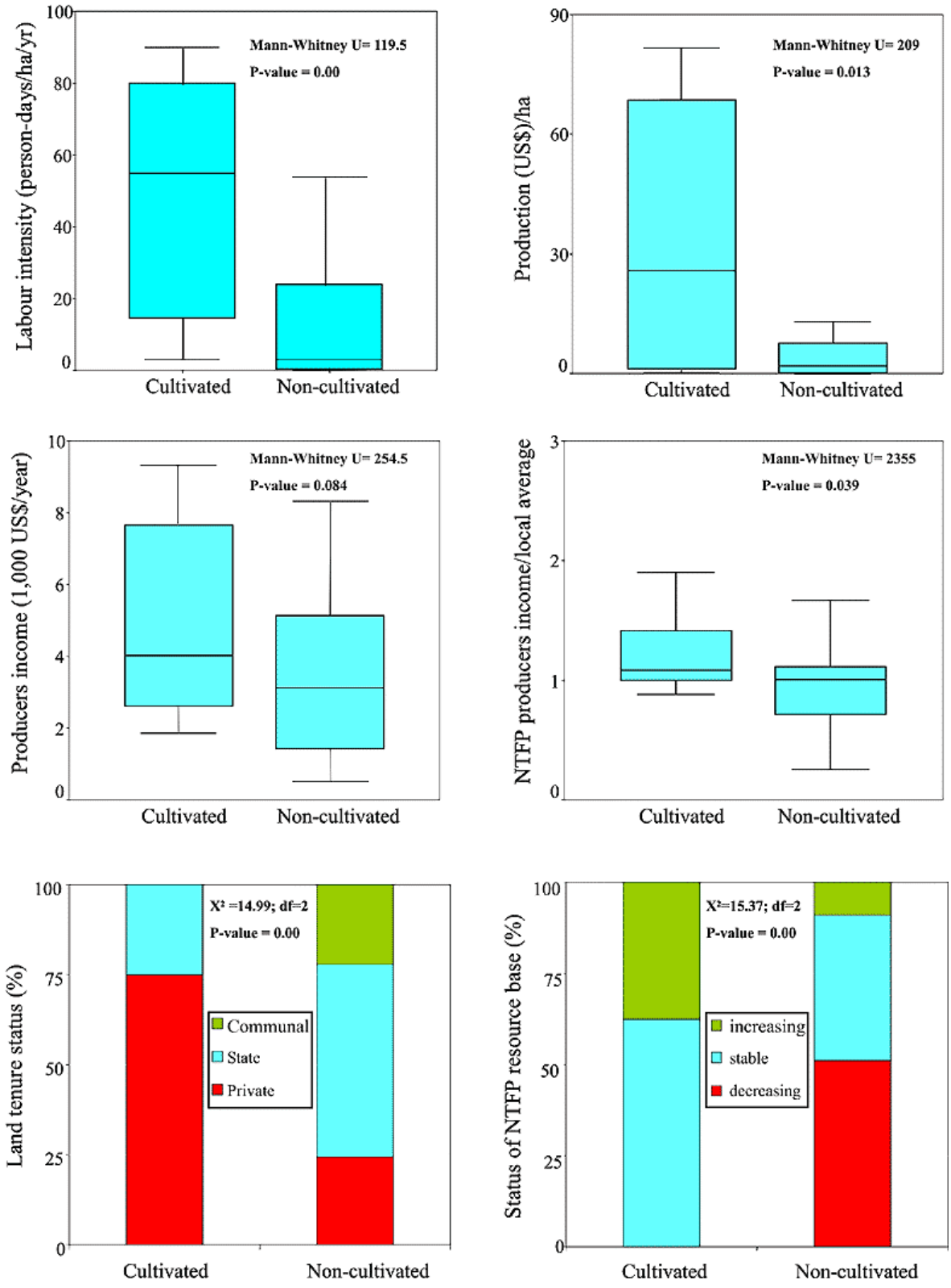
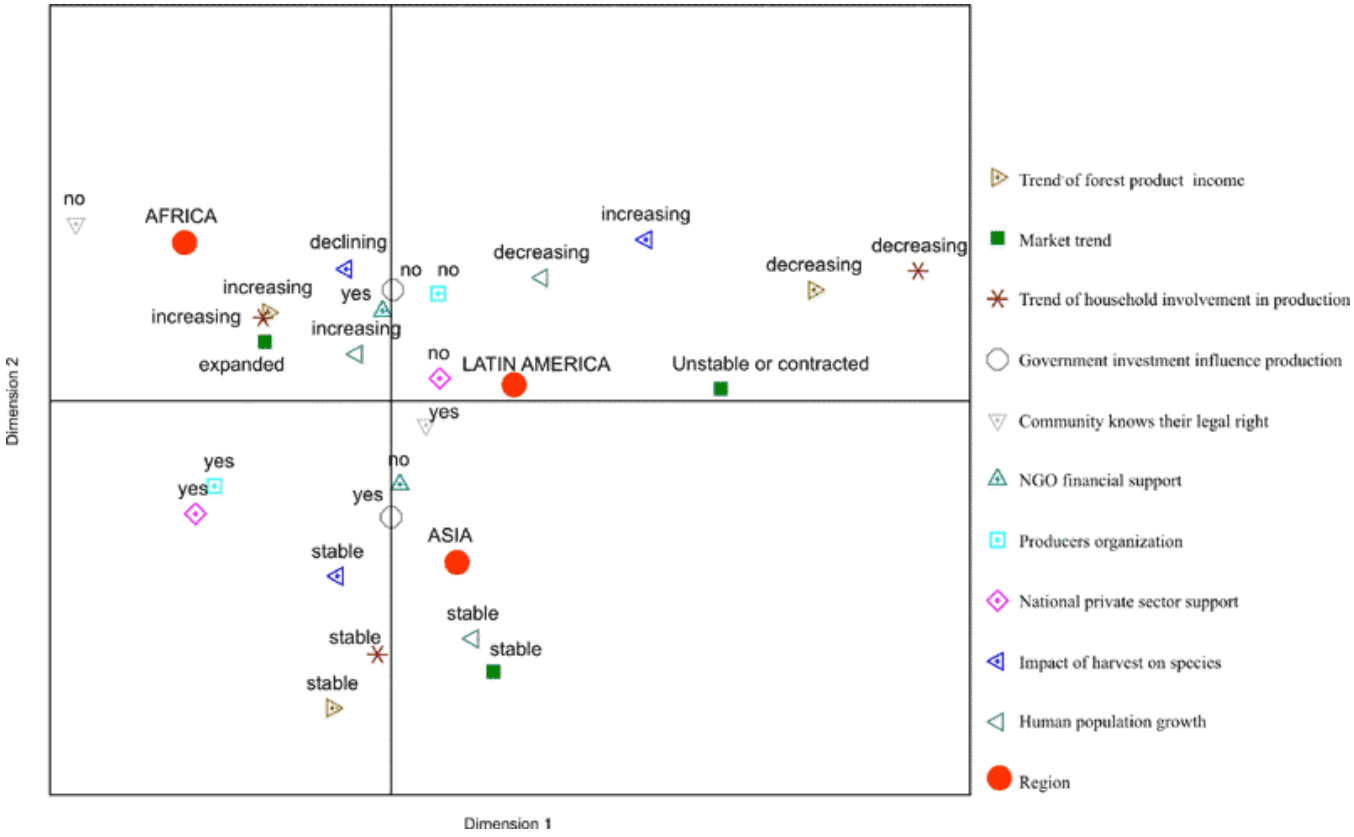


Table 2. Significant associations for key variables in cases from three regions: Asia, Latin America, and Africa. Values reported are media values. NTFP = Nontimber forest products; Kruskal-Wallis = Kruskal-Wallis nonparametric test (df = 2).

Variables	Region			Kruskal-Wallis	
	Asia	Latin America	Africa	X^2	*P*-value
Population density (persons/km^2)	75.1	22.3	11.1	10.65	0.005
Elevation of study area (miles above sea level) [Erratum]	600	200	400	8.30	0.016
Road density (km/km^2)	0.44	0.17	0.12	5.56	0.062
Precipitation (mm)	1859	1950	944	11.02	0.004
Percentage of product harvested from wild population	40	97	100	8.06	0.018
Labor intensity in NTFP production (person-days•ha^{-1}•yr^{-1})	30	2	4	5.68	0.058
Land price at purchasing power parity (U.S.$/ha)	2640	675	368	16.30	0.000
Time to harvesting maturity (years)	7	10	15	6.86	0.032
Reproductive period (years)	5	7.5	20	13.64	0.001
Average household size	5	5.5	6	8.39	0.015
Local labor rate (U.S.$/day at purchasing power parity)	6.55	10.25	5.62	5.23	0.073
Number of economically harvestable individual per hectare	400	23	17	8.17	0.017
Value of production (U.S.$•ha^{-1}•yr^{-1})	6.82	2.74	0.43	9.02	0.011
Estimated raw material trade in area (U.S.$/yr)	220,000	70,000	8900	11.28	0.004
NTFP production area per household (ha)	5.9	45.6	132	10.77	0.005
Total trade (export + national)	11,230,000	2,003,000	555,000	11.26	0.003

Fig. 4. A multiple correspondence analysis of key variables by region. Dimensions 1 and 2 account for 24% and 21% of variance in the model, respectively.



Even though all the cases except Korean mushrooms are in tropical or subtropical environments, there is a marked climatic differentiation. The African cases, for example, occur in settings that are significantly drier than those of the other cases. Moreover, the African cases have a larger climatic variability than the other two regions (*CV* = 0.80, compared with *CV* = 0.47 for Asia and *CV*= 0.42 for Latin America). This suggests a higher internal climatic heterogeneity in the African sample.

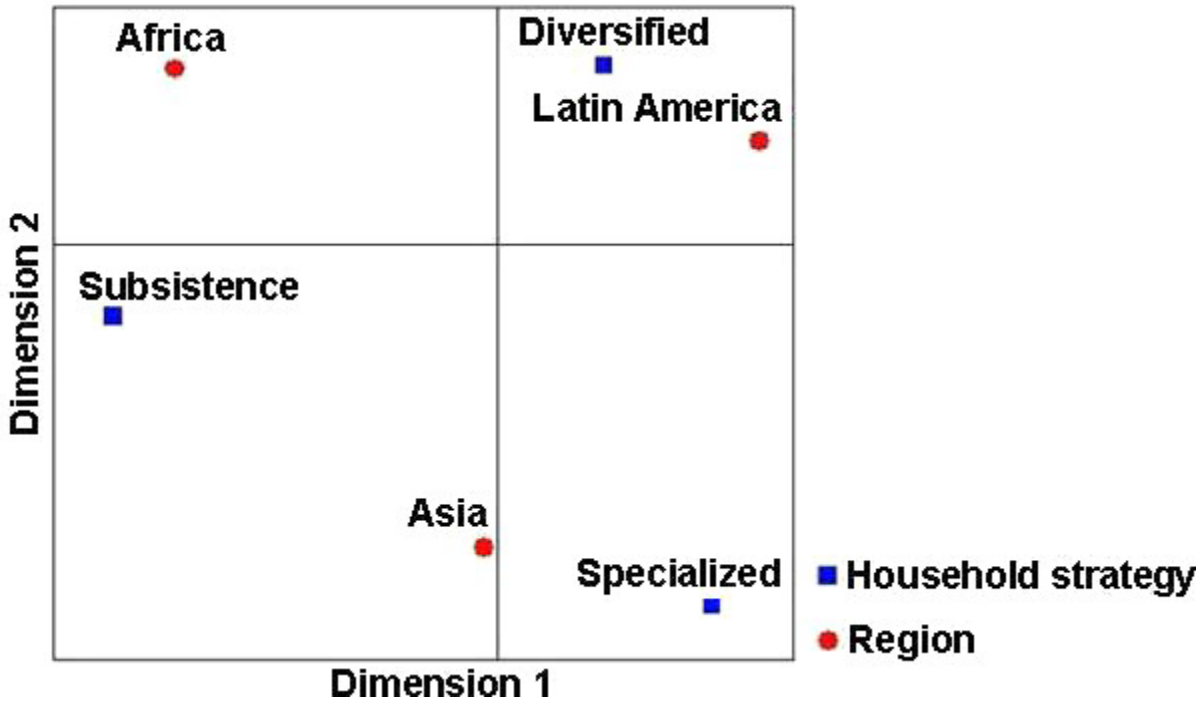
Levels of economic development in the case study sites can be inferred from three variables: road density, local labor rate, and the per capita income of NTFP producers. The African cases have significantly lower values for these three variables than do the cases from the other regions (Table 2). This significant difference is even more marked if we conduct pairwise comparisons of this region with each of the others. The African cases had larger family sizes, more rapid population growth, and lower levels of development than did the cases from the other regions (X^2 = 10.636, df= 4, P = 0.031). This means that the African cases are putting increasing pressure on resources and suffer more climatic restrictions than do the cases from the other tropical regions. Moreover, with stagnant or declining economies in many African countries, there may be greater demand for low-cost NTFPs and lower opportunity costs for commercial harvesters and traders.

We expect that different environmental and development conditions will affect the way forests and NTFPs are used. The analysis of our sample shows that African cases tend to have lower household incomes and smaller trade volumes compared to other regions. They also have growing human populations and an expanding NTFP market demand that increases pressure on the resources. Resources are predominantly unmanaged. Producers' organizations tend to be informal, and there is little government intervention or private investment in the sector.

Asian cases tend to have lower rates of local population growth. In Asia, the forest products are also generally managed more intensively than in Africa, and so there are more cases with a stable resource base. Formal producers' organizations are more common in Asia than in Africa, and producers have a better understanding of their legal rights. Both government interventions and private investment tend to be more common in the Asian cases than in the cases in Africa.

The Latin American cases tend to have intermediate economic conditions and population trends, with more variability within the case set than in the other regions. The NTFP market trends in Latin America are also variable, with a higher frequency of unstable boom and bust situations. There is no clear pattern of management regime nor any stability of resource bases. Producers have a medium level of organization, and they are knowledgeable about their rights. There is some support from government and nongovernment organizations, but little private sector investment.

Fig. 5. A bivariate analysis of household economic strategies by region.



We compared the regional case sets and their household economic strategies using bivariate analyses to provide a regional perspective of global processes and their effects on household NTFP use and trade (Fig. 5). Rather than a geographically determined analysis, the results present a general outlook that indicates regional features. Thus, although it is possible to find all kinds of strategies in each region, the features of the African cases tend to be associated with those of subsistence strategies, Latin American cases with diversified strategies, and Asian cases with specialized strategies.

This result may help to explain the divergence in the literature regarding the potential of NTFPs as tools to improve conservation and local livelihoods. Authors with different regional experiences could be more likely to stress different aspects of NTFP development. For instance, in Africa, researchers often emphasize the safety net and subsistence functions of NTFPs (Falconer 1990, Cavendish 2000). In Asia, which has better developed and more stable markets, research has focused more on market functioning and appropriation by elites (Dove 1993). In contrast, in Latin America, where markets tend to be more innovative and dynamic, researchers tend to stress the importance of

the "green" market, e.g., "rain forest crunch," for NTFP conservation and development (Clay 1992, Evans 1993).

CONCLUSIONS

Classifying forest products according to their role in household economic strategies suggests a continuum from lower to higher levels of development with highly differentiated roles and management approaches. Moving from subsistence to a cash economy drives a process of specialization that leads to higher incomes for producers in absolute terms as well as in relation to average local incomes. Increasing market demand for wild-harvested forest products tends to result in overexploitation, a process that is exacerbated by deforestation. Cultivation and intensified forest management are ways to maintain or increase the supply of valuable products to stable or expanding markets. Secure land/resource tenure stands out as a key factor in the cultivation of trees for nontimber forest products (NTFPs).

Although commercial NTFP production provides important income to producers in each of the three sets of cases, its income potential is also linked to the existence of infrastructure, access to skills and services, and other conditions that have been identified in the nonfarm rural economy literature (Lanjouw and Feder 2001). These features are found less often in Africa than in Asia and most of Latin America. Without them, the commercialization of NTFPs may not deliver great improvements and may lead instead to forest-based economies in permanent poverty. The safety net and subsistence value of NTFPs must be recognized. Nevertheless, interventions need to focus on products and systems with growth potential if poverty is to be reduced and people allowed to do more than meet their basic needs. Intervention plans need to consider opportunities and constraints at the household and local levels. They need to understand the nested relationship between local and regional conditions that link NTFP-based economies with general regional development. NTFP activities can neither be researched nor promoted in isolation from the context of the livelihoods affected by them.

The ways that forests are valued and managed and their role in alleviating rural poverty are being revisited (Byron and Arnold 1999, Wunder 2001, Scherr et al. 2002). Our analysis of 61 cases demonstrates the importance of NTFPs as supplementary sources of income. It shows that NTFP activities follow the same economic principles as other income-generating activities. It also shows that some of the best income-earning opportunities lie in intensified systems that mark a transition from gathering to cultivating and that work to overcome the problem of resource depletion.

Responses to this article can be read online at: http://www.ecologyandsociety.org/vol9/iss2/art4/responses/index.html

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The first two authors shared the lead in the analysis and writing of this manuscript. All the other authors, who are listed alphabetically, made significant intellectual contributions to the paper. We thank the Department for International Development for financial support for the research. The work was made possible by the careful documentation of the 61 individual cases by the case authors listed in Appendix 1. Sven Wunder, J. E. M. Arnold, Doug Sheil, Arild Angelsen, and two anonymous reviewers provided valued help with detailed comments and suggestions on earlier versions.

APPENDIX 1

Table A1.1. List of cases and their authors.

No.	Product	Species	Primary use of the product	Locality of raw material (province, country)	Author
1	Kernels	*Vitellaria paradoxa* C.F. Gaertner	Food (vegetable fat)	Atacora, Benin	Kathrin Schreckenberg
2	Fuel wood	*Acacia seyal* Delile	Fuel wood	Far north of Cameroon	Tata Precilla Ijang

3	Medicinal bark	*Prunus africana* (Hook. f.) Kalkman	Medicine	Southwest Cameroon	Nouhou Ndam
4	Rattan	*Laccosperma secundiflorum* (P. Beauv.) Kuntze	Rattan furniture	Central Cameroon	Defo Louis
5	Rattan	*Laccosperma secundiflorum* (P. Beauv.) Kuntze	Rattan handicrafts	Rio Muni, Equatorial Guinea	Terry Sunderland
6	Chewsticks	*Garcinia kola* Heckel and *Garcinia epunctata* Stapf	Medicine/cosmetics	Western Ghana	Dominic Blay, Jr.
7	Rattan	*Eremospatha macrocarpa* (G. Mann & H. Wendl.) H. Wendl.	Rattan handicrafts	Southwestern Ghana	Charles Adu-Anning
8	Wood	*Brachylaena huillensis* O. Hoffm.	Woodcarvings	Coastal Kenya	Simon K.Choge
9	Root	*Harpagophytum procumbens* (Burch.) DC ex Meisn.	Medicine	Omaheke, Namibia	Rachel Wynberg
10	Fruit	*Garcinia kola* Heckel	Food	Ogun, Nigeria	Atilade Adebisi
11	Fruit	*Dacryodes edulis* (G. Don) H.J. Lam	Food	Edo, Nigeria	Hassan G. Adewusi
12	Bark	*Cassipourea flanaganii* (Schinz) Alston	Medicine	Eastern Cape, South Africa	Michelle Cocks
13	Wood	*Pterocarpus angolensis* DC.	Woodcarvings	Northern South Africa	Sheona Shackleton
14	Wood	*Polyscias fulva* (Hiern) Harms	Woodcarvings	Mpigi, Uganda	Omeja A. Patrick
15	Elephant hunting	*Loxodonta africana*	Sport hunting	Mashonaland, Central Zimbabwe	Dale Dore
16	Palm fiber	*Hyphaene petersiana* Mart.	Palm baskets	Masvingo, Zimbabwe	Phosiso Sola
17	Wood	*Afzelia quanzensis* Welw.	Woodcarvings	Masvingo, Zimbabwe	Wavell Standa-Gunda
18	Bamboo	*Phyllostachys heterocycla* (Carrière) S. Matsum.	Bamboo mats and handicrafts	Zhejiang, China	Fu Maoyi
19	Mushrooms	*Tricholoma matsutake* (Ito & Imai) Singer	Food	Yunnan, China	Chen Ying Long
20	Cardamom	*Elettaria cardamomum* Maton	Spice	Kerala, India	T.K. Raghavan Nair
21	Garcinia fruit	*Garcinia gummi-gutta* var. *conicarpa* (Wight) N.P. Singh	Medicine	Karnataka, India	Nitin Rai

22	Tendu leaves	*Diospyros melanoxylon* Roxb.	Cigarrete wrappers	Madya Pradesh, India	Arvind A. Boaz
23	Ant larvae	*Oecophylla smaragdina*	Bird food	Banten, Indonesia	Nicolas Césard
24	Benzoin	*Styrax paralleloneurum* Perkins	Incense	North Sumatra, Indonesia	Carmen García Fern ndez
25	Damar resin	*Shorea javanica* Koord. & Valet.	Paints, inks, and varnishes	Lampung, Indonesia	Hubert de Foresta
26	Rattan	*Calamus* spp.	Rattan handicrafts and mats	East Kalimantan, Indonesia	Fadjar Pambudi
27	Sandalwood	*Santalum album* L.	Essential oils for perfume	East Nusa Tenggara, Indonesia	Dede Rohadi
28	Wood	*Paraserianthes falcataria* (L.) I.C. Nielsen	Woodcarvings	Bali, Indonesia	Dede Rohadi
29	Wood	*Agathis alba* (Lam.) Foxw.	Woodcarvings	West Java, Indonesia	Pipin Permadi
30	Mushrooms	*Lentinula edodes* (Berk.) Pegler	Food	Chungnam, Republic of Korea	Youn Yeo Chang
31	Bark	*Boehmeria malabarica* Wedd.	Incense	Oudomxay, Laos	Joost Foppes
32	Cardamom	*Amomum* spp.	Medicine	Phongsaly and Huaphan, Laos	Catherine Aubertin
33	Mulberry bark	*Broussonetia papyrifera* (L.) L'Hér. ex Vent.	Paper	Sayaboury and Luang Prabang, Laos	Catherine Aubertin
34	Fruit	*Choerospondias axillaris* (Roxb.) B.L. Burtt & A.W. Hill	Human food	Bagmati, Nepal	Krishna H.Gautam
35	Rattan	*Calamus* spp.	Rattan handicrafts	Southern Tagalog, Philippines	Honorato G. Palis
36	Bamboo	*Neohouzeaua dullooa* (Gamble) A. Camus	Bamboo handicrafts	Bac Kan, Vietnam	An Van Bay
37	Cardamom	*Amomum villosum* Lour.	Medicine	Bac Kan, Vietnam	Dinh Van Tu
38	Rattan	*Calamus tetradactylus* Hance	Rattan handicrafts	Ha Tinh, Vietnam	Vu Dinh Quang
39	Brazil nuts	*Bertholletia excelsa* Bonpl..	Food	Vaca Díez and Iturralde, Bolivia	Dietmar Stoian
40	Hearts of palm	*Euterpe precatoria* Mart.	Food	Vaca Díez and Iturralde, Bolivia	Dietmar Stoian
41	Fruit	*Orbignya phalerata* Mart.	Oil	Maranhão, Brazil	Claudio Pinheiro

42	Fruit	*Platonia insignis* Mart.	Food	Pará, Brazil	Socorro Ferreira
43	Fruit	*Bactris gasipaes* Kunth	Food	Amazonas, Brazil	Charles Clements
44	Fruit	*Endopleura uchi* (Huber) Cuatrec.	Food	Pará, Brazil	Patricia Shanley
45	Leaves	*Baccharis trimera* (Less.) DC.	Medicine	Pará, Brazil	Walter Steenbock
46	Leaves	*Maytenus ilicifolia* Mart. ex Reiss	Medicine	Paraná, Brazil	Marianne Scheffer
47	Hearts of palm	*Euterpe edulis* Mart.	Food	São Paulo, Brazil	Alfredo Fantini
48	Roots	*Pfaffia glomerata* (Sprengel) Pedersen	Medicine	Paraná, Brazil	Cirino Corrêa Júnior
49	Rubber	*Hevea brasiliensis* Müll. Arg.	Rubber handicrafts	Acre, Brazil	Mariana Ciavatta-Pantoja
50	Roots	*Psychotria ipecacuanha* (Brot.) Stokes	Medicine	Alajuela, Costa Rica	Rafael A. Ocampo
51	Pine resin	*Pinus caribaea* Morelet	Turpentine	Pinar del Río, Cuba	Ynocente Betancourt Figueras
52	Palm fibers	*Carludovica palmata* Ruiz & Pav.	Panama hats	Manabí, Ecuador	Rocío Alarcón Gallegos
53	Fruit	*Pouteria sapota* (Jacq.) H.E. Moore & Stearn	Food	Veracruz, Mexico	Martin Ricker
54	Fruit (allspice)	*Pimenta dioica* (L.) Merr.	Spice	Puebla, Mexico	Miguel-Angel Martínez-Alfaro
55	Leaves for fiber	*Sabal yapa* C. Wright ex Becc.	Roofing	Quintana Roo, Mexico	Javier Caballero
56	Tree bark	*Trema micrantha* (L.) Blume	Bark paper	Puebla, Mexico	Citlalli López
57	Wood	*Bursera glabrifolia* (Kunth) Engl.	Woodcarvings	Oaxaca, Mexico	Silvia E. Purata
58	Wood	*Bursera aloexylon* (Schiede ex Schltdl.) Engl.	Woodcarvings	Puebla, Mexico	Paul Hersch-Martínez
59	Bush meat	*Tayassu tajacu* and *Tayassu pecari*	Food	Maynas, Peru	Carlos Cornejo Arana
60	Fruit	*Myrciaria dubia* (Kunth) McVaugh	Food	Maynas, Peru	Mario Pinedo Panduro

61	Fruit	*Uncaria tomentosa* (Willd. ex Roem. & Schult.) DC.	Medicine	Puerto Inca, Peru	Walter Nalvarte

APPENDIX 2

List of variables and information to be included

Background to case study

1. *Year of data.* Provide the year that your year-specific data refers to. Although we will attempt to standardize by using data from 1998, enter a different date here if the bulk of the data does not come from 1998. Individual variables may come from different years. If that is the case, specify the year next to those variables.
2. *Purpose of study.* In a few sentences, indicate the reasons for the original study or studies. Explain if it was the result of academic research, a consulting report, or a conservation, rural development, or other project. Include a note on the scope and duration of the research.
3. *Species name.* Give the scientific name, trade name, and common name of the species in the case study. In some cases, more than one species will be mentioned. Try to provide an assessment of the relative importance in volume terms of the different species.
4. *Locality of raw material production area.* Indicate province, district, township, etc.
5. *Country.*
6. *Latitude and longitude.*
7. *Names of collaborators.* Where different collaborators are contributing different sets of data to the same case study, indicate this on the spreadsheet.

Geographic setting

1. *Spatial extent of the raw material production area.* Indicate the size of the raw material production area for the case study in square kilometers. In cases where the forest/collection area and the village area are adjacent to each other, the spatial extent is the sum of these two areas. Where the village area is embedded in the collection area, then it is the area that people in those villages use to collect the forest product.
2. *Size of the human population.* Indicate the number of people in the raw material production area for the case study, including those in adjacent settlement areas. This number includes all the people living in the area, not only those engaged in the forest product production-to-consumption system. However, large urban centres should be excluded from the raw material production area.
3. *Trend in the growth of the human population.* Has the human population in the area increased, remained stable, or decreased during the previous decade? Include changes resulting from migration. The population is considered stable if change is less than 1%.
4. *Predominant land use.* Indicate major land uses in the raw material production area, recorded in terms of absolute area in square kilometers according to the following categories: rain-fed crop production, irrigated crop production, permanent crops, pasture including savannahs/woodlands that have been reused for grazing, swidden fallow, forest, settled areas, and marsh/swamp.
5. *Level of available transportation infrastructure.* Record the total length of passable roads and rail per square kilometer in the 100,000-ha area centered on the raw material production area.
6. *Forest type.* Indicate the forest type according to the Holdridge classification system.
7. *Elevation of raw material production area.* Give the mean elevation of the raw material production area expressed as miles above sea level. [Erratum]
8. *Soil type.* Note the predominant soil types derived from the FAO Soils Map of the World.
9. *Precipitation.* Record the average annual precipitation of the raw material production area in mm.

Characteristics of the product

1. *Source of the product.*

    A. Animal

        1) Whole or part of carcass, hides, i.e., harvesting kills the animal.

        2) Products made by animals, e.g., honey, silk, birds' nests, i.e., harvesting does not kill the animal.

    B. Plant

        1) Vegetative structure, e.g., leaves, branches, stem, bark, root

        2) Reproductive propagules, e.g., flowers, fruits, seeds, other.

        3) Plant product, e.g., exudate: latex, resin, gum.

        4) Product of parasitic infection of plant, e.g., stick lac, gaharu.

    C. Fungus

        1) Mushroom

    D. Forest

        1) Tourism

        2) Ecological services

2. *Use of product.* Using the list below, indicate the first, second, and third most important uses of the product on a volume basis. In this question, use includes subsistence or commercial use. Select only one product per column.
3. *Perishability of the product.* Indicate the number of days at ambient temperature, but under cover, required for the harvested forest product, air-dried if applicable, to lose 50% of its farmgate value.

Characteristics of the production system

1. *Importance of wild gathering in the raw material production area.* Indicate the percentage of annual production in the raw material production area that is collected from the wild or naturally reproducing population vs. the managed population in a forest/natural environment and the cultivated population.
2. *Importance of wild gathering in international production of the product.* Answer yes or no to these questions: Is there significant national or international commercial production of this product that is harvested from the wild or naturally producing population? From a managed population in a forest/natural environment? In a cultivated population?
3. *Trend toward increasing intensification in the raw material production area.* Note the percentage increase in annual production from a managed/cultivated/ domesticated resource in the previous decade.
4. *Habitat type.* Indicate the percentage of annual production of product in the raw material production area from the following habitat types: primary forest, disturbed primary forest, secondary forest (> 10 yr old or part of a forest system), savannah/woodland, fallow as part of an agricultural system, agricultural fields

with very few scattered trees, plantation, agroforest, coastal/wetland. If this classification does not work for your particular study site, please add and explain the appropriate categories.

5. *Length of the biological harvesting season.* Indicate the number of months per year that harvesting can be carried out based on the biological limits of the organism.
6. *Length of the effective harvesting season.* Indicate the number of months per year that harvesting can be carried out based on climatic limitations, e.g., rainy season prevents access or high humidity limits processing; cultural norms; market demands, e.g., sales only in particular festive seasons; or government regulations, e.g., hunting seasons.
7. *Production technology and labor intensity.* Calculate the average person-days per hectare per year for growing and harvesting the product, but do not include transport to/from the harvesting area.
8. *Production technology and technology intensity.* Compute the average cost in U.S. dollars of inputs other than labor per hectare per year for growing and harvesting the product. This sum should cover tools, bullets, fertilizers, pesticides, etc. The cost of large capital items that last more than a year should be averaged over the typical life of the item.
9. *Gender representation in production.* Indicate the percentage of production and harvesting labor carried out by women.
10. *Land tenure.* Indicate the percentage of production that is carried out under different types of land tenure based on these categories (note that resource rights are covered in a later section): private land, state land, communal land or common property, and open access.
11. *Value of the land.*. Calculate in U.S. dollars the value of the land if rented or sold, including concession fees.

Ecological implications of production

1. *Geographic range.* Choose the appropriate category to indicate the total global area in which the target species lives: large ($> 10^6$ km^2), medium ($< 10^6$ but $> 75{,}000$ km^2), small ($< 75{,}000$ km^2).
2. *Habitat specificity.* Choose the appropriate category to indicate the the number of different habitat types (see above) in which the target species can live: wide (many habitats), moderate (2–3 habitats), narrow (1 habitat).
3. *Regeneration period.* Give the time in years from germination or birth to harvesting maturity.
4. *Reproductive period.*. Give the time in years from germination or birth to reproductive maturity.
5. *Life span.* Indicate in years the average life span of an individual.
6. *Impact of the harvest on the individual.* Describe the effects of harvesting on the individual, i.e., the individual is killed, damaged, or unaffected.
7. *Impact of the harvest on the target species.* Describe the effects of harvesting on the local population of the target species, e.g., the population is declining, stable, or increasing.
8. *Impact of the harvest on the ecosystem.* Describe the effects of harvesting on the ecosystem, e.g., negative, neutral, or positive.
9. *Impact of the harvest on dependent organisms.* Describe the effects of harvesting on dependent organisms, e.g., negative, neutral, or positive.
10. *Exploitation history.* Indicate in years the length of time a resource from the raw material production area has been exploited commercially.
11. *Density.* Indicate the number of economically harvestable individuals per hectare.
12. *Recruitment.* Indicate the percentage of mature individuals within the raw material harvesting area. Harvesting areas may be small areas used for harvesting within a larger productive forest.

Socioeconomic characteristics of the raw material production area

1. *Average household size.* Indicate the average number of people per household in the raw material production area. “Household” designates a unit of production and not a unit of social organization, although in practice these will often overlap.
2. *Number of producers per household.* Indicate the average number of people involved in production per producer-household. Producers include both collectors and harvesters.

3. *Average annual household income.* Calculate in U.S. dollars the average total annual household income, i.e., subsistence + barter + cash, in the raw material production area. Clarify the extent to which the data really represent subsistence use, e.g., many income statistics may incorporate agricultural subsistence but not income from forest products. Specify the nature of all the income data.
4. *National annual household income for data year.* Calculate in U.S. dollars the national average household income for the year of data collection. For large countries with large differences in average household incomes between states, e.g., Brazil, provide both national and state figures.
5. *National annual household income for 1998.* Calculate in U.S. dollars the national average household income for the year 1998. To explore cross-case comparability, we will attempt to get data for a common year. The previous question reflects the reality that much of the data from the studies may not come from 1998. For large countries with large differences in average household incomes between states, e.g., Brazil, please provide both national and state figures.
6. *Integration into the cash economy.* Indicate the percentage of average total income, i.e., subsistence + barter + cash, of households in the raw material production area that is earned in cash.
7. *Local labor rate.* Calculate in U.S. dollars the average daily wage for labor in the raw material production area.
8. *Proportion of households involved in the production-to-consumption system.* Indicate the percentage of households in the raw material production area that are involved in: (a) production, (b) processing, (c) marketing, and (d) production and/or processing and/or marketing. Generally, (a), (b), and (c) do not sum up to give (d) because many households may be performing more than one function.
9. *Trend in household involvement in the production-to-consumption system.* Has the percentage of households involved in production, processing, and marketing the product increased, remained stable, or decreased?
10. *Average household income of producer households.* Calculate in U.S. dollars the average annual household income, i.e., cash + subsistence + barter, of producer households in the raw material production area.
11. *Degree to which the product contributes to the household income of producers.* Indicate the percentage of average producer-household total income, i.e., subsistence + barter + cash, derived from the product.
12. *Numbers of products in the nontimber forest product (NTFP) portfolio.* How many other NTFPs are produced on average per producer household for trade, inclusive of barter? Choose the appropriate category: 0–2, 3–5, 6, or more.
13. *Trend in income from forest product production.* Has relative household income from production of the forest product increased, remained stable, or declined over the previous decade?
14. *Social attitudes toward forest product production.* Do producers of the product have high, medium, low, or no particular status in their local communities? Do producers of the product have high, medium, low, or no particular status at the national level?

Institutional characteristics of producers

1. *Level of organization among raw material producers.* Is there a raw material producers' organization that deals with the product in question? Choose from the following: no, informal, formal.
2. *Effectiveness of the organization.* Is the raw material producers' organization effect on the producers generally positive, neutral, or negative?
3. *Age of the organization.* If there is a producers' organization, how many years has it been in existence?
4. *Degree of participation in the organization.* Indicate the percentage of forest product producers who participate in a producers' organization.
5. *Barriers that prevent new households from getting involved in producing the product.* Are there barriers that make it difficult for new producers to enter the market? If yes, choose one or more of the following: social barriers, e.g., local rules, restrictions of caste, family, or ethnic ties; economic barriers, e.g., the costs of entry are too high for some; technical barriers, e.g., production/processing requires special skills or knowledge; regulatory barriers, e.g., laws preventing entry.
6. *Customary rules governing forest/product use.* Are there local, i.e., traditional or customary, nonstatutory, rules governing access to and management of the product? Answer yes or no.

7. *Respect by the community of their customary laws.* Answer yes or no to these questions: Do raw material producers generally respect the traditional rules governing access to and management of the product? Are the rules effectively enforced?
8. *Effectiveness of customary rules.* Is the effect of traditional rules governing access and management of the forest product generally positive, neutral, or negative in influencing exploitation of the resource for the product in question? Positive would mean resource exploitation tends to be sustainable. Do these rules promote equitable access to the resource? If not, which groups dominate resource access? Do these rules affect total production?

Policies affecting raw material production

1. *Government regulations.* Answer yes or no to the following questions: Are there current government regulations or rules that are intended to influence the production of the product or raw material? If yes, is their effect generally positive, neutral, or negative in influencing exploitation of the resource for the product in question? Positive would mean resource exploitation tends to be sustainable. Do these regulations promote equitable access to the resource? If not, which groups dominate resource access? Do these regulations affect total production?
2. *Incentives, e.g., tax, subsidies.* Are there taxes, fees, or subsidies that are intended to influence the production of raw materials? If yes, is their effect generally positive, neutral, or negative in influencing exploitation of the resource for the product in question? Positive would mean resource exploitation tends to be sustainable. Do these incentives promote equitable access to the resource? If not, which groups dominate resource access? Do these incentives affect total production?
3. *Direct investment by government in research, extension, direct ownership, etc.* Is there government investment to support, encourage, or develop the production of raw materials? If yes, is its effect generally positive, neutral, or negative in influencing exploitation of the resource for the product in question? Positive would mean resource exploitation tends to be sustainable. Does this government investment promote equitable access to the resource? If not, which groups dominate resource access? Does government investment affect total production?
4. *State intervention.* Has state intervention in the production of raw materials generally increased, remained unchanged, or decreased during the past decade?
5. *Legal recognition/resource tenure.* Answer yes or no to these questions: Do raw material producers have the recognized legal right to harvest the product for trade? Do raw material producers have the recognized legal right to change the land use to another production system?
6. *Legal recognition.* Have the legal rights of raw material producers to harvest the product for commercial purposes improved, remained unchanged, or worsened over the last decade?
7. *Community knowledge of legal rights.* Are the raw material producers in the community generally aware of the nature of their legal rights to harvest the product for commercial purposes?
8. *Legal action to claim land.* Have there been any official claims by producers to increase land/resource rights over the past decade?
9. *Relationship between state and traditional (local) laws.* Are state laws and traditional (local) rules conflicting, complementary, or neutral to each other with regard to the product in question?

Characteristics of the processing industry

If there is more than one important end product, this section would be repeated for the most important by volume and the second most important commercialized end product. The questions in this section refer to the entire production-to-consumption system, not just to the raw material production area. Indicate the most important product and the second most important product, e.g., for a case of the baobab tree, bark might be the most important product and fruit the second most important product.

1. *Product.* Use the categories in the geographic setting section in question 2.
2. *Degree of transformation from raw material to finished product.* Rank the degree of processing that is required as low, e.g., fruit, bush meat, or other products that can be used directly by the consumer;

medium, e.g., fiber from grass used for weaving or handicrafts, wood for carvings; or high, e.g., essential oil extracted from a plant and used in incense or as a chemical component in medicine.

3. *Proportion of the value of the forest product in the finished product.* Indicate what percentage of the value of the final product in the main market is represented by the value of the raw material (farmgate price).
4. *Processing steps.* Indicate how many major processing steps, e.g. drying, powdering, distilling, packaging, are performed inside the country and outside of the country? Please list the steps in comments. Omit the out-of-country information if it is too difficult to obtain.
5. *Size of processing unit.*Choose one of the following to indicate the average number of employees, including household members, per processing unit in the step with the largest number per processing unit: 1–5, 6–10, 11–50, > 50). In some cases a processing unit will be a household-run operation, in others a factory that hires employees. How many employees are inside the country and outside of the country?
6. *Gender representation in processing.* Indicate what percentage of the processing labor is carried out by women.
7. *Total number of processors.* Indicate how many processing units use raw materials originating in the raw material production area.
8. *Level of organization among processors.* Answer yes or not to the following question: Is there a formal organization concerned with the processing of the product in question among the processors at the lowest level (primary processors)?
9. *Age of organization.* If there is such an organization, how many years has it been in existence?
10. *Degree of participation in the organization.* Indicate how many processing units participate in the processors' organization.
11. *Effectiveness of processors' organization.* Does the processing organization have a positive, neutral, or negative effect on the bargaining power of processors?
12. *Barriers to entry.* Are there barriers that make it difficult for new processing units to enter the industry? If yes, are these social barriers, e.g., local rules, restrictions of caste, family or ethnic ties; economic barriers, e.g., the costs of entry are too high for some; technical barriers, e.g., processing requires special skills or knowledge; or regulatory barriers, e.g., laws preventing entry.
13. *Regulations.* Are there current regulations/rules that are intended to influence the processing subsector? If yes, is their effect on total production generally positive, neutral, or negative?
14. *Incentives, e.g., tax, subsidies, etc.* Are there taxes, fees, or subsidies that are intended to influence the processing sector? If yes, is their effect on total production generally positive, neutral, or negative?
15. *Direct investment, e.g., research, extension, direct ownership, etc.* Is there government investment to support, encourage, or develop the processing of the product? If yes, is the effect on the total output of processed product generally positive, neutral, or negative?
16. *State intervention.* Has state intervention in the processing of the product increased, remained unchanged, or decreased during the past decade?

Characteristics of trade and marketing

If there is more than one important final product, this section should be repeated for the most important end product by volume and for the second most important end product.

1. *Product.* Use the categories in the geographic setting section in question 2.
2. *Age of market.* Indicate how many years the product has been traded from the raw material production area.
3. *Market trend.* Has the market or the production-to-consumption system for this product expanded, remained stable, contracted, or shown boom/bust characteristics during the past decade?
4. *Total number of raw material traders in the production-to-consumption system.* Indicate the absolute number of first-order traders, i.e., traders who buy from producers of raw materials; second-order traders, i.e., traders who buy from first-order traders; and third-order traders, i.e., traders who buy from second-order traders, in the production-to-consumption system who are involved in trading products that originate in the raw material production area?

5. *Trade opportunities for raw material producers.* To what extent can raw material producers choose whom they sell their product to? Choose from among the following: they can sell to 1 buyer, 2–4 buyers, or more than 4 buyers.
6. *Price of raw material.* Indicate in U.S. dollars the average price/kg of the raw material at the farm or forest gate.
7. *Distance to transportation network.* Indicate in kilometers the walking distance from the raw material production area to the nearest road, river, or rail transport.
8. *Distance to markets.* Indicate in hours how much time is required to travel from the raw material production area to market. What is the mode of travel?
9. *Value of trade in the raw material production area.* Indicate in U.S. dollars the total annual farmgate value of the trade in the raw material originating from the raw material production area.
10. *Value of national trade.* Indicate in U.S. dollars the total annual farmgate value of the national trade in the raw material in the country, including all production areas.
11. *Value of the export trade in raw materials and semi-processed products.* Indicate in U.S. dollars the value of total national exports of raw materials and semi-processed products using Free on Board (FOB) prices.
12. *Total number of traders of finished products in the production-to-consumption system.*. Indicate the absolute number of first-order traders, i.e., traders who buy from manufacturers; second-order traders, i.e., traders who buy from first-order traders; and third-order traders, i.e., traders who buy from second-order traders, in the production-to-consumption system who are involved in trading products that originate in the raw material production area. This question is especially relevant for handicrafts, e.g., wood carving, basket making, etc.
13. *Value of the export trade in finished products.* Indicate in U.S. dollars the value of total national exports of finished products using the raw material from all production areas, not only the raw material production area of the case.
14. *Market transparency.* Indicate the percentage of raw material producers who have an accurate knowledge of what the product is used for, the percentage of raw material producers who have an accurate knowledge of the price paid for raw materials by second-order traders, and the percentage of raw material producers who have an accurate knowledge of the grading standards used by second-order traders.
15. *Perishability of the finished product.* Indicate the number of days required for the finished product to lose 50% of its value under typical storage conditions.
16. *Product adulteration.* Is the finished product subject to adulteration, e.g., the addition of water or other substances? Choose from the following: Always, occasionally, never.
17. *Price variation.* Indicate as a percentage how much higher the price is for high-priced finished products compared to low-priced finished products of the same kind/function.
18. *Importance of "vertical integration."* Indicate the percentage of processing firms that have ownership in firms supplying their raw materials and/or export and marketing firms. (In this question we are considering processing firms that use raw materials from the raw material production area.)
19. *Level of organization among traders.* Is there a formal trade organization?
20. *Age of organization.* If yes, indicate the number of years the trade organization has been in existence.
21. *Degree of participation in the organization.* Indicate the percentage of traders who participate in the trade organization.
22. *Barriers to entry.* Are there barriers that make it difficult for new traders to enter the business? If yes, are these social barriers, e.g., local rules, restrictions of caste, family or ethnic ties; economic barriers, e.g., the costs of entry are too high for some; technical barriers, e.g., marketing requires special skills or knowledge; or regulatory barriers, e.g., laws preventing entry.
23. *Intensity of state involvement affecting forest product trade.* Does the state try to influence the sector through policy instruments such as regulations governing the trade of the product? If yes, is the effect of state involvement generally positive, neutral, or negative in influencing the trade of the product in question? Are there incentives such as taxes, fees, or subsidies intended to influence the trade of the product? If yes, is their effect generally positive, neutral, or negative? Is there direct government investment intended to support, encourage, or develop the trade of the product? If yes, is the effect on total trade generally positive, neutral, or negative?
24. *State intervention.* Has state intervention in the trade of the product increased, remained unchanged, or decreased during the past decade?

25. *Corrupt practices.* Do the regulations create conditions that encourage illegal costs for the trade?

Outside intervention

1. *External support for forest product production/producers/processing/trading.* Have external donors or nongovernment organizations intervened to support the production-to-consumption system by providing assistance of a financial; technical, e.g., training, technical backstopping, etc.; organizational, e.g., capacity building; or political and/or advocacy nature?
2. *Targets of external support.* Has external support from donors or non-governmental organizations been targeted to (a) raw material producers, (b) traders, (c) processing/manufacturing industry, or (d) retail/export industry.
3. *Trend toward increasing or decreasing outside support.* Has outside support from the donors or nongovernment organizations increased, remained stable, or decreased to raw material producers, traders, the processing/manufacturing industry, or the retail/export industry?
4. *External support for forest product production/producers/processing/trading.* Have there been outside interventions from the private sector to support the production-to-consumption system in terms of financial support; technical support, e.g., training, technical backstopping, etc.; organizational support, e.g. capacity building; or political support or advocacy?
5. *Target of external support.* Has external support from the private sector been targeted to raw material producers, traders, the processing/manufacturing industry, or the retail/export industry?
6. *Trend toward increasing or decreasing outside support.* Has outside support from the private sector increased, remained stable, or decreased to raw material producers, traders, the processing/manufacturing industry, or the retail/export industry?
7. *Source of external support.* Which is the main source of external support: local/national nongovernment organizations, international nongovernment organizations, foreign governments, the national private sector, or the international private sector?

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