



CIFOR Poverty Environment Network (PEN) Survey Analysis

Consultancy report

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Publication date:
2013

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Bakkegaard, R. K. (2013). *CIFOR Poverty Environment Network (PEN) Survey Analysis: Consultancy report.*

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CONSULTANCY REPORT

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Riyong Kim Bakkegaard

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1. Introduction and background

An estimated 1.6 billion people are dependent to some degree on forests for their livelihoods, of which 350 million to a high degree for their subsistence or income (World Bank 2004). In Africa, over two-thirds of the total population of 600 million people are dependent to varying degrees on forests for their livelihoods (CIFOR, 2005). There is substantial anecdotal evidence of the importance of forests and environmental resources to rural livelihoods from a range of case studies (e.g. Cavendish, 2000, Fisher, 2004, Mamo et al 2007, Jagger, 2012).

Income generated from environmental products – i.e. products from non-cultivated ecosystems such as natural forests, woodlands, wetlands, lakes, rivers, and grasslands – can be a significant income source for rural households providing energy, food, construction and medicines both for subsistence and cash uses. A meta-analysis of 51 cases from 17 countries by Vedeld et al. (2004) has shown that forest and environmental income can contribute up to 22% of total household income. In Africa, a Zimbabwean case study by Cavendish (2000) found that environmental incomes contributed to 35% of average rural incomes. In Malawi, Fisher (2004) found forest income to contribute 30% of total household incomes, where Mamo et al (2007) in Ethiopia found this to be 39%. In contrast, Ambrose-Oji (2003) in Cameroon found forest resources to contribute between 6-15%. Indeed, the value of forest goods and services are not accurately captured by traditional household income accounting surveys, or often underestimated, or wrongly attributed to other sectors (PROFOR 2008).

As a result, the true value of forests and other environmental products is not captured in GDP measurements and much debate about forest's potential to achieve significant poverty alleviation, as the quantitative contribution of forests is not well-documented (Dasgupta 1993, Oksanen et al. 2003, FAO 2006). CIFOR's Poverty and Environment Network (PEN) (www.cifor.org/pen) was the first international project that attempts to consistently measure the role of forests and the environment in household income and poverty alleviation. Started in 2004, PEN has developed an innovative way of doing research, whereby partners (mostly PhD students) co-supervised by CIFOR researchers use standardized definitions, questionnaires and methods to collect quarterly socio-economic household and village data from 58 sites in 24 developing countries (Wunder et al 2013). Data collection was completed in 2009. The preliminary PEN results indicate that forest and other environmental incomes may on average constitute between one fifth and one fourth of total household income, but with significant variations between countries and cases according to forest quality and abundance, market proximity, and population density, amongst other factors (Wunder et al 2013). The global average puts the forest income share at 22.2% of household income (Angelsen et al 2013), same as found by Vedeld et al (2004).

Continuing systematic collection of forestry data and strengthening the forestry statistics through regularly implemented surveys such as the Living Standards Measurement Study's household surveys would therefore ensure that forest and environmental incomes remain sufficiently documented and would also provide much needed empirical data on forests' role in livelihoods. This is not only essential for designing effective policies and meaningful projects in the forestry sector, but would allow for the broader consideration of natural resource use in rural livelihoods.

According to the World Bank website, the LSMS-ISA is an integrated approach to collecting data on household, agriculture and community. Current surveys suffer serious measurement problems in agricultural income and production data, which affect valuation of welfare contributions (World Bank, 2011; LSMS-ISA,

undated). LSMS-ISA provides the platform for the validation of these measurement issues, relating specifically to crop production and income, household labour inputs, as well as accurate measurements of plot sizes, soil fertility and water resources (LSMS-ISA, undated).

The existing environmental modules in the LSMS examine households’ general environmental priorities for action in rural and urban settings. It includes modules on attitudes and practices of urban air quality, water use, sanitation and fuel use, as well as contingent valuation of improved resource provision (Whittington, 2000). These environmental modules make no explicit attempt to quantify and value forest or environmental product use or forest and environmental-related service provision (e.g. carbon sequestration, watershed services).

Agriculture, livestock and tree crop plantation contributions to income and subsistence consumption in households are included in the LSMS-ISA Agricultural surveys. A separate fisheries module has been created together with the World Fish Center for the LSMS-ISA to capture small-scale fisheries data that can be used to estimate household fishery labour input, input use and expenditures, production and disposition of output (sales and revenues), and household consumption of own-production. It can also be combined with other modules in the household survey to estimate total and fisheries-related income (Béné et al 2012). However, a specific forestry/ environmental module detailing non-timber forest product income or forest-derived product income as well as income generated from other environmental products is yet to be developed. With this in mind, this report draws the lessons learnt from the PEN experience, methodology and approach to assist in the development of a Sourcebook and specific forestry module for the Integrated Surveys on Agriculture under the World Banks Living Standards Measurement Study (LSMS-ISA). A concrete recommendation of the core, extended, and community-level modules that could comprise the separate forestry module is also provided (Appendix 8c) as a starting point for further development, as it can clearly become an instrument that would allow comprehensive collection of forest data and its role in rural livelihoods.

2. Methodological approaches, issues and survey designs in LSMS-ISA, PEN and in collecting socioeconomic data related to forestry.

The PEN experience

At the larger scale, the PEN project focused on measuring the contribution of forests and the environment to household income and poverty alleviation. This global research project surveyed more than 8,000 households over 12 month periods (Wunder et al 2013). Of the LSMS-ISA countries, PEN surveys were implemented in Malawi, Uganda, Nigeria and Ethiopia. Village surveys were implemented at the beginning (V1) and end (V2) of the survey period. Household surveys included an initial annual survey (A1), collecting basic household information; a terminal survey (A2) capturing economic shocks, land-use changes, and other phenomena over the past 12 months; and four quarterly household income surveys (QS1-QS4) using one or three month recall periods (Angelsen et al 2013; see Table 1).

Table 1 PEN Questionnaires and their contents

Questionnaire	Contents
Village Survey 1 (V1)	GPS coordinates, geographic and climate variables, demographics,

	infrastructure, forest land cover/ use, forest resource base, forest institutions, forest user groups (existence)
Annual Household Survey 1 (A1)	Household composition, land holdings, assets and savings, forest resource base (available to HH), forest user groups (participation)
Quarterly Household Survey 1-4 (QS1-QS4)	Income and expenditure (inputs) for forest, forest-based products, fishing and aquaculture, business, wage, agriculture, livestock and other income
Annual Household Survey 2 (A2)	Crises and unexpected expenditures, forest services (cash or in-kind payments), forest clearing (by household), welfare perceptions and social capital, enumerator assessments of households
Village Survey 2 (V2)	Risk (crises faced by village), wages and prices (of agricultural products), forest services (payments or technical support)

Before attempting to create a forestry / environmental module, it is first necessary to define the types of income to be recorded. In the matrix below, products are categorised according to their sources. Importantly, PEN recorded non-forest environmental income, partly to see the relative importance of forests to other ecosystems and natural resources, and also to get a complete estimate of total income.

Source	Forest	Non-forest
Environmental	Forest products from managed and unmanaged natural forests	Non-forest environmental e.g. gold mining, fishing outside forests
Non-environmental	Tree crop plantations (i.e. cultivated)	Other e.g. crop

A basic comparison of LSMS-ISA and the PEN project is presented below in Table 2. Fundamental differences between the two methodologies include sampling strategies employed, structure of the survey design, and the frequency of implementation.

Table 2 Comparison of LSMS-ISA and PEN

Aspect	LSMS – ISA	PEN
Methodology/ frequency - for HH questionnaires	Household based interview, one-off or two visits (post-planting and post-harvest) every 2 years (LSMS-ISA survey timeline). Frequency ultimately determined on country-by-country basis subject to funding availability Recall : 1 week, 1 month, 3 month, 1 year	Household based interview executed every quarter over a 12 month period.
- annual surveys		Recall periods range from 1 month - 3 months Implemented once at start and end of survey period, to collect asset data and household demographics Recall periods in A2: 12 months prior
- community questionnaires	Community questionnaire (frequency and main respondents unknown)	Interview with village head, and village focus group discussions Recall period in V2 :12 months prior
Site selection	Implemented nationwide but necessarily nationally representative	Opportunistic selection of study sites, but fulfils criteria: Tropical or sub-tropical sites, close proximity to forests, contributes to variation at the case level (e.g. region/project boundary) across sites
Household sampling	(selection methodology unknown)	Random sampling in pre-selected study sites

Representativeness	Need for nationally representative sample (LSMS-ISA, undated)	Limited extrapolation of case study data to national samples, due to opportunistic selection of study sites
Survey design	Income components are in separate modules (e.g. agriculture and fisheries)	Various income sources all included in Quarterly surveys. Assets & HH demographics etc (non-fluctuating variables) collected in A1
Implementation	Enumerators employed by National Bureau of Statistics	Enumerators local/non-local, supervised by PhD students
Types of forest and environmental income recorded	Forest / environmental income to be collected in forestry module <u>not definite yet</u> Forest non-environmental (tree crop plantations, and non-forest non-environmental (e.g. crop, pasture etc.) collected in LSMS-ISA HH and Agriculture surveys	Forest, non-forest environmental, forest non-environmental, and other income (e.g crop, pasture etc.)

General methodological lessons learnt from PEN

One of the outputs of PEN has been the production of a book on the PEN survey methodology from start to the end of the research process. “Measuring Livelihoods and Environmental Dependence: Methods for Research and Fieldwork” (2011) is based on the experiences and expertise of the 33 PEN partners who conducted the fieldwork, and PEN resource persons that guided the intellectual process – and important lessons learnt from these experiences drawn from the book and exemplified below.

Survey preparation

Variables to be asked: As Jagger and Angelsen (2011) note, surveys tend to be overloaded. To determine whether or not inclusion is justified, one needs to consider whether there is variation in the variable at the village level, which may influence inclusion into either the household or village survey. Secondly, the importance of obtaining reliable quantitative measures and representative figures may justify inclusion into the household questionnaire. Using the simple matrix below, one can determine which method is best in uncovering information (Jagger and Angelsen, 2011 p.91):

Does the variable vary in the village? →		
Are representative quantitative figures feasible and needed? ↓	YES	NO
YES	Structured household survey	Structured village survey
NO	Key informants, focus groups	Village meeting

Defining terms: PEN developed technical guidelines that set out concrete definitions of concepts which helped in the standardized collection of data (definitions outlined in Appendix 8a).

Survey structure: the sequence of questions plays an important role in determining the reliability and validity of the information uncovered, and can be either done under the interview itself or when the questionnaire is

developed. Questions related to sensitive issues and illegal products could be asked towards the end of the questionnaire or on a subsequent visit, when relationships and trust have been built between the enumerator and the respondent. Also, to aid memory and recall by respondents, one could place questions on certain resource use (e.g. agricultural products), after for example, land area and types of plots owned. This ensures that respondents have these areas in mind when answering.

Survey implementation

Study site selection: In the PEN experience, case study site selection was to some degree dependent on individual PEN partners' research interests and criteria. Sites nevertheless fulfilled three basic criteria that included: (i) being located within tropical or sub-tropical regions of Asia, Africa or Latin America; (ii) close proximity to forests; and (iii) contributing to country or site-level variation to the global data set (Angelsen et al 2013). In choosing study sites for the forestry module in LSMS-ISA, it would be necessary to determine basic criteria that would fulfil the objectives of the project, e.g. representativeness at a national scale.

Site-specific information: Background research on the main forest products that are found in each region is essential. This comprises the original list that can be tested in a pilot and then adapted to add or subtract further important collected products. One method is the use of community focus groups, where the main important products are discussed (particularly seasonal products) or a seasonal calendar is developed. After this list is compiled, it can be integrated into the forest product section so that each enumerator is certain to ask about that particular product. In the PEN technical guidelines (2007, p.22-23), it is suggested that partners:

1. Get a gross list of agricultural and forest products at the national level (official statistics, research reports, etc.)
2. Use the RRA/PRAs, the first village interview (V1), questionnaire pretesting, and proper observation to consolidate the relevance of that list at the district/village levels.
3. Include (print) the list of village-relevant products directly into all the household questionnaires so that the enumerator will remember to ask for all the potential products the household cultivate or harvest. At the end of each table one should also ask if any other products have not been mentioned and are being collected/harvested or cultivated/produced.
4. Similarly it is important to get the full list of local units and their standard measurements, as variations of local unit names could exist. This is useful to avoid confusion when data coding.

Seasonality / temporal variation in products: In season, certain forest products (e.g. *safu* fruit *Dacryodes edulis* in DRC) could provide significant contributions to household income. As a result, timing of the questionnaire and recall periods become very important factors in the accurate capture of this data.

Implementation of quarterly surveys over a year can allow shorter recall periods and frequent visits that may better capture seasonal information. Annual visits capturing data over the past year could also help reflect seasonal variation, but they tend to suffer from poor reliability due to difficulty of recall over such a long time period and is especially true when attempting to recall regular transactions and events, as opposed to unexpected expenditures (Jagger and Angelsen, 2011). Nevertheless, with limited opportunities to conduct quarterly surveys, one could improve the accuracy, reliability and validity of the data in annual surveys by, for example, timing surveys to capture the harvest of the most important products that need to be accurately

recorded, or though identifying these products prior to survey start through e.g. seasonal calendars, and listing them directly into the questionnaires.

Approaching communities: Once communities are selected, introductory meetings are essential. These can take place with the village head where the aims and intention of the research can be outlined. Transparency is key and it is often a good idea to allow anyone from the communities to attend these introductory meetings (Jagger et al 2011a).

Approaching households: In the PEN experience, households within communities were randomly sampled. Methods for random sampling varied from sampling from community lists drawn up at the beginning of the survey start, to transect walks through the village and selection of every *n*th household.

Once selected, willingness of a household to participate in the survey is not necessarily a given and several factors could influence this (from Jagger et al 2011a) including: 1. Timing and availability, 2. Level of research fatigue in the area, 3. Compensation for time spent and participation in survey, and 4. General interest in the research team.

As fields can often be located far from the homestead, villagers could often travel away for an entire day only to return in the evening so making appointments could be helpful. For example in the DRC, household members would often work away in fields most of the day, with the result that the research team would mainly work from afternoon into the late evening and use the daytime for data checking. Intra-household variations in respondents could also affect data validity and reliability, particularly when household heads are asked to account for collection activities of other household members (Fisher et al 2010). As a result, it is useful to be consistent in the interview approach, and circumstances allowing, interview the household member responsible for a particular activity.

Research fatigue can also be an issue as household surveys can often be very time consuming. Reporting back could be one example to 'give back' and give closure to the communities visited. The use of compensatory gifts could also be a good idea, and PEN researchers were encouraged to give practical gifts such as sugar or salt, valued at the daily wage rate (Jagger et al 2011a). Nevertheless, the size, type and amount of the gift needs to be weighed against logistical concerns, especially if the research team can only access remote communities by foot with all questionnaires and camping equipment.

Building trust is also a major foundation for collecting reliable and accurate data, particularly when seeking responses to questions about household assets, savings and other semi-legal activities that could potentially be sensitive. Enumerators need to underline that information extracted from households is confidential and only used for the purposes of research. Therefore developing good rapport is a must and could be facilitated by engaging in community activities, helping in household activities, and being able to speak the local language amongst other things (see Jagger et al 2011a).

Enumerator selection/training /performance: Jagger et al (2011b) outline several factors that need to be considered when building a team. They are: level of education, local language skills, prior experience with surveys, local knowledge of the region or communities and research budget. Enumerators can be external (e.g. students from universities or staff from international organisations), or internal (e.g. members of the community themselves).

Trade-offs do exist. For example, hiring staff from international organisations may be more costly, and make households reluctant to share information about activities that may go against the activities of the organisation (e.g. felling trees). They could have little regional knowledge and therefore require more time to build rapport with local communities. On the other hand, by hiring local staff, households could feel insecure in sharing details of personal wealth and assets, and more time may need to be spent on training as general education levels could be lower. Costs could nonetheless be cheaper.

Once the team is selected, enumerators need to be trained in the survey methods, in order to understand what is being asked, how to approach the households and record data, as well as develop a common understanding of the concepts and questions being asked. It is also useful to have a standard set of definitions and concepts that one can refer to. A further hurdle is translating questions into the local language (see Jagger et al 2011b p.166 for an exercise in translating questionnaires and other tips), but further adjustments could be made after pre-testing the surveys – an essential step to help clarify certain questions, and potentially edit the survey so that the final interview does not become prohibitively long.

Consistency checks of data: In the survey itself, enumerators need to be vigilant that the assets, resources, products and production that are recorded are - on the whole - consistent between surveys and within surveys. For example, cross-checking of land ownership could occur between Village (V1 Section D1) Annual (A1 Section C) and Quarterly surveys (QS):

1. Data on land owned/ cultivated (from Annual A1 Section C and Village Section D1), with land reported under various sections of quarterly surveys (QSB1 col. 3 and 4, QSC2 col 7 & 8 QSD1 col 2 & 3,)

Enumerators could also use common sense to check that labour, land or assets owned and production were generally consistent:

2. Area of land (A1) and amount produced (QS)
3. Assets owned (A1) and amount produced (QS)
4. Labour in household (A1) and amount produced (QS)

And that there was no double counting:

5. Forest products recorded in Section B of QS and forest products used for processing in Section C of QS
6. Wage income recorded in Section F were not recorded as input costs in other income sections (B, C, D, H, I).

Post-survey and other issues

Visual inspection and coding: In the PEN experience, data checking, cleaning and entry took a lot longer for most partners than originally thought, and therefore due time should be dedicated to this. Data checking should take place in the field where it should be feasible for enumerators to go back to households to verify questionable entries. All sections should be filled in, and sections should be checked for consistency by the team leader. Coding should ideally be done by the enumerator who filled out the survey, and requires the development and maintenance of a central coding system.

Subsistence pricing: In data collection of forest products, valuation can be tricky as many products may not be traded, and used only for subsistence. Therefore methods of attributing values to products varied across sites (see Section 3 Country Case studies). Validity and reliability of own-reported values can nonetheless be analysed ex-post: unit values of forest products can be analysed to see if differences in product quality and

quantity are clearly reflected in price differences between the different unit values. Similarly ratio of quantities should correspond to the ratio of unit prices for products that were recorded in more than one unit (Cavendish, 2002).

Missing data and outliers: Missing data are recognised as one of the biggest data quality problems as data can be missing for several reasons. Importantly it is the end user that may need to know why the data is missing, and therefore it is necessary to distinguish between different kinds of missing data (Babigumira 2011). Outliers (observations that are unusually large or small) and inconsistencies are also issues that can be uncovered during the data entry stage. A full description of some methods of ensuring data quality in the data entry phase is described by Babigumira (2011).

Restitution: Reporting back to communities not only shows appreciation to communities for their participation, it can also be useful in validating preliminary findings (Jagger et al 2011a). Furthermore it can help reduce fatigue amongst respondents who feel that information is being returned to them.

Other specific lessons learnt from PEN

- **Codebook** – provided a comprehensive coverage of products, although at times resulted in duplicate codes as a result of the large bulk of studies being done and recording of same data in different sections (e.g. some wild fruits could be collected under non-forest environmental income E, but also planted under agricultural income H). In data checking and coding, one needs to ensure that the right codes are used.
- **Tenure codes** – In many cases rules governing the tenure of land plots can be complex. In PEN, tenure regimes were whittled down into a 3 digit code representing the de jure owner (1st digit), de facto owner (2nd digit) and degree of rule enforcement (3rd digit), which can be difficult to do and to compare across groups (due to the subjectivity of the last digit). In the suggested forestry module (Appendix 8c), the three digit code has been replaced by a simpler delineation of tenure – private, community and state, and open defacto.
- **Plot sizes** - Collecting geospatial information on plot sizes could assist in the monitoring of land clearance and triangulation of own-reported data on forest clearing. Problems in estimating the extent of land under a particular tenure regime may also be difficult (see DRC case-study below).
- **Assets** – were recorded in PEN Annual Survey 1 Section D, only at the start of the survey year, limiting opportunities to analyse wealth changes as a result of forest income or otherwise. Additional collection of asset data at the end of the survey year could allow this. This section also asks about saving in banks and credit associations and gold and jewellery (Question 3 in A1 Section D), which could also be sensitive to uncover (as mentioned above).
- **Shocks and coping mechanisms** – In Section B of the Annual survey 2, households are asked if they “have faced any major income shortfalls or unexpectedly large expenditures during the past 12 months”, and asked to judge “how severe” they were. Degrees of severity were subjective (ranging from no crises, to moderate to severe). Drawing from experiences in studies of subjective measures of well-being, the suggested forestry module could employ a scale that could better allow for inter-household comparisons. One example is a simple 11 point (0-10) numerical scale anchored at end-

points by verbal labels (e.g. none to very severe), which recent high quality studies have shown possess several significant data quality advantages (see OECD, 2013). In terms of responses, harvesting of forest products was included as a coping mechanism, however further identification of the specific products harvested could contribute to more detailed analyses on forests as safety nets of households.

- Time spent on collection activities – This was not systematically collected for each forest product but many forest collection activities also take place together with agricultural activities so recording time spent would account for this. Having accurate measures of labour invested could also contribute to analyses in the trade-off between value for effort. This could be an additional question in a specific forestry module (see Appendix 8c).
- Intercropping – Exact areas of crop were not recorded when several crops were intercropped, with no clear mechanism for separating plot areas dedicated to each crop. This contributed to variance in determining value:weight ratios and local unit conversions, and was only an issue in the cultivated agricultural crops.
- Site selection – Case study sites were often selected purposefully, often to accommodate the research questions of the individual PEN partner, and this needs to be considered when analysing and extrapolating the PEN data.
- “Exploiting the loneliness of PhD students” – The use of PhD students as PEN partners had the advantage of providing a cost-effective method of data collection.
- Village Focus Group Discussions (FGD) – the village surveys were partly answered during Village FGDs. Village FGDs often worked very well, as it gave a good opportunity for villagers and research team to uncover some important issues surrounding resource base decline or increase, and provided a forum to answer questions about the research project itself.
- Stock from one period to another – accounting for stock from one period to another was also challenging, particularly as the PEN survey collected data every quarter. For example, agricultural and forest product stocks (collected in last quarter) that may have been used in processing (for a current quarter) were not recorded therefore possibly contributing to double counting. This could also be incorporated as a separate question in the forestry module.
- Origin of products – PEN focused on determining where forest products originated from, e.g. firewood from fallow for instance. It also assisted in documenting forest product harvest of domesticated sources e.g. medicinal plants.
- Data checking and cleaning – one common shortcoming was the estimated time needed for data checking and cleaning amongst PEN partners. This included, among other things, attributing missing values, errors in data entry, or inconsistencies in recorded data.
- Species level data – excepting PEN partners whose focus was on collection of certain species, the generic PEN household survey did not collect species level data on e.g. bushmeat or timber. This could easily be incorporated in the product lists in the income modules.
- Quantification of units – whilst allowing for collection of data in various units, the PEN survey aimed to uncover income derived from environmental sources and thereby did not systematically standardize units, or provide conversion factors for all units.

3. Key questions that worked well in PEN surveys across different countries.

PEN aimed to address several main research topics. The overall research question outlined in the PEN Technical guidelines (2007) are:

- (1) What is the current role of forests in poverty alleviation?
- (2) How can that role be enhanced through better policy formulation and implementation?

Subtopics to these questions are outlined in Table 3 below, including the sections that address how these questions are answered.

Table 3 PEN survey contributions and methods to analysis of various research topics

Research topic	PEN survey component	Method/ Question types	Remark
Forest dependency in poverty spectrum	Quarterly surveys Section B, C, D, E, F, G, H, I, J and Annual surveys (Section D Assets) Households put into poverty classification based on income and wealth	HH poverty classification based on total income over year (summing QS Section B, C, D, E, F, G, H, I, J), plus value of assets A1 section D and livestock assets section I. Forest dependency (Relative Forest Income) measured as = $\text{Absolute Forest Income} / \text{Absolute Total Income}$	Allowed analysis of whether forest dependency is largely a phenomenon when few alternative opportunities exist - by examining forest income dependency across a range of household incomes in sample
Food security, Forests and current consumption	Section B in A2 and Village survey 2 section B on Risk Section B in QS	Q: "has the HH faced any major income shortfalls or unexpectedly large expenditures during the past 12 months?" A: e.g. serious crop failure Q: "has the village faced any of the following crises over the past 12 months?" A: e.g. widespread crop disease, drought, flood etc. Q: "what are the quantities and values of raw-material forest products the members of your HH collected for both own use and sale over the past month?"	Levels of <u>severity</u> of food shortage were difficult to compare across household (due to subjective severity measure). Coping mechanisms did include harvesting of forest products but the specific products. This question, if asked specifically during the lean seasons, could uncover the important forest products used to support current consumption (Abundance, diversity and derived income)
Shocks and forests as safety nets	Section B in A2 covers crisis and unexpected expenditures.	Q: "How did you cope with income loss or costs?" A: -harvest more forest products -harvest more wild products	This could uncover the diversity of forest products used to cope with shock. As it stands, this section was problematic as the evaluation of severity was

		- (could add specifications of products, and whether they were sold or consumed)	difficult to compare across households.
Pathways out of poverty (e.g. using products to accumulate assets)	Asset data (A1) Livestock asset data (QS Section I)	Asset data was only collected in A1. Would be optimal to have records of assets at the end, to record wealth changes. Collection of livestock data across the four quarters could provide useful panel data on accumulation of livestock assets over the year. This could be tested against corresponding increase/decrease in forest product collection	Little can be said about HH poverty reduction during the year due to only one recording of asset data (A1 Sect D), and no complete overview of HH consumption and expenditure.
Forest product income and use in different environments	Section C in A1 on land available to households and geographical location	Forest income /product change across geographical location OR on differential access to land at HH level	Difference in forest product use over case studies in varying forest types, as well as in different forests (abundance, condition)
Forest product income and use in different institutional contexts	Section C in A1 also record tenure regimes of different land	Forest income/ product change across tenure regimes “what is the ownership status of the natural / managed forest”	Difference in forest product use (abundance, diversity and income earned) can be studied over the varying tenure regimes and management
Forest product income and use across markets	V1 (C question 10)	Forest income /product change across distances to market “what is the distance from the village centre to the nearest market for forest products?”	(Abundance and diversity of) forest products and market proximity can be studied. Also, the importance of processed products can be examined (QS Sect C)
Forest products use and health	No specific section on medicinal plants – sometimes revealed as an important product under V1 (E) Forest Resource Base	e.g. “what is the most important product for the livelihood of the people in the village?” “what are the main products collected from natural/managed forests?”	This could be specifically included as a separate section in the HH questionnaire

Income contributions and forest and environmental products in Sub-Saharan Africa

Angelsen et al (2013) analysed the global PEN dataset for relative income contributions between regions. Table 4 below (from Angelsen et al 2013) highlights some results from Africa since LSMS-ISA countries are located here. Non-forest environmental, crop and business income make up relatively larger shares of income in Africa than in the other regions. Authors attribute the dominance of savannahs, bush lands and other non-forest wildlands in Africa to the large percentage of non-forest environmental income.

Table 4 Absolute and relative income contributions across regions

Income category	Absolute income (\$US PPP)				Relative (percent of total)			
	Global	Latin America	Asia	Africa	Global	Latin America	Asia	Africa
Forest (natural)	422.0 (650.6)	1,353.8 (1,104.9)	262.6 (179.6)	200.7 (274.5)	21.1 (13.1)	28.5 (16.4)	18.4 (9.1)	20.5 (13.8)
Forest (plantation)	18.3 (44.6)	0.63 (2.0)	29.0 (54.9)	16.4 (42.8)	1.0 (2.4)	0.1 (0.1)	1.8 (3.3)	0.8 (1.8)
<i>Forest (natural & plantation)</i>	<i>440.3 (651.8)</i>	<i>1,354.4 (1,104.3)</i>	<i>291.7 (182.4)</i>	<i>217.2 (304.7)</i>	<i>22.2 (13.0)</i>	<i>28.6 (16.3)</i>	<i>20.1 (9.3)</i>	<i>21.4 (13.8)</i>
Non-forest environmental	85.7 (127.5)	119.1 (85.4)	47.1 (37.5)	103.4 (173.3)	6.4 (5.8)	3.6 (2.8)	3.7 (3.0)	9.6 (6.7)
<i>Environmental (natural forest & non-forest environmental)</i>	<i>507.7 (693.3)</i>	<i>1,472.9 (1,1121.8)</i>	<i>309.7 (195.9)</i>	<i>304.1 (394.7)</i>	<i>27.5 (12.4)</i>	<i>32.1 (16.5)</i>	<i>22.0 (9.4)</i>	<i>30.1 (11.6)</i>
Crop	432.0 (405.4)	786.8 (642.3)	425.7 (232.1)	305.4 (333.2)	28.7 (13.3)	18.5 (12.7)	29.1 (13.2)	32.2 (12.0)
Livestock	235.4 (355.5)	578.0 (695.4)	249.6 (218.9)	97.5 (88.4)	12.3 (9.2)	11.7 (10.4)	13.2 (8.4)	11.7 (9.5)
Wage	325.5 (749.4)	1,154.9 (1,589.8)	237.5 (150.3)	86.8 (94.9)	15.2 (10.7)	22.6 (12.4)	17.6 (6.4)	10.7 (8.6)
Business	179.8 (269.6)	328.2 (362.7)	180.6 (314.9)	124.1 (160.9)	7.4 (6.3)	4.5 (4.0)	6.3 (6.4)	10.6 (6.5)
Other	153.5 (254.2)	424.3 (402.7)	169.4 (233.6)	40.7 (43.9)	7.8 (7.5)	10.7 (8.6)	9.9 (9.8)	5.0 (3.1)
Total ³	1,852.2 (1,889.1)	4,745.8 (2,793.0)	1,601.7 (652.2)	975.1 (852.3)	100	100	100	100
N	58	10	21	27	58	10	21	27

In terms of products, Table 5 shows that fuel products (i.e. firewood and charcoal) dominate forest income in Africa, contributing 37.3% of forest income. In value terms, fuelwood dominates other forest products as the most important product (Angelsen et al 2013). Food products contribute over a quarter (27.3%) with structural and fibre products also contributing a quarter (25%). Conversely, food products are mainly derived from non-forest environmental areas, contributing 43.8% of this income source, and are dominated by plant and animal products. The authors find some degree of substitutability, such that in forest scarce locations, collecting food, fuelwood and other products from non-forest environments is relatively more important. An overview of the most important forest products in selected LSMS-ISA countries is given in the country case studies below.

Table 5 Main products providing forest and non-forest environmental incomes (percent of income category, from Angelsen et al 2013).

Product	Forest income ¹				Non-forest environmental income			
	Global	Latin America	Asia	Africa	Global	Latin America	Asia	Africa
Food	30.3	53.0	27.3	24.2	48.9	41.6	60.0	43.8
Plant products	16.6	30.9	14.9	12.7	18.1	17.4	10.8	23.5
Animal products	11.9	21.8	10.5	9.3	28.4	24.0	48.9	15.6
Mushroom	1.7	0.3	1.9	2.1	2.4	0.2	0.3	4.6
Fuel	35.2	13.2	37.3	41.7	20.6	39.2	14.5	18.0
Firewood	31.2	11.7	32.9	37.2	19.6	38.3	11.9	18.0
Charcoal	4.0	1.5	4.5	4.5	1.1	0.9	2.6	0.0
Structural & fibre	24.9	25.4	25.0	24.7	9.9	4.4	9.5	12.3
Sawn wood	7.7	19.1	7.7	3.5	1.1	1.7	1.2	0.8
Poles & construction materials	3.8	0.9	1.8	6.4	0.8	0.2	0.0	1.5
Other wooden products	2.4	1.4	2.0	3.0	0.0	0.0	0.0	0.1
Non-wood products ²	11.0	4.0	13.4	11.8	8.1	2.5	8.3	10.0
Medicine, resins & dyes	5.5	5.2	5.1	5.9	4.0	5.3	1.2	5.6
Fodder	3.0	0.6	4.4	2.9	11.6	9.6	10.7	13.0
Manure	0.8	2.5	0.8	0.1	0.8	0.0	0.4	1.3
Other	0.2	0.0	0.0	0.5	4.1	-	3.6	6.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Absolute value (\$US) ³	433	1,342	281	215	86	119	47	103
Pct. of total income	21.8	28.3	19.5	21.2	6.4	3.6	3.7	9.6

1. Forest income includes income from natural and plantation forests but does not include payments for forest services, which make up 0.36% of total income in the global sample.

2. Includes leaves, thatch and bamboo.

3. All values are per adult equivalent in purchasing power parity (PPP) adjusted \$US.

Note: Subcategories may not add up to main category due to rounding-off with one decimal.

Country case studies

Below are selected examples of country case studies that highlight some issues faced by the various PEN researchers in the field. Malawi, Uganda, Ethiopia are presented because they are LSMS-ISA countries. DRC is also included, as the author has first-hand experience with the fieldwork.

Malawi

The Malawi PEN study includes two sites under the Forest Co-Management program - Chimaliro and Liwonde Forest Reserves in the central and southern regions. Malawi forests are dominated by *miombo* woodlands and *Acacia* woodlands. In the studied communities the major forest products were mainly firewood, mushroom, thatching grass, wild fruits, poles and some medicinal plants. Some specific challenges / issues faced by the Malawi team are outlined in Table 6.

Table 6 Issues faced by the MALAWI PEN team

Issue	Solution
Remoteness of villages	Being prepared for extra time on travel
Attrition – particularly resulting from survey fatigue as well as coinciding with seasonal work elsewhere (2 nd phase in January 2007)	Little can be done about attrition, but the PEN partner had decided to inflate the sample for each site from 150 to 200 HHs
Quantifying some local units into metric units	Local units and their value were used instead in data entry
Complex and unique coding systems	Extra training for enumerators

Lost a few enumerators in the course of the survey year as a result of them entering permanent employment.	Had a backup of enumerators. Nevertheless, given complexity of survey, holding onto same enumerators was essential.
Subsistence pricing	Area was previously surveyed in 2002 so finding estimates of product values was relatively easy. When they did not know, respondents were asked how much they would be willing to pay for that product to be sold

Uganda

The Uganda PEN study included three purposively selected forest sites in western Uganda: Rwenzori Mountains National Park; privately held forest southeast of Bugoma Central Forest Reserve; and Budongo Central Forest Reserve. These sites were a subset of sites sampled by a World Conservation Society study in 2003.

The major forest products collected in the different forest sites are given in Table 7, and main issues faced by the Uganda team are outlined in Table 8.

Table 7 Main forest products in different Ugandan PEN forest sites

Forest site	Budongo	Bugoma	Rwenzori
Main forest products	Timber Fuelwood Building materials (poles and ropes) Thatch	Fuelwood Wild foods Building materials (poles and ropes)	Fuelwood Timber Wild foods (including meat) Ropes Bamboo Medicinal plants

Table 8 Issues faced by the UGANDA PEN team

Issue	Solution
Remoteness of villages and access during rainy season	Preparation for extra travel time and costs
Attrition due to illness, illness in team	No solution under fieldwork, but for future reference: January – March high malaria incidence.
Alcoholism amongst communities	Interviewing HH early in the day, or interviewing alternate members, or rescheduling
Language diversity	Need for extensive translation of surveys
Method of subsistence pricing	Price from first-hand sale, or village price, or nearby market price or own estimations using conversion factors. As last resort, used the value the HH would be willing to accept for the product

Ethiopia

The study site was located in *Arsi Negele* district, specifically in two geographical branches of the forest frontier zone of *Shashemene* Forest Industry Enterprise that had the most natural forest cover and greatest variety of forest types. The villages were selected for their variation in degree of enforcement, market access, forest

abundance and types, poverty and population density. Main forest products in the villages in the lowland zones include firewood, thatching grass, fodder, along with charcoal trading. In the midland zone villages, forest products included firewood, poles, timber, grass and fodder as well as charcoal trading. Main issues faced by this country team are outlined in Table 9.

Table 9 Issues faced by the ETHIOPIA PEN team

Issue	Solution
Conflict in initially chosen sites	These sites were dropped after careful consideration and monitoring of situation
Suspicion from households about the survey, unwilling to disclose information	Assurance of confidentiality and repeat visits to build trust
Data entry and cleaning not budgeted for, and took a lot of time	This was a necessary stage of data processing, so funds had to be found
Information on illegal activities difficult to obtain	Necessary to rely on secondary information
Method of Subsistence pricing	Relatively easy as most products were traded, otherwise values imputed from village prices

Democratic Republic of Congo (DRC)

The study sites were located around Luki Biosphere Reserve in western DRC. Forest type is lowland humid forests, and villages were purposively selected on the basis of their variation in distance to market, and their location in and around buffer zones. Sampling of households was done from either random number selection from village lists or through selection along transects. Main forest products included firewood, bushmeat, eru (*Gnetum africanum*), mushroom, caterpillars and wild fruits. Main issues are outlined in Table 10.

Table 10 Issues faced by the DRC PEN team

Issue	Solution
Remoteness of sites, great distances	Research team stayed on sites, which facilitated rapport and trust building between team and communities
Asset data collected in various currencies	Asset data collected again during 3 rd and 4 th visit to get approximate modern day value
Inaccurate estimations of land holdings within villages	Triangulation through Landsat images owned by local NGO
Language diversity	Although questionnaire was in French, local languages were dominant, so questionnaire sometimes had to be translated in up to 4 different local languages (thus having enumerators with these skills was important)
Lack of enumerator confidence in first quarter affecting data quality	Intensive reflection sessions, interviewing in pairs (two enumerators together) and group sessions
Method of subsistence pricing	Methods were: Own-reported values, estimation of market value by respondent, amount respondent would be willing to sell product for
Quantification of subsistence reporting	Quantify number of meals using that product and multiply to determine a monthly figure

Example of a Forestry module

Appendix 8c presents an outline of a core, extended and community-level forestry module. All sections are either modified from the PEN household and village surveys, or modelled after the Fisheries module. The core module consists of:

1. **Income** – covers forest, forest-derived, non-forest environmental income and other forest-related income generated over past 12 months. Similar to the fisheries module, a column on labour (time spent) is included, with the recognition that forest product collection often occurs as a part of other livelihood activities (e.g. visits to the field) rather than full time. Furthermore, collecting this information could add to analysis of trade-offs between value for effort (see Section 2 Other Specific lessons learnt from PEN). A column recording stocks of forest products used in forest derived income has also been added (Table B2).
2. **Assets** – forest related assets can be recorded in this section, modelled after the LSMS survey components on assets. It is designed to be added directly in to the LSMS Household survey in cases where the forestry module is implemented.
3. **Access** – records data on households' access to the nearest forest resource base.

The community module – questions that can be posed to a community focus group – consists of:

1. **Calendar** – of forest and environmental resources, with options to specify when harvest and sale mainly takes place. This section is modelled after the calendar in the Fisheries Module. In doing this calendar, one could choose when implementation of the forestry module would occur to capture most accurate data on forest products, or in a high or low/lean season
2. **Infrastructure and support** – covering distance to road, river and markets. Although some questions are covered in the LSMS Household surveys, an important addition is collection of data on markets for forest products (distance, time taken and mode of transport), and in general this needs to be streamlined with the existing sections in the LSMS. This section also documents source of cash, in-kind and other support related to forests and forestry services received by the community. Here it would be beneficial to link with existing sections on salary earned e.g. payments related to Eco tourism may not necessarily be an individual transfer but also include payments to villagers employed as forest guards (which would be recorded in the salary section) .
3. **Most Important Products**–the economically and socially important products in the community are asked. This is a good basis prior to collecting income data at the household-level (i.e. knowing what products to collect data for- see Section 2 above Pre-survey essentials). Origin of products (land type) as well as ownership status of land where products are collected in this module.
4. **Units and pricing** – local units for forest products and metric conversions are recorded. Pricing of products can also be done– if sold, average price over the year should be recorded. If used for only subsistence, hypothetical valuation techniques should be used i.e. what price villagers would be willing to pay for product.

Optional modules are also included, and depend on the relevance to the implementing country. These include:

1. **Shocks** – this module is asked at a household level and covers any idiosyncratic shocks faced by households in the recent year, with options on selecting how forests may have been used to cope with the shocks. Evaluation of severity of shock has been modified to an 11-point scale commonly used in subjective valuations. This section could be integrated into the existing sections on shocks and coping strategies of the LSMS Household survey.
2. **Forest clearance** – this module is also asked at the household level, covering clearance of forest over the past year and reasons for clearance. This particular section in the PEN experience, however, didn't work as optimally as hoped in collecting information on local forest clearance due to the sensitive nature of clearing activities and problems in determining temporary clearing, which may have led to underreporting. Measures of deforestation could be better achieved with the integrated use of remote sensing/ other geo-spatial data.
3. **Land cover and tenure** – this section collects data during a community focus group or meeting on the types of land at the village level, ownership status of land types, and main forest and non-forest environmental products grown on the land types. It also includes a section on forest types found in the community, as well as the main users and the main types of products are collected from these forest types.
4. **Forest institutions** – this covers the rules that regulate the collection and use of certain forest products, and is designed to be asked at a community focus group or meeting.

In further developing the forestry module, it is important to note that parts of the LSMS-ISA household, community and agriculture module need to allow for forestry module add-ons. For example, transfers made to the community for eco-tourism above should be able to also record salaries to eco-guards in the relevant salary sections of the LSMS HH survey. Another example is shocks – the additional module on shocks (created above) could be integrated into existing sections on shocks and coping strategies to avoid overburdening the household survey.

4. Future plans of integration of different sources of data in data collection design, analysis or presentation

In the existing PEN surveys, use of geospatial information was limited and was highly dependent on the research questions of the individual PEN partners. In analysis of forest clearing, some PEN partners could, for example, employ remotely-sensed imagery to provide data on land cover change and forest clearing by households (e.g. Wyman and Stein, 2010; Duchelle et al 2010). Other options for future integration of different sources of data could include using existing studies or inventories. For example, in Tanzania, a LSMS-ISA country, the National Forest Resources Monitoring and Assessment project or NAFORMA which is funded by government of Finland (NAFORMA 2013) is conducting the country's first-ever comprehensive forest inventory that could be integrated with socio-economic information collected by the a pilot forestry module.

5. Key elements to consider while developing forestry modules in LSMS-ISA

Scope

PEN data aimed to analyse various research questions (outlined in Table 3) covering some of the dynamic roles that forests play in rural livelihoods. Taking basis in the fishery module developed by the LSMS-ISA, it is recommended that any core module should at least include income data from forest products and forest-derived products, as well as income from other non-forest environmental sources. It should also cover household access to forest resources (as found in PEN A1 Sect C and E) (see Appendix 8c). Community modules are also necessary to collect local contextual data e.g. market access and infrastructure. The extent of additional data will largely depend on the research questions that should be answered by the data collected by the LSMS, but suggestions for optional modules are provided in Appendix 8c.

Frequency

Use of panel data can provide more accurate data on past events and provide useful data to estimate change in a household and are also more reliable in measuring changes in mean values of certain household or individual characteristics, i.e. that they are not by chance alone. Cost-wise, one can save on not having to collect basic information on households. Alternatively, transferring basic information to the next survey could be more costly than multiple cross-section surveys, and more time could be taken to locate the previously interviewed households (Glewwe and Jacoby, 2000). Attrition also needs to be factored in when following household, and can be costly in terms of losing data points. In fact, surveyed households in PEN that had 2 or more missing quarters were dropped from the dataset and therefore PEN partners inflated their samples by 10% (Angelsen et al 2012; PEN, 2007).

The frequency of survey implementation could play a large role on the accuracy of data collected on forest products. For instance, as noted above, in an area where seasonal products are common and make large income contributions to households, frequent recurrent visits (e.g. quarterly) with short recall periods could be used to yield more precise results (Jagger et al 2012). Other advantages of repeated visits include building and maintaining trust and rapport with the communities being visited and opportunities to verify uncertain data – both of which lend to increasing the reliability and validity of the data collected.

Site selection and inter-site comparisons

Section 3 above highlights the differences between regions and countries in terms of forest products collected. Identification of the most important products to that site will be useful in ensuring that details of that product collection are recorded, entered and analysed correctly so that correct value is attributed. One example is firewood – this turned out to be the most important product in the PEN global dataset in terms of value, and therefore required extra attention when recording and checking the data, and converting and standardizing local units across sites.

In addition, political, socio-economic and cultural factors are also likely to vary widely, as will the concepts such as forests, ownership, and other aspects of resource use. As a result, it is extremely useful to have a common list of definitions that can be systematically employed and consequently permit inter-site comparisons.

6. Feasibility for the pilot studies related to the future work of PEN

Data collection phase of PEN has ended, and no future collection of data is planned. However the University of Copenhagen is coordinating a project in Tanzania, aimed at designing an environmental module, field testing and analysis. It was unfortunately rejected for funding by the Danish government for this year but plans to resubmit in the following year are in the pipeline. The proposed timeline will be well into 2016.

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8. Appendix

a. List of PEN definitions

(from PEN Technical Guidelines, 2007)

Term / concept	PEN definition	Origin
Forest	<i>lands of more than 0.5 hectares, with a tree canopy cover of more than 10 percent, where the trees should be able to reach a minimum height of 5 meters in situ, and which are not primarily under agricultural land use.</i>	FAO
Natural forest	<i>consists of indigenous (native) tree species. It is managed only to a very limited degree, i.e., one may practice "tolerant forest management in which the native vegetation is largely conserved or reconstructed through successional processes (Kiersum 1997)"</i>	
Managed forest	<i>consists predominantly of indigenous vegetation, and with active management to increase the frequency and productivity of beneficial species. The management will include felling (trimming, thinning in addition to regular harvesting) and planting of indigenous and/or exotic species.</i>	FAO
Plantation	<i>consists of forest stands established by planting and/or seeding in the process of afforestation or reforestation. They are composed either of (a) introduced species (all planted stands), or (b) intensively managed stands of indigenous species, which meet all the following criteria: one or two tree species planted, even age class, regular spacing.</i>	FAO
Closed forest	have a canopy cover above 40 %. Examples include tropical rainforest and mangrove forest.	FAO
Open forest	have a canopy cover between 10 and 40 %. Open forests generally have a continuous grass layer. Examples include the wooded savannahs and woodlands in Africa, and part of the <i>cerrado</i> and <i>chaco</i> in Latin America.	
Cropland	land from which crops are harvested.	FAO
Plantation	land with trees grown for wood or timber	FAO
Fallow	Idle cropland which is part of an agricultural (cropping or pastoral) rotation system, but which is temporarily not being cultivated. to qualify as fallow the age should be below 15 years <i>and</i> there should concrete plans for bringing the land back into agricultural use.	
pasture	where grasses and/or legumes have been established by humans and/or involve some other form of active management.	
Agroforestry	agricultural land use that combines growing trees (woody perennials) with annual (<i>herbaceous</i>) crops, either on a spatial or temporal scale."	ICRAF
silvipasture	combination of trees and pasture. To qualify as a silvipasture system, either the trees or the pasture (or both) must have been established by humans.	
shrubs	vegetation types where the dominant woody elements are... woody perennial plants, generally of more than 0.5 m and less than 5 m in height on maturity and without a definite crown	
Thicket	Shrubs with a closed canopy	
Grassland	Land which has naturally occurring grass as the predominant vegetation. If it has trees scattered around (and canopy cover below 10 %), it is referred to as <i>savannah</i> or <i>wooded grassland</i> , but is still categorized as <i>grassland</i>	
Wetlands	Land areas where water saturates the soil, either permanently (<i>swamp</i>) or parts of the year. <i>Mangrove</i> forest is often considered a wetland, but should in PEN research be	

	included in the “unmanaged natural forest” category. If a wetland is used for agriculture, e.g. for paddy rice, it should be included in one of the agricultural land categories.	
Income	the value added of labour and capital (including land).	
Barter	A form of trade where a commodity (e.g., agricultural produce) or service (e.g., labour) is exchanged for another commodity or service, without any monetary transactions involved.	
Gift	the transfer of a commodity or service without any direct compensation.	
Forest Products	products collected from a forest. Forest products include timber and a wide range on non-timber products (NTFPs), both tree-based (e.g., fruits), various plants (e.g. tubers), and fauna (e.g., caterpillars or bush pig). A product harvested or collected from the forest is defined as a forest product if its supply depends on the existence of the forest, i.e., it will disappear if the forest is gone. E.g. minerals, fish, game meat, forest products outside forests, forest services.	
Environmental income	<i>incomes (cash or in kind) obtained from the harvesting of resources provided through natural processes not requiring intensive management.</i>	
Forest income	PEN distinguishes between four types of forest income: 1. Income from self employment in the harvesting of forest products in the raw , and used or sold in an unprocessed way. Section B of quarterly household survey (Q1-Q4). 2. Income from self employment of processed (value added) forest products, e.g., woodcrafts and carpentry. Section C (Q1-Q4). 3. Wage income from employment in forest based activities, such as logging or tourism. Section F (Q1-Q4). 4. Direct payment (transfers) to the household for forest-based environmental services, e.g., carbon credits or profits from community-based forest ecotourism. Section C (A2).	
Forest User Group (FUG)	<i>a formal or informal association of forest users, responsible for a set of activities related to setting, implementing and/or enforcing rules of forest use and management. The group must have a minimum level of organization, including a clear understanding of who are the group members, regular meetings at least once a year, and some joint activities during a year (but all members may not necessarily participate in these).</i>	
Village	the lowest administrative unit in an area, normally under the jurisdiction of a village leader/council.	
Household	a group of people (normally family members) living under the same roof, and pooling resources (labour and income). Labour pooling means that household members exchange labour time without any payment, e.g., on the farm. Income pooling means that they “eat from the same pot”, although some income may be kept by the household member who earns it.	

b. Malawi and Ugandan LSMS-ISA with forest-specific questions

c. Example of a forestry module

d. PEN questions for LSMS