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Measuring forest and wild product contributions to household welfare: Testing a scalable household survey instrument in Indonesia☆

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ABSTRACT

Systematic comparisons of human dependence on forests and environmental resources have been challenging, as a result of heterogeneous methodologies. Specialized Forestry Modules have been developed, with the goal of filling current information gaps concerning the economic importance of forest and wild products in household welfare and rural livelihoods. Results from a pilot assessment of the Forestry Modules in West Kalimantan, Indonesia, are presented, showing that the Forestry Modules perform well in extracting the expected information: mean per capita forest and wild product income shifts according to the geographical "forest gradient". Significantly, in the forest-rich upstream village, mean forest and wild product income and mean forest-related wage and business incomes exceeds current mean agricultural income statistics for West Kalimantan and mean non-agricultural rural household incomes in the lowest bracket. Consumption of forest products and importance as a coping strategy was higher in the most upstream village, where sale of forest products in times of shock was more marked in the most downstream village (where forest coping strategies were also least important). The Forestry Modules' detailed and systematic approach can help ensure that contributions of forest and wild products are not underestimated in national figures.

1. Introduction

Forests usually play important provisioning and supporting roles in the livelihoods of rural households (Byron and Arnold, 1999; Sunderlin et al., 2005). Some figures estimate that as much as 90% of those who live in extreme rural poverty are to some degree reliant on forests for their livelihoods (Chao, 2012). Beginning with seminal studies nearly two decades ago (e.g. Cavendish, 2000), a growing body of case-studies from a range of contexts showed that products and services from non-cultivated ecosystems (such as natural forests, woodlands, wetlands, lakes, rivers and grasslands) can be significant sources of income for rural households, providing energy, food, construction materials and medicines, both for subsistence and cash uses (e.g. Bakkegaard et al., 2016a; Fisher, 2004; McSweeney, 2004; Mamo et al., 2007; Appiah et al., 2009; Rayamajhi et al., 2012).

However, systematic comparisons of human dependence on forests and other environmental resources have been challenging, as research to date has been comprised primarily of case studies using heterogeneous methodologies. In the 2005 World Development Special Issue on 'Livelihoods, Forests and Conservation', one of the main conclusions was that more worldwide studies, or synthesis of case studies, were needed in future research (Sunderlin et al., 2005). This call led to a global meta-study by Vedeld et al. (2007), synthesizing 54 case studies with an estimated average forest income contribution of 22%. The Center for International Forestry Research (CIFOR) initiated the Poverty and Environment Network (PEN), a pan-tropical comparative study with cases in 24 countries, where household (including forest-related) income was scrutinized using best-practice standardized methods, such as quarterly household surveys (www1.cifor.org/pen). PEN results showed an average contribution of 27.5% forest and environmental income to households living in or near forests; a figure that was only marginally lower than that of crop income (Angelsen et al., 2014). Other studies found that even people living in areas of lower tree densities may still rely substantially on the extraction of surrounding wild resources (Shepherd, 2012).

Given these indications of the importance of forests to the well-being of rural populations in many contexts around the world, there is a strong case to routinely include an adequate set of questions regarding households' reliance on forest and wild products in household welfare surveys that are used for policy development and evaluation. However, at present there is a systematic failure by the world's key household-

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level socioeconomic surveys to capture the full contribution of forest and environmental income in rural livelihoods (GTZ, 2004; FAO, 2008; World Bank, 2008).

A set of standard methodologies that consistently measure the welfare contribution of forests and the environment to household income and poverty alleviation could eventually ensure that forests and other environmental products are more reliably captured in local livelihood metrics, regional poverty measures, and national gross domestic product (GDP). Nevertheless, several measurement and data collection challenges are associated with this goal. For instance, forest product extraction may be illegal, so that respondents may be uncomfortable reporting it in a household survey. Forests may provide essential subsistence-oriented products, but lacking a market price makes it difficult to value accurately (PROFOR, 2008; Wunder et al., 2011). Furthermore, extraction of many forest products is markedly more seasonal and sometimes related to specific events, such as household shocks, than average household income, for both forest supply and demand reasons (Byron and Arnold, 1999).

Despite these challenges, work towards a standardized data-collection process for the contribution of forests to household welfare has been progressing in recent years (Angelsen et al., 2011). Yet, developing nationally representative data on the role of forest and wild products in the household economy requires a more systematic approach across forest types and ecoregions that considers how to deal with background factors determining the levels of resource use (e.g. population density, ethnicity, forest cover, or proximity to roads).

In response to this challenge, FAO along with CIFOR, IFRI (International Forestry Resources and Institutions), PROFOR (Program on Forests, World Bank), and the LSMS-ISA team of the World Bank (Living Standards Measurement Study – Integrated Surveys on Agriculture) have joined forces to develop specialized modules on forest and wild products (hereafter referred to as Forestry Modules), with the goal of filling current information gaps concerning the economic importance of forest and wild products. The work involved two phases. In phase one, three reports were produced: (1) a review of the coverage of forest-related socioeconomic issues in selected surveys (Russo, 2014); (2) a micro-data analysis of selected socioeconomic surveys (Riggott, 2014); and (3), an analysis of CIFOR's Poverty Environment Network (PEN) survey (Bakkegaard, 2013). Phase two included: (1) the development of standard and expanded survey modules on forest and wild products; (2) field testing of modules in three different country contexts (including testing of a tablet version); and (3) producing a sourcebook to guide potential users (http://foris.fao.org/preview/90390/en/). The primary goal is for national statistical offices to integrate this module into national-level household socioeconomic surveys, thus providing more complete information on national income, welfare, and livelihoods.

The Forestry Modules include household-level and community-level instruments to collect data on the welfare contribution of forest and wild products (and forest services) to rural households. They cover 13 different themes including aspects such as direct income, wage-related income, business-related income, health, construction and energy contributions, among other themes, as well as qualitative data on governance of forests and its resources, and their importance in crisis or coping responses. In the modules, forests are defined according to the FAO (2006, p. 169) definition as:

Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ*. It does not include land that is predominantly under agricultural or urban land use.*

This definition encompasses old-growth natural forest, secondary and regenerating natural forest, and managed plantations. Forest products are therefore products originating from forests as defined above, and include timber and a wide range of non-timber forest products (NTFPs), including tree-based products (e.g. fruits and nuts), plants (e.g. tubers), and animals (e.g. bush-meat), and including other wood products derived from e.g. trees on farms. Wild products refer to products originating from "non-forest" and "wild" systems (e.g. other wooded lands, savannahs, *miombo*, fallows, scrub-, grass- and rangelands). Encompassing non-forest wild products is important, as their combined harvest in some environments can exceed the value derived from forests (e.g. Pouliot and Treue, 2013). Excluded from the module are products grown in agricultural lands (cropland, pastures, agroforestry, silvipasture, fallow areas) and cultivated and captured resources from aquatic environments, which are already covered in the LSMS under the Agricultural (World Bank, 2015a) and Fisheries Modules (World Bank, 2015b), respectively.

The objective of this paper is to present the results from a pilot assessment of the Forestry Modules in Indonesia, and scrutinize their effectiveness in capturing key socioeconomic data related to forest and wild products. We do this by first presenting an existing official tool that measures socio-economic data in forest areas, namely the Indonesian Forestry Survey, and then we turn to a description of the pilot site, the Forestry Modules and the main results of the assessment of the survey tool. We present the results of forest and wild product income across the village sites, which we predicted would reflect the gradient in forest cover and forest types, if the Forestry Modules were effective in collecting the data they were designed for. From the most important sections of the Forestry Module (in welfare terms), the "Income" and "Shocks and Crises" modules, we present some in-depth substance findings from the pilot test. We then conclude with insights into further areas for methodological development, as well as on the contribution of forest-related data to national-level planning processes.

2. Pre-existing Indonesian sources of forest-related socioeconomic data

There are several pre-existing Indonesian data instruments that aim to collect socioeconomic data on households. A few years apart, different national household surveys have been carried out across Indonesia, including national socioeconomic household surveys since 1976, the Family Life Surveys since 1993, and agricultural censuses every decade starting in 1963. Following the 2003 Agricultural Census, several subsurveys were developed and carried out in 2004, including the Indonesian Forestry Survey[1], which collected data on households living within, or on the fringes of forest areas. The Indonesian Forestry Survey was Indonesia's first attempt at gathering comprehensive data on households' use of different types of non-private forests, including conservation areas and protected forest areas, according to reviews of national socioeconomic surveys back to 1990 (www.rand.org/labor/bps/susenas). At least as far back as 1990, the national socioeconomic surveys collected data on products gathered in the forest, but were limited to rough estimates of yearly collection, consumption, and sales based on retrospective questions. The Forestry Survey was repeated in 2014, following the 2013 Agricultural Census. According to Statistics Indonesia (2014), the primary aim of the Indonesian Forestry Survey was to collect data on shifting cultivation, harvesting of forest products, and the socioeconomic condition of the households residing within, or in close proximity to, forests, primarily to allow the government to establish effective plans and policies to develop communities within or near forests. The survey components record a yes/no participation in, or occurrence of, an activity in a checklist form, rather than documenting the actual value or quantity.

Given the intended aim of the Indonesian Forestry Survey, the results highlight some of the difficulties in obtaining quality data on forest income. Though the survey includes questions regarding different types of product quantities extracted from forest areas, the lack of price or

[1] https://sirusa.bps.go.id/webadmin/kuesioner/2014_3352_ques_ST2013-SKH.S.pdf. A guidance for agricultural and forestry survey has also been developed. https://sirusa.bps.go.id/webadmin/pedoman/2014_3352_ped_Pedoman%20Pencacah%20ST2013-SKH.PCS.pdf.