

## Analysis

# Forest Resource-based Household Economy in the Communities of the Nanay River Basin, Peruvian Amazonia



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## ABSTRACT

Resource use in rural communities is an important factor affecting local livelihoods and forest conservation in Amazonia. In this paper, we estimate the income obtained from roundwood and irapay palm (*Lepidocaryum tenue* Mart.) fronds by 79 households living in three Amazonian rural communities where harvest and trade of forest products is the main economic activity. These communities are found in the upper, mid-upper and mid-lower Nanay River Basin (northeastern Peru). We analyze data from a survey of these households conducted in 2009–2010. Results show that both work time and forest income are the highest in the upper Basin, the area furthest from the main urban market in the region, Iquitos. The highest forest income per hour worked, however, is found in the mid-upper Basin. The estimated incomes are equivalent to a low-to-mid level salary in Iquitos, suggesting that the economic incentive is not high enough for these rural households to move to an urban area. Our findings also indicate that the most remote community may be more vulnerable to resource access regulation changes.

## 1. Introduction

National and international statistics usually fall short of fully capturing forest income (FAO, 2010) despite the widely-recognized importance of forest resources in the livelihoods of local inhabitants in the tropics (Wunder et al., 2014a). This is not only because rural communities may be overlooked by national authorities but also because it is difficult to accurately retrieve data over large areas with little information infrastructure (Salo et al., 2014: ch.17). Therefore, much of the knowledge on forest-based local economies in the tropics is either overly general or too fragmented and bound to local contexts. Although the economies of tropical forest-dwelling populations are gradually becoming better understood (Angelsen et al., 2014; Coomes et al., 2016), more research is needed to analyze how forest incomes sustain livelihoods while they intertwine with forest conservation (Coomes et al., 2004; Miller et al. 2011; Pattanayak and Sills, 2001; Sunderlin, 2005; Wunder et al., 2014a). Besides, tropical forest populations are becoming increasingly urban, and circular migration and multi-local residence are blurring the rural–urban divide (Hecht et al. 2015). This means that while official statistics show growing rates of urbanization, forest resources may remain as an important source of income for poor

households also in urbanizing areas (Padoch et al. 2014).

Peruvian Amazonia is a region with rich history of forest resource use (Álvarez et al., 2007; Barham et al., 1999; Brokamp, 2015; Coomes, 1996; Coomes et al., 2004; Kvist et al., 2001; Pyhälä et al., 2006). While agriculture has become the most important economic activity for many rural communities, with timber and non-timber forest product extraction becoming less important over time (Coomes et al., 2016), livelihood strategies are nevertheless diverse in the region (Porro et al., 2014). Livelihood-improving policies that simultaneously pursue forest conservation, to be effective, therefore need to be tailored in a context-specific fashion (Porro et al., 2014; Zenteno et al., 2013). This entails addressing not only current circumstances including, e.g. tenure, resource availability, and household assets (Angelsen et al., 2014; Prado Córdova et al., 2013; Wunder et al., 2014a), but also potential path-dependencies (i.e. past practice, tradition or preference tends to continue even in the presence of more feasible alternatives) manifest in the continuum ranging from local ephemeral conditions to broader geographical and historical contexts (Coomes et al., 2016). In certain Amazonian localities, timber and non-timber forest products remain very important for local communities, and policies overlooking these resources may unwittingly impact local livelihoods.

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Our study area in the Nanay River Basin, northeastern Peru, is a case of this type. In their much-debated paper, Peters et al. (1989) argued that the area offered high economic potential because of the richness of forest resources and the vicinity of a historically important trading center for forest products, the city of Iquitos. Moreover, the area is characterized by soils with very little potential for commercial agriculture, implying that rural income is to a particularly large extent based on forest resources, and is likely to remain so (IIAP, 2006; Pyhälä, 2003; Raygada et al., 2007; Suárez, 2007). The Nanay Basin is well known for its white-sand forest with a mosaic of fragile habitats in which resource use has been little studied (Álvarez et al., 2007; Cardozo, 2013; De Oñate-Calvín, 2012; Pyhälä, 2003).

In this paper, we analyze the harvest, use and trade of two key forest products in the area, white-sand and floodplain roundwood for house construction, and irapay palm (*Lepidocaryum tenue* Mart.) fronds for roof thatch. Our study involved a sample of 79 households living in three communities along the Nanay River, at different distances from Iquitos. Based on a survey of these households conducted in 2009 and 2010, we estimate the income obtained from roundwood and palm fronds and the work time devoted to their harvest and trade. While most research on forest resource use in Amazonian rainforests emphasizes the local organization of activities, there are few quantitative analyses of local economies. We also provide a detailed accounting of the labor required for harvest and transport of forest products, which allows estimating returns to household labor. Our study contributes to understanding how resource-dependent households, with limitations for agricultural expansion, generate income from forests in Amazonia.

## 2. Materials and Methods

Primary forests cover over half of Peru and the country's Amazonian region is almost completely forested. The Nanay River Basin is found in the Amazonian lowlands of the Loreto Department (368,851 km<sup>2</sup> and c. 900,000 inhabitants; INEI, 2008), in northeastern Peru (Fig. 1). Roughly half of the Loreto population lives in Iquitos, the main market in the region and a growing urban center. Iquitos surroundings are characterized by an extensive fluvial transport network and a diverse

mosaic of tropical rainforests with greatly varying soil origins, land physiography, and hydrological conditions (Encarnación, 1993).

### 2.1. Analyzed Communities

According to SERNANP (2013) and to our own data, the number of households in 32 communities from the Nanay Basin ranges from 7 to 280 (the interquartile range is 15 to 42). In most communities, services include a health post and a primary school with one teacher (for children up to 11 years of age). There is no water or electricity infrastructure. The Nanay Basin is one of the few areas in Peruvian Amazonia where roundwood and irapay frond harvest and trade are the main livelihood supporting activities. This is the case in the upper Nanay and within the Allpahuayo Mishana National Reserve (RNAM) in the mid-lower Nanay (IIAP, 2006; Pyhälä, 2003; Raygada et al., 2007; Suárez, 2007). Roundwood and irapay frond products cover the demand for house construction in rural areas and in sub and *peri* urban Iquitos.

While large tracts of Peruvian Amazonia have been allocated as oil (Finer and Orta-Martínez, 2010) and timber concessions (Salo and Toivonen, 2009), the creation of protected areas for biodiversity conservation has entailed reconfiguration of resource use rights, governance and management in the Nanay Basin. Communities within protected areas have obtained new formal use rights (excluding outsiders) and adopted formal resource management measures (Cardozo, 2011). Two internationally financed development projects (“Nanay I”, 2001–2004, and “Biodamaz, Phase II”, 2004–2007) assisted several Nanay communities in formal resource governance and management (Cardozo, 2011). In both projects, the Peruvian Amazon Research Institute (IIAP) played a central role. The Regional Government of Loreto has also become increasingly active in the area (Salo et al., 2014: 137).

For our study, we selected three communities where the principal economic activity was forest product harvest and trade (Álvarez et al., 2007; Raygada et al., 2007), and that were located at different distances from Iquitos. We chose the community of Puca-Urco in the upper Nanay (105 km from Iquitos as the crow flies), Ungurahual in the mid-upper Nanay (70 km), and Yuto in the mid-lower Nanay, within the RNAM

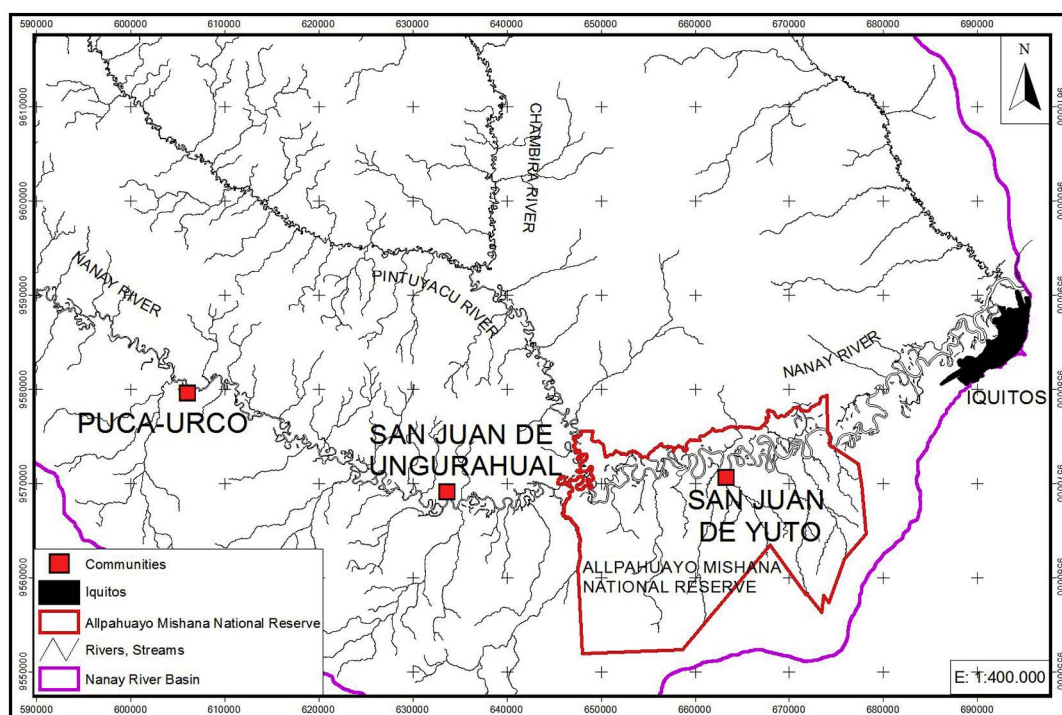


Fig. 1. Location of the Puca-Urco, Ungurahual and Yuto communities in the Nanay River Basin.

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