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Contribution of Non-Timber Forest Products livelihood strategies to rural development in drylands of Sudan: Potentials and failures

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ABSTRACT

In recent decades there has been growing interest in the contribution of Non-Timber Forest Products (NTFPs) livelihood strategies to rural development and poverty alleviation. However, the potential of NTFPs to contribute to development remained limited and open to doubt. The study objectives were to: (i) analyze the role of NTFPs livelihood strategies in rural development in order to explain their potentials and failures; and (ii) identify and analyze the factors influencing the contribution of NTFPs livelihood strategies to household income. The study was carried out analyzing three NTFPs in Rashad locality in the Nuba Mountains, Sudan in 2008–2009. The data were collected through interviews, direct observations and market surveys. Purposive sampling technique was applied to select 221 and 62 collector and trader households, respectively. The results revealed that *Adansonia digitata* fruit sale represents a subsistence strategy for some sampled households and accumulative strategy for others, while *Ziziphus spina-christi* and *Balanites aegyptiaca* fruits sale is a subsistence strategy for all the surveyed households. The study results also showed that the income from selling the fruits was positively and negatively influenced by different external and internal factors. The study concluded that any assumption regarding the potential of NTFPs to positively affect rural development depends on their role in an accumulative strategy that lifts people out of poverty. Institutional, technical and financial supports are necessary to influence the future direction of the NTFP contribution toward accumulative strategy.

1. Introduction

The term Non-Timber Forest Products (NTFPs) covers all tangible products of forest origin, except wood, and includes a wide range, such as rattan, resins, essential oils, latex, nuts, species, fruits, seeds, leaves, game, fish, birds, eggs and honey (Ros-Tonen et al., 1995).

In the late 1980s, influential studies, such as the one by Peters et al. (1989), suggested that harvesting NTFPs in tropical forests could generate higher revenues than timber. In the following years, interest in NTFPs grew spectacularly, based on three propositions: (a) NTFPs are important for local livelihoods and NTFP trade offers opportunities for development; (b) NTFP extraction is less environmentally destructive than logging or agriculture; and (c) increasing the value of NTFPs will add value to standing forest and thus provide an incentive to maintain the forest (Arnold and Ruiz Perez, 2001). The idea that production and trade in NTFPs could lead to rural development was picked up by non-government organizations, donors and development agencies.

A lot of studies focused on NTFP economy (e.g. Neumann and Hirsch, 2000; Arnold and Ruiz Perez, 2001; Ros-Tonen and Wiersum, 2005). Most of these tempered expectations (Lawrence, 2003). Some commentators criticized the economics of the Peters et al. (1989) study (e.g. Neumann and Hirsch, 2000; Sheil and Wunder, 2002). Other studies found that NTFP values were much more modest (e.g. Godoy et al., 2000; Peters et al., 1989; Ros-Tonen and Wiersum, 2005). Even so, enthusiasm has continued to grow in line with the growing attention from the international community on the potential of markets to contribute to development objectives (Scherr et al., 2003; Ferrand et al., 2004).

Researchers at the Center for International Forestry Research (CIFOR) in Indonesia have classified NTFP case studies, using multivariate statistical approaches. The method aims at simplifying the diversity of NTFP case studies by identifying 'typologies' or groups of case studies according to common characteristics that often do not say much about the development potential because each group is characterized by the role of NTFPs in total household income without further details on how the household uses the related income (e.g. Ruiz Perez et al., 2004; Belcher et al., 2005) These

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relevant issues will be dealt with in more detail in Section 4.2 where the typologies will be compared with the results from our findings.

Despite the grouping of NTFP case studies, however, people's understanding of the role and potential of NTFPs to contribute to financial capital accumulation in order to lift rural households out of poverty remains limited and it is open to doubt whether NTFPs make a contribution to development. Most research efforts have been case studies, with little potential to make generalizations (Marshal et al., 2003; Belcher et al., 2005; Ros-Tonen and Wiersum, 2005). In addition, studies revealed that the NTFP trade is complex and dynamic, influenced by a suite of interrelated factors (de Beer and McDermott, 1996; Neumann and Hirsch, 2000; Arnold, 2002; Kusters and Belcher, 2004; Alexiades and Shanley, 2004; Sunderland and Ndoye, 2004). These factors are related to markets (Neumann and Hirsch, 2000; Arnold, 2002; Newton et al., 2006), the political environment in which the products are traded (Nygren et al., 2006), characteristics of the primary resource (Neumann and Hirsch, 2000) and participants (Newton et al., 2006). However, these factors were not analyzed in relation to the NTFP contribution to development. An economic valuation of the NTFPs alone is insufficient, as it does not take into account factors that determine the context of the market chain and influence the actual value of the NTFPs. Thus, the overall aim of this case study is to improve the understanding of NTFP potential in rural development and the factors that influence the NTFP role in the semi-arid lands of Sudan. Sudanese and international organization, under the umbrella of the Sub-Saharan African Food Tree Species Forest Genetic Resources (SAFORGEN) programme (Eyog-Matig et al., 2002) and with the coordination of Biodiversity International, have been working in the recent past for the conservation and sustainable use of priority food tree species in Sub-Saharan Africa, providing useful information related to the environmental and social context of NTFP production in semi-arid lands of Sudan. Taking into consideration the background information provided by the SAFORGEN programme and by few other studies on the NTFP economy in the study area (Babiker et al., 1985; Robinson, 2006; Goenster et al., 2011) the specific research objectives of this paper are to: (i) analyze the role of NTFP livelihood strategies in rural development (poverty alleviation) in order to explain their potentials and failures; and (ii) identify and analyze the factors influencing the contribution of NTFP livelihood strategies to household income.

2. Materials and methods

2.1. Study area

The study was conducted in the Rashad locality of Nuba Mountains in the north-western part of the dry land Savanna Zone in South Kordofan State. The study area lies between latitudes 10° and 13° N and longitudes 29° and 33° E.

The study area covers a total of 7872 km^2 with a population of 241,046. The inhabitants are indigenous Nuba people and other ethnic groups, e.g. Baggara, Bargu, Barnu, and Fellata (UNDP, 2003). There are three main land users groups: agriculturalists and minor livestock holders, pastoralists, and town/urban groups (NMPACT, 2002). The key determinants of household wealth and main source of income for agriculturalists and pastoralists are crops and livestock. Household income is also derived from paid labor and off-farm activities and local-level NTFP trade. In economic terms, levels of food and cash incomes are determined by access to the plains for farming, grazing and collecting wild products, and access to markets for both goods and labor.

The climate is tropical semi-arid. Annual rainfall ranges from 400 to 676 mm; the rainy season extends from June to October. The main land uses in the study area are traditional agriculture, animal husbandry and forestry.

There were a number of reasons for selecting the study area:

- The area has been affected by civil war and ethnic tensions that have resulted in widespread poverty.
- It is still well-endowed with NTFPs offering a variety of opportunities for trading.
- It lies within the Savanna region which constitutes the largest proportion of Sudan occupied by poor rural communities.
- There are limited livelihood options and employment opportunities, suggesting that alternative cash income generating options may be important.

2.2. Non-Timber Forest Products selection

Three NTFPs (*Adansonia digitata*, *Ziziphus spina-christi* and *Balanites aegyptiaca*) all important as edible fruits were selected in the study area using the following steps:

- First, all NTFPs in the local markets visited in the study area were recorded (14 NTFPs).
- Second, local traders were asked for the names of villages where collection of the recorded NTFPs is concentrated (nine villages).
- Third, 10 households were selected in each village to rank the 14 NTFPs based on their economic importance for rural households in the village.
- Finally, the three top-ranked NTFPs were selected and ranks were compared among villages to find out the most frequent top three NTFPs (85 of 90 households ranked *A. digitata*, *Z. spina-christi* and *B. aegyptiaca* as the top three in the nine villages).

2.3. Data collection and analysis

One sampling strategy – purposive sampling – was used to select 221 household collectors (76 for *A. digitata*, 70 for *Z. spina-christi* and 65 for *B. aegyptiaca*) and 62 household traders (27 for *A. digitata*, 27 for *Z. spina-christi* and 8 for *B. aegyptiaca*). The participants in the study include members of local households who were in the village or in the local markets during the survey. There were different collectors and traders for each studied fruit. The participants were selected to permit the collection of more in-depth and reliable data (Wollenberg, 2000). The households were interviewed using a structured questionnaire. The data from the questionnaire were augmented with additional qualitative data by pursuing, through conversation, any interesting issues that emerged. Annual quantities of fruits collected were recorded and the mean value by each collector and trader was calculated. The gross annual cash income from local-level trade was obtained by multiplying the amount of fruit sold annually by the mean selling price, obtained from the local markets and from interviews. Income from commercial farming was computed by multiplying the crop yields by their farm gate prices. Income from subsistence crops was computed by multiplying crop yields by local market prices. Labor earnings from local wage employment were calculated by multiplying the number of days worked by the wage rate. Information about employment was collected from individual household members, in terms of the number of hours worked per day and number of days worked during each operation. Employment was expressed in terms of person-days, where each person-day was equivalent to 8 h of work. The household was used as the basic unit of analysis. Quantitative data from the interview results were analyzed statistically. The cash income from the sales of fruits and other sources was averaged and converted to US$ using the conversion rate for the Sudanese Pound at the time of