



The production and commercialization of palm wine from *Hyphaene coriacea* and *Phoenix reclinata* in Zitundo area, southern Mozambique

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ABSTRACT

In southern Mozambique a traditional wine is produced using the sap from two palm species, *Hyphaene coriacea* and *Phoenix reclinata*. Production of palm wine is one of the main livelihood activities in the Zitundo area. We examined the local production and trade of palm wine in the area. Using structured interviews we investigated the tapping activity, local management practices and the palm wine market, and assessed the incomes derived from palm wine sales and the tappers' perceptions on productivity, abundance and sales fluctuation. Tapping palms was practiced year round in five of the sixteen villages in the area and the mean number of palms tapped per day was 102 ± 52 per tapper. Tappers spent an average of 25 ± 18 h per week on tapping activities resulting in an average return to labour of R39 (\pm US\$3) per hour. The mean, annual, net income from palm wine sales was R24,981 \pm R12,094 (US\$1878 \pm 909) per tapper, which accounted for 85% \pm 22% of the tappers' annual household income. Palm wine is a highly commercial commodity in Zitundo area, with an average commercialization index of 63% \pm 23%, and is likely to help alleviate poverty in the area. *Hyphaene coriacea* was tapped more than *Phoenix reclinata*, although most tappers regard the wine from the latter to be of a better quality. The importance of palm tapping in local livelihoods and poverty alleviation needs greater acknowledgement by government and development agencies in the area, towards inclusion in sectoral development policies and conservation programmes.

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1. Introduction

Harvesting and trading non-timber forest products (NTFPs) is an important source of income to many rural households, particularly in areas where other economic opportunities are scarce (Dovie et al., 2005; Angelsen et al., 2014). According to Shanley et al. (2016) about 1.5 billion people globally utilize or sell NTFPs. Although some NTFPs can enter international markets, most are traded at local and regional level (S. Shackleton et al., 2007; Shanley et al., 2016), which, according to S. Shackleton et al. (2007), are growing via the entry of new products and the expansion of the existing trade. These local markets are especially important for marginal groups who, due to their lack of formal education, skills and isolation, have limited formal sector income-earning opportunities (Shackleton et al., 2008).

Shackleton et al. (2011) listed four main reasons for individuals or households to participate in NTFP trade, including i) as a short-term safety-net to smooth household shocks, fill income gaps, and cope with special needs when facing emergencies or tribulations; ii) diversifying

livelihood strategies by using NTFP income to complement other sources of income; iii) as the main source of income, when some level of specialization in a given NTFP generally occurs; and iv) as a last resort strategy due to the lack of other income earning or livelihoods opportunities. In southern Africa, there are multiple examples and case studies of each, but as yet the relative magnitude of each of these has not been ascertained.

Frequently the economic returns derived from local NTFP sales are considered to be modest (Emery and Zasada, 2001; Pearce and Pearce, 2001; S. Shackleton et al., 2007), and are often insufficient to fully support a household (Wilkie et al., 2001). However, most studies do not disaggregate part-time or casual traders from full-time ones, which serves to underestimate mean incomes for full-time traders. For example, C.M. Shackleton et al. (2007) demonstrated that returns per unit time worked are frequently higher for NTFP trade than other unskilled wage opportunities, were such opportunities available. Both absolute income from NTFPs as well as dependency on this source of income varies across countries and regions (Heubach et al., 2011; Saha and Sundriyal, 2012; Stanley et al., 2012; Adam et al., 2013; Angelsen et al., 2014). The meta-analysis of Stanley et al. (2012) on ecological and economic sustainability of NTFPs, found that, on average, in African and Latin American countries, NTFP income accounts for 25%

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of the total household income, only slightly higher than the share of 23% in Asian countries. Additionally Angelsen et al. (2014) conducted a global comparative analysis of environmental income across 24 developing countries, and found that both absolute environmental income and dependency were higher in Latin America (\$US 1473 per annum and 32% for absolute income and dependency, respectively), with Africa ranking third in absolute income (\$US 304 per annum) and second in dependency (30%). Income from NTFPs, as well as dependency, can be influenced by several factors, such as i) ecological conditions (Coomes et al., 2004; Mugido and Shackleton, 2017); ii) seasonality of resource exploited (Shackleton, 2004); iii) trader's socio-economic characteristics including age, household size, education, assets, income opportunities, residency time and ethnicity (Gavin and Anderson, 2007; Heubach et al., 2011; Angelsen et al., 2014; Khosravi et al., 2016; Mjoli and Shackleton, 2015); and iv) market accessibility (Barbier, 2010; Adam et al., 2013; Mugido and Shackleton, 2017). From the studies mentioned above, it is clear that the effect of NTFP trading on livelihoods must be understood within the specific social-ecological context of individuals and households.

An important NTFP produced and traded by households in many countries is palm wine. Palm wine is a fermented beverage produced from the sap of various species of palms (Mbuagbaw and Noorduyn, 2012), and is common in areas of Asia, Africa and Latin America with high palm abundance (Johnson, 1992; Tapsoba et al., 2014). In these areas, palm wine has a nutritional, sociocultural and economic importance (Lasekan et al., 2007; Mbuagbaw and Noorduyn, 2012). According to Campbell (1969) palm sap is rich in riboflavin, vitamin B and nicotinic acid, thereby contributing to the diet of people who use it. Palm wine is also a mandatory beverage for many traditional ceremonies in many African societies (Okon and Okorji, 2014), and has been used in Nigerian traditional medicine to treat malaria, measles, and jaundice and to promote breast milk production in nursing women (Bassir, 1968; Okon and Okorji, 2014). The trade in palm wine is also an important economic activity in many areas, providing income, not only to the palm tappers, but also to a variety of other market chain participants (Okereke, 1982; Cunningham, 1990a, 1990b; Naidu and Misra, 1998; Dalibard, 1999; McKean, 2003; Mbuagbaw and Noorduyn, 2012; Babitseng and Teketay, 2013; Okon and Okorji, 2014).

Hyphaene coriacea and *Phoenix reclinata* are the two dominant species in the palm savanna of the Maputaland coastal plain which covers the southeastern parts of Maputo province in southern Mozambique and northeastern parts of KwaZulu-Natal in South Africa. These species are a source of edible fruits, weaving materials and palm wine. Cunningham (1985, 1990a, 1990b) and McKean (2003) investigated the role of these species in the local economy and the effects of harvesting on the species in the same ecoregion in neighbouring South Africa. According to Cunningham (1985, 1990a, 1990b) although individual profits from palm wine sales are small (R30 – R70), the regional income from palm wine sales, transportation and resale is large (about R158,000 or R410,000 p.a. in current terms), providing income for nearly 500 people in the area. Furthermore Cunningham (1985, 1990a, 1990b) suggested that the exploitation of *H. coriacea* for palm wine at the time of his study was close to maximum capacity in the area, while the level of domestic and commercial harvesting of *H. coriacea* leaves for basketry was low and below the optimal capacity (Cunningham, 1988). McKean (2003) found that *H. coriacea* leaf harvesting in KwaZulu-Natal (South Africa) had negligible impact on leaf production.

Palm wine production from *H. coriacea* and *P. reclinata* is an ancient activity in southern Mozambique. According to Cunningham (1990a), palm wine tapping has been practiced in this area since the early Iron Age around 1500 BP. Presently, production and trade of palm wine is regarded as one of the main livelihood activities in the Zitundo area, southern Mozambique. However, the level of production and trade is unknown, as are local practices and management. Local data on harvesting, trading and management practices, along with biological data such

as the ecology, abundance, population structure, and dynamics of the exploited species, are important to assess the conservation status of traded species and in designing conservation and development plans (Svarrer and Olsen, 2005; te Velde et al., 2006; Ticktin, 2015). Therefore, this study examined the local production and trade of palm wine in the Zitundo area of southern Mozambique. Specifically we i) describe the tapping activities, local management practices, local trade and the perceptions on productivity, abundance and sales fluctuations; ii) determine the incomes derived from palm wine sales, the level of dependency on palm wine income and the palm wine commercialization index; and iii) identify the factors that influence the income earned, the level of dependency and palm wine commercialization index.

2. Methods

2.1. Study area

The study was conducted in five of 16 villages that compose the Zitundo Administrative Post in Matutuine district, southern Mozambique, namely Phuza, Ndovo, Mabucuti, Zitundo-sede and Huco. They were selected because they are the sites where palm wine tapping activities occur. With the exception of Huco, these villages are within the palm savanna, where *H. coriacea* and *P. reclinata* are the dominant tree species, with approximately 602 and 252 stems per hectare, respectively (Martins and Shackleton, 2017). Beside palm savannas, dry forests, swamp forests, grasslands, wetlands, and estuarine vegetation are found in the Zitundo area (Kirkwood, 2014). The climate is tropical to sub-tropical with mean annual temperatures of approximately 23 °C, and precipitation between 750 mm to 888 mm p.a. (Mander and Pollett, 1994). Physiographically the area is a low coastal plain with elevations around 50 m (McKean, 2003). The soils are sandy and gray with low agricultural potential (McKean, 2003).

The Zitundo Administrative Post covers an area of 864 km² (INE, 2009), with a population of 6674 people (MAE, 2012) in 1777 households, and an average of four people per household (INE, 2009). Fifty-two percent of the Zitundo population is male, the illiteracy rate is 27% and the poverty incidence was 78% in 2005 (MAE, 2012). The majority of the population are of the Ronga ethnic group, which have occupied the area for more than 500 years (Shaffer, 2010). The main livelihood activities in the area include subsistence agriculture, goat and cattle herding, wild fruits and wild plant collection, beekeeping, fishing, hunting, charcoal production, craft and mat production as well as palm wine production (Governo do Distrito de Matutuine, 2008; Shaffer, 2010).

2.2. Data collection

Thirty-seven tappers were interviewed between February and August 2016. Preceding the commencement of the survey permission was obtained from the Zitundo traditional leader (Zitundo Régulo) and the local community leaders, and ethical clearance was obtained from Rhodes University. All participants were briefed about the purpose of the research and informed that participation was voluntary. We obtained the consent from the interviewees and the confidentiality of the information received was assured. We identified and selected the first tappers with the help of local leaders, and interviewed all other tappers as identified by their fellow tappers working in these areas. We were not able to interview all the tappers in the area (around 50 tappers work in the area) because some were out of the country (in South Africa) in the days the interviews took place and a few declined to participate. The interviews were conducted in the tappers native language Ronga and took place in the locations where they harvest the species on a regular basis as well as in Phuza market. A questionnaire survey was conducted to gather information on: i) tapper demographics and socioeconomic characteristics; ii) sources of income and assets; iii) amounts harvested, activity timing, and techniques used;

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