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Published online: 02 Feb 2017.

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Socio-economic factors influencing marketing of non-timber forest products in tropical lowland rainforests of south-western Nigeria[§]

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A number of factors persist to constrain the non-timber forest products (NTFPs) market and, by extension, its potential to contribute meaningfully to livelihood development and poverty reduction objectives. To better utilise the potential of NTFPs, it is important to have a better understanding of the key factors governing the success and failure of NTFPs trade. This paper reports on the market constraints and socio-economic factors that influence trade in five top-priority NTFPs within the tropical lowland rainforests of south-west Nigeria. The NTFPs investigated were bush mango (*Irvingia gabonensis*), African walnut (*Plukenetia conophora*), chew-stick (*Massularia acuminata*), fever bark (*Annickia chlorantha*) and bush pepper (*Piper guineense*). Field data were collected in 10 villages located within and around Omo and Shasha forest reserves using a household questionnaire survey. The results showed that seasonality, poor transport, lack of storage facilities and market information were the four main constraints influencing marketing and trade in the NTFPs. In addition, the level of education, gender (sex), household income, ethnicity, distance to the market and access to roads significantly influenced market knowledge and information among households involved in the trade of NTFPs. There is need to improve on the limited source of NTFPs information, enhance skills for product transformation, build innovative storage facilities, and develop the process of domestication and integration in traditional land-use systems.

Keywords: market chain, market constraints, market knowledge, non-timber forest products

Introduction

Non-timber forest products (NTFPs) are important for local livelihoods and their trade offers opportunities for development. In several instances, NTFPs marketing offers more than reasonable returns and constitute a key part of a diversified livelihood strategy in most rural communities in the tropics. This is especially so in a healthy economic environment where products are well marketed (Marshall et al. 2006; Shackleton et al. 2007). However, the prospect for NTFPs to contribute meaningfully to livelihood development and poverty reduction objectives has also been variously contested (Gubbi and MacMillan 2008; Piya et al. 2011; Amusa et al. 2011). In a case study in the Periyar Tiger Reserve, India, Gubbi and MacMillan (2008) found that most NTFPs collectors (82%) did not wish to continue harvesting NTFPs if alternative livelihoods from agriculture were available. Similarly, Piya et al. (2011) showed that collection and marketing of NTFPs is not an attractive source of income for the Chepang community in Nepal, especially for those relatively better-off households who possess higher landholdings, food self-sufficiency and income from alternative sources.

The non-attractiveness of NTFPs as a source of income has been attributed mainly to the often nominal prices offered for their collection, which does not even cover the labour costs involved. Apart from this, and despite the fact that the extension of the market system to more remote areas has increased both the demand and the opportunity for increased cash incomes through the sales of NTFPs, certain factors, such as resource distribution within the forest, seasonal and annual fluctuations in quantity and quality of NTFPs production, and overexploitation, tend to limit the scope for NTFPs to lift people out of poverty (Amusa et al. 2011). Against this backdrop, it is important to have an improved understanding of key factors governing the success and failure of NTFPs trade in order to better utilise their potential and enhance their contributions to local livelihood (Kar and Jacobson 2012).

A valuable starting point towards improving NTFPs contributions to livelihood is a clear understanding of the NTFPs market chain. Generally, NTFPs markets are usually informal with fairly short, although not necessarily simple, supply or market chains. These markets are commonly based on long-standing traditional knowledge and skills. For local markets, production varies across products, locations and individual households (Shackleton et al. 2007). Furthermore, several subsets of activities make

up the value chain of NTFPs, viz. production, collection, processing, storage, transport, marketing and sale. The relative importance of each differs from product to product, which may not occur sequentially and some may even be repeated or omitted for particular products (Marshall et al. 2003; Belcher and Schreckenberg 2007). The structure of relationships between actors in the value chain – collectors, middlemen, traders and wholesalers – vary across time and space. In addition, the roles and returns on profit to actors in the chains may change over time. However, the general pattern in much of the literature on NTFPs indicates that the relationships between collectors and traders (particularly the middlemen or intermediaries) are economically exploitative (Neumann and Hirsch 2000). One of the conditions predisposing the NTFPs collectors to exploitation is when intermediaries have a monopoly of information. In this case, collectors are extremely vulnerable to exploitation most especially where they have limited or no market knowledge on the product.

In this study, we investigated the market constraints and socio-economic factors influencing trade in five top-priority NTFPs within the tropical lowland rainforests of south-west Nigeria. There is a need to understand the gap in NTFPs-related market knowledge in order to improve trade in NTFPs across the tropics (Kar and Jacobson 2012). This is particularly important at the household and/or NTFPs collector level. In addition, analysis of socio-economic factors in relation to NTFPs-related market knowledge is important for understanding the local dynamics that influence the harvesting and marketing of NTFPs at the household level. This study will contribute to improve the existing dearth of literature on the issue.

Materials and methods

Study site
The study was carried out in and around two government forest reserves, namely Omo and Shasha (Figure 1), located within the tropical lowland rainforest zone of south-west Nigeria. The eco-zone within which the forest reserves are located has been identified as of high priority for conservation attention on a continental scale, because of its rich biodiversity and importance for threatened flagship species, such as the iroko (*Milicia excelsa*) and the forest elephant (*Loxodonta africana cyclotis*) (Toham et al. 2006; Oates et al. 2008). The forest reserves were specifically selected for the study because they constitute a major area for NTFPs in Nigeria and have common ecological, social and economic characteristics that indicate high forest dependence. Omo and Shasha forest reserves also make a significant forest-based contribution to the economies in the respective states wherein they are located.

Omo Forest Reserve (OFR) is geographically situated between 6°65′ to 7°12′ N and 4°04′ to 4°72′ E in the Ijebu East and North Local Government Areas of Ogun State. The reserve covers an area of about 132 500 ha (Oates et al. 2008). Its vegetation is of a mixed moist semi-deciduous rainforest. Earlier work reported by Okali and Ola-Adams (1987) distinguished a dry forest in the northern part and a humid forest in the southern part of the reserve. Shasha Forest Reserve (SFR) is located between 7°00′ to 7°12′ N

and 4°38′ to 4°65′ E in Ife South Local Government Area of Osun State. The total area is around 31 000 ha (Balogun and Oloyede-Koso 2007; Oates et al. 2008). Of this area, about 6 920 ha is under plantations of various species, such as *Gmelina arborea*, *Tectona grandis*, *Terminalia* spp., *Pinus* spp. and *Nauclea diderichii*. The remaining 24 080 ha is currently dominated by pockets of degraded natural forests characterised by broken canopies. For management purposes, OFR is subdivided into areas or sectors called J1, J3, J4 and J6, whereas SFR is subdivided into two major areas, viz. Area 4 and Area 5.

There are several isolated villages or camps called enclaves within OFR and SFR. In addition to these settlements (which have continued to grow), large numbers of migrant farmers have also moved in, some of them encouraged as *taungya* farmers to help establish the different plantations. Estimated total populations in OFR and SFR is put at about 20 000 and 12 000 people, respectively (Amusa 2014). The communities are dominated by the Yoruba ethnic group. However, there are also mixtures of several households from other ethnic groups. The communities are essentially farming communities that rely on the forest as a supplementary source of livelihood. Fishing, hunting and collection of NTFPs are additional occupations for the majority of the enclaves' population. Despite the importance of NTFPs for livelihoods of the people, forest managers and practitioners have paid little attention to these resources.

Site selection and data collection
The numbers of communities in and around OFR and SFR are difficult to ascertain owing to the prevalence of several migrant camps scattered throughout the forests. The population of the enclaves and camps varies from 50 to 500 people. Most migrant camps have less than 100 people. A simple random sampling technique was used to select four enclaves in the J4 sector of OFR and six enclaves within and around Areas 4 and 5 of SFR. The decision on choice of sector and number was proportionate to size and preponderance of enclaves as well as NTFPs-related activities. A household survey was conducted through questionnaires that included a mixture of open and closed-ended response questions. A sampling intensity (SI) of 30% was used where total number of households was less than 100, whereas 10% SI was used where the number exceeded 100 (Diaw et al. 2002). In all, a total of 166 households were randomly selected from the 10 communities. All interviews were conducted in Yoruba and Pidgin with the full willingness of the respondents. The first contact in each community was with the Baale (community head) with whom discussion on the purpose of the work was held and his approval and cooperation obtained. This strategy, apart from being a cultural norm in the Yoruba sociocultural milieu, also proved invaluable and contributed to the success of the survey. The respondent in each household comprised any member (age 18 years or above) of the selected household involved in NTFPs trade.

The NTFPs questionnaire focused on five top-priority species (Amusa and Jimoh 2012), comprising bush mango (*Irvingia gabonensis* (Aubry-Lecomte ex O'Rorke) Baill.), African walnut (*Plukenetia conophora* Müll.Arg.), chew-stick
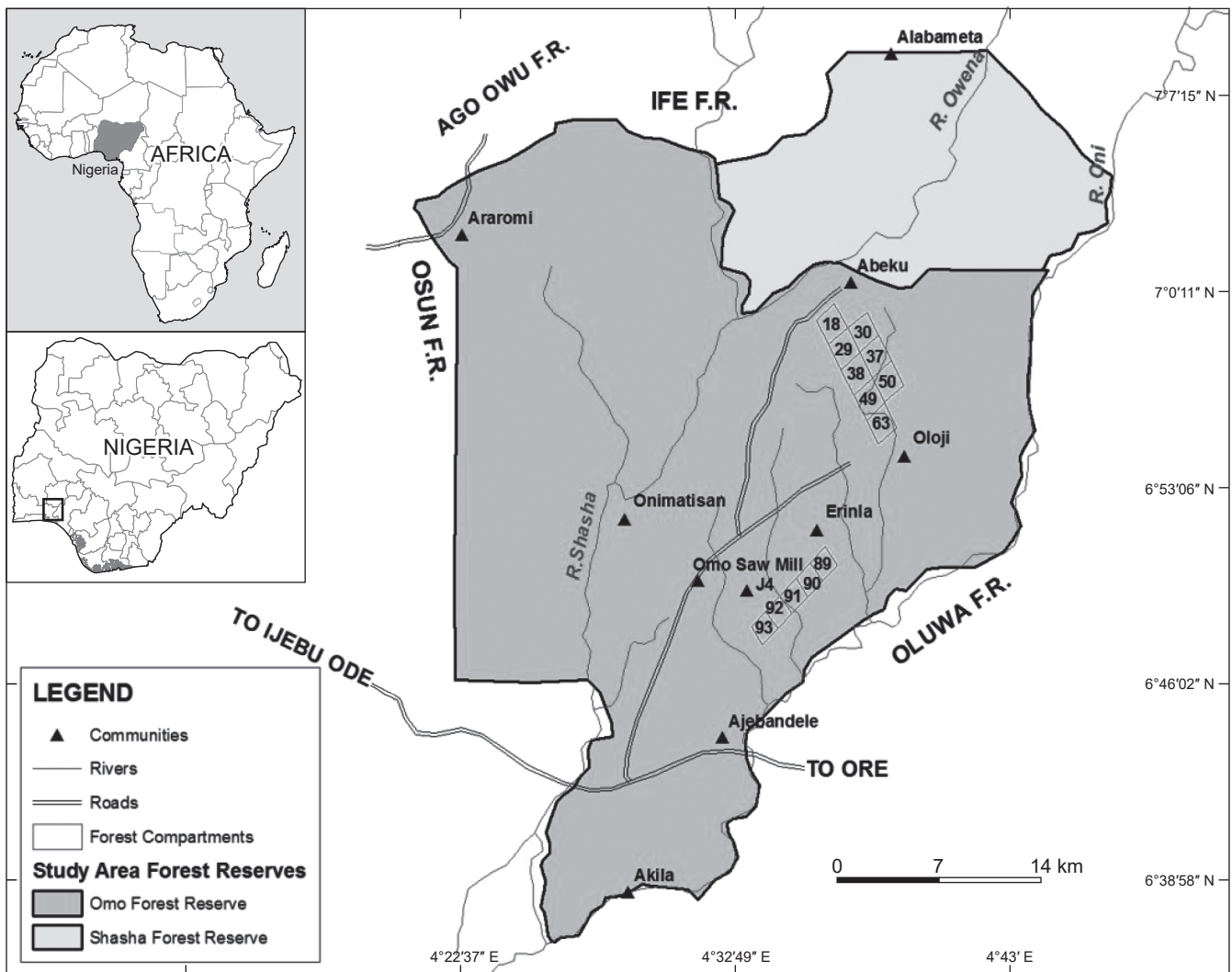
Figure 1: Map of the Omo–Shasha Forest Reserve complex (adapted from Field Survey 2012)

(*Massularia acuminata* (G.Don) Bullock ex Hoyle), fever bark (*Annickia chlorantha* (Oliv.) Setten & Maas) and bush pepper (*Piper guineense* Thonn.). Data were collected on demographic and socio-economic characteristics of respondents, market constraints influencing trade in NTFPs, NTFPs-related market knowledge, and socio-economic factors influencing market knowledge and information. The marketing channel of the selected NTFPs was prepared based on the information generated from the household survey in each of the study site. The data generated from the household survey were complemented with participant observation in the field.

Data analysis
Data obtained were analysed by means of descriptive and inferential test statistics. Demographic and socio-economic characteristics of respondents, market constraints and NTFPs-related market knowledge were analysed using frequency distribution and percentage. The NTFPs market constraints were further explored using weighted rank. In this case, each respondent was to list the five

most important NTFPs market constraints in their order of importance against each of the NTFPs under study. The list of market constraints was then scored in a descending order from 1 to 5. The first most important market constraint was scored 1 whereas the least important was scored 5. The scores for all respondents were pooled for all of the identified market constraints and the mean for each market constraint calculated. Respectively, the market constraint with the least mean score was ranked highest and that with the highest mean score was ranked the lowest.

To establish the final position of NTFPs market constraints in the ranking exercise, the following parameters, denoted by letters in brackets, were calculated: (1) number of times each market constraint was mentioned (a); (2) Mentioned Value (b); (3) Average Ranking (for a particular market constraint) by respondents (c); (4) Rank Value (d); and (5) Final Assigned Value (e). The number of times a particular market constraint was mentioned (a) was computed to obtain its Mentioned Value (b), and the Average Ranking (c) of each market constraint was calculated as a function of the sum of its assigned ranking

by respondents divided by the total number of respondents. The Rank Value (d) was obtained by tabulation and ordering of the position of the individual market constraint. The Assigned Value (e) was determined by adding the Mentioned Value (b) and the Rank Value (d) and thereafter dividing the result by 2, i.e. $e = (b + d)/2$ (adapted from Adeola et al. 1994).

Respondents' NTFPs market knowledge was assessed following the method of Kar and Jacobson (2012) using a 0 to 10 scale, with 0 = no knowledge and 10 = highest knowledge score. The average market knowledge score of respondents was then calculated for each NTFP. In addition, the relationships between respondents' demographic and socio-economic variables were investigated as a function of the factors influencing NTFPs-related knowledge. This was carried out using the bivariate correlation analysis (Pearson and Spearman).

Results

Marketing channel of NTFPs in the study area
The marketing channel of NTFPs in the study area encompasses the collectors, processors, village merchants, wholesalers, retailers and the final consumer (Figure 2). At the local level, household collectors sometimes gather NTFPs and sell them directly to local consumers. This is the case with such products as bush mango and African walnut, which are often consumed as a snack and delicacy among the local populace. Collectors may directly process the fruits of bush mango before selling the kernel to village merchants or directly sell the fruit at the market to local residents or to the village merchants for further processing. This is also the situation in the case of chew-stick. However, beyond the local level, middlemen including the village merchants, wholesalers and retailers play crucial roles in providing market insight, advancing credits, organising transport, and augmenting volumes for national and regional markets. This is particularly important in view of the terrain, bad road network and poor transportation services within the forest reserves. The village merchants often contract harvesters to collect NTFPs in the study area. This is very common with regard to fever bark. They also move from household to household to gather products for the local markets. The wholesalers act as product distributors to different parts of the country and even beyond. The retailers sell in small quantities to the final consumers and mostly through hawking of the products. Meanwhile, pricing of the NTFPs is largely decided by the market intermediaries.

Market constraints affecting trade in NTFPs
Table 1 shows the major market constraints affecting trade in NTFPs. These include seasonality, insufficient and poor transportation services, poor road network, lack of storage facilities, lack of training or skills for product transformation, and lack of market information (including product quantity demand, prices, markets and profit margins). Seasonality was the most limiting factor for trading in the majority of the products except for chew-stick and fever bark, for which product distribution within the forest and poor transportation facilities were considered the major constraints. At the moment, the peak collection and marketing period for African walnut is May to September. Bush mango has a peak production and marketing period from July to October. Bush pepper is harvested between December and February to coincide with the fruiting period. Chew-stick and fever bark are harvested throughout the year.

NTFPs-related market knowledge
Investigation of respondents' NTFPs-related market knowledge showed that respondents possess relatively high knowledge for chew-stick, whereas market knowledge for bush pepper was lowest (Table 2). Market knowledge scores for bush mango, African walnut and fever bark
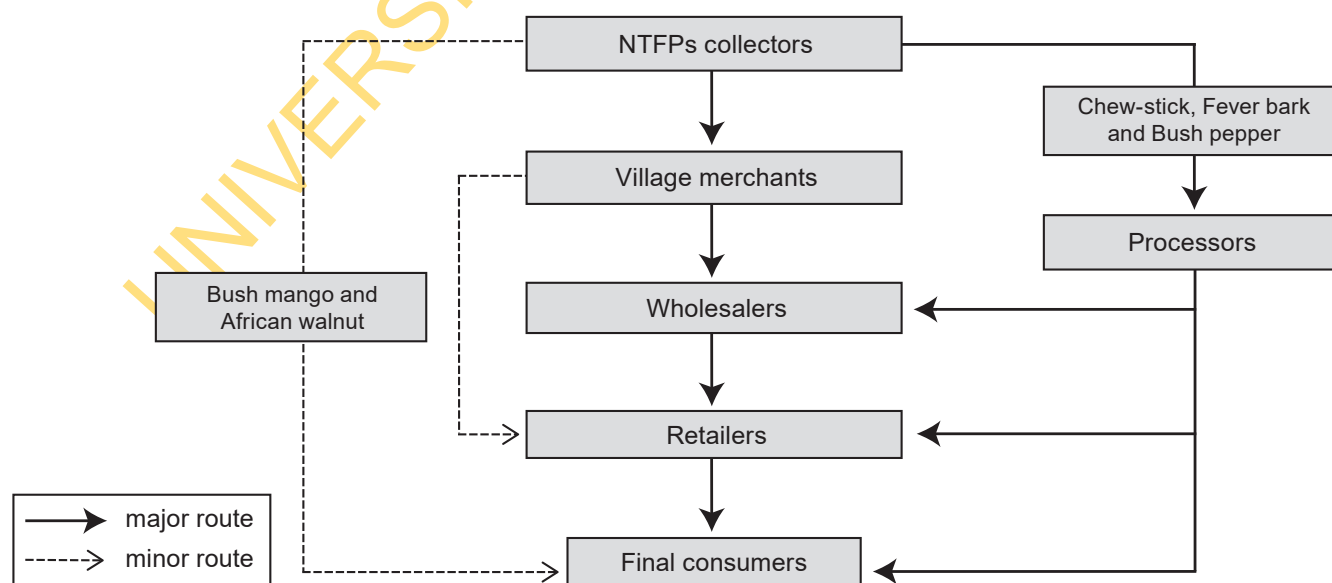

Figure 2: Marketing channel of non-timber forest products (NTFPs) in the study area

were close to average. There was no discernible pattern in respondents' knowledge scores and species type or market value. Nevertheless, chew-stick, which had the highest mean score, is a product with the biggest market outlet in Ijebu-Ode in Ogun State, Nigeria. This lends credence to the local name of the product, Pako Ijebu (the chew-stick of Ijebu), after the name of the town Ijebu. Generally, respondents' knowledge on categories/levels of market intermediaries was comparably higher than those of other NTFPs-related market knowledge. Their knowledge of profit margin between different categories of intermediaries and product destinations was low.

Socio-economic factors influencing NTFPs-related market knowledge

A number of socio-economic factors influence the respondents' NTFPs-related market knowledge in a disparate manner (Tables 3 and 4). For instance, respondents' age and distance to market only significantly impacted on market knowledge of African walnut and bush pepper, respectively. On the other hand, NTFPs trading experience, sex, marital status and ethnicity were significantly positively correlated to respondents' market knowledge of most of the NTFPs under study. Respondents' household size had no significant impact on their market knowledge of any of the NTFPs. The higher the level of education of respondents,

Table 1: Market constraints influencing trade in non-timber forest products

Non-timber forest product	Market constraint	Final assigned value
Bush mango	Seasonality	2.5
	Product distribution within the forest	4.0
	Insufficient and poor transportation services	3.5
	Lack of storage facilities	3.0
	Lack of training or skills for product transformation	3.0
	Lack of market information	3.0
African walnut	Seasonality	2.0
	Product distribution within the forest	3.5
	Insufficient and poor transportation services	4.0
	Lack of storage facilities	3.0
	Lack of training or skills for product transformation	3.0
	Lack of market information	3.0
Chew-stick	Seasonality	4.0
	Product distribution within the forest	2.0
	Insufficient and poor transportation services	2.0
	Lack of storage facilities	4.0
	Lack of training or skills for product transformation	4.5
	Lack of market information	3.5
Fever bark	Seasonality	4.0
	Product distribution within the forest	1.5
	Insufficient and poor transportation services	2.0
	Lack of storage facilities	4.0
	Lack of training or skills for product transformation	4.5
	Lack of market information	3.0
Bush pepper	Seasonality	2.0
	Product distribution within the forest	4.5
	Insufficient and poor transportation services	4.0
	Lack of storage facilities	4.0
	Lack of training or skills for product transformation	3.5
	Lack of market information	2.5

Table 2: Non-timber forest product-related market knowledge

Market knowledge	Mean respondents' score for each non-timber forest product					
	Bush mango	African walnut	Chew-stick	Fever bark	Bush pepper	Mean
Categories/levels of market intermediaries	5.49	6.53	7.87	9.01	2.18	5.18
Profit margin between different categories of intermediaries	2.27	4.31	5.64	1.21	0.36	2.76
Product transformation/ value addition	7.39	0.43	8.67	6.32	0.24	4.61
Product destinations	4.15	5.24	3.53	3.51	2.45	3.78
Final prices of products at various destinations	4.56	5.12	5.45	4.13	2.67	4.39
Mean value	4.77	4.33	6.23	4.84	1.58	

Table 3: Bivariate correlation of respondents' selected socio-economic background with non-timber forest products (NTFPs) related market knowledge (for parametric variables)

Socio-economic factor	Non-timber forest product				
	Bush mango	African walnut	Chew-stick	Fever bark	Bush pepper
Age	0.635	0.042*	0.571	0.829	0.971
Household size	0.372	0.563	0.646	0.454	0.752
Level of formal education	0.014*	0.527	0.035*	0.638	0.846
Household's income	0.011*	0.135	0.023*	0.515	0.625
NTFPs trading experience	0.025*	0.416	0.014*	0.723	0.034*
Distance to market	0.424	0.314	0.332	0.418	0.013*

* $p < 0.05$ (two-tailed)

Table 4: Bivariate correlation of respondents' selected socio-economic background with non-timber forest product-related market knowledge (for non-parametric variables)

Socio-economic factor	Non-timber forest product				
	Bush mango	African walnut	Chew-stick	Fever bark	Bush pepper
Sex	0.034*	0.006*	0.459	0.043*	0.024*
Marital status	0.028*	0.016*	0.726	0.038*	0.056
Ethnic group	0.004*	0.258	0.037*	0.016*	0.029*
Residency status	0.536	0.237	0.041*	0.627	0.008*

* $p < 0.05$ (two-tailed)

the broader their market knowledge of bush mango and chew-stick. Similarly, respondents' market knowledge of bush mango and chew-stick increased with household income. The female gender had more extensive market knowledge of bush mango, African walnut, fever bark and bush pepper, as they engaged more in these NTFPs trading activities. Most of the actors in NTFPs trade were married, and this could explain why marital status also significantly influenced market knowledge of the above NTFPs. Except for African walnut, market knowledge of NTFPs also differed on the basis of ethnicity. Residency status *vis-a-vis* nativity or being an immigrant significantly influenced respondents' market knowledge of chew-stick and bush pepper.

Discussion

The ranking of market constraints against each of the study NTFPs varies according to product type, particularly as it relates to what part of the species is harvested as NTFPs. The influence of seasonality was obvious in bush mango, African walnut and bush pepper because they are fruit/seed-producing species. Insufficient and poor transportation services, as well as product distribution within the forest, were the major constraints for chew-stick and fever bark. The high ranking of these factors, as in the case of insufficient and poor transportation services, may be attributed to the large size of products, and the fact that harvested products are first carried to bundling points before they are cut into marketable sizes. With regard to product distribution within the forest, this may be an indication of overexploitation and declining status of the products in the forest reserves.

Investigation of the marketing channels of NTFPs has shown that pricing of products is largely decided by the market intermediaries. Although our study did not explore the profit margin distributed along the market chain,

several related studies have shown that collectors have the smallest profit margin in the NTFPs market chain (Mhapa 2011; Piya et al. 2011). Some of the factors that may predispose NTFPs collectors in our study to low returns and exploitation are similar to those identified in previous works. These include the following factors: NTFPs collectors are unorganised and dispersed; trading is done individually; necessary knowledge and skills for product transformation is lacking; necessary marketing information to gain leverage in the market is also lacking; and there is a lack of related business assets, such as storage and transport (Ahenkan and Boon 2011). There is a striking note in the practice of intermediaries putting demand with the collectors before NTFPs collection and advancing payment in form of credits. This has been observed to tie the collectors to the apron-spring of the traders through debt or patron–client type relationships (Neumann and Hirsch 2000). Piya et al. (2011) suggested that shortening the marketing chain would leave more of the NTFPs value in the hands of the collectors. However, we believe that capacity building for collectors in efficient harvesting and processing skills may hold better prospects for them.

Our findings on NTFPs-related market knowledge are consistent with the report of Kar and Jacobson (2012) working on trade in NTFPs in Chittagong Hill Tracts of Bangladesh. Other workers, such as Franzel et al. (2007), have also reported lack of capital and unstable prices and supplies, especially during the rainy season, as constraints for effective trade in NTFPs. Generally, market constraints often reduce the bargaining power of the poor harvesters supplying the products (Bhattarai et al. 2003). To eliminate market constraints, Kar and Jacobson (2012) suggested the need to develop more transportation facilities, arrange more financial support, and enhance villagers' access to NTFP markets through extension officers and mass media. These suggestions are applicable in the present

study area, if forest managers and practitioners could pay more attention to the issues of NTFP management and development.

The relationship between socio-economic factors and NTFPs market knowledge is congruent with the report of Marshall et al. (2006). Therefore, these factors need to be carefully considered when designing initiatives to enhance market knowledge of NTFP collectors. Kar and Jacobson (2012) suggested that knowledge development strategies should be NTFP-specific, as different socio-economic factors have particular effects on market knowledge. Policy and institutional support would also have to take this into account.

While the importance of NTFP-related market knowledge cannot be over-emphasised, the generally low level of NTFP-related market knowledge among the respondents could be attributed to the little attention being paid to the NTFPs presently by forest managers and planners, as well as absence of extension activities and mechanisms on this category of forest products. Given that trade in many NTFPs is usually seasonal, it is vital for respondents to have information on NTFP traders, markets and market prices. This would help in obtaining more income from the sales of NTFPs, thereby increasing their contribution to livelihoods. Marshall et al. (2006), in a study in Mexico and Bolivia, observed that market knowledge tends to increase collectors' income from NTFPs. Thus, enhancing the villagers' market knowledge could be an effective avenue for NTFP-based interventions with prospects for meaningful contributions to livelihood development and poverty reduction objectives (Kar and Jacobson 2012). In addition, it is also important to consider initiating a market information system for enhanced NTFP-based income and development. In this regard, taking into account the different sources that collectors use at present and those they would like to use in the future to gather market information is vital.

Conclusions

The study has shown that several market constraints, including seasonality, insufficient and poor transportation services, poor road network, lack of storage facilities, lack of training or skills for product transformation, and lack of market information, persist to influence trade in NTFPs. To enhance their contributions to livelihood development and poverty reduction objectives, however, improvement in NTFPs-related market knowledge is not only important, it is also paramount and imperative. Nevertheless, the study also showed that NTFPs-related market knowledge varies from one product to the other, and is further influenced by different socio-economic factors. Therefore, there is need to improve on the limited source of NTFPs information, enhance skills for product transformation, build innovative storage facilities, and develop the process of domestication and integration in traditional land-use systems. Respondents' socio-economic status and influence on NTFPs-related market knowledge are crucial for forest managers and practitioners in the design of appropriate policy measures and mechanism for NTFPs projects and interventions.

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