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Unchaining the trade: Beyond the direct benefits of gum Arabic value chain in Sudan

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Abstract

Market or value chain analysis is an important tool to aid understanding of the flow of traded non-timber forest products (NTFPs), from local harvesters or producers to the final consumers, as well as the relative distribution of benefits at each stage. However, there is little consideration of the flow of benefits to external actors supplying goods and services to the chain actors as well as exploration of how widely the economic and development benefits of NTFP trade permeate. As an illustration, the study examined the gum Arabic value chain in East Darfur, Sudan. Snowball sampling was used to select market chain and external actors who were then interviewed using semi-structured questionnaires. Four different sets of chain actors were identified and their income distribution was assessed. It has been estimated that there are approximately 2,000 external actors who supply goods or services to the market chain actors. For many of these the income from supplying the gum Arabic chain actors is their most important source of cash income, and for some, it is their only source. This study therefore indicates that much work on NTFP incomes and value chains has overlooked this wider constituency, and therefore underestimated the importance of NTFP trade in local and regional economies.

Keywords: External Actors; Income Generation; Non-Timber Forest Products Trade; Sudan

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1. Introduction

Many types of non-timber forests products (NTFPs) are traded in local, regional and international markets and participation in NTFP trade is growing (Cunningham, 2011; Weyer et al., 2017). The income contributions of NTFP trade to participating households can range from small amounts of supplementary income to significant contributions in multi-income households or all household cash income. For example, Marshall et al. (2006a), in reviewing case studies in Mexico and Bolivia, found that the contributions to household income from NTFP trade ranged between 7 % and 95 %. As opposed to widespread consumptive uses of NTFPs for household subsistence (Angelsen et al., 2014), trade in NTFPs can lead to poverty alleviation for those specializing in it and with adequate access to remunerative markets (Belcher et al., 2005; Vedeld et al., 2007).

Whilst local markets may contribute to the livelihoods of greater numbers of NTFP traders (Shackleton et al., 2007), it is the wider regional, national and international markets that frequently offer better prospects for meaningful earnings. However, accessing wider markets typically requires a greater number of role-players in the market chain, such as those providing transport services, agents linking producers and markets, entrepreneurs, or those adding value at different stages along the chain. Consequently, the original NTFP harvester or producer is likely to receive a diminishing share of the final product value paid by the end consumer as the market chain extends (Nkem et al., 2010). However, when markets are distant from producers very few can access such markets (due to limited finances, transport and social connections) without intermediaries (te Velde et al., 2006, Belcher and Schreckenberg, 2007), and even though the involvement of such intermediaries reduces the share received by the harvester/producer, the total revenue can be enhanced to all actors if there is equitable sharing.

Market chain analysis has gained credence as an analytical tool to describe and examine the different stages, transactions and role-players involved in NTFP trade, from the harvester through to the end consumer (Jensen, 2009; Mitchell and Coles, 2011). For example, Abtew et al. (2013) used market chain analysis to determine the actors and their relative incomes in the frankincense (*Boswellia papyrifera* gum) trade in central Sudan. They reported that whilst involvement in the trade was profitable for all actors, that the gum-tappers received only slightly more than one-third of the total market value (across 828 tappers), and that their annual income from tapping was only one-tenth of the annual income of village traders, who in turn, earned only half as much per year as urban merchants of frankincense. In comparison, the market chain analysis of another resin NTFP, agarwood (*Aquilaria crassna*), harvested from tropical forests in Laos found that the several thousand harvesters received a much lower share, only 13 % (Jensen 2009). Market chain analysis is also widely used to explore beyond just the numbers of people involved, the units bought and sold and the prices, to examine issues relating to inequality, power, transparency and vulnerability along the chain and between different actors (Bolwig et al., 2011). As such, the term 'value chain' is preferred as it moves beyond just the descriptive as embodied in the term market chain.

A core, first-step activity in value chain analysis is the identification of the actors involved. Bolwig et al. (2011) classified actors into many categories, including chain actors, external actors, expelled actors and excluded actors. However, the majority of the NTFP value chain analyses have not covered all these actors, but focused exclusively on the chain actors, namely those people along the chain directly involved in chain

activities, buying and reselling the product along the way up until the final consumer (Bolwig et al., 2011). In contrast, the people that supply an array of goods and services to the chain actors (i.e. to the chain rather than along it), the so called 'external actors' (Bolwig et al., 2011) have never, as far as we are aware, been considered within the NTFP literature. These include servicing activities within the chain, without buying and reselling the central chain product, such as supplying containers or spare parts, as well as broader support or services to actors in the chain even if not adding to the product itself, such a food. The latter requires elucidation of where chain actors spend the income they earn from chain related activities. This omission is likely to result in marked underestimates of both the number of people involved in, and as beneficiaries of, NTFP trade, as well as the real value of NTFP trade to local and regional economies, which is the focus of our study, using gum Arabic as an example. If the underestimations are significant, it has several development implications.

Numerous NTFPs are collected from the dry forests in Sudan, consumed at household level, and commercial locally for a diversity of uses and/or exported abroad. Gum Arabic, for instance, is a significant source of hard currency for the country (CBOS 2006, 2007), and Sudan provides approximately 60 % of the world's supply of gum Arabic (Koli et al., 2013). It is mostly produced by rural farmers in traditional, rain-fed farming areas, which are some of the poorest and most food-insecure regions of the country (Couteaudier, 2007). The population of approximately six million people living in these areas represent up to 20 % of the national total. The incomes and value chains of gum Arabic have been examined in relatively few places. Core findings include that there are over 15,000 producers in East Darfur alone (FNC- East Darfur 2016), and that nationally the gum Arabic production and trade supports approximately 20% of Sudan's population or around 6 million people (Couteaudier, 2007). However, the importance of gum Arabic in rural livelihoods is not yet been widely examined, but appears to be variable between regions. Koli et al. (2013) concluded that gum tapping was largely a supplementary activity for farmers in the Dalanj Locality, Sudan. However, Munjawamariya et al. (2015) illustrated that the degree of engagement and income from gum Arabic in eastern Senegal depended strongly on a harvester's access to credit and markets, whereas in Ethiopia, Mekonnen et al. (2013) concluded that there was a negative relationship between involvement in farming and involvement in gum tapping, indicating specialization in one or the other. Nonetheless, none of these analyses of gum Arabic trade have considered the roles and contributions of external actors out of the value chain.

Within the context of the above mentioned, this paper reports on findings of a study of the gum Arabic trade in the East Darfur region of Sudan, with a focus on external actors. Specifically, we sought to address the following questions: (i) Who are the gum market chain actors and what are their characteristics in terms of gender, age and education? (ii) What is the level of income distributed between chain actors? (iii) Who are the external actors at the rural scale and (iv) How important is the gum Arabic trade to the external actors.

2. Material and methods

2.1. Study area

The study was conducted in East Darfur state in western Sudan between Nov 2015 and Feb 2016. The state of East Darfur was created in January 2012 in a 53,000 km^2 region that was formerly part of South Darfur state,

as part of the on-going peace process for the greater Darfur region. The state shares borders with the Republic of South Sudan in the south, West Kordofan state in the east, North Darfur state in the northwest, and South Darfur state in the west. It lies in a broad arid savanna region at 13° 10' N and 27° 20' E. The summer with an average daily temperature of 40° C begins in March and ends in May. The rainy season starts early in June and ends in October (FNC-East Darfur, 2016).

Most (70 %) of the 1.3 million inhabitants are farmers and pastoralists depending largely on land and natural resources. A large majority of them practice traditional, shifting cultivation in rain-fed areas. The capacity of farmers to produce food is limited by erratic rainfall, low soil productivity and inadequate technologies, together with an inefficient marketing system and financial support (FNC-East Darfur, 2016).

Savannas cover 31% of the total area. The main tree species are *Acacia seyal*, *Acacia senegal*, *Balanites aegyptiaca* and *Tamarindus indica*. The dominant commercialized NTFP is gum Arabic which plays a critical role in supporting local livelihoods and diversifying local subsistence and income-generating activities. Involvement in gum Arabic trade also potentially optimizes use of household labour resources during the dry season, and helps insure against the risks of agricultural failures and ongoing conflict. It is estimated that within the study area there as 15,000 producers, 300 village traders, 121 urban traders, 50 gum Arabic agents and 10 exporters (FNC- East Darfur, 2016). However, the area of tapped trees is currently only 10% of the available *Acacia* trees (FNC- East Darfur, 2016).

2.2. Data collection

The units of analysis were the gum Arabic external chain actors and the associated external actors. Data collection comprised three phases. In the first phase, secondary sources were reviewed and key informant interviews were conducted to profile the general stages and processes, situation of the gum Arabic sector at national level and to identify any pertinent issues to be investigated at the local level. This facilitated a preliminary identification of the different stages that were likely to be encountered in the local level value chain analysis (e.g. collection, processing, trading, etc.).

In the second phase, snowball sampling was used to identify chain actors. Starting from the local gum Arabic producers collecting the commodity, the chain and external actors were traced at local level. A case study methodology (Yin, 2009) was used since value chain analysis is an explorative method that requires numerous foundations of indication for in-depth thoughtful of the entire procedure, results and its constituents beside the value chain (Jensen, 2009). Actors along the value chain were interviewed using semi-structured questionnaires followed by additional questions depending on the responses of the different actors to clarify or expand on issues of interest. A total of 197 interviews were conducted amongst value chain participants (130 producers, 50 village traders, 15 urban traders, and 2 companies/exporters). Substantial care was taken to triangulate and crosscheck information on quantities, prices, incomes and linkages within and between different actor groups along the value chain, and when necessary previously interviewed respondents were contacted again. For estimation of the average prices, the selling price given by actors at a given stage was crosschecked with the buying price at the succeeding stage. Additional investigations were conducted if there are discrepancies. In addition, informal conversations were held with several local community members.

The third component involved identifying and interviewing external actors. The initial identification was achieved by means of a focus group discussion with gum Arabic value chain actors as a starting point for identifying where they spent their income from gum production or trading, their suppliers and who are the main recipients out of the market chain. When the external actors were identified and mapped, they were then approached purposively for an in-depth interview. The number of external actors interviewed was 54 (15 gum Arabic cleaners, 4 shop owners, 3 blacksmiths, 7 water suppliers, 10 sack traders, 12 gum loaders, and 3 truck owners). The main information collected from the external actors was: (i) type of goods and services provided by them to gum Arabic chain actors, (ii) income received per season from engagement with gum Arabic actors, (iii) sources and amounts of other household income per season, and (iv) ranking of the importance of gum Arabic services linked income relative to other income. The data were also enriched through direct observation by the researchers. Once again, considerable care was taken to crosscheck and verify information regarding the services, their value and frequency between those providing and those receiving the good or service, which is necessary when dealing with sensitive subjects like prices, gum quantities and incomes.

2.3. Data analysis

Both qualitative and quantitative analyses were employed. Value chain analysis was used in the (i) drawing and explanation of the value chain through explicit demonstration of the various players included in the chain, their major activities, and connections; (ii) computing the incomes along and out of the chain (for external actors); and (iii) access mapping and presentation of mechanisms followed by chain actors to gain control and maintain access to income. The currency exchange rate at the time of data collection was US$1 = SDG6.4 (Sudanese Gineh).

Total production, marketing and processing costs were estimated based on collection or marketing, labour, drinking water, food, transportation, taxes, duty fees, processing, and packing materials costs. The gross margin was calculated as an indicator for benefit distribution along the gum Arabic value chain using equation 1 (Marshall et al. 2006):

$$Gross\ margin\ \% = \frac{Revenue - Total\ cost}{Revenue} \times 100 \quad \text{....eq 1}$$

$$Revenue = Sale\ volume \times Unit\ price$$

The data were analysed using Statistical Package for Social Science (SPSS) version 20 and Microsoft Excel. Fisher LSD post-hocs tests were used for comparisons between the external actors' income. Content analysis was applied for qualitative data. Following Adam and Pettenella (2013), the content analysis was done through: (i) determination of the key subjects, (ii) handover ciphers to those subjects, (iii) grouping of replies below the core subjects, and (iv) combination of the answers to offer detail to and understanding of each subject.

3. Results

3.1. Market chain actors and their characteristics

The market chain of gum Arabic producers and sales from the study area has three purposeful parts: collection, cleaning, and commercialization which include trade in local, town and national markets by traders, suppliers and sellers, and exporters. Various actors are engaged in these activities at different levels. Generally, these three functional segments could be divided between four major groups of actors broadly classified based on their activities and position along the chain (Fig. 1).

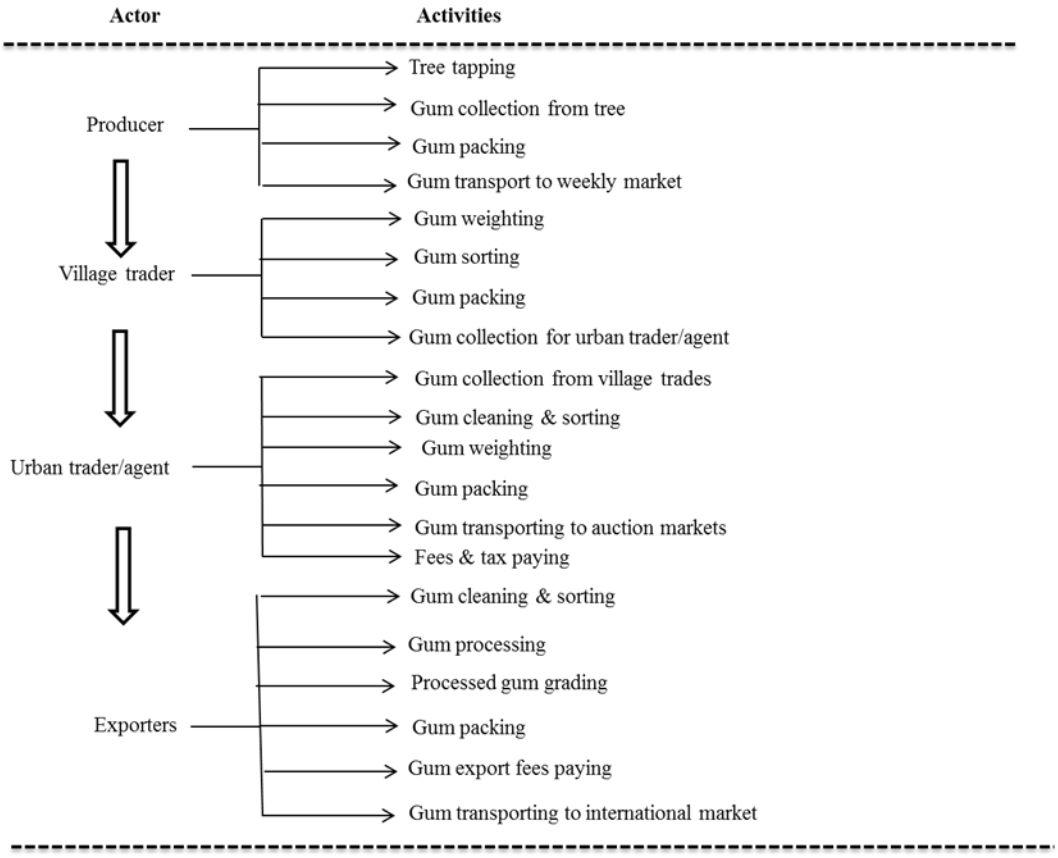

Figure 1. Market chain actors and their activities

At the producer level, most participants are male (69.2%), with slightly less than one-third (30.8%) being female (Table 1). Female producers have less formal education than their male counterparts and receive a greater proportion of their income from the gum trade. Traders tend to have higher education than producers and tend to have been involved in the gum Arabic value chain longer than most producers.

Table 1. Characteristics of the chain actors along the market chain

Attribute		Producer		Village trader	Urban trader
		Male	Female		
Age (year)		42 ± 12	35 ± 24	36 ±4	45 ± 20
Household size (persons)		9 ± 1	6 ± 3	11 ± 7	9 ± 5
Education	None (%)	70	90	60	50
	Primary (%)	2	7	37	30
	Secondary (%)	28	3	3	20
Time in gum Arabic trade (year)		6	5	10	15
Primary income comes from gum Arabic trade (%)		77	60	58	50

3.2. Level of income distributed between chain actors

Producers obtain a profit margin of 48.76 ± 33.7 SDG (7.62 US$)/Guntar (a Guntar is equivalent to 100 kg) per season. The producer receives an average price of 180 SDG (28.13 US$). Rounding this as an average production of 50 ± 22.3 Guntars per season (six months), the total income per producer is approximately 9,000 SDG (1,406 US$) per season. The cost of one Guntar of gum at producer level is 107.60 SDG (16.81 US$). The same figure also presents the price structure of village traders who buy the gum from the rural producers and sell it on to urban traders or agents. We found that the producers have established social connections with tribal leaders and village traders. These social connections enable them to access credit from village traders to pay for any initial investments required for gum production, such as advance subsistence loans, the supply of materials such as tapping tools or sacks, and other operating costs.

At the next level, the village trader receives an average price of 220 SDG (34.38 US$) per Guntar. A village trader, on average, handles about 540 ± 46.78 Guntars of gum during a season. This equates to a total seasonal revenue of approximately 118,800 SDG (18,563 US$) per village trader. The input costs deducted were the purchase value of the product, gum transportation, and labour. The cost for a Guntar of gum at the village trader's level is 99.11 SDG ± 67.89. Rural sellers have contact to marketplaces and information. The gathering and dispersal of gum Arabic at rural markets requires reasonable financial capital to pay for sacks and gum Arabic commodity. Rural traders and distributors have link to credit from town dealers and/or agents. Normally, traders borrow money to producers so that the producers are beholden to sell the gum to them. The urban traders also link via social ties with gum collectors and town traders resulted from their social identity.

Urban traders perform the distribution procedures in the gum chain. Urban traders are also "*backward*" incorporated in that they obtain gum Arabic through their agents. This makes it tremendously challenging to analyze the benefits to these players. Thus, merely their dispersal roles are measured in this investigation. From the market survey, it was found that the estimated quantity of gum that an urban trader handles is about 1,000 Guntars per season. Thus, an urban trader, on average, gains an annual net income of 300,000 SDG (46,875 US$) from their gum trading and distribution operations. This figure is equivalent to a profit margin of 6.4% throughout the whole season. The participation of women in the gum value chain reappears at this stage in the urban areas. The cleaning activity is performed exclusively by women. It offers full-time jobs for many women in the urban areas. The field survey indicated that urban traders or agents have contact to capital and information on quality necessities of exporters due to their contact to exporters and their agents. More

money is capitalized at the urban trader or agent level for cleaning, packing and buying the produce in majority. Town traders use credit instruments and robust communal links with village traders to conserve their contact to provisions.

3.3. External actors and the importance of generated income

The field observations indicate that gum Arabic production and marketing is well linked to external actors positioned out of the direct market chain and receive income from chain actors for the services or goods that they provide (Fig. 2). At the production level, the blacksmiths, sack traders and water suppliers receive income from gum producers for providing tapping tools (axes), sacks and water, respectively. In addition to that, the gum producers also pay money to local shop owners for basic commodities such as tea, sugar, onions, salt, cooking oil, soap and clothes. At the village trader level, the truck owners receive money for transporting the collected gum from rural markets to urban agents. At the urban trader/agent level, the truck owners, sack traders, gum cleaners and gum loaders are the main contributors who receive money for providing services.

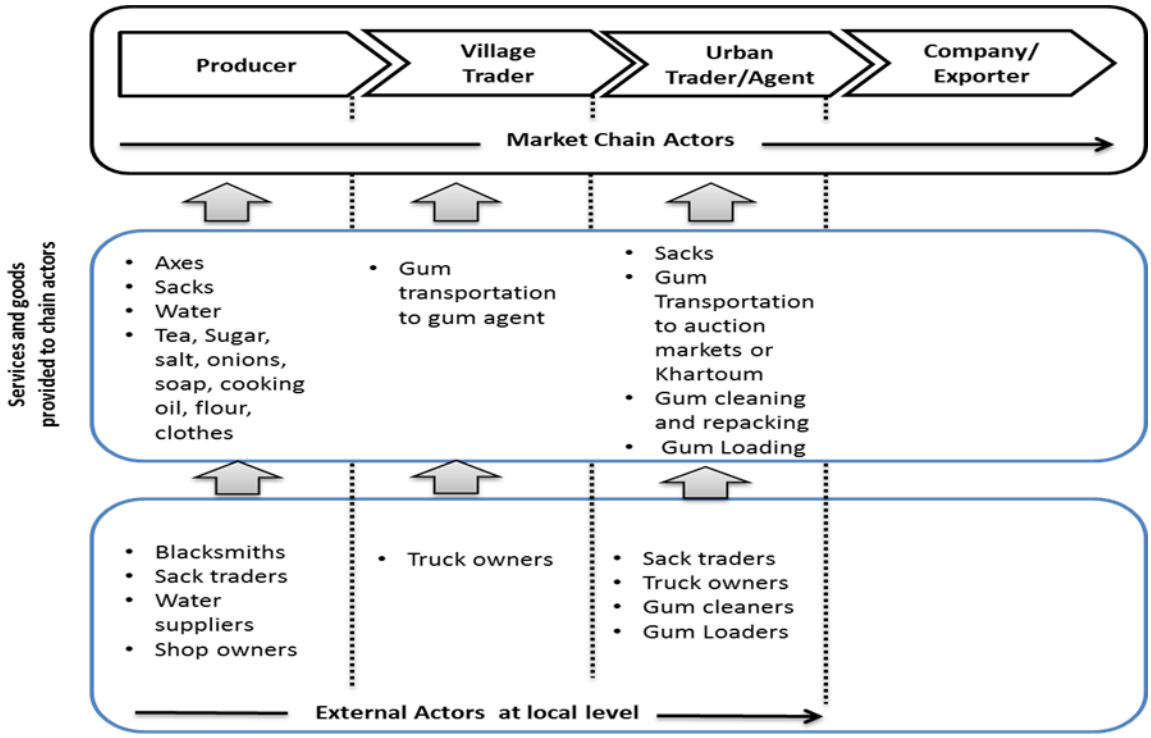

Figure. 2 External actors and services/goods provided to chain actors at East Darfur level

The supply of goods or services to the gum market chain actors was ranked as particularly important for many of the external actors. At the local level, all (100%) the blacksmiths, 66% of sack traders, 76 % of drinking water suppliers and 45 % of shop owners stated that the income they receive from gum producers provided their only source of cash income during the six-month gum production and marketing season at local level.

Across the survey area, 98% of external actors who are linked with gum production activities were the breadwinners for their households. Furthermore, 90% of all external actors who receive money from gum producers revealed that they have no alternative sources of income.

Truck owners who provide services (gum transportation) for village traders had the lowest percentage (52%) of external actors who were the sole breadwinners in their households. They also had the lowest percentage (36%) of external actors who were relying solely on the income generation from gum transportation to urban agents, with a number having a strong focus on livestock and farming in East Darfur and the surrounding states.

At the urban end of the value chain the external actors who provide services or goods also depend greatly on the received income. For instance, 100% of gum cleaners and 99.5 % of porters depend on the income provided by the urban traders or agents (Table 2). By comparison, 100% of gum cleaners (solely women) and 87% of gum porters were the breadwinners for their households, 99.8% of whom had no other source of income and no alternative employment. Ninety-five percent of external actors belonged to households receiving only one source of income. This was the case for 97% of gum cleaners in comparison to 85% of gum loaders. Even for those belonging to households receiving multiple sources of income, the importance of the income generation from gum chain actors was stressed.

Most external actors reported income received from gum chain actors as their first most important contribution to household income (Table 2). Coupled with the fact that 91 % of external actors at the production level were the single income earners in their household, corroborates the importance of the external income generation. No significant difference was found in the distribution of income generation across the external actors who generate income from producers for their services/goods provision. Only one-quarter (25.3%) of the entire sample of external actors enjoyed two or more sources of income. The strength of the income earned from gum chain actors is further revealed in that the mixed income sources (e.g. livestock, fish and agriculture together with services/goods provision to chain actors) was also ranked fairly highly. In terms of those external actors receiving income from chain actors, the highest proportion were to be found at gum producer level (64.8%; n=35), and the least at urban trader level (35.2%; n=19).

Table 2. External actors' ranking of income from gum Arabic chain actors (% of all external actors)

External actor	Ranked 1st (n=45)	Ranked 2nd (n=7)	Ranked 3rd (n=2)
Blacksmith	100.0	0.0	0.0
Sack trader	66.3	22.2	11.5
Water supplier	75.5	24.5	0.0
Shop owner	45.4	34.7	19.9
Truck owner	35.8	45.0	19.2
Gum cleaner	100.0	0.0	0.0
Gum loader	100.0	0.0	0.0

The receipt of more income streams was common amongst shop proprietors (60%), truck owners (80%) and sack traders (66%) at the urban trader/agent level, but much of this was associated to the livestock and

agricultural production beside income generation from chain actors. Truck owners at the urban trader/agent level had significantly ($F = 7.5$; $p < 0.0001$) more income sources (4.2 ± 1.0) than other suppliers such as sack traders (2.1 ± 0.7), gum cleaners and gum loaders (1.1 ± 0.8 and 1.1 ± 1.0, respectively).

For those external actors who are highly dependent on supplying goods/services to gum Arabic chain actors, it is possible to make some estimates of the income earned from such engagement (Table 3). However, the seasonal income received by shop proprietors makes it difficult to assess as they do not keep receipts separately for gum Arabic value chain actors and other residents in their village. The analysis shows that a blacksmith produces an average of 400 ± 46.89 axes (gum tapping tools) annually, and sells them for 20 SDG each. A sack trader sells, on average, approximately 1,000 sacks per season at 15 SDG per sack. Similarly, drinking water suppliers sell, on average, 25,000 ± 11.76 litres at 0.40 SDG each. Truck owners transport seasonally an average of 12,000 ± 67.09 Guntars of gum at 65 SDG per Guntar. Women cleaners earn approximately 3,000 SDG per season from cleaning and packing 150 Guntars at an average of 20 SDG each. The rate per Guntar is a lot lower for gum porters (5 SDG each), but their seasonal income is higher (4,500 SDG) because they load, on average, 900 ± 43 Guntars each. The mean seasonal income earned from supplying goods/services to the gum Arabic market chain actors differed between the different types of external actors ($F = 15.12$; $p < 0.0001$).

Table 3. External actors, incomes and contribution of income received from gum chain actors for 2015 harvest season (currency exchange rate at the time was 1 US$ = 6.4 SDG)

External actors	Sample	Estimated no. in region	Mean (± SE) seasonal income (SDG)			% contribution of supplying the gum value chain
			from supplying gum chain actors	from other sources	Total	
Blacksmiths	3	150	10,000 ± 2.5	0	10,000	100.0
Sack traders	7	350	15,000 ± 25.0	7,000 ± 33.7	22,000	68.2
Water suppliers	7	250	9,900 ± 13.0	2,000 ± 45.2	11,900	83.2
Truck owners	3	20	780,000 ± 67	300,000 ± 93.0	1,080,000	72.2
Gum cleaners	15	750	3,000 ± 1.3	0	3,000	100.0
Gum loaders	12	450	4,500 ± 2.0	0	4,500	100.0

4. Discussion

4.1. Market chain actors and their characteristics

The study recognized four major actors along the gum Arabic value chain defined according to position and activities in the chain. These includes: producers, village traders, urban traders/agents, and companies/exports. The producers establish relationships with village traders and local leaders. This relationship is very important for the producers to obtain financial capital for buying tapping tools (axes), having food and drinking water during the tapping and collection periods. This mirrors the findings of Abtew et al. (2012) who found that frankincense investment required financial capital at the tapper and producer

levels in South Kordofan, Sudan. The village traders function as intermediaries to tie producers to urban markets. They gather gum Arabic from producers in weekly markets and to a slighter degree, from production locations. The urban traders/agents own warehouses in urban centers. They buy gum Arabic in bulk and perform primary processing, which is mostly limited to cleaning and grading. In addition to that, urban traders, also organize gum production through agents in production areas or urban centers. Exporters include commercial banks and agro-private commercial firms which are small and are centered in Khartoum and Port Sudan. These actors possess export permits, pay taxes and customs to trade the gum Arabic in the global markets (CBOS, 2016).

The market players' socioeconomic characteristics along the chain influence the selection of their production activities and marketing routes as well as the design and implementation of the interventions for gum Arabic production and marketing development at local level. Gender roles and responsibilities, which are influenced by social, economic and cultural factors in the study area, dictate the positioning of women and men in society. The local community in East Darfur is patriarchal and resource ownership is male dominated. However, women are heavily involved in gum Arabic economic activities including tapping, gum collection and cleaning. This contrasts with Abtew et al. (2012, 2014), who reported that gum Arabic and frankincense tappers and producers in the Greater Kordofan region of Sudan are male. The involvement of females in gum Arabic tapping and production may be due to the on-going conflict in the Darfur region which limits the options for certain livelihoods activities. For instance, cattle, one of the old-style savings, are no longer attractive due to the conflict (UNEP, 2008). Additionally, at the rural end of the chain most actors are middle-aged, which does not conform with the findings of Abtew et al. (2014) and Adam et al. (2013) about NTFP use and trade in Sudan. This is probably because gum Arabic is the only available economic activity during the dry season. This may be related to the low level of formal education for most gum Arabic actors which limits their seasonal or longer-term employment options outside the study area.

4.2. Level of income distributed between chain actors

The analysis of costs and revenues along the gum Arabic value chain indicates that the producer obtains the lowest profit margin per Guntar (7.62 US$) among gum market chain actors. However, this is mostly likely due to lower gum price at rural markets. The implication of this is that some rural producers are often forced to create relationships with village traders or agents to receive a loan either in cash or cash plus foodstuff. Consequently, many producers lose any power for negotiating the gum price and s/he must accept the price announced by the trader. However, in Senegal, a trader who gives credit to gum collectors primarily requires suggesting a higher price to the collector to appeal him to delivering the commodity to him/her Reardon et al. (2009). In addition, Mujawamariya and D' Haese (2012) reported that offering credit reduces the risk of inconsistent supply and search costs for a new gum trader. According to Fafchamps (2006), confidence usually decreases chances for dishonest by misrepresenting quality by the producer or not paying by the trader. The confidence criterion leftovers important since there are often family or social ties, and thus the 'borrower' must be a potential supplier of gum which is used for paying back of the credit provided. However, the negative impact of advance credit can affect gum producers because they remain price takers Mujawamariya and D'

Haese (2012). In general, the negotiating power of gum collector or producer is significantly condensed as s/he obligates to sell to the trader to have pay off some or all the debt and to obtain credit in the future.

Despite the recognized benefits to credit, gaining access to credit rural area of the developing world is often difficult and costly. Randela et al. (2008) criticized the absence of credit for small-scale cotton farmers in South Africa. Credit shortage destructively squeezed on the farmers' capability to participate in markets through expanding transaction costs in input markets in Mozambique (Heltberg and Tarp, 2001). An absence of credit also prohibited farmers from obtaining new know-how in Pakistan (Manig, 1990). Rural regions are frequently not well aided by official credit organizations. According to Yaron (1992) official loaning organizations usually emphasis on large-scale farmers and disregard small-scale farmers because of the high cost of processing and servicing small loans and the prevalent belief those small entrepreneurs represent a bigger hazard. The risk of defaulting payment faced by the rural lenders is strengthened by the deficiency of information on customers and the imperfect collateral, particularly in parts with shared forms of land tenure (Armendáriz and Morduch, 2005). In the lack of official credit, small-scale farmers might participate in microfinance creativities or apply for credit through traditional organizations or collectives (World Bank, 2007).

4.3. External actors and the importance of generated income

The study results indicate that gum Arabic value chain actors are receiving services and goods from the external actors (blacksmiths, sack traders, water suppliers, truck owners, shop owners, gum cleaners, and gum loaders). The provided services and goods differ according to the value chain actor (receiver) and position along the chain. The significant proportion of external actors for whom the income from value chain actors was their only source of income and who were the sole income earners in their households, is an indication of the degree to which those involved are dependent on the income generation from servicers and goods provision to gum Arabic actors. Additionally, the high proportion of respondents having no alternative source of income other than the provision of services and goods is no longer be an option, substantiates this further. In addition to this, the generated income allows those involved to diversify their livelihoods and to meet the needs of those at home. This is acutely important for women cleaners who may be responsible for the care of one or more children at home. The generated incomes from gum market chain actors are also useful because they are often being located at local level and they are a suitable alternative when other income sources (e.g. agricultural, animals, etc.) are constrained due to the ongoing conflicts in the region. The importance of the incomes generated by the external actors was further evidenced by how highly it was ranked in comparison to other household incomes, with most of the external actors ranking the generated income as the first or second highest contribution to their household income. The dependency on the received income was particularly sizeable from December to May. For some, the reliance was exacerbated by the scarcity of other income sources during the dry season.

Consideration of the benefits and incomes to external actors is likely to add further emphasis to the role and importance of NTFPs in local and regional economies. In opening an area for new research, we hypothesise that benefits and incomes to external actors will be proportional to the length and magnitude of the commodity market chain. Additionally, those NTFPs that involve considerable processing and value addition at one or

more stages are likely to also offer greater benefits to external actors as they supply goods and services during the value addition stages.

5. Conclusions

The overall picture portrayed through this work was one of immense economic benefits from gum Arabic production and trading between chain actors. However, this is not restricted to the gum Arabic chain, as the benefits also flow laterally to large numbers and different types of external actors. In addition to this, the importance of income generation was revealed by the external actors, and the large proportion who had no other alternative for their livelihood and for whom the services/goods provision at gum production and marketing was their household's only source of income. The importance of this source of revenue was also reflected in it being ranked higher than all other income sources. It was hard to differentiate the income generated by shop owners because of the apparent blurring of the income from other people who are not gum chain actors. As this paper presents a new angle on the non-timber forest products (NTFPs) income importance for the livelihoods beyond market chain actors' income, it recommends further studies on external actors' income role in livelihoods and the factors affecting its generation level to facilitate comparison and generalization in NTFPs' literature.

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