The role of indigenous gums and resins in pastoralist livelihood security and climate change adaptation in Garba Tula area of Northern Kenya

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Abstract

Agriculture both livestock and crop farming is by far the most important economic activity in Northern Kenya and is envisaged to remain a source of income and livelihood in rural areas. Unfortunately harsh climatic conditions prevailing in arid and semi-arid areas in Northern Kenya require strenuous efforts with large economic and technical investments to achieve successful agricultural development. On the other hand, woody vegetation resources that are indigenous in Northern Kenya could provide an additional opportunity for accelerated economic development. The study examined the role of gums and resins extracted from woody vegetation as an alternative or complimentary livelihood strategy to livestock keeping and enhancing adaptive capacity to climate change among the pastoralist communities in Garba Tula area of northern Kenya. The result shows that majority of the pastoralist derive financial gain from the collection of gums and resins which is mainly used in buying food, livestock, salt and drugs activities buttressing their continuing involvement in the livestock economy. Collection of gums and resins in the households is done by individual members with young people playing increasing role both in collection and marketing. Although gums and resins play an important role in pastoralist livelihood, the potential has not been fully realised. Among the contributing factors include lack of financial capital, transport, lack of sound market information to guide opportunities, trends and prices, lack of expertise to boost production, insecurity in the area and lack of policy and infrastructural support.
Although myriad challenges exist in the gums and resins sector opportunities are enormous. If sustainably exploited gums and resins can increase household income and accelerate economic development in the area, create new jobs and complimentary/alternative livelihoods for the pastoralists in Northern Kenya. Value addition, training local communities on ways of increasing production and strengthening local knowledge and indigenous plant based activities can be linked to international programmes to realise full benefits from gums and resins sector in northern Kenya.

Introduction

People living in Northern Kenya face myriad challenges that undermine development in the region. Recurrent drought, violent conflict, cattle rustling and inadequate government attention are among the major constraints that hinder livelihood strategy in the area. The bulk of the

population in Northern Kenya depends on pastoralism. A livelihood derived mainly from livestock foraging on the natural woody vegetation, grass and use of water resources as common property resource where opportunities for alternative livelihoods, including agriculture are limited due to high rainfall variability, recurrent droughts, harsh climatic and environmental conditions (Berger, 2003; Ame, 2006; Pkalya et al., 2003). It is the way of life of some 13.2 percent of Kenya's estimated 39 million people (2009 estimates) and contributes around ten percent to the Kenyan's Gross Domestic Product in 2002 and twenty five in 2001 (Simpkin, 2004).

Pastoralist communities in Kenya are almost solely dependent on the livestock products mainly milk, meat, blood, hides and skins for their livelihood (GoK, 2005). It is estimated that 70% of the livestock in Kenya are domiciled in the arid and semi arid areas and in possession of the pastoralists valued at Ksh 70 billion (GoK,2004). Pastoralists are also actively involved in safeguarding the natural environment in the dry land through proper range management practice that promote biodiversity conservation and wildlife tourism in the country. It is estimated that 90% of the gazetted national parks and game reserves are located in drylands areas predominantly occupied by pastoralist communities (KEFRI, 1992).

Despite richness in livestock and natural resources base in areas occupied by pastoralists it records the highest incidences of poverty and people have the least access to basic services like education, nutrition, health and credit facilities compared with other areas in the country (GoK, 2005a). The highest poverty levels remain in the northern pastoralist districts, with huge proportions of the population falling below the national poverty line (KNBS, 2007). A number of factors had contributed to under development and high incidence of poverty in the pastoral communities in Northern Kenya. Before and after independence pastoralists have been side-lined in decision making process resulting to political and economic marginalisation. The cause of this marginalisation is partly attributed to mobility and remote locations of pastoralists dwelling areas (Oxfam, 2008). Cross border ethnic association of the pastoralists is another factor that has contributed to marginalisation Most of the major pastoralist groups by nature of their mobile lifestyle move across national boundaries for instance Somalis between Ethiopia, Somali and Kenya, Borana between Ethiopia and Kenya. These cross-border identities render pastoralists vulnerable in the political cultures of nation states. Pastoralists are sometimes believed by their fellow-nationals to have divided loyalties, and used as political mileage by other communities to lock pastoralist out of political dispensations (Morton et al., 2007). In addition to the above factors, perhaps the greatest source of pastoralist marginalisation is the idea, which dominated much of the development thinking in the latter part of the twentieth century and in many areas continues today: that pastoralism is an outmoded way of life that needs replacing with 'modern' livelihood systems (Oxfam, 2008).

Although the pastoral communities face myriads of challenges in their survival, they have devised many ways in mitigating or overcoming such challenges. The primary strategy of pastoralists is ensuring food security rather than maximum meat production; hence large herds are maintained to ensure adequate food in the event of drought and changes from cattle to sheep and goat husbandry as feed requirements of the later is less than the former (Oba, 1997; Berger, 2003). Pastoralist's nomadic mobility lifestyle enables them to access water sources

and productive patches of land for forage (Galvin et al., 2004) and move away from disease. In the range lands the pastoralists have dry and wet season grazing areas where they have distinct calendar of movement between these areas. This calendar is now elusive due to severe droughts that are taking place more frequently than before. Previously the cycle of drought used to be fairly spaced but in recent years the length has shorten drastically from 20 years (1964-1984), to 12 years (1984-1996), to 2 years: 2004-2006 (GoK, 2010) and currently occurring on yearly basis (2007/2008/2009/2010/2011). Climate variability in particular drought conditions stifle pastoralist livelihood strategy and anticipated climate change is expected to exacerbate the situation (Verhagen et al., 1999).

In northern Kenya trend of increasing rainfall extremes especially the short rains and increase in intensity of the extreme drought currently experienced is expected due to climate change (Downing et al., 2007). Occurrence of these extreme climate conditions will affect livestock and crop productivity in the area exerting more pressure on already fragile livelihood system. On the other hand, woody vegetation resources that are indigenous in Northern Kenya could provide an additional opportunity for accelerated economic development. Commiphora species and many other trees and shrubs in the arid and semi-arid area hold known or potential promise as producers of economically valuable products. For instance myrrh from Commiphora myrrh is an important product used in pharmaceutical industries cosmetics and perfumery and in the traditional medicines (Massoud et al., 2001). Non-Wood Forest Products are also used as buffer by dry land inhabitants during harsh climatic conditions (Dube et al., 2001).

Based on the challenges and opportunities accorded by the utilisation of the gum and resins by the pastoralists as an alternative livelihood component or an avenue to explore during the exit from the pastoralism life style and as safety net in the wake of climate change, the research aim to explore the extent to which the pastoralists in Garba Tula areas are engaged in the gum and resin harvesting and trading. The role of gum and resins in boosting livelihood security and climate change adaptation and explore the existing value chain, actors and the policy environment under which the trade operates. Critically analyse ways of enhancing the socio-economic and environmental benefits of the gum and resin exploitation activities and highlight policy or attitude change required to achieve sustainable gum and resin exploitation and analyse the perceived or measurable impacts in terms of cost-benefit analysis in order to gauge whether the effort put in harvesting the gums and resins in terms of time and money is recouped by selling the gum and resins so as to scale up the current operation or look for better alternative livelihood pathway that will generate better return.

Income and livelihood characteristics

Communities in Garba Tula area are predominantly pastoralists relying on livestock as a major source of income and livelihood strategy. The level of dependence on the livestock varies from household to household based on number of herd kept. The bulk of the household derive both financial and domestic gain from the livestock keeping activities. Community members are also

involved in collection and sale of the gums and resins, charcoal, selling of poles, mats, collection of precious stones and to less extent trading in foods materials and other commodity of trade mostly by shop keepers.

The survey established that 52% of the household interviewed derive financial benefits from the sale of the livestock. The average monthly income stands at Kshs 4730 with some earning as little as 700 and others as high as 20,000. Gums and resins collection and sale is another major income activity in the area. The practice is wide spread in all the target villages with 59% of the households engaged in the collection and selling of the gums and resins.

Constraints in changing livelihood strategy

The recurrent drought in northern Kenya is a major challenge to pastoralist livelihood security and many people had already left pastoralist life style and many pastoral communities may look for exit strategy to other form of livelihood. Frequent cattle rustling, availability of food in town centres which reduces dependence on animal products and enrolment of young generations in schools also contributing. Some of the areas where people are shifting to partially or wholly are crop production in areas where agricultural production is viable, collection of gums and resins, exploitation of the precious stones, employed in government and other offices for those with education, engagement in various business enterprises. Although transition to other forms of livelihoods are currently in progress peoples livelihood is so intertwined with livestock sector and dependence on pastoralism will remain an important income generating activity for foreseeable future. During the course of the survey community members gave varied constraints they are facing in shifting from pastoralism to alternative livelihood strategies.

Main constraints highlighted by respondents are:

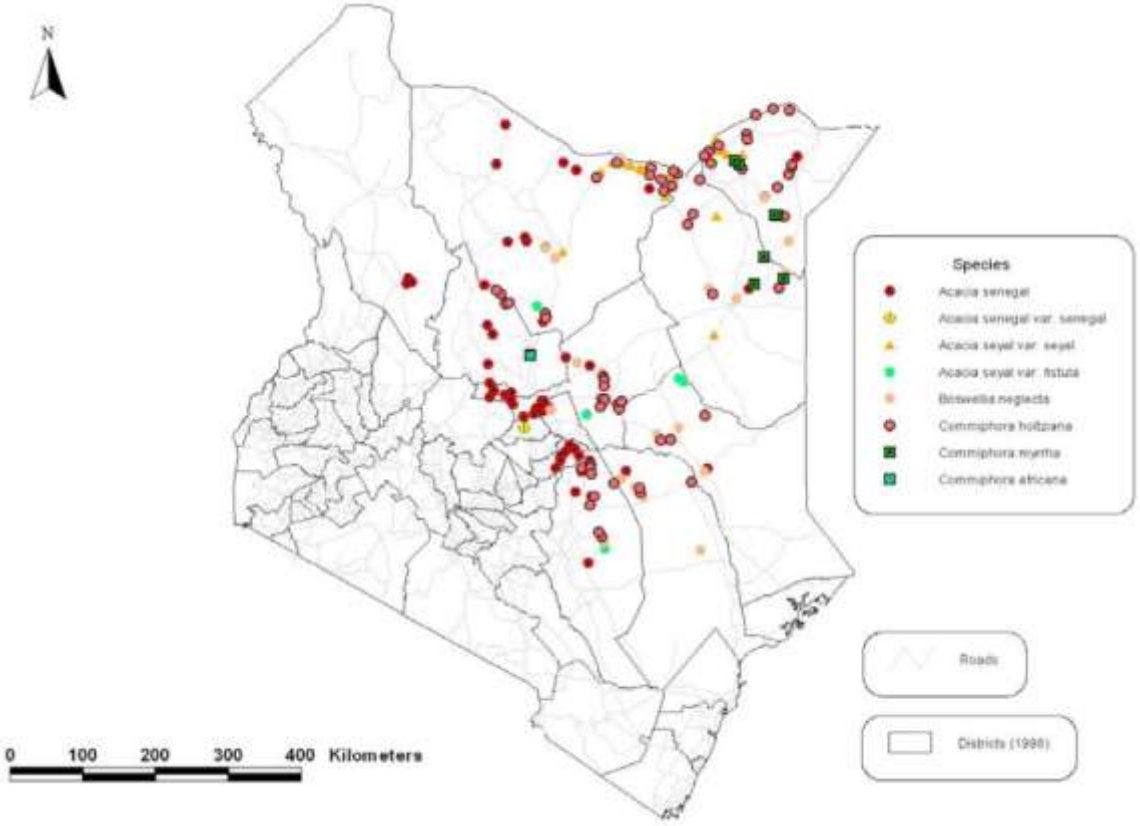
- Lack of financial capital: about 51% of the respondents attribute lack of financial means as a major constraint in changing their livelihood. Many claim of having entrepreneurial skills of starting their own business but state that lack of capital is major bottleneck.
- Lack of knowledge: 40% of the respondents are not knowledgeable of alternative livelihood strategy and stated that the only livelihood they are used to is pastoralism.
- Lack of water and rainfall: scarcity of water is a major challenge for community members that had intention of shifting to crop production. The only area where crop is a viable option is along the river banks but also the water level is also declining due to ravaging drought that had lasted more than three years according to many respondents.
- Want to remain pastoralist: 4% of the respondent stated that they want to remain pastoralists and see no problem of remaining in the same lifestyle. This is a sentiment echoed by wealthy households. They claim that shifting to another lifestyle will take them long time to learn and adjust to it. Some also expressed the sentiment that owning livestock is a sign of wealth and prestige in pastoral set up hence forfeiting it will relegate them to low social standing in the society. The bulk of the people who are strongly feel to remain in the pastoral life style are mainly the wealth households who benefiting from livestock keeping activity.

Due to above constraints the amount of people who managed to shift to another lifestyle was negligible. During survey only 1% of the households managed to shift to crop production and exclusive exploitation of the gums and resins. They partly attribute the shift to total loss of livestock and assistance of NGOs in the area that provided them with support to start crop production. They stated that NGOs provided them with water pumps to irrigate their crops but currently they are having resource constraints to buy fuel.

Gums and resins resource availability

Northern Kenya is endowed with variety of gums and resin yielding trees. The resource is exploited both for commercial and domestic purposes. Commercial production of gums and resin in Kenya is mainly confined in the arid districts of Isiolo, Marsabit, Moyale, Mandera, Wajir, Garissa and Samburu. Vegetation of these areas are dominated mostly by Acacia and Commiphora species and classified as *Acacia-Commiphora* woodlands (Beentje, 1994). Gums are mainly produced by acacia species while gum resins are extracted from Commiphora. Most common gum found in the area is gum arabic extracted from *Acacia senegal* (L.) Willd. var. kerensis or Acacia seyal Del. var. seyal. Gum resins are myrrh from *Commiphra myrrha* (Nees) Engl; opoponax or hagar from *Commiphora holtziana* Engl and frankincense from *Boswellia neglecta* S. Moore.

Figure 1 Distribution of gums and resin resources in Kenya



Source: Gachathi and Eriksen 2011

In Garba Tula the most abundant and commercially preferred gum resin is opoponax locally referred to as "Hur" in Borana language while in Somali "Hagar". Frankincense and gum arabic are also item of trade even though not so popular currently mainly due to low market price.

Gums and resins yielding trees are abundant around the homestead and in almost all grazing areas where the herders normally take their livestock. Collection of the gums and resins are done in areas around the homestead and some collectors can go as far as 80 km in search of gums and resins. In majority of the households collection is done by husband and young boys and in some quotas wife also actively participates but selling of the gums and resins in the household is mostly done by the head of the household.

The quantity of gums and resins harvested per month in household varied considerably based on the level of income from the livestock and availability of gums and resins yielding trees. Average amount of collection in the household surveyed was 38 kg but the values varied significantly among the households and villages. The value ranges from as small as 3kg and

even reach 100 kg per month. The amount of opoponax produced by individual trees also varied ranging from 40g-2kg. The yield was dependent on the season, the age of the tree and whether the tree is damaged by making a cut on the stem/ branches or not. Survey indicates that old trees produced more than young trees, dry season is the period when there are much production and making cuts or damage on the trees resulted to more production of the opoponax (about 58% of the respondents have the practice of making cuts on the stems and branches to increase yield). After wounding the tree sap oozes out and is ready for collection after 2days or even some times weeks according to respondents. Other variety of gums and resins tree species take longer from the time of wounding to the time of collection for example in Nigeria gum arabic takes 3-4 weeks (Sagay and Mesilke, 2011) and subsequent collection done bi-weekly or weekly.

Collectors of opoponax (about 55%) observed that the amount of the resins has decreased. They attribute the decrease to recurrent drought especially in the last three years (2008-2011) which they say has made the trees less productive. Respondents stated that the production of gums and resins is dependent on the cycle of rain and dry season. In instances where there is abundant rain during the rainy season and followed by dry spell the trees produce good yield but if the cycle is interfered with like in the recent years where there is prolonged drought the yield decline considerably. The increase in number of collectors during this period has also resulted to competition for available gums and resins. Collectors indicate that people are venturing in to gums and resins collections to gain supplementary income due to dwindling income from the livestock sector as a result of the biting drought. People travel long distance in search of gums and resins due to decrease in amount of quantity found in the nearby locality. Some dedicated collectors travel as far as 80 kilometres and spend nights out to collect meaningful amount of gums and resins for sale.

Gums and resins yielding trees are found mostly in the communal land where the accesses to resources are free. Currently there is no restriction in place on the amount of harvest done by an individual or group of people. The involvement of government, civil society or NGOs in sensitising the community on the harvesting regime which is sustainable is non–existent currently. Additionally there isn't any current initiative that educates and sensitizes the community on the benefits and market potential that exists for gums and resins within the country and beyond Kenyan borders.

The respondents have observed that the trees are becoming less healthy and decreasing in number. Drought, human destruction and livestock damage were major factors attributed to decline in the number and unhealthy conditions of gums and resins yielding trees in the area. Collectors are of the opinion that collection of the gums and resins do not affect the tree growth and survival. Some experienced collectors indicates that some harvesting practices affect the tree growth especially making deep cuts on the trees trunks and branches which allow insect damage and ultimately death of tree. Majority of the collectors stated that they take necessary precautions to avoid damage to trees. One of the measures they practice was to make slight cut on the branches and trunks to avoid damage to sapwood in order not to disrupt the flow of water and nutrients that is essentially for tree survival. The community members are also aware of the environmental changes that are taking place in area. They are of the opinion that trees are

generally becoming scarce, pastures are less abundant with seeds disappearing, temperature has increased and rainfalls are rare without a particular pattern as before. They attribute the changes mainly to drought, overstocking and immigration of other communities into Garba Tula area.

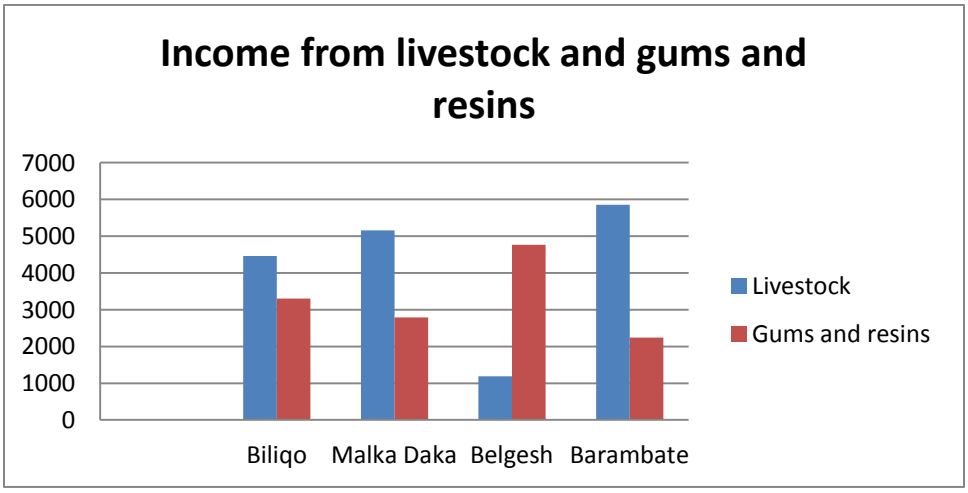
The changing climatic variables are causing more challenges to already fragile livelihood situation in the Garba Tula area. The communities are facing myriad constraints in coping with the climatic variability. Among the major ones highlighted by respondents during the survey includes: lack of financial capital, scarcity of water and drought, unpredictable rainfall and lack of knowledge on available options to effectively cope with climate variability.

Planting of the gums and resins trees is not currently practiced in the area and the domestication is not an option the community members are considering currently. Majority of respondents consider the gums and resins trees are freely and abundantly available in the locality currently and in their own opinion there is no need to domesticate them. Other reasons given by respondents why the community has taken up planting of the gums and resins trees include: lack of knowledge on methods of propagation, lack of financial capital, scarcity of water and tendency of opoponax producing trees not growing well in the homestead but prefer rocky and rough terrain.

Income from gums and resins

The collection and selling of gums and resins in the Garba Tula area is wide spread and undertaken by people of diverse social standings. The estimates of average monthly income from gums and resin across the villages was found to be Kshs 4200 but varied from village to village and household to household. Income from the gums and resins for interviewed households ranged from Kshs 300 to 12000. The dependence on the gums and resins and earning in some villages was equally important or higher than income generated from livestock. For example in Belgesh the amount of income from the opoponax was higher compared to income from livestock.

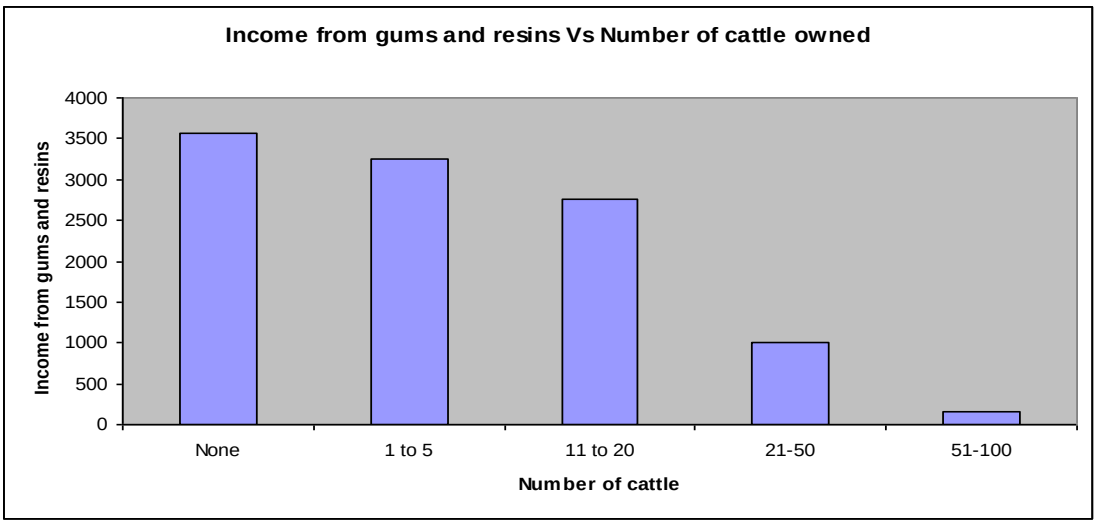
Figure 2 Amount of monthly income derived from the livestock and gums and resins



The collectors incur some operational cost both in cash and kind during the gums and resin collections. An average of Ksh 990 is spent per month. The money is mainly used for buying subsistence like food, water, cigarettes, tobacco and khat (mirra). In some cases where the household doesn't have the tapping and collection equipment some initial cost are incurred. The operational cost that fall under kind is mainly the time spent in collection of the gums and resins. Collection of the gums and resins is tasking according to most respondents they have to travel long distance in search of the gums and resins others walking as far as 80 km. The time spent in collecting 1 kg of opoponax can vary from 15 minutes up to 20 hours depending on the availability of the gums and resins, distance travelled and the number of collectors involved.

The dependence of the household on the gums and resins as income generating activity is partly influenced by the number of livestock owned. The number of livestock owned and the amount of income the household get from gums and resins was negatively correlated. Using the number of goats against the amount of income from the gums and resins correlation coefficient value of –0.00214 was recorded but the value increased to -0.5311 when the income from gums and resins and the number of cattle owned by household was analysed. Indicating wealthy household depended less on the gums and resins as compared to poorer household.

Figure 3 Income derived from gums and resins based on the number of cattle owned



The knowledge on the importance of the gums and resins as income generating activity also was found to be a major determinant factor in gums and resins exploitation. In Belgesh village for example where the majority of the community members are returnees from Somalia who came back to Kenya after Somali war of 1990s. They learnt the art of collecting and selling gums and resins during their stay in Somalia and quickly tap into the existing markets in their locality after they resettled in Northern Kenya.

Apart from the poor household with no livestock or few number who are involved in the collection and sell of gums and resins as alternative or complimentary income to livestock

keeping activity. Other category of people involved in collection and sell of gums and resins are herders who spare time to collect as they graze their animals and opportunists cashing on emerging opportunities in addition to their normal livelihood activities.

Income generated from the sale of gums and resins is used for various purposes among people of different income brackets. Majority of the household (70%) mostly the poor use the income from gums and resins in buying sustenance that is food and other household items. Frequency of selling the collected gums and resins to buy sustenance depend on the need of the household. Some households sell the same day the amount of gums and resins they collect to buy food the same day while for those who have options they prefer to accumulate gums and resins and sell in bulk which fetch better price. Considerable number of household (24%) also indicates that the income they derive from the gums and resins are used for paying school fees for their children.

Income from gums and resins also support livestock keeping activity. About 22% of the respondent said that the money they get from the gums and resins are used to buy livestock mainly the small stock but others after accumulating the money after some period use to buy even cattle. Apart from the restocking money from gums and resins support livestock well being. A number of household (6%) use the money from gums and resins too buy salt for their livestock and in some household money is also use to buy veterinary drugs.

Households (73%) mostly depend on income from the gums and resins during the dry season when the income from the livestock is diminished. Hence income from gums and resins serve as both safety net function and complimentary income source for both wealthy and poor pastoralists in Garba Tula area. Respondents also indicate that the importance of the gums and resins as income generating activity in recent years has gained impetus due to the ravaging drought in the area. Survey data indicates that 68% of the respondent have taken up gums and resins collection and sells less than five years. Corresponding with the frequent drought experienced in the area.

Apart from the financial gains gums and resins play important social role among the pastoralists in the Garba Tula area. Gums and resins are used for various domestic purposes. Opoponax the most abundant in the area is mainly used for:

- Acaricide against ticks
- Treat snakes and scorpion bites
- Treat foot rot and mange
- Treat chest congestion, common cold, amoeba and lymph nodes swellings in human
- Appetiser

The main domestic uses of Frankincense are: used as incense in homes and also during the religious ceremonies, used as chewing gum. For gum Arabic the community members eat as food stuff during drought period.

The collectors of the gums and resins encounter several problems. These challenges emanate from several interlinked factors and hampering full realization of benefits from gums and resins

sector. The major constraints highlighted by the respondents during the survey revolve around production and marketing and include:

- Lack of financial capital to buy subsistence required during the gums and resins collection. Inadequate finance limits the efforts of collectors and result to inefficient collection. Respondents indicated that they require food, water and other subsistence especially when they travel far distances and in case where they spend protracted period by staying in the field for days.
- No established market in place for the gums and resins. Collectors complain of unreliable demand and buyers. The market they claim is not that developed and sometimes it can take long to market their gums and resins especially those located far from the market centres.
- The collectors lack sound market information to guide them on the opportunities, trends and price mechanism concerning gums and resins trade.
- Gums and resins tree species grow in remote and areas with rugged topography where there is lack of access roads and other infrastructural facilities. Reaching those areas take lot of effort and time. Transporting the collected gums and resins to the market is extremely difficult especially when the amount of collection is large bearing in mind that common means of transport is just human (collectors). Due to lack of transport collectors cannot reach areas located far from their abode where there are abundant gums and resins resources.
- Collectors lack appropriate collection equipment and storing materials. Appropriate sacks like polypropylene are not available to collectors so they are forced to store the fresh produce in variety of papers and plastic bags that are not clean. Handling the products with less hygiene interferes with the quality and jeopardise smooth entry to lucrative international markets.
- Some respondents indicated that the trees are producing less gums and resins as compared to previous years mainly attributed to recurrent droughts in the area.
- Collectors are not knowledgeable on ways and practice of boosting the yield from trees. There is prevalent shortage of the trained researchers who can educate the community members on appropriate techniques of tapping gums and resins. Although community members have the culture of collecting gums and resins they have not yet inculcated modern tapping practices.
- Opoponax yielding trees are damaged by camels mostly owned by Somali communities who frequently immigrate into Garba Tula area from Wajir, Mandera and Garissa. Camels eat the trees and result to drying and ultimately death reducing the number of trees and production levels.
- Insecurity. Frequent tribal clash between the Borana and neighbouring Samburu was noted as a major constraint in collection of gums and resins. Respondents stated that the transitional areas where Borana and Samburu live have plenty of the gums and resins but due to conflict no collection is currently done in those areas.

Value chain and market structure

Currently the trade in the gums and resins in the Garba Tula and Northern Kenya in general is not well developed. Buying and selling is done at many levels ranging from the collection point up to trading centres in small and major towns with Garba Tula being the major trading centre

where majority of the traders who buy the gums and resins in bulk are located. The price of the gums and resins increases as the commodity head to end of the value chain. The number of traders buying gums and resin are few mostly based in trading centres or having agents who buy at collection points or small centres and in return sell to them. But there is emerging trend where traders are going around and buy gums and resins from the small town where they have stationed their agents and also buying directly from collectors. These groups of traders are those whose main activity is gums and resins exclusively and operate like cartels. They are the ones who do most of the buying and sell their consignment in bulk to exporters who are mainly based in Nairobi or Mombasa.

Collectors are paid Kshs 60-100 per kg for opoponax both by agents and traders, agents mostly sell at 100-120 to the traders while traders who transport the gums and resins to Nairobi or Mombasa get Kshs 180-250 from the exporters. Bulk of Opoponax is currently exported to China market and exporters get between Kshs 300-450 per Kg.

According to collectors in recent years the price of opoponax has improved. In the span of 10-15 years the price had increased from Kshs 30-100 but has stagnated at Kshs 100. The rise in price is attributed to rising demand for opoponax from the end market mainly China. Some collectors also attribute the increase in price to new entrant of traders into gums and resins market which has increased competition among the traders and rise in price.

The amount of the gums and resins brought by collectors to the trading centres per each sale vary in quantity ranging from 0.5 – 20 kilograms. The quantity brought to the market according to some traders dictate the price at which they buy gums and resins. They pay higher price if the quantity is large compared to smaller quantities. The argument being if they get the commodity in bulk they can quickly transport to Nairobi for sell resulting to higher stock turnover and more profit than collecting the gums and resins for long period of time and few number of sales. In the study area the survey established that there were no gums and resins collection and selling associations in place currently. This results to uncoordinated practices which limit the full realisation of the benefits that can be derived from the gums and resins sector in the area.

The amount of the gums and resins bought and sold by traders differ. The cartels taking the lion share of the market due to networks of agents they have at different locality and being informed of the prevailing demand and market prices in Nairobi where the bulk of the gums and resins are taken by the cartels. According to buyers who are stationed at major market centres majority of the sellers of gums and resins are male mostly the middle aged (21-45 years) although currently there is significant increase in number of women and teenage boys involved. Majority (90%) of the traders buy gums and resins the way the collectors bring to them without assigning grades and subsequently sell the same products to other traders mostly the traders who go around buying the stocks. Traders who sell the gums and resins to the exporters do grading before they sell to them and getting different prices for different grades presented. Currently they are no value addition practices in place right from the collection point up to the export stage where the gums and resins are shipped or sold to industries in Kenya which uses gums and resins for industrial purposes.

There are a number of challenges faced by the traders involved in gums and resins in Garba Tula area. The prime ones being:

- There is no established market where gums and resins are sold. The cartels operating in the area are taking advantage of this loop hole and exploit other traders.
- The supply of the gums and resins do not meet the current demand. Gums and resins collection done in far areas away from the market hence transport cost is high and in most cases means of transport not available. One trader states that with good organisation structure supply can be boosted.
- Lack of operational capital to invest in the gums and resins trade
- Lack of storage facility which in most cases result to gums and resins loose weight mainly because the traders cannot get the supply in bulk and forced to keep the portion they get waiting to boost with further supply
- For traders who transport the consignment to Nairobi additional challenges exists:
    - Kenya Forest service personnel ask for certificate of origin during transportation and extort money from traders. The officers do not issue certificate of origin if you request prior to transportation of gums and resins
    - Police officers are not aware of gums and resins business and most of the time attribute gums and resins as materials for manufacturing explosives. So they always ask for bribe
    - There is no NEMA office in Garba Tula area hence traders have difficulty in obtaining permit

Conclusions and recommendations

Gums and resins resources in Northern Kenya currently hold enormous potential to contribute to livelihood security and increase adaptive capacity of the pastoralist communities. They offer both alternative and complimentary role of boosting the income level of the household in the region. Gums and resins being a renewable resource if sustainably exploited apart from financial gain encourage biodiversity conservation and maintain ecosystem integrity.

Currently the potential of the gums and resins to effectively contribute to poverty alleviation and economic development at the household level and national stages has not been fully realized. Gums and resins resources are abundant and wide spread in the expansive drylands of Northern Kenya. Collection and marketing of the gums and resins in the region has been a practice in the pastoral area of Northern Kenya for many years and its role as an income generating activity is gaining more impetus due to recurrent drought that is diminishing the amount of revenue gained from the livestock sector. The dependence on the gums and resins among the poor household is more pronounced than wealthier counterpart even though the practice is current being adopted by well to do members of the community.

The involvement of the members of the household in gums and resins collection and sell cut across all gender and age group in Garba Tula area unlike livestock and other trade in the locality which is mainly dominated by male and older members of the household. Participation of all gender and age groups in gums and resins sector accord an opportunity for bulk of the population

to actively engaged in one sort of employment activity that can contribute to boosting the income level and well being of community in the area.

Although gums and resins hold promise to contribute to enhancement of livelihood in the drylands of northern Kenya currently there are some bottlenecks that hampers its potential. Undeveloped market, lack of financial capital, inappropriate tapping methods that result to tree damage, lack of policy to facilitate growth of the sector and difficulty in obtaining relevant permits by traders who transport their consignment to Nairobi are among the prime. The bulk of the constraints facing gums and resins sectors are closely linked or correlated to the underdevelopment in the area. High poverty level and lack of infrastructure characterises Northern Kenya emanating majorly from laxity and lack of will by government to develop the area. Lack of necessary infrastructure and absence of facilitation from the government impact negatively on gum and resin sector development or necessitate huge investment for the sector to run efficiently and bring lasting benefit to pastoralist communities in Northern Kenya.

A number of interventions are required from different quarters to make the gums and resins sector successful and realise its full potential:

- Financing the collectors to facilitate their operational activities and buying of the necessary equipments, materials and alimentation required during gums and resins collection. Operating capital need to be advanced to traders inform of grants or microenterprise loans that are similar to other sectors in the country.
- Capacity building of the collectors especially training them on tapping methods and proper storage techniques that do not encourage adulterations and loss of the quality and quantity due to unfavourable weather conditions. Trainers and extension officers need to be deployed to capacitate the collectors.
- Market and value chain development is an essential component to advance the gum and resin enterprise in the area. There is need to provide reliable information on market trends and prices to enable communities understand benefits associated with the enterprise.
- Value addition and inculcating practices that are compliant with the statutory standards in the international markets need to be given proper considerations to maximise benefits accruing from gums and resins collection and trade
- Sensitizing the community members on the economic value of gums and resins sector as an alternative or complimentary enterprise to existing income generating activity mainly livestock.
- Investment in the ASALs is unattractive especially to private sectors who are driven by motive of profit and prefer to operate in areas with good infrastructural facilities hence it is necessary for initial development or given driven assistance in the gums and resin enterprise to raise the business potential sufficiently to attract private sectors involvement and create avenues for partnerships.
- Formation of the collector groups, associations or cooperatives is needed to foster cooperation and coordination of the collection and sale of the gums and resins. Pulling resources will enhance economies of scale in production and foster bargaining power for better prices. Establishing proper storage facilities and quality assurance can easily be enhanced if the concerned parties organise themselves in formal grouping.
- Maintaining peace and putting in place appropriate conflict resolution mechanism in areas prone to conflict will allow communities to move freely across ethnic boundaries in search of gums and resins.

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