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Potentials and Challenges of Beekeeping Industry in Balang'dalalu Ward, Hanang' District in Manyara, Tanzania

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ABSTRACT

This study examines production status and identifies challenges facing beekeeping industry in Hanang' District. The study involved 94 bee keepers and 5 key informants. Primary data from the subjects were collected by questionnaires and on site physical observations. Data were analyzed by using (SPSS 11.5). Results show that 34.0 % of the respondents produce less than 100 kilograms (kgs) of honey and 29.8% of them produce 1-10 kgs of beeswax per year respectively. On the other hand 62.8% and 30.9% of beekeepers have productivity of honey and beeswax ranging between 11-20 kgs and 0.6-1 kgs respectively. Nevertheless, 29.8% and 1.5% of the respondents have productivity ranging between 21-30 kgs and 0.6-2 kgs of honey and beeswax respectively. This amount is higher compared to estimated national production capacity of 15 kgs of honey and 1 kg of bees wax per hive per year. Major challenges in business of honey and beeswax production include unreliable markets, low production knowledge/skills, lack of value adding mechanisms and lack of capital for quality improvement and market expansion. This study therefore recommends provision of appropriate capacity building and financial support to beekeepers in order to optimize production of bee products in the study area.

Keywords: Beekeeping, beekeepers, beeswax, colonies

[10]Institute of Rural Development Planning
[11]Hanang District Council

INTRODUCTION

Beekeeping (apiculture) is the management of colonies of bees for the production of honey and other hive products and for the pollination of crops (Alfred and Roger (2008*)*. It is an art and science of keeping honeybees and sting less bees (Melliponiculture) (URT, 1998). At the beginning of the 21st century the United States maintained an estimated 2.5 million colonies of honey bees, producing about 78 million kg of honey equivalent to 31 kg (68 lb) of honey per colony, and 9 to 18 kg (20 to 40 lb) of beeswax for every ton of honey harvested per year worth 171 million pounds. Germany, the United Kingdom, and Russia are the world's leading honey-producing countries and leading exporters in Europe (William, 2007). In Africa beekeeping is also common in countries like Ethiopia where beekeepers may between 10-600 colonies each producing between 12 and 18 kg of honey and 1 kg of beeswax and this number of hives is part of the criteria used to determine a beekeepers social standing within the community (Amssalu,2002)

In Tanzania, it is estimated that the production potential of bee products in the country is about 138,000 tons of honey and 9,200 tons of beeswax per annum from 9.2 million of honey bee colonies. However, the current actual amount harvested is 4,800 tons and 324 tons per year respectively, which is about 3.5% only, of the expected production (URT, 1998). Even though, in beekeeping potential areas such as Tabora and Rukwa regions an ordinary beekeeper usually owns at least 150 hives and produces an average of 10 and 0.5kgs of honey and beeswax per annum per hive which is equivalent to a total of 1,500 Kgs. honey and 75 Kgs. beeswax respectively which worth Tshs. 2,250,000/= (URT, 2001).

In Hanang' district in 1995, production of honey and beeswax were 92,426 Kgs and 3,111 kgs respectively, compared to expected 150,000kgs honey and 5,000kgs beeswax. Out of this 68% equivalent to 62,849.70 kgs honey and 2,115.50 kgs beeswax was from Balang'dalalu Ward (HDC, 1996). The base line survey conducted by Njiro Beekeeping Research (IBC) centre in 1992, shows that Balang'dalalu Ward had greater potential for high production of bee products to a level of 15 and 1 Kgs of honey and beeswax per hive annually respectively. Additionally, another survey conducted by Boniface (1992), revealed that bee products production was still as low as 3 and 0.5 Kgs of honey and beeswax respectively. Tanzania Wildlife Research Institute (TAWIRI) in 2009, also conducted a study and revealed that productivity was still below recommended level and was found to be 6.6 kgs of honey and 0.5 kgs of beeswax compared to recommended annual production of 15 kgs and 1 kg of honey and beeswax respectively (Mumbi and Silas, 2009).

In order to boost production, Arusha Beekeepers Association in collaboration with Danish Beekeepers Federation (DBF) conducted a feasibility study and initiated a project to support beekeepers groups for modern beekeeping by training and supplying modern beekeeping gears between 1995 and 1997. Also National Income Generation Programme (NIGP) under poverty alleviation Division in the Vice President's office conducted a three years beekeeping project aiming at increasing production of bee products for household use and sale for income and ultimately reduction of income poverty at household level. The intervention as well focused on empowerment of beekeepers groups particularly women and youths with expectation of up scaling to other villagers (AGR/09/97(UNDP, 1999). Despite those efforts, bee products production status is questionable. The extent to which beekeepers currently honey and beeswax in unclear, challenges currently facing beekeepers in Balang'dalalu Ward are not well known, thus, this study intends to generate information on bee products production status and critical challenges facing bee keeping industry in Balang'dalalu ward

METHODOLOGY

This study was conducted in Balang'dalalu ward which is located 40 kilometers south of Kateshi, the capital town of Hanang' District. The District has 18,921 people; 9,649 are males and 9,273 are females and the total number of households is estimated to be 3,784 (HDC, 2009). Balang'dalalu Ward is bordered by Kateshi township authority to the North, Singida Rural District to the South, and Kondoa District to the East and Iramba District to the west. The total population of the Balang'dalalu Ward is 18, 921 people of whom 9,649 are males and 9,273 are females (HDC, 2009). The study covered two potential villages in beekeeping activities namely: Murumba and Lalaji with current (2010) projected population of 7,568 (Murumba 4,012 and Lalaji 3,556). These villages' borders with Mgori forest reserve in Singida Rural District to the south and has been selected because of its high potential in beekeeping due to presence of Miombo and acacia forests, bush land and thickets which are suitable for beekeeping.

A cross-sectional research design was adopted in this study because it allows data to be collected at a single point in time without repetition from the representative sample. The reason for the choice of such a design is that, it is easier and economical to conduct especially where resource constraints like time, labour and money dictate the results, as it was the case for this study.

Two types of data were collected which included primary and secondary data. Primary data were collected from bee's keeper's household heads or their respective representatives. Secondary were collected from Ward Executive Office (WEO), Village Executive Office (VEOs), the District Beekeeping office (DBO), District forest office (DFO), and IRDP library. The ward and key informants

were selected purposefully; while villages were randomly selected using simple random sampling technique (lottery) and household heads respondents were selected systematically. The sampling unit was households. And the sample size was 94 respondents (beekeepers) from two villages were obtained using formula developed by Yamane (1967), that; $n = N/[1+N(e)^2]$ Where by: n = sample size, N = Sampling frame, e = prediction error 0.1 (10%), 1 and 2 are constants. This gives; $n = 1513/[1+1513(0.1)^2]$; thus, n = 94 respondents.

The number of respondents from each village was then proportionally computed as follows:- Murumba village:- $n = 94/1{,}513 \times 802$(households) $= 49.8 \approx 50$ respondents and Lalaji village:- $n = 94/1{,}513 \times 711$(households) $\approx 44.17 = 44$ respondents. This calculation from the two villages makes a total of 94 household heads. Adding 5 key informants, therefore in total 99 respondents were involved in the study. The distribution respondents are shown in the Table 1.

Table 1 : Distribution of respondents

Category	Number
Household head of (bee keepers)	94
Village executive officer (VEO)	2
Ward executive officer (WEO)	1
District Beekeeping Officer (DBO)	1
District Forest Officer (DBO	1
Total	99

Combinations of data collection methods were used. For primary data physical observation and interviews were applied using semi structured questionnaire with both closed and open ended questions. Physical observations were mainly for forests hives used, various measures for honey and beeswax such as buckets, bowls, and calabashes. Secondary data were collected by abstracting accessed documents from libraries and other resource centers. Documentary review involved perusal of existing forest and beekeeping reports as well as policies relevant to the study was done for researchers to comprehend and be acquainted with the real existing situation.

Primary data, after being collected from the field using questionnaire were edited before punching them into the computer software (SPSS 11.5). Data processing involved coding and entry into Statistical Package for Social Sciences (SPSS version 11.5) prior to analysis data were cleaned and verified. Using SPSS 11.5 data on bee products production status were analyzed mainly at univariate level where descriptive statistics and frequencies for study variable were computed. Analyzed data in this paper have been mainly presented in tables and graphs for meaningful interpretation and discussion.

RESULTS AND DISCUSSIONS

Characteristics of the Respondents

The socio-economic characteristics of the respondents examined in this study were age, sex, marital status and educational level. The main reason for choosing these characteristics was to get the general overview of what the study sample was composed of.

Table 2: Respondents' Characteristics

	Responses (n=94)	
Age (years)	Number	%
20-35	20	21.3
36-60	67	71.3
>61	7	7.4
Total	**94**	**100.0**
Sex		
Male	87	92.6
Females	7	7.4
Total	**94**	**100.0**
Education		
Not attended school	9	9.6
Primary education	78	83.0
Tertiary education	1	1.1
Other education	6	6.4
Total	**94**	**100.0**
Marital status		
Married	92	97.9
Single	1	1.1
Widow	1	1.1
Total	**94**	**100.0**

The ages of respondents practicing beekeeping were found to range from 20 to 80 years. Results in Table 2 indicate that most of those engaged in beekeeping activities are between 36 and 60 years of age (71.3%) as compared to other age groups. This has a relevant implication in the sense that traditional beekeeping in the area is a labour intensive job usually undertaken in the forests which need energetic experienced people who are committed and able to bear life risks; even more, they are the risk and care takers for their families in terms generating an income. Adults therefore, play a great role followed by youths 21.3%, which indicates that youths are slowly assuming responsibilities from the adults since they are able bodied while only 7.4% of elders are participating implying that they are no longer able to do hard work due to weakness because of old age.

As shown in Table 2, 92.6 % of the respondents or beekeepers were male and 7.4 % female. This implies that beekeeping venture is mostly done by men due to the nature of the occupation itself, which is carried out in the thick forests and hives are traditionally sited on tall trees, where women can not manage to operate easily. Few women participate in beekeeping, their apiaries are located on farms nearby to their homes, and beehives are sited on stands or short trees at reasonable height easy for women to manipulate the bee colonies. Aggressiveness of bee species kept, the *Apis mellifera scutellata* was also cited as one of the bottle necks for women to participate in the activity, but also culture to some extent. Although this is the case, however, due to economical constraints women are nowadays indirectly involved in beekeeping enterprises. For example, many societies have considerable traditional knowledge and skills concerning bees, honey, and related products. The products of beekeeping are often used by women: the important *tej* (honey wine) industry in Ethiopia, for example, is run by women. Elsewhere in Africa, women brew and sell honey beer (Amssalu, 2002).

The education level of most (83%) respondents is standard seven leavers (Table 2). Exposure to education will increase ability of the keepers to obtain, process, and use information relevant to the adoption of improved innovations of beekeeping at their disposal. Hence education will increase the probability that a beekeeper will adopt improved beekeeping innovations and hence increased productivity of bee products. This is due to the fact that beekeeping is a self employment opportunity available in the study area and elsewhere in the country.

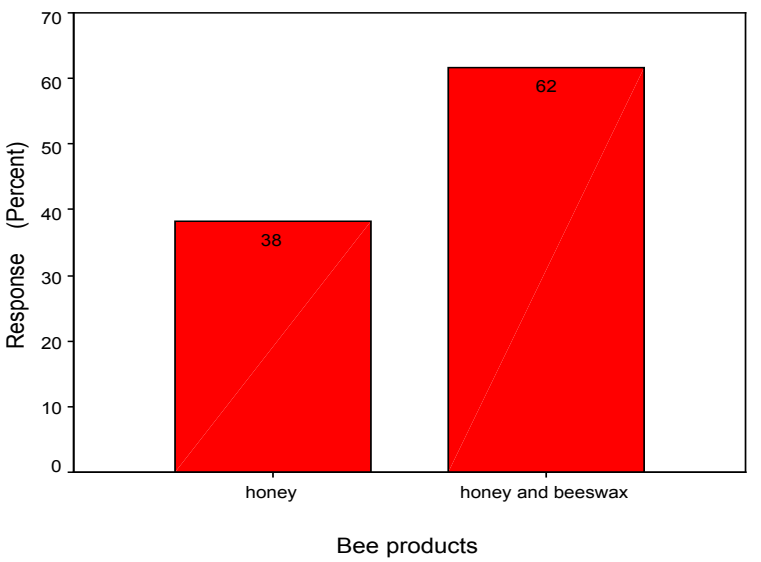
On marital status, the study found out from the sample that 97% of bee keepers are married ones (Table 2). The findings imply that beekeepers who are engaged in beekeeping activities have some off-farm income used the money to purchase farm inputs and capital goods such as hand hoes and plows and to meet other family needs. Currently, beekeeping in Tanzania has been identified as an economic activity that has the potential in both reducing rural income poverty as well as improving the sustainable management of forest and woodland resources (URT, 2006).

Potentials of Beekeeping among Beekeepers

Types of Bee Products

The findings as indicated below (Figure) show that 38 % of the respondents produce honey only, while 62 % produce both honey and beeswax. Although these two products (honey and beeswax) reported by respondents seem to be produced separately, but in reality they are complementary thus, the issue here is that large number of beekeepers do not process their comb/crude honey to get both refined honey and clean beeswax while others do. This means that beekeepers get a loss in beeswax which benefited buyers of comb honey. The reasons given for not processing the products among others include: less customers who prefer refined honey, reduced amount of honey when processed and lack of knowledge and equipment, but also erroneous thought that refined honey is not a genuine product because it does not contain the natural appearance of the honey combs and might have been tampered by additional of other elements. With this perception, there is need to deliberately initiate sensitization programmes to make beekeepers change from this negative attitude and accept to process their honey in order to add value and quality to their honey and get beeswax as a secondary hive product for sale or manufacturing of other secondary products such as candles, cosmetics and skin ointments (Shaushi, 2007).

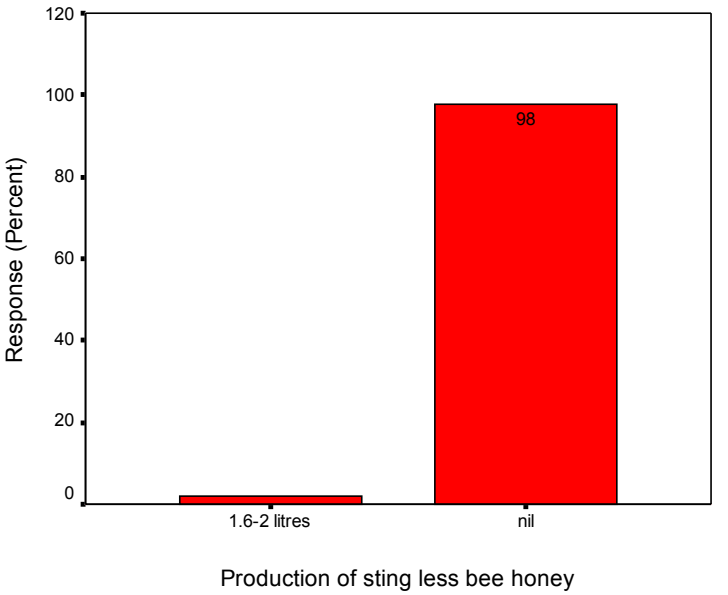
Figure 1: Types of Bee Products Produced



The results in Figure 2 show that there is a potential of sting less bees but only 2% of the beekeepers keep them to get honey while 98 % do not. However, focus group discussion with beekeepers argued that sting less beekeeping can be enhanced due to their potentiality and easy to manage. From a survey conducted

by Njiro Beekeeping Research centre in Kilimanjaro, Arusha, Manyoni and Tabora it has been found that sting less bee honey can fetch as much as twice the price of the honey from the common honeybee (Silas, 2005).

Figure 2: Production of sting less bee honey per hive per year.



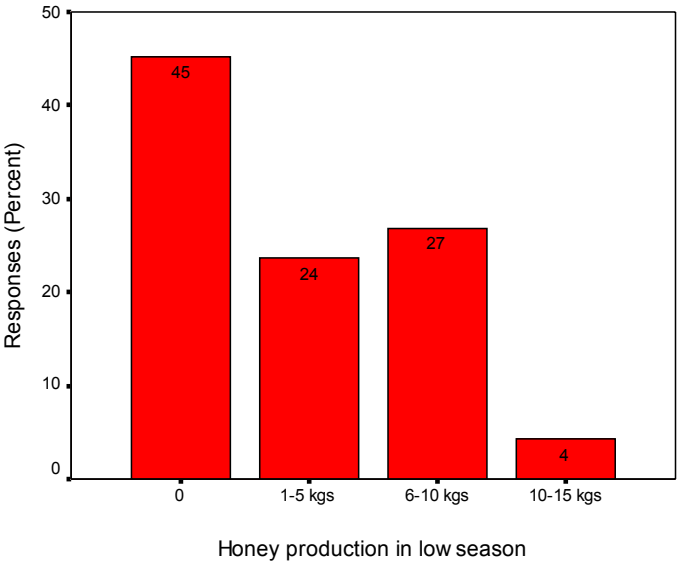
Honey and beeswax production in major and minor seasons

The results in Figure 3 revealed that in major season 63% of the respondents produce between 11-20 kgs, 30% produced between 21-30 kgs and 7% produced between 6-10 kgs per hive per year. This implies that the area is comparatively suitable for honey production since more than 50% have productivity above the recommended national average production of 15 kgs of honey and 1 kgs of beeswax per hive per year (URT, 2001). The findings further show that 30% who produced between 21-30 kgs per hive per year approaching the level of Argentina where each colony yields between 30-35 kgs per year (Michael, 2004). Figure 3 shows honey production per hive per year in Balang'dalalu ward.

Figure 3: Average Honey Production per Hive per year

In low seasons as shown in Figure 4 most of the beekeepers, about 45 % do not harvest anything at all while 24%, 27% and 4 % harvested between 1-5kgs, 6-10kgs, and 10-15 kgs respectively. This implies that generally there is low production in the minor season by almost a half. The reason behind this low production is that, the minor season occurs during dry seasons when most of the plants are not in bloom and many hives become unoccupied depending on the apiary location. In views of beekeepers, they complain not to be satisfied with the general status of production in the sense that 46 % and 28 % of them would have been satisfied by producing between 21-25 kgs and 31-35 kgs per hive per season respectively, which is reasonably above the recommended amount based on the research conducted in the area for which results had set amounts between 15-25 kgs per hive per year (Mumbi and Silas, 2009). On the other hand 2%, 4%, and 20% would have been satisfied by producing honey per hive per year ranging between 11-15 kgs, 16-20 kgs, and 26-30 kgs, respectively.

Figure 4: Honey production in low season



Focus group discussions revealed that the reasons given for unsatisfactory production were bee pests attack, climate change, drought, frequent absconding of bees and lack of enough forage. Figure 5 shows the expected production level according to beekeeper's views which are substantiated by the abundance of bees and forest resources existing in Balang'dalalu ward. On the basis of the expected production level, there is potential for increased productivity if projects for interventions and production promotion are put in place.

Figure 5: Expected Annual Honey Production per Hive

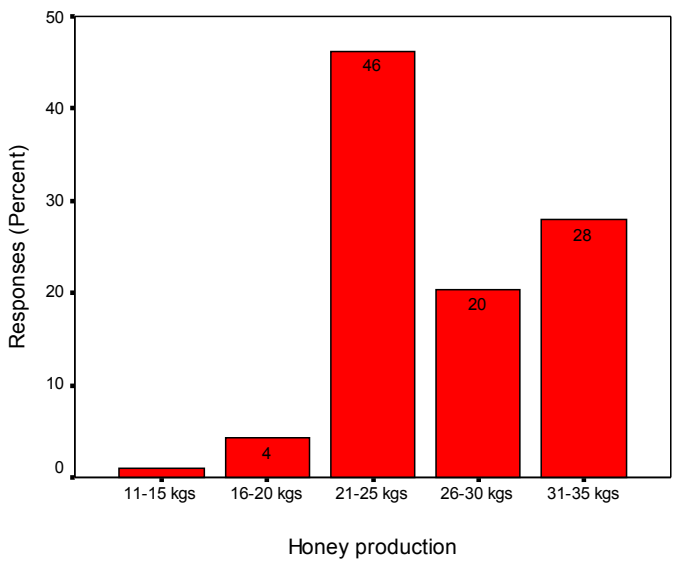
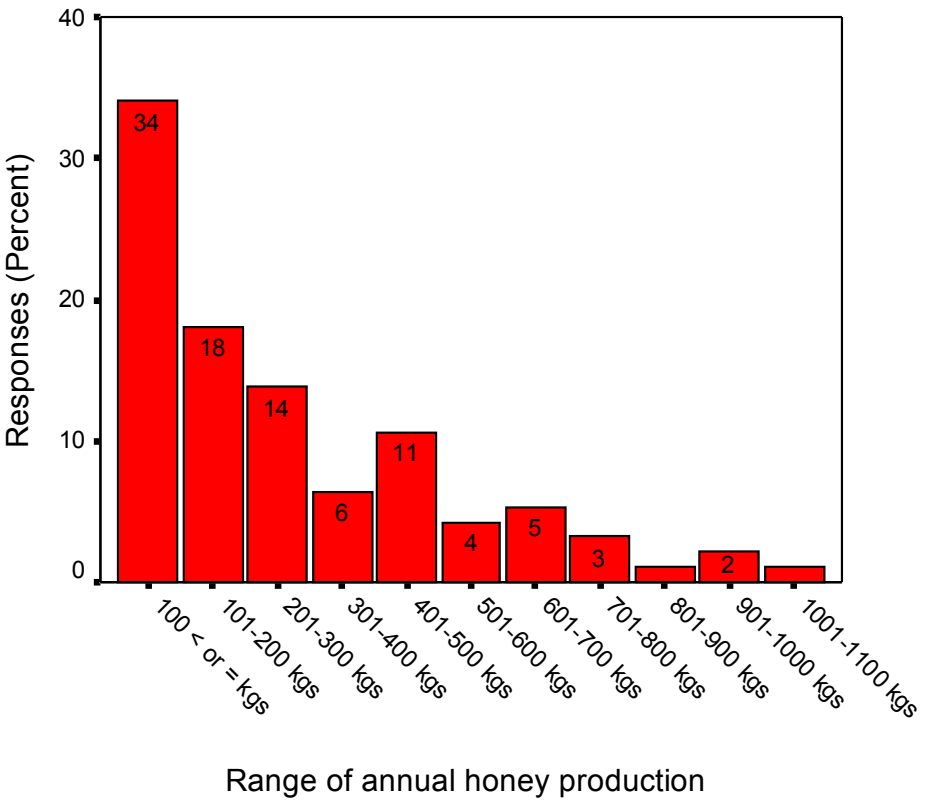


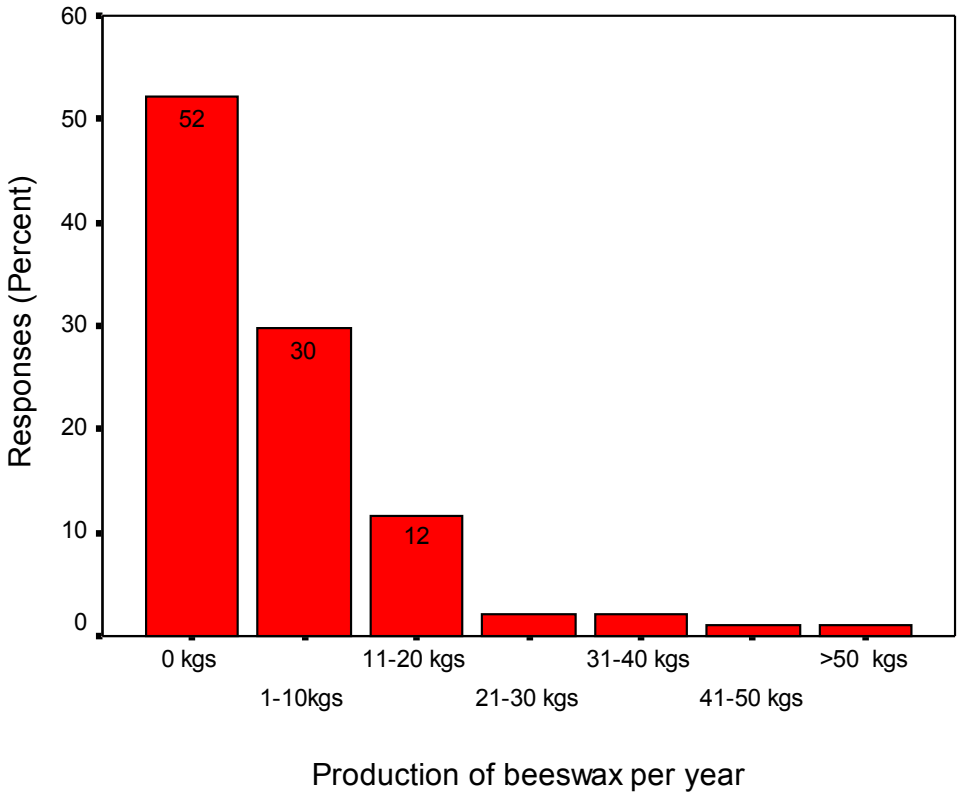
Figure 6 indicates total annual level of honey production, results show that, 34.0% of the beekeepers produced less than 100kgs of honey and 1.1 % produced between 1001-1100 kgs in a year. Other ranges of annual production level of honey are as shown in Figure 6 below. Members of the Focus Group Discussion argued that the factors for the differences in the level of production of honey in a year were bee pests, climate change, absconding of bees' drought and inadequate forage, but also the number of bee hives a beekeeper possesses. Others were low level of beekeeping technology and transportation problems. Figure 6 displays the scenario.

Figure 6: Total Annual Honey Production of Respondents



On beeswax, results in Figure 7 reveal that 52 % of the respondents do not produce beeswax and 1% produce more than 50kgs while 30%, and 12%, produces between 1-10 kgs, 11-20 kgs of beeswax respectively. This indicates that most of the beekeepers do not process their honey but sell it with combs which lead to loss of this valuable hive product which goes to benefit the buyers instead of producers. These variations in annual production per annum are displayed in the Figure 7.

Figure 7: Production of Beeswax per year



Trends of bee products production for the past five years

Results in Table 7 show that 47.9%, 51.1%, 31.9%, 29.8% and 29.8% households produced less than 100 kgs in years 2005, 2006, 2007, 2008, and 2009 respectively. The leading year for low production was 2006 where 51.1% of the households keeping bees produced less than or equal to 100 kgs of honey as shown in Table 3. The major reason given for this situation was prolonged drought. Further results show that year 2009 was leading in production whereby between 1000 and 1100 kgs of honey were produced by 1.1% of the households and the reasons given for this good harvest is the general good climate particularly enough rainfall in that year. The trend of production of honey is as shown in Table 3.

Table 3: Trend of Total Honey Production of Respondents from Year 2005 – 2009

Honey production range in (Kgs)	Percentage of beekeepers with range of honey produced (n = 94)				
	2005	2006	2007	2008	2009
<100	47.0	51.1	31.9	29.8	29.8
1.01-200	13.8	16.0	23.4	22.3	21.3
201-300	12.8	11.7	14.9	12.8	13.8
301-400	4.3	5.3	10.6	4.3	4.3
401-500	5.3	8.5	7.4	8.5	5.3
501-600	4.3	2.1	7.4	8.5	6.4
601-700	4.3	3.2	4.3	5.3	1.1
701-800	2.1	1.1	-	5.3	6.4
801-900	2.1	1.1	-	2.1	1.1
901-1000	1.1	-	-	1.1	2.1
1001-1100	2.1	-	-	-	1.1

On beeswax production, the trend for the past five years from 2005 to 2009 shows that 45.1% beekeepers did not produce and/or process beeswax as opposed to 48.9% of beekeepers who produce beeswax get (Table 4). From this data it is found that most of the honey produced is used or sold in crude form. This implies that there is low production of beeswax and hence beekeepers do not benefit more although it an important one to the nation for export to get foreign money (URT, 1998).

Table 4: Beeswax Production from Year 2005 – 2009

Beeswax production range in (Kgs)	Responses (%) (n = 94)				
	2005	2006	2007	2008	2009
0	50.0	48.9	51.1	46.8	47.9
1-10	4.3	5.3	3.2	6.4	5.3
11-20	1.1	1.1	1.1	1.1	1.1
21-30	44.7	44.7	44.7	45.7	45.7

Table 5 shows beeswax production per hive per year. The findings indicated that 25.5% of the respondents get less than or equal to 0.5 kgs of bees wax and 30.9% get between 0.6-1 kgs per hive per year while the recommended amount per hive is 1kg (URT, 2001). The findings of this study revealed that beeswax production in the study areas is relatively low as compared to the recommended amount and hence can arouse perplexity for intervention in promoting beeswax production in the study area. The study also found that 1.5% of the sampled respondents produced of beeswax in a year. This implies that it is possible to meet the recommended production of 1 kg per hive per year). However, focus group discussions revealed that some of the respondents (38.3%) do not process beeswax for various reasons, such as lack of knowledge, few customers to purchase the commodity and lack of processing equipment.

Table 5: Production of Beeswax per Hive per Year

Kilograms (kgs)	Responses(n = 94)	
	Number	%
≤0.5	24	25.5
0.6-1	29	30.9
1-1.5	2	2.1
1.5-2	2	2.1
>2	1	1.1
Don't process	36	38.3
Total	**94**	**100.0**

Besides there is misconception that the amount of honey becomes little in amount when processed, but this is a matter of understanding in that despite such reality, refined honey fetches high price due to its added value and hence does not affect the expected income of one who process. In comparison, according to the beekeeping policy (URT,1998) one colony of bees is estimated to produce 1kg per year, and therefore the low production as shown in Table 6 could be due to reasons given. The results in Table 6 indicated low productivity of beeswax per year as compared to the recommended production.

Data from Hanang District Lands Natural Resources and Environment show that, the average productions of bees wax per hive per year is about 0.14 kgs thus, generally that there is a problem in beeswax production in the Hanang District. On quality of bee products it is found that since most of the crude honey harvested is not processed, likewise the beeswax, it remain questionable to verify the quality of bees products from this area although Tanzania is reputable for exporting high quality honey. For example in 1991, Tanzania won in competition by 100% of the quality test for "organic honey in UK (URT, 1998). Furthermore other factors such as Hydroxy-methyl- furfuraldehyde (HMF), colour, and taste, viscosity and

aroma standards are measures for quality in honey and bees wax production and marketing (URT, 2001). Interventions to solve such problems could be appropriate to improve beeswax production. This could benefit the nation in raising the GDP.

Table 6: Average Total Production of Beeswax per Year

Beeswax (kgs)	Responses (n = 94)	
	Number	%
0	49	52.1
1-10	28	29.8
11-20	11	11.7
21-30	2	2.1
31-40	2	2.1
41-50	1	1.1
50 and above	1	1.1
Total	**94**	**100.0**

Contribution of beekeeping to household income

As shown in Table 7, 46.8% of the respondents reported that beekeeping activity contributed between 1-10 % to the household income. This situation could be due to the diversified nature of the household income by engaging in more than one income generating activity. More awareness creation is required to make people optimize utilization of the beekeeping resources at low cost but with greater financial gains. The contribution of beekeeping to household income is indicated in Table 7.

Table 7: Contribution of bee products in household income

Income contribution (%)	Responses (n = 94)	
	Number	%
0- 10	44	46.8
11-20	34	36.2
21-30	8	8.5
31-40	6	6.4
41-50	1	1.1
51-60	1	1.1
Total	**94**	**100.0**

Challenges facing beekeeping industry in Balang'dalalu ward

In any business there are challenges that have to be solved in order to survive. The bee keeping industry in Balang'dalalu ward face a series of drawbacks; namely technology, market, equipments, climate, transportation, credit accessibility, lack of training/skills and cultural practices.

Inadequate capacity building programs

Beekeeping although does not require high technology in practice, it however, there is still inadequate capacity building programmes in beekeeping industry (URT, 2001). The results in Table 8 revealed that that only 27.7% of the bee keepers have attended training and 72.3% have not attended any capacity building program. This may also be one of the contributing factors for low bee products production.

Table 8: Attendance to beekeeping training

Attendance	Response (n = 94)	
	Number	**%**
Attended	26	27.7
Not attended	68	72.3
Total	**94**	**100.0**

Unprocessed products

Processing of bee products although may increase the quality and add value to honey and beeswax. Findings in Table 9 show that 77.7% of the respondents do not process their honey while 22.3% only do so. An intervention has to be sought to address the situation. It was learnt that processing of honey is a challenge to most of the beekeepers due to a number of reasons such as: lack of customers to buy refined honey or beeswax, low knowledge for processing and lack of equipment but for those who process responded that they fetch good prices for their processed products.

Table 9: Proportion of beekeepers processing honey after harvesting

Honey status	Responses (n = 94)	
	Number	%
Processed	21	22.3
Not processed		73
Total		77.7
	94	**100.0**

Unreliable market

Market is another challenge facing beekeeping industry in the study area. The results in Table 10 show that 93.6% of respondents have no access to reliable market while only 6.4% do have. The reasons given in Table 10 are: inadequate customers during harvesting season 71.3%, difficult transportation of bee products to markets 26.6%, but only 2.1% claimed to have access to market. Due to those challenges there is a need to make deliberate efforts in making close monitoring in order to find appropriate measures which can contribute to improved beekeeping development.

Table 10: Market accessibility problems for bee products

Market accessibility	Responses (n = 94)	
	Number	%
Accessible	88	93.6
Not accessible	6	6.4
Total	**94**	**100.0**
Existing Market Accessibility Problems		
Inadequate customers at harvesting time	67	71.3
Difficult transportation of bee products to markets	25	26.6
No problems with market of bee products	2	2.1
Total	**94**	**100.0**

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The research findings indicate that the level of production of bee products, honey and beeswax is a generally low in the study area, although the potential is high as per beekeepers' views where by majority of beekeepers affirmed that the vegetation of Miombo woodland, Acacia forests, bushes and thickets existing in the area the major inputs for bee products production.

Factors determining this low production pattern were given to be unfavorable climatic conditions, low level of technology dominated by the use of indigenous knowledge and/ methods, inadequate customers of bee products peak of harvesting season, inadequate trainings for modern beekeeping, lack of modern beekeeping equipments, and frequent forest fires which destroyed biodiversity and killed bees.

Challenges identified were unreliable market, low capacity for processing technologies of bee products, lack of processing equipment, absence of all weather roads that hindered linkage between beekeepers and markets within and outside the District and diverse of economic activities.

Recommendations and policy implications

Low production of bees products revealed in Balang'dalalu is related to low awareness of beekeepers on sustainable utilization of the available beekeeping resources in their area. The solution to this situation is to introduce programmes for community sensitization on harnessing the beekeeping resources for income generation to improve their livelihoods.

Factors identified to determine for bee products production such as low level of technology, unfavorable climatic conditions, and biodiversity destruction should be addressed through capacity building and empowerment for high production and productivity. Involvement of other interested stakeholders within and outside the country may be sought to support various beekeeping development projects. Up scaling of the current beekeeping development programme implemented by the Government should be expanded to newly identified potential areas like Murumba and Lalaji villages to enhance production and productivity of bee products.

Challenges constraining beekeeping industry in Balang'dalalu like market, processing technologies, absence all weather roads and economic diversification activities. It is recommended that there should be deliberate efforts to design participatory strategies backed by research results that would steer for investment in small scale and medium enterprises that can help in mobilizing beekeepers to build institutional capacity for mass production in order to attract investors in beekeeping venture. This will help to address much of problems such as processing for quality and added value to bee products for internal and external markets.

Furthermore, beekeepers are advised to form their local associations provide the means for beekeepers to advance their craft, lobby for the protection of bees, and organize collective processing for honey and wax, and gain access to markets.

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