

## TANZANIA BEEKEEPING PRODUCTION INITIATIVES FOR SUSTAINABLE INDUSTRIAL DEVELOPMENT

Maziku, Petro<sup>1</sup>; Assenga, Nestory<sup>2</sup>; Msacky, Richard<sup>3</sup> and Shaffii, Mwanaidi<sup>4</sup>

1. Lecturer – Business Administration Department 2. Assistant Lecturer –Business Administration Department 3. . Assistant Lecturer – Business Administration Department 4. . Assistant Lecturer –Business Administration Department  
College of Business Education –Dodoma Campus, P.O. Box 2077 Dodoma, Tanzania, Corresponding Author:Email [p.maziku@cbe.ac.tz](mailto:p.maziku@cbe.ac.tz)

### ABSTRACT

*This paper explored the potential initiatives, opportunities and challenges faced by bee and honey producers in Dodoma region in relation to industrial development. The study employed the cross sectional design in collecting primary data from various bee and honey firms in region for the year 2016/2017. A sample of 55 bee and honey firms was randomly selected and involved in the study. Descriptive analysis was used in analyzing the data in which descriptive statistics and features such as means, bar charts and tables were used in presenting the study findings. Findings of the study indicated that, availability of water and potential flowering plants, good linkage with other small industries and availability of both local and international markets were the most potential opportunities for producers. Furthermore, establishment of bee keeping association, training and government support were the initiatives mostly recommended by beekeepers. However, the use of traditional technology in bee keeping and lacks of support from the government were found to be the most challenging factors to beekeepers. Based on these findings, the study recommends the government through the Ministry of Natural Resources and Tourism and private sector to build capacity to beekeepers on the application of modern beekeeping technologies including the use of frame and plastic bar beehives and access to both domestic and foreign markets. Furthermore, efforts of strengthening the existing initiatives by the government and other stakeholders are highly recommended in order to facilitate the process of converting these challenges into opportunities to beekeepers*

**Keywords:** *Initiatives, Sustainable industry, Bee and honey, Dodoma, Tanzania*

### 1.0 Introduction and background

Currently, the bee and honey production at a global level has given a great attention to most of governments as potential contributor to international economic growth. This follows with the increasing trends in the global demand for honey and beeswax and other products over the past 10 years (ITC, 2015; Mwanayoka, 2017). According to International Trade Centre-ITC (2015) it is reported that, the global market for honey and its products was projected to exceed 1.9 MT by the year 2015. To meet the increasingly market demand a number of initiatives have been established by most of major honey producing countries in the world. China being the largest honey producing nation in the world, with around a 40 per cent slice of the market followed by USA, Argentina and Ukraine have implemented different initiatives (MMA, 2007; ITC, 2015). In Africa different stakeholders (Government, NGOs and CBOs) in honey and bee sub sector have been engaged in implementing various initiatives to support the sector. These included Honey Care Africa and Community Action for Rural Development (CARD) which support beekeeper in the rural community in East Africa Community member countries (Neuss, 2016). Basically, the initiatives for industrial development (including honey sector) began seriously in Africa after independence which was aimed at transforming their economies from agrarian based to industrial economy (Mendes *et al.*, 2014; Rickett & Shackleton; 2019).

But, this potential has not fully been utilized productivity is still low and beekeeping markets are still under-served (Tutuba & Van haverbeke, 2018). The beekeeping industry is poorly organized, functions through disorganized channels, with uncoordinated actors thus beekeepers remain local and relatively poor

Similar to other countries in Africa, in Tanzania, beekeeping and honey industry is limited in terms of production yield and markets access, though the actual economic value of beekeeping in the country is far greater than the value of honey produced (Mwanyoka, 2017; Tutuba *et al.*, 2019). To embark on this, different initiatives to industrial development for different sectors were established. One of these initiatives was the formulation of the Sustainable Industrial Development Policy (SIDP) 1996-2020. The SIDP was aimed at enhancing the sustainable development of industrial sector (including beekeeping) in the country. The implementation of the SIDP was influenced by Structural Adjustment Program (SAP) whereby the emphasis was laid on marketing orientation and private sector led economy. Under SAP the private sector was recognized as the main vehicle for making the desired investment in the industrial sector while the government was tasked to provide enabling investment environment (URT, 2010). The SIDP implementation initiatives coincided with the Tanzania Development Vision (TDV) 2025 which sets out the new policy framework for the transformation of Tanzania from a least developed country to a middle income country by 2025 (URT, 2005). To speed up the efforts of attaining the SIDP goals, the government enacted the Export Processing Zones (EPZs) Act in 2002. The objectives of the EPZs were to attract and promote investment for export led industrialization, to increase foreign exchange earnings, to create and increase employment opportunities, to encourage and attract the transfer of new technologies and promote the processing of local raw materials for export value (Gabagambi, 2013). The enactment of EPZ induced several industries and initiatives to be established under SIDP in different sectors including the bee keeping industry and programmes. These included the National Beekeeping Programme (NBKP, 2001), the Beekeeping Act No. 15 of 2002, Tanzania Honey Council (THC), Empowering Communities through Training on Participatory Forest Management (PFM) and Honey care Africa initiative operating in Tanzania and Kenya. The main objective for these Acts and programmes were to improve the quality and quantity of honey and bee products in the country.

Following these initiatives, the government of Tanzania has recognized the important role played by the Beekeeping sector in increasing agricultural production and industrial growth through the pollination of plants (FAO, 2009; Berenbaum, 2007; Nyatsande *et al.*, 2014). Tanzania being one of the leading honey producers in Africa, it has 48 million hectares of forests and woodlands available and suitable for beekeeping and production (MNRT, 2014; Guyo and Solomon, 2015). The sector generates about US\$ 2 million in Tanzania for each year from the sale of honey and beeswax and about 2 million urban and rural people are employed in the sector (MNRT, 2010; Mwanyoka, 2017). Moreover, findings from the study by SUA (2018) under REDD+ project shows that, Tanzania has 9.2 million honey bee colonies with the production capacity of 138,000 tons of honey per year. For that matter the sector is considered to play a vital role in poverty reduction and economic development through provision of food for rural people, medicine, raw materials for industry and income for beekeepers and intermediaries. Thus, increasing the productivity of the bee and honey sector is one of the pre-requisites for industrial growth and economic development in Tanzania (MNRT, 1998; URT, 2010). Moreover, Tanzania is the second largest honey producer in Africa after Ethiopia (45,300 MT) and the tenth in the world which makes the country to be a biggest African supplier to the EU markets (ICT, 2015; Tutuba and Vanhaverbeke, 2018). Also, the presence of both stinging and non-stinging honeybees coupled with existence of indigenous knowledge in beekeeping in Tanzania also provides great potential investment opportunities.

Despite its importance and potentials, the production and investment potentials have not yet fully been utilized and beekeeping markets are still under-served (Tutuba *et al.*, 2019). The beekeeping and honey industry is poorly organized, with uncoordinated actors along the market channels making most of beekeepers to remain relatively poor. Moreover, the production of bee keeping sector in Tanzania remains low compared to its potential, which is estimated at more than 100, 000 and 6,600 metric tonnes of honey and beeswax per annum, respectively (MNRT, 2010; ITC, 2015). The current actual production stands at 34, 000 tonnes of natural honey and 1830 tonnes of beeswax, which is only 34% and 27% of the potential, respectively (FAOSTAT, 2012). Unfortunately, only 7% of this potential for beekeeping and production is utilized dominated by local and relatively poor beekeepers (MNRT, 2014; Tutuba *et al.*, 2019). The large gap between actual production and the expected production potentials in the beekeeping industrial sector in Tanzania, depict the extent of the available untapped opportunities in the sector which call for an immediate investments from both government and private sector. To make this happen, the fifth government regime under President John Pombe Magufuli has decided to make Tanzania as an industrial driven economy country by 2025. However, this could only be possible if, the available opportunities and challenges in

various sectors including the bee keeping sector are well understood by both local and foreign investors. It is under this background this study was aimed to fill this gap with specific focus on exploring the initiatives, opportunities and challenges under the bee and honey industry in Dodoma.

### **3.0 METHODOLOGY**

#### **3.1 Study Area and Population**

This study was conducted in Dodoma region located at the Central Zone of Tanzania. Dodoma region was chosen to be the study area for some several reasons. Firstly the region is one of the emerging regions with large numbers of bee and honey firms in the country after Tabora and Kigoma regions. Dodoma is also one of the regions with fast growing population resulting from the government's decision of shifting its operation from Dar es Salaam to Dodoma that will form the future market for the bee and honey products. The coming of the government offices in Dodoma is considered as new growing domestic markets which will increase the demand for honey and bee wax products in the region. According to the Tanzania 2012 Census, the population of Dodoma region was estimated at 2,083,588 people with a growth rate of 2.1% per annum (NBS, 2012: 2014). The study covered bee and honey producers and processors both small and medium scale firms in the region. Three districts namely Chamwino, Bahi and Dodoma Urban districts were selected for the study. The targeted population of the study included all bee and honey production firms in the region. These formed the population that was used in the determination the study sample.

#### **3.2 Data type and Source**

The study used both cross-sectional and time series data that were collected in the study area during the study period from May 2016 to June, 2017. The collected data included the characteristics of the firms, opportunities available to the firms, initiatives taken to make the bee and honey industry sustainable and the challenges faced by the bee and honey firms. The unit of analysis was the bee and honey firms and these were represented by their owners or any key informant representing the firms.

#### **3.4 Sample and Sampling Procedures**

From the study population, a sample of 55 bee and honey firms was randomly selected. This sample size was calculated based on the sampling formula by Nassiuma, (2000). The study applied the multistage sampling procedures where both probability and non-probability sampling techniques were used at different stages of the sampling process. The sampling was done in three stages. At the first stage, three districts (Chamwino, Bahi and Dodoma urban) out of seven (7) districts were purposely selected based on their bee and honey production potentials in the region. At the second stage a systematic random sampling was used to select some firms out of the total number of bee and honey firms obtained from the region forestry offices. In the third stage, the purposive sampling was used to select 55 owners of the firm to be the respondent for the study since these could provide the key information related to their firms.

#### **3.5 Data Collection methods and Analysis**

The study used self-administered open and closed ended questionnaires to collect data from the study respondents. The Likert Scale questions with five level of measurement were used in capturing the responses of respondents on the related information. This was the most appropriate tool for the study given the nature of information that was collected and the limited time for the study. This tool was also appropriate since it gave the enumerators a chance to clarify some of the questions and obtain more information from the respondents where it was necessary (Tumaini, 2012). The collected data were coded, entered in SPSS then cleaned and analyzed. In the analysis, the Likert scale questions were analyzed by finding their mean scores. The mean scores were then ranked and the interpretations were done according to theories and empirical literatures. The rule of thumb for interpretation of the mean scores is that since the Likert scale questions were 5 points based, the responses were that any score that exceeds the median value of 2.5 was showing agreement with the statement and any score below the median value of 2.5 was showing disagreement with the statement.

## 4.0 RESULTS AND DISCUSSIONS

### 4.1. Size of the Business Firm

The size of the firms was measured in term of size of the invested capital and number of employees based on SME policy 2003 classification. Results as presented in Table 1 indicate that, out of the 55 bee and honey firms visited, the majority (59.1%) were small firms. The remaining percentages (40.9%) of firms were medium sized. This implies that, the production of honey in the region is monopolised by small scale enterprises. These findings concur to those reported by MIT (2014), that majority of SMEs in Tanzania falls under micro and small size.

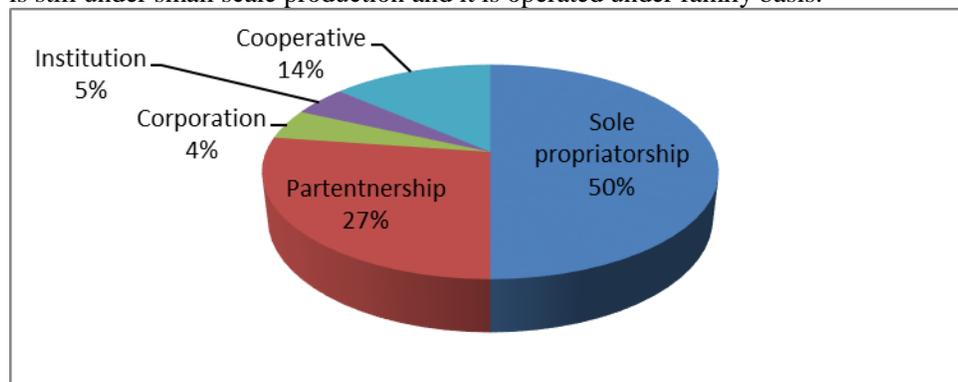
**Table 1: Size of the Business Firms**

Size	Frequency	Percent
Small	33	59.1
Medium	22	40.9
Total	55	100.0

Source: Computation from the field 2017

### 4.2 Forms of ownership among bee and honey producers

The findings as presented from Fig 1 showed that the largest proportion (50%) of the bee and honey firms visited were sole proprietorships. Only 27% were in partnership form and the remaining percentages were under cooperative, corporation and institutional ownership. This implies that, bee and honey production in Dodoma region is still under small scale production and it is operated under family basis.



**Figure 1: Type of ownership by bee and honey firms**

These findings can be attributed to the fact that most of the firms under the bee and honey industry are small and medium sized firms. The key issue to note here is that, the study gave comparatively equal chances of selection to both the small and medium enterprises. These results are in line to what was presented by ITC (2015) and TanTrade (2007) that over 80 % of beekeeping production is done using traditional hives and large part of this is still a family activity led by heads of the family.

### 4.3 Years in Which the Firm has been Operating

The number of years in which the firm has been in operation was also an important characteristic that was investigated. The results under Table 2 indicated that, a larger percentage (54.6%) of the firms had been in operation for a period between 1 to 10 years. The remaining percentage (45.4 %) of firms had stayed in operation for a period of more than 10 years. This is due to fact that most of the bee and honey firms are still small or medium sized. However it is worth to note that, it was found that some firms had stayed in operation for more than ten years (Table 2).

**Table 2: Years in Operation of the Firms**

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Number of Year	Frequency	Percent
1 to 10 years	30	54.6
Above 10 years	25	45.4
Total	55	100.0

**Source:** Computation by the researcher from the Study Sample

#### 4.4 Ability to Acquire Markets outside the Country

The ability of the firms to acquire markets outside the country was also investigated. The results as presented in Table 3 show that, majority (84.1%) of the firms responded to have no access to foreign markets. The remaining firms which represent 15.9% of the surveyed firms had access to foreign markets. This situation could be attributed to the reasons that most of the bee and honey producers in Dodoma are still under the family ownership and use traditional methods of production and marketing. Therefore, the quality of their honey and bee wax products could not easily fit to the external markets. During the survey, owners of firms in Dodoma reported some reasons for why they cannot access the international markets which included factors associated with poor processing and packaging which prevent them from accessing foreign markets (MNRT, 2014).

**Table 3: Access to Foreign Markets**

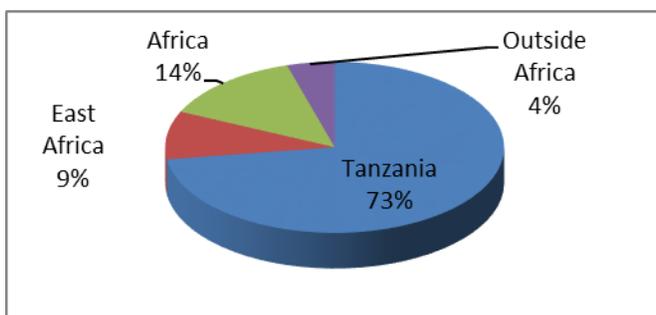
Response	Frequency	Percent
Yes	9	15.9
No	46	84.1
Total	55	100.0

**Source:** Computation from the field data, 2017

These findings are in line with those of MNRT (2014) who found that, more than half of honey produced in the country is consumed locally as food and very little was exported. Moreover, the findings are in line with those of ITC (2015) and IFC (2018) who found that, majority (86%) of beekeepers use traditional log hives which produce less honey ( 5-15 kgs ) depending on season and in most cases, honey production is secondary or even a third economic activity. Also, similar to Nyatsande *et al.* (2014) who found that, beekeepers in Tanzania was local and relatively poor working in unorganized marketing systems.

#### 4.5 Main Markets for Bee and Honey Products

A further enquiry was done to investigate the main market accessed by the bee and honey firms in Dodoma region. The findings from Figure 2 show that, the majority of firms (about 73%) had their main markets in Tanzania which included cooperatives, local brewing industries and urban areas. Only 27% of the visited firms managed to access external markets from other countries in Africa and Europe. This implies that, the external markets accessibility for bee and honey producers in Dodoma region is limited to local markets only. These findings concur with those of MNRT (2014) that, more than half of honey produced in Tanzania is locally consumed and a little of it sold to EU, Oman, UAE, Kenya, Rwanda, Uganda and Iran. According to Mwanyoka (2017) it was reported that, traditional bee keepers in Tanzania have been selling honey at a throw away price and throwing away associated products such as the beeswax.



**Figure 2: Main Markets for Honey producers in Dodoma**

The findings in Figure 2 further portray that, there are barriers of entry to foreign markets for most of bee and honey enterprises in Dodoma and in Tanzania at large. The possible explanation of the inability to access external market is the failure of local producers to meet the international standards of bee and honey products requirements. This in other hand could limit the future expansion of bee and honey production and thus its sustainability. These findings are similar to those of ITC (2015) that, Tanzanian honey and wax exports has been continuously declining for the past four years, for example, in 2010 only 291.5 metric tons were exported, in 2011 were 343.4 tons, in 2012 were 280.5 tons and in 2013 were 93 ton.

#### 4.6 Major Activities of the Firm

The major business activities of firms operating in bee and honey industries were also investigated. The results as presented in Table 4 showed that, majority of the firms (75%) were found in the category of processing and marketing as their major production activities. The percentage of firms which were involved in production and processing was 15.9% while only 9.1% were dealing with production only.

**Table 4: Major Business Activities of the Firm**

Activity	Frequency	Percent
Production only	4	9.1
Production and processing	7	15.9
Processing and marketing	33	75.0
<b>Total</b>	<b>44</b>	<b>100.0</b>

**Source:** Computation from the Study Sample

#### 4.7 Main Partners and Stakeholders

The main partners and stakeholders in bee and honey industry were investigated. The study findings show that, the major partners were NIGP, RLDC, DONET, SIDO, ITISO Women group, FCS, government, NGOs, Central Park Bees, Individual customers, TBS, TFDA. These are stakeholders who have direct or indirect effects on the bee and honey firms in Dodoma.

#### 4.8 Main Users of Bee and Honey Products

The study findings further indicated that, bee and honey products in the region were having market demand from individual consumers, local breweries, shoe makers, pharmaceutical industries and candle makers. These categories of users constitute the target and niche markets for bee and honey products. Following the shift of government operation to Dodoma, about 1,250,000 new individual consumers are expected to enter the Dodoma markets resulting from 250,000 public servants with their family members averaged at 5 people per family (NBS, 2014; Mlay *et al.*, 2017). This trend of population increase presents great opportunity for local bee-keepers and processors to benefit from the increased honey and beeswax demand in the region.

#### 4.9 Opportunities in Bee and Honey Industry

Table 5 presents various opportunities available in bee and honey industry with their mean scores and rank that were derived from the responses of respondents in the study area.

**Table 5: Opportunities in Bee and Honey Industry**

Opportunities	Mean score	Rank
Availability of water and potential flowering plants have influenced the growth of bee keeping	4.88	1
Bee keeping industry has a good linkage with other small industries	4.77	2
There is an availability of both local and international markets.	4.70	3
The increase in the need for employment opportunity is one of the opportunities for bee keeping	4.66	4
Bee keeping is emerging as a successful agricultural practice.	4.57	5.5
Bee keeping is an opportunity to local carpenters who produce bee hives	4.57	5.5
Bee and honey development in Dodoma is sustainable	4.45	7
Indigenous beekeepers' knowledge and experience stabilizes the industry potentiality	4.43	8
The natural environment is conducive to the production of bee products	4.39	9
The relocation of the government to Dodoma is an opportunity to bee and honey producers.	4.30	10
Adoption of improved technologies by honey producers enhances bee keeping sustainability.	4.27	12

**Source:** Computation from the Study Sample

Results from Table 5 show that, the mean scores of all the Likert scale statements showing opportunities for the bee and honey industry were above the mean score of 2.5. This indicates that, the respondents generally agreed that all the mentioned opportunities exist and can potentially influence the performance of the bee and honey industry. However, the availability of water and potential flowering plants was ranked the first out of all the opportunities reported by respondents. This implies that, the availability of the potential flowering plants provides a good environment for bee keeping in the region as compared to other opportunities. Furthermore, discussion with key informants and bee keepers revealed that the potential flowering plants in Dodoma provide natural bee pollen that makes the honey produced in Dodoma superior in terms of quality and taste as compared to honey from other countries in Africa. This nature of flowering call for more investment in the bee and honey sector in Dodoma due to the fact that, it will imply competitive comparative advantages for bee products both in local and external markets. These findings concur to those of UNDP (2014) that, availability of organic honey in Njombe district created a competitive advantage for bee and honey products from the district both for local and foreign markets. Furthermore, the findings concur with those of Tutuba *et al.* (2019) that, the presence of both stinging and non-stinging honeybees coupled with existence of indigenous knowledge in beekeeping in Tanzania provides great potential investment opportunities.

Results in Table 5 further indicate that, the linkage between the bee keeping industry and other small industries is the second ranked opportunity. This is due to the fact that, small industries were reported to be market outlet for beekeepers' honey and by-products like bee-wax and propel. The lowest ranked opportunities were the relocation of the government to Dodoma and the natural environment. This may be interpreted that, the relocation (Shift) of government to Dodoma is not a significant factor as it has low contribution to the bee and honey production. It could be that the respondents considered this as a long term market opportunity for bee producers in Dodoma and not short term opportunity. On other hand, the natural environment of Dodoma is ranked the least opportunity for bee and honey production. This may mean that, although bee keeping industries are influenced by its natural environment yet this is not a significant opportunity to the bee keepers in Dodoma. The first two and the last two opportunities were taken to depict the respondents' views on bee and honey business opportunities in Dodoma (Table 5).

#### 4.10 The initiatives for implementing sustainable bee and honey industry

The sustainable bee and honey industry is the prime demand for bee and honey producers in Tanzania. The study investigated the initiatives available for implementing sustainable bee and honey production, processing and marketing from different stakeholders. Table 5 presents the mean scores from the Likert scale calculated from the respondents' responses.

**Table 6: The initiatives for implementing sustainable bee and honey industry**

Initiatives	Mean Score	Rank
Establishment of Tanzanian bee keeping association is a motivation to the bee keepers	3.91	1
Bee keepers are currently obtaining bee keeping training from Non-Government Organizations (NGOs)	3.25	2
Government has initiated different programmes to support development of bee and honey industry	2.91	3
Bee keeping is one of the major agricultural activities being upheld by government programmes of poverty alleviation	2.57	4
Small bee keepers and honey producers receive subsidies from government	2.36	5
There are incentives from government	1.66	6
Capacity building to owners of bee and honey is done by the government.	1.50	7

**Source:** Computation from the Study Sample by researchers

Table 6 indicated that, the establishment of Tanzanian bee keeping association was the first ranked initiative as motivation to bee keepers in the region. This was implied by mean score of 3.91 which is greater than the medium score of 2.5. This is because beekeepers considered the establishment of Tanzanian bee keeping association as a tool for market participation. Moreover, training from government, Non-Government Organizations (NGOs) and bee keeping capacity building agencies were ranked second by bee keepers. These findings show that, bee and honey producers were more motivated by training from both government and private sectors. This is because training could enhance their productivity of honey and bee-wax through the introduction of improved beehives and extension services. These findings are in line with those of Mwanyoka (2017) and UNDP (2014) which indicate that, capacity building offered by Tanzania Forest Service and other NGOs facilitated more in the improvement and efficiency of beekeeping production in East Usambara Mountain and Hai district farmers

On the other hand, capacity building to owners of bee and honey industry is one of the initiatives which scored a minimum mean score and ranked the last. This was implied by the mean score of 1.5 which is below the medium score of 2.5. This shows that, bee and honey producers do not get the required production and operations skills, knowledge and experience from domestic and international capacity building agencies. Receiving of technical

knowledge would help to develop the industry for sustainable performance in areas of quality and quantity of bee and honey products. Greater market share, turnover and profit are one of the objectives of any business which are also what the capacity building initiative agencies are ought to provide to bee and honey firms. It is also worth noting that, the least means score consider incentives from government as the last ranked government initiative.

#### 4.11 Challenges facing bee and honey industry

Despite the available opportunities as discussed in the above section, yet bee and honey firms in Dodoma faced some challenges. The ranking of these challenges was done through calculating the mean scores of the Likert scale responses as presented in Table 7. Findings from Table 7 indicate that, the use of old technology in bee keeping, not practicing bee keeping as a commercial activity, lack of adequate support and information from government were ranked the top challenges facing the industry. All of these challenges had mean scores greater than the medium value of 2.5 showing a high degree of agreement from the respondents. Government support and information for bee and honey producers are of significant value in terms of productivity, competitive advantage, market share and economic growth. Therefore, inadequacy in terms of support and information to bee and honey producers will imply low productivity and poor access to local and international markets. These findings concur with those of ITC (2015) who found that, in Tanzania the bee and honey sector is challenged by low productivity in beekeeping practices, lack of business mind-set and innovation among the beekeepers, inconsistencies in quality of processing and packaging and poor trade facilitation training on entrepreneurship.

On the other hand, challenges which were ranked the last included those concerned with the quality of honey produced from Dodoma and the negative impacts of bee keeping on the environment. This indicates that, the two challenges were not alarming and neither were they barriers to both actors of protection of the natural environment and producers of honey from Dodoma. The two challenges can be easily converted into competitive advantage for bee and honey the industry (Table 7).

**Table 7: Challenges facing Bee and Honey Industry**

Challenges facing bee and honey industry	Mean Score	Rank
The use of old technology in bee keeping by honey producers is a challenge	4.59	1
Bee and honey has not been for a long practiced as a business in Tanzania	3.98	2
There is lack of support and information from government	3.91	3
The natural environment is not supportive	3.39	4
Packaging and labeling of honey is very expensive	3.05	5
There are complexities which cannot be translated into investment strategies	2.89	6
There is lack of sustainable domestic and foreign honey markets	2.84	7
There are high costs which make the implementation of bee keeping unprofitable	2.77	8
Bee keeping needs too much time and manpower in every day operations	2.55	9
The bee and honey industry can have negative impacts on the environment	2.43	10

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**Source:** Computation from the field data, 2017

## 5.0 CONCLUSIONS AND POLICY RECOMMENDATIONS

### 5.1 Conclusions

The conclusion of the study findings has been made based on the specific objectives. The main findings on this study showed that, the bee and honey industry in Dodoma has many opportunities. Indeed, the study has shown that the most potential opportunities included the availability of water and potential flowering plants, good linkage with other small industries and availability of both local and international markets. It can therefore be concluded that since there are potential opportunities in the bee and honey industry, the industry is still an emerging sector that can benefit small and medium enterprises and therefore contribute to the growth of the economy in Tanzania.

Furthermore, findings from this study indicated that, establishment of bee keeping association, bee keeping training from Non-Government Organizations (NGOs) and different programs established by the government to support development of bee and honey industry were the initiatives mostly appreciated by bee and honey producers. This implies that, the initiatives currently being implemented in Tanzania are important approaches to the bee keepers and they could contribute much to the growth of the industry.

The study also has found that, out of all the challenges, the most alarming ones included the use of old technology in bee keeping, not being able to practice bee keeping as a business and lack of support and information from the government. Apparently it can also be concluded that the noted challenges are substantial and may therefore limit the growth and sustainability of the bee and honey industry in the region and country as whole.

### 5.2 Recommendations

Based on the key findings of this study, the following recommendations were extended. Given the great opportunities for the bee and honey industry in Dodoma, the Ministry of Natural Resources and Tourism and Local Government Authorities should take some measures to empower beekeepers with relevant skills to take advantage of the good environment around them that supports bee keeping, to enhance backward and forward market linkages to the bee and honey industry actors, and to build capacity to bee keepers on how to capture and access both domestic and foreign markets such as EAC, SADC and EU.

More initiatives should be emphasized by stakeholders (including the Ministry of Natural Resource and Tourism) in the industry. These may include initiatives such as giving incentives, subsidies and capacity building to bee and honey producers.

Government through TFS, SIDO, CAMATERC and other interested stakeholders should provide education to both beekeepers and honey processors on how to adopt the improved technology in producing and processing their products and convert these challenges into opportunities by facilitating the industry with the provision of the modern bee and honey production facilities.

Also, extension officers should continue to create awareness to bee and honey producers on market opportunities. This is because support and information from government are inadequate and thus other stakeholders (especially the private sector) may take this as an opportunity and provide the same to the bee and honey producers for fostering the growth of the industry.

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