



Income sustainability and poverty reduction among beekeeping value chain actors in the Berekum Municipality, Ghana

Hans Kwaku Duah ^{1*}, Alexander Yao Segbefia ¹, Michael Kodwo Adjaloo ², David Fokuo ¹

¹ *Department of Geography and Rural Development, College of Social Sciences and Humanities, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*

² *Technology Consultancy Centre, College of Engineering, KNUST, Kumasi, Ghana*

Abstract

Increased level of poverty in many communities around the globe as a result of rapid population growth has led to some consideration of major livelihood activities where potentials of reducing poverty are enormous. This study examined the prospects of sustaining bee-keepers' income to enhance poverty reduction and improve livelihoods in the Berekum Municipality in the Brong-Ahafo Region of Ghana. Questionnaires and interview schedule were the main research instruments used in gathering data. These were supplemented with personal observation. Questionnaires were administered to 51 bee-keepers, 11 honey traders and 4 inputs providers who are the major Beekeeping value chain actors in the Berekum Municipality. Cross tabulation, Mean, Line graphs, and Frequency tables were employed in the analysis of quantitative data using the Statistical Product and Service Solution (SPSS version 18) software and excel. A narrative analysis was adopted for the qualitative data collected. Descriptions and quotations were also used in analyzing qualitative data. A cost and benefit analysis was carried out to determine the profit obtained from honey trade, honey production, and provision of Beekeeping tools over a five year period in order to establish income sustainability. The results indicated that Beekeeping has contributed enormously not only to the living conditions of the value chain actors, but also increased their income levels as a result of favorable honey market environment in the Berekum Municipality. Beekeeping activity in the study area has a lot of potentials in reducing poverty and improving livelihoods through employment creation.

Keywords: Beekeeping; Poverty, Livelihood; Income Sustainability

Published by ISDS LLC, Japan | Copyright © 2017 by the Author(s) | This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Cite this article as: Duah, H.K., Segbefia, A.Y., Adjaloo, M.K. and Fokuo, D. (2017), "Income sustainability and poverty reduction among beekeeping value chain actors in the Berekum Municipality, Ghana", *International Journal of Development and Sustainability*, Vol. 6 No. 8, pp. 667-684.

1. Introduction

Beekeeping has been identified as one of the greatest non-farm activity globally and in Africa, as it is capable of reducing extreme poverty and improving rural livelihoods (Campbell et al., 2012). It is a promising non-farm activity for rural households and contributes substantially to the incomes of the bee actors and the economy of many countries in Africa like Ghana, Rwanda, Kenya, Angola and Cameroon (EARO, 2000; Gezahegn, 2001). Ethiopia's total contribution of honey to the international market stands at approximately 54,700 tons per year, the largest in Africa, and around two million people are involved in the beekeeping value chain (Hilmi et al., 2011). This has resulted in high international recognition for beekeeping as a viable economic activity in Africa.

According to Noah and Peter (2013), all the municipalities and districts in the Brong Ahafo Region in Ghana show increasing trend of honey production. The region has a total number of 5,748 bee-keepers comprising 3,536 males and 2,212 females (Subbey, 2009). The average annual production of honey for 2010 was 74,088kg. A significant percentage (48.9%) of the income of bee-keepers is derived from honey production, followed by crop production. Thus, it is could be inferred that Beekeeping is capable of generating income through employment creation and improving livelihoods, and hence, reduce poverty. However, the income sustainability and poverty reduction of Beekeeping value chain actors' in the Berekum municipality remain largely unexamined. This is imperative if we are to measure the contribution and the potential of Beekeeping as a poverty reduction tool or strategy. The study was therefore carried out to examine the prospects of sustaining income of bee-keepers in the Berekum Municipality, Brong-Ahafo Region of Ghana. The aim is to enhance poverty reduction and improve livelihoods in the area.

2. Materials and methods

2.1. Site description

The Berekum Municipality is located between Latitude 7°15'S and 8°00'N and Longitude 2°25' E and 2°50'W. It shares boundaries with Domaa East District to the South-West, North-West by Tain and Jaman District, South – East is Sunyani West District as shown in figure 1. The Municipality has a total land area of 1,653 Km². It lies within Semi-Equatorial Climate Zone, and therefore has fairly uniform temperature, ranging between 26°C in August and 30°C in March each year. Sunshine duration for most part of the year averages 7 hours per day. Relative humidity is generally high throughout the year between 70 to 80 per cent in the dry season and 75 to 80 per cent in the wet season. The Municipality experiences one of the highest rainfall patterns in Ghana with a mean annual rainfall ranging between 1,275mm-1,544mm. The rainfall follows a double maximum rainfall pattern which occurs in May to June and September to October each year. The vegetation is described as a transition forest which has the right floristic composition and environment for honey bees and beekeeping (Adjare, 1984).

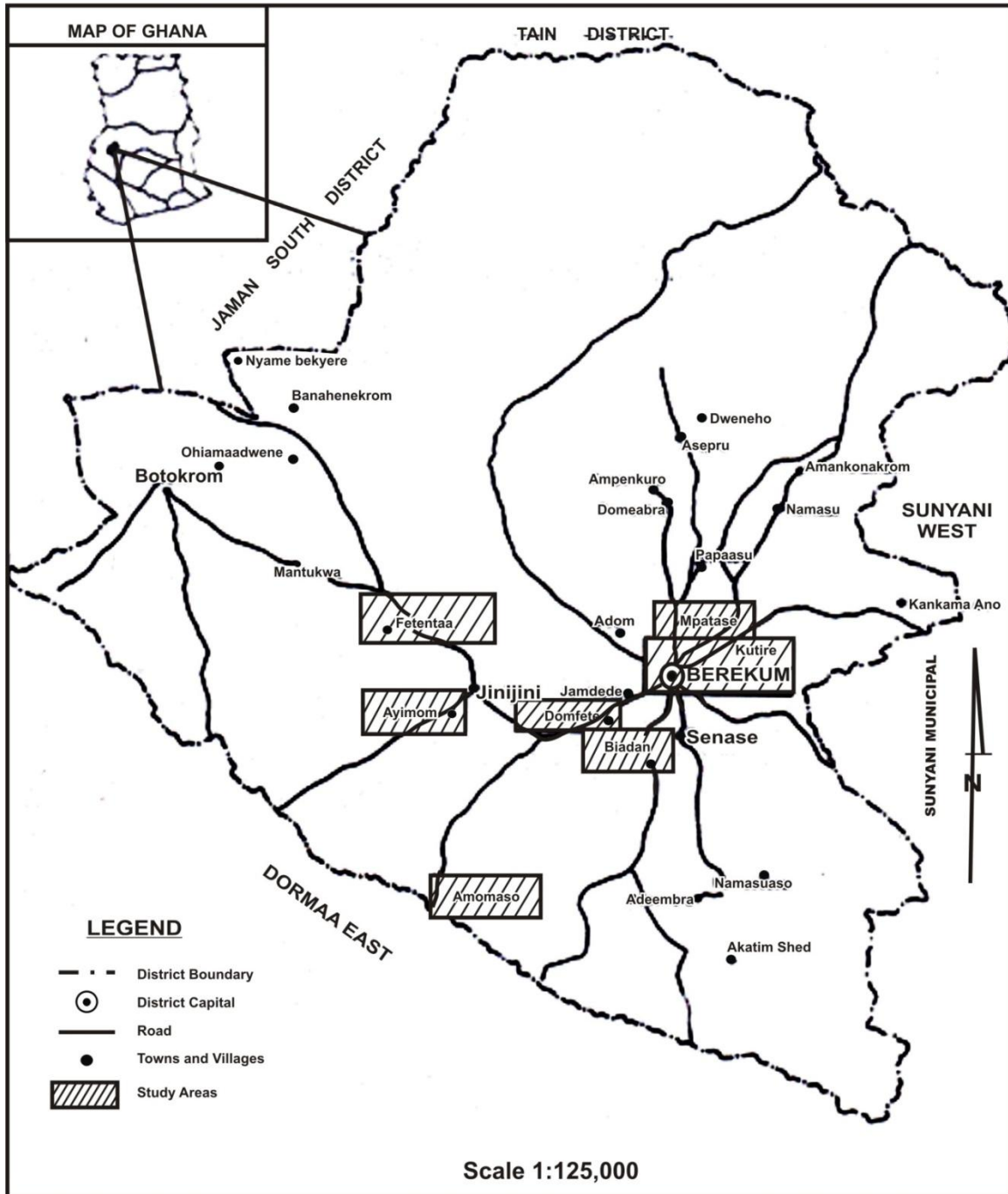


Figure 1. The map of Berekum municipality showing the selected study communities

The Municipality is strategically located as roads from Sunyani, Dormaa, Jaman and Seikwa meet(Figure 1) enabling business transactions with all the four (4) other districts which share boundaries. The location makes transportation of goods and services to and from the Municipality easy encouraging inter-districts trade.

2.2. Sampling design, data collection and tools for data analysis

The study used a mixed method approach in collecting both qualitative and quantitative data concurrently (Creswell and Clark, 2007). The primary data were collected from honey traders, bee-keepers and input providers using questionnaires. The secondary information was obtained from theses, journals, internet and other authoritative sources. A cross-sectional survey design which offers information about a population at a given point in time (Bless and Higson-Smith, 2000) was employed. The design was intended to gain enough information for greater understanding of Beekeeping activities and income sustainability, and hence help provide an overall picture of the bee industry in the municipality. Furthermore, the approach assisted in getting different data from different actors in the beekeeping value chain.

Data were collected using questionnaire, interview schedule, focus group discussions and observation techniques. The questionnaire was used as the potential respondents were scattered over the municipality. Also, it was an efficient way to collect data quantifiably and statistically; and enable large respondents to be reached within a short time period. The interview schedule was employed because its flexibility made it possible to obtain in-depth information about the economic impact of Beekeeping activities on the respondents on a one-on-one basis, as more information was provided by the respondents. This interview schedule was basically used to elicit information from the Beekeeping value chain actors about how the income from the Beekeeping had impacted on their livelihoods. Quantity of honey traded within five years in the study area was analysed. The respondents were allowed to demonstrate their perceived rate of either decrease or increase in honey trading through focus group discussions. The respondents were randomly selected from the study area i.e. Berekum. The biophysical and socio economic characteristics of the study area made the selection of Berekum for the collection of pertinent data to address the research problem. A sample size (n) = 11 of respondents was determined by $n = N/1+N(a^2)$, where n = sample size, N = total population of honey traders, a = 5% is the margin of error (Slovin, 1960).

Table 1. The Sample Size for the Study

Berekum Municipality Communities	Actors Bee-keepers	Honey Traders	Input providers	Total
Berekum	41	11	4	56
Fetenta	2	0	0	2
Ayimom	2	0	0	2
Amomaso	1	0	0	1
Domfite	2	0	0	2
Kutire	1	0	0	1
Mpatase	1	0	0	1
Biadan	1	0	0	1
Total	51	11	4	66

Source: Authors own construct (2015)

The quantitative data gathered were subjected to factor analysis to identify and examine direct and indirect drivers for both high or low honey production and trading in Berekum. Factor analysis aided to reduce many variables to a more meaningful number of variables and also assist in analyzing

interrelationship among variables (Chala et al., 2009). The figures or frequency tables generated in the SPSS version 18 were also exported to excel for editing for enriched visual representation. Content analysis was employed to analyze the qualitative data by drawing inferences from the views of the respondents (Gemechis et al., 2012).

3. Results and discussions

3.1. Socio-demographic characteristics of respondents

Out of the 51 beekeepers (i.e. those who actually managed the honeybees in a bee farm) forty-nine (49) were males while the remaining two (2) were females. The male dominance in this aspect of the beekeeping value chain may be attributed to the fact that females have not received the necessary support and encouragement to participate in the enterprise.

Table 2. Socio-demographic Characteristics of Respondents

Gender	Input suppliers	Beekeepers	Honey traders	Total	Non-participant
Male	4	49	4	55	8
Female	0	2	7	11	2
Total	4	51	11	66	10
Educational					
Background	Input suppliers	Beekeepers	Honey traders	Total	Non-participant
No school	0	3	1	4	1
Primary	1	9	3	13	2
Junior high school	2	12	1	15	2
Senior high school	1	19	5	25	4
University	0	2	0	2	0
Others	0	6	1	7	1
Total	4	51	11	66	10
Marital status	Input suppliers	Beekeepers	Honey traders	Total	Non-participant
Single	0	1	1	2	0
Married	4	48	10	62	10
Divorced	0	0	0	0	0
Separated	0	2	0	2	0
Others	0	0	0	0	0
Total	4	51	11	66	10

Main						
Occupation	Input suppliers	Beekeepers	Honey traders	Total	Non-participant	
Farming	0	32	3	35	10	
Other trading	0	7	6	13	0	
Honey trading	0	0	2	2	0	
Teaching	0	6	0	6	0	
Carpentry	4	0	0	4	0	
Beekeeping	0	3	0	3	0	
Auto mechanics	0	2	0	2	0	
Others	0	1	0	1	0	
Total	4	51	11	66	10	

Average annual income before Beekeeping						
	Inputs providers	Beekeepers	Honey traders	Total	Non participants	
501-1000	0	1	0	1	0	
1001-1500	0	6	0	6	0	
1501-2000	0	9	0	9	0	
2001-2500	1	8	2	11	1	
2501-3000	1	10	1	12	2	
3001-4000	2	17	8	27	7	
Total	4	51	11	66	10	

Sources: Field Study, 2015

In addressing the situation, a male bee-keeper at Berekum said during Focus Group Discussion that (Fieldwork, 2015):

“There was not even a single female who was a bee-keeper ever since I started this beekeeping and also joined Beekeepers’ Association. Over the years, we have tried, as executives of the association, to encourage women to partake in beekeeping management. With regards to this, we have ordered each male beekeeper to involve his wife in the beekeeping management. This will eventually enhance and increase women’s participation in beekeeping”.

Women participation in beekeeping is very crucial in that their involvement in the industry could create employment for them, and enable them get additional income to cater for their household needs. On the other hand, the few women in the bee management for honey production could be a good indicator that women were developing interest in beekeeping value chain activities. Though male beekeepers were many, more men could be encouraged to enroll in beekeeping as the extra income would help them with their basic responsibilities such as payment of utility bills, payment of school fees and provision of accommodation to ensure sustainability and prosperity of their families.

Out of eleven honey traders, seven were females while the remaining four of the respondents were males (Table 2). Relatively, few people were engaged in honey trading, due to the fact that most of the honey producers sold their honey directly to final consumers. Honey traders testified that honey trading is a very profitable business, and that one will not run at a loss in honey commerce. Honey trading has aided in reducing poverty and improving living conditions. Women involvement in honey trade may be attributed to the fact that they have limited honey production skills and resources. The results of this study indicates that there were more men in the whole value chain of the Beekeeping than women except honey trading where women were more than their male counterpart. It is believed that economic empowerment of women is a sure way of reducing poverty in the society (Klasen and Lamanna, 2009; OECD, 2012). Therefore the involvement of women in any part of the value chain could be a good way of reducing poverty and enhancing the standards of living among women.

The survey revealed that most of the value chain actors had formal education. Out of the sixty-six respondents twenty-five of them had attained Senior High School (SHS), nine had attained tertiary education in the university, vocational or technical education (Table 2). It was observed that the actors' education reflected in their willingness to accept new ideas and innovations, and thus produce more honey for increased volume of sales. Earlier studies have indicated that "a more educated community may translate into higher rates of innovation, higher overall productivity and faster introduction of new technology" (UNESCO, 2012) and, that a strong foundation for economic success and shared prosperity may be attained by investing in education (Noah and Peter, 2013). The observation corroborated earlier findings by Byron and Arnold (1999) who had observed that education has significant effect on quantity of honey produced and marketed.

Notwithstanding the above, inputs provision and honey trade was practiced by actors at the lower ladder of education as illustrated by the results (Table 2) of the survey which showed that those who constituted the critical part of the value chain (i.e. input suppliers; and honey traders) had either no formal education or at best had Junior High education. The implication is that Beekeeping is a practical non-farm activity that requires little or no education. The industry therefore, is capable of engaging people who could be described as unemployable due to lack of or inadequate formal education, and hence can be used to reduce the poverty level and enhance the livelihoods of people in such category in the society.

Most of the actors in the study area were married with at least two children. The married respondents might have been driven by the multiple responsibilities they have to perform in their households; therefore getting extra income these activities was a big liberation to them.

Table 2 illustrates the major occupations of honey value chain actors. Majority i.e. thirty five (35) of the actors declared that food and cash crops farming were their main occupation, and that Beekeeping as secondary occupation. This implied that Beekeeping and honey trading could be conveniently practiced alongside other jobs such as trading, auto mechanics, cocoa farming, and growing food crops as indicated in the table. Managing bees does not affect any activity that will be performed by the bee-keeper. However, it was noted that a few bee-keepers honey traders practiced Beekeeping as a full time occupation. Such respondents confirmed that they were getting enough money to perform their social responsibilities as

family heads. Income received from Beekeeping and honey trading activities were very useful in supporting family basic needs.

It can be inferred from the above discussions that Beekeeping and honey trading is a very convenient and sustainable field that the youth who are unemployed should be encouraged to engage themselves in Beekeeping either as a full time job or as a secondary career. This would go a long way to help reduce unemployment rate, poverty level as well as improving living standards in the study area.

3.2. Income sustainability of value chain actors in the Berekum Municipality

The study showed that Beekeeping could be an important economic activity capable of generating enough income to support rural life and to enhance household income. The actors indicated that Beekeeping activity has the potential of reducing economic stress and is very sustainable. This is because the initial money invested in Beekeeping is far lower than the income generated (Table 3). Startup equipment such as smokers, bee hives and bee suits could last for not less than ten years. As a result, the profit margin in the end is very huge. Accordingly, income from Beekeeping can provide an improved livelihood, more food security and safety in the long term as well as the ability to pay for needed health care and other basic family expenses. Moreover, income from Beekeeping enables a farmer to plough back into the Beekeeping enterprise to improve it (Fadare et al. 2008).

3.3. Input production and income analysis in Berekum

Manufacturing of bee hives and sales of other bee equipment in the Berekum Municipality has remained one of the indispensable supplementary occupations to the input providers such as carpenters. To further assess the income sustainability of value chain actors (input providers, honey producers and honey traders), the income generated for the past five years (2011 to 2015) was statistically represented (Table 3); and the various components used in the computation of an average total expenditure (Table 3) presented in Table 4. The five year period depicted the income situation of value chain actors in the municipality as at the time of study. The total average bee-hives produced within the five year period was five hundred and sixty-two (562) which translated to an average income of thirty seven thousand, nine hundred and thirty cedis (GH¢37,930) at an average selling price of four hundred (400) Ghana cedis (Table 3). Similarly, the highest average production of one hundred and seventy-five (175) hives was recorded in 2015 with its average selling price of one hundred Ghana cedis (GH¢100). The total net income for 2015 was thirteen thousand, nine hundred and sixty Ghana cedis (GH¢13,960). The average per capita income for the four inputs providers stands at three thousand, four hundred and ninety cedis (GH¢3,490) as supplementary income in 2015 alone.

Throughout the years (2011-2015) there was progressive increase in production of bee hives and income in the Berekum Municipality (Figure 2). The reason was due to increase in the number of new bee enthusiasts enrolling in the Beekeeping business with time, while established beekeepers were expanding their bee farms. On the contrary, input providers manufactured the lowest number of bee hives in 2011 (Table 3; Figure 2). An average of fifty bee hives was produced and two thousand, two hundred and ten

Ghana cedis (GH¢2,210) obtained as profit. The fewer production of beehives in 2011 was attributed to the fact that few people were into Beekeeping as an income generation venture. It could be inferred from the analysis that generally, inputs providers earned enough supplementary income that enabled them to cater for their household's needs such as paying school fees, rents, cloths, building houses and paying other utility bills, as the total cost of providing inputs in all cases was far lower than the average total profit. Thus, the income accrued was reasonably significant to reduce their poverty level and improve their living standards.

Table3. Input Production and Income Analysis in Berekum

Year	Total Average Hives Produced	Average selling Price per Hive	Average Total Income	Average Total Expenditure	Average Income less expenditure	Average net per capita income	Average change in per capita income
2011	50	60	3,000	790	2,210	553	553
2012	80	70	5,600	1,340	4,260	1,065	512
2013	115	80	9,200	2,000	7,200	1,800	735
2014	142	90	12,780	2,480	10,300	2,575	775
2015	175	100	17,500	3,540	13,960	3,490	915
Total	562	400	48,080	10,150	37,930	9,483	3,490

Source: Survey data, 2015

Table 4. Components of input providers' expenditure

Inputs providers' expenditure
Cost of Transportation
Cost of Wood
Light bills
Tax from municipal assembly
Monthly cost of the shop or store
Cost of other materials/equipment

Sources: Survey data 2015

The analysis of the survey also established that input providers' income was sustainable because each input provision showed an increase consistently and most input providers had done this work, in some cases, for the over fifteen years. There was regular payment of these hives ordered by bee-keepers. With regards to this, a male input provider in Berekum said (Field survey, 2015):

"Manufacturing bee hives is a good business because every year bee-keepers in Berekum Municipality come here to place orders. I have been receiving a lot of money from this and it is

my prayer that more people will develop interest in Beekeeping so that I will get more orders from them”.

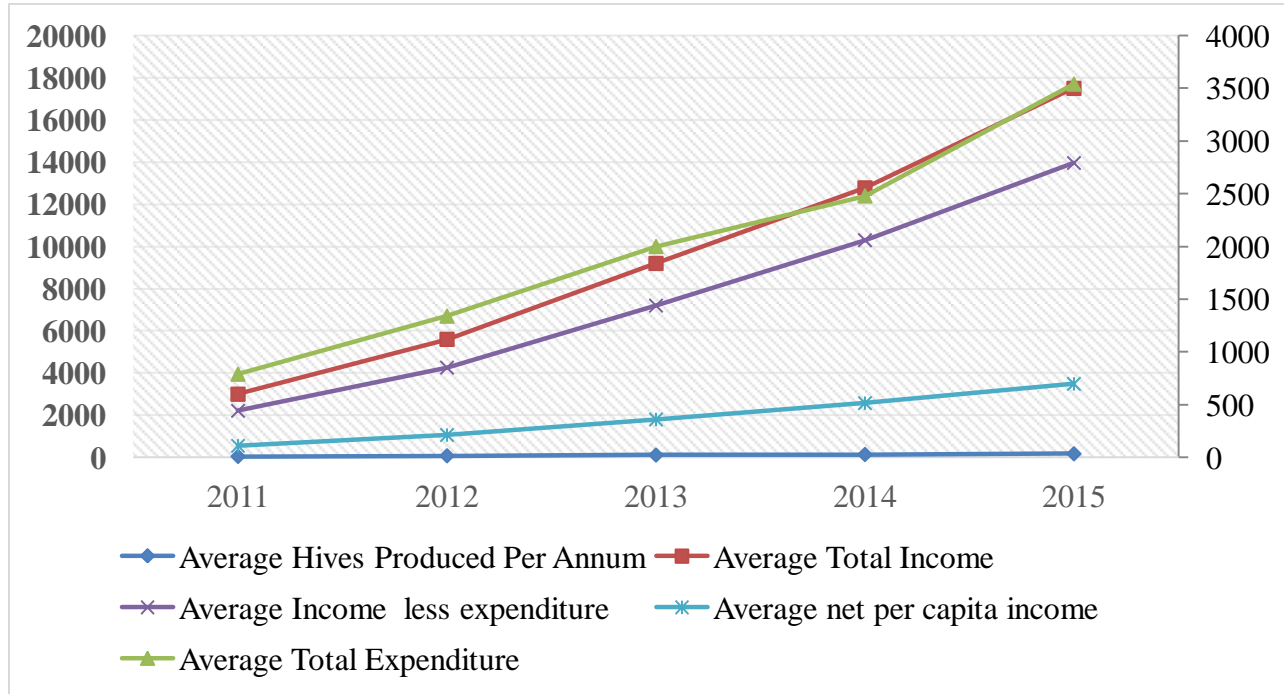


Figure 2. Trend of Bee Hive Production in Berekum (Source: Source: Field Data, 2015).

It is noted, however, that the manufacturing of bee hives is a male dominated activities because it involves more physical strength.

3.4. Honey Production and Income Analysis of Bee-keepers in Berekum

An analysis was carried out to investigate the strength of forty-one (41) bee-keepers with regards to income sustainability and how the income generated affects their livelihoods using their honey production. The results were presented in Table 5 and Figure 3. Further explanation of what actually goes into honey production expenditure (i.e. items that compose of total average expenditure) are also presented in Table 6.

There was a gradual boost of honey production from 2011 to 2015 in the study area (Table 5; Figure 3). The observation was attributed to the time of honey harvesting, and the population of bees in hives. The highest average number of colonized bee-hives and an average quantity of honey produced was recorded in the year 2015. About three thousand, two hundred and forty three (3,243) gallons of honey was produced from a total of one thousand, one hundred and ninety five (1,195) colonized hives. Selling at an average price of one hundred and twenty Ghana cedis (GH¢120) per six litre gallon, an average total net income of three

hundred and eighty three thousand, one hundred and forty two Ghana cedis (GH¢383,142) was accrued. Against the national monthly minimum wage of (GH¢216) which translates to (GH¢ 2,592) per annum in 2015, the amount of money accrued from honey sales is quite considerable in poverty reduction and can subsequently improve livelihoods among bee-keepers.

Table 5. Honey Production and Income Analysis in Berekum

Year	Average no of Colonized Hives	Average no of Gallons Produced per annum	Average Selling Price per Gallon	Average Total Income per annum	Average Total Expenditure per annum	Average total net income	Average net per capita income	Average change in per capita income
2011	608	1,671	80	133,680	4,445	129,235	2,534	2,534
2012	776	2,172	90	195,480	3,429	192,051	3,765	1,231
2013	896	2,553	100	255,300	3,740	251,560	4,933	1,168
2014	1,052	3,084	110	339,240	5,075	334,165	6,552	1,619
2015	1,195	3,243	120	389,160	6,018	383,142	7,513	961
Total	4,527	12,723		1,312,860	22,707	1,290,153	25,297	7,513

Source: Source: Field Data, 2015

Table 6. Expenditure for Producing Honey

Expenditure on the following items	
Clearing of hive site	Bee hive
Harvesting cost	Smoker
Processing cost	Bee veil
Packaging cost	Harvesting coat/gear
Hand gloves	Wellington boot
Knife	Torch light
Transportation	Tax from assembly
Others	

Source: Survey data, 2015

However, in 2011, out of six hundred and eight colonized hives (608), the bee-keepers harvested one thousand, six hundred and seventy one (1,671) six-litre gallons of honey, and earned an average net income of one hundred and twenty nine thousand, two hundred and thirty five Ghana cedis (GH¢129,235). The production of honey was far below their expectation, but was due to two major factors: Firstly two incidences of bush fires ravaged most of the colonized bee hives leading to rampant absconding. Secondly,

honey harvesting was delayed as most of the activity was carried out during the rainy season. The honey serves as food for the bees during raining season, hence at the time of harvesting the quantity of honey supposed to be harvested had declined. The implication is that it is advisable or bee-keepers to harvest their honey early enough before the rain start. Harvesting the honey at the wrong time will eventually reduce their income levels. Notwithstanding these facts, receiving an average net income of (GH¢129,235) in 2011 as a supplementary income was enormous and can equally support in improving standards of living among bee-keepers.

One prominent different in income that exists between the two year periods (2011 and 2015) was due to the fact that prices of honey were different at each year. The prices were eighty (GH¢80) and one hundred and twenty Ghana cedis (GH¢120) for 2011 and 2015 respectively. These prices were due to the interactions of demand and supply each year. This implies that getting appreciable price for honey is a major contributing factor to the total annual income. There may be other reasons contributing to the large or low production of honey such as the type of bees kept, diseases that affected bees and others which the bee farmers may not be aware of, and therefore were not accounted for in this article.

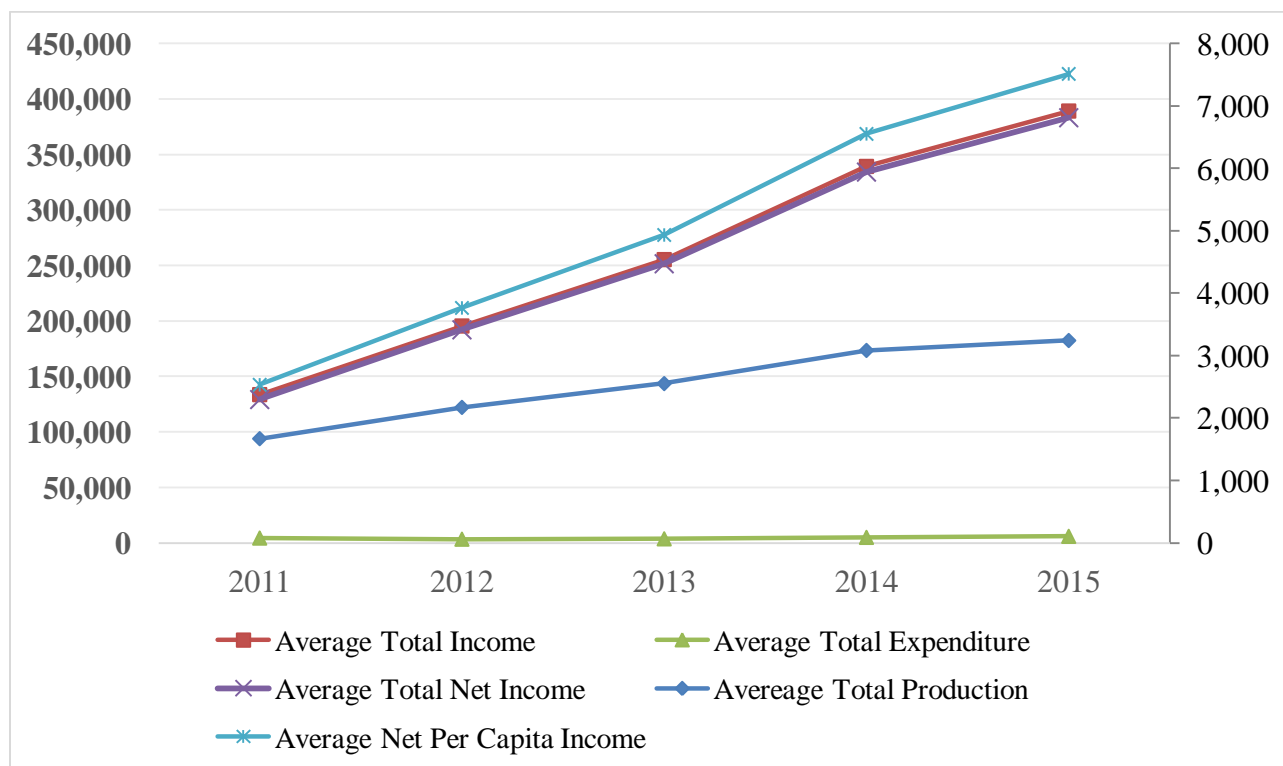


Figure 3. Trend of Honey Production and Income Analysis in Berekum (Source: Source: Field Data, 2015)

There was appreciable increase in both average number of gallons produced over the five years period and average total net income for the five years data provided (Figure 3). The data indicates that Beekeeping

is very sustainable because honey production shows an increasing trend. Most of the bee-keepers had been in the practice for the past twenty-five years. Due to experience, they are able to work on their errors and improve production subsequently. The sustainability of Beekeeping had been established by Gidey and Mekonen (2010). The data showed that Beekeeping generates appreciable income. Throughout the five years, total average expenditure was always smaller than the total average income. Respondents reiterated during field survey that Beekeeping generates sustainable income to support family livelihoods based on the fact that the income generated was appreciable, secured, and regular. The market for honey is very vibrant. Global Development Solutions (GDS) (2011), reinforced the above survey that Beekeeping is a very sustainable and a crucial avenue towards poverty reduction and enhancing the quality of life.

From study honey production is an important source of household income in the municipality. The long term survival of Beekeeping requires sustainable income that (income that can provide an improved livelihood, more food security and safety, good health care and other basic family expenses in the long term), and also re-investable to enhance the enterprise (Fadare et al., 2008). According to Bradbear (2003) income from Beekeeping can be a source of valuable strength to countless numbers of rural people's livelihoods. Beekeeping therefore, may be seen as an important occupation and part of rural life worldwide which is capable of reducing economic stress on bee-keepers and enhance their household income. In communities where access to income is limited, small scale Beekeeping can contribute significantly to livelihood security (Bradbear, 2003).

3.5. Income analysis of honey traders in Berekum

Further study was carried out on honey trading as another supplementary business in the municipality and since the honey trader is the last value chain actor. It was observed during the study that honey trading is mostly done by the market women. The findings (Table 7; Figure 4) indicated that the highest total number of six-litre gallons of honey sold by the eleven honey traders was recorded in 2015. An average of two thousand, two hundred and forty seven (2,247) gallons of honey was sold. They were able to maximize net profit of five thousand, eight hundred and eighty nine Ghana cedis (GH¢ 5, 889) at the selling price of one hundred and forty Ghana cedis (GH¢140). Expectedly, the lowest quantity of honey sold was witnessed in 2011. Honey traders sold a total of eight hundred and sixty (860) gallons of honey and made a total net profit of two thousand, two hundred and sixty nine Ghana cedis (GH¢2,269). The total average expenditure in both 2015 and the remaining years were far less than the mean total income accrued from trading in honey. The disparities that existed between prices and profits emerged from the fact that honey traders sold their honey at different prices, at different seasons and also dealt with different customers. For this reason, there was no uniform price on the market and hence different profits were made. The income accrued was reasonably significant to lessen poverty level and improve living standards.

The income realized from selling honey is very sustainable for the reason that most honey traders have been in the business for the past nineteen years. Access to honey from the producers was not difficult, and whatever quantity bought could be sold. Generally, there was progressive demand and the sales of honey in the Berekum Municipality. A female honey trader confirmed that she had been in the honey trading business

for the twelve years, and till then customers came from all over the country to buy honey from her. She reiterated that she had contracted two other women who traded their honey stock through hawking during the market days. She further indicated that honey trading had been very beneficial to her in looking after her children after her husband travelled abroad for the past eight years. The study therefore confirmed that honey trading is a very rewarding business which provides sufficient income to support family's expenditure.

Table 7. Income Analysis of Honey Traders in Berekum

Year	Average no of Gallons of Honey sold	Average Cost price per gallon	Average Selling Price per Gallon	Average Profit per gallon	Average Total Income per annum	Average Expenditure per Annum	Average net per capita income	Average change in per capita income
2011	860	80	100	20	25,800	840	2,269	2,269
2012	1,000	90	125	35	35,000	1,415	3,053	784
2013	1,400	100	130	30	42,000	1,715	3,662	609
2014	1,700	110	145	35	59,500	2,115	5,216	1,554
2015	2,247	120	150	30	67,410	2,624	5,889	673
Total	7,207	500	650	150	229,710	8,709	20,089	5,889

Source: Survey data, 2015

Table 8. Expenditure for Trading in Honey

Total Expenditure for Trading in Honey
Materials for packaging
Transportation cost
Tax from municipal assembly
Cost of honey per gallon
Other cost

The average total expenditure in table 7 was obtained by adding the following items in Table 8.

Sources: field data 2015

These findings (Figure 4) indicated that there was positive upward increased in honey activity over the five years period in Berekum implying that honey trading is both profitable and sustainable. Again the average total expenditure per annum was far lower than the average total income accrued from honey trading. Therefore, the income accrued was reasonably significant to reduce their poverty level and improve their living standards.

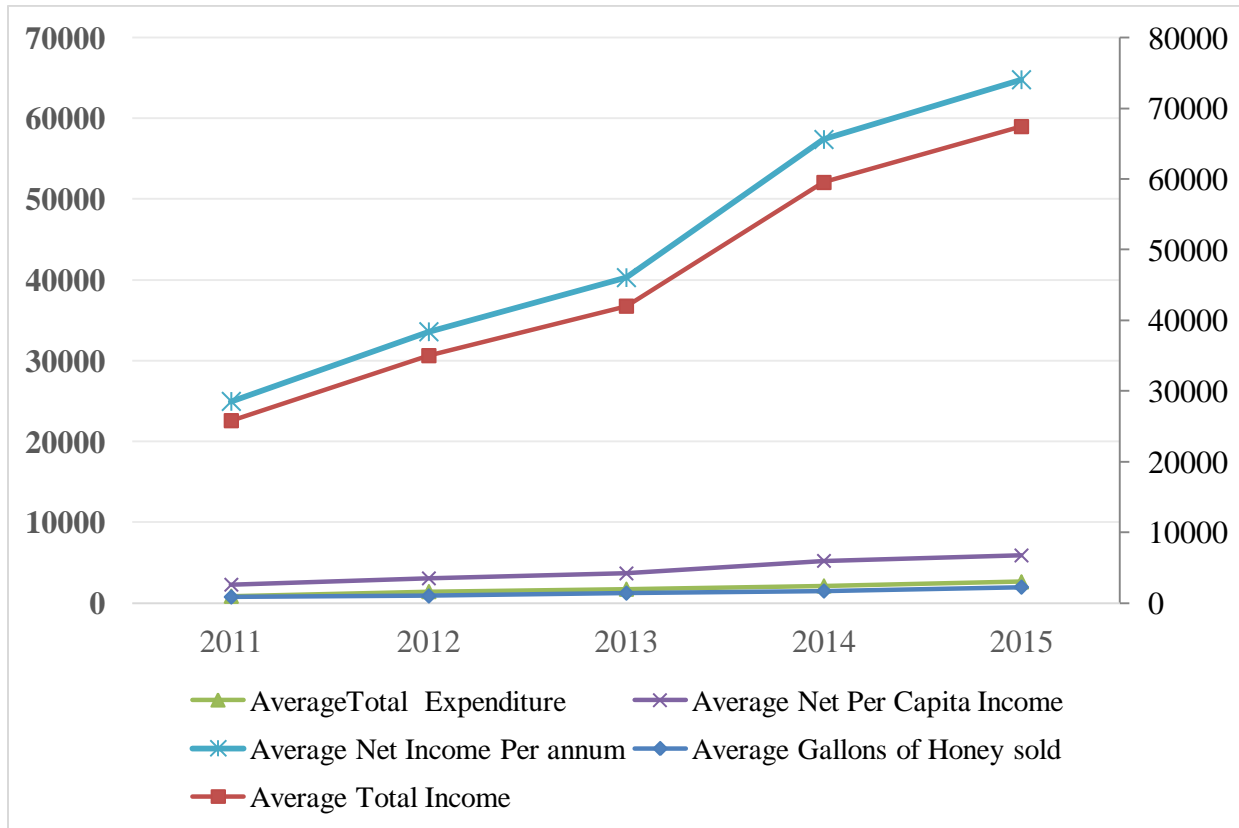


Figure 4. Trend of Honey Trading and Income Analysis in Berekum (Source: Source: Field Data, 2015)

3.6. Bee-keepers and farmers in the municipality

A comparative analysis between income levels of ten farmers (non- bee-keepers) and ten bee-keepers who were farmers as well. Factors considered were similar farm sizes, the same type of food crops grown, and location of farm.

The bee-keepers’ income was the total income received from both apicultural activities and sale of food crops, while the income of non-beekeepers is obtained from sale of food crops only. Ninety percent of the non-bee-keepers’ income fell within zero cedis to three thousand. As expected the income level of bee-keepers is far higher than the non-beekeepers was higher (figure 4). This implies that adding Beekeeping to their main occupation was beneficial, and is a sure way to reduce poverty levels and improve their living conditions in the rural settings.

It can therefore be concluded that input providing, honey trading and Beekeeping serve as livelihood supplements for all the value chain actors irrespective of their income and consumption levels in the Berekum Municipality. Generally, income that value chain actors accumulated from Beekeeping value chain activities is quite considerable and sustainable to reduce poverty among them. Thus, currently, more than fifty percent of the total annual income of nearly every one of value chain actors is obtained from the

Beekeeping value chain activities. It has been established already that value chain actors hardly save part of their income received from their activities and this opens a new area for research to find out why most value chain actors did not save.

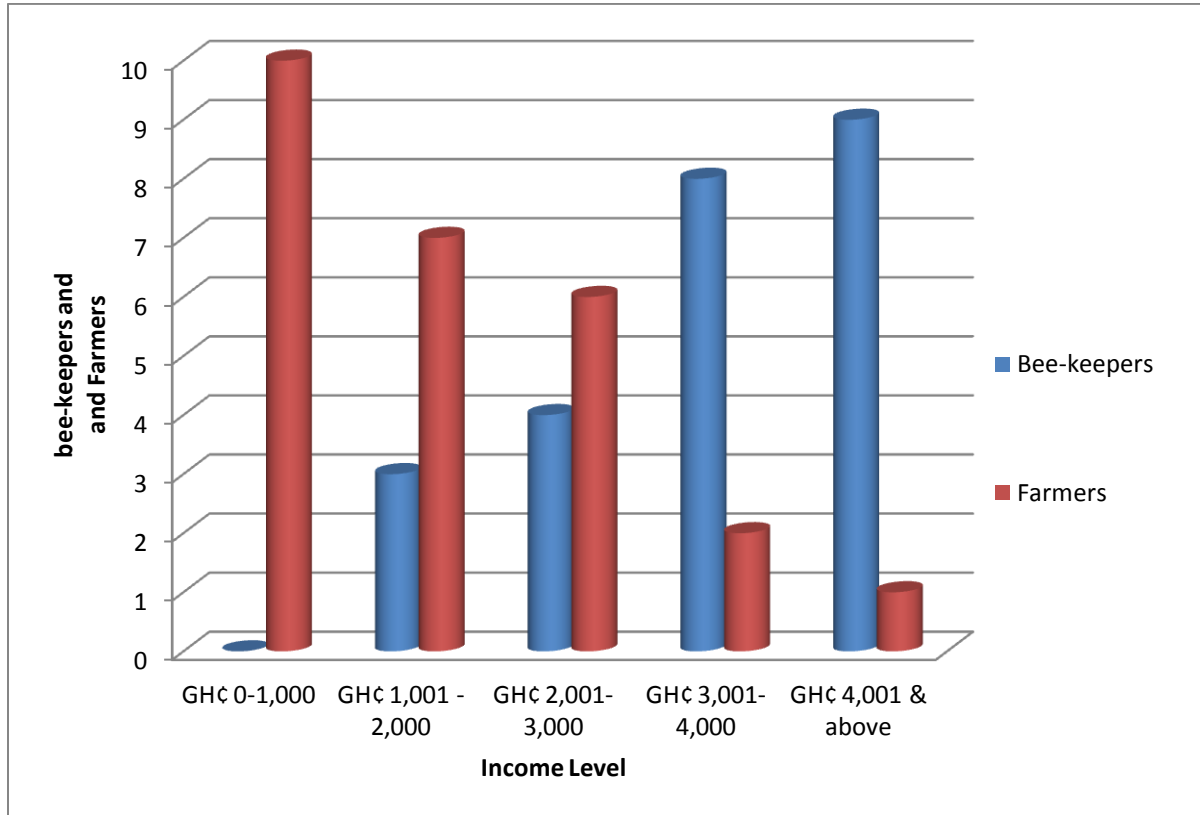


Figure 5. Income Levels of Bee-Keepers and Farmers (Source: Field Survey, 2015)

Consequently, the results are in consistent with the conceptual framework. It could be testified from the modified conceptual framework that there is mutual interdependency among the value chain actors in the municipality. The input providers (initial stage) produced bee-hives for bee-keepers. The bee-keepers depend on bee hives to produce honey by adopting very hygienic method of extracting honey from the comb. The last actor, honey trader, buys honey from the bee-keepers either in the form of wholesale or retail and markets it domestically.

4. Conclusion

The study was conducted with the objective of understanding the Beekeeping as a livelihood activity in reducing poverty in the Berekum Municipality of Brong Ahafo region with specific focus on Beekeeping value

chain actors. Beekeeping has been identified in the Municipality as a major cash income generating activity among value chain actors.

When the sub-sector is given appropriate support, Beekeeping has great potentials to create employment and generate income as well. Beekeeping is currently undertaken largely on a part-time basis to complement other sources of income. About ninety percent of the respondents practiced honey trading as their secondary occupation. Evidence from the field also suggests that the level of interest in Beekeeping as a full-time employment in the sub-sector is high in the study area. It is rather untoward that only two respondents have taken honey trading as full time business. Therefore, there is the need to publicize and showcase the Beekeeping products for people to develop interest in it.

Beekeeping is an economically viable activity. When effectively supported, it can be the pillar for reducing poverty and enhancing economic development among the vulnerable in the society. Throughout the Berekum Municipality, there is a huge potential for the sub-sector to complement other interventions to promote rural livelihoods. There are virtually no barriers for entry. For example, it requires less labour input, low income and can conveniently be combined with other economic activities as shown by the results. The vibrant international market and growing domestic demand offer projections for the export of top quality honey from Berekum. Hence, a large pool of Berekum's population should be encouraged to take Beekeeping as a means of livelihood activity.

References

- Adjare, S.O. (1984), *The golden insect, A handbook on beekeeping for beginners*, IT Publications, Russell Press Ltd., Nottingham, UK.
- Bless, C. and Higson-Smith, C. (2000), *Fundamentals of Social Research Methods, an African perspective* (3rd Ed.), Lansdowne, South Africa: Juta.
- Bradbear, N. (2003), *Bees and rural livelihoods*, 16pp booklet in English, Portuguese and Spanish editions, Bees for Development, Monmouth, UK.
- Byron, R.N. and Arnold, J.E.M. (1999). "What futures for the people of the tropical forests?", *World Development*, Vol. 27 No. 5, pp. 189-805.
- Chala, K., Taye, T., Kebede, D. and Tadele, T. (2012), "Opportunities and challenges of honey production in Gomma district of Jimma zone, South-west Ethiopia", *Journal of Agricultural Extension and Rural Development*, Vol. 4 No 4, pp. 85-91.
- Creswell, J.W. and Plano, C. (2007), *Research Design* (3rd Ed.), University of Nebraska, Lincoln, London.
- Fadare, S.O., Ojo, S.O. and Imoudu, P.B. (2008), "Analysis of Production Performance of Beekeeping in the Niger Delta Area of Nigeria", *Apiacta*, Vol. 43, pp. 37-48.

Geazahegne, T. (2001), "Marketing of honey and beeswax in Ethiopia: past, present and perspective futures", Proceedings of the 3rd National Annual Conference of Ethiopian Beekeepers Association, September 3-4, Addis Ababa, Ethiopia, pp. 78-88.

Gidey, Y. and Mekonen, T. (2010), "Participatory Technology and Constraints Assessment to Improve the Livelihood of Beekeepers in Tigray Region, Northern Ethiopia", *CNCS Mekelle University*, Vol. 2 No. 1, pp. 76-92.

Hilmi, M., Bradbear N. and Danilo M. (2011), "Beekeeping and sustainable livelihoods", Rural Infrastructure and Agro-Industries Division Food and Agriculture Organization of the United Nations, Diversification booklet No. 1, 2nd Ed, Rome 2011.

Klasen, S. and Lamanna, F. (2009), "The impact of gender inequality in education and employment on economic growth", New evidence for a panel of countries. *Feminist Economics*, 15: 3, pp. 91-132. In: UN Women, *Progress of the World's Women 2015-2016: Transforming economies, realizing rights* Chapter 4, p. 199).

Organization for Economic Cooperation and Development (OECD) (2012), "Gender Equality in Education, Employment and Entrepreneurship", Final Report to the MCM, Available at: <http://www.oecd.org/employment/50423364.pdf> (accessed 16 April 2014).

Slovin, M. (1960), Determining Sample Size, Elementary Statistics, A Morden Approach, EDIS University of Florida