Short Communication:
Profitability of beekeeping using locally made transitional top bar beehive in Wolmera Woreda, Oromia Region, Ethiopia

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Abstract. Gobena WE. 2020. Short Communication: Profitability of beekeeping using locally made transitional top bar beehive in Wolmera Woreda, Oromia Region, Ethiopia. Asian J Agric 4: 1-4. Beekeeping is an important source of livelihood and can be integrated with other agricultural activities. The objective of this study is to assess the profitability of beekeeping using locally built transitional topbar hive. Two-stage sampling procedure and stratified sampling technique used in the study. Primary and secondary data are collected analyzed using descriptive statistics and partial budgeting. The partial budgeting result reveals that beekeeping is profitable by using this hive with incremental net benefit of 462.12 ETB and the beekeepers increased their benefit from the hive by more than 2.9 fold by using this beehive as compared to traditional hive. The study concludes beekeeping with this hive can be profitable business for the marginal farmers who have little business capital and land resource. Moreover, income from a single bee colony at beekeeper’s backyard can be improved with minimum cost if this hive with its package used. The overall finding of this study mainly underlined the importance of extension support and technical back to the beekeepers to use this hive.

Keywords: Beehive, beekeeping, locally made, profitability, transitional top bar

INTRODUCTION

Beekeeping plays a valuable part in improving rural livelihoods of many countries like Tanzania and Nigeria (Ajao and Oladimeji 2013; Ntalwila et al. 2017). Its success can be noted in countries like Ethiopia (Mazorodze 2015). Many studies show importance of beekeeping from different activities. It can be viewed as a means of combating poverty (Goldenberg 2004; Mickels-Kokwe 2006; Ogaba 2002; Lalika 2009; Ayansola 2012). Other studies have shown that beekeeping practices are an important income-generating activity, promoting employment and tourism-revenue (Joni 2004; Wodajo 2011; Ajao and Oladimeji 2013; Chazovachii et. al. 2013; Qaiser et al. 2013; Wongelu 2014). It also can play major role in natural resource management and ecosystem service via pollination (Chazovachii et al. 2013; Ndegwa 2014). Several studies have shown that investment costs are relatively low, being less than 50% of income generated, making beekeeping a thriving business that can contribute invaluably to a household income (Saha 2002; Bradbear 2009; Ndegwa 2014; Wongelu 2017). Evidence from the Central Statistical Agency (CSA) shows there is an increase in number of hives from 6.2 million in 2017 to 6.5 million hives in 2018.

Ethiopia has large apicultural resources and the potential of producing over 500,000 tones of honey per year (Ethiopian Apiculture Board [EAB] 2016). The annual production of honey and beeswax is low compared to its potential (EAB 2016). This is due to the reason that more than 95% of our beekeepers use traditional hive management practices which affect yield. This results in traditional production system which results in low production and productivity, poor pre and post-harvest processing and handling techniques and practices combined with poor marketing efforts have kept it part of the subsistent sector (Meaza 2010 ). In most cases, Ethiopian beekeepers are observed to use traditional hives which is very difficult to manage honeybees and to produce honey and honey products in the required quality and quantity. The maximum yield obtained from a traditional bee hive so far is estimated on average to be below 7 kg/hive (Nuru 2004). However, it has been observed as more than 15kg/hive crude honey can be produced if top-bar hive is used (Nuru 2004). Locally made transitional top bar beehive is important for our farmers as it is extremely inexpensive and equally important as that of machine-made top bar hives (Melaku 2005; Wodajo 2011; Wongelu 2014; 2017). A study conducted by Wongelu (2017) also shows honey yield which ranges from 10.25kg/hive/season to 37kg/hives/season harvested using this hive. Profitability of beekeeping business is influenced by type of used, ecological condition, colony strength and management practices (Tucak et al. 2004; Al-Ghamdi et al. 2017). Therefore, the main objective of this study is to assess the profitability of beekeeping using locally made transitional top bar hives in the study area.
MATERIAL AND METHODS

Study area
The study was conducted in Wolmera District, Oromia Special Zone Surrounding Finfinne, Oromia Region, Ethiopia from 2012-2013. Detail description of study area presented below.

Wolmera district
It is one of the Districts in Oromia Special Zone Surrounding Finfinne, Oromia region. It is about 30 km away in West of Addis Ababa along the Ambo road at 9°02N and 38°34E. The District is split into two agro-climatic zones namely highland 61%, mid-highland 39% (Bureau of Agriculture [BoA] 2013). Crop-livestock mixed farming system characterizes agriculture in the District. The major crops in the farming system that provide foraging resources for honey bees are fabacean, chickpea and lentil (BoA 2013). In the District, about 3,566 hives exist out of which about 1853 are traditional, 870 transitional and 843 box hives (BoA 2013).

Method of data collection
The study used both primary and secondary data sources. Primary data collected from sample households using structured interview schedule, personal observation of sites and group discussion. Secondary data that support primary data was collected from different sources like journals, research articles, internet, and concerned offices.

Data analysis
In order to perform profitability analysis, production costs for both traditional and locally made transitional beehive types considered. The analysis was carried to estimate per hive net return from both types of hive. Based on the survey data, the costs of production and returns at the prevailing prices were used to estimate the benefits. This section aims at identifying and quantifying the different costs, which are incurred by the beekeepers in production process. Beehive, bee colony, supplementary feed, labor, transport cost, depreciation cost on beehives and interest on input costs were the cost items that needed to run locally made transitional top bar and traditional beehive honey production. Honey yield was the benefit of both types of beehives.

Profitability analysis of each beehive type was determined using the following formula shown below. Simple descriptive statistics farm budget techniques and Gross Return analysis frequency, percentages and tables were utilized. The farm income model is as shown:

\[ NI = GR - TC \]

Where:
\( NI \) : Net Income for honey production.
\( GR \) : Gross Revenue to honey production (the revenue from honey sale)
\( TC \) : Total production cost (direct expenses and purchases for beekeeping activities).

RESULTS AND DISCUSSION

Profitability of the Hive
Honey yield is an important determinant factor in adopting the technology. In order to compare the performances of the locally made transitional top bar and traditional beehive yield, the cost and net returns obtained from sampled respondents were recorded and compared. The analysis was done to arrive at per hive net return from both types of beehive. As shown on the table one below, hive, bee colony, supplementary feed, labor, and transport costs were the cost items that needed to run locally made transitional and traditional beehive honey production and categorized under column one, category of cost.

<table>
<thead>
<tr>
<th>Added cost (Birr)</th>
<th>Locally made transitional beehive</th>
<th>Traditional beehive</th>
<th>Additional return (Birr)</th>
<th>Locally made transitional beehive</th>
<th>Traditional beehive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hive cost</td>
<td>45.0</td>
<td>4</td>
<td>Honey yield in pound</td>
<td>20.75</td>
<td>10.6</td>
</tr>
<tr>
<td>Colony cost</td>
<td>90.0</td>
<td>90.0</td>
<td>Total added return</td>
<td>799.85</td>
<td>312.65</td>
</tr>
<tr>
<td>Supplementary feed</td>
<td>2.76</td>
<td>1.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor cost</td>
<td>27.75</td>
<td>46.63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport cost to market</td>
<td>3.87</td>
<td>2.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td>8.47</td>
<td>7.49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total costs of production</td>
<td>177.85</td>
<td>152.77</td>
<td>Total return from sell of honey</td>
<td>799.85</td>
<td>312.65</td>
</tr>
</tbody>
</table>

Note: Net income from locally made transitional top bar beehive (799.85-177.85=622.00 ETB); Net income from traditional beehive (312.65-152.77=159.88 ETB); Incremental net benefit of locally made transitional top bar beehive is (622.00-155.99=462.12 ETB)
Based on the data collected from sampled beekeepers, hive cost and service life for the hives were on average 435.00 Ethiopian Birr (ETB) and 10 years for locally made transitional and 20 ETB and 5 years for traditional hive (1USD=18.2226 ETB in January 2013). The average price paid to purchase bee colony was 450.00ETB at current market price (2013), the commercial life for the honey bee colony was assumed to be 5 years provided that this colony is not used for reproduction and renting the colony for pollination service is not practiced in the country and this cost was common for both type of hives. Labor cost was calculated based on hours spent in beekeeping for both types of beehive per month, summed for a year and converted to Birr which was 35.00 ETB for daily laborer. Similarly, feed cost and transport cost was calculated based on cost spent on the items divided by number of beehives and interest 5% was added on total costs.

On the other hand, honey yield was the benefit for both types of beehives and categorized under column two, return. To get the total revenue from each type of hive, honey yield obtained in the course of the year was multiplied by selling price. In the study area, the average honey yield per annum for traditional and locally made transitional top bar beehive was 9.41 kg and 4.81 kg, respectively. It is below the national average which is 10-15 kg and 7kg respectively (Nuru 2004). The price of one-kilogram honey from locally made transitional top bar and traditional beehive was 65 and 85 birr, respectively. The price difference was due to quality of honey harvested from the beehives.

The partial budgeting result reveals that beekeeping is profitable by using locally made transitional beehive. Table one also summarizes that the incremental net benefit of locally made transitional beehive 462.12 ETB. This shows that the beekeepers increased their benefit from locally made transitional beehive more than 2.9 fold compared to traditional hive. Melaku (2005) also came with similar conclusion in his study using partial budgeting analysis that timber made Kenyan top bar hive was beneficial and remunerative.

**Conclusion and recommendations**

In conclusion, beekeeping is potential income-generating activity with relatively low investment and operation costs. It could be an effective business for farmers who have little business capital and land resource. Income from a single bee colony at beekeeper's backyard can be improved with minimum cost if locally made transitional top bar beehive with its package used. This study underlines the importance of extension support to beekeepers in the use of this hive technology.
ACKNOWLEDGEMENTS

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