

Adoption of Modern Box Bee Hive Technology Towards Smallholder Farmers: The Case of Sodo Zuria Woreda, Wolaita Zone, Southern Ethiopia

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Abstract

This study was accompanied in wolaita zone, Sodo Zuria Woreda, SNNP regional state. The general objective of the study was to assess farmers' responses towards factors affecting adoption of modern box bee hive technology in smallholder farmers. Multi-stage sampling procedure was followed to select the kebeles and the households for the study. The data were collected from 110 purposively selected sample households from four selected kebeles using probability proportional to size. The semi Structured interview schedule was established, pre-tested and used for assembly the important data for the study from the sampled households. For the validity and reliability of data, focus group discussion and key informant interviews were also conducted to generate qualitative data. In addition, secondary data were collected from relevant sources such as internet, books, agricultural and rural development offices. Descriptive statistics and inferential statistics were used to describe the nature of data and examine the significance of the relationship between dependent variable and independent variable. Furthermore, Binary logit model was used to determine the relative influence of independent variables on the dependent variable. The result of descriptive statistics revealed that out of the total sample respondents 43.6% were adopters and 56.4 % of them were non-adopters. The results of the study indicated that sex, education, participation in cooperative organization, utilization to credit, contact with extension agent, Farm size, training, distance to market center and relative disadvantage were found to have positive and significant influence on adoption of improved box bee hive technology. While non-farm activity, beekeeping experience, age, and labor force, TLU, of the households not significantly related with the adoption of improved box bee hive technology. The whole findings of the study underlined the significance of institutional support in the areas of extension, research and training concerning the production of improved box bee hive technology. Henceforth, agricultural policy and development interventions should be given consideration to the enhancement of such institutional support to farmers so as to achieve wider adoption of improved box bee hive technology to smallholder farmers.

Key terms: adoption, improved box

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1. Introduction

Ethiopia has a huge potential for beekeeping production because of its endowment with diversity in climate and vegetation resources for beekeeping (Kidane, 2014).

Beekeeping, also called apiculture, is management of honey bee colonies for pollination of crops and honey and other products (Bradbear, 2009). It is an environmentally friendly and non-farm business activity undertaken by farmers and landless people. That means, it does not occupy cultivated land, requires less investment and provides quick economic benefits, besides, it being a nonpolluting intensive agricultural practice (Conrad, 2007).

Honey and bees-wax are the two main products generated by the beekeeping subsector. World Trade of honey fluctuates between 997,000 tons and 1,000,000 tons yearly. Totally one third amount of honey produced in the world is from the two biggest honey producer countries Russia and China. Developing countries taken as a group produce about 500,000 tons. Beekeeping offers environmentally beneficial activity that can help the developing countries in alleviation of poverty and maintaining natural biodiversity (MASHAV, 2016).

Ethiopia has a huge potential for beekeeping production because of its endowment with diversity in climate and vegetation resources for beekeeping (Kidane, 2014).

Beekeeping activity has important contribution economically and ecologically (Ajebush, 2018). This sub sector has remarkable potential to contribute to employment generation, local and global market, livelihood improvement, and biodiversity conservation and helps ensuring economic advantages of women, youths and Ethiopia's geographical position poor households. Development of the Beekeeping practices could significantly enhance crop production, food security, maintenance of plant diversity and ecosystem stability 9-(Apimondia International Symposium, 2018).

Moreover, the importance of beekeeping as an income-generating activity pivots on the fact that many people use honey as food, medicine and for sale. Beekeeping offers a great potential for development and is

comparatively less demanding in terms of investment, labour and time. In addition, beekeeping is advocated to improve human welfare by alleviating poverty through increased household income: it is a source of food and nutritional security, raw materials for various industries, medicine, increased government revenue through levies and taxes, improved biodiversity conservation and enhancing environmental resilience (Kihwele *et al.*, 1999; MNRT, 2004).

Apiculture also plays a role in generating and diversifying the income of subsistence Ethiopian smallholder farmers mainly the small land holders and landless (EARO, 2000; Gezahegn, 2001).

Offa district has potential for beekeeping activities because relatively covered with rich natural resources and thus the apiculture is immense in it. In the district, where there is a high potential of natural resources, honey production is entirely a mean of income for small scale farmers. In this area, most of the beekeepers keep bees and use the income generated from that to purchase grains, agricultural input, clothes and to pay land tax. However, despite its potential role in the development of rural economy, the beekeeping sector faces several major problems such as lack of beekeeping skills, inappropriate production technologies, weak market access, weak price incentive systems, and limited financial capacity of beekeepers (Melaku *et al.*, 2008).

To solve these challenges, national efforts has made in linking small scale farmers with agricultural marketing chains. Access to market, credit service, new technologies and risk reduction are some of the benefits for farmers from producers association. But, small-scale farmers are often reluctant to adopt new production technologies.

Thus, this study is designed to investigate the information gap on factors affect smallholder farmers' adoption hinder to use improved box hive technology.

1.1. objectives of this study

The specify objective of this study is:

- ❖ to discover factors affecting adoption of improved box hive technology in the study area
- ❖ to ascertain the perception of smallholder farmers towards improved box hive technology

2. RESEARCH METHODOLOGY

2.1. Description of study area

The study was conducted in Sodo zuria district, found in southern Ethiopia. Livelihood of Most of people is Agriculture and the agricultural activities of rural poors is depends on rain fall. This exposes them to lead their life continuously in harsh condition.

2.2. Study design

This study was employed both quantitative and qualitative design for descriptive research. The method of research which concerns itself with the present phenomena in terms of conditions, practices beliefs, processes, relationships or trends invariably is termed as descriptive survey study. According to Aggarwal (1998), descriptive research is devoted to the gathering of information about prevailing conditions or situations for the purpose of description and interpretation. Similarly, this study were intended to gather relevant information, which utilizes a semi-structured questionnaire on perception of smallholder farmers towards modern box hive technology and its contribution in household food security and current status of honey production potentials in the study area.

Questionnaires of quantitative data were analyzed through descriptive statistics using SPSS version 20 software whereas Factors affect Adoptors and non-adopters of the hive was analyzed through descriptive statistics and binary logit model was used.

2.3. Sample size and Sampling techniques

Multistage-stage sampling procedure was used to select sample respondents. First, three kebele in Sodo Zuria woreda were designated by simple randomly Gilo Bisare, Gulgula and Buge wanche. Second, beekeepers were stratified into sub-groups based on agro-ecology zones, and users and non-users of box hive technology. Third, purposive sampling was used to select household for survey. The sampling frame of the study was the total households of selected kebeles. The sample size was determined by using simplified formula of Yamane $n = \frac{N}{1+N(e)^2}$

2.4. Type and Source of Data

Both quantitative and qualitative data obtained from primary and secondary sources. Household data collection methods such as survey questionnaire, FGDs and key informant interviews were used to obtain primary data. The primary data that were collected for quantitative research regarding to explanatory variables.

Secondary data such as description about the study area location, topography, climate, population, agricultural production was collected from relevant sources like books, internet, related journals and annual

report of zone and woreda agricultural office.

2.5. Methods of Data Collection

The main data gathering tool for this study was semi-structured interview. In addition to that, for qualitative study, Key informant Interview and group discussion were used.

The quantitative primary data required for the study was collected from sampled households by conducting formal survey using Semi-structured interview.

2.6. Data Analysis

The data were analyzed using software SPSS version 20 version. Appropriate techniques and procedures were used in the analysis to identify the influence of demographic factors, socioeconomic, institutional variables and psychological factors on the adoption decision process of modern box bee hive technology. Descriptive statistics were used such as mean, standard deviation frequency and percentile. Inferential statistics such as Chi-square test; f test were used to test significant levels of the dependent variables on independent variables and also the econometric analysis was employed.

Binary logistic regression is used to calculate the probability of two possible outcomes .In this finding, the two possible outcomes were either adopters or non-adopters. To examine the factors that influence adoption of improved box bee hive technology a binary logistic regression was employed.

3. Reason for not adopting MBH

The reason replied by most of respondent on why they are not adopting modern beehive was cash shortage and expensiveness of the technology.

Table 1. Reason for not adopting MBH

Reasons to not adopt MBH	Frequency	Percent
did not try to get	4	3.6
not available	8	7.3
cash shortage	24	21.8
too expensive	26	23.6
Total	62	56.4

Source, own survey , 2021

Table 2. Binary logit model output

Variables	B	S.E.	Wald	Sig.	Exp (B)
SEXHH	1.424	.595	5.735	.017	4.156
EDUC	.865	.239	13.104	.000	2.375
ACCTC	1.424	.421	11.434	.002	4.154
CWEXA	3.100	.650	22.742	.000	22.200
TRAI	1.569	.422	13.825	.000	4.800
EXPER	-.358	.216	2.737	.098	0.699
NONFAC	.037	.394	.009	.926	1.037
AGEHH	-.044	.027	2.637	.104	0.957
DISTMRT	-.500	.220	5.154	.023	0.607
FARSIZ	1.090	.372	8.581	.003	2.975
LABAV	.566	.378	2.241	.134	1.762
PICOOP	1.863	.442	17.760	.001	6.443
TLU	.599	.178	11.366	.073	1.819
REDADVIB	-.199	.076	6.798	.009	0.819

Pearson χ^2 value= 111.857, Log likelihood = -38.849, Cox & Snell R Square=0.638

Sample size of respondents =110, Probability=0.000 , significant at *,** 1% and 5% level

Source, own survey , 2021

4. Recommendations

- The study revealed that education status of household head positively and significantly affects farmers' decision to adopt modern box hive technology. More educated household heads are in the better position to adopt the new technology. Therefore, the regional and zonal Government sector involved in education should boost the educational status of the farmers through adult education.
- Extension services was found to be significantly influencing adoption MBH hive, it should be

strengthened down to the village level to inform farmers in order to increase the rate of adoption.

- Zone and woreda cooperative office should strengthen the existing cooperative beekeepers and Encourage those to form as savings and credit cooperatives as finance to increase their apiary size.
- The respondents were found to face marketing limitations which significantly bound their benefit from improved box bee hive adoption. Hence, greatly emphasis of zonal and woreda government has to be given to the improvement of market and marketing system particularly through cooperative unions.
- Farmers were found to face marketing constraints which significantly limit their benefit from beekeeping. Thus, considerably emphasis of zonal and woreda government has to be given to the improvement of market and marketing system particularly through cooperative unions.
- Participation in training was among the important variable that positively influenced the adoption of improved box bee hive. This indicates that extension service should be extended by establishing additional development centers and empowering them. Therefore, to sustain the positive contribution of the extension service to the adoption of improved box bee hive, strengthening extension services is necessary. Therefore, attention should be given to the research and extension linkages, and frequent training must be organized for beekeepers to adopt improved technologies
- Female-headed households are less adopter of improved box hive than male headed households. This might be due to lack of access to information sources. Hereafter, increase the participation of women and awareness creation should be done both by governmental and non-governmental organizations about the versatile of improved box bee hive technology more effectively.
- According on the discovery of this study further researches can be executed in the forthcoming in order to improve box hive and beekeeping technology in the study area.

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