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Assessment of Factors Affecting Adoption of Modern Beehive in East Wolega Zone, Western Oromia

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Abstract **- In order to promote diversification of agriculture and reduce poverty, beekeeping is one of the major agricultural activities being upheld by the government programmes. Even though the government should give enough attention and take beekeeping into consideration as one of the strategies for reducing poverty and ensuring food through millennium goals, there are different constraints in bee keeping production. Multi-stag purposive sampling techniques were employed where five districts were selected based on apiary potentials purposively from Eas wolega Zone. Accordingly Gobu sayo, Diga, Guto jida, Gida ayana and Ebantu district were selected. The respondents were divided into adopter and non-adopter categories. Based upon 38 adopters and 59 non-adopters were taken for the study through random sampling method. The data were analyzed using descriptive statistics, logistic regression model under Spss softwere. from the survey result, All of the respondents which is about 100% are male headed and female has not get a chance to included in sample. The mean age of the respondent was 39.26 years and The mean age for adopters and non-adopters were 38.07 and 40.03 respectively with insignificant mean difference (t-value = 0.695 and sig. 0.388) at 5%. Beekeepers in study area start beekeeping activities by catching the swarm and through inheritance. The major honeybees pests exist in the study area were identified and prioritized by the respondents, accordingly Ant, honey badger, birds, spider and wox moth problems were ranked respectively. Logistic Regression model revels that total land area and Extension service were positively and significantly influence adoption of MBH at 5%,and level education was positively and significantly influence at 10%. Level of education, Total land area, Experience in beekeeping, participation in demonstration and participation in training were found to be positively and insignificantly influencing adoption.**

1. BACK GROUND AND JUSTIFICATION

In order to promote diversification in agriculture and reduce poverty, beekeeping is one of the major agricultural activities being upheld by the government programmes of poverty alleviation. It offers a great potential for income generation, poverty alleviation, sustainable use of forest resources and diversifying the export base. beekeeping is a relatively low investment venture that can be undertaken by most people (women, youths, the disabled and the elderly). With beekeeping, there is no competition for resources used by other forms of agriculture but agricultural research has not given due emphasis to assessment and understanding of modern methods of bee farming especially in developing countries (Dr. U.K. Behera(2007).Even though apiculture is one of the oldest agricultural practices and Cush generating activities, research on beekeeping in general and the characterization of Ethiopian honey bee in particular is at an infant stage.

As noted by(Gidey and mekonen) the direct contribution of beekeeping includes the value of the out puts produced such as honey, beeswax, queen and bee colonies and other product such as pollen royal jelly, bee venom and propels in cosmetic and medicine, it provide an employment opportunities.Eeven though it is not well known, it is estimated that around one million farm households are involved in beekeeping business using traditional intermediate and modern beehive and thousands of households are engaged in Tej making in almost all urban areas.

Ethiopia is one of the four biggest wax exporter to the world market after China Mexico and Turkey and with honey production our country ranks 10th on the world, the system of production commonly exercised were traditional (from the total of about 4,601,806 hives exist in the country 95.5% 4.3%,and 0.2o% are traditional, transitional and modern bee hive respectively(Beyene and david 2007) Even though the government should give enough attention and take beekeeping into consideration as one of the strategies for reducing poverty and ensuring food through millennium goals, as indicated by (Gidey and mekonen) there is different constraints in bee keeping production such as inadequate availability of production technologies: limited beekeeping knowledge, limited availability of vegetation, limited training and technical assistances in beekeeping, lack of honey marketing facilities,

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insignificant research activities and other related factors, the rural beekeeping households have not sufficiently benefited from the honey subsectors.

The area was characterized by highly populated, extreme increase of deforestation, land less and decrease of land holding of many house increase from time to time. To this zone the use of modern beehive introduced before three decay's, but still most small scale farmer's use traditional beehive.

So this project identify the core problem of not more success of beekeepers by using modern beehive in east wollega zone, where comparatively vegetation cover, bee flora and bee colonies are more available when compared to other parts of Ethiopia

2. Research Methodology

2.1. Sampling Techniques

East wollega zone purposively selected because high potential in beekeeping production. Multi-stage purposive sampling techniques were employed where five districts were selected based on apiary potentials. Accordingly, Gobu Sayo, Diga, Guto Jida, Gida Ayana and Ebantu were selected. Then based on beekeeping potential, two PAs were selected from each district totally twelve PA (Ukko makanisa, Laga lafto, Gamachis, Bikila, jirenya, du'a kane, Konjo, Korea gobu, Walga'ii and Qello) has been selected. From each kebele 9 to 12 beekeepers which makes the total respondents 97 were selected and interviewed.

2.2. Data Types and Data Collection Methods

Both qualitative and quantitative data was collected from primary and secondary sources. Qualitative data used to assess smallholders farmers attitude towards the use of modern beehive technology in study area. Preliminary survey was conducted to assess the potentials of each district in beekeeping and at the second stage formal survey was conducted by structured questionnaires. Focus group discussion was also conducted with beekeepers and district level beekeeping experts.

2.3. Method of Data Analysis

The tools for data analysis were descriptive statistics such as percentages, frequencies, mean and standard deviations; t-test employed by SPSS statistical software. Analytical model selected for this study is binary logit model, which significantly identifies the influences of determinants of modern bee hive adoption. However, as of Aldrich and Nelson, (1984), the outputs of Probit and logit models are usually similar. but logit model is easier to estimate.

Model specification

Following Maddala (1983), Aldrich and Nelson (1984), Green (1991) and Gujarati (1995) the logistic distribution for the adoption decision of improved box hives can be specified as:

$$pi = \frac{1}{1+e^{-zi}}$$ ----------equation 1

Where, Pi is a probability of adoption of modern bee hive for the i^{th} farmer

e- represents the base of natural logarithms

Zi - is the function of a vector of n explanatory variables which is expressed as

$Zi = P_o + \sum_{i=1}^{n} pixi + ui$

Z - is an underlying and unobserved stimulus index for the i^{th} farmer

i- are observation on variables for the adoption model

Po- is the constant term

Pi - are the unknown parameters to be estimated

Ui- the disturbance term

n- the number of explanatory variables identified for the study

If pi is the probability of adopting modern bee hive their 1-Pi represents the probability of not adopting the technology and expressed as

$$1\text{-}pi = 1\text{-}\frac{1}{1+e^{-zi}} = \frac{e^{-zi}}{1+e^{-zi}} = \frac{1}{1+e^{zi}}$$ ----------equation 2

Then, the odd ratio of the equation 1 and 2 is expressed as

$$\frac{pi}{1-pi} = \frac{1+e^{zi}}{1+e^{-zi}} = e^{zi}$$ ----------equation 3

Equation 3, $\frac{pi}{1-pi}$ defines the probability of adoption of modern beehive to non adoption of the technology. Finally, the logit model is expressed as follows by taking the natural logarism of odd ratio

$$Li = \ln\left(\frac{pi}{1-pi}\right) = \ln e^{po+\sum_{i=1}^{n} pixi} = zi = po + \sum_{i=1}^{n} pixi$$ -equation 4

Where Li= log of the odds ratio in favor of modern bee hive adoption, which is not only linear in xi but also linear in the parameters.

3. RESULT AND DISCUSSION

3.1 Demographic condition of the respondents

Rural household adoption of new technology was influenced by demographic , socio-economic , institutional and physiological factors. Adoption of modern beehives technology by farm households to the context of this measured in terms of modern bee hives technology users and non-users. 39.2 % respondent were adopter of modern hive and 60.8 % respondent were non adopters. From the survey result, All of the respondents which is about 100% , are male headed and female has not get a chance to included in sample. Of the total households interviewed, 97% are married and only the remaining 3% are single. With regard to religion of the respondents 75.3% are protestant, 21.6% are Orthodox, 2.1% are Muslim and 1% others. (Table 1)

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Table 4 Sex, Marital status and religion of the household

variables	Non adopter n=59	Adopter n=38	Combined n=97
sex			
Male	59(60.8)	38(39.2)	97(100)
Female	-	-	-
Marital status			
Married	57(96.4)	37(97.3)	94(97)
single	2(3.6)	1(2.7)	3(3)
Religion			
Protestant	42(71.2)	31(81.5)	73(75.3)
Orthodox	16(27.1)	5(13.2)	21(21.6)
Muslim	-	2(5.3)	2(2.1)
Others	1(1.7)	-	1(1)

Source own survey 2014 () percent

The mean age of the respondent was 39.26 years and ranged from 19 to 80 years. The mean age for adopters and non-adopters were 38.07 and 40.03 respectively with insignificant mean difference (t-value = 0.695 and sig. 0.388) at 5%.

The result shows that the beekeepers in the study areas getting older and more resources are in the hands of older farmers. Mean Educational level of the household was 6.75 and ranged from nil to 12 and about 16.4% of respondent are illiterate. Similarly Mean education level of adopter and non adopter was 6.7 and 6.5 respectively with insignificant mean difference (t-value =0.819 and sig. 0.778) at 5%. Assumption of homogeneity of variance with respect to education was not violated. About 22.03 % of non adopter and 7.89 % adopter are illiterate. The average family size of sample respondents was 7.10 and ranged from 0 to 19 persons. Of which about 49% are economically active and it was 7.078 and 7.126 persons per household for adopters and non adopters). 73.2% of the respondent meet the food consumption requirement from own production but 25.8% doesn't met their food consumption because of shortage land for farming purpose.

Beekeeping experience is one of the variables that was considered. Mean Beekeeping experience of adopter and non adopter was 16.28 and 15.00 respectively. The result indicates that the mean years of beekeeping experience of both categories are nearly equal. The mean comparison of MBH adopters and non-adopters shows that no statistically Significant difference is observed in terms of beekeeping experience. (t-value= 0.909, sig value= 0.36). Table (2)

Table 2 the Mean distribution of sample respondents by personal related variables

Mean variables	Non adopter n=59	Adopter n=38	Combined n=97	t-value
Age	40.03(14.41)	38.07(11.98)	39.26(13.48)	0.695
Education	5.06 (3.85)	6.71(3.61)	5.71(3.82)	2.100
Family size	6.88(3.57)	7.07(3.43)	6.92(3.50)	0.280
Less 10 yrs	2.22(1.54)	2.05(1.46)	2.15(1.50)	
10-14yrs	1.11(1.05)	1.10(1.15)	1.11(1.08)	
Male15-65 yrs	1.86(1.47)	1.94(1.48)	1.88(1.48)	
Female 15-65	1.47(1.29)	1.71(1.79)	1.58(1.49)	
Greater 65 yrs	0.25(0.57)	0.23(0.58)	0.23(0.57)	
Tropical livestock unit	4.83 (4.99)	10.29 (7.20)	8.91 (7.37)	1.458
Total land per HH	2.22 (1.74)	3.13(2.08)	2.73(1.88)	2.063*
Beekeeping Experience	15 (8.78)	16.28 (9.09)	16.16 (11.49)	0.909

*significant at 5% level of significance. Source own survey 2014 () standard deviation

3.2. Perception of beekeepers about MBH

It was found important to identify perceived relative advantages/ problems of modern bee hives by comparing with local beehive so as to get the general perception of beekeepers of adopter (N=38) of MBH

Table 3. Perception of respondents towards MBH

Number in table shows % of household answered when the researcher ask about modern hive relative to terms of very low, low, medium, high, very high as comparing local hive

Parameter about MBH	Very low	Low	Medium	High	Very high
Cost of hive		-	15.7	39.4**	28.9
yield		-	21.1	13.2	65.8 *
Produce quality honey			13.2	18.4	68.4*
Ease for inspection	2.6		15.8	21.1	60.5*
Needs high skill	13.2	5.3	13.2	26.3	42.1**
Absconding	28.9*	28.9*	21.1	15.8	5.3
Pest &predators	15.8	7.9	28.9	34.2**	13.2
Swarming(half absconding)	31.6	15.8	34.2	7.9	2.6
disease	23.7	36.8*	36.8	2.6	
Marketing problem	36.9*	39.5*	21.1	2.6	
lack of wax	10.5	10.5	23.7	31.6**	23.7
Thief problem	81.6	15.8	2.6		

Source , survey result:2014.

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High yield, produce quality of honey, ease for inspection, low or very low Absconding , low disease, lack of honey market problem, lack of thief problem are the major relative advantages of modern beehive by comparing local hive which were identified by the majority of adopters of modern hive. See table 5 (* sign).

On the other hand, high cost , need of high skill, pest and predators, Lack of wax are the main relative disadvantages of MBH. see table 5 (** sign).

3.3. Beekeeping demonstration and training

Beekeeping demonstration and training develops the beekeepers' self-confidence in the technology. It also increases the productivity of the beekeepers. In the study area, about 20% non adopters and 44.7% adopters of modern bee hive have got training and about 22% non adopter and 32% of adopter have got demonstration by Development agent and bee expert of woreda. The trainings were like bee management, hive product keeping, advantages of MBH verses traditional beehive

Table 4. Responses of sample respondents on beekeeping training

Response of training	Non adopter n=59)	Adopter (n=38)	Total (n=97)
Yes	12 (20)	17 (44.7)	29 (30)
No	47(80)	21(55.3)	68 (70)
Total	59(100)	38(100)	97(100)
Responseof demonstration			
Yes	13(22)	12(32)	25(25.7)
No	46(78)	26(68)	72(74.3)
Total	59(100)	38(100)	97(100)

Source survey result 2014 ( ) indicates percentage

Among the respondents 30% of them got the training and 25.7% got demonstration. The remaining 70% and 74.5% of the respondents did not get the training and demonstration respectively. This indicates that the demonstration and training coverage was low. As a result, the majority of the beekeepers were using their indigenous knowledge. The relationship between adoption and training was significant. ($x2^{=}$ 707, 0.008) which implies that developing the skill of beekeeper through beekeeping training enhanced adoption of MBH. It was also observed that 55% of the adopters did not get training on MBH (Table 8). Those respondents who got beekeeping training, indicates that the beekeepers were well familiar with effective utilization of modern bee hive along with its management practices.

3.4. Modern bee hive adoption

During the study period, the zone had 9,418 MBH. Among the respondents, 39% of them were adopting the technology. The respondents of adopter's category had the total number of 155-modern bee hives and 466 traditional bee hive.

The average number of modern bee hive per adopter was 4.07. beekeepers were understood advantage of MBH over traditional bee hive. However, the cost of the technology is too high according to their perception.

Table 5. Beehives adoption by district.

No	Districts	Response on using MBH		Total
		Yes	NO	
1	Gobu sayo	9	11	20
2	Diga	6	15	21
3	Guto jida	6	11	17
4	Gida ayana	11	12	23
5	Ebantu	6	10	16
Total		38	59	97

Source, own survey result, 2014

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

Table 11 reason on not adopting MBH

No	Reason of not adopting MBH	frequency	percent
1	Did not try to get	2	3.4
2	Did not agree its advantages	13	22
3	Not available	6	10.2
4	Cash shortage	19	32.2
5	Too expensive	19	32.2
Total		59	100

Source, own survey result, 2014

Adopters was get modern bee hive from different source 47% MOA,11% BAMRC, 16%NGO, 21%Market and 5% others like by own making.(table 6)

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Table 11 Responses of sample respondents on source, availability and purchases amount they need of modern hive.

T.L	Source of modern bee hive	Adopter n=38	Available on time you need		Can purchase amount you need	
			yes	no	yes	no
1	MoA	18 (47)				
2	BAMRC	4(11)	6 (16)	32(82)	11 (30)	27(70)
3	NGO	6(16)				
4	Market (IMX)	8(21)				
5	Others	2(5)				

Source survey result 2014 ( ) indicates percentage

About 82% respondent replies that it is not available when they needed and 70% because of Expensiveness of hive and cash shortage of respondent they cannot purchases amount of they needed every year.
The result of group discussion clearly indicates the general picture of the technology in the view of the beneficiaries.

3.5. Major beekeeping practices by sample respondents
The beekeepers of the study area have developed different beekeeping practices using their Indigenous Knowledge (IK) and beekeeping training.

3.5.1. Honeybee feeding and hive shading practice
Honeybees store honey for their own consumption during dearth period. Beekeepers are harvesting honey, which the honeybees stored for themselves. sometimes, honeybees face starvation due to lack of feed.
To overcome the problem, supplementary feed is required for the honeybees. In this study, it was found that 68% and 12% of the respondent provided supplementary feed from adopter and non-adopter categories respectevily. Supplementy feed like shiro, water, flour, sugar and Daakuu.
Hive shading is also one of the practices that is recommended to protect the honeybees from high temperature, wind and rain. Among the adopter of modern bee hive 86% were adopting the Practice whereas 43% of non-adopters were constructing hive shade.

Table 7 Responses of sample respondents on hive shade construction and supplementary feed

Practice	Adopter n=38		Non adopter n=59		Total (n=97)	
	yes	No	yes	no	yes	no
HiveShade construction	33 (86)	5 (14)	25 (43)	34(57)	58 (60)	39(40)
Provide Supplementary feed	26(68)	12(32)	7(12)	52(88)	33(34)	64(66)

Source survey result2 014 ( ) indicates percentage

3.6 Means of engaging in beekeeping
Farmers can start beekeeping using different methods. Beekeepers can start beekeeping activities by catching the swarm, purchasing or through inheritance.
The majority of the beekeepers in study area started beekeeping with inheriting from parents (Table 13). According to the respondents 52.6 % of them started beekeeping through inheritance and 47.4% by catching the swarm. both adopters and non-adopters engaged in beekeeping activity with similar situation in starting beekeeping.

Table 8. Means of getting honeybee colony

No	Means of colony getting	Adopter n=38	Non adopter n=59	Total sample (n=97)
1	Inheritance (from parents)	18 (47.4)	33 (55)	51(52.6)
2	Catching the swarm	20 (52.6)	26 (45)	46(47.6)
3	Purchasing	-	-	-
4	Other	-	-	-

Source survey result 2014 ( ) indicates percentage

In relation to apiary site, in the study area respondents were keeping their bees 28.9% in backyard, 19.6% under eaves of the house, 17.5% hanging on trees near to home, 23.7% hanging on tree in forest and under eaves of the house, 6.2% under eaves of the house and on tree near home, 4.1% under house, tree near to home and in forest (Table14).

Table 9 Apiary site of the sample respondents

No	Apiary site	Adopter n=38	Non adopter n=59	Total sample (n=97)
1	Backyard	18(47.4)	10(16.9)	28(28.9)
2	In the house	11(28.9)	8(13.6)	19(19.6)
3	Hanging on trees near to home	1(2.6)	16(27.1)	17(17.5)
4	Hanging on tree in forest and under eaves of the house	4(10.5)	19(32.2)	23(23.7)
5	under eaves of the house and on tree near home	2(5.3)	4(6.8)	6(6.2)
6	under eaves house, tree near to home and in forest	2(5.3)	2(3.4)	4(4.1)

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The majority of the respondents were keeping their bees in backyard and in the house, which accounts 28.9% and 19.6% respectively. Such apiary sites are appropriate for daily activities of beekeeping.

3.7 Determinants of Adoption of Modern bee hive

Explanatory variables that are selected for econometric model would be discussed based upon the model output. Accordingly, as indicated in Table 12, 73 % of the total variation for the MBH hive is explained by logistic model. The explanatory variables that fit the model, Age, TLU, total land of household head, experience of beekeeping Extension service , Participation in training, Participation in demonstration, Educational level of the household.

The multicollinearity problem was checked by using VIF (Variable Inflation Factor) for continuous variables and CC (Contingency Coefficient) for nominal variables and there is no series problem (Table 11). By rule of thumb, there is no problem of multicollinearity as CC was found to be less than 0.8 while VIF found was less than 10.

Where, according to Maddala (1992) and Gujarati (2004) VIF can be defined as:

VIF (xi) $=\frac{1}{1-R^2}$, where, $R2$ is the squared multiple correlation coefficient between Xi and the other explanatory variables.

Table 11. Results of multicollinearity test: Variance inflation factor for the continuous explanatory variables

variable	Collinearity Statistics		
	Tolerance	VIF	$\frac{1}{VIF}$
Age	.556	1.800	
Education	.850	1.177	
TLU	.621	1.611	
total land	.628	1.593	
experiencebeekeep	.672	1.488	

Table 12. Logistic regression for factors influencing MBH adoption

variable	B	S.E.	Wald	Sig.	Exp(B)
Age	-.005	.027	.039	.844	.995
TLU	-.035	.042	.674	.412	.966
Totalland	.398	.169	5.560	.018*	1.488
Experiencebeekep	.007	.028	.055	.814	.993
Extension service	1.159	.578	4.015	.045*	3.186
Participationintraining	.844	.618	1.866	.172	2.325
Participationindemonstration	.634	.631	1.011	.315	.530
Educationlevel	.128	.074	2.973	.085**	1.136
Constant	-2.431	1.146	4.495	.034	.088

-2 Log likelihood 104.123

Predicted adopter 60 %
Non-adopter 81.8%
Over all 73%
*, **, significant at p<0.05, p<0.1

From the results of the model, Total land area was positively related to the adoption and significant at 5%. The odds in favor of adopting MBH increased by a factor of 1.48 for beekeeper whohave more farm land area. This shows that farmers who have more land area more interested beekeeping with MBH compared to the Farmers who have less farm land area.

Extension service positively related to the adoption and significant at 5%. The odds in favor of adopting MBH increased by a factor of 3.18 for beekeeper who have got extension service. Education increases the knowledge of beekeepers on MBH as they get more access to information. It also increases the understanding of the technology which,in turn, helps to easily apply the technology. As hypothesized, education influences adoption of MBH positively and significantly at 10 %. The odds in favor of adopting improved box hive increased by a factor of 1.13 for beekeepers who had more education level.

4. CONCLUSION AND RECOMMENDATIONS

4.1. Conclusion

The study was conducted in East wollega zone, western part of Oromia, The zone has a
total land of about 1,384,973 Ha; from this, farming 63.3%, grazing 10.5%, forest 11.5% and other 14.7% and it contains about 3.7% of oromia land. Its agro-ecology 7.2%dega , 51.1%Weina dega and 41.7% kola with minimum and maximum temperature 23ºc and 36ºc respectively, gain 800-2260mm rain fall in year.

Beekeeping is the most important source of household income in study area for instance in year 2015, The

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beekeepers of the Zone have got 3725.16 quintal of honey that worth 260,761,200 Birr, withthe price of 30.00 Birr/kg. currently the zone have 9,418 MBH.

The study was conducted with objective of The Major factors that determines the adoption of MB and quantifying the relative importance of the various factors associated with adoption. multi-stage purposive sampling techniques were employed and five districts were selected based on Apiary potentials purposively. Accordingly, Gobu Sayo, Diga, Guto Jida, Gida Ayana and Ebantu were selected. Then based on beekeeping potential, two PAs were selected from each district. Accordingly, the respondents were divided into adopter and non-adopter households. Based upon their 38 adopters and 59 non-adopters were taken for the study through random sampling method.

Both quantitative and qualitative data were collected using personal interviews, focus group discussions. The data were analyzed using descriptive statistics such as percentages, frequencies, mean, and logistic regression model by spss softwere.

Beekeepers of the study area start beekeeping activities by catching the swarm, purchasing or through inheritance.

The majority of the beekeepers in study area started beekeeping with inheriting from parents. With reference to comparison made on the perception of relative advantage and disadvantage of MBH;

High yield, produce quality of honey, ease for inspection, low or very low Absconding , low disease, luck of honey market problem, luck of thief problem are the major relative advantages of modern hive by comparing local beehive which were identified by the majority of adopters of MBH On the other hand, high cost , need of high skill, pest and predators, Lack of wax are the main relative disadvantages of MBH.

The major honeybees` pests exist in the study area were identified and prioritized by the respondents based upon the damage cause on the honeybees by honey bee enemies. Ant, honey bee bedgers, birds, spider and wax moth are the major honeybee enemies in the area, which affected both adopters and non-adopter, According to the prioritization result, even though ant causes a serious problem, respondents were use improved ant protection method by DIDIT and traditional way by adding wood ash around hive and circulating by roof hive stand.

Lack of honey extractor was the problems raised by respondent , thy process honey traditionally.

Logistic model revels that total land area and Extension service were positively and significantly influence adoption of MBH at 5%, where as level of education significant at 10%, on other hand Age, TLU, Experience in beekeeping, participation in demonstration and participation in training were not significantly influencing adoption of MBH. Due to expensiveness of technology and cash shortage of the farmers, they cannot purchases amount they need from different sources. Even through when they purchases from market (IMX) there is problems encounters about quality of MBH.

4.2. Recommendations

Based on the results of the study, the following recommendations are suggested.

- Researchers have to search other alternative, on modifications of the modern beehive to reduce the cost of the technology.
- Traditionally processing honey in study area, affect quality of honey, this turn reduce price of product. So AERC should give attention on adaptation of honey extractors
- The research, beekeeping extension, NGOs, and GO should develop the skill of beekeepers on the management of absconding and more promote bee forage in the Zone .
- 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 Livestock Resource and Development office, should follow the quality of MBH which is supplying by other organization like IMX.
- Zone and woreda cooperative office should strengthen the existing cooperative beekeepers and Encarouge them to form as form savings and credit cooperatives (SACCOs) as source finance to increase their apiary size.
- Appropriate interventions of honey bee pests control should be strengthened to reduce colony disturbance and improve overall productivity.

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