

Harnessing Potentials and Optimization of Apicultural Education as Pathway for Alleviating Poverty in Southern Nigeria

ABSTRACT

The role of apicultural education as a catalyst for reducing rural poverty among bee farmers was investigated in Ini Local Government Area of Akwa Ibom State, Nigeria. The survey research design was used in achieving this. To adequately and appropriately execute the project, some objectives were formulated. From these objectives, research questions were generated and hypotheses formulated accordingly to guide data gathering and analysis. The instrument for data gathering was a four point close ended questionnaire from which 150 bee farmers and 50 extension agents were selected to respond to items in the questionnaire using the census approach. Data collected from their responses were subjected to two forms of descriptive analysis. The first was percentage descriptive analysis which was used to x-ray the biodata. Second, mean and standard deviation were used to treat the research questions. The third method used is the independent t-test on the three man hypothesis of the study. The result of the analysis warranted the rejection of the three null hypothesis tested at 0.05 level of significance with 198 degrees of freedom using 1.96 as the critical f value. The results showed that 98 percent of bee farmers who had received apicultural education through extension services produced had more honey yield due to increase awareness on modern bee keeping techniques, adequate processing information and marketing strategies which invariably increased their income. Based on the findings made in this research, it was concluded by that giving the farmers and rural

25 dwellers apicultural education such as training them on how to construct apicultural equipment,
26 producing of honey, producing and processing of bee wax into other products such as polish,
27 candles etc. will enhance their performance in bee farming and thus alleviate their poverty.

28 **Keywords: Apicultural education; honey production; poverty, reduction, rural farmers**

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INTRODUCTION

31 **1.1 Background to the study**

32 Bees (*Apis mellifera*) have received serious attention in many parts of the world because
33 of their unprecedented utility. A bee is a flying insect in the family of Apidae and Insecta class,
34 an insect, which is closely, related to wasp and ant, because they belong to the same Order
35 (Hymenoptera). Bee in the opinion of Farlex (2013) is, defined as any of several hairy bodied,
36 winged, stinging insect with piercing and sucking mouths parts, used for gathering pollen grain
37 and nectar for production of honey and other bee products. Such bees that produce honey are,
38 referred to as honeybees. Honeybee according to Michener (2007) is a subset of bees in the
39 genus *Apis*, primarily distinguished by the production and storage of honey in addition to
40 construction of colonial nest. Honeybees are, known for their role in pollination and production
41 of honey and other by-products. The Ministry of Agriculture and Rural Development (MOARD)
42 (2006) reported that bee by-products include honey, wax, propolis, royal jelly and venom. Bee
43 products are highly treasured throughout the world. Exporters as well as consumers value and
44 constantly demand bee products. In the views of Leen, Willen, Piet and Hago (2005) the demand
45 for bee-products highly valued because of their food, medicinal and industrial uses. More so, bee
46 by-product like pollen is, considered as one of the complete natural food for man and bee itself,
47 since it is rich in protein, vitamins and minerals (Curtis, 2010). Albert (2012) explained that bee
48 products like pollen are, used as anti-fungal, anti-bacterial and anti-viral medicine. Bee by-
49 products like royal jelly regulate nerve impulse, enhance the ability to think clearly, alleviate

50 pains and inhibit ageing. In the view of Timiladu (2008), bee products are, used in
51 pharmaceutical industries for manufacturing candles, cosmetics, shoe polish, adhesive and
52 others. Many individuals obtained these products majorly through beekeepers or apiarists
53 practicing apiculture.

54 Apiculture (beekeeping) is the management of bees in hive, thus, resulting in production
55 of valuable products. Onabe (2011) asserts that apiculture is the art of making a shelter for bee to
56 live in. Also, Idris (2005) that apiculture is the art of rearing bees for their by-product to
57 generate income and obtain medicinal value in addition to the benefit of pollinating agricultural
58 crops. In the context of this study, apiculture is an agricultural activity whereby interested rural
59 farmers apply their knowledge of bee biology to provide good housing, appropriate feeding and
60 needed management practices to bees, for harvesting their products for income. Hence, it is the
61 practice where bee colony is, established and managed by a farmer.

62 A farmer is a person who owns or manages a farm. Mungan (2010) asserts that a farmer
63 is a person engaged in agriculture with bias in livestock or crop production for food and raw
64 materials. A farmer therefore is one who grows crops and rear animals for food and income.
65 Some of the farmers that grow crops and rear animals live within a city (Urban, while others live
66 in rural areas). Rural farmers live in open swath of land with few homes or buildings. US Bureau
67 (2005) identified rural areas as territories with population and housing unit not in urban area and
68 places with less than 2,500 people. Wiconoc (2013) defined rural area as population, housing,
69 territories not included in urban area. In this study, rural area refers to a geographical area that is
70 located outside towns and cities where majority of the inhabitants are farmers; who work
71 effortlessly to overcome the imposing poverty line.

72 Poverty is a global phenomenon, which affect continents, nation and people differently
73 (Ojo, Omokoro, Auta & Hisyna, 2016). The higher level of poverty in Nigeria, which has
74 attained an endemic nature, is becoming worrisome. National Planning Commission of Nigeria
75 (2014) opined that poverty is a situation whereby an individual has less than \$1 per day. The
76 report indicates that about 75% of Nigeria's population lives between the poverty line. Poverty is
77 a condition where one does not have the ability to adequately, meet the basic human necessities
78 such as food, shelter, clothing and medical care. In the view of International Center, for
79 Alleviation of Poverty (2013), poverty exists when people lack the means to satisfy their basic
80 needs such as food clothing and education.

81 In Ini Local Government Area, many farmers are poor because they lack quality
82 education to improve methods of crop production and livestock farming activities, especially the
83 lucrative ventures like apiculture, which has the ability to enhance their purchasing power. In
84 view of Osinem in Agbo (2015), farming in most communities in Nigeria has low output because
85 the occupation is, perceived as a way of life rather than a business venture. Although there are
86 few beekeepers in the study area, farmers that engaged in the art have low output as a, result of
87 lack of quality knowledge of biology and inadequate skills for effective farm management. The
88 low productivity of bee products is the major impediment for rural apiarists. There is low output
89 of honey compared to its demand in Ini Local Government Area. This makes farmers to
90 adulterate the little harvested, so as to meet with the demand and further increase the amount of
91 what is realized from the output. Thus, the adulteration process brings about low quality honey.
92 This consequently leads to loss of confidence and withdrawal of potential customers from buying
93 the product from the area. Also, many youth in the study area as observed go into the wild to
94 obtain honey via crude method of harvesting, thus, destroy the bee hive, the bees and waste most

95 of the bee by-products due to improper processing. The quest for alternative means of survival
96 has witnessed the youth moving to cities for greener pasture; thus, neglecting farming in the area
97 with apicultural activity inclusive. Central Agricultural Census Commission (2003) stated that in
98 weak or harsh agro ecosystem where crop production is marginal and risk of crop failure is high,
99 apiculture provides a good alternative option for farmers. It is therefore necessary that rural
100 farmers in Ini Local Government Area be, trained in the modern methods of bee keeping, which
101 could boost their production and increase their income that in turn will lead to poverty
102 alleviation.

103 Poverty alleviation means improving living condition of people who are already poor.
104 Ekwuruike (2005) asserts that poverty alleviation is an effort geared towards reducing the
105 magnitude of poverty. It is, referred to as the means of promoting growth; that could
106 permanently lift as many people as possible out of the humanity live of poverty. Poverty
107 alleviation therefore is the means of enhancing the purchasing power of rural farmers in Ini
108 Local Government Area, so that they could satisfy their basic needs. The farmers could be,
109 enhanced to live better life by engaging in agricultural business, after they might have gone
110 through education and proper training. It is against this background that this study was,
111 undertaken to assess apiculture education as a pathway for rural poverty alleviation. The specific
112 objective was to ascertain the extent to which the training of apiculture equipment construction,
113 honey production and bee wax production serves as a pathway for rural poverty alleviation in the
114 study area.

115 116 **2.1 MATERIALS AND METHODS**

117 118 **Research design**

119 The research design adopted for this study is survey research design. According to Isangedighi,
120 Joshua, and Ekuri (2004), survey research design involves the collection of data so as to
121 accurately and objectively describe existing phenomena. It depends basically on questionnaires
122 and personal interviews, as instrument for data collection. The survey design was considered
123 appropriate for this study, because it seeks to assess apiculture education as a necessary pathway
124 to rural poverty alleviation.

125 **Area of the study**

126 The research location is Ini Local Government area of Akwa Ibom State. The choice is due to the
127 researcher's familiarity with the area. Ini Local Government lies in the southern part of the state.
128 It is located between latitude $5^{\circ} 24'0''N$, $5.40000^{\circ}N$ and longitude $7^{\circ}44'0''E$, $7.73333^{\circ}E$
129 respectively (Wikipedia, 2016), it shares a common boundary with Ikono Local Government
130 Area to the south, Obot Akara Local Government Area to the east and Abia state to the north.
131 The local government has projected population of about 99,196 people of which 52,644 are
132 males and 46,552 are females according to the population census of 2006. However, as at 2014,
133 the projected population was 129,469. Yellow page (2012) asserts that Ini Local Government has
134 an Area of approximately 320,451 square kilometer. The area is mainly, characterized by double
135 rainfall, which starts from the month of April to October, reaching its climax in the month of
136 June and September. The annual average rainfall is about 2000m with little dry season in August.
137 Over eighty percent (80%) of the total annual rainfall over a period of seven (7) months that is
138 April together on the average is experienced in this area. The language spoken is Ibibio.

139 **Population of the study**

140 The population of the study is, made up of local farmers and rural dwellers, which consists of
141 male and female. Based on convenience, the researcher used 5000 persons with 2500 males and

142 2500 females as the population of rural dwellers and farmers in the studied area. The population
143 size comprises of the 100 villages (Ministry of Local Government and chieftaincy Affairs, 2017).
144 1:1 is the ratio of male to female.

145 **Sampling technique**

146 The study adopted two sampling techniques which are simple random sampling technique which
147 was used in picking the 10 communities from the 100 communities that made up Ini Local
148 Government Area and accidental sampling technique which was used in picking the number of
149 the population to be studied.

150 According to Isangedighi, Joshua, Asim and Ekuri (2004) simple random sampling technique
151 describes a means by which the researcher gives every member of the population equal and
152 independent opportunity to be, selected. Here, the researcher first wrote the names of all the
153 villages in the area in pieces of paper, folded them, put them into a container and mixed
154 thoroughly and blindly picked 10 communities, which formed the communities used for the
155 study.

156 Nwankwo (2006) defined accidental sampling technique as involving picking any available
157 member of the population to be studied as part of the sample until the desired sample is reached.

158 In picking the required number of farmers for the study, accidental sampling technique was,
159 found suitable because the researcher found it difficult to have an assembly of all the farmers and
160 rural dwellers in each village. As a result, farmers and rural dwellers were accidentally picked
161 from each of the 10 communities giving a total of rural dwellers and farmers. In each village, 37
162 persons were chosen.

163 **Sample**

164 The sample for the study was 370 rural dwellers and farmers picked from the 10 villages. Taro
165 Yamen's formula was, employed to get the sample size of the population of 5000. $S = N / (1 + N\alpha^2)$
166). Where S= Sample size, N= Population size, α = Level of significance usually 0.05 (Nwankwo,
167 2006). Therefore, S= 370. Where the population ratio of male to female is 1:1; the male sample =
168 $370/2 = 185$; female / sample $370/2 = 185$.

169 **Instrumentation**

170 The major instrument used for this study was questionnaire. The questionnaire was tagged
171 "Training in Apiculture Questionnaire (TAQ)". The items were carefully, designed by the
172 researcher to obtain responses from the respondents. The questionnaire was, divided into two
173 parts. PART A was design to obtain personal data and socio-economic on the respondents while
174 PART B was, used to obtain information from the respondents in line with the variables under
175 study. The instrument consisted of fifteen items structured in a four points scale. The options are
176 Strongly Agree (SA) – 4point, Agree (A) – 3point, Disagree (D) – 2point, and Strongly Disagree
177 (SD) – 1 point.

178 **Validity of the instrument**

179 The items in the questionnaire were drawn in-line with the variables under study. Before
180 using the instrument, the items developed were, given to three (3) experts in research and
181 statistics and one in agricultural education for screening. The experts carefully vetted the items to
182 ensure both face and content validity of the instrument. Items found relevant were, retained while
183 the irrelevant items were, dropped.

184 **Procedure for data collection**

185 The questionnaires were administered to thirty-seven (37) farmers in each of the ten (10)
186 villages making a total of three hundred and seventy (370) used for the study between May and

187 August, 2018. The respondents were, informed of the exercise and the importance of giving
188 honest response to the items. The researcher administered the questionnaire copies personally to
189 the respondents and those who were not able to read were, helped by the researcher to explain
190 the content of the instrument, and they responded appropriately. At the end, three hundred and
191 seventy questionnaire copies, administered were all, collected from the respondents.

192 **Procedure for data preparation and coding**

193 A four point scale type questionnaire scale ranging from Strongly Agree (SA) to Strongly
194 Disagree (SD) was, adopted for response in the instrument. The scoring of the questionnaire was,
195 done as follows, with the help of the scoring keys

196 Strongly Agree (SA) = 4points

197 Agree (A) = 3points

198 Disagree (D) = 2points

199 Strongly Disagree (SD) = 1point

200 **Procedure for data analysis**

201 Three approaches were adopted to analyze the research data. First, the bio-data of the
202 study was analyzed using the statistical package for social sciences (SPSS v 22) software for the
203 inferential and descriptive analysis. Secondly, summary measures of mean and standard
204 deviation was used to treat the objectives and research questions. Thirdly, independent t-test was
205 employed to test the three null hypotheses at 0.05 level of significance. Thus, the stated
206 hypotheses, their variables and statistics used are as follows:

207 Hypothesis 1

208 There is no significant difference in the mean ratings of male and female rural farmers on
209 the training required for alleviating poverty through construction of apiculture equipment.

210 Independent variable: Construction of apiculture equipment

211 Dependent variable: Rural poverty alleviation

212 Statistical tool: Independent t-test statistics

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214 Hypothesis 2

215 There is no significant difference in the mean ratings of male and female rural farmers on the
216 training required for alleviating poverty through honey production.

217 Independent variable: Honey production

218 Dependent variable: Rural poverty alleviation

219 Statistical tool: Independent t-test statistics

220 Hypothesis 3

221 There is no significant difference in the mean ratings of male and female rural farmers on the
222 training required for alleviating poverty through bee wax production.

223 Independent variable: Bee wax production

224 Dependent variable: Rural poverty alleviation

225 Statistical tool: Independent t-test statistics

226 Decision Rule: for the mean ratings, the following limits of numbers were, used to
227 interpret the mean values attracted by each item of the questionnaire:

228 Strongly Agreed (SA) 4point

229 Agreed (A) 3point

230 Disagreed (D) 2point

231 Strongly Disagreed (SD) 1point

232 For the hypotheses, the decision rule was to reject the null hypotheses were the calculated
233 t-test value was greater than the critical t-test value. If otherwise, do not reject.

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235 **3.1 RESULTS**

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237 Descriptive analysis portrays the position of bio-data of respondents. Thereafter, a summary
238 measure of the responses was done to the three research questions of the study. This is followed
239 by an independent t-test to accept or reject the stated hypotheses.

240 Age distribution of the male and female farmers/rural dwellers is shown on this Table 1.

241 The data shows that majority of the farmers accounting to 247 or 66.76% fall in the ages of 26-
242 45 years. Farmers in the age range of 46 years and above make 98 or 26.48% of the practitioners
243 of beekeeping, which is more of bee hunting in Ini Local Government Area.

244 It is also worthy to note that the youth, making up 25 or 6.76% of the sampled respondent
245 are engaged in bee farming (bee hunting).

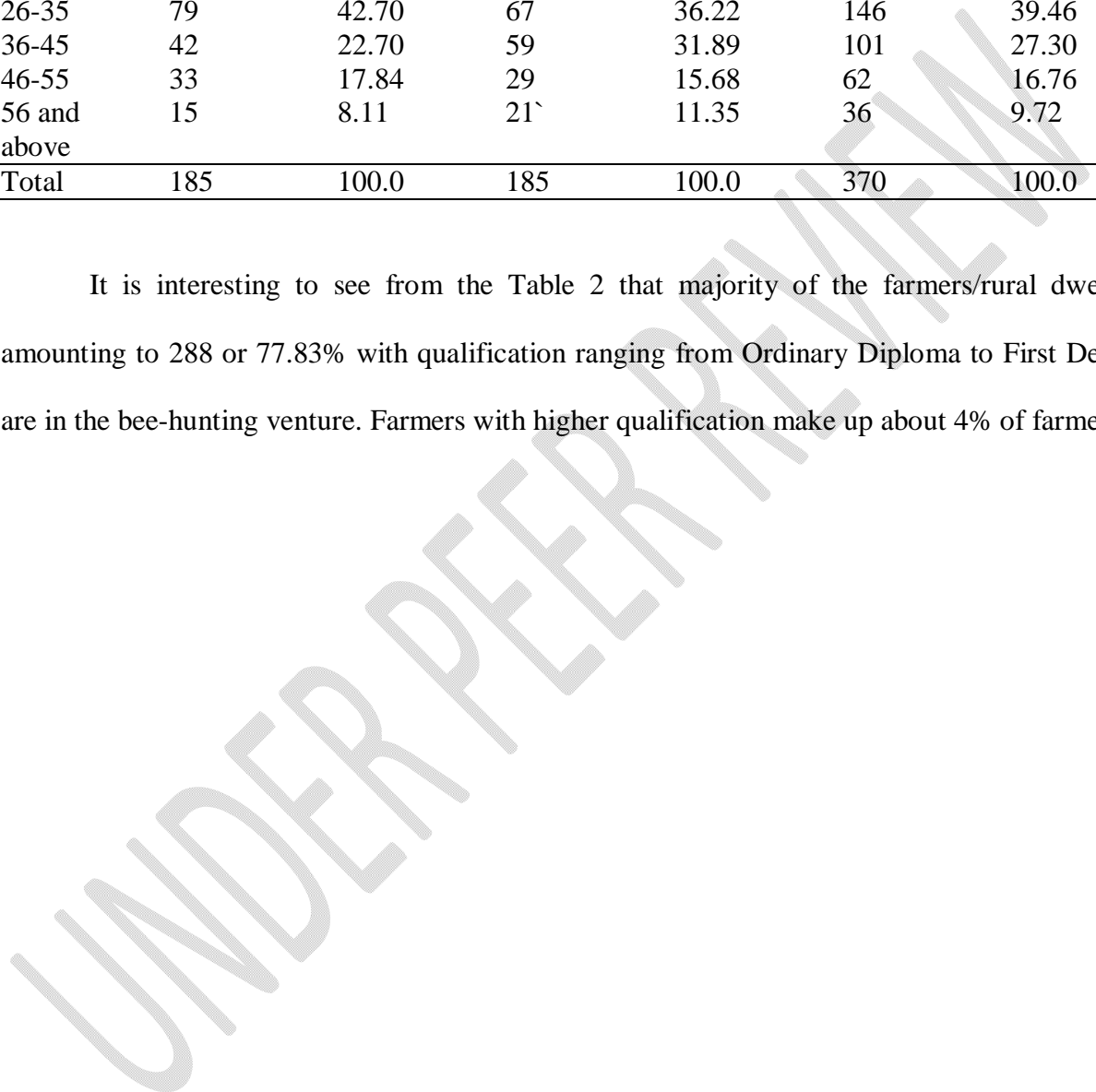
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Table 1:
Distribution of farmers/rural dwellers by age

Age range (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
15-25	16	8.65	9	4.86	25	6.76
26-35	79	42.70	67	36.22	146	39.46
36-45	42	22.70	59	31.89	101	27.30
46-55	33	17.84	29	15.68	62	16.76
56 and above	15	8.11	21	11.35	36	9.72
Total	185	100.0	185	100.0	370	100.0

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It is interesting to see from the Table 2 that majority of the farmers/rural dwellers amounting to 288 or 77.83% with qualification ranging from Ordinary Diploma to First Degree are in the bee-hunting venture. Farmers with higher qualification make up about 4% of farmers.



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Table 2:
Distribution of farmers/rural dwellers by educational qualification

Age range (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
FSLC	39	21.08	29	15.68	68	18.38
WAEC/GCE	86	46.49	77	41.62	183	44.05
HSC/OND/DIP	37	20.0	54	29.18	91	24.59
1ST DEGREE	19	10.27	15	8.11	34	9.19
PGD/MSC/PHD	4	2.16	10	5.41	14	3.79
Total	185	100.0	100.0	100.0	370	100.0

257 PGD = Post graduate Diploma; M.Sc = master of science; PHD = Doctor of philosophy

258 FSLC =First school leaving certificate; WAEC=West African Examination Council; GCE =
259 General certificate of Education; HSC = Higher School Certificate; OND = Ordinary national
260 Diploma; HND = Higher National Diploma; DIP = Diploma

261 Sex is not a barrier to bee hunting in Ini Local Government Area. The Table 3 presents a
262 balanced respondents by sex. The bee farming is traditionally, practiced in the area.

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Table 3:
Distribution of farmers/rural dwellers by sex

S/N	Sex	No. of farmers	Percentage (%)
1.	Male	185	50.0
2.	Female	185	50.0
Total		370	100.0

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269 The Table 4 shows that 183 or 49.46% do not own beehives. Another 7 or 1.89% claim to

270 have locally made hives.

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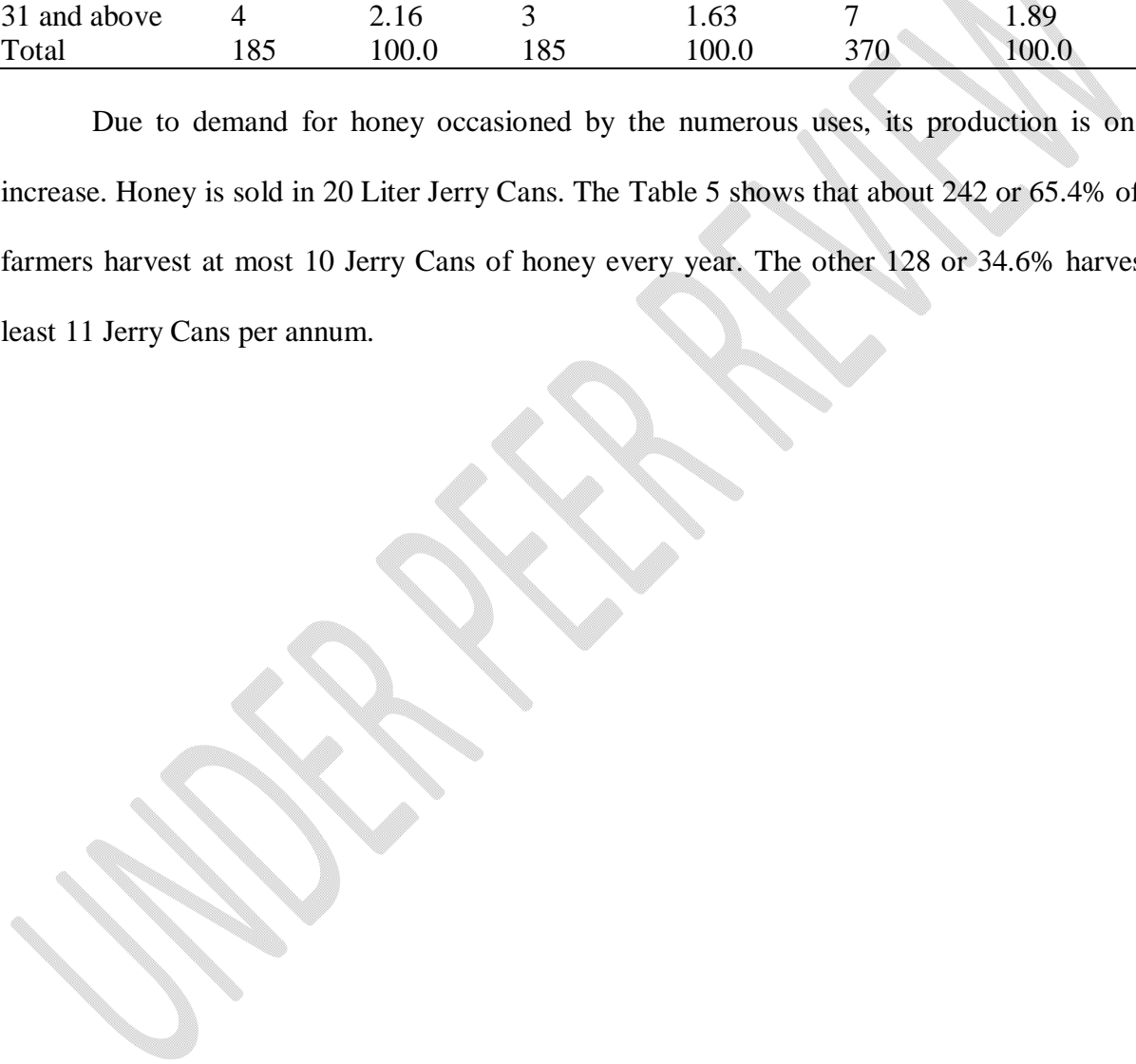
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Table 4:
Distribution of farmers/rural dwellers by number of beehives owned

No. of hive	Male		Female		Total	
	No.	%	No.	%	No.	%
None	107	57.84	76	41.08	183	49.46
1-10	28	15.14	94	50.81	122	32.97
11-20	39	21.08	7	3.78	46	12.44
21-30	7	3.78	5	2.70	12	3.24
31 and above	4	2.16	3	1.63	7	1.89
Total	185	100.0	185	100.0	370	100.0

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Due to demand for honey occasioned by the numerous uses, its production is on the increase. Honey is sold in 20 Liter Jerry Cans. The Table 5 shows that about 242 or 65.4% of the farmers harvest at most 10 Jerry Cans of honey every year. The other 128 or 34.6% harvest at least 11 Jerry Cans per annum.



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Table 5:
Distribution of farmers/rural dwellers by the quantity of honey produced per year

Quantity of honey (Liters)	Male		Female		Total	
	No.	%	No.	%	No.	%
1-5	53	28.65	87	47.03	140	37.83
6-10	67	36.22	35	18.92	102	27.57
11-15	29	15.68	27	14.59	56	15.14
16-20	22	11.89	14	7.57	36	9.73
21 and above	14	7.56	22	11.89	36	9.73
Total	185	100.0	185	100.0	370	100.0

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Collection of respondents responses show that more than half of the bee farmers (53%)

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do not produce bee wax. Only 4.32% of the farmers can boast of more than 40 kg of the product

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per year (Table 6)

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Table 6:
Distribution of farmers/rural dwellers by the quantity of bee wax produced.

Quantity of bee wax (Kg)	Male		Female		Total	
	No.	%	No.	%	No.	%
None	117	63.24	79	42.70	196	52.97
1-10	21	11.35	43	23.24	64	17.30
11-20	19	10.27	24	12.97	43	11.62
21-30	15	8.12	15	8.11	30	8.11
31-40	8	4.32	13	7.03	21	5.68
41 and above	5	2.70	11	5.95	16	4.32
Total	185	100.0	185	100.0	370	100.0

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297 **Table 7. Results of analysis of research questions using mean and standard deviation**
 298 **Training in the construction of apiculture equipment**
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S/N	Variable	Scores						
		Male			Remark	Female		
		\bar{X}	SD			\bar{X}	SD	Remark
1	Fabrication of bee suit	52.6	4.29	S	52.6	4.28	S	
2	Construction of bee hive	51.8	3.70	S	50.8	4.35	S	
3	Use of hive tool in harvesting honey	46.6	2.47	NS	47.8	2.86	NS	
4	Construction of hive stand	52.9	4.49	S	52.7	4.28	S	
5	Construction of smoker	50.5	3.69	S	51.2	4.06	S	

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 302 The analysis shows that apart from training in special methods of processing honey,
 303 (44.5) respondents indicated that they require training in hive baiting, appropriate hive location
 304 and inspection, honey harvesting and marketing of honey. All of these scored above the 50
 305 average mark of the study (Table 7).
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308 **Table 8. Training in honey production**

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S/N	Variable	Scores					
		Male			Female		
		\bar{X}	SD	Remark	\bar{X}	SD	Remark
1	Baiting of hive	51.5	4.19	S	54.8	4.68	S
2	Appropriate location and inspection of hive	53.1	4.61	S	52.1	4.13	S
3	Special methods of processing honey	48.9	3.67	S	44.5	2.11	NS
4	Timing on when and how to harvest honey	47.1	3.08	S	52.3	2.21	S
5	Effective and efficient marketing of honey	50.1	3.60	S	52.8	4.11	S

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On the average, the farmers indicated interest more on training in controlling defect of bee wax (53.8 marks) and in the products from bee wax (53.1 marks). Training in the extraction of bee wax fell below the average with 43.2 marks for the male farmers and 43.8 marks for the female farmers (Table 8).

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Table 9. Training of farmers on bee wax production

S/N	Variable	Scores					
		Male		Remark	Female		Remark
\bar{x}	SD	\bar{x}	SD				
1	Identification of bee wax	49.5	3.45	S	50.0	4.23	S
2	Extraction of bee wax	43.2	2.30	NS	43.8	3.20	S
3	Production of candle, polish etc from bee wax	53.1	4.41	S	49.6	3.31	S
4	Controlling defect of bee wax	53.8	4.97	S	52.9	3.93	S
5	Specialized methods of marketing bee wax	51.2	3.57	S	52.4	4.23	S

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323 **3.3 Inferential data analysis and interpretation of results**

324 **Hypothesis One**

325 There is no significant difference between the mean ratings of male and female rural farmers on
326 the training required for alleviating poverty through the construction of bee equipment.

327 **Table 10:**
328 **Independent t-test analysis of the male, and female responses on the training of bee**
329 **equipment.**

Variable	N	\bar{X}	SD	t-cal	t-cri
Male farmers	185	50.8	3.78	1.7500	1.96
Female farmers	185	51.02	3.97		

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332 Significance at 0.05 level, df=368.

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334 The analysis on the table produced or calculate t of 1.7500 which falls within the critical t
335 range of -1.96 to 1.96 at 0.05 significance level with 368 degree of freedom. The null hypothesis
336 was accepted; thus, draw a conclusion that there is no significant difference between the mean
337 ratings of male and female bee farmers on the training required for alleviating poverty through
338 the construction of bee equipment.

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340 **Hypothesis Two**

341 There is no significant difference in the mean ratings of male and female rural farmers on
342 the training required for alleviating poverty through honey production.

343 **Table 11:**
344 **Independent t-test analysis of respondents' responses on the need to be trained in honey**
345 **production to alleviate poverty.**

Variable	N	\bar{X}	SD	t-cal	t-cri
Male farmers	185	50.16	3.83	1.7610	1.96
Female farmers	185	51.02	3.84		

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348 Significant at 0.05 level, df=368

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350 Analysis has produced or calculated t of 1.7610, which is less than the critical t of 1.96 at
351 0.05 significance level, with 368 degrees of freedom. On the basis of the result, the null
352 hypothesis was accepted. Thus, there is no significant difference in the mean ratings of male and
353 female rural farmers in accepting that they require training in honey production to alleviate
354 poverty.

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372 **Discussion**

373 The present study have shown that administration of apicultural education through
374 adequate manpower training in the study area has significantly increased honey production,
375 increased bee farmers income and consequently significantly reduced rural povertyThe findings
376 in this study is in agreement with Onabe, Aboh and Ndifon (2016) that apiculture benefits
377 several sectors, that where there is beekeeping activities, people in the community can generate
378 income through the sales of bee equipment. The implication of the acceptance is that both male
379 and female rural farmers do not differ in their interest to receive training in the construction of
380 bee equipment. A breakdown of their desire is that they need to be trained on how to fabricate
381 bee suit to avoid bee stings. They also need to be trained on how to construct modern beehives
382 like Kenyan Top-Bar, Langstroth etc. However, they require no training on how to use hive tool
383 for harvesting honey, but require training in the construction of beehive stand and smoker.

384 In the same way, hypothesis two that tested there is no significant difference in the mean
385 ratings of male and female rural farmers on the training requires for alleviating poverty through
386 honey production was accepted. The findings are in consonant with the opinion of Habiso and
387 Ngrazi (2010) where they state that poverty alleviation through honey production brings with it
388 numerable benefits to rural dwellers. It is also in line with Sharma (2010) where he state that
389 honey production can serve as an additional income generating activities during planting off-
390 season. The implication of the acceptance is that both male and female farmers/rural dwellers do
391 not differ in their interest to receive training in honey production. A breakdown of their desire is
392 that, they need training on how to bait the hive, appropriate way of locating the hive for fast
393 colonization, inspection of hive, methods of processing honey, and timing on when and how to
394 harvest honey and effective and efficient marketing of honey.

395 Also, hypothesis three that was tested that there is no significant difference in the mean
396 rating of male and female farmers/rural dwellers on the training required for alleviating poverty
397 through bee wax production was accepted. The findings is in line with Stefan (2016) assertions
398 that said good quality bee wax depend on the production methods and also African Organic
399 Agriculture Manual (2011) opined that bee wax has numerous uses and sells for almost the price
400 per weight of honey. The implication of the acceptance is that both male and female
401 farmers/rural dwellers do not differ in their concern to receive training on bee wax production.
402 The study revealed that they require training on how to identify bee wax, extract bee wax,
403 produce candles, polishes etc from bee wax, control defect of bee wax and specialized methods
404 of marketing of bee wax.

405
406 The major purpose of this study was to assess apiculture education as a necessary
407 pathway for rural poverty alleviation in Ini Local Government Area of Akwa Ibom State.
408 Apicultural training through educational programmes has been reported by Stefan (2016) to
409 improve bee farmers productivity in Ikot Ekpene, Akwa Ibom state Nigeria. Similarly, Habisco
410 and Ngrazi (2010) had observed that timely and adequate administration of apicultural training
411 on bee farmers in Okangha Community in Ikom Local Government area of Cross River State
412 increase bee farmers output in three consecutive seasons. These consequently increased bee
413 farmers income and significantly reduced rural poverty in the study area. The findings of the
414 research revealed that:

- 415 1 Training in the construction of apiculture equipment will help alleviate poverty in Ini
416 Local Government Area of Akwa Ibom State
- 417 2 Training in honey production will enhance availability of quality honey all year round
- 418 3 Training in bee wax production will aid reduction of poverty

419 **Conclusion**

420 Based on the findings made in this research, it was concluded by that giving the farmers and
421 rural dwellers apicultural education such as training them on how to construct apicultural
422 equipment, production of honey, producing and processing of bee wax into other products such
423 as polish, candles etc. will enhance their performance in bee farming and thus alleviate their
424 poverty. The government of southern States should liaise with the ministry of agriculture to
425 organize series of apicultural training for farmers and rural dwellers. The extension agents and
426 other trainers should use the findings of the study as a guide to train farmers and the rural
427 dwellers to augment and sustained their knowledge in bee keeping

428 1 Entrepreneurs should make use of the study to establish a profitable enterprise in
429 apiculture to increase their income and to contribute to the availability of bee products

430 2 Well to do individuals should empower the youths by helping them get trained in
431 fabricating apiculture tools and possibly automated machines abroad

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