EFFECT OF BEEKEEPING ON POVERTY STATUS OF WOMEN IN OGUN AND KADUNA STATES, NIGERIA

BY

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OCTOBER, 2016

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A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY DEGREE IN AGRICULTURAL EXTENSION AND RURAL SOCIOLOGY

DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY,
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ZARIA, KADUNA STATE,
NIGERIA

OCTOBER, 2016

DECLARATION

I hereby declare that this thesis titled **"Effect of Beekeeping on Poverty Status of Women in Ogun and Kaduna States, Nigeria"** has been written by me and it is a record of my research work. No part of this work has been presented in any previous application for another Degree or Diploma in this or any other Institution. All borrowed information has been dully acknowledged in the text and a list of references provided.

Ibukun Helen OJO **Date**
Student

CERTIFICATION

This thesis titled **"Effect of Beekeeping on Poverty Status of Women in Ogun and Kaduna States, Nigeria"** by Ibukun Helen OJO meets the regulations governing the award of the Degree of Doctor of Philosophy in Agricultural Extension and Rural Sociology of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to my Husband Mr A.N. Hiikyaa, and my siblings Mrs R.O. Oniyire and Engr J.M. Ojo

ACKNOWLEDGEMENTS

My profound gratitude goes to the chairman of the supervisory committee Prof. D.F. Omokore who painstakingly read the research report and gave very detailed and valuable suggestions. Working under him as a student turned out to be a great privilege and an advantage for me. Apart from academics, I learnt a lot from his hardwork, tolerance, patience and good sense of humour. All these attributes make him my role model. My gratitude and unreserved appreciation goes to member of the supervisory committee Prof. S.J. Auta, for her painstaking efforts in providing scholarly guidance in the execution of this research. I don't have words to express her patience and motives to share her experience and knowledge. Special appreciation also goes to Prof. M.A. Damisa, member of the supervisory committee for his valuable contribution. The efforts of the following people: Prof. B. Ahmed, Prof. M.O. Akinola, Prof. S.A. Sani, Prof. M.K. Ajala, Prof. and Mrs J.O. Ogunwole, Prof. and Dr. (Mrs) C.K. Daudu, Dr. O. Yusuf and Mr. J.O. Owolabi, cannot be easily forgotten. Their contribution and encouragement greatly assisted me.

I am eternally grateful to my siblings; Mrs. R.O. Oniyire, Engr. J.M. Ojo, Mr. and Mrs. S.T. Kolawole and Mrs. A.I. Ilenre for being the pillar for my academic progress. To them am indebted forever. My heartfelt gratitude and appreciation goes to my mother, Mrs. L. Ojo, Barrister O.O. Oniyire, my dear A.E. Oniyire, O.E. Oniyire, all my cousins and nephews for their words of encouragement and prayers. Deep appreciation goes to Prof. and Mrs. J.O. Olukosi, whose continuous prayers and encouragement lifted me when I was downcast. You are father and mother indeed to me. I remember with gratitude the continuous prayer, encouragement and moral support I received from Dr. (Mrs) O. Adenaike, Mrs. R. Jatau and Dr. C.A. Ugwuanyi. Our interaction will never be

forgotten. Iam grateful to Mr. B. Idris of Beekeeping Extension Society. Mr. G. Gajere and Mr. J. Mallam of Kaduna Agricultural State Development Project; Mr. E.A. Asade of Bees Extension Education Services, Mr. B. Oreyemi of Bee friendly, Mr. K. Sobowale and Mr. H. Tomson of Tommy Bee; Mr. A. Oduntan of Bee Craft, Ogun State for their co-operation and to the sample respondents who co-operated with me in supplying relevant information in addition to their hospitality during the period of data collection. My sincere thanks also go to Mr. A. Lanlehin, Mrs. C. Olonitola, my colleagues, all staff of the Department of Agricultural Economics and Rural Sociology, Ahmadu Bello University, Zaria and those too many to mention by names, who contributed in one way or the other to the vision and fulfillment of this thesis. To my husband Mr. A.N. Hiikyaa I say thank you for been there for me. Above all, I thank Almighty God for His protection, provision, wisdom and strength to complete this study.

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ABSTRACT

The study investigated the effect of beekeeping on poverty status of women in Ogun and Kaduna States, Nigeria. Ogun State Beekeepers Network group (OBNG) and Beekeeping Extension Society (BES) in Kaduna State were purposively chosen for the study. OBNG has a population of 214 women beekeepers while BES has 256. A sample of 107 and 128 which represent 50% of the women beekeepers' were randomly selected from the population respectively, giving a total of 235 women beekeepers used for the study. The analytical tools employed were mean, mean-scores, percentages, mean per capita household income, gross margin, logit regression analysis, Pearson Products Moment Correlation (PPMC) and Z-test. The result of socioeconomic characteristics of the respondents showed that 65.7% and 94% of beekeepers in Ogun and Kaduna States respectively, were in their active age with mean beekeeping experience of 4.6 years and 8.8 years, respectively. This shows that beekeeping is relatively a new enterprise among the respondents. Majority of the beekeepers were small scale producers with an average of 23 and 12 hives in Ogun and Kaduna States, respectively. The study further revealed that 72.5% and 69.53% of the beekeepers in Ogun and Kaduna States had temporary access to land, respectively. Seventy four percent of them in Ogun State did not belong to beekeeping cooperative whereas 70% of the beekeepers in Kaduna States belong to beekeeping cooperative. The beekeepers had limited (17% and 6% of Ogun and Kaduna States, respectively) access to credit. Majority (93% and 79% of beekeepers in Ogun and Kaduna States, respectively) were not visited by extension agent. Honey and bee wax were the major bee products produced by the beekeepers. Result of mean per adult household income analysis revealed ₦78,861 and ₦34,604 as poverty line with a resultant 45% and 48% of the beekeepers considered as been poor in Ogun and Kaduna States, respectively. An average rate of returns of ₦2.54 and ₦3.75 per ₦1 invested by beekeepers in Ogun and Kaduna States, respectively was obtained. Logit regression analysis established that age, beekeeping experience, farm size, household size, number of dependants, cooperative, extension services and training were the major determinant of poverty status of the beekeepers. The significant coefficients of PPMC results were within the range of -.259 to .294, suggesting that beekeeping weakly alleviates poverty status of the beekeepers in the study areas while Z-test analysis revealed that there is significant difference between profitability of beekeepers in Ogun and Kaduna States, respectively at 1% level of probability. Theft, bush burning, predators, vandalization of hives and climate change were some of the major problems militating against beekeeping in the study area. Cost and return analysis indicated that honey bee production is highly profitable in the study areas. Based on the findings of this study, beekeepers are advised to scale up production, combine production with various methods of value addition in order to produce varieties of secondary products from honeybee. This will provide wider market, improve their earning and invariably make beekeeping a better poverty alleviation strategy. Beekeeping cooperative should be strengthened and members are encouraged to pool their resources together to attract credit from financial institutions.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Poverty is a global phenomenon, which affects continents, nations and people differently. It afflicts people in various depths and levels, at different times and phases of existence. There is no nation that is absolutely free from poverty. The main difference is the intensity and prevalence of the malaise. Nations in Sub-Saharan Africa (SSA), South Asia and Latin America are currently with the highest level of poverty and consequently with the lowest level of socio-economic development. They also have the highest level of social insecurity, violence, unrest and generally unacceptable low standard of living (Ezekiel, 2003). Arogundade, Adebisi and Ogunro (2011) noted that poverty in its simplest form refers to the inability of an individual to attain the minimum standard of living. It can also be defined as a social condition characterized by inadequate access to basic human needs (food and non–food) for the sustenance of socially acceptable minimum standard of living in a given society. It is pertinent to note that poverty is a relative term. There is no standard concept or definition of poverty because of its multidimensional nature as well as its dynamic properties (Barnes, 2010; Segun, 2010).

World wide, about 925 million men, women, children are chronically hungry due to extreme poverty; while up to 2 billion people lack food security intermittently due to varying degree of poverty (Food and Agriculture Organisation (FAO), 2010). Nigeria as a developing country is seriously challenged by poverty. The poverty experienced by Nigerians is pervasive, multifaceted and chronic, affecting the lives of a large proportion of the populace (Kwaghe, Amaza and Jafaru-furo, 2009). Studies provide

graphical details of the escalating poverty situation in Nigeria since 1980 (National Bureau of Statistics (NBS), 2007; 2012). Across the Country, poverty is not restricted to the rural areas; poverty also exists in urban areas. The fact is that urban poverty appears more devastating, more challenging, more complex, psychologically disorientating than the rural poverty because of its nature and circumstances. Urban poverty may denote the poor people who live in squalor in urban cities like Lagos, Abuja, Port Harcourt, Onitsha and a host of others while rural poverty is taken to refer to the condition of the poorest of the poor who inhabit the rural areas of Nigeria. Nigeria is one of the most resource-endowed nations in the world (Etim, Edet and Esu, 2009) but Nigerian is ranked among the poorest of the poor countries in the world (Ogege, 2011; UNDP, 2006; 2008; 2013). The incidence of poverty in Nigeria became alarming in 2010 when the Millennium Development Goals (MDGs) report for the year reveals that more than 50% of Nigerians live in chronic poverty (www.bglgroupng.com). The recent poverty profile report of the National Bureau of Statistics for 2010 has now corroborated this position. The bitter reality of the Nigerian situation is not only that poverty is getting worse by the day, but out of every 10 Nigerians 7 live in conditions of extreme poverty of less than 1 US dollar per day (Amobi, 2008). This amount of money will barely provide for a quarter of the nutritional requirements for healthy living.

In recognition of the incidence and severity of poverty, successive Nigerian governments since 1960 have attempted to alleviate poverty among Nigerians through various sectoral programmes in agriculture, health, transport, housing and financial sectors. Some multi-sectoral programmes were also introduced. Efforts at poverty alleviation by the Nigerian government under the agricultural sectoral programme include Farm Settlement Scheme, Operation Feed the Nation, Agricultural Credit

Guarantee Scheme, Green Revolution, River Basin Development Projects. Other agricultural strategies include the establishment of National Agricultural Land Development Authority (NALDA), the Strategic Grains Reserves Programme, the development of fishery, small ruminant production and pasture grazing reserve. The multi-sectoral programmes embarked upon to alleviate poverty, some of which were women-friendly include; Better Life for Rural Women, Family Support Programme, Directorate of Food, Roads and Rural Infrastructure (DFRRI), National Directorate of Employment (NDE), Mass Mobilisation for Social Justice and Economic Reconstruction (MAMSER), Family Economic Advancement Programme (FEAP), National Poverty Eradication Programme (NAPEP), National Economic Empowerment Development Strategy (NEEDS). Their aims were to ameliorate the suffering of the people by providing employment opportunities, increase production and supply of food and access to credit facilities to enable the poor establish their own businesses. Despite the admirable positivities of the above policies, poverty pervades within the social system. It has therefore been irrevocably clear that there is the need to go back to the drawing board to harness the potentials of agricultural practice in order to reduce the risk of poverty.

Agriculture is a fundamental instrument for stemming and reversing the worsening poverty, food insecurity and natural resources degradation trends in Sub Saharan Africa (Asogwa, Umeh and Okwoche, 2012). Globally, agriculture provides livelihoods for more people than any other industry. Growth in agricultural production and productivity is needed to raise rural incomes, to support the increasing numbers dependent on the industry and to meet the food needs of the fast growing urban population. The roles of the Nigerian agricultural sector include provision of food for the population. The sector

has been the largest employer of labour, with more than 75% of the nation's population involved in one form of agriculture-related activities or another. It provides income for the farming households as well as being a major source of foreign exchange earnings for the nation. In Nigeria, women farmers are productive force in subsistence agriculture. They also contribute to household well being through their income generating activities (Rahman and Usman, 2004). Various reports on the contribution of women to agricultural development in the country (Damisa, Samndi and Yohanna, 2007; Ajah, 2012) reveal that women contribution to farm work is as high as 60-90% of the total farm task. The contribution of the women ranges from such tasks as land clearing, land tilling, planting, weeding, fertilizer/manure application to harvesting, food processing, threshing, winnowing, milling, transportation and marketing. It is estimated that women are responsible for two-thirds of the food crops produced in Nigeria. Rural women also pick forest products such as snails, mushrooms, vegetables and spices for sale and family consumption. Nigerian women's role in agriculture does not stop in crop production, they are responsible for tending small livestock such as sheep, goats, pigs, poultry as well as beekeeping in recent time.

Beekeeping or apiculture can be described as the skill of keeping bees for income and food (FiBL, 2011). Apiculture (honeybee keeping) in Nigeria as a traditional art started time immemorial with straw, basket, gourd or pot hives playing an important role in the production of honey. Beekeeping as an enterprise offers great potentials for rural development in almost all African countries. It has been appraised in some parts of Nigeria and other parts of the world with remarkable success in terms of profitability (Farinde, Soyebo and Oyedokun, 2005; Ja'afar-furo, Suleiman and Hong, 2006). As an agricultural enterprise, apiculture is relatively inexpensive and easy to start. It is

comparatively less demanding in terms of investment, labour, time and is feasible in marginal conditions and places where crops or other enterprises have failed. The enterprise has many advantages over other types of agriculture for instance, the enterprise requires little land and the quality is less important since hives are placed on trees. The importance of beekeeping as an income-generating activity is due to the fact that beekeeping produces honey that many people use as food, medicine and for sale. It is advocated to improve human welfare by alleviating poverty through increased household income, a source of food and nutritional security, raw materials for various industries and ensures an increase in yield of many tropical crops through enhanced pollination.

Beekeeping as an enterprise can serve as means of empowering resource poor women who are characterized by low capital investment. Notable characteristics of this enterprise include: beekeeping does not require land ownership or rental. It makes use of indigenous resources which will promote their long term sustainability and uplift the living standard of the beekeepers. Beekeeping is an activity that can successfully be adopted by women because keeping 4-5 modern beehives economical for a woman beekeeper needs little space (about $100m^2$), which most women can afford; usually a space available at the backyard can be used. The income from this small apiary (minimum of 350 US dollar per annum) is equivalent to income from growing food crop such as wheat or maize on half hectare of land. This will increase income of a woman by one dollar per day. It does not need much labor, which most women lack. A woman can manage a small apiary only with little assistance from someone during harvesting. Still on the notable characteristics, beekeeping does not need most of the expensive agricultural inputs (seeds, fertilizer, etc), which are difficult for women to easily access.

Rather, it needs one time investment on hives. It is a seasonal activity and inspection can be done at spare time. These characteristics among others are highly compatible with women's needs and constraints. The above suggest that beekeeping could be one of the tools to reduce poverty among women. The study therefore intends to investigate factors affecting honeybee production as well as the effect of beekeeping on poverty with women as the focal point in the study areas.

1.2 Problem Statement

In most African countries, Nigeria inclusive, poverty for long has been a major contending force against the pace of development. It has remained persistently unabated despite many laudable initiatives geared towards poverty alleviation. The continuous rise in the level of poverty in Nigeria has shown that more of the country's population lives in chronic poverty (NBS, 2012). At independence in 1960, the poverty level was 15% of its population and rose to about 69% of its population in 2010 (NBS, 2010). Statistics on human development and social provision reveal that the population of Nigeria is increasingly becoming one of the poorest in the world (Etim *et al.,* 2009; UNDP, 2013) and that Nigerian as a whole, is in a very vulnerable position, in spite of the country's potentials in all kinds of mineral resources, agriculture, water, oil and gas.

The concern over poverty and the need to alleviate it is predicated on the fact that poverty is a social phenomenon with multifarious negative consequences such as hunger, malnutrition, disease, unemployment, increase in the number of destitute, beggars, prostitutes and paupers. Poverty appears to have also led to increase in child labour, child abandonment and abuse, increase in infant, child and maternal mortality rates. Increase in the rate of crime and protracted crisis in many parts of Nigeria is also

rooted in inability of the people in meeting their basic needs due to poverty. In view of the high incidence of poverty in Nigeria and its scourge on the nationals, every feasible and practical alternative should be employed to curtail the co-attendant mallacies. Since agriculture has been identified as a panacea to poverty alleviation and the active role of women in this process is adequately recognized, it is instructive to note that recently, beekeeping has been promoted and specifically targeted at women as an interventionist strategy.

Beekeeping is an aspect of agriculture. According to Alleyne (2010), a shortfall in number of bees coupled with global warming are exhibiting some damaging effects on pollination of plants and by extension their population. Similarly, Grossman (2013) asserted that the declining bee populations pose a threat to global agriculture and other numerous species of wild plants. FAO (2014), concluded that the existence of many species of plants and animals would not be possible if bees were not available. These reports affirmed that honeybees are central to a sustainable agriculture and invariably, poverty reduction. In spite of these reports, the role of honeybees in sustainable agriculture and poverty reduction remains poorly known and appreciated. Beekeeping has yet not been made an integral part of agriculture in Nigeria. It is against this background that this study was undertaken to find answers to the following research questions regarding the effect of beekeeping on poverty status of women in the study areas:

i. what are the socioeconomic characteristics of the women beekeepers and institutional factors affecting beekeeping in the study areas?

ii. what are the different honeybee products produced by the women beekeepers in the study areas?

iii. how profitable is honeybee production in the study areas?

iv. what is the poverty line of the women beekeepers in the study areas?

v. to what extent has beekeeping affected poverty status of the women beekeepers in the study areas?

vi. what are the constraints facing women beekeepers in the study areas?

1.3 Objectives of the Study

The broad objective of the study was to investigate the effect of beekeeping on poverty status of women in Ogun and Kaduna States. The specific objectives were to:

i. describe the socioeconomics characteristics of the women beekeepers and institutional factors affecting beekeeping in the study areas;

ii. identify the different honeybee products produced by the women beekeepers in the study areas;

iii. determine poverty line of the women beekeepers in the study areas;

iv. estimate the profitability of honeybee production in the study areas;

v. determine the extent to which beekeeping has affected the poverty status of the women beekeepers in the study areas, and

vi. identify the constraints facing the women beekeepers in the study areas.

1.4 Justification for the Study

The overt role of beekeeping as a viable agricultural practice that could alleviate poverty and sustain rural employment in Nigeria is well documented (Ja'afar-furo *et al.*, 2006; Babatunde, Olorunsanya, Omotesho and Alao, 2007; Nuhu, 2011). Apiculture enterprise provides the much needed diversification in the agricultural production base.

Nigeria has good potentials for beekeeping. The country is blessed with numerous melliferous plants. The tropical climate with varying agro ecological conditions ensures the availability of flowers from numerous species of wild and cultivated plants throughout the entire year from which honey bees can forage for food (nectar and pollen). It is also an activity that can be done by anybody whether female or male, young or old. It is therefore imperative that efforts to encourage beekeeping in Nigeria should be supported and encouraged.

Many studies are available on men's participation in beekeeping in Nigeria **(**Onwubuya, Ajani, Ugbajah and Nenna (2013); Yahaya and Usman 2008; Micheal, 2008; Tijani, Ala, Maikasuwa and Ganawa, 2011) but regrettably, there is a dearth of information on women participation in beekeeping. Most of the available literature on women is on processing and marketing of honey. Furthermore, there is little empirical evidence on the potentials of beekeeping for poverty alleviation among women in the study areas. The foregoing, therefore, underscore the need to carry out this study. The findings of this study would contribute to the existing body of literature and knowledge on apiculture agricultural sub-sector and its linkage to poverty eradication specifically among women. It is further expected that the finding of the study would improve both the women beekeepers and non beekeepers income as well as generate employment. The study would also stimulate further research on beekeeping. The findings of this study would be a valuable document that would help government, NGOs and Research Institutes in coming up with appropriate interventions that would boost beekeeping in the study areas.

1.5 Hypotheses of the Study

i. Socio economic characteristics and institutional factors have no significant influence on poverty status of women beekeepers;

ii. Beekeeping enterprise have no significant influence on poverty status of the women beekeepers' in the study areas, and

iii. There is no significant difference between profitability of beekeepers in Ogun and Kaduna State.

CHAPTER TWO

LITERATURE REVIEW

2.1 Concept of Beekeeping

Agriculture in Nigeria, accounts for more than one-third of total gross domestic product (GDP), ensures food security, alleviate poverty and reduce labour force wastage (Amaza and Maurice, 2005). The agricultural share of the GDP stood at about 90% before independence in 1960 and decline over time (Amaza and Maurice, 2005). The decline in the contribution of agriculture to the country's GDP overtime is due to its dwindling relevance relative to other sectors of economy, especially the commercial exploration of petroleum. This condition leads to poor agricultural output in general and consequently, impoverishment of the people that are agriculture dependent. The search for sustainable forms of farming such as beekeeping, which will be complementary and also improves biodiversity, therefore, becomes imperative.

Beekeeping or apiculture is an activity in which man rears honeybees and acquires their products. Onwubuya *et al.* (2013), define beekeeping as the practice of keeping and management of honeybee colonies, in hives constructed by man. According to Shu'aib, Kyiogwom and Baba *(*2009), beekeeping refers to the practice and management of the bees in the hives, which leads to the production of valuable materials such as honey, beeswax, etc. It involves construction of beehives to catch swarms for harvesting of honey and other products during the honey flow period. The management of bees in hive makes ownership of the bee colony very clear, it can be kept near home and harvesting is easier. So long as a honeybee is an animal, the apiculture is generally treated as a form of animal husbandry. All over the world, beekeeping is an integral part of agriculture. It is practiced either as a main activity or as a secondary part-time

activity. Beekeeping is often practiced on a small scale and represents a traditional way of animal husbandry in most cultures. The size of a beekeeping enterprise run by a full-time farmer depends essentially on the socioeconomic situation in the country concerned. In some countries, 20 bee colonies may be sufficient to earn a living for one family, whereas in other countries, one enterprise may comprise more than 2000 colonies. In beekeeping, land ownership is virtually unnecessary, and beekeeping can be practiced in both cultivated landscapes and in natural habitats. Beekeeping practices can either be stationary or migratory, where the beekeeper moves colonies of bees in pursuit of honey flows or for the commercial pollination of crops.

Africa is the original home of honeybee, *Apis mellifera*. Africa and other tropical countries in the Caribbean and pacific therefore have highly appropriate habitat for honeybees. The common Africa honeybee in Nigeria is *Apis mellifera Mellifera addnsonni* (Oluwaseun, 2009). It is found in the wild and also, deliberately kept by beekeepers. Honeybee is an insect that lives in groups or colonies showing social organisations among its castes and in the area of division of labour. Interest in bee keeping started with hunting and robbing of wild colonies in hollow cavities in trees and rocks. (Halil and Nuray, 2007).

2.1.1 Beekeeping and Sustainable Livelihood

The sustainable Livelihood Analysis (SLA) has since the 1990s become the dominant approach to the implementation of development interventions by a number of major international agencies. It is defined in terms of the ability of a social unit to enhance its assets and capabilities in the face of shocks and stresses over time (Stephen, Nora and Moses, 2009). SLA first seeks to identify the important of assets in livelihood, their

trends over time and space as well as the nature and impacts of shocks and stresses (environmental, economic and social) upon these assets. A livelihood comprises the capabilities, assets and activities required for a means of living. It is deemed sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities, assets, and activities both now and in the future, while not undermining the natural resource base (Olivier, 2008). Individuals' livelihood depends on access to different types of assets. These assets fall into five categories: natural, human, physical, social and financial (Department for International Development, 2002) and no single category of asset are on its own sufficient basis for creating a livelihood. Beekeeping is a useful means of strengthening livelihoods because it uses and creates a range of assets. According to Lemessa (2007), successful beekeeping can be achieved by drawing upon all the five categories of assets.

2.1.2 Sustainable Livelihood Framework

The sustainable livelihoods framework (SLF) is an effort to conceptualize livelihoods in a holistic way (figure 1). The elements in the SLF are discussed thus:

i. **Beekeeping Assets**

- **Natural asset:** Beekeeping livelihoods are built upon natural resource stocks: bees, flowering plants and water. Bees are natural asset accessible in the wild. They collect honey resin and gum where they can; hence wild, wastelands and even land-mined areas all have value for beekeeping. Beekeeping is possible in arid areas and places where crops or other enterprises have failed; the roots of nectar-bearing trees may still be able to reach the water table far below the surface. This makes beekeeping feasible in marginal conditions, which is important for people who need to restore their livelihoods or create new ones.

Bees are the only livestock with no competition with other animals. It ensures the continuation of natural assets through pollination of wild and cultivated plants. Flowering plants and bees are interdependent: one cannot exist without the other. As bees visit flowers, they collect food and their pollination activities ensure future generations of food plants, available for future generations of bees and for people too (Bradbear, 2003; Bernard, *et al.,* 2013). It is a perfect self-sustaining activity (figure 1).

- **Human asset:** Human asset includes health, education, knowledge and skills, capacity to work, capacity to adapt (Olivier, 2008). Many societies have considerable traditional knowledge and skills concerning bees, honey and related products (Bradbear, 2003). Human asset also provides labour as family members can assist in beekeeping. It can be carried out by male, female and children often help with some beekeeping activities. Although human asset is partly related to household size much also depends upon level of education, experience, age etc (figure 1).

- **Physical asset:** Within the context of SLA, physical assets could be equipment and technology (hives and stands, protective kits, baits etc. traditional and improved technology). In sustainable beekeeping, all equipment must be available, made and mended locally which, in turn, contributes to the livelihoods of other local people (Bradbear, 2003). Beekeeping can add to the livelihoods of many different sectors within a society including village and urban traders, carpenters who make hives and stands, tailors who make veils, clothing and gloves and those who make and sell tools and containers (Bernard *et al.,* 2013).

Infrastructure (transport, roads, vehicles, water supply and sanitation, energy, communications) is essential in beekeeping. Although beekeeping is an aerial agricultural activity that does not occupy cultivated land, access to land with good melliferous plant is important as the location for sitting apiary goes a long way to determine honeybee performance and success of beekeeping enterprise (figure I).

- **Social asset (Network group):** This can be in forms of faith-based groups, youth groups, labour rotational groups, savings/credit, membership of cooperative societies or membership of NGOs. The social network groups are important instruments, worthy of consideration in the spread of beekeeping information and technology. Such network provides valuable support-base for livelihood. Information on beekeeping can be exchanged and if some of the groups are state or national in scale, could provide useful information to policy makers for beekeeping programs and implementation. Social resources such as networks, producer and marketing associations have great significance for beekeeping development (Bradbear, 2003; Stephen *et al.*, 2009). Local associations provide the means for beekeepers to advance their craft, lobby for the protection of bees, organize collective processing for honey and wax, and gain access to markets. Access to networks at a wider level through non-governmental organizations (NGOs) such as BES will help beekeepers to find sources of training, markets, new research results and improves their understanding of beekeeping enterprise (figure I).

- **Financial assets:** Although significant financial assets are not essential to initiate beekeeping activities at subsistence level, they are essential for development of beekeeping enterprises. Successful marketing depends on adequate supplies of containers for processing and packaging. Credit is necessary for beekeeping associations to run collection centers, buying products from producers and selling in bulk (Bradbear, 2003). Finance is also needed to buy some equipment such as honey press, wax extractors etc. Beekeepers could pool their finance together to purchase equipment for joint use as individuals may not necessarily need to own one (figure I).

ii. Beekeeping Outcomes

According to Bradbear (2003), beekeeping produces a number of quite different outcomes. These are:

- Pollination of flowering plants, both wild and cultivated, is vital for continued life on earth.
- Beekeeping products such as pollen, propolis and royal jelly can be harvested and marketed, although special techniques and equipment are needed for some of these products.
- Beekeepers and other community members can create assets by using honey, beeswax and other products to make secondary products such as candles, skin ointments, shoe polish and beer. Secondary product brings a far better return for the producer than selling the raw commodity.
- Honey, beeswax and products made from them, such as candles, wine and food items have cultural value in many societies and may be used in rituals for births, marriages, funerals and religious celebrations.

- Products of beekeeping are used for apitherapy in many societies.

These outcomes are real and they strengthen beekeeper's livelihoods. Beekeeping helps people to become less vulnerable, strengthens the beekeepers' ability to plan for the future and reduces the danger that they will slip into poverty in a time of crisis, for example, if a family member becomes ill, death or crops failure (Bradbear, 2003) (figure 1).

iii. Vulnerability Context of Beekeeping

- **Trends**

a. Adjacent forest communities may dependent on forest resources for their livelihood,

b. Loss of bee resources due to forest destruction, wild fires and agricultural expansion, (shifting cultivation) (Stephen, 2013) (figure I).

- **Shocks**

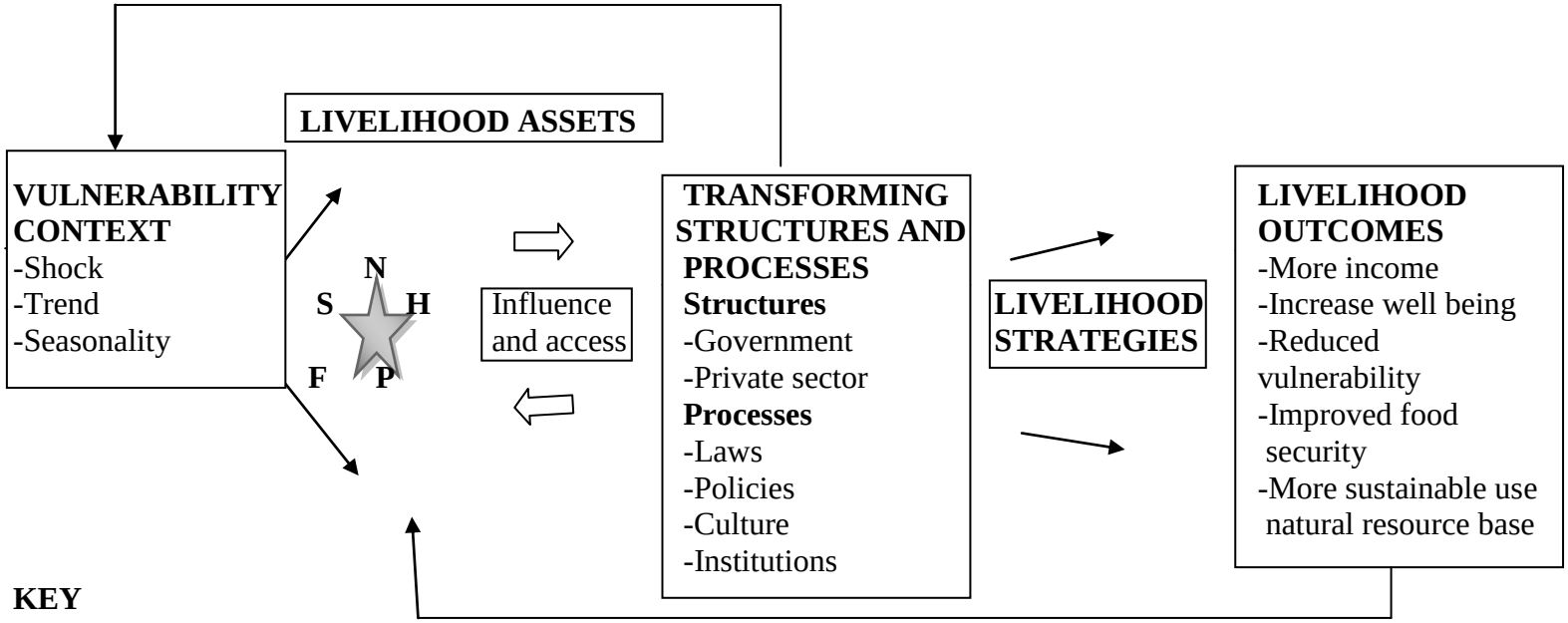
a. Conflicts between resources users (in protected areas) beekeepers and forest dealers, tourist hunting; in general land is between beekeepers and crop growers

b. Outbreak of diseases in production areas,

c. Application of agrochemicals and water pollution,

d. Problem of animals in beekeeping areas and (Stephen, 2013)

e. Vandalization and pilfering (figure I).



KEY
N=Natural asset
H=Human asset
P=Physical asset
F=Financial asset
S=Social asset

Figure 1: Sustainable livelihood framework
Source: Lasse, (2001).

- **Seasonality**

a. Honey flow is determined by weather. low or high rainfall affect tree species that honeybee depend on for nectar and forage,
b. Prolonged dry season and absconding of bee colonies,
c. Seasonal demand for honey and beeswax by buyers; and
d. Timing of swarms and harvesting bee products (figure I).

Based on SLA/SLF, the natural asset created by beekeeping if harnessed and backed up by structures (policies) and processes (culture) that favour women economic activities, then beekeeping would reduce women vulnerability to poverty, leads to positive outcomes such as more income, improved food security etc, and more sustainable use natural resource base both now and in the future.

2.2 African Beekeeping Practices

Honey hunting occurs in many countries and is commonly involved in subsistence farming. Hunting for honey in the wild is a way to diversify food supply as well as to sell honey. However, honey hunting kills bees as fire and smoke are used to rid the bees from their nests. It can also cause forest fires. In some areas honey hunting represents a non-sustainable depletion of honeybee colonies and habitat. The practice of honey hunting affects the surrounding environment as pollination services are no longer available. This puts in jeopardy the honey hunter's livelihood as well as making crops and other plants in the area more vulnerable. Moreover the honey and wax obtained from such a practice are of low quality. For example honey can be sold with parts of honey comb in it, ash and brood (Hilmi, Bradbear and Mejia, 2011)

Along side honey hunting, there are two types of beekeeping practices: traditional and improved/modern beekeeping. The traditional forms of beekeeping have developed over the centuries in Africa. In this type of beekeeping the small scale farmer provides protection for the bee colony in exchange for periodic harvests of honey and wax. This protection may be as simple as providing a hole in a wall, a clay pot or a basket attached to a tree branch so that bees can colonize it. This enables the beekeeper to harvest honey without destroying the colony and risking the important pollination services that bees provide. Traditional beehives are found throughout the world, and are an extremely successful technology. The use of traditional hives is, however on the decline due to the increasing scarcity of the large logs that such hives are often made from or placed.

Modern form of beekeeping involve using purposely made hives, constructed in box form with movable frames separated by space for bees to fix their combs on the frame. Modern beehives allow honeybee colony management and use of a higher level technology with larger colonies. This allows for large-scale bee farming. The hives not only allows for ownership of the bee colony and its products, but importantly makes it easier to harvest bee products as bees can be kept closer to the farm household and /or can be moved with greater ease. This, unlike, honey hunting provides far more reliable sources of honey products, on a regular basis and enables small-scale farmers to manage and control the bee colony, like any other agricultural enterprise (Hilmi *et al.*, 2011). The introduction of modern apiculture technology (improved beehives and accessories) has allowed relocation of bee colonies from the bush to backyard and from trees down to the ground. This has given women the chance to participate in beekeeping.

2.3 Nigerian Beekeeping Practices

Honey bees live in nests of golden combs which have exquisite arras of hexagonal cell sculptured made of beeswax. They choose the right dwelling place called nest inside cavity with an access hole, crevices, thick branch of a tree, hollow trees, under rock outcroppings and other areas or a hive that scout bees believe are appropriate to give the colony protection from cold, wind, predators and to store honey. For thousands of years, honey hunters harvest honey from bees living in the wild. Honey hunting is the process of plundering colonies of bees in their natural habitat when they are discovered by honey hunters. Honey hunters are not real beekeepers but they are found in every part of Nigeria, both in the forest and in the savanna going from one place to another destroying natural nest and colony of bees with fire and taking their honey. There are two types of beekeeping practices in Nigeria. These are traditional and modern beekeeping. Honey hunting and traditional beekeeping constitute an age old tradition of Nigerians.

Although the origin of beekeeping (domestication of bees in hives by man) in Nigeria is not certain, available records show that the art of beekeeping started in Zaria in 1927 (Oduntan, 1999). Beekeeping in Nigeria as a traditional art started with traditional structures such as gourd, pot, basket, straw hives playing an important role in the production of honey. Traditionally, forest nesting *Apis mellifera adansonii* is the honeybee kept in traditional hives. In Nigeria, the type of hives used varies from one area to another. According to Oduntan (1999), gourd hives are used in Kwara, Kogi and Ogun States. Pot hives are use in Niger, Benue, Plateau and Bauchi States while basket hive are used in Southern part of Kaduna. He further state that Zaria, Kastina, Sokoto, Kano, Borno and Bauchi uses straw hive. Traditional beekeeping hives are made from

local materials such as hollowed out logs, bark formed into a cylinder, clay pots, woven grass or cane and whatever is available locally and suitable (Ajao and Oladimeji, 2015). The basic principle of traditional beekeeping in Nigeria, are the same irrespective of the type of hive used. Entrance holes are made to form a suitable entrance for bees. The hives are installed at convenient heights on trees. Suitable bee baits is generally put into the hives to attract bees. Most of the time, once installed, the beekeepers rarely visit the hives until the end of the season (harvesting time).

The sole purpose of the hive is to encourage bees to nest in a place easily accessible to the beekeeper. The bees build their nest inside the hive in whatever hive type is provided, just as they would build it in a natural cavity. The traditional beekeepers are often highly skilled, knowing exactly where to place the hives and when to harvest them. Honey and beeswax is obtained by plundering the bees nest. Depending on the expertise of the beekeeper, bees may be killed or not during harvesting process. These systems, though an improvement over the wild bee hunting are not reliable because brood and honey are harvested and the bees are scattered with smoke. New colonies hardly survive as many of such colonies are starved to death. Ajao (2012) however state that bee colonies and structures destroyed during harvesting may remain empty for a while but later attracts swarm which may eventually settle in the empty hive and start building a new nest. In most cases traditional beekeeping with hives placed in trees is practiced by men while bee nest in pots and other structures on ground are owned and harvested by women.

Modern beekeeping methods aim to obtain maximum honey crop, season after season, without harming bees (Nicola, 2002). Modern beekeeping involves the use of modern

hives and hive equipment such as smokers, bee dress with veils and gloves which makes it possible for beekeepers to work in the day light rather than at night. The modern hives used in Nigeria include the langstroth hive, the modified dandant hives and the Kenya top bar hives which is popularly used in the South Western States. Modern beekeeping adopts the principle of having box like enclosure with removable tops or frames. Inside this box, the combs are contained in a wooden frame which the beekeepers can remove for inspection. This box is called the brood chamber of the hive and forms the permanent place where the young bees will be reared. The framed hives proffered the advantages which includes efficient honey harvest and low manufacturing cost. In this type of bee management, bees are encouraged to construct their comb from the underside of a series of top bars thus, allowing for periodic inspection of combs so as to monitor the performance of the established colonies by the beekeepers.

2.4 Socioeconomic Importance of Beekeeping

2.4.1 For food

Honey, which is one of the products in beekeeping, is a sweet natural food and is most commonly consumed in its unprocessed state (i.e. liquid, crystallized or in the comb). It is eaten as food, or incorporated as an additive in a variety of food and beverages. Honey can be consumed whole or mixed with other foods as supplement. Bee brood (larvae and pupae) have high nutritional value and are fed to malnourished children. Royal jelly and pollen are consumed for their high protein value. In some area, a beekeeper stored maize mixed with honey in a drum for about six months and then releases it to the community around during hunger period (Stephen, 2013). To buttress this, Sagali (2014) states that both honey and brood are important sources of food. According to him, a mixture of honey and sorghum is an emergency food in parts of

Southern Tanzania because it can be stored for a long time. Honey is composed of plant sugars that are readily absorbed by the body. It contains plenty essential vitamins and minerals which are indispensable to all living things. According to Onabe (2005) honey contains 29 percent of protein, 19 percent of amino acid, vitamins and minerals for body building. Olarinde, Ajao and Okunola (2008) indicate that honey is composed of water, food, energy, protein, fat, carbohydrate, ash, calcium, phosphorus, iron, sodium, potassium, vitamin A, thiamine, riboflavin and vitamin C (ascorbic acid).

2.4.2 As medication (apitherapy)

Honey and other bee products is an ingredient used in pharmaceutical industries and in medicines prepared by traditional healers. Bee products such as bee venom, honey and propolis are used for treatment of many conditions following the antibiotic nature of the products. The conditions/diseases treated using bee products include stomach upsets, diarrhea, vomiting, wounds, burns, cough, measles, false teeth, toothaches and fungal infections. Bee products are used in the treatment of many human ailments. For example, bee venom is an important remedy for many ailments such as Arthritis, Parkinson disease and other diseases related to the nervous system (www.au-ibar.org/component/jdownloads/finish/142/260). The venom can be obtained through bee stings

2.4.3 For cultural purposes

Honey is used for beverage brewing and occasionally served at important cultural ceremonies such as weddings. It is also served to very important guests as sign of high regard. Honey was used in Egypt as cosmetics and also for embalming the Egyptians dead pharaohs. It was among the tithes and offertory given by the Jews to the Levites in

their culture. In some African cultures honey is also used to pay dowry (www.au-ibar.org/component/jdownloads/finish/142/260).

2.4.4 For income generation

Honeybee products can be marketed locally or abroad to get money, with or without value addition. Beekeeping industry also provides incomes to various stakeholders in the value chain. These include bee farmers, artisans, pharmaceutical industry, food, beverage industry, honey dealers among others. Stephen (2013) asserts that products from beekeeping are complementary sources of income, school fees and emergency for the family. Studies by Marigat (2004); Mburu, Affognon, Irungu, Mburu, and Raina (2015) assert that products of beekeeping generate income for the beekeepers and non beekeepers.

2.4.5 Other benefit of beekeeping

Honeybees provide pollination services, thereby playing a vital role in food production and overall agricultural productivity. Over 75% of all the crops in SSA benefit from pollination (www.au-ibar.org/component/jdownloads/finish/142/260). Bees are considered the most efficient pollinators because they have hairy bodies which easily pick up pollen grains as they move about in flowers. During a single day, one bee may visit several hundreds of flowers. So bees are important to farmers. More bees mean better pollination and high yield. In some countries pollination by bees is hired and earned beekeepers additional income.

Beekeeping helps to conservation natural resources. Beekeeping is a non destructive activity that could be employed in the conservation of biodiversity in protected areas,

avoid bush fire and massive killing of bees, multiply and sustain bees' population, improve vegetation, improve crops yield and protect the forest *(*www.auibar.org/ component/jdownloads/finish/142/260).

Several authors have shown that relationship exists between people' socio-economic characteristic and beekeeping (Ebojei, Alamu, and Adeniji, 2008; Fadare, Ojo, and Imoudu, 2008; Lawal and Banjo, 2010). Fakayode, Babatunde, Olowogbon and Adesuyi (2010) acknowledge that socio-economic characteristics play important roles in the economic performance of beekeepers. Age to a certain extent, affects the managerial ability of a person and his access to some production inputs. This is especially true in traditional societies like Nigeria where responsibilities are assigned according to age (Abdulsalam, 2004). Ajao (2009) study on traditional beekeeping in Patigi indicates that 62.2% of the respondents are within age group of 20-30 years. The implication of this study is that most of the respondents were within the economically active age. Report by Babatunde *et al.* (2007) on economics of honey production shows that the average age of beekeepers is 43 years and majority of them are between 36 and 45 years of age. This finding probably shows that beekeeping is prominent among young people. This estimate is comparable to those of other studies by Farinde *et al*. (2005); Saner, Engindeniz, Tolon and Cukur Saner (2004). Finding is also synonymous with Asa (2003) whose study indicates that people in the age groups of 41-60 are more economically active and independent than those in the age group of less than 21 years and above 60 years. To support this, Secumade (2005) posit that youthful age is good for beekeeping as energy, ability to stay long at work and initiative are required. In situations where the bee farms are located far from the home, the young and virile workforce will be better able to trek such long distances. Olarinde, Ajao and Okunola (2008), opine that increased and sustainable honey production would better be achieved

through young beekeepers that can devote their full time to honey production. Conversely, Tijani *et al.* (2011) findings indicate that age has a positive and significant effect on beekeeping. The study suggests that income in beekeeping is higher among old beekeepers than young ones. This is probably because older beekeepers tend to have more experience in beekeeping than the younger ones. Consequently, the former are likely to be more efficient in beekeeping than the later.

Although beekeeping can be undertaken by both young and old, review of literature indicates that variations between age and beekeeping production may be difficulty to ascertain. Age is believed to be capable of influencing individuals' interest, view and conducts. It is equally believed that young people are more adventurous, less risk-averse and are therefore more favorably disposed towards trying new things. Nwaru (2004), discovers that the ability of a farmer to bear risk and be innovative decreases with age. Studies by Mbah (2012) reveal that honeybee production declines with advancement in age. Age is therefore expected to be negatively related to beekeeping.

Farming experience is an important factor determining both productivity and production level in farming. But the effect of farming experience on productivity and production may be positive or negative. Fadare *et al.* (2008) opine that successful beekeeping is directly related to experience. Comparable finding by Tijani *et al.* (2011) reveal that 62% of the farmers studied had reasonable beekeeping experience of over 16 years. Their study shows that beekeeping experience had direct relationship with annual income from beekeeping. Fakayode *et al.* (2010) observe that years of involvement in beekeeping significantly affect the quantity of honey harvested by the respondents. Contrary to the above report, findings by Abdul-Malik and Mohammed (2012); Mbah

(2012) reveals a negative relationship between farming experience and beekeeping while Secumade (2005) reports an insignificant relationship between farming experience and beekeeping.

Other studies (Micheal, 2008; Yahaya and Usman, 2008) reveal that many beekeepers have limited experience in beekeeping. This is because modern beekeeping enterprise in many parts of Nigeria is a recent innovation. This has implications for the level of skill acquisition and exposure that these farmers have vis a vis beekeeping. Generally, it would appear that up to a certain number of years, farming experience would have a positive effect on beekeeping while after that, the effect may become negative. The negative effect may be derived from aging or reluctance to change from old and accustomed farm practices and techniques to modern and improved ones. But despite that it is assume that years of practicing an act makes the practice more effective and efficient. Efficiency leads to cost minimization, increased profit and thus, improved standard of living.

Bee farm size is determined by the number of hives or bee colony owned in an apiary. This explains variation in production capacity. Apiary is the place where honeybee colonies are kept on farm or homestead. Abebe (2011) indicates that beekeeping activity does not require large or fertile land. Uncultivated land can be used. Even landless farmers with small plots of land around homesteads can engage in beekeeping. Babatunde *et al.* (2007) show that one-third of the beekeepers have their apiaries on rented and purchased land, the other two-third are those using family and donated land. If the one-third that keep bees on rented and purchased land could have access to free

land, this would reduce the cost of production and increase the income from honey production.

Jony (2011) shows that the number of bee colonies significantly affects the income from honey production. This suggests that the more the number of colonies the higher the income obtained by beekeepers. This is plausible, because beekeepers who have more colonies obtain higher income than those with small number of colonies. Comparable finding by Mbah (2012) shows that number of hives was positively significant with the output of honey. This was confirmed by the findings of Sekumade, (2005) who had a similar result in a related study. However, literatures indicate that most beekeepers owned between 20–40 bee colonies (Secumade, 2005; Babatunde *et al.,* 2007; Yahaya and Usman, 2008). This shows that majority of the beekeepers in the country are small scale farmers.

The number of hives owned acts to represent the amount of honey harvested or the amount that a farmer anticipated to harvest at the end of harvesting season. The larger the number of hives owned, the higher the quantity of honey harvested and consequently, the desire to diversify products from beekeeping through value additions to create a wide income base. The decision to add value has a positive influence on the extent of value addition. This is because value is being added to a larger percentage of beekeeping products. This can be explained by the theory of economies of scale. One who adds value to more products is likely to incur reduced costs per unit and in turn is likely to benefit more from the value addition exercise because they are able to sell in bulk. This puts them in a position where they can negotiate for better prices as well as contracts with major buyers in which case therefore, are assured of a constant market.

Education is an important instrument to enhance human capabilities and to achieve the desired objectives of socioeconomic development. The level of education of a person is an important factor that determines his/her ability to make decisions on production, sale and enterprise selection. Education enables farmers to have access to diversified sources of information in the area of interest, enhancing learning capacity and improves farm management practices. There are divergent views as regards the relationship between education and beekeeping.

Tijani *et al.* (2011) finding indicates that years spent in formal education had direct relationship with annual income from beekeeping. Ajao (2009) is of the opinion that high literacy level will help in the understanding and adoption of the techniques involved in modern beekeeping. Fadare *et al.* (2008) findings show that high level of education with 60% of the respondents having secondary school education and above will enable respondents to access relevant information that will stimulate honey production. Babatunde *et al.* (2007) assert that beekeeping is practice mostly by educated people and therefore, adoption of modern beekeeping techniques would not be a problem. On the contrary Jony (2011) state that beekeeping does not require specific education. His study reveals that educational level has no effect on income from honey production. This means that individuals educated or not, can undertake beekeeping. Fakayode *et al.* (2010) study reveal that over 90% of the respondents had primary school education implying that they could easily comprehend and use new techniques in their beekeeping enterprises. Secumade (2005) finding reveal that about 90% of the respondents had secondary education and below. This result attests to the lack of complexity of beekeeping as information about beekeeping enterprise can be easily passed and acquired. Regardless of the differences in opinion, education affects the way

farms are managed as well as overall production. This is because educated farmers tend to be receptive to superior management practices that will boost their production. It can therefore be inferred that the better educated women beekeepers are likely to have higher production level than the less educated ones. With the right education and experience beekeeping is a successful means of generating income.

Household size is the main source of farm labour. There are different activities involved in beekeeping that requires labour such as swarm catching, transferring, hive construction, preparation, transportation to the sites or to the forest and putting them on trees, inspection, honeybee feeding, honey harvesting, honey extraction and marketing. In this regard, having more family members who participate in production can improve the income from beekeeping. Jony (2011) reports that the number of family members participating in honey production positively and significantly affects the income from honey production. This is expected as more labour increases the number of hives constructed which increases honey yields. This was supported by Fadare *et al.* (2008). Fakayode *et al.* (2010) however report an insignificant relationship between household size and quantity of honey harvested. Comparable result by Tijani *et al.* (2011) indicate that household size had negative relationship with beekeeping.

Nigeria is characterized by high dependency ratio. According to Godwin (2010), the labor force age (between 15 and 64 years) dependency ratio is 259 dependants per 100 workers nationwide. The above scenario works concertedly to reinforce the poverty syndrome of the average Nigerian employee, as each bears heavy economic burden of over 200 non-workers.

Dependency, which is determined by demographic characteristics such as household size and household structure are important indicators that could affect honeybee production, income and household living standards. Among the relative advantages of beekeeping is that the whole family can be involved in beekeeping activities. The participation of the members of the family in beekeeping activities may ensures availability of sufficient labour during the operations and contributes in the sustainability and improvement of beekeeping enterprise. Household with more adult equivalents assisting in beekeeping is expected to have a positive influence on beekeeping implying that the larger the household in terms of adult equivalents, the higher the output from beekeeping. However, household with more children and aged equivalent (dependency) that do not contribute to household income may have a negative influence on beekeeping. This is because dependency ratio exacts a negative impact on household welfare, suggesting that increase in dependency ratio would result in reduction in the income resources available to cater for the needs of each household member. The decline in the per capita income from beekeeping is an indication of down spiral living conditions of household members.

Apart from the socioeconomic variables, literatures equally shows that institutional variables such as membership of cooperative societies, credit, access to agricultural extensions services and training, among others affects beekeeping. It is widely believed that cooperatives form an indispensable component of economic empowerment and development (Ogunbameru, Okelue and Idrisa, 2010). It enables farmers to pool their limited resources to enhance their earnings capacity through lower input and credit costs and better marketing of products. Ajao (2009) states that formation of beekeeper's association can encourage contact between people and provide means of obtaining loans

to establish bee farms. This was supported by Lea (2012) who states that cooperatives, if well organized, can play an important role by bringing producer and traders together and gives farmers an assurance about existing markets. He went further to say that cooperative can facilitate capacity building activities. Luensman (2011) opines that cooperative provide an accessible, local source of experienced beekeepers to draw knowledge from. It is an efficient way to connect area resources, making them accessible to people who might not otherwise know that they exist. Cooperative could also have equipments that is collectively owned and shared by members. Modern beekeeping equipment can be very expensive and can be a barrier for beekeepers. In beekeeping, some equipments is needed only initially, such as the hive box, but some is needed periodically, such as honey frames and need to be replaced occasionally. Cooperative allows member's access to group equipment without each person needing to own such equipments is an added advantage.

Group membership may positively contributes to beekeepers output and this can be explained by the fact that individuals in groups are easily influenced by their associates through exchange of ideas than those in isolation. Members of beekeeping groups also receive training on diverse issues relating to beekeeping and are therefore willing to adopt improve beekeeping practices as a means of improving their farm income. Furthermore, members of beekeeping groups are in a better position to pull their resources together and take advantage of economies of scale. They access wider markets and higher prices unlike their colleagues who are non members. Farmers, particularly women acting individually face high transaction costs because they deal in small quantities. A strong justification for beekeeping cooperative group is the critical role cooperative play in both the delivery and marketing of agricultural outputs that will

help reduce transaction cost. Moreover, farmers in groups have a strong bargaining power when marketing their products and in turn receive better returns for their produce.

The role of credit cannot be over emphasized in any agricultural business. It has been a main focus of many research works in agricultural finance. To some credit is "all in all" for a farmer to produce (productive input) while others hold different opinions. Whichever way it is looked at, credit is an important instrument in the development of agriculture. Researchers (Idris, 2010; Olowa and Olowa, 2011; Okwoche, Asogwa and Obinne, 2012) emphasize that the smallholder farmers, already caught in the quagmire of the vicious cycle of poverty, requires not only labour or land but an injection of capital to extricate it from that cobweb. Yet studies in Nigeria show that access to agricultural credit is one of the challenges to agricultural production (United Nations (UN) 2009; Odoemenem and Obinne 2010). Access to credit is important for farmers to take advantage of new business opportunities and expand income-generating activities. It is an important instrument in the development of agriculture as it provides additional financial resources that are needed for optimum farm production.

Fadare *et al.* (2008) attribute low level of innovation adoption by beekeepers to non-availability of adequate credit to procure modern beekeeping equipment. Similarly, Onwubuya (2004) report lack of funds as a limiting factor to bee farmers in adoption of extension services. Tijani *et al.* (2011) assert that inadequate credit could be a problem to beekeeping because it would deprive farmers from accessing modern inputs and reduce the intensity of use of technologies. Farmers who have access to credit are more likely to adopt improved technological innovations compared to farmers who do not

have access to credit. This is because adoption of improved technologies may require extra resource commitment that can only be met through acquisition of credit facilities. Study by Abebe (2011) reveals that adoption of improved box hive is positively and significantly influenced by credit. Fakayode *et al.* (2010) finding reveals that access to credit significantly affect the quantity of honey harvested by beekeepers. The effects of having access to credit facilities in lifting beekeepers out of poverty is that credit alleviate capital constraints. This will enhance the ability of beekeepers with little or no savings to acquire necessary inputs encourage the adoption of beekeeping technologies which enhances productivity and promotes standard of living. Credit can also affect beekeepers poverty by increasing their risk-bearing ability and by altering their risk coping strategy.

Access to agricultural extension services and training are other important factors that can bring about improvement in beekeeping. Anderson (2007) defines the terms agricultural extension and advisory services as the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills and technologies to improve their livelihoods. Abebe (2011) asserts that extension plays a great role in promoting improved beekeeping technologies. Study by him reveals that beekeepers who frequently visit extension agent get more acquaintance with beekeeping technology and tends to adopt. This is supported by Fadare *et al.* (2008) who state that modern beekeeping technology is gradually gaining ground but the level of innovation adoption among the beekeepers is still low because of low contact with extension agents. Onwubuya (2004), confirm that poor knowledge of beehive management and long distance to extension training, limit beekeepers adoption of extension services. In agreement Sisay (2011), state that

husbands tend not to allow their wives to travel long distance to attend training. However, he found that the establishment of training and demonstration center in the villages has given women more access to know improved beekeeping practices. Abdul-Malik and Mohammed (2012) note that access to extension services increases output of honey. Contrary to this Jony (2011) indicates that number of visits by extension agents have no effect on the household income from honey production. The researchers however attribute this finding and the reason why farmers are still practicing forest beekeeping to the weak extension service.

Training is an essential input in the development of beekeeping industry (Pal and Thomas, 2002). Review of literature on extension training show a statistically significant correlation between extension training and yield (World Bank, 2008; Collett, 2009). Abebe (2011) states that training is very important to create awareness on beekeeping technology, develops the beekeepers' self-confidence in the technology and increases the productivity of the beekeepers. Studies by Gezahegne (2001) indicate that there is shortage of skilled personnel for beekeeping management, post-harvest handling, processing and quality control of bee products, which increases the knowledge gap of the beekeepers. Kugonza and Nabakabya (2008) suggest that inadequacy in skills can be overcome through strengthening extension especially through the use of the field school technique with active apiary demonstrations.

Training may positively affect beekeeping and can be explained by that fact that it imparts skill on beekeeper. This will assist them in addressing challenges related to beekeeping techniques; create product market linkages and sustainable management of the natural and planted woodlands from which the bees harvest pollen and nectar. This

will ensure sustenance of the enterprise. In addition, training could assist farmers to produce and market their products at a high markets value, a development that could assist in improving their source of livelihood and as an excellent opportunity to generate more incomes.

2.5 Honeybee Products and their Benefits

Honey-bee belongs to the order of insects called hymenoptera. A typical bee colony is made up of three types of bees: queen, workers and the male, referred to as the drone. Bee is said to be social insect because it exists together in large numbers within a colony (Adinya, Ayuk, Akpet and Agiopu, 2008). Ahmed and Grung (2004) reveal that it takes 3-4 months for honey to be ready for harvesting from the day the bees locate the hive. Honeybees have been described as the most useful of all insects known to man, because, it provides man as well as other forms of life with basic services for their survival. Bees for Development (2002) asserts that honeybees are the only livestock capable of harvesting nectar and pollen and converting them to high value products and without them, these valuable resources would go to waste. The species of bees responsible for all the benefits to man are varied. However, the predominant honeybee species in Africa is the African honeybee *Apis mellifera adonsonii.* Africa is known to have about 10% of the total world's bee population with Nigeria as one of the largest reservoirs (Hussein, 2000). *Apis mellifera adonsonii* is well adapted to the African ecological conditions and produces several honey crops per year. It gathers its own food freely throughout the year and there is little need to feed it especially in the savannah regions (Abdullahi, Sule, Chimoya and Isah 2011). The common African honeybee in Nigeria (*Apis mellifera adansonni*), live throughout the year and naturally build their nests in a hole of a tree, inside a cave and under the roof of buildings, but traditionally, people also keep

bee colonies (Fadare *et al.*, 2008). People in communities all over the world keep bees for their products and services they offer (Hilmi *et al.*, 2011). As an agricultural activity, bees produce a good number of products of economic importance; the most commonly produced products are honey, wax and bee colonies. But with more specialized skills many beekeepers can produce such bee products as pollen, propolis, royal jelly and bee venom.

Honey is the most popular and traded bee product. Honey is composed of about 95 percent of sugars, with other elements comprising the remaining 5 percent subdivided into water, organic acids and minerals. It is a useful source of high-carbohydrate food and commonly contains a rich diversity of minerals, vitamins, adding nutritional variety to human diets (Bradbear, 2009). Krell (2006) reports that honey improved physical performance, provide resistance to fatigue, improve food assimilation and mental efficiency. It is commonly indicated as a 'lifesaver' for people in critical health condition (Marieke, Henk, Leen, Jaap and Jan, 2005).

Another bee product of good economic potential is wax. Commonly, beeswax is used for candle making, for metal castings and models, in food processing as an ingredient. It is also used in the cosmetic, textile, printing, varnish and polish industries. Pollen contains a range of constituents: 30 percent protein, including all amino acids, a full spectrum of vitamins and minerals, lipids, trace elements, etc. (Bradbear, 2009). Pollen is used in food and cosmetics industries. Propoils is mainly consumed for its medicinal value, while royal jelly is claimed to increased physical resistance and improved intellectual performance. However these properties have not been confirmed by scientific evidence. Bee brood and adult bees are consumed in many countries and in

some countries, they are considered as a treat. Brood and adult bees contain reasonable amounts of protein (Krell, 2006).

There is a considerable history of bees and bee products having medicinal properties (Hilmi *et al.*, 2011). Honey, beewax, pollen, propolis, royal jelly and venom are seen by many to have curative properties, even though others suggest the contrary as a result of lack of critical scientific scrutiny on bee products (Bradbear, 2009). Honey is primarily seen in the traditional medical systems as having curative properties. This is derive from the fact that honey made from a particular medicinal plant is traditionally assumed to transfer its properties to the honey. However these claims are not supported by orthodox scientific evidence (Krell, 2006). In terms of honey, scientific evidence sees honey more of a food than a medicine, the benefits been derived more from nutritional effects. However, Krell (2006) states that applications of honey accelerate wound healing. According to him common bacteria, *Streptococcus pyogenes*, that cause sore throats, can be inhibited from growth with the use of honey. In terms of beeswax, claims are made that it has antibiotic properties and can be used for arthritis and nasal inflammations (Bradbear, 2009).

Propolis is well known to have medicinal value and this has also been proved scientifically. It has bactericidal, fungicidal and antiviral effects. In Sub-Saharan Africa, for example, it is used in herbal medicines (Krell, 2006). Although pollen is not being recognized as a medicinal drug, it is used in traditional medicine for prostate problems. Claims are made of positive effects of royal jelly on human beings, however, opinions differ as some argue that there is no scientific evidence to support such assertion (Bradbear, 2009). Still claims are made of the use of bee venom and its positive effects

on rheumatoid arthritis and tendon, strain and muscle injuries, however there are people who claim there is lack of scientific evidence to support such affirmation.

2.6 Profitability and Attractiveness of Beekeeping Enterprise

Beekeeping can be a fascinating hobby, a profitable sideline, or a full-time occupation. The most important goal of farm business is profit maximization. Profit stimulates farmers to venture into risky business and also drives them to develop ways of reducing cost and adopting new technologies always in an effort to satisfy consumer interest. A reasonable and sustainable level of profitability is essential for the feasibility and continuity of an enterprise (Yildirim, 2006). Studies by Yahaya and Usman, (2008); Nuhu (2011) indicate that beekeeping is a low cost agricultural enterprise. It has been found to be profitable with little investment made (Gurung, 2005). Onwumere, Onwukwe and Alamba (2012) assert that apiculture being an agribusiness enterprise requires the most suitable management practice (considering other environmental factor) to maximize output. Dalang (2001) notes that on a comparative basis, apiculture stands out conspicuously as a high revenue generating venture compared to arable cropping. Analysis by Ja'afar-furo *et al*. (2006) show that investment returns on beekeeping was 9.12% compared to 0.4% for crop production. This finding is consistent with Farinde *et al.* (2005); Anyiro, Ezeh and Duruson (2012); Azeez, Akankuku and Ojo (2012); Famuyide *et al.* (2014) who also report in separate surveys that honey production was a viable and highly profitable enterprise in Nigeria.

Although studies attest to the profitability of beekeeping, honey yield per beehive is a major factor, which affects the profitability of beekeeping enterprises (Jones, 2004). Rich floral resources (Güler and Demir, 2005); bee races (Akyol and Kaftanoğlu, 2001)

and colony size (Tucak, Perispic, Beslo and Tucak, 2004) are effective on a higher and sustainable level of profitability. Comparable study by Workneh (2007) on traditional, transitional and movable frame hives shows the profitability of beekeeping enterprise. According to Werkinah (2007), the incremental net benefit of moveable frame hive was double compared to transitional hive given the management skill. Similarly Micheal (2008) study reveals that langstroth hive give more profit than top bar hive. Supporting this Keralem (2005) opines that the profitability of beekeeping varies with the type of technology adopted. For instance transitional hive gives higher yield per colony compared to local hives. Furthermore, Fadare *et al.* (2008) observe that the net return of traditional beekeeping technology (₦5,964.97) was about 15% of modern beekeeping technology (₦39,319.22). Shiferew (2010) note that annual gross production value for beekeepers with combination of hive types is three fold compared to beekeepers that only had traditional hives.

The honeybee is a social insect whose life is so closely linked with the flowering plants in its environment. Bees collect food from flowers that differ in morphology, color and scent. Honeybee whole seasonal cycle revolves around the flowering seasons of the plants it has co-evolved to pollinate. The bees' seasonal cycle vary in different parts of the world depending on the climatic conditions that determine plant flowering periods (Belieh, 2009). This means that the size of the colony will change throughout the year in a way that coincides with the quantities of nectar and pollen that the worker bees are able to collect. Nectar is the main ingredient for making honey. It is mainly sourced from flowers and occasionally from honey dew secreted by plant-feeding insects. Two important attributes of the floral resources necessary for honeybee production are color and odor. Honeybees are attracted by colors while odor guides the bee within limited

ranges. Important colors that attract bees are blue, yellow, white, green-blue and ultraviolet. Plant species with these flower colors attract more bees to them and therefore contribute more nectar to the honey produced than plants with other flower colors. Black color arouses aggression especially if the object is close to the beehive and in motion (Wendoh, 2012). The floral resources in a particular environment also determine the kind of honey produce by a beekeeper. A beekeeper can decide to produce honey made from nectar of one plant species (mono-flora honey) which attracts higher prices in the market or otherwise.

Bees that produce enough honey to be worth harvesting belong to the two sub families of the family *Apidae*: *Apidae* (honeybees) and *Meliponinae* (stingless bees). *Apidae* has only one genus, *Apis*, and about nine species of which the *Apis mellifera* species is of much greater economic importance than any others. The races and strains of *Apis mellifera* are overriding world importance in beekeeping and are the basis of world's beekeeping industry. These bees are native to Africa and Europe. Race in honeybees is a result of natural selection and honeybees have been adapted to different geographical areas of the world for many years without the interference of mankind. An understanding of these factors among others is a pre-cautionary measure necessary for beekeepers to maximize profit from beekeeping enterprise.

2.7 Contribution of Beekeeping to Poverty Alleviation

In nearly all countries of the world, bees and their products are not only well known and have wide consumer preference; they provide sustainable livelihoods to many small-scale farmers and other rural and non-rural people (Hilmi *et al.*, 2011). Livelihoods strategies in rural areas depend on agriculture and are often vulnerable to food

insecurity, shocks such as floods, illness, political unrest or rising food prices that easily affect the household's ability to produce and purchase food. Beekeeping can be practiced as a safety net, providing households with extra income from the sales of honey and other beehive products. This is supported by Fadare *et al.* (2008) who state that beekeeping as a complementary enterprise to many beekeepers provides insurance against risk and uncertainty that could result due to inclement weather and pest attacks on crops. Husselman (2008) opines that beekeeping as a traditional occupation of many communities worldwide can increase farmer's income by 50% under favourable conditions. Levi (2001) claims that beekeeping and honey production would not only boost the revenue of the beekeeping families but also, in turn significantly advance the local economies in communities.

Bees produce a good number of products (honey, wax, pollen, propolis, royal jelly, bee venom) and its derivatives (candles, honey beer and wine, honey soap etc). These "transformed" bee products can enable beekeepers and farmers in general to be less vulnerable to poverty. According to Hilmi (2005), beekeeping enables the generation of food and money that can maintain and support farm families in a fairly simple manner. Hilmi *et al.* (2011) reiterate that bee products have a good value on local markets and are easily tradable. Honey for example, requires few inputs and has a good cash value related to bulk and weight. It is also easy to transport to distant markets, such as export markets. Estimates show that honey sales account for as much as 25% of average household income of small-scale woodland-based enterprises in Zambia and contribute to household food security (Mickels-Kokwe, 2006). Lietaer (2010) states that honey harvesting generally takes place during lean periods in agriculture, therefore the collected beehive products can be sold and provide additional income to meet other

family needs such as school fees or health expenses, especially during periods of reduced income from agriculture. Secumade (2005) affirms that income from honey production usually comes between the periods of October and April when most farm produce would have been sold and the farmers may not have any income from crops. Babatunde *et al.* (2007) findings on income analysis of honey production reveal that with an average of 313 litres of honey produced per annum per beekeeper, the gross income is 890 naira per litre (US $7) or 4888 naira per man-day (US $41). According to them, the net income indices (net income/litre, net income/man-day) are lucrative and highly remunerative. Their study demonstrates that honey production has potential for poverty reduction among rural families.

Beekeeping is a veritable means of creating jobs particularly for the unemployed youth and poor rural population. Bhusal1 and Thapa (2005) note that improved beekeeping enterprise with high yielding race, *A. mellifera* and its adoption through training and mobilization of the rural poor and disadvantaged people can generate income, solve unemployment problem, help alleviate poverty and prevent migration as well. In a similar vein Moniruzzaman and Rahman (2009) state that Bangladesh wherein poverty, unemployment are the major economic problems, beekeeping may be a source of employment and extra income which helps to improve the standard of living of the rural people. Apart from beekeepers, Adeola, Bifarin and Folayan (2011) assert that many non-beekeepers also generate income from other bee based businesses like honey packaging, production of honey-based cosmetic, candle making, medical practice predicated on bees and honey (bee therapy), beekeeping equipment manufacturing, research, food service industry such as baking with honey, honey sports beverages and honey wine. Nuhu (2011), however opine that with close to 70 percent of the rural

population in Nigeria living in poverty, income generating opportunities such as beekeeping are critical for poor rural families. To buttress his point he states that beekeeping can be an important self employment opportunity for the generation of supplemental income for poor and subsistence farmers, particularly women.

Honey is often considered the main output from beekeeping; however it is only one of many benefits. The crucial service that bees deliver is the maintenance of biodiversity: ensuring that insect pollinated plants set seed and bear fruit. These seeds ensure future generations of plants and also feed other fauna within an ecosystem (Bradbear, 2011). Globally, honeybee provides pollination service. Lietaer (2010) cites that bees are important pollinators and many ecosystems depend on the pollination of bees for their existence and for increasing their genetic diversity (cross-pollination). An estimated eighty percent of flowering plants are entomophilous i.e. depending more or less on insect pollination to be able to reproduce, and it is estimated that half of the pollinators of tropical plants are bees (Bradbear, 2011). About one third of all plants or plant products eaten by humans depend directly or indirectly on bees for their pollination (FAO, 2009). In the United States of America, it is estimated that bees contribute to the pollination of over 90 crops for a value of more than 15 billion USD a year (Berenbaum, 2007).

Crops pollinated by bees have been proven to produce higher yields and better quality, often at no extra cost for the farmer. Bee for development (2012), report that honey bees increase its seed yield by 43 percent. Gidey and Kibrom (2010), cites that honeybees can increase the yield of Citrus sinensis by 30%, watermelon by 100%, tomatoes by 25% and onion yields by 94%. Bradbear (2011) states that coffee yield can increase by

50% when optimally pollinated. Jun (2009) notes that even if pollinators are not particularly needed generally where abundant natural pollinators are present, it has been recognized that, by using managed pollinators, not only the rate of fruiting increases but also, in the case of oil crops, the weight of seeds increases and their oil content is enhanced. This indicates that honeybees have a vital role in increasing food production and overall agricultural productivity. Supporting this, Moniruzzaman and Rahman, (2009) assert that beekeeping can play a vital role in sustainable agricultural development as it increases resource without changing environmental balance. Olarinde *et al.* (2008), affirm that beekeeping practice improves the ecology of an environment and helps in plant reproduction, which largely improves the living standard of the people and the nation's economy as a whole. Jun (2009) concludes that pollination on the part of plant sector will translate into enhanced cash income for farmers just as the direct product of the insect.

While many literatures indicates that beekeeping represent great potential to alleviate poverty, it is important to elucidate the various means in which beekeeping can help to alleviate poverty. Beekeeping produces many products that are used for food, medicine and other purposes as part of a subsistence livelihood strategy. Beyond consumption at home, the collection and sale of honeybee products provide a source of cash income for beekeepers. Honey bee products provide an important safety net for resource-poor households, particularly at times when other income sources are unavailable. This safety net function is even more important in bad times, when crops fail or are destroyed. During this lean period, beekeepers can draw on income from sales of honeybee products to meet needs between seasons. Both the current consumption and safety net

roles of beekeeping serve to reduce the severity of deprivation and keep people from becoming poorer (World Bank, 2008).

Beekeeping production, processing and value addition can benefit both beekeepers and non beekeeper through bee based businesses (cottage industries). The establishment of bee cottage industries can generate self employment, hence improving the economical position and living standards of the people. Further more, beekeeping is a desirable entrepreneurial activity as it can be done alongside other agricultural/income earning activities. This additional income can helps to lift beekeepers out of poverty by functioning as a source of savings, investment, asset building and lasting increases in incomes and well-being (Nuhu, 2011).

Majority of Nigerians are concentrated in rural areas and they derive their main livelihood from agriculture (Etim and Ukoha, 2010). Beekeeping is probably the only form of agriculture with an overwhelmingly positive impact on the natural environment. It is a valuable conservation tool, allowing people to derive economic benefit from indigenous forests and other floral resources in a non-destructive way, ensuring local participation in conservation efforts. It also makes a very significant contribution to other forms of agriculture by effecting the pollination of many economically important plants (World Bank, 2008).

2.8 Empirical Studies on Constraints Associated with Beekeeping Enterprise.

Apiculturist all over the world are faced with constraints, which militate against their production and the economic contribution beekeeping, brings to their livelihoods. Some of the major constraints and problems are highlighted below:

2.8.1 Disease, pests and predators

Honey bees are subject to many diseases and pests like any other livestock. According to Abebe and Puskur (2010), disease and pests affects the honeybees' life, hive products and can lead to death colonies. Studies (Adeday, Shiferaw and Abebe, 2012; Kinati, Tolemariam, Debele and Tolosa, 2012), reveals that pest and predators were found to be major challenges for honeybees and beekeepers. Kinati *et al.* (2012), findings reveals that ants, wax moth *(Galleria mellonella)*, bee-eater birds, spider, bee lice (*Braula coecal.),* honey badger (*Mellivora capensis*), monkey, small hive beetles (*Aethina tumida*) and lizard were the most harmful pests of beekeeping. Monga and Manocha (2011) agree with other finding that attack of honeybee by pests and diseases are major constraint that destroys colony during heavy infestations. This situation is worsened by financial constraints, which makes it difficult for beekeepers to replenish the colonies and to bring the number of bee colonies back to the level where the activity is economically viable. This was supported by Ebojei (2008); Oyerinde and Ande (2009) that pest attack is a major constraint to beekeeping in Kaduna and Kwara State respectively. Similarly, Fakayode *et al*. (2010) reports pests and diseases constraints among beekeepers in Ekiti State. Pérez-Sato, Châline, Martin, Hughes and Ratnieks (2009) corroborate other findings that diseases and pests are common problems faced by beekeepers all over the world, which Hussein (2000) asserts that meropods and bee louse constitute the major problem of beekeeping in Nigeria.

Pests and diseases have a significant effect on the quality and quantity of honey produced (Dewey, 2000). Pests like the black ants feed on the honey. Other pest like lizards, birds, mammals that feed on the bees can reduce honeybees colony population. These respectively reduce the quantity of honey produced. Wax moth, small and large

hive beetles lay eggs on the honey combs (Marchand and Marchand, 2003), contaminate the honey and other bee products and affects the quality of the hive products. Lawal and Banjo (2010) comparative analysis on honey production between strong and weak colony reveals 24% and 50% economic loss due to pest infestation, respectively. According to the report, a strong and uninfected colony produces 25 liters/hive/year but when infected, it produces 19 liters/hive/year (24% drop). It is even worse for weak colony where an uninfected colony produce 7 liters/hive/year but on infected, colony produces 3.5 liters/hive/year (50% drop). Result demonstrates that pest infestations decrease the performance of colony. Bradbear (2011) notes that beetles spoil the honey in combs, cause it to ferment, and damage the combs. The colony is weakened, eventually dying out or absconding. Related literature by Ejigu, Gebey and Preston (2009) reveal that pests and predators cause devastating damage on honeybee colonies within short period of time and even over night. Kajobe *et al.* (2009) report shows that the effects of the pests were detrimental in the traditional hives and least with the langstroth hives. This is because the traditional hives are more susceptible to pests since these hives can easily harbour pests; besides traditional hives are more difficult to manipulate in a bid to control the pests and diseases than the langstroth hives.

2.8.2 Chemical poisoning

The most publicized danger to the hive stemming from human activities is chemical poisoning (Ross, 2007). This typically occurs from spray drift or honey bee exposure to poison on blossom following application, as a result of non adherence of pesticide applicators to label direction which are design to reduce the chance of honey bee death. Chemical poisoning may manifest in the form of death adult bee piled up in front of hive entrance. Adeday *et al.* (2012) report the use of chemicals and pesticides to control

pest of crop, weeds, tsetse fly and house pest as threat to honey bee colonies and contamination of hive products. Lietaer (2010**)** affirms that excessive use of pesticides, constitute major direct threats for bees. The writer reiterates that bees bring the pesticide-contaminated pollen and nectar to their hive and slowly poison their offspring as the pollen and nectar are fed to the bees. COST (2008) states that use of certain types of agro-chemical is one of the possible causes of Colony Collapse Disorder (CCD), a phenomenon that recently hit many beekeepers throughout the world. Pokhrel (2008), identify pesticide poisoning as a concerned ecological problems in beekeeping. Phadke (2008) reports excessive use of pesticides as constraints in the development of beekeeping in India. Koshiyama, Lorenzon and Tassinari (2011) state that beekeeping explored near areas that use pesticides, such as fruits fields, represent an important danger for the quality of honey, due to chemical contamination. Similarly, Weick and Thorn (2002) posits that exposure to pesticides can affect the performance and ability of bee workers to perform the field tasks, impacting immediately in the bee colony performance. As a consequence, bee colonies do not allow enough honey yields to beekeepers.

2.8.3 Plants

By and large, the plant kingdom offers few threats to the honey bee. The greatest may well be the threat of having a large branch from a nearby tree fall on top of hive during a storm. Plant also produce myriad of toxic compound, that can spill over into the nectar or pollen that honey bee feed on. This nectar or pollen is toxic to the bees themselves, and those in which the honey produced from their nectar are toxic to humans. Kinati, Tolemariam, Debele and Tolosa (2012) discover few poisonous plants in their studied area. Nuru (2002) document some poisonous bee plants and pollen grains of nine

poisonous species of bee plants from the families Ranuculaceae, Solanaceae, Acanthacae, Euphorbiaceae and Phytolacaceae. Keralem (2005) also notes that Gumero, Yeferenj Digit (Cassia siamea), *Bisan (Crotonmacrostachyus*), *Iret* (*Aloe brahana*), *Foch* (*Zizyphusmucronata*), *Endod (Phytolacca dodecandra*) and *Susbania* species are suspected as bee's poisonous plant.

2.8.4 Absconding and low hive occupation rate

One of the most prevalent problems faced by bee farmers is that of absconding of colonies. Several causes have been identified, and these include: effects of disease and pests, drought, lack of forage, lack of proper bee management and human disturbance among others. African bees often depart from their hives by absconding instead of the normal swarming process. Oyerinde and Ande (2009) study on correlation between absconding and the occurrence of insect pests (i.e. *A. tumida, C. pennsylvanicus* and *G. mellonella*) in Kwara State shows a significantly close to perfect correlation for each pest. They conclude that the three insect pests could be the major pests responsible for the high absconding rate of bees within Kwara State. Similar support to findings, Kamatara (2006) reports that ants cause most of absconding with a prevalence of 50.1% in on-station hives in central Uganda. Absconding reduces the production of the hives because the hive becomes empty. Pests especially the termites feed and destroyed the hive which in turn reduced the number of hives and consequently absconding of the bees (Dewey, 2000). The destruction of the hives forced the farmers to replace the hives frequently which adds to farmers cost of production. Lea (2012) cites absconding and low hive occupation rates as obstacles for farmers to turn beekeeping into a commercial activity in some parts of the world.

2.8.5 Bush burning

Burning of undergrowth and destroying of forestland for expansion of farmland could trigger a reduction of honey producing floras and foraging areas. The elimination of good nectar and pollen producing tree species in many areas makes it difficult to maintain bee colonies without feeding (Keralem, 2005). Apart from land clearing by burning, honey hunting, for example, is an activity that is widely practiced in some forest areas in developing countries where bees are abundant, but is a direct threat for bees. The activity consists of plundering wild bee colonies. The honey hunter uses fire to chase the bees away and often kills the bee colony by burning it to facilitate the collection of honey. This is not only a direct threat for the bees but also for the forest as this type of fire is sometimes reported as the origin of forest fires and wild bush fires, destroying large parts of forests and habitats for bees and other pollinators (Lietaer, 2010). Micheal (2008) reports bush burning as a major constrain militating against beekeeping. According to him, bush burning is a serious problem because majority of the beekeeper in his study were not land cultivators. They do not own land but their hives are kept at suitable location on other people's farm mostly with the consent of land owners. Fakayode *et al.* (2010) and Tijani *et al.* (2011) studies corroborate this finding.

2.8.6 Marketing constraints

A well-organized market channel is one of the main driving factors for expansion of honey production. Through market channels, producers can be linked to potential buyers. An increased participation of farmers in these channels also leads to more supply for honey processors. Lack of strong organized market channel for bee products has been reported as a constraint to beekeeping (Jony, 2011). Lack of standard and

grading systems discourage farmers to produce high quality products. As a result, the honey price received varies based on the good will of buyers (Ejigu, Gebey, and Preston, 2009). In remote area, demand comes only from local consumption which leaves more supply on local market. Most honey on local markets according to Gezahegne (2001) is un-extracted, unstrained and has post-harvest handling problems. In turn, this can bring low price of honey and discourage producers. The low price also discourages the farmers to add value.

2.8.7 Packaging

Packaging according to Hilmi *et al.* (2011) can be a major constraint to bee product marketing as mostly this is carried out in rural and remote areas using recycled drinking bottles and other packaging materials sourced locally. These packaging materials are unsuitable for wider distribution of bee products to town, city and export markets. Improved packaging materials, for example new glass jars with lids for honey, are not commonly available in many rural areas and their cost can be high.

Lea (2012) states that a major obstacle for smallholders to engage in beekeeping seems to be the lack of knowledge about advanced beekeeping methods, their unawareness about the profitability of beekeeping and limited access to markets. He notes that, in many cases the supply chain is not efficient: there is no proper infrastructure, such as transport system, processing facilities or certain equipment. Thus access to markets and traders is limited. All this depicts a disincentive for beekeepers to invest in beekeeping activities. Bradbear (2011), however, asserts that because apiculture is not a mainstream agriculture, beekeepers are poorly served by service providers. This is worsen because honey is widely bartered and traded informally. While this is good, it creates a barrier to

further development, with no incentive to increase volumes of honey and beeswax traded.

Pest, predators, diseases, bush burning, chemical poisoning among other constraints causes great economic loss to beekeeping. Furthermore, the use of certain types of chemicals, the possible causes of Colony Collapse Disorder (CCD), poses great threat to food security. For better utilization of unexploited economic potential of the apicultural resources in a sustainable way, as well as to upgrade and to promote beekeeping as an antidote for poverty alleviation among women farmers in Nigeria, an understanding of these constraints is essential to the design of interventions that enhance positive and minimize negative impacts on the environment as well as the social system of the beneficiaries.

2.9 Women and beekeeping

In most of African countries, beekeeping has often been a male dominated enterprise due to a mix of cultural and social factors, as well as practical constraints, that limit women's participation (Mujuni, Natukunda and Kugonza, 2012; Nel and illgner, 2004; Shackleton, Paumgarten, Kassa, Husselman and Zida, 2011). Some of the constraints identified were lack of time, bee-sting phobia, inability to hoist and harvest honey from the traditional bee-hive. In traditional beekeeping, the African bee, *Apis Millifera* is common and known to be aggressive. Therefore, honey harvesting and apiary cultural practises on beehives inhabited by the African bee could only be done at night when women were expected to be carrying out household chores. Another constraint is that the traditional bark hive requires physical strength and since climbing is often required for the collection of honey, beekeeping is not considered suitable for women for

modesty reasons. Harvesting honey from traditional beehives also requests long absences from home, which competes with women's domestic chores.

However, with intervention from development agencies, a change in beekeeping practices has occurred. According to Raina, Kioko, Gordon and Nyandiga (2009) the introduction of stingless bees and use of Langstroth bee hives have encouraged women participation in beekeeping. This is because bee care and honey harvest chores could be carried out during the day alongside household chores. Macoloo, Recha, Radeny and Kinyangi (2013) research indicate that women are increasingly taking up beekeeping as an income generating activity. Another study noted that, participation of women in beekeeping was more likely within groups unlike when carried out by individuals due to shared responsibilities, indigenous knowledge and skills in the management of bee colonies (Nel and Illgner, 2004). Raina *et al.* (2009) found that training encouraged the use of bee suits to protect the beekeeper from bee stings when harvesting honey during the day when bees are more aggressive. In addition, due to introduction of the Langstroth hives that were hoisted near the ground, honey harvesting could be done easily without having to climb trees, which is culturally unacceptable for women. Studies by Vlek, Denich, Martius, van de Giesen and Gichora, (2003) and Macoloo *et al.* (2013) for example appreciated that more women are participating in beekeeping as an income activity with the aim of improving their livelihoods. Additionally, Nel and Illgner (2004) argue that beekeeping can enhance the position and income of a woman in a society.

Beekeeping or apiculture is an activity in which man rears honeybees in hives to acquires their products. All over the world, beekeeping is an integral part of agriculture.

It is practiced either as a main activity or as a secondary part-time activity. Africa is the original home of honeybee, *Apis mellifera*. The common Africa honeybee in Nigeria is *Apis mellifera Mellifera addnsonni*. It is found in the wild and kept by beekeepers. Beekeeping in Nigeria as a traditional art started in 1927 in Zaria using structures such as gourd, pot, basket, straw hives in the production of honey. The type of hives used varies from one area to another. The basic principle of traditional beekeeping in Nigeria, are the same irrespective of the type of hive used. Beekeeping is a useful means of strengthening livelihoods because it uses and creates a range of assets (natural, human, physical, social and financial asset). These assets if harnessed and backed up by good structures and processes will reduce vulnerability to poverty; generate positive outcomes such as more income, improved food security and a sustainable use of natural resource base both now and in the future.

Honeybees provide pollination services, thereby playing a vital role in food production and overall agricultural productivity. Beekeeping helps to conserve natural resources, generate income. Bees produce a good number of products (honey, wax, pollen, propolis, royal jelly, bee venom) and its derivatives (candles, honey beer and wine, honey soap etc). These "transformed" bee products enable beekeepers and farmers in general to be less vulnerable to poverty. Beekeeping represents great potential to alleviate poverty. It produces many products that are used for food, medicine and other purposes. Beyond consumption at home, the collection and sale of honeybee products provide a source of cash income for beekeepers. Beekeeping production, processing and value addition can benefit both beekeepers and non beekeeper through bee based businesses (cottage industries). The establishment of bee cottage industries can generate

self employment, hence improving the economical position and living standards of the people.

Apiculturists all over the world are faced with constraints, which militate against their production and economic contribution of beekeeping to livelihood. Such constraints includes: disease, pests and predators; chemical poisoning, absconding and low hive occupation rate; bush burning, packaging, lack of knowledge about advanced beekeeping methods, beekeepers unawareness about the profitability of beekeeping and limited access to markets. These constraints cause great economic loss to beekeeping.

In most of African countries, beekeeping has often been a male dominated enterprise due to a mix of cultural and social factors, as well as practical constraints, that limit women's participation (Mujuni *et al.*, 2012). However, the introduction of stingless bees and use of Langstroth bee hives have encouraged women participation in beekeeping. With the use of Langstroth hives that were hoisted near the ground, honey harvesting could be done easily without having to climb trees, which is culturally unacceptable for women (Raina *et al.*, 2009).

CHAPTER THREE

THEORETICAL FRAMEWORK

3.1 Poverty - A Conceptual Clarification

Poverty is a generic concept which scholars lack a consensus on the definition. This is because poverty affects various aspects of an individual including physical, morality, knowledge, and character among others. There exist two types of poverty namely; absolute and relative. Absolute poverty also referred to as subsistence poverty is grounded in the idea of subsistence-the basic condition that must be met in order to sustain a physically healthy existence. People who lack these fundamental requirements (sufficient food, shelter and clothing) of existence are said to live in poverty. The concept of absolute poverty enjoys universal applicability. It is held that standards for human subsistence are more or less the same for all people of an equivalent age and physique, regardless of where they live (Addison, Hulme and Kanbur, 2008).

The universal applicability of the concept of absolute poverty is not universally acceptable. It is dismissed on the ground that a definition of poverty must relate to the standards of a particular society at a particular time (Fields, 2000).This inevitably draws us to the concept of relative poverty. Relative poverty on the other hand, is a type of poverty that exists when people though may be able to afford the basic necessities of life but are still unable to maintain an average standard of living (World Bank 1996). It should be noted that the concept of relative poverty presents its own complexities. This is because as societies develop, understanding of relative poverty must also change. Also as societies become more affluent, standard for relative poverty are gradually adjusted upwards (Ogege, 2011).

Apart from the typology of absolute and relative poverty, it is also categorized along five dimensions of deprivation (Oladunni, 1999). The categorization are:

- Personal and physical deprivation: This has to do with deprivation that is experienced in nutrition, health, literacy, disability and lack of self confidence.

- Economic deprivation: This category of deprivation comprises the lack of access to property, income, money etc. The most vital and common manifestations of poverty is denial of access to basic necessities of existence.

- Social deprivation: This kind of deprivation involves the barrier to full participation in social, political and economic life. A person who is deprived in personal and economic spheres of life may be deprived of their fundamental human rights.

- Cultural deprivation: This deprivation occurs when people are found lacking in values, beliefs, knowledge and information etc. As a result of this, victims are not able to take advantage of economic and political opportunities.

- Political deprivation: this involves the lack of political voice. Those who are deprived politically suffer marginalization and are subjected to coercion through physical or economic threats.

3.2 Theories of Poverty

Just as there is no universally acceptable definition of poverty, so it is with theories of poverty. For this study, attempts have been made to discuss theories of poverty from individualistic (culture of poverty and situational theory of poverty); structural theory of poverty and the concept of social exclusion.

3.2.1 Individualistic theory of poverty

Major theories that base their explanations of poverty on individualistic traits include the culture of poverty and the situational theory of poverty. These theories were viewed from the angle of the individual's inability to be productive so as to get out of poverty. It placed blame for poverty on the poor themselves. That those who suffered from very low incomes did so because they were unable or unwilling to provide adequately for their own well being. From this point of view, neither the society nor the social groups to which individuals belong to were accountable and the society should not therefore be responsible for providing for the needs of the poor. Such individualistic theories of poverty were particularly popular in the nineteen century (Haralambos., Holborn and Head, 2008).

3.2.1.1 Culture of poverty

The culture of poverty also known as vicious circle of poverty was developed in late 1950s, by Oscar Lewis (Haralambos and Heald, 1980). It is known as culture of poverty theory because it concerns people whose environment and belief exhibit different culture and/or a sub-culture from the rest of the society. This theory suggests that the characteristics of the poor help to cause and perpetuate poverty (Lewis, 1966; 1998). The thrust of the culture of poverty theory is that poverty is the outcome of transmission, from one generation to another, of a set of beliefs, values and skills that are not compatible with economic success (Bradshaw, 2006; Lewis, 1998). Analysts and proponents of the culture of poverty theory argue that poverty produces people with unique personal trait of present-oriented outlook, hopelessness, sense of fatalism, lack of work ethic, low self-esteem, laziness, resignation, dependence, "irresponsible self indulgence" and the inevitable inability to defer gratification etc (Samueison, 1997;

O'Connor, 2001). In addition, these traits are passed down from parents to children, thus explaining generational poverty.

Social scientists have paid considerable attention to the trait of present-time orientation. This trait is hypothesized to be important in perpetuating poverty and preventing upward mobility out of poverty because the poor learn not to delay gratification or plan for the future, and they are not psychologically prepared to take advantage of new opportunities. Alternately, this trait is thought to be a coping mechanism since it would be psychologically damaging to continually worry about or plan for a future that holds no promise of improved life circumstances or a better life (Lewis, 1966). The theory of culture of poverty has been greatly misunderstood and misused. Lewis saw it as an extreme form of adaptation that the poor are forced to make under certain circumstances and in certain places. The poor rejects the dominant culture and its institutions because they do not serve them. Their own subculture grows out of despair and protest.

3.2.1.2 Situational theory of poverty

The second category of explanatory models is situational theory. The situational theory of poverty was a response to the culture of poverty. This theory views poverty as a reaction to situational constraints. That poverty results from imposed constraints such as low income, unemployment and illness (Haralambos and Heald, 1980). In contrast to the culture of poverty theory, the situational perspective argues that the poor experience impoverishment, not because they have internalised pro-poverty beliefs, values and behaviours, but because they occupy an unfavourable position in the socioeconomic structure of society (Islam, 2005). According to the situational view, the poor behave differently than members of more privileged groups because they lack basic resources

and secure jobs or simply lack opportunities to live up to values held by mainstream society. In other words, the theory views the behaviour of the poor as adaptations to the restrictive position they occupy in society. The situational theory gives importance to the structural conditions that give rise to poverty, but it also tends to focus upon the individual responses to the objective situation of poverty. It differs from the culture of poverty theory in a fundamental sense. It does not assume the pre-existence of a subculture that gives coherence and solidity to the behaviour of the poor. The situational theory holds that individuals rationally follow a pattern of behaviour, which is suitable for the objective situation of their life.

In applying the individualistic theory of poverty as a comparative reference point, the study assumed selected socioeconomics/institutional variables as correlate of poverty. It could be explained that the socioeconomic characteristics of low education, limited training with large household size and high dependency ratio etc are responsible for poverty. These characteristics re-enforces the other and trap the women farmers in low productivity, low saving. As a result of low income, the propensity to save is limited. Adoption of improved beekeeping practices and beekeeping value chain can also be hindered. Additionally, expansion into commercial beekeeping may not be feasible. This peculiar circumstance makes it difficult for the women farmers to escape poverty, thus vicious cycle of poverty (figure 2)

Using the individualistic model for comparison provides opportunity to test in a comparative context the assumption that socioeconomic and institutional variables affect beekeeping production and poverty. Although this approach is a useful tool in the prediction of the correlate of poverty among beekeepers, this study finds the

individualistic theory inadequate. The theory (culture of poverty and situational theory of poverty) looked at poverty from individual perspective. This study refute the notion held by culture of poverty that the causes and roots of poverty stems from personal trait but rather uphold the notion that poverty stem from situational constraint facing the women farmers (situational theory of poverty). With personal effort of hard work, informal network, policies that remove barriers and open gate way to opportunities, generational poverty that stem from cycle of poverty will be broken, (figure 2). For example a training in agriculture, and working with farmers to help them improve their agriculture techniques, create greater crop yields and protect the environment. Similarly, access of women farmer to micro credit will increase household income that can be invested in beekeeping and other business. This leads to greater access to basic needs and food etc. These are examples of how to break cycle of poverty.

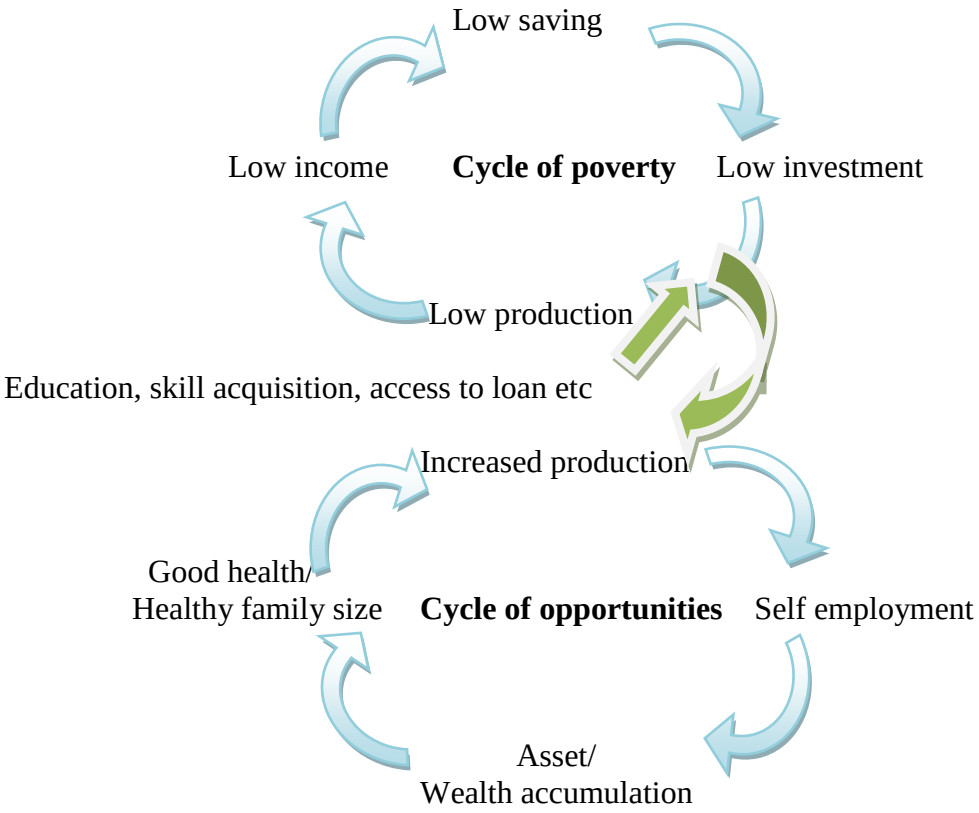


Figure 2: Cycle of Poverty and Opportunity

Another weakness of culture of poverty is that the poor had no culture of their own and do not constitute any homogenous group, rather they are part and parcel of the heterogeneous society that they live in.

The impact of the personal deficit arguments about poverty mask the multiple axes of marginality and vulnerability by which women in particular are encumbered. The stigma attached to poverty is doubly virulent when it is associated with the presumed failures of individual, and can only results in punitive policies and contemptuous treatment of the poor. The crux of the personal deficit argument is that it fails to account for the deeply embedded structural forces that bring about poverty and interpret many of the coping strategies and creative responses adopted by the poor as the root of their poverty. A deeper examination of the structural and systemic forces that collude in constructing poverty can unearth the power embedded in the social structures and institutional practices that confront the poor (Bradshaw, 2006; Brady, 2009).

3.2.2 Structural /Marxian theory of poverty

The structural approach is taken largely by sociologists with a macro perspective on society. The early exponent of this theory is Karl Marx and Max Weber. Marxists see society as a structure which is responsible for peoples' poverty **(**Blacksacademy, 2002). Structural theory of poverty sees differences in individual attributes as irrelevant, and argues that poverty has only societal-level origins: that the characteristics of economic systems create poverty, not the characteristics of individuals. This theory hold that poverty is caused by the structure of the larger socioeconomic order (Islam, 2005); it argued that people are poor because racism, sexism, and segregation limit or deny certain categories of people access to training or jobs that are sufficient to maintain an

acceptable standard of living or quality of life (Massey, 1990). The theory also suggests that it is the macro structure of society that produces inequality and consequently poverty. Supporters of the structural school of thought argue that most poverty can be traced back to structural factors inherent to either the economy and/or to several interrelated institutional environments that serve to favor certain groups over others.

Using the structural theory of poverty as a framework, the study attempts to x-ray the effect of social institutions on assets (land), credit, decision making among others**.** Social institution in this study refers to structures that are design to empower and at the same time regulate the general attitude and action of people. These structures include traditions, custom, social and religious norms etc. This study assumes that these structures act as constraints on women economic activities and restrict their ability for increased production. It also assume that the interplay between social institutions on assets (land), credit, decision making among others account for poverty among women farmers. The explanations for the above assumptions are as follows:

3.2.2.1 Inheritance of assets and property

Patriarchal ideologies, steeped in traditional customs and culture, frequently dictate inheritance of asset on gender line. Inheritance is an extremely significant means of property transfer in many African societies. Platteau and Baland (2000) assert that the major mode of land acquisition in most African countries is inheritance. Inheritance of asset have been conceptualised as providing households with an important 'cushion' for staying out of poverty despite instances of economic livelihood fluctuations (Chimhowu, 2006). Correspondingly, studies of poverty trajectories of households and individuals in African societies have identified that exclusion from assets inheritance

exacerbates vulnerability to chronic poverty (Laurel, 2006; Oleke. Blystad and Rekdal 2005; Bird, K. Pratt, O'Neil and Bolt, 2004, Human Rights Watch, 2003).

Of all productive agricultural assets that contribute to increase income and well being, land is perhaps the most powerful. Secure access to or ownership of land increases decision making of the individuals on production. Nigeria is a patriarchal society and inheritance is patrilineal which invariably creates severe cultural inhibitions to the aspiration and productive capacity of women. Scores of literature show that women do not own agricultural land (Fabiyi, Danladi, Akande and Mahmood 2007; Oladejo, Olawuyi and Anjorin, 2011; Yusuf, Arigbede and Kolade, 2010) hence majority of them farm on fragmented plots of non arable or infertile land. This probably accounts for their subsistence level of production. The potential cost of women insecurity and unequal access to land is high. Insecurity of tenure over land increases women farmers' vulnerability while lack of ownership increases the likelihoods of falling into poverty in case of divorce or death of spouse.

3.2.2.2 Access to instutionalized credit

Women lack of asset act as a self perpetuating cycle which only serves to strengthen already existing gender biases in employment opportunities. Without asset to act as collaterals, it becomes more difficult for women to access credit to purchase property and productive inputs. Women lack of access to credit could be attributed to the following reasons: women smallholder farmers are often not regarded as "economically active" and that makes it very difficult for them to get credit for farming. There are few banks or micro-credit schemes in rural areas and not enough information about credit available, how to apply, and repayment terms. Applying for credit can be a difficult and

confusing process, especially for majority of women farmers who are illiterate. Land is usually required as collateral (security) for credit but women are not usually the registered owners of the land they farm. Many women cannot enter into contracts such as credit agreements in their own right. The husband or other male family member has to give permission or even sign on her behalf. Without access to credit, it is very difficult for women subsistence farmers to develop small business enterprises and empower themselves economically. Those who get loans from unregulated money-lenders can end up hopelessly in debt or lose everything (Olatomide and Omowumi (2011).

3.2.2.3 Decision making

Patriarchal norms also account for women restricted role in decision making at household, community and national levels. The lack of female voice underpins women economic activities. At the household level, sexual division of labour which is socially construed entails that women play a supportive role to their husband. They farm together with their men but the proceeds goes to the men. Male dominance in decision making in agricultural production and proceeds also continued even in situations where women own personal farm and are the key provider of labour. They therefore lack control over their output, neither can they independently takes decision on investment opportunities or diversifying their economic activities (Iruonagbe, 2009; Ajah, 2012).

The role of women in agricultural production is non controversial, yet at the higher levels (community and national) farmers are still generally perceived as 'males' by policy-makers, development planners and agricultural service deliverers (Kasten and Okhoya, 2007). For this reason, women find it more difficult than men to gain access to

valuable resources such as land, agricultural technology, extension services and training that would enhance their production capacity. Many women farm in remote rural areas, where there are limited extension services. This makes it very difficult to access or demand public extension services. Apart from that extension services are mostly designed for commercial farmers who grow cash crops but most women farmers are smallholders who grow subsistence food crops. Few women have been trained as extension workers. Extension service providers usually expect women to go to where they are, but there may be social, cultural or religious taboos against doing so (Kasten and Okhoya, 2007; FAO, 2010; World Bank and IFPRI 2010).

Cultural or religious norm entails the permission of women to work outside their homes. This is common in the northern part of Nigeria where women are kept in purdah. This limits their level of interaction, limit exchange of knowledge/experience and exposure to improve production technologies that could boost their income earning activities. Almost all extension workers are men and few have been trained to provide services and information that women smallholder farmers need. Limited female extension agents in Nigeria further accentuate women marginalization to agricultural extension education and training (Kastens, and Okhoya, 2007; World Bank and IFPRI 2010). These conditions have entrenched the women farmers in a vicious cycle of poverty that places them at a less advantageous vantage of income and resource empowerment.

The advantage of this theory is that it provides foundation to examining how structural factors affect poverty. Some analysts of this theory demonstrates that structural factors shape income and earning inequality (Nielsen and Alderson, 1997; Alderson and Nielsen, 2002) which possibly account for people' poverty. In agreement to the above

assertion, this study upholds the notion that poverty is routed in the structure of society rather than in the individual. Despite the importance of structural theory, other structural analysts argue that an exclusive concentration on structural theory leads to an incomplete understanding of poverty (Brady, 2009; Christopher and Patrick, 2012). Christopher and Patrick therefore suggest an alternative explanation of poverty: social exclusion.

3.3 Concept of Social Exclusion

The social exclusion approach studies the structural characteristics of society, which engender processes and dynamics that exclude individuals or groups from full social participation. It makes particular reference to the distribution of opportunities and resources needed to overcome exclusion, and to the promotion of inclusion in both the labour market and social processes. Nasrin (2002) refers to social exclusion as the norms and processes that prevent certain groups from equal and effective participation in the social, economic, cultural, and political life of societies. Similarly, Social Exclusion Knowledge Network (SEKN), (2008) state that exclusion consists of dynamic, multidimensional processes driven by unequal power relationships interacting across four main dimensions- economic, political, social and cultural and at different levels including individual, household, group, community, country and global levels. Social exclusion in any of the four dimensions can intersect with exclusion in other dimensions. The dimensions of social exclusion according to SEKN (2008) are as follows:

- The social dimension is constituted by proximal relationships of support and solidarity (such as friendship, kinship, family, neighbourhood, community,

social movements) that generate a sense of belonging within social systems. Social bonds are strengthened or weakened along this dimension.

- The political dimension is constituted by power dynamics in relationships which generate unequal patterns of formal rights embedded in legislation, constitutions, policies and practices and the conditions in which rights are exercised, including access to safe water, sanitation, shelter, transport and power and to services such as health care, education and social protection. Along this dimension, there is an unequal distribution of opportunities to participate in public life, to express desires and interests, to have interests taken into account and to have access to services.

- The cultural dimension is constituted by the extent to which diverse values, norms and ways of living are accepted and respected. Diversity is accepted in all its richness at one extreme along this dimension, and at the other there are extreme situations of stigma and discrimination (SEKN, 2008).

- The economic dimension is constituted by access to and distribution of material resources necessary to sustain life (such as income, employment, housing, land, working conditions and livelihoods) (SEKN, 2008).

In using this concept as a reference point, study agrees the women farmers either as individuals or group are economically, culturally, socially and politically disadvantaged. Although the four dimensions are useful tool in explaining poverty among women, this study will delve on the cultural, economic and political dimension of social exclusion as a reference point.

3.3.1 Cultural and economic deprivation

Although the claim that the majority of the world's poor are women cannot be substantiated, the disadvantaged position of women is incontestable. This study assumes that women's poverty is deeply rooted in cultural and economy deprivations. Women may be economically active, but by keeping many of them locked into a patriarchal family situation, which is culturally entrenched, deny them basic access to economic resources (Iruonagbe, 2009). Economic deprivation is a reflection of women having relatively fewer material assets (lack of access to land, livestock, housing etc), fewer social assets (income, goods and services to which people have access through their social relationships) and fewer cultural assets (formal education and cultural knowledge that enable people perform in the human environment), cultural practices, tradition and religious interpretations of women's status (SEKN, 2008; Iruonagbe, 2009). All these place them at greater risk of being poor. Early marriage and childbearing, the tendency to have larger numbers of children leave women and their children highly vulnerable to impoverishment in the event of divorce, abandonment, widowhood or economic crisis.

3.3.2 Political deprivation

Women empowerment is a key component of democratic governance; nevertheless, gender inequalities are still ingrained in the political system of many developing countries (IPU 2013), Nigeria inclusive (Dauda, 2004). Nigeria is classified as one of the least equitable countries with regard to women's political empowerment. Lack of adequate representation in decision-making positions and governance structures by implication will amount to gross alienation and under-representation of women in the process of decision-making in programmes that affect them. This probably account for persistent poverty despite the implementation of many laudable poverty alleviation

programmes by successive Nigerian governments. In a study conducted in Rivers State by Nkebari and Nyenke (2005), 66.7% of women were being prevented from politics due to such barriers like early marriage, widowhood practices etc. This is glaringly in sharp contrast with the situation elsewhere. For instance, in Sweden where both sexes have equal access to schooling, women representation in the Swedish parliament was as high as 43% in 2001. However, in the Commonwealth Report 2007, only 5-member countries- Mozambique (39.2%); South Africa (42.3%); New Zealand (32.2%); Tanzania (36%) and Uganda (35%) have met its 30% benchmark for women's representation in governance with conspicuous exclusion of Nigeria. Women exclusion from the political process will continue to worsen their precarious socioeconomic situations.

Using the social exclusion concept as a reference helps to establish empirically the extent to which multiple factors (social, economic, cultural and political) impact on poverty. The main strength in the use of social exclusion concept within poverty studies is that the concept reveals that the determinants of poverty are multi-dimensional, and need to be understood beyond simplistic and reductionist arguments that point to individual failure (Hickey and and Du-Toit, 2007; Tilly, 2006.

Social exclusion approach can help contextualize poverty in social systems and structures. The social exclusion approach insists that poverty should be understood as a social phenomenon rather than something that can be attacked without considering the social bases of economic activity (Hickey and and Du-Toit, 2007.

The approach involves a clear awareness of the multidimensionality of deprivation Ruggeri-Laderchi, Saith and Stewart (2003). Hulme and Shepherd (2003) pointed out that this multi-dimensionality is a central aspect of chronic poverty. Moreover, this propensity towards multi-dimensionality goes (methodologically) deeper than else where within poverty analysis, and goes beyond the usual 'income plus human development' approach to straddle the more significant divides in social reality and social analysis, namely that between culture and political economy (Kabeer, 2000).

Another strength between the social exclusion approach and the investigation of chronic poverty is the focus on politics (Bhalla and Lapeyere, 1997; Tilly, 2006). Chronic poverty research identified the central role played by politics both in the production of chronic poverty and in attempts to reduce it (Hickey and Bracking, 2005; Hickey and Du-Toit, 2007). Political aspects of exclusion include the denial of political rights such as political participation and the right to organise, and also of personal security, the rule of law, freedom of expression and equality of opportunity (Bhalla and Lapeyere, 1997). Here, the analysis of social exclusion can be helpful in uncovering the links between people's exclusion from political communities e.g. a lack of citizenship status and their poverty. Nonetheless, the concept of social exclusion has been strongly criticized on the ground of what exclusion might mean in different cultural contexts. So far, the best argument against this charge has been to argue that social exclusion research essentially focuses on the causal processes leading to deprivation, thus rendering the concept legible in any context (Ruggeri-Laderchi *et al.,* 2003).

Social exclusion as a concept offers a multi-dimensional and multi-disciplinary view of poverty. These multiple disadvantages affect women farmers' production capacity

hence majority of them are subsistence farmer. The role of women in food security is well documented in Nigeria (FAO, 2007). Yet many women produce food crop for household consumption (subsistence farmers) and often go through cycles of relative abundance and scarcity. For many families that rely on subsistence production for survival, the period immediately prior to harvest is a 'hungry period'. During these periods of scarcity, many families lack sufficient resources to meet their basic needs (World Bank and IFPRI. 2010). Review of theories of poverty indicates that different factors, (socioeconomic, structural, cultural and political etc) determine women inclination toward poverty (Ruggeri-Laderchi *et al.*, 2003; SEKN, 2008). Some of these factors can be overcome by beekeeping in the following ways:

Beekeeping has the potential to break cycles of relative abundance and scarcity of food crop production as honeybee production and harvests can occur up to three times in a year and can be available during off cropping season (Sekumade, 2005). It can also be integrated with food crop production (Jun, 2009). Literatures indicate that crop production integrated with beekeeping improve crop yield, both in quantity and quality and translate into higher income (Berenbaum, 2007; Jun, 2009). Beekeeping can be practice as 'landless-based enterprise', as hives, with the consent of farm owner can be place on other peoples' farm. Additionally, it can also be practice on non-arable land, located close to homestead. This can reduce the problem confronting women in accessing land and eliminate structural constraints that impede women working outside their homes. Skill training on beekeeping management, exchange of ideas and experience between members of beekeeping cooperative etc may help to overcome individual constraints of lack of education and training.

The reviewed theories and concept revealed the complexity of poverty and helped to build a consensus that poverty is a phenomenon with many dimensions and many causes, which manifests itself in different ways. These theories and concept therefore shows that no singly theory can explain the root causes of poverty among women farmers. It requires a combination of theories (Ruggeri-Laderchi *et al.*, 2003; SEKN, 2008). However, the above theories have been able to identify some of the probable causes of poverty among women farmers. It therefore follows that if beekeeping is to be an effective anti-poverty strategy, the issues raised in the aforementioned theories and concept must be addressed.

Poverty is a generic concept which scholars lack a consensus on the definition. This is because poverty affects various aspects of an individual including physical, morality, knowledge, and character among others. Just as there is no universally acceptable definition of poverty, so it is with theories of poverty. Individualistic (culture of poverty and situational theory of poverty); structural theory of poverty and the concept of social exclusion were the theories that guide this study. The reviewed theories and concept revealed the complexity of poverty and helped to build a consensus that poverty is a phenomenon with many dimensions and many causes, which manifests itself in different ways. These theories and concept therefore shows that no singly theory can explain the root causes of poverty. It requires a combination of theories.

CHAPTER FOUR

METHODOLOGY

4.1 Study Area

The study was conducted in Ogun and Kaduna States. Ogun State Beekeepers Network (OBNG) and Beekeeping Extension Society (BES) were used for the study. OBNG and BES are based in Ogun and Kaduna States respectively. These beekeepers group were chosen because the group has high percentage of females as members. These groups have also facilitated the adoption and use of low-cost and appropriate hive technologies and provided training to the beekeepers.

Ogun State is in the South-Western zone of Nigeria and lies within the tropics. It shares common boundaries with Lagos State to the South, Oyo and Osun State to the North, Ondo State to the East and Republic of Benin in the West (figure 3). The State has a climatic pattern of distinct wet and dry seasons, and a total landmass of about 16,409.26 square kilometers. The mean annual rainfall varies from 128cm in the Southern part of the State to 105cm in the Northern area. It has a tropical rainfall pattern, starting around march and end in November. There are two vegetative types in Ogun State viz rainforest in the Southern part and predominantly savanna in the North. The estimated female population is 1,880,855 (50.45%) out of 3,728,098 (National Commission for Mass Literacy, Adult and Non-Formal Education, 2008). The projected population figure for 2016 using an annual growth rate of 2.8% is, therefore 2,281,956. Agriculture is the main occupation of the people. Crops grown are yam, cassava, maize, rice, plantain, beans, vegetables and citrus fruits such as orange, paw-paw, pineapple etc. The main cash crops produced in the State are cocoa, cashew, kola nut, oil palm and palm kernels, rubber and coffee.

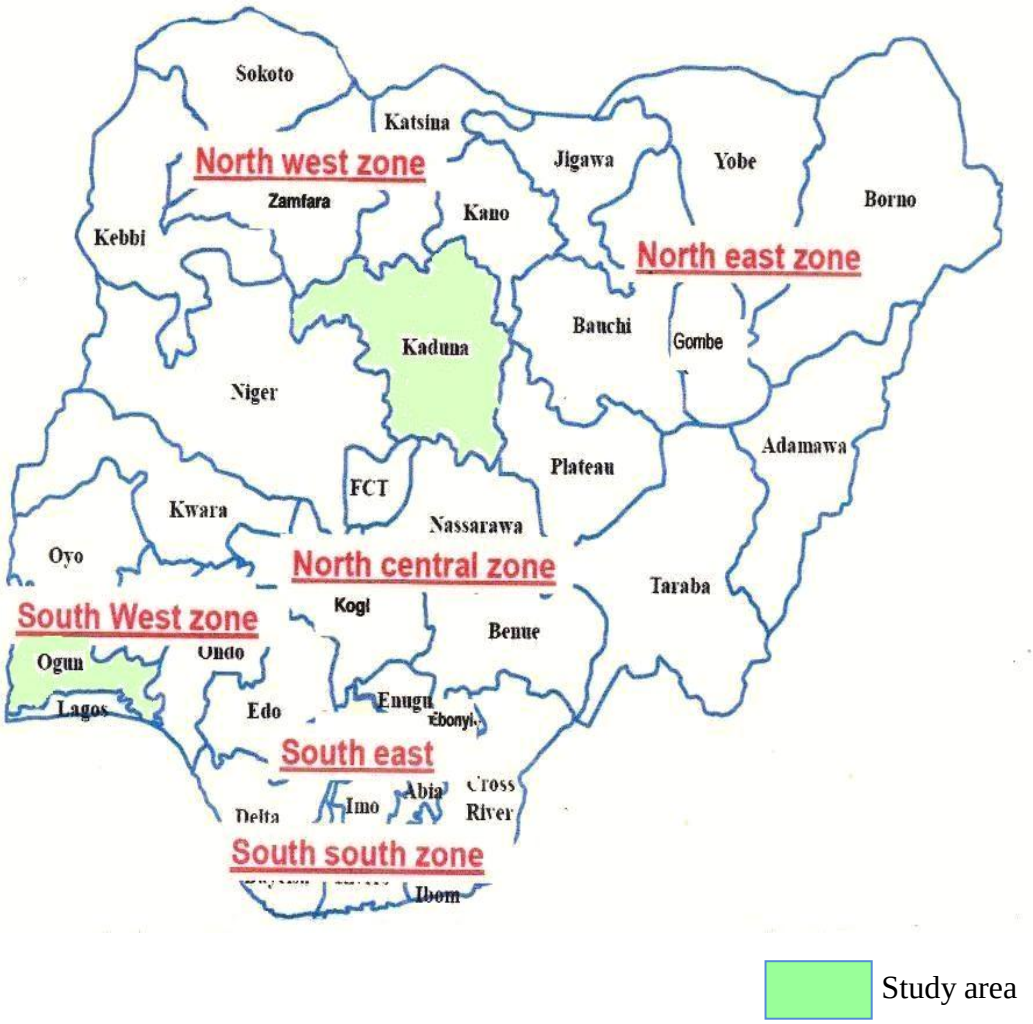


Figure 3: Map of Nigeria, showing the study areas

Kaduna State is in North-Western part of Nigeria. The State is located between latitudes 9^{o} and 12^{o}N and longitudes 6^{o} and 9^{o}E and shares a common boundary with Zamfara, Kastina, Niger, Kano, Bauchi and plateau State. To the South-West, the State share boarder with Federal Capital Territory, Abuja and Nasarawa State (figure 3). It has an approximate land mass of 48,743.2km^{2}. Annual rainfall is between 1500mm and 2000mm North and South respectively. The raining season sets in April and continues through October, with the highest peak being in August. Kaduna State has an estimated female population of 2,954,534 (48.7%) out of 6,066,562 (National Commission for

Mass Literacy, Adult and Non-Formal Education, 2008). The projected population figure for 2016 using an annual growth rate of 2.8% is 3,584,601. Crop and livestock production are the predominant economic activities of the people. Arable crops grown are maize, Soya beans, ginger, chillies, cassava, sesame, tomatoes, cotton, sugar cane, sorghum, rice and acha. Tree crops such as mango, citrus, guava, palm kernels and passion fruits are equally grown in large quantities. Some of the women in the two States are also involved in livestock production such as cattle, sheep, goat, poultry, beekeeping etc.

4.2 Sampling Technique and Sample Size

The target population under study was women involved in beekeeping in Ogun and Kaduna States. The sample size was selected using purposive and systematic random sampling techniques. OBNG and BES groups were purposively selected for the study. The choice of these beekeeping groups was essentially on the basis of active participation of women in beekeeping. OBNG had two hundred and fourteen women beekeepers and BES had two hundred and fifty six women beekeepers. Systematic random sampling of the women beekeepers was done by selecting every second name on the list provided by OBNG and BES. One hundred and seven; and one hundred and twenty eight which represent fifty percent of the women beekeepers' were randomly selected from OBNG and BES. A total of two hundred and thirty five women beekeepers were used for the study.

4.3 Data Collection

Primary data and secondary sources of information relevant to the study were used for the study. Preliminary visits to the study area were made by the researcher and the

trained enumerator in November 2012. A pre-test using 11 and 13 randomly selected women beekeepers in Ogun and Kaduna States were carried out in December 2012 to determine the extent to which the questions in the research instrument were clearly understood. Validity test was done to assess if the research instrument measures what it is supposed to measure. Judges were used to validate the research instrument. Staffs of BES in Kaduna State and Elacon in Ogun State were used as judges to scrutinize and comment on the research instrument. Based on their comments, the research instrument was modified before being used for data collection. Test re-test method was employed to determine the reliability of the research instrument using Cronbach's Alpha. A coefficient of 0.71 was obtained and based on this coefficient, the research instrument was considered reliable.

Cronbach's alpha equation (Kirk, undated).

$$\alpha = \frac{n}{n-1}\left(1 - \Sigma\frac{vi}{vt}\right)$$

n = number of questions

Vi = variance of scores on each question

Vt = total variance of overall scores on the entire question

α= Reliability coefficient

Primary data were collected by the researcher and enumerator between February-June 2014 through the use of structured questionnaire and interview schedule administered to the women beekeepers. One hundred and seven members of OBNG and One hundred and twenty eight members of BES were used for the study. A total of two hundred and thirty five women beekeepers were used for the study.

Data collected from the respondents focused on socio-economic characteristics of the women beekeepers, institutional factors affecting honeybee production, honeybee products produced, quantity of honeybee products produced, income obtain from sales of honeybee products and the contribution of beekeeping to both basic needs and asset to determine the extent to which beekeeping have affected poverty status of the women beekeepers. The selected socioeconomic characteristics were: age, beekeeping experience, bee farm size, access to land for hive placement, educational level, household size, number of dependants and marketing outlets. The selected institutional variables were; year's of membership of beekeeping cooperative society, access to credit, amount of credit received, extension services and training received. Secondary sources of information were obtained from the existing literature relevant to the study.

4.4 Analytical Technique

Descriptive statistics was used to organize, summarize and analyze the data collected. This involves the use of measures of central tendency such as frequency distribution, mean, mean-scores and percentages to achieve objective 1, 2 and 5 of the study. Mean per capita household income and gross margin analysis was used to achieve objective 3 and 4 respectively. Rank order was used to achieve objective 6. Logit regression analysis and Pearson Products Moment Correlation (PPMC) were used to test hypotheses 1and 2 respectively while Z-test was used to test hypothesis 3 of the study.

4.4.1 Mean score

Mean scores on the contribution of beekeeping to household basic needs such as food, clothing, medical care, rent, school fee, asset (land, livestock, house and saving) were obtained by rating statements to determine the contribution of beekeeping to the

standard of living of the respondents. Rating statements were constructed and measured on a 3-point likert type scale with: not at all, moderate and high, with scores of 1, 2 and 3 respectively. Mean responses were calculated. The mean responses equal or greater than 2 was regarded as improved standard of living while mean responses less than 2 was regarded as poor standard of living.

4.4.2 Poverty line estimate

Two-thirds mean per capita household expenditure was used to determine the poverty status of the beekeepers. To determine the contribution of beekeeping to poverty status of the beekeepers, using income as a proxy, a poverty line was constructed. Given the absence of an official poverty line for the purpose of measurement, Ali-Akpajiak and Pyke (2006), posits that the World Bank and the Federal Office of Statistics have established that two-thirds mean per capita household expenditure would determine the poverty line in Nigeria (relative poverty). The poverty line that was used for this study was constructed based on two-thirds mean per capita household expenditure per adult equivalent concept. Adult equivalent was generated from Organization for Economic Cooperation and Development (OECD) scale (Haughton and Khandker, 2009) and adopted as follows:

$AE = 1+ 0.7 (N_{1adult} - 1) + 0.5N_{2\ children}$ ..... (1)

Where AE = adult equivalent household size

N_1 = number of adult 15 years and above

N_2 = number of children less than 15 years

therefore:

$$\text{Per capita Income} = \frac{\text{beekeeper's total income per annum}}{\text{AE}} \quad \text{…….....(2)}$$

Mean per Capita beekeepers' Income (MPCRI) was calculated by;

$$\text{MPCRI} = \frac{\text{Total income for all beekeepers per annum}}{\text{Total AE for all beekeepers}} \quad \text{……..(3)}$$

From MPCRI, poverty lines were drawn to get two mutually exclusive classes (i.e. non poor; poor). The non poor were households whose MPCRI is equal or greater than 2/3 MPCRI while the poor were households whose MPCRI is less than 2/3 MPCRI.

4.4.3 Gross margin

Gross margin (GM) is the difference between the total revenue (TR) and the total variable cost (TVC) obtained from the sale of bee products. It was used to measure the profitability of beekeeping and it is expressed as follows: GM = TR-TVC

Where: GM = Gross Margin, TR=total revenue, TVC =total variable cost. (Olukosi and Erhabor, 2005)

4.4.4 Logistic regression model

The logic regression model is a technique that is used in estimating the probability of an event with binary or dichotomous variable. This model is based on cumulative logistic distribution function as expressed by Gujarati (1995). The model is specified as follows:

$$P_i = \frac{1}{1 + e^{-z}} \quad \text{----------(1)}$$

If P_i represent the probability of non poor and the probability otherwise will be $1 - P_i$

$$\frac{1 - P_i}{1 + e^{-z}} = 1 - 1 \quad \text{----------(2)}$$

Therefore, equation (2) can be expressed as follows:

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{z}}{1 + e^{-z}} = e^{z} \quad \text{---------- (3)}$$

The ratio of equations (1) and (2) is the odds ratio in favour of non poor. Thus taking the natural logs of equation (3), we have:

$$L_i = \text{In} \left[\frac{P_i}{1 - P_i} \right] = Z \text{ ---------- (4)}$$

L_i = the logs ratio which is called the logit

$$Z = \alpha + \beta_1 X_1 + \beta_2 X_2 + \text{---------- } \beta_{12} X_{12} \text{ ---------- (5)}$$

Where Z is a theoretical or an observable variable in the sense that although, X's are generated from the field, the β's are not observable. In order to obtain the value of Z, the likelihood of observing the sample needs to be formed by introducing a binary variable Y_i such that:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \text{---------- } \beta_{12} X_{12} \text{ ---------- (6)}$$

Where; Y= (Poverty status of the women beekeepers; 1or 0)

1 if $_i$th women beekeeper is non poor

$Y_i = 0$ if $_i$th women beekeeper is poor

X_1-X_{12} are the independent variables that can influence poverty status of the women beekeepers.

Where: X_1 = Age (years)

X_2 = Beekeeping experience (years)

X_3 = Number of hives

X_4 = Access to land (number)

X_5 = Years of schooling

X_6 = Household size (number)

X_7 = Number of household members who are dependant

X_8 = Marketing channels (number)

X_9 = Frequency of extension visit (number)

X_{10} = Frequency of re-training (number)

X_{11} = Amount of credit obtained (naira)

X_{12} = Years of belonging to beekeeping cooperative society

4.4.5 Pearson Products Moment Correlation analysis

Pearson Products Moment Correlation (PPMC) analysis was used to determine the extent to which beekeeping has alleviated poverty of the beekeepers and denoted by r. The correlation coefficient gives the degree of association between any two variables (X and Y) under consideration and ranges from −1 to 1. The coefficient was classified into weak (r = ± 0.10 to 0.29), moderate (r = ± 0.30 to 0.49) and strong (r = ≥ ±0.5) (Shukla, undated). PPMC model is specified as follows:

$$r = \frac{n(xy) - (x)(y)}{\sqrt{[nx^2 - (x)^2]\,[ny^2\ (y)x^2]}}$$

y= accrued income from beekeeping

x = basic needs/assets (food, clothing's, medical care, rent, school fee, land, livestock's, saving and house)

n = Number of pairs of scores

Σxy = Sum of the products of paired scores

Σx = Sum of x scores

Σy = Sum of y scores

Σx^2 = Sum of squared x scores

Σy^2 = Sum of squared y scores

4.4.6 Z-test

Z-test was used to test hypothesis 3, that is, whether there is significant difference between returns (profit) of the beekeepers. The Z-test was used to evaluate whether the

difference between returns of the beekeepers is statistically significant or not. The formula is given by

$$Z = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Where:

$\overline{X}_1$ = average return for Ogun State beekeepers in naira (₦)

$\overline{X}_2$ = average return for Kaduna State beekeepers in naira (₦)

σ_1^2 = variance for Ogun State beekeepers' return

σ_2^2 = variance for Kaduna State beekeepers' return

n_1 = sample size of Ogun State beekeepers' return

n_2 = sample size of Kaduna State beekeepers' return

4.5 Measurement of Variables and *a prior* Expectations

4.5.1 Independent variables and their measurement

The independent variables for this study were socioeconomic characteristics of the women beekeepers and institutional factors and they are discussed as follows:

4.5.1.1 Socioeconomic characteristics of the beekeepers

i. **Age:** This refers to the approximate chronological age of the beekeepers at the time of data collection. It was measured as actual age given in years. Age can either be negative or positively related to poverty depending on the age group that dominates beekeeping.

ii. **Beekeeping experience:** This refers to the number of years the beekeepers has been in beekeeping. The beekeepers were asked to indicate the years. It is expected to have negative influence on poverty.

iii. **Number of hives owned by the beekeepers**: The beekeepers were asked to indicate the number of hives on their bee farm. Bee farm size is expected to have negative influence on poverty.

iv. **Access to land:** Refer to land on which the bee hives are kept. This was measured as 1= permanent and 0 = temporary. Access to land is expected to have negative influence on poverty.

v. **Level of education:** This is the knowledge of education acquired by the beekeepers through formal education. Years of schooling in primary, secondary and post secondary schools were used. A score of 0 was assigned to no formal; 4 for koranic education, 6 years for primary, 12 years for secondary and 14 years and above for post secondary. Level of education is expected to have negative influence on poverty.

vi. **Household size:** This is the total number of people living in a household. The beekeepers were asked to indicate the number of people that live and feed in their house. Increase in household size is expected to increase poverty status of the beekeepers.

vii. **Number of dependants:** This refers to the number of household members that contributes to household basic needs (either by providing money or farms to provide food to support the family upkeep) to non contributor. Increase in number of dependants is expected to increase poverty status of the beekeepers.

viii. **Marketing outlets**: Refers to the processes by which honey and other bee products are being sold. It was be categorized as Hawking = 1, local market = 2, farm site = 3, through cooperatives = 4, friends and relatives = 5, stores = 6, roadsides = 7 and traditional homes/churches = 8.

4.5.1.2 Institutional factors

i. **Extension visits:** This is defined as the frequency of contact of beekeepers with extension workers in the last one year prior to the time the study was conducted. It was measured as no visit, visited once in a year, visited once in six months, visited once in three months and visited once in two weeks with 0, 1, 2, and 4.

ii. **Training:** Refers to acquisition of knowledge and skills on beekeeping. As beekeepers group, the beekeepers were given basic training on beekeeping and re-trained from time to time by either their NGO, beekeeping cooperative, workshop and other beekeepers. Frequency of re-training in the last one year prior to the time the study was conducted was investigated and measured as not trained, very rare, rare, often and very often, with a score of 0, 1, 2, 3 and 4.

iii. **Credit:** Is the amount of money received plus the cash equivalent of equipment received in naira in the last one year prior to the time the study was conducted. Non credit beneficiaries were assigned the value of 0.

iv. **Membership of beekeeping cooperative society:** years of belonging to beekeeping cooperative society was used. The beekeepers were asked to state how long they have belonged to the cooperative society in years while non cooperative members were scored 0.

Frequency of extension visits, re-training, amount of credit received and years of belonging to cooperative society are expected to have negative influence on poverty.

4.5.2 Dependent variables and their measurement

i. **Poverty:** Poverty in this study is based on two-third mean per adult income expenditure. Beekeepers with MPCRI less than 2/3 were considered poor and those with MPCRI equal or greater than 2/3 were considered non poor. This was measured as 0=poor and 1= non poor.

ii. **Income:** Refers to the amount of money realized from sale of honey bee products per annum in the previous year to the time of data collection. Income was measured in naira and is equal to total revenue from beekeeping products minus total variable cost incurred in production. Income is expected to be negatively related to poverty.

iii. **Standard of living:** This refers to contribution of beekeeping to basic household needs as well as the ability of the beekeepers to acquire assets. Mean response of less than 2 was categorized as poor standard of living while mean response greater than 2 was categorized as improved standard of living**.**

CHAPTER FIVE

RESULTS AND DISCUSSION

5.1 Description of Socio-economic and Institutional Factors Affecting Beekeeping

This chapter deals with the presentation and discussion of the result of the study. Findings were presented according to stated objectives. Selected socio-economic characteristics and institutional factors were considered in order to elicit valuable information on the effects of such variable on beekeeping among women in the study areas.

5.1.1 Socio-economic characteristics of the women beekeepers

5.1.1.1 Age of beekeepers

The age of the beekeepers was investigated in order to find out the age group mostly involved in beekeeping. Data in Table 5.1 indicates that 2.7% and 20% of the beekeepers in Ogun and Kaduna States respectively, were less than 25 years. In the same order, 15% and 33% were between 25-31 years; 19% and 21% were between 32-38 years while 29% and 20% were between 39-45 years in Ogun and Kaduna States respectively. The youthful age (≤45 years) forms a reasonable proportion cumulating to 65.7% in Ogun State and 94% in Kaduna State. This finding is similar to that of Ajao and Oladimeji, (2013); Folayan and Bifarin (2013) and Onwubuya *et al.,* (2013); Adgaba *et al.* (2014) who noted that most of the beekeepers studied in Kwara, Edo, Enugu States and Saudi Arabia respectively were below the age of 50 years. It was further discovered that 22% and 6% of Ogun and Kaduna States beekeepers respectively were between the ages of 46-52 years while it is only in Ogun State that 12.3% of the beekeepers were 53 years and above.

The mean age of the beekeepers in Ogun State was 41.84 years and that of Kaduna State was 32.1 years, which indicates that young and active female population group dominates beekeeping in the study areas, with younger beekeepers from Kaduna State group. This young age may be an advantage in adopting innovations in beekeeping. Finding is supported by Orisakwe and Agomuo (2011) who found that middle age farmers adopt agro-forestry technologies more than any other group.

Table 5.1: Distribution of beekeepers according to age

	Ogun		**Kaduna**	
Age (years)	**Frequency**	**Percentage**	**Frequency**	**Percentage**
< 25	3	2.7	25	20
25–31	16	15	42	33
32-38	20	19	27	21
39-45	31	29	26	20
46-52	24	22	8	6
≥52	13	12.3	-	-
Total	**107**	**100**	**128**	**100**
Mean		41.84		32.10
Standard deviation		10.30		8.28

5.1.1.2 Beekeeping experience

How long the beekeepers have been in beekeeping was investigated and documented in Table 5.2. About 74% and 42% of the beekeepers from Ogun State and Kaduna States, respectively had 1-5 years beekeeping experience. Another 21%and 23% had been in beekeeping business for 6-10 years while 5% and 35% had been in beekeeping for over 10 years. The mean beekeeping experience for Ogun State beekeepers was 4.6 years and

almost double (8.8 years) for Kaduna State beekeepers. With these means, it could be inferred that beekeeping is a relatively new enterprise among women in Kaduna and Ogun States. Findings are in consonance with studies by Micheal (2008); Yahaya and Usman, (2008) who noted that modern beekeeping enterprise in many parts of Nigeria is a recent innovation. Contrary to this, finding by Ajao and Oladimeji (2013); Tijani *et al.* (2011) in Kwara and Borno States respectively reported that most of the farmers have reasonable beekeeping experience of 16-20 years.

Table 5.2: Distribution of beekeepers according to beekeeping experience

Beekeeping Experience (years)	**Ogun**		**Kaduna**	
	Frequency	**Percentage**	**Frequency**	**Percentage**
1-5	79	74	54	42
6-10	23	21	29	23
>10	5	5	45	35
Total	**107**	**100**	**128**	**100**
Mean		4.6		8.8
Standard deviation		2.9		5.7

5.1.1.3 Number of hives

With respect to number of hives, figure 4 shows that 29% and 66% of Ogun and Kaduna States beekeepers respectively owned 2-12 hives. About 37.3% and 22% of Ogun and Kaduna States beekeepers respectively owned 13-23 hives. Another 16% and 6%; 8.4% and 5% beekeepers from Ogun and Kaduna States, respectively owned 24-34; 35-45 hives while 9.3% and 1% beekeepers from Ogun and Kaduna States, respectively owned more than 45 hives. The mean number of hives owned by Ogun State beekeepers was 23 hives while 12 hives was owned by Kaduna State beekeepers. These probably

show that majority of the beekeepers were small scale. Finding is supported by Abdul-Malik and Mohammed (2012) and Ajao and Oladimeji, (2013) who in their respective studies found that majority of the beekeepers were small scale farmers.

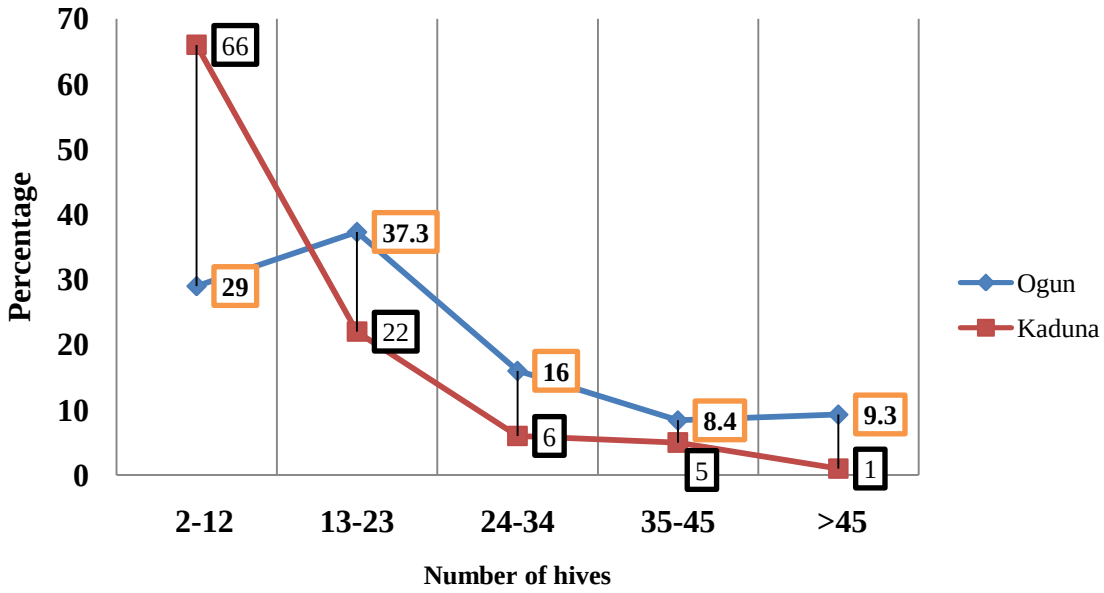


Figure 4: Distribution of beekeepers according to number of hives

5.1.1.4 ***Access to land***

Land is a major factor in agricultural production. Yet it is a major constraint to women farmers' production. One of the advantages of beekeeping is that the potential beekeeper only need users permit and not necessarily own one. Furthermore the hives are movable and can be relocated to another farm if the need arise. Access to land was classified into temporary and permanent access (Table 5.3). Majority of the beekeepers (72.57% and 69.53%, Ogun and Kaduna States, respectively) had temporary access. Although, more of the beekeepers placed their hive on family land, this is given to them by their husbands on temporary bases. Permanent access was 27.43% for Ogun State beekeepers while Kaduna State beekeepers had 30.47%. Results of the analysis attest to report of many scholars (Fabiyi *et al.*, 2007; Yusuf *et al.*, 2010; Oladejo *et al.*, 2011)

that land is a major limiting factor for women productivity. Beekeeping therefore has the potential to minimize this problem.

Table 5.3: Distribution of beekeepers based on access to land

Method of land access		Ogun		Kaduna	
		Frequency	**Percentage**	**Frequency**	**Percentage**
Temporary	Family land	45	38.50	61	47.65
	Rented	13	11.00	7	5.47
	Cooperative land	15	12.82	15	11.72
	Borrowed land	2	1.70	-	-
	Other crop farmers land	10	8.55	6	4.69
Permanent	Land by gift	3	2.60	15	11.72
	Purchased land	17	14.53	4	3.12
	Inherited land	12	10.30	20	15.63
	Total	**117***	**100**	**128**	**100**

*multiple responses

5.1.1.5 ***Education***

Education plays significant role in the fight against poverty. It influences people decision on awareness, perception, reception, adoption of innovations, and their ability to view and comprehend new ways of doing things to improve their living condition. Graphically, figure 5 depicts the educational level of the beekeepers. Much difference was recorded as only 3.67% of Ogun State beekeepers had no formal education compared to 27.34% of Kaduna State beekeepers. Comparable result was obtained at primary school level with 28.44% and 26% for Ogun and Kaduna States beekeepers

respectively. At secondary and post secondary level of education, Ogun State beekeepers recorded higher percentage of 33.94% and 31.2% respectively compared to Kaduna State beekeepers with 24% and 23% respectively at secondary and post secondary schools.

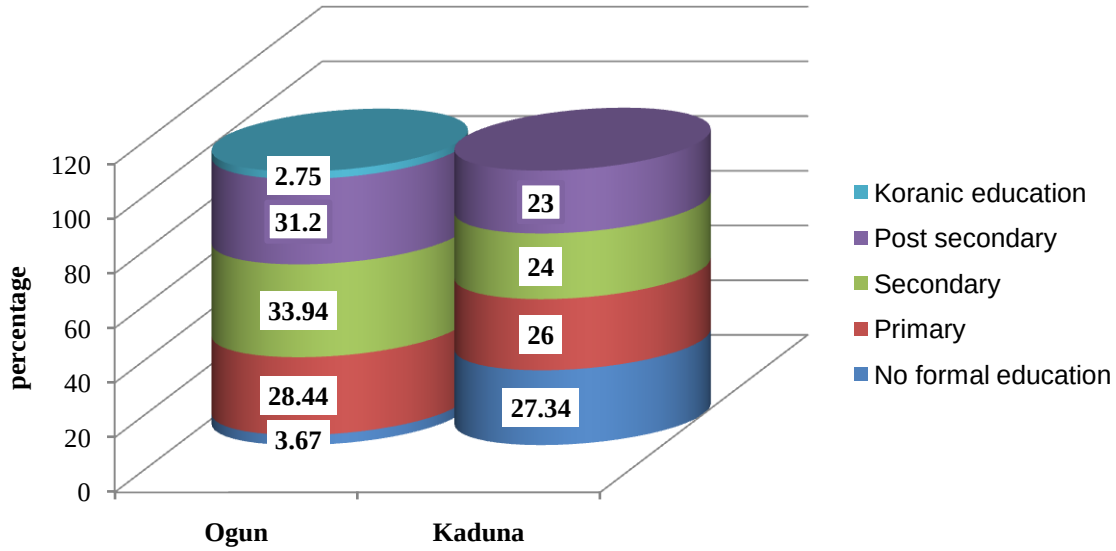


Figure 5: Distribution of beekeepers according to levels of education

About 2.75% had koranic education in Ogun State. Based on education distribution of the beekeepers in figure 5, it can be inferred that Kaduna State beekeepers are less educated when compared to Ogun State beekeepers. This finding can be attributed to the culture of male child preference in education that is more evident in the northern part of Nigeria. Finding is similar to Yahaya and Usman (2008) report that beekeepers had western education up to tertiary level, but majority stopped at secondary level.

5.1.1.6 ***Household size***

Household sizes may be an expression of an economic burden, poverty situation and social indication of a given population. However, large household size may be an

advantage in an agrarian society because of the availability of work force. Poverty reduction strategies therefore require an effective assessment and a clear understanding of how household size and its structure affect poverty. Responses on household size (Table 5.4) indicated that 98% and 61% of the beekeepers from Ogun and Kaduna States respectively had 2-9 people in their household. About 2% of the beekeepers from Ogun State had 10-17 people in their household. In Kaduna State, 37% and 2% of the beekeepers had 10-17 people and more than 17 people respectively in their household.

Table 5.4: Distribution of beekeepers according to household size

	Ogun		**Kaduna**	
Household size	**Frequency**	**Percentage**	**Frequency**	**Percentage**
2-9	105	98	79	61
10-17	2	2	47	37
>17	-	-	2	2
Total	**107**	**100**	**128**	**100**
Mean		5		9
Standard deviation		2.2		3.3

The mean household size was 5 and 9 for Ogun and Kaduna States beekeepers respectively. These means (5 and 9) indicates that Ogun State beekeepers' household size is smaller than that of Kaduna State beekeepers. It could also be inferred that the household size of majority of the beekeepers in Ogun State is comparable to the national average family size of 5 while Kaduna State beekeepers had higher household size greater than the national average family of 5 (National Bureau of Statistics, 2010; 2012). Large household size in Kaduna State could be attributed to early girls' marriage and long years of child bearing that are very common in the Northern States of Nigeria.

5.1.1.7 Labour contribution in beekeeping by household members and family upkeep

Household members usually work together to maximize profit. Investigation was carried on adult and child labour contribution in beekeeping. Investigation on adult labour contribution reveals that about 96% and 95% of Ogun and Kaduna States beekeepers, respectively were assisted by 1-3 adults. Furthermore, 4% and 5% of the beekeepers from Ogun and Kaduna States, respectively were assisted by 4-6 adults (Table 5.5). The mean adult labour contribution in each of the State was 2 adult.

Table 5.5: Distribution of beekeepers according to labour contribution

Variables	Ogun		Kaduna	
	Frequency	Percentage	Frequency	Percentage
Adult				
1-3	71	96	79	95
4-6	3	4	4	5
Total	**74**	**100**	**83**	**100**
Mean		2		2
Standard deviation		1.6		1.4
Child labour				
1-3	41	98	75	84
4-6	1	2	13	15
>6	-	-	1	1
Total	**45**	**100**	**89**	**100**
Mean		2		3
Standard deviation		1.5		2.6

Variable on child labour contribution reveals that 98% and 84% of the beekeepers from Ogun and Kaduna States, respectively were assisted by 1-3 children. Another 2% and 15% of Ogun and Kaduna States beekeepers, respectively were assisted by 4-6 children while 1% of Kaduna State beekeepers had more than 6 children that assisted them. The mean children labour contribution for Ogun State beekeepers was 2 against 3 in Kaduna State (Table 5.5). The use of adults and children labour in beekeeping, therefore suggest that beekeeping can be a family enterprise that generate employment for both young and old.

Investigation was also carried out on household members' contribution to family upkeep aside working on bee farm (Table 5.6). This was done to determine the number of household members that were totally dependants. About 94% and 70%; 6% and 20% of Ogun and Kaduna States beekeepers respectively, had 1-3 people and 4-6 people that contributed to family upkeep. In addition, 10% of Kaduna State beekeepers had over 6 people who contributed to family upkeep. The mean number of people that made contribution to household upkeep was 2 in Ogun State and 3 in Kaduna State.

Table 5.6: Distribution of beekeepers according to contribution family upkeep

Contribution to family upkeep	**Ogun**		**Kaduna**	
	Frequency	**Percentage**	**Frequency**	**Percentage**
1-3	47	94	48	70
4-6	3	6	14	20
>6	-	-	7	10
Total	**50**	**100**	**69**	**100**
Mean		2		3
Standard deviation		1.8		2.1

5.1.1.8 Dependency

Dependency exerts negative influence on household income. The number of dependants (Table 5.7) was investigated. Result show that 77% and 48% of Ogun and Kaduna States beekeepers had 1-3 dependants respectively. Findings also show that 23% of the beekeepers from Ogun State had 4-6 dependants and terminated here. About 37% and 15% of the beekeepers in Kaduna State had 4-6 and more than 6 dependants respectively. The mean number of dependant for Ogun State beekeepers was 2 and twice (4) for Kaduna State beekeepers. The mean number of dependants reveals that beekeepers in Kaduna State had more dependants when compared to beekeepers in Ogun State. It can therefore be implied that Kaduna State beekeepers are more likely to spend more of their income in meeting basic needs (feeding, clothing, educating, training etc) of their dependants rather than investing on productive asset or expansion of their farm size.

Table 5.7: Distribution of beekeepers according to number of dependants

	Ogun		**Kaduna**	
Dependants	**Frequency**	**Percentage**	**Frequency**	**Percentage**
1-3	78	77	56	48
4-6	24	23	44	37
>6	-	-	18	15
Total	**102**	**100**	**118**	**100**
Mean		2		4
Standard deviation		1.7		3.2

4.1.1.9 Nature of beekeeping

Majority (98% and 93%) of the beekeepers (Ogun and Kaduna States, respectively) took beekeeping as secondary occupation while only 2% and 7% took it as primary occupation (figure 6). This shows that beekeeping could be combined with other forms of occupations and could also serve as supportive source of income to the beekeepers.

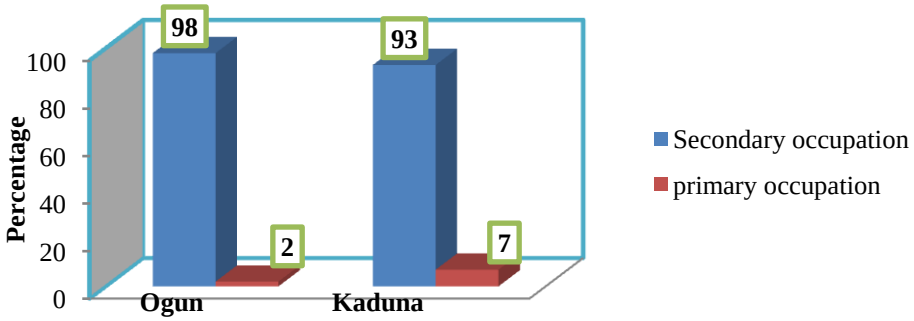


Figure 6: Distribution of beekeepers according to nature of beekeeping

However, it could be inferred that the full economic potential of beekeeping is yet to be realized by the people since beekeeping is a secondary occupation. Finding suggests that in the light of high unemployment and supply demand gap of honey in the country, beekeepers should be encouraged to take up beekeeping as a primary occupation. Finding lends credence to Nuhu (2011) who referred to beekeeping as an important self employment opportunity for the generation of supplemental income for subsistence farmers.

Among those that took beekeeping as secondary occupation, further investigation revealed that 35% and 22% of Ogun and Kaduna States beekeepers respectively signified trading as their major occupation. About 18% and 21% (Ogun and Kaduna beekeepers respectively) were into government/paid employment. Another 34% and 54% of them were into farming. In Ogun State, 8%, 3% and 2% of the beekeepers were

artisans; retiree and student respectively while in Kaduna State, 2% and 1% of the beekeepers were retiree and student, respectively (Table 5.8).

Table 5.8: Distribution of beekeepers according to major occupations

Major occupations	Ogun		Kaduna	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Trading	37	35	26	22
Government/paid employment	19	18	25	21
Farming	36	34	65	54
Artisan	8	8	-	-
Retiree	3	3	2	2
Students	2	2	1	1
Total	**105**	**100**	**119**	**100**

5.1.1.10 Marketing outlets

The production of any commodity is said to be incomplete until the commodity concerned reaches the ultimate consumers. Therefore producing hive products for profit and growth of the apicultural sector of the economy is highly dependent on successful marketing. Marketing outlets used by the beekeepers was investigated and presented in Table 5.9. About 2.3% and 17% of Ogun and Kaduna States beekeepers sell their bee products by hawking. Selling at local market, farm site and road sides was reported by 9.1% and 46.3%; 10.9% and 13.6%; 1.1% and 5.4% by Ogun and Kaduna States beekeepers, respectively. In the same order, 32.7% and 10.2% sells their products via friends and relatives while 26.3% and 1.4% made sale via stores/shops. Selling via cooperatives was reported by 6.3% and 6.1% (Ogun and Kaduna State beekeepers,

respectively). Sales via traditional homes and churches were reported by 11.4% by Ogun State beekeepers.

Table 5.9: Distribution of beekeepers according to marketing outlets

	Ogun		Kaduna	
Marketing outlets	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Hawking	4	2.3	25	17
Local market	16	9.1	68	46.3
Farm site	19	10.9	20	13.6
Road side	2	1.1	8	5.4
Friends and relatives	57	32.6	15	10.2
Stores/shops	46	26.3	2	1.4
Cooperative	11	6.3	9	6.1
Traditional homes/church	20	11.4	-	-
Total	**175**	**100**	**147**	**100**

*multiple responses

From the different marketing outlets reported, it could be inferred that the beekeepers use marketing outlets that probably attract low price for their produce. The important role of cooperative in marketing of agricultural outputs is well documented (Idrisa., Sulumbe and Mohammed, 2007; UN, 2009; Ogunbameru, *et al.,* 2010; Lea, 2012). Cooperatives are expected to provide access to wider markets and higher prices but from the result in Table 5.9, it could be inferred that the beekeeping cooperative groups did not offer their members adequate marketing services.

4.1.1.11 Sources of information on beekeeping

Information is an important input for production. Rural women often suffer from acute low productivity, due to ignorance, which is a direct consequence of either inadequate or total lack of information. This study sought to know the sources of information on beekeeping. Findings in Table 5.10 indicates that the major sources of information used by Ogun and Kaduna States beekeepers were friends and relatives into beekeeping (18.4%and 16.3%); NGOs (16.5% and 15.5%); radio (13% and 20.7%); television (11.9% and 16.3%) and cooperative (10.7% and 11.8%), respectively.

Table 5.10: Distribution of beekeepers according to sources of information on beekeeping

	Ogun		**Kaduna**	
Sources of information	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Friends and relatives into beekeeping	48	18.4	66	16.3
NGOs	43	16.5	63	15.5
Radio	34	13.0	84	20.7
Television	31	11.9	66	16.3
Cooperative	28	10.7	48	11.8
Research Institute/University	27	10.3	6	1.5
Written publications	27	10.3	31	7.6
Internet	17	6.5	14	3.4
Extension agents	2	0.8	28	6.9
Seminars	4	1.5	-	-
Total	***261**	**100**	***406**	**100**

*multiple responses

Other minor sources of information reported by 10.3% and 1.5%; 10.3% and 7.6%; 6.5% and 3.4% (Ogun and Kaduna States beekeepers, respectively) were research Institute/University, written publications and internet. The limited use of these sources of information could be attributed to low educational status of the beekeepers (figure 6). About 0.8% and 6.9% of Ogun and Kaduna States beekeepers, respectively reported extension agents as their source of information. Similar result was obtained by Micheal (2008) who noted that fellow beekeepers and extension agents were the major (80%) and least (10%) sources of information used by beekeepers. About 1.5% of Ogun State beekeepers reported seminar as their source of information. Finding corroborates Banmeke and Olowu, (2005); Sabo, (2007); Swanson and Rajalahti (2010) and Owolabi, Abubakar, and Amodu (2011) assertion that less than 10 percent of women farmers have access to agricultural extension communication sources.

5.1.2 Institutional factors influencing beekeeping

5.1.2.1 Membership of beekeeping cooperative Societies

Membership of cooperative society and years of been in cooperative group was investigated. Data analysis (Table 5.11) shows that 74% and 30% of the beekeeper in Ogun and Kaduna States, respectively did not belong to any beekeeping cooperative group. A probe into how long the beekeepers have been in their groups indicates that 16% and 45% belong to beekeeping cooperative between 1-4 year in Ogun and Kaduna States, respectively. Response for 5-8 years and greater than 8 year membership was reported by 8% and 22%; 2% and 3% by Ogun and Kaduna States, beekeepers respectively.

Table 5.11: Distribution of beekeepers according to membership of cooperative society

Membership of cooperative (years)	Ogun		Kaduna	
	Frequency	Percentage	Frequency	Percentage
Does not belong	79	74	39	30
1-4	17	16	57	45
5-8	9	8	28	22
>9	2	2	4	3
Total	**107**	**100**	**128**	**100**

5.1.2.2 Access to credit

Results show that overwhelming majority (73% and 94%) of Ogun and Kaduna States, beekeepers respectively did not receive credit in the last one year. Among the credit beneficiaries, 17% and 10% of Ogun State beekeepers received credit in the form of cash and equipment, respectively while 6% of Kaduna State beekeepers received credit in the form of cash only (figure 7).

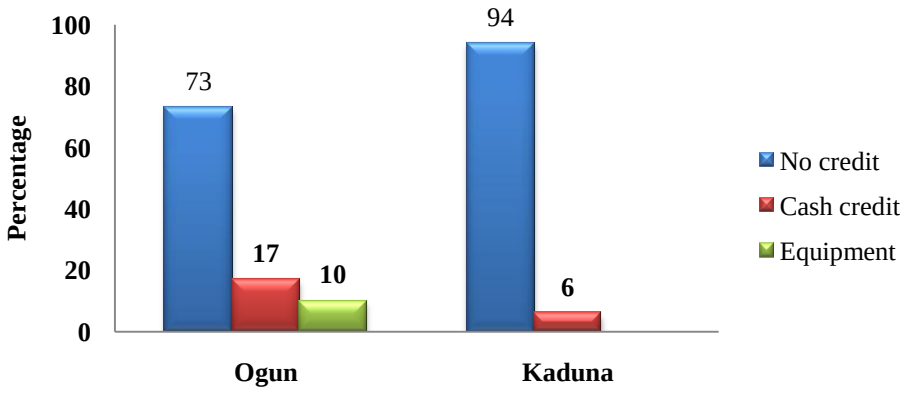


Figure 7: Distribution of beekeepers according to credit obtained

In order to appreciate the level of financial assistance received by the beekeepers, analysis was made into the amount of cash received. About 43% and 86% of the Ogun and Kaduna States beneficiaries received cash of less than ₦15,000-60,000. Another

57% and 14% of the beneficiaries from Ogun and Kaduna States, respectively received cash above ₦60,000. The mean cash received was ₦96,150 by Ogun State beneficiaries and less than half (₦45,430) for Kaduna State beneficiaries (Table 5.12).

Table 5.12: Distribution of beekeepers according amount and sources of credit receive

	Ogun		Kaduna	
variables	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Amount of money (₦)				
< 15,000- 60,000	8	43	6	86
>60,000	10	57	1	14
Total	**18**	**100**	**7**	**100**
Mean	₦ 96,150		₦ 45,430	
Standard deviation	₦70,100		₦ 21,200	
Sources of credit				
Husband	5	17	-	-
Bank	1	4	-	-
Cooperative	3	10	6	67
Friend and relatives	4	14	-	-
NGO/BES	16	55	3	33
Total	29	100	9*	100

*Multiple responses

Probing further, 55% of the credit beneficiaries in Ogun State obtained credit from NGOs. This was followed by friends, husband and cooperative with 17%, 10% and 4%, respectively. The least (4%) source of credit was bank (table 5.12). In Kaduna State

67% of the credit beneficiaries obtained their credit from cooperative while 33% obtained their credit from BES.

For distribution of equipments received by Ogun State beekeepers, 22.72% and 13.6% of the beneficiaries received hive stand and bee suit respectively. About 11.4% each received wax extractors and smokers. Furthermore about 9.1% each received hives and packaging bottles; 6.8% each received honey press and honey knife while 4.54% each of the beneficiaries received sprayer and protective kits (Table 5.13).

Table 5.13: Distribution of Ogun State beekeepers according to equipments received from OBNG

Equipments	**Frequency**	**Percentage**
Hive stands	10	22.72
Bee suit	6	13.60
Extractor	5	11.40
Smokers	5	11.40
Hives	4	9.10
Packaging bottles	4	9.10
Honey press	3	6.80
Honey knife	3	6.80
Sprayer	2	4.54
Protective kit	2	4.54
Total	***44**	**100**

*Multiple responses

5.1.2.3 Agricultural extension services

Agricultural extension services constitute a driving force for any agricultural development. The relationship between agricultural extension agent and the farmer is an important determinant in the adoption and sustenance of improved farm practices such as beekeeping. Figure 9 shows that the overwhelming majorities (93% and 79%) of Ogun and Kaduna States beekeepers, respectively were not visited in the last one year prior to the time of this study. Extent of extension visits among those visited was investigated (figure 8). About 5% and 9% of Ogun and Kaduna States beekeepers respectively were visited once in a year. Another 1% and 8% of Ogun and Kaduna States beekeepers respectively were visited once in six month. Furthermore, 1% and 3% were visited once in three months in Ogun and Kaduna States, respectively while 1% of Kaduna State beekeepers were visited once in two weeks. Based on findings it can be inferred that extension services on beekeeping is limited among beekeepers studied.

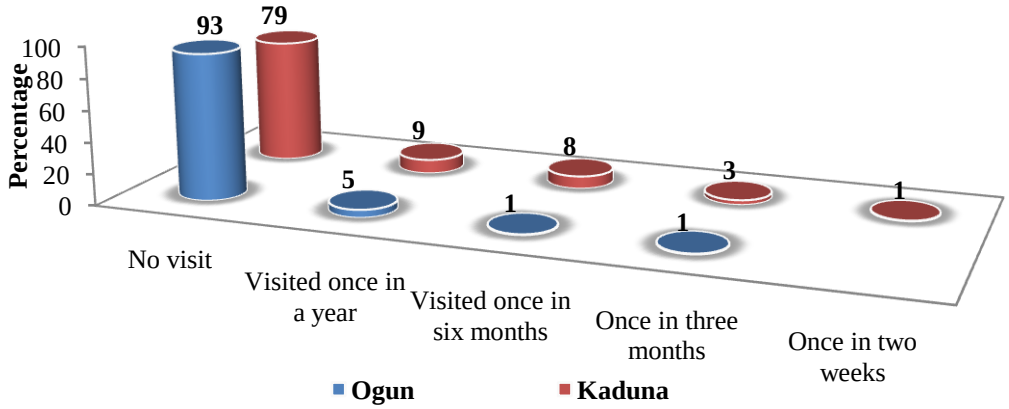


Figure 8: Distribution of beekeepers according to extension visits

The nature of extension services received by the beekeepers was investigated and presented in Table 5.14. Swarm control and wax processing to get secondary products were reported by 17% and 11%; 8% and 14% by Ogun and Kaduna States beekeepers respectively. Specific information reported by beekeepers in Ogun State were bee

rearing with 25%; proper use of insecticide and use of honey as additive in baking with 17%. Labeling and honey classification were reported by 8% each.

Table 5.14: Distribution of beekeepers according to nature of extension services

	Ogun		Kaduna	
Extension Services received	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Swarm control	2	17	4	11
Wax processed to get secondary products (candle, cream)	1	8	5	14
Bee rearing	3	25	-	-
Proper use of insecticide by beekeepers and crop farmers	2	17	-	-
Honey used as additive in baking	2	17	-	-
Labeling	1	8	-	-
Honey classification	1	8	-	-
Use of water spray and smoke to calm bee	-	-	6	16
Identifying leaves for bait and making bait	-	-	9	24
Queen trap and transfer	-	-	8	21
Packaging	-	-	3	8
Honey fortification with ginger oil	-	-	1	3
Pricing information	-	-	1	3
Total	***12**	**100**	***37**	**100**

*multiple responses

How to use water spray to complement smoke in calming bees while working in the farm, identification of leave that can be use as bait or leaves to make bait; queen trap and transfer were specific information reported by Kaduna State beekeepers. These

scored 16%, 24% and 21% respectively. About 8% reported packaging. Honey fortification with ginger oil and information on pricing were reported by 3% each.

Inquiry into reasons for lack of extension visits was made. Results of findings in Table 5.15 indicate that the most reported reasons by beekeepers in both States were: extension agents for beekeeping are not available in my locality with a score of 15.5% and 30.47% (Ogun and Kaduna States, respectively). No interest scored 13.6% and 15.2% while I prefer to seek for assistance from my NGO scored 12.7% and 29.5% (Ogun and Kaduna States respectively). The least reasons given were I don't need the services of extension agent for my beekeeping and the time for extension programs is not convenient with a score of 3.6 and 1%; 5.5% and 2% (Ogun and Kaduna States, respectively).

Reasons specifically given for lack of extension services by Ogun State beekeepers were Ogun State Agricultural Development programme (OGADEP) does not have well trained extension agent for beekeeping. This scored 29.1%. It is easier to get assistance from my NGO than from extension agent with a score of 8.2% and Iam more knowledgeable in beekeeping than extension agents in the zone with a score of 11.8%. In Kaduna State about 8.5% of the beekeepers reported that the extension agent in the zone was transferred while 13.33% said their locations were difficult to access.

Table 5.15: Distribution of beekeeper according to lack of extension visits

Reasons for lack of extension visits	Ogun		Kaduna	
	Frequency	Percentage	Frequency	Percentage
Extension agents for beekeeping are not available in my locality	17	15.5	32	30.47
No interest	15	13.6	16	15.2
I prefer to seek for assistance from my NGO	14	12.7	31	29.5
I don't need the services of extension agent	4	3.6	1	1
The time for extension program is not convenient	6	5.5	2	2
OGADEP does not have well trained agent for beekeeping	32	29.1	-	-
It is easier to get assistance from my NGO than extension agents	9	8.2	-	-
Iam more knowledgeable in beekeeping than extension agents in the zone	13	11.8	-	-
The extension agent in the zone is on transfer	-	-	9	8.5
My location is difficult to access	-	-	14	13.33
Total	***110**	**100**	***105**	**100**

*Multiple responses

5.1.2.4 Training

Training is very important to create awareness on technology as well as to make the beneficiary more productive. Investigation on re-training was carried out (Table 5.16). Findings reveal that 32% and 51% of Ogun and Kaduna States beekeepers did not receive any re-training in the last one year prior to the time the study was conducted. In the order of Ogun and Kaduna States, results of analysis further shows that 4% and 2%;

10% and 5%; 8% and 1% were re-trained by extension agent; cooperative and other beekeepers, respectively. In Kaduna State, majority (41%) of the beekeeper were re-trained by BES an NGO whereas, Ogun State beekeepers were trained by a number of NGOs. Furthermore, 18%; 14%; 7% and 2%, respectively were re-trained by Tommy Bee; Elacon; Bee Friendly and Bee Craft and 5% were re-trained in a workshop.

Table 5.16: Distribution of beekeepers according to re-training

		Ogun		Kaduna	
Training		**Frequency**	**Percentage**	**Frequency**	**Percentage**
	Not trained	41	32	67	51
Trained by:	Extension agents	5	4	2	2
	Cooperative	13	10	6	5
	Other beekeepers	10	8	1	1
	BES	-	-	54	41
	Tommy bee	23	18	-	-
	Elacon	17	14	-	-
	Bee friendly	9	7	-	-
	Bee craft	3	2	-	-
	Public workshop	6	5	-	-
	Total	***127**	**100**	***130**	**100**

*multiple responses

The type of re-training received was investigated (Table 5.17). Re-training received that were common to beekeepers in Ogun and Kaduna States was making of candle and cream using bee wax, with a score of 10.8% and 24%; 9.45% and 13%, respectively. Making of label and wax extraction or molding into definite shape, scored 6.8% and

3%; 6.8% and 13% respectively. Apitherapy score 12.16% and 11% respectively. Re-training received and specifically reported by Ogun State beekeepers includes queen rearing methods, making of soap and polish from bee wax with a score of 10.8%; 8.1% and 5.4%, respectively. About 16.22% and 13.51% were re-trained on methods of harvesting/processing bee products and bee colony management respectively. Re-training specific to beekeepers in Kaduna State was making of honey in sachet and sewing of bee catcher using veil cloth, with a score of 16% and 20%, respectively.

Table 5.17: Distribution of beekeepers according to nature of re-training received

	Ogun		**Kaduna**	
Training received	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Candle	8	10.80	22	24
Cream	7	9.45	12	13
Label	5	6.80	3	3
Wax extraction/molding	5	6.80	12	13
Apitheraphy	7	12.16	10	11
Queen rearing methods	6	10.80	-	-
Soap	4	8.10	-	-
Polish	2	5.40	-	-
Harvesting/processing products	10	16.22	-	-
Colony management	8	13.51	-	-
Sachet honey	-	-	15	16
Making bee catcher	-	-	18	20
Total	***74**	**100**	***92**	**100**

*multiple responses

Further investigation on frequency of re-training reveals that 3% and 7%; 42% and 46% beekeepers from Ogun and Kaduna States, respectively indicates very rare and rare. Another 29% and 34%; 26% and 13% indicates often and very often in the same order (Table 5.18).

Inquiry was also made into the relevance of re-training received. About 58% and 59% of those re-trained (Ogun and Kaduna States, respectively) reported that re-training was very relevant. Another 41% each from Ogun and Kaduna States reported that the re-training was relevant. Despite the report of the majority, 1% of the beekeepers from Ogun State reported that the re-training was not relevant (Table 5.18).

Table 5.18: Distribution of beekeepers according to frequency and relevance of re-training

	Ogun		**Kaduna**	
Variables	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Frequency of re-training				
Very rare	2	3	4	7
Rare	28	42	28	46
Often	19	29	21	34
Very often	17	26	8	13
Total	**66**	**100**	**61**	**100**
Relevance of re-training				
Very relevant	38	58	37	59
Relevant	27	41	24	41
Not relevant	1	1	-	-
Total	**66**	**100**	**61**	**100**

5.1.2 Honeybee Products

For a particular product to be produce, people must know about it. Awareness of bee products was studied to identify the different bee products known and produced by the beekeepers.

5.2.1 Awareness of honeybee products

Level of awareness in this study is by comparing the number of beekeepers that are aware of each of the bee product to the total number of beekeepers and categorized into high, moderate and low. High level of awareness (100% each; 94% and 93%) was reported for honey and bee wax by Ogun and Kaduna States beekeepers, respectively (figure 9).

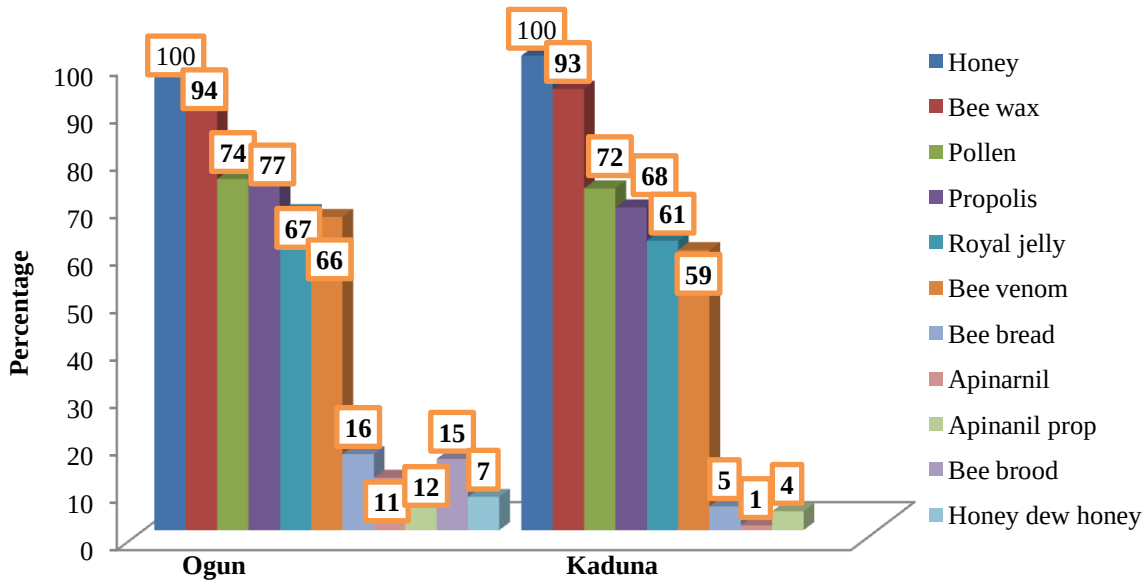


Figure 9: Distribution of beekeepers according to awareness of honey bee products

Moderate level of awareness (74% and 72%; 77% and 68%) was reported for pollen, propolis by Ogun and Kaduna States beekeepers, respectively. In the same order, another moderate level of awareness (67% and 61%; 66% and 59%) was reported for royal jelly and bee venom. Low level of awareness was recorded for bee bread;

apinarnil and apinanil prop with 16% and 5%; 11% and 1%; 12% and 4% by Ogun and Kaduna States beekeepers, respectively. Another low (1% and 4%) level of awareness was reported for bee brood and honey dew honey, respectively by Ogun State beekeepers.

5.2.2 Honeybee production

Ogun State beekeepers produce 7 bee products whereas Kaduna State beekeepers produce 4. All (100 percent) the beekeepers produce honey. In Ogun State, the number of beekeepers producing bee wax almost triples (68% and 23%) those of Kaduna State beekeepers. Similarly, the number of Ogun State beekeepers producing pollen almost doubles (7% and 4%) those of Kaduna State beekeepers. The number of beekeepers in Ogun State producing propolis was 12 while only 1 person of the beekeepers in Kaduna State produces propolis. About 7%, 13% and 1% of Ogun State beekeepers produces bee venom, bee bread and bee brood respectively (figure 10). Pictorially, honey and bee wax were the major bee products produced by the beekeepers. This finding is in agreement with Ayansola (2012).

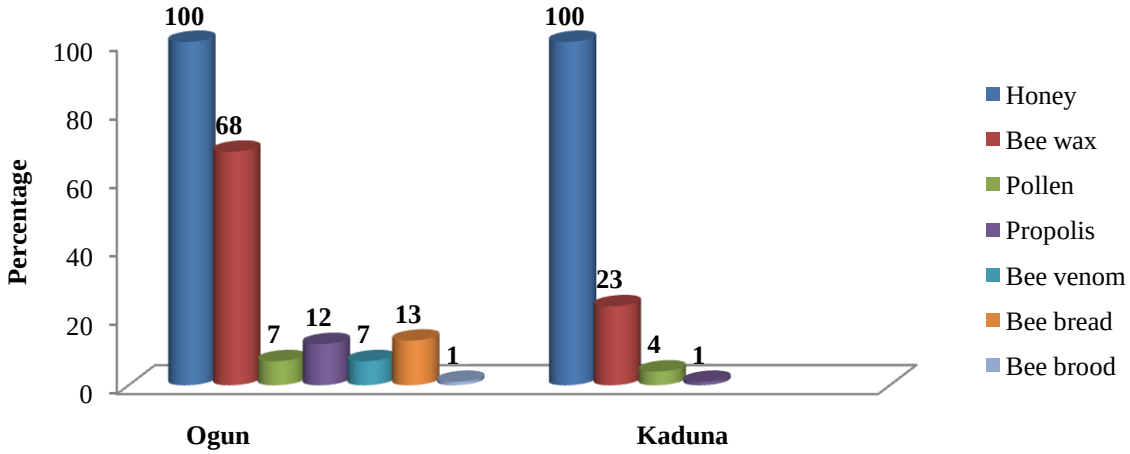


Figure 10: Distribution of beekeepers according to production of honey bee products

For maximum return of inputs, it is expected that the beekeepers will produce all the bee products. Contrary to this assumption, some bee products were not produced. Some of the major reasons deduce for not producing those bee products were: no equipments and equipment related problems (expensive, sophisticated and not available locally) was reported by 40% and 19% by Ogun and Kaduna States beekeepers, respectively (Table 5.19).

Table 5.19: Distribution of beekeepers based on reason for not producing the entire bee products

	Ogun		Kaduna	
Reasons	**Frequency**	**Percentage**	**Frequency**	**Percentage**
No equipments/ equipment related issues	46	40	34	19
No technical knowledge on how produce and harvest	23	20	26	14
Not aware of their market demands	33	28	41	22
Not trained on how to process	7	6	33	18
Interest in honey only	5	4	9	5
Iam new in beekeeping	2	2	-	-
I don't know their value	-	-	28	15
Wax extraction using fire is hectic/ difficult	-	-	13	7
Total	***116**	**100**	***184**	**100**

*Multiple responses

No technical knowledge on how to produce and harvest those products was reported by 20% and 14% by Ogun and Kaduna States beekeepers, respectively. About 28% and

22% beekeepers from Ogun and Kaduna State, respectively claimed they were not aware of the market demand for those bee products. This response indicates that availability of market is an important driving force for production of all the bee products (Table 5.19). Another 6% and 18% of the beekeepers from Ogun and Kaduna States claimed they were not trained on how to process those products while others claimed that their interest is in honey production with a score of 4% and 5%, respectively. In Ogun State, 2% of the beekeepers claimed they are new in beekeeping. With this statement, it can be inferred that those beekeepers are not ready to take risk. In Kaduna State, some beekeepers also claimed that they don't know the value of those products while others claimed that wax extraction using fire wood is difficult and hectic with a score of 15% and 7% respectively (Table 5.19). Findings on alluded reasons for not producing all the honey bee products is supported by Gallmann and Thomas (2012); Nebiyu and Messele (2013). Gallmann and Thomas in their finding reported that the necessary steps for preparing and selling small quantities of beeswax is difficult. Hence, beeswax is very often disposed off rather than collected.

Nebiyu and Messele (2013) however stated that lack of knowledge on the importance of bee wax as an income generating hive product compared to honey, lack of processing skills, lack of market and lack of processing material were reasons reported by beekeepers for not producing wax. Another related publication also stated that Pollen, royal jelly, propolis and bee venom are hive products which call for experience in beekeeping and specialized skills in production and marketing (www.beekeeping. com/articles/ us/small _bee keeping/hive_ products.htm)

5.2.3 Quantity of honey bee products produced

5.2.3.1 Quantity of honey produced

Further investigation reveals that the total output of honey produced by all (100%) the beekeepers in Ogun State was 11,878 liters (L) with a mean output of 111L. In Kaduna State, a total of 10,140L of honey was produced while the mean output was 79.23L. (Table 5.20).

5.2.3.2 Quantity of bee wax produced

In Ogun State, out of 68% of the beekeepers that produce bee wax, 65% had record of their production which gave a total output of 994 kilogram (kg) while 3% had no record of the quantity of bee wax produced. The mean bee wax for the 65% of the beekeepers was 14.21kg. (Table 5.21). In Kaduna State, out of 23% of beekeepers that produce bee wax, 11% had record of their production which gave a total output of 320 Kg. About 12% had no record of the quantity of bee wax produced. The mean bee wax for the 11% of the beekeepers was 22.86 kg. (Table 5.20).

5.2.3.3 Quantities of other bee products produced

The total output of pollen and propolis produced by 7% each of Ogun State beekeepers was 77kg and 95kg, respectively. The mean output of 11kg and 13.54kg was obtained for pollen and propolis respectively. About 4% and 1% of beekeepers in Kaduna State produces pollen and propolis but no record of the quantity produced (Table 5.20). Total output of bee venom produced by 4% of Ogun State beekeeper was 83kg. About 3% of the beekeepers had no record of bee venom produced. The mean output of bee venom for 4% of the beekeepers was 20.75kg. Additionally, about 13% and 1% of Ogun State

beekeepers produces bee bread and bee brood but no record of quantity produced (Table 5.20).

Table 5.20: Distribution of beekeeper according to quantity of output

Estimated variables		honey	bee wax	pollen	propolis	bee venom	bee bread	bee brood
Ogun	Total output	11878	994	77	95	83	-	-
	Minimum	3	2	5	2	11	-	-
	Maximum	620	200	30	32	30	-	-
	Mean	111	14.21	11	13.54	20.75	-	-
	% production with estimate	100	65	7	7	4	-	-
	% production without estimate	0	3	0	5	3	13	1
Kaduna	Total output	10140	320	-	-	-	-	-
	Minimum	4	1	-	-	-	-	-
	Maximum	850	250	-	-	-	-	-
	Mean	79.23	22.86	-	-	-	-	-
	% production With estimate	100	11	-	-	-	-	-
	% production without estimate	0	12	4	1	-	-	-

5.2.3.4 Number of harvests of honey bee products per year

Results show that majority (71% each) of the beekeepers from both States carried out harvesting of bee products once in a year. Another 24% and 28% of Ogun and Kaduna States beekeepers respectively claimed to harvest twice in a year and the remaining 5%

and 1% did their harvesting thrice in a year (Table 5.21). The probable reason for harvesting honey bee products once in a year is that beekeeping is a secondary occupation to majority of the beekeepers (figure 6). Finding is at variance with Ayansola, (2012) who reported that majority of the beekeepers carried out harvesting of honey two to three times in a year while others harvest honey more than three times per annum.

Table 5.21: Distribution of beekeepers according to number of harvest per year

	Ogun		Kaduna	
Harvest	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Once	76	71	90	71
Twice	26	24	36	28
Thrice	5	5	1	1
Total	**107**	**100**	**128**	**100**

5.3 Poverty Status of Women Beekeepers

Poverty status in this study was based on household income from beekeeping. Although attempts have been made to define or measure poverty using individuals, household, family income or expenditure, as basis of defining who is poor, the study used and considered the relative poverty measurement to determine the poverty status of the beekeepers. The advantage of this measurement over other measurements is that poverty was determined in relation to the living standard of the target population and also the ability to assess changes in the living standard of the people over time.

The mean per adult equivalent household income in a year was ₦117,703 for Ogun State beekeepers and ₦51,647 for Kaduna State beekeepers. This gives two-thirds of

₦78,861 and ₦34,604 per adult equivalent, which was the poverty line for beekeeper in Ogun and Kaduna State respectively. Based on poverty line estimate of ₦78,861 and ₦34,604 it therefore means that 45% and 48% of the beekeepers in Ogun and Kaduna States, respectively were below the poverty line (Table 5.22).The poverty line estimate for Ogun State beekeepers is more than twice higher than that of Kaduna State beekeepers. Finding therefore attests to the advantage of relative poverty measurement, which defined poverty based on living standard of the target population.

Table 5.22: Distribution of beekeepers according to income per household adult equivalent

	Ogun		**Kaduna**	
Income (₦)	**Frequency**	**Percentage**	**Frequency**	**Percentage**
<3000 – 100000	56	52	108	84.4
100001 – 200000	36	34	14	10.9
200001 – 300000	11	10.3	5	3.9
>300001	4	3.7	1	0.8
Total	**107**	**100**	**128**	**100**
Mean	117,703		51,647	
2/3 household income	78,861		34,604	
USD per day	2.03		0.83	
Poor	45		48	
Non poor	55		52	

1 United State Dollar (USD) = ₦160

The mean household income obtained from beekeeping was also discounted at the rate of ₦160/USD, which gave 2 dollar and 0.83 dollar per day for Ogun and Kaduna States

beekeepers, respectively as at the time the study was conducted. It therefore means that majority of Ogun State beekeepers earn 2 dollar equivalent per day from beekeeping whereas Kaduna State beekeepers earn less than 1 dollar per day (Table 5.22).

5.4 Profitability of Beekeeping

Profit determines the viability of an enterprise per period of time. Effort was made to determine the costs and returns associated in honey bee production and serves as a proxy for measuring profitability. The costs and returns in honey bee production were estimated and presented in Table 5.23. The average total variable cost incurred by Ogun State beekeepers was ₦62,311 and the average revenue from bee products of ₦220,400 was realized, leading to an average gross margin of ₦158,000. In Kaduna State, the average total variable cost incurred and average revenue were ₦21,429 and ₦101,957 with an average gross margin of ₦80,528. This indicates that beekeeping enterprise is profitable in the study areas.

In order to ascertain the extent of profitability of honey bee production, the average rate of returns was calculated. The average rate of returns was ₦2.54 and ₦3.75 for Ogun and Kaduna States beekeepers respectively. This means that for every ₦1.00 invested, ₦2.54 was realizes by Ogun State beekeepers while Kaduna State beekeepers realize ₦3.75 (Table 5.23). It can therefore be concluded that honey bee production is more profitable in Kaduna State. Comparable findings by Fadare *et al.* (2008); Yahaya and Usman (2008) and Qaiser, Tahir, Taj and Ali (2013), respectively revealed that beekeeping is profitable with an average profit of ₦1.63; ₦4.6 and ₦1.47 realized on every Naira invested. Finding by Abdullahi, Isekenegbe and Mohammed (2014) also

revealed 250% and 329% as the rate of return on investment for modern and traditional beekeeping, respectively.

Table 5.23: Average cost and returns of honey bee production

	Items	Ogun Value (₦)	Kaduna Value (₦)
	Variable costs:		
	Family labour	8100	5671.3
	Hired labour	9649	7256
	Baiting materials	4834	1821.74
	Smoking materials	2042	1157.14
	Transportation	9137	3018
	Packaging	9132	2504.37
	Label	6417	
	Banners	7500	
	Advert	5500	
A	**Total variable cost (TVC)**	**62,311**	**21,429**
	Returns from bee products		
	Honey	160975	90956.68
	Wax	15996.4	11000
	Pollen	8943	
	Propolis	3200	
	Venom	31286	
	Total revenue from bee products (TR)	**220,400**	**101,957**
B	**Gross Margin (GM) = TR-TVC**	**158,000**	**80,528**
C	**Average rate of returns = B/A**	**2.54**	**3.75**

5.5 Effects of Beekeeping on Poverty

The beekeepers perception on the contribution of beekeeping to basic household needs and asset acquisition were explored. Mean scores were calculated in order to determine the extent to which beekeeping has affected poverty status of the beekeepers.

5.5.1 Beekeeping and household basic needs

Beekeepers perception statement on contribution of beekeeping to basic needs was rated in descending order. In Ogun State, school fee was rated first, followed by medical care, clothing, food and rent. The probable reason is that Ogun State beekeepers are moderately education (figure 6) and probably have the desire that their children are better educated than they are. Medical care was rank second in Ogun State but ranked first in Kaduna State. This is probably so because some products of beekeeping, particularly honey, combined with herb is commonly used in the treatment of minor ailments at home. Clothing, food and rent were ranked third, fourth and fifth. Grand mean perception statement on household basic needs of 2.47 was obtained in Ogun State. Food, clothing, rent and school fee were ranked second, third, fourth and fifth, respectively by Kaduna State beekeepers. Grand mean perception statement on household basic needs of 2.07 was obtained in Kaduna State. These means (2.47 and 2.07) implies that beekeeping has improved the beekeepers ability in meeting their basic needs hence it can be inferred that beekeeping has improved standard of living of the beekeepers, with Ogun state having more improved standard of living compared to Kaduna state beekeepers (Table 5.24).

Table 5.24: Beekeepers perception on household basic needs

Statements on basic needs		Not at all	Moderate	High	Mean	Rank
Ogun:	School fees	4	22	276	2.82	1
	Medical care	3	80	192	2.57	2
	Clothing	9	60	204	2.55	3
	Food	1	146	99	2.33	4
	Rent	11	100	138	2.30	5
	Grand mean on basic needs				**2.47**	
Kaduna:	Medical care	7	174	102	2.21	1
	Food	55	8	207	2.11	2
	Clothing	9	214	36	2.07	3
	Rent	10	198	57	2.02	4
	School fees	37	126	84	1.93	5
	Grand mean on basic needs				**2.07**	

5.5.2 Beekeeping and asset acquisition

Assets such as land, livestock, houses owned by farm households are important for reducing poverty. The value of household assets measures the ability of the household to withstand economic shocks and income shortfalls to finance the purchase of household needs. Ownership of assets serves as a surety and a fallback strategy for the household against transitory poverty because some of these assets could be sold to procure basic household needs in periods of temporary financial distress. This means that poverty status will be reduced with possession of assets. Beekeepers perception statement on asset was rated in descending order. In Ogun State, saving was rated first.

This was followed by livestock, houses and land. The grand mean perception statement on asset was 1.74. In Kaduna State, livestock was ranked first, followed by saving, land and houses. A grand mean perception statement of 1.75 was obtained in Kaduna State (Table 5.25). Although beekeeping is profitable in the study areas (Table 5.23), these grand mean scores implies that beekeeping has not improve the beekeepers' ability to acquire assets, which can serve as important 'cushion' for escaping out of poverty during economic fluctuations.

Table 5.25: Beekeepers' perception on assets acquisition

Statements on assets		**Not at all**	**Moderate**	**High**	**Mean**	**Rank**
Ogun	Saving	7	70	195	2.54	1
	Livestock	55	40	96	1.79	2
	Houses	76	54	12	1.33	3
	Land	80	46	12	1.30	4
	Grand mean on assets				**1.74**	
Kaduna	Livestock	12	138	141	2.30	1
	Saving	56	122	33	1.70	2
	Land	76	86	27	1.50	3
	Houses	81	62	48	1.50	3
	Grand mean on assets				**1.75**	

The probable reasons for this finding is that: majority of the beekeepers are small scale producers with little left to invest or acquire asset (figure 4), Beekeeping is a secondary occupation in the studied areas (figure 6), many of the beekeepers harvest honey products once in a year instead of three to four times (Table 5.21), not all the bee

products were produce by the beekeepers (figure 10) and some of the honey bee products were produced but not recorded or sold (Table 5.20). This finding is at variance with studies by Hulme and Shepherd (2003); Hulme and McKay, (2005).

5.6 Constraints to Beekeeping

Constraints faced by beekeepers were grouped into major and minor constraints. Three major constraints common to the beekeepers were theft, bush burning and predators. Theft, bush burning and predators were ranked 1st, 2nd and 4th, respectively by Ogun State beekeepers (Table 5.26) while predators, theft and bush burning were ranked 1st, 2nd and 3rd, respectively by Kaduna State beekeepers (Table 5.27). Two other major constraints specifically reported by Ogun state beekeepers were vandalization of hives by intruders and effect of climate change in term of low forage, poor colony formation which leads to low yield. These constraints were ranked 3rd and 4th respectively (Table 5.26).

Minor constraints common to the beekeepers were lack of funds, deforestation (caused by lumbering and charcoal makers) and inaccessible farm location resulting in high cost of transportation. Lack of fund was ranked 5th and 7th by Ogun and Kaduna State beekeepers respectively (Table 5.26 and 5.27). Deforestation and inaccessible farm location resulting in high cost of transportation tied and each was ranked 8th by Ogun State beekeepers (Table 5.26) while these two constraints were ranked 5th and 8th by Kaduna State beekeepers (Table 5.27).

Table 5.26: Constraints to beekeeping in Ogun State

Constraints	**Frequency**	**Mean rating**	**Rank**
Theft	40	23	1
Bush burning	37	22	2
Vandalisation of hives	20	12	3
Predators and pests	18	11	4
Climate change affect beekeeping	18	11	4
Lack of fund	16	9	5
Aggressiveness of bees	7	4	6
Adulteration of honey	6	4	7
Deforestation by lumbering and charcoal makers	4	2	8
Inaccessible farm location and high cost of transportation	4	2	8
Total	***170**	**100**	

*Multiple responses

Another minor constraint specifically reported and ranked 6th and 7th by Ogun State beekeepers was aggressiveness of bees and adulteration of honey respectively (Table 5.26). Specific minor constraints reported and ranked 4th; 5th; 6th and 8th respectively by Kaduna State beekeepers were poor market price of products; problem of herbicide and insecticide use; absconding of bees and vandalization of hives by herd/herds' men respectively (Table 5.27). Effects of climate change on beekeeping was the least (9th) minor constraint reported by Kaduna State beekeepers as against major constraint (ranked 3rd) reported by Ogun State beekeepers.

Table 5.27: Constraints to beekeeping in Kaduna State

Constraints	Frequency	Mean rating	Rank
Pest and predators	62	25	1
Theft	60	25	2
Bush burning	59	24	3
Poor market price of products	13	5	4
Deforestation by lumbering and charcoal making	11	5	5
Problem of insecticide/herbicide used on crop	11	5	5
Absconding	8	3	6
Inadequate funds	7	3	7
Inaccessible farm location and high cost of transportation	5	2	8
Vandalisation of hives by herds and herds men	5	2	8
Climate affect beekeeping	3	1	9
Total	***244**	**100**	

*Multiple responses

5.7 Testing of hypotheses

5.7.1 Test of hypotheses on influence of socioeconomic characteristics and institutional factors on poverty

HO_1: Socio economic characteristics and institutional factors have no significant influence on poverty status of women beekeepers.

Hypothesis 1 was tested using logit regression analysis. Poverty status of the women beekeepers was the dependent variable while selected socioeconomics characteristics (age, beekeeping experience, number of hives, access to land, education, household size, number of dependants and marketing channels) and institutional factors (years of

belonging to cooperative society, amount of credit received, extension services and training received) were the independent variables.

For hypothesis 1, logit results (Table 5.28) show that age (-.097), beekeeping experience (-.426), number of hives (.117), household size (.104), number of dependants (-.425) and year of belonging to beekeeping cooperative (-.485) had significant influence on poverty status beekeepers in Ogun State, while in Kaduna State, logit result (Table 5.30) show that age (-.078), beekeeping experience (-.119), number of hives (.205), household size (.434), number of dependants (.279), year of belonging to cooperative (-.259), frequency of extension visits (-.761) and re-training (-.237) had significant influence on poverty status of beekeepers. Access to land, education, marketing channels and amount of credit received had no significant influence on poverty status of beekeepers in both States.

The estimated coefficients of Ogun State beekeepers' age was -.097 while in Kaduna State the estimated coefficients of age was -.078. Age was statistically significant at 1% levels in both States. It therefore means that poverty decreases with age of beekeepers (Table 5.28 and 5.29). It is often argued that poverty increases at old age as the productivity of the individual decreases. However, the relationship between age and poverty may not be linear, as would be expected. Thus, according to the life-cycle hypothesis, it is expected that poverty is relatively high at young age, decreases during middle age and then increases again at old age. Based on life cycle hypothesis, it can be inferred that majority of the beekeepers are in their middle age, with mean age of 41.84 and 32.10 for Ogun and Kaduna States beekeepers respectively (Table 5.1). This probably account for decrease in poverty with age of the beekeepers. Result is

consistent with those of Rodriguez (2002); Gang *et al.* (2003). In another related study, Anyanwu, (2011) found that in all Igboland, it is only in Abia State that increase in household head's age significantly reduce poverty but at a decreasing rate.

The estimated coefficients of beekeeping experience were -.426 and -.119 for beekeepers in Ogun and Kaduna States, respectively. Beekeeping experience is negative as expected, thus beekeeping experience conformed to the *a priori* expectation and statistically significant at 10% and 5% levels for Ogun and Kaduna States beekeepers respectively (Table 5.28 and 5.29). The negative sign implies that poverty status of the beekeepers decreases with more years of been in beekeeping. The beekeepers' level of experience is an important factor of their managerial acumen. It can therefore be inferred that those beekeepers that had been in beekeeping for quite a long time are likely to be more effective and efficient in input resource utilization than those that just started beekeeping. This leads to cost minimization, increased profit, income and thus a decrease in poverty status of the beekeepers. Finding is synonymous with Fabiyi *et al.* (2008); Etim *et al*. (2009); Umeh and Asogwa (2011); Asogwa (2012).

The estimated coefficients of number of hives were .117 and .205 for beekeepers in Ogun and Kaduna States, respectively. Bee farm size is statistically significant at 1% level and shows a positive influence on poverty in both States. This implies that poverty increases with increase in number of hives owned by the beekeepers. Number of hives thus failed to conform to the *a priori* expectation (Table 5.28 and 5.29). This could be explained by the facts that many of the beekeepers were faced with problems such as pest and predators, vandalisation of hives, climate change problem and deforestation. Pest and predators normally eat up the bees and leaves the hives empty.

Table 5.28: Logit estimate of influence of socioeconomic and institutional variables on poverty status of Ogun State beekeepers

Variables	Regression coefficient	SE	Level of Significance
Age (X_1)	-.097	.037	.009***
Beekeeping experience (X_2)	-.426	.240	.076*
Number of hives (X_3)	.117	.036	.001***
Access to land (X_4)	.182	.227	.423
Education (X_5)	.459	.349	.188
Household size (X_6)	.104	.039	.007***
Number of dependants (X_7)	.425	.244	.057**
Marketing channels (X_8)	.239	.208	.251
Cooperative (X_9)	-.485	.183	.008***
Amount of credit obtained (X_{10})	.076	.296	.796
Re-training (X_{12})	-.220	.142	.120
Extension visit (X_{11})	-.087	.380	.819

p<0.01, ** p<0.05, * p<0.10; SE =Standard Error; X^2 value= 61.31
percentage predicted correct = 81.3

Problem bordering on climate change and deforestation could leads to inadequate forage and nectar unavailability, which the bee feeds on. Inadequate forage and nectar unavailability reduces honey bee performance and production (Table 5.26 and 5.27).

The estimated coefficients of household size were .104 and .434 for Ogun and Kaduna States beekeepers, respectively. Household size was statistically significant at 1% level in both States. Household size show a positive influence on poverty as expected and thus conformed to *a priori* expectation. The positive influence implies an increase in poverty status of beekeepers as household size increases (Table 5.28 and 5.29). Similar

findings were reported by Kates and Dasgupta, (2007); Etim *et al.* (2009); Olorunsanya and Omotesho (2012).

Table 5.29: Logit estimate of influence of socioeconomic and institutional variables on poverty status of Kaduna State beekeepers

Variables	**Regression coefficient**	**SE**	**Level of Significance**
Age (X_1)	-.078	.033	.018**
Beekeeping experience (X_2)	-.119	.062	.054**
Hives' number) (X_3)	.205	.051	.000***
Access to land (X_4)	-.033	.127	.791
Education (X_5)	.163	.220	.480
Household size (X_6)	.434	.150	.004***
Number of dependants (X_7)	.279	.110	.011***
Marketing channels (X_8)	-.086	.097	.376
Cooperative (X_9)	-.259	.096	.007***
Amount of credit obtained (X_{10})	.078	.233	.738
Re-training (X_{12})	-.237	.122	.051**
Extension visits (X_{11})	-.761	.374	.042**

p<0.01, ** p<0.05, * p<0.10; SE = Standard Error; X^2 value = 52.58
percentage predicted correct = 77.3

The estimated coefficients of number of dependants were .425 and .279 for beekeepers in Ogun and Kaduna States, respectively and statistically significant at 5% and 1% levels in that order. The number of dependants' shows positive influence on poverty as expected and thus conformed to *a priori* expectation (Table 5.28 and 5.29). The positive

influence implies an increase in poverty status of beekeepers as the number of dependants' increases. Finding is consistent with the finding by Etim *et al.* (2010).

The estimated coefficients of years of belonging to beekeeping cooperative were -.485 and -.259 for beekeepers in Ogun and Kaduna States, respectively. Years of belonging to cooperative were statistically significant at 1% and negative in both States. The negative influence implies decrease in poverty with increase in years of belonging to beekeeping cooperative. Years of belonging to beekeeping cooperative thus conformed to *a priori* expectation. The reduction of poverty might be as a result of various benefits accruable to members of cooperative societies, such as access to information (Table 5.11), credit facilities (figure 7) and access to re-training (table 5.16) that could enhance their productive capacity. Finding is in support of Amaza, Olayemi, Adejobi, Bila, and Iheanacho (2007); Umeh and Asogwa (2011); Asogwa *et al.* (2012) submission that the prevalence of poverty is higher among households which do not belong to any farmers' cooperative group.

In Kaduna State the estimated coefficients of re-training and frequency of extension visit were -.237 and -.761; and statistically significant at 5% level each. Re-training and frequency of extension visits were negative (Table 5.29). It can therefore be inferred that beekeeper that had re-training and extension visits have lower poverty status than those that do not receive training and extension services. Training and extension services thus conformed to the *a priori* expectation. The probable reason for decrease of poverty among beneficiaries of re-training and extension services is that training and extension services will improve farmers' productivity, profit and invariably reduces poverty status of the beneficiaries.

The result of the logistic analysis (Table 5.28 and 5.29) shows that the X^2 calculated was greater than X^2 tabulated at 1% level of probability and implied that the factors included in the study actually influenced poverty status of the beekeepers. Thus the null hypothesis that socioeconomic characteristics and institutional factors have no significant influence on poverty status of the women beekeeper's was rejected as age, beekeeping experience, farm size, household size, number of dependants and years of belonging to cooperative society had significant influence on poverty status of the beekeepers in both States. In addition, re-training and extension visits equally had significant influence on poverty status of the beekeepers in Kaduna State. The X^2 value was 61.31 and 52.58 for Ogun and Kaduna States beekeepers, respectively at significant level of 1% of probability. This implies that the model as a whole fit significantly with the data. The percentage of accurate prediction was 81.3 and 77.3 for Ogun and Kaduna States beekeepers respectively.

5.7.2 Test of hypothesis on influence of beekeeping on poverty status of the beekeepers

HO_2: Beekeeping enterprise have no significant influence on poverty status of the women beekeepers' in the study areas, and

Hypothesis 2 was tested using Pearson Product-Moment Correlation analysis (PPMC). Accrued income from beekeeping was the dependent variable while basic needs (food, clothing, medical care, rent and school fees) and assets (land, livestock, saving and house) were the independent variables. Data analysis shows that food and clothing were positively and weakly correlated (r = 0.262 and 0.294 respectively) to income in Ogun State. In Kaduna State food was positively and strongly correlated (0.692) to income while clothing was positively and moderately correlated (0.482) to income. Food and clothing were statistically significant at 1% level of significant as expected and

conformed to *a priori* expectation in both States (Table 5.30 and 5.31). The positive correlation of food and clothing to income suggest that the ability of the beekeepers in both States to provide food and clothing probably increases with increase in income from beekeeping. This is so because food and clothing are needed by human being for survival.

In Ogun State, medical care and land were positively and weakly correlated (r = 0.260 and 0.224, respectively) to income. School fees was positively and moderately correlated (r = 0.402) to income (Table 5.30). Medical care and school fees were statistically significant at 1 percent level of significant while land was statistically significant at 5 percent level of significant as expected and conformed to *a priori* expectation.

Table 5.30: Correlation analysis showing the influence of beekeeping on poverty status of Ogun State beekeepers

	Y	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
Income (Y)	1									
Food (X_1)	.262**	1								
Cloth (X_2)	.294**	-.137	1							
Medical care (X_3)	.260**	297**	-.081	1						
Rent (X_4)	-.105	.058	-.073	.212*	1					
School fee (X_5)	.402**	-.057	.028	.036	.096	1				
Land (X_6)	.224*	.066	-.034	-.086	.123	.006	1			
Livestock (X_7)	-.137	-.015	-.016	-.001	-.197*	.021	-.115	1		
Saving (X_8)	.279**	.009	.058	.276**	.027	.122	.155	.089	1	
House (X_9)	-.113	-.013	.087	.064	-.145	-.040	.101	-.140	.012	1

**p<0.01 (2 tailed) *p<0.05 (2 tailed)

The positive correlation of medical care and school fees to income suggest that the ability of Ogun State beekeepers to provide medical care and school fees probably increases with increase in income from beekeeping while their ability to acquire land probably increase with increase in income from beekeeping.

In Ogun State, saving was positively and weakly correlated (r=0.279) to income at 1 percent level of significant as expected and conformed to a *priori* expectation (Table 5.30). The positive correlation coefficient of saving suggest that the ability of Ogun State beekeepers to have saving will increase with increase in income from beekeeping. Conversely, in Kaduna State saving was negatively and weakly correlated (r= 0.236) to income at 1 percent level of significant. Saving thus failed to conform to *a priori* expectation (Table 5.31).

Land and house were negatively and weakly correlated (r= 0.178 and 0.259 respectively) to income at 5 and 1 percent level of significant respectively in Kaduna State (table 5.31). Land and house failed to conform to *a priori* expectation. The negative correlation coefficient of saving, land and house suggest that the ability of Kaduna State beekeepers to have saving, acquire land and house will decrease with increase in income from beekeeping. This deviation can be attributed to large house hold size (Table 5.4) which translated to more dependants (Table 5.8) among Kaduna State beekeepers.

Table 5.31: Correlation analysis showing the influence of beekeeping on poverty status of Kaduna State beekeepers

	Y	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
Income (Y)	1									
Food (X_1)	.692**	1								
Cloth (X_2)	.482**	.155	1							
Medical care (X_3)	.063	-.023	.039	1						
Rent (X_4)	-.171	-.166	-.078	067	1					
School fee (X_5)	.144	.149	-.060	.028	109	1				
Land (X_6)	-.178*	-.092	-.091	.312**	.175*	.084	1			
Livestock (X_7)	.267**	.319**	.132	.204*	.073	.045	-.013	1		
Saving (X_8)	-.236**	-.275**	-.057	.001	.032	.025	-.035	.098	1	
House (X_9)	-.259**	-.268**	-.068	.537**	.120	.083	.306**	-.172	.257**	1

**p<0.01 (2 tailed) *p<0.05 (2 tailed)

Large family size usually attracts high expenditures and if not matched with adequate income, the beekeepers ability to save, acquires land and house will be reduced. From the PPMC result, only food had positive and strong correlation to income in Kaduna State. School fees and clothing had moderate correlation to income in Ogun and Kaduna State respectively. All others (food, cloth, medical care, land, saving in Ogun State and livestock in Kaduna State) were positive but weak correlates to income.

Based on the weak coefficients of more of the explanatory variables considered in the study, it could be inferred that income from beekeeping weakly alleviate poverty status of the beekeepers in the study areas. Thus the null hypothesis that beekeeping has no significant influence on poverty status of the women beekeepers' in the study areas was therefore rejected.

5.7.3 Test of hypothesis on profitability of the beekeepers

HO_2: There is no significant difference between profitability of beekeepers in Ogun and Kaduna State.

The result in Table 5.32 indicates that Z calculated for the beekeepers returns was 5.264 which imply that the Z value was statistically significant at 1%. The Z-calculated for the beekeepers was greater than the tabulated Z-value (1.972) at 1% level of probability. Since the Z-calculated was greater than the tabulated Z-value, the null hypothesis that there is no significant difference between profitability of beekeepers in Ogun and Kaduna States was therefore rejected.

Table 5.32: Test of profitability of beekeepers

Items	Ogun	Kaduna
Mean	177340.8103	84584.8
Variance	22291758092	1.31E+10
Z statistics	5.263570244	
Z Critical	1.972141177	

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Findings

The broad objective of the study was to investigate the effect of beekeeping on poverty status of women in Ogun and Kaduna States. Purposive sampling was used to choose OBNG and BES because the active participation of the women in beekeeping. A sample of 107 and 128 which represent 50% of the women beekeepers from Ogun State beekeepers Network Group and Beekeeping Extension Society figure was selected using systematic random sampling technique. A total of 235 women beekeepers were used for the study. Data collected was analysed by the use of descriptive statistics, mean per capita household income and gross margin analysis along with logit regression analysis, Pearson Product Moment Correlation analysis and t-test.

The results of the analysis on socioeconomic characteristics of the beekeepers showed that majority of the beekeepers were in their active age and are small scale bee farmers, with a mean beekeeping experience of less than 9 years. Majority (about 70%) of them had temporary access to land. Comparable level of education with 28.44% and 26% for Ogun and Kaduna States beekeepers respectively were obtained at primary school level, but at secondary and post secondary school, Ogun State beekeeper were better off. The mean household size for Ogun State beekeeper was 5 while that of Kaduna State beekeepers was 9. The mean adult labour contribution in each of the States was 2 adults while the mean children labour contribution for Ogun State beekeepers was 1 against 3 in Kaduna State. The mean number of dependant for Ogun State beekeepers was 2 and twice (4) for Kaduna State beekeepers. Only 2% and 7% of Ogun and Kaduna States beekeepers took beekeeping a as primary occupation and The beekeepers use marketing

outlets that do not afford them high price of produce while cooperative group offer limited marketing services to their members.

Findings on institutional factors affecting honey bee production revealed that about 74% and 30% of the beekeeper in Ogun and Kaduna States, respectively did not belong to any beekeeping cooperative group. Majority of the beekeepers did not have access to credit and extension visits. Extension communication source of information was among the least used by the beekeepers. About 41% and 67% of Ogun and Kaduna States beekeepers did not have access to re-training.

Ogun State beekeepers produce 7 bee products whereas Kaduna State beekeepers produce 4. Beekeepers in both States produces honey, bee-wax, pollen and propolis. In addition, Ogun State beekeepers produces bee venom, bee bread and bee brood. Honey and bee wax were the major bee products produced by the beekeepers. Some of the major reasons deduce for not producing all the bee products were: lack of equipments, lack of technical knowledge on how to produce and harvest those products and lack of market. Majority of the beekeepers harvest honey bee products once in a year, which implies that honey bee products are under exploited by the beekeepers.

The mean per adult equivalent household income in a year was ₦117,703 for Ogun State beekeepers and ₦51,647 for Kaduna State beekeepers. This gives two-thirds of ₦78,861 and ₦34,604 per adult equivalent, which was the poverty line for beekeeper in Ogun and Kaduna States, respectively. Based on poverty line estimate of ₦78,861 and ₦34,604, 45% and 48% of the beekeepers in Ogun and Kaduna States, respectively were considered poor. Although the poverty line estimate of Ogun State beekeepers

double (₦78,861) that of Kaduna State, more (55%) of the beekeepers in Ogun State are above the poverty line when compared with Kaduna State beekeepers. Hence it can be inferred that Kaduna State beekeepers has higher poverty status. Furthermore, correlation result revealed that beekeeping weakly alleviates poverty status of the beekeepers in both States.

Costs and returns analysis of honey bee production gave an average gross margin of ₦158,000 and ₦80,528 for Ogun and Kaduna States, respectively. This indicates that beekeeping enterprise is profitable in the study areas. The average rate of returns of ₦2.54 and ₦3.75 (Ogun and Kaduna States, respectively) indicates that beekeeping is more profitable in Kaduna State.

Perception statement on basic needs was 2.47 and 2.07 for Ogun and Kaduna States beekeepers, respectively, while perception score on asset was 1.74 and 1.75 for Ogun and Kaduna States beekeepers respectively. Major constraints common to the beekeepers were theft, bush burning and predators. Vandalization of hives and effect of climate change were specific major constraints reported by Ogun State beekeepers. Minor constraints reported were lack of funds, deforestation, inaccessible farm location, aggressiveness of bees, adulteration of honey, poor market price, herbicide/insecticide problem and absconding of bees.

Test of hypothesis using logit regression analysis show that age, beekeeping experience, farm size, household size, number of dependants and cooperative had significant influence on poverty. Other variables in the model such as access to land, education, marketing outlets, amount of credit obtained and extension services had no significant

influence for explaining variation in the poverty status of Ogun State beekeepers even though the X^2 value was 61.31 at 1% level of probability. In Kaduna State the logit result show that age, beekeeping experience, farm size, household size, number of dependants, cooperative, extension services and training had significant influence on poverty status of the beekeepers. Other variables in the model such as access to land, education, marketing outlets and amount of credit obtained had no significant influence for explaining variation in the poverty status of Kaduna State beekeepers even though the X^2 value was 52.58 at 1% level of probability.

Result of PPMC analysis on influence of beekeeping on basic needs and assets shows that food, cloth, land and saving have positive significant correlation to income in both States. Medical care and school fees were positive and significantly correlated to income in Ogun State while livestock and house were negative and significantly correlated to income in Kaduna State. Z-test analysis indicates that there is a significant difference between profitability of beekeepers in Ogun and Kaduna States at 1 percent level of probability. Based on the results of logit regression analysis, Pearson product moment coefficient and Z-test analysis, the three hypotheses stated for the study were rejected.

6.2 Conclusion

The cost and return analysis indicates that honey bee production is highly profitable in the study areas but it is a secondary occupation for almost all the beekeepers hence beekeeping weakly alleviate poverty status of the beekeepers. Honey and bee wax were the two major bee products produced by the beekeepers. Lack of equipment and lack of technical knowledge on how to produce other bee products including unassured market

were among the major reasons adduced for not producing other bee products. The determinant of poverty was age, experience, number of hive, household size, number of dependants, cooperative, re-training and extension visits. The coefficient of PPMC results evidently show that beekeeping weakly alleviate poverty status of the beekeepers in the study areas. It is therefore concluded that for beekeeping to be an effective antidote for poverty alleviation and for the apicultural sector to make significant contribution to the economic sectors of the nation, all the bee products must be produced in appreciable quantities.

6.3 Recommendations

The following recommendations are derived from the study;

i. Beekeepers are advised to scale up production, combine production with various methods of value addition in order to produce varieties of secondary products from honey bee. Sales of secondary products (candle, cream, soap, shoe polish etc) will provide wider market, improve beekeepers earning and invariably make beekeeping a better poverty alleviation strategy.

ii. Ogun State Beekeeping Network Group and Beekeeping Extension Society should establish a link with cosmetics and confectionaries industries to further create assured market for honey bee products so that beekeepers will be well compensated for their effort.

iii. The study established that the beekeeping cooperative in the study areas offers limited marketing services to their members. Beekeeping cooperative should be strengthen for annexing marketing information and equipments from

government and non-government organizations. The women leader of OBNG and BES should encourage beekeepers that are not members of beekeeping cooperative to join one.

iv. Beekeepers as members of cooperative group should pool their resources together to attract credit from financial institutions. This will assist them in bulk purchase of equipments and chemicals needed for eliminating pests and predators.

v. The result of this study has shown that Ogun State Beekeeping Network Group and Beekeeping Extension Society have contributed in various ways to promote beekeeping in the study areas but extension services/knowledge of agricultural extension agents in beekeeping in the study is grossly inadequate. To bridge this gap, agricultural extension agencies of Ogun and Kaduna States should collaborate with Beekeeping NGOs (Bee craft, Bee friendly, Bees Extension Education and Tommy Bee) in Ogun State and BES in Kaduna State to learn from them. If possible extension agents should be adequately trained in beekeeping by these NGOs so as to develop beekeeping extension specialist, competent enough to teach and guide farmers on improved beekeeping. Study also suggests that female extension agents should be part of this training.

vi. Although beekeeping is highly profitable in the study areas, result indicate that beekeepers were not trained on all the honey bee products. Study suggests that OBNG and BES should give adequate training to beekeepers on other honey bee products, value addition and record keeping. They should be encourage to

produce other honey be products like bee wax, pollen, propolis, royal jelly and their derivatives for maximum gain from beekeeping enterprise.

vii. Majority of the beekeepers harvest their products once in a year. Agricultural extension agencies and beekeeping NGOs in the study areas are also required to embark on awareness campaign programmes to provide adequate information on number of production and harvest cycle in a year, processing and marketing of all hive products. This will ensure proper understanding of these products, uses and encourage beekeepers to produce them so as to earn more income that will improve their living standards and further pull them out of poverty.

viii. The beekeepers are encouraged to control bush burning, which is one of the major challenges confronting them by fire tracing.

ix. For control of predators like wax moth, wall gecko, lizards and termites, simple management practices such as use of salt solution or spent engine oil should be taught to beekeepers.

x. Deforestation by lumbering, charcoal making, vandelization of hives by herds are some of the problems that emanate from multiples uses of land and are treat to beekeeping. Hence clearly defined land use pattern, that is locally based should be established and made public to all. This will guide and possibly regulate activities of all land users.

6.4 Contribution to Knowledge

i. Beekeeping has reduced the poverty status of women by 39% and 30% in Ogun and Kaduna States, respectively.

ii. Beekeeper in Ogun State needs an extra ₦35487.48kobo (45%) while beekeeper in Kaduna State needs an extra ₦16,609.92kobo (48%) annually in addition to their mean household income of ₦117,703 and ₦51,647 respectively, to attain the poverty line or to move out of poverty.

iii. Every one naira invested in beekeeping enterprises get a profit of ₦1.54 kobo in Ogun State while beekeeper in Kaduna State get a profit of ₦ 2.75 kobo for every one naira invested..

iv. Finding of the study also established that 93% and 73% |of the women beekeepers in Ogun and Kaduna States respectively do not have access to extension services.

v. From the result of logit regression analysis, it was established that age, number of hives, household size and beekeeping cooperative society were factors that collectively contributed 61% of total variation in poverty status of the women beekeepers in Ogun State while number of hives, household size, number of dependants and beekeeping cooperative society were factors that collectively contributed 53% of total variation in poverty status of the women beekeepers in Kaduna State.

vi. The study established that for every ₦1 invested in beekeeping enterprise, a profit of ₦1.54k and ₦ 2.74k respectively was realized by Ogun and Kaduna States women beekeepers.

vii. The result of PPMC established that Ogun State women beekeepers' basic need such as food (r=0.262) and clothing (r=0.294) were weakly correlated with income obtained from beekeeping enterprise at 1% probability level while Kaduna State women beekeepers' basic need such as food (r=0.692) and clothing (r=0.482) respectively was strongly and moderately correlated with income obtained from beekeeping enterprise at 1% probability level.

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APPENDIX

Questionnaire

EFFECT OF BEEKEEPING ON POVERTY STATUS OF WOMEN IN OGUN AND KADUNA STATES, NIGERIA

DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY,
FACULTY OF AGRICULTURE,
AHMADU BELLO UNIVERSITY, ZARIA,
KADUNA STATE.

QUESTIONNAIRE FOR WOMEN BEEKEEPERS.

Instruction: this questionnaire is for research purpose only and will be treated confidently. Kindly tick (✓) *or fill in the blank spaces as appropriate.*

1. How old are you? ———— years
2. How long have you been into beekeeping? ———— years
3. How many hives do you have in your honey bee farm? ————
4. Where do you keep your hives?
    a) Family land ( )
    b) Land obtained by gift ( )
    c) Rented land ( )
    d) Purchased land ( )
    e) Inherited land ( )
    f) Other crop farmers' land ( )
    g) Others (specify): ————————————————————
5. Educational level
    a) No formal education ( )
    b) Primary school ( )
    c) Secondary school ( )
    e) Post secondary school ( )
    d) Others (specify): ————————————————————

6. Total numbers of household member (family size) _____

7. How many member of your household assist you in your bee farm in the last one year? _____

   (a) Adult (over 15 years) _____ (b) Children (below 15 year) _____

8. How many member of your household contribute to family upkeep? _____

9. How many member of your household totally depend on you for their upkeeps?_____

10. Is beekeeping your primary occupation? Yes ( ) No ( )

11. What is your other occupation apart from beekeeping? _____

12. How do you sell your bee products?(tick the ones that you use)

    a) Hawking ( )

    b) Local market ( )

    c) Production site ( )

    d) Cooperatives ( )

    e) Friends and relatives ( )

    f) Stores ( )

    g) Roadside ( )

    h) Others (specify): _____

13. Are you a member of any beekeeping cooperative society? Yes ( ) No ( )

14. For how long have you been in the beekeeping cooperative? _____ (years)

15. Did you obtain credit for beekeeping in the last one year? Yes ( ) No ( )

16. If yes, in what form did you receive this credit?

    a) Inform of cash ( )

    b) Inform of equipment ( )

    c) Others (specify): _____

17. If cash, how much was the total cash received (in naira) _____

18. If in the form of equipments, list them and their naira value

Equipments	Value (naira)
_____	_____
_____	_____
_____	_____

19. If cash, what was the source of your credit?

a) Husband ( )

b) Relatives and friends ( )

c) Local money lenders ( )

d) Cooperatives ( )

e) Banks ( )

f) Others (specify) _____

20. Through what sources do you obtain information on beekeeping?(tick as many sources used)

a) Written publications ( )

b) Radio ( )

c) Television ( )

d) Extension agent ( )

e) Friends and relatives ( )

f) Women leaders ( )

g) Cooperative members ( )

h) Research Institutes/Universities ( )

i) Internet ( )

j) Beekeeping Extension Society/Bee Friendly ( )

21. Others (specify) _____

22. Did you receive agricultural extension visit/advice on beekeeping in the last one year? Yes ( ) No ( )

23. If yes, how many times were you visited or given advice on beekeeping by extension agent in the last one year?

    a) Twice in a month ( )
    b) Ones in a month ( )
    c) Ones in three month ( )
    d) Ones in six month ( )
    e) Ones in one year ( )

24. If yes, how many times did you go to extension agent for advice/services on beekeeping in the last one year?

    a) Twice in a month ( )
    b) Ones in a month ( )
    c) Ones in three month ( )
    d) Ones in six month ( )
    e) Ones in one year ( )

25. What is the nature of service/advice rendered to you by the extension agent?

_____

_____

_____

_____

_____

26. If no, why were you not visited? _____

_____

_____

27. Did you receive any re-training on beekeeping in the last one year? Yes( ) No ()

28. If yes, who trained you?

a) Beekeeping Extension Society/Bee Friendly ( )

b) Extension agent ( )

c) Cooperative ( )

d) Other beekeepers ( )

e) Others (specify): _____

_____

_____

29. If yes, on what were you trained? _____

_____

_____

_____

30. If yes, how often have you benefitted from such training?

a) Very often ( )

b) Often ( )

c) Rare ( )

d) Very rare ( )

31. How relevant was the training to your beekeeping?

a) Very relevant ( )

b) Relevant ( )

c) Not relevant ( )

32. Which of the following bee products are you aware of?

Honeybee products	**Awareness (tick as many as you are aware of)**
Honey	
Bee wax	
Polen	
Propolis	
Royal jelly	
Bee venom	
Others (specify)	

33. Tick from the list the honeybee products produce by you

Honeybee products	**Honeybee produced (tick as many as produced)**
Honey	
Bee wax	
Polen	
Propolis	
Royal jelly	
Bee venom	
Others (specify)	

34. From question 33, what are your reasons for not producing other bee products?

_____

_____

_____

_____

35. What is the total quantity of honeybee products produced last year and the total amount of money realized after sales?

Product	**Quantity (L or Kg)**	**Amount (₦)**

36. How many times did you harvest your honeybee products last year? _____

37. What is the average amount of money spent on the following last year?

Inputs	**Amount**
Hired labour	
Baiting materials	
Smoking materials	
Transportation	
Packaging containers	
Others (specify):	

38. How has beekeeping assist you in meeting these needs?

Contribution of beekeeping to:		Not at all	Moderate	High
Basic needs	Food			
	Clothing			
	Medical care			
	Housing			
	Children school fees			
	Others (specify)			
Asset	Land			
	Livestock			
	Saving			
	House			
	Others (specify):			

39. What are the problems facing you in beekeeping?

_____

_____

_____

_____

_____

40. What suggestions can you give that can help to improve beekeeping in your area?_____

_____

_____

_____

_____

Thank you very much.

PLATES



Plate 1: Bee swarm



Plate 2: Bee hive



Plate 3: Colonized bee hives with top opening



Plate 4: Colonized bee hive with opening at the bottom