

**DEVELOPMENT OF A TRAINING PROGRAMME IN BEEKEEPING
FOR POVERTY ALLEVIATION OF RURAL FARMERS IN ENUGU
EAST AGRICULTURAL ZONE OF ENUGU STATE**

BY

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FACULTY OF EDUCATION
DEPARTMENT OF VOCATIONAL TEACHER EDUCATION
(AGRICULTURAL EDUCATION)**

MARCH, 2015.

TITLE PAGE

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MARCH, 2015.

APPROVAL PAGE

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Supervisor

DEDICATION

This work is dedicated to the researcher's husband Engineer B.O Makata, my children Ugoma, Golibe, Chibuzo, Amarchi and Ebubechi Makata for their love and passion for education.

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Abstract

This study focused on the development of training programme on beekeeping for poverty alleviation of rural farmers in Enugu East Agricultural Zone of Enugu State. Five (5) research questions guided the study and five (5) hypotheses were formulated and tested at the probability of 0.05 level of significance. Research and development (R&D) design was used for the study. The population for the study was 432 comprising 307 Agricultural Science Teachers, 40 Extension agents and 75 beekeepers. The population of Agricultural Science teachers was sampled using 20% proportionate stratified random sampling techniques while the entire population of the Extension Agents and Beekeepers were used because of their small size. The questionnaire was divided into 5 sections (Objectives, Content, Materials, Methods of training and methods of evaluation). The questionnaire items developed from the review of literature and function of industry and were validated by 5 experts and were used to collect data from the respondents. Cronbach Alpha reliability method was used to determine the internal consistency of the instrument. The reliability coefficients of 0.84, 0.91, 0.90, 0.89 and 0.97 were obtained for the five sections respectively. Agricultural Science Teacher and Extension Agents responded to all the sections while Beekeepers responded to section 2 and 3 (content areas and materials used in beekeeping training programme). The questionnaires were administered to the respondents with the help of six research assistants. The data collected were analyzed using mean and standard deviation to answer the research questions while t-test and Analysis of Variance (ANOVA) statistics were used to test the null hypothesis at the probability of .05 and appropriate degree of freedom. The findings of the study revealed that 11 objectives were relevant while 65 content area items, 18 materials, 11 methods of training and 8 methods of evaluation of farmers' performance were required in developing a training programme in beekeeping for poverty alleviation of rural farmers in Enugu East Agricultural Zone of Enugu State. The null hypothesis tested revealed that there was no significant difference in the mean ratings of the Agricultural Science Teachers, Extension Agents and Beekeepers on 74 out of 83 items on the content areas and materials required in beekeeping training programme. Also there was no significant difference in the mean ratings of the Agricultural Science Teachers and Extension Agents on 26 out of 30 objectives, methods of training and methods of evaluation required in beekeeping training programme. The identified objectives, content areas, materials and methods of training and evaluation were packaged into a training programme in beekeeping for poverty alleviation of rural farmers. It was recommended that the package be used to organize workshops and conferences for farmers, extension agents, teachers and entrepreneurs in beekeeping enterprise.

CHAPTER ONE

INTRODUCTION

Background of the Study

Bees have received serious attention of the people in many parts of the world because of their utility. A bee is a flying insect in the family Apidae and class insecta which it is closely related to wasps and ants (ONWARD Paper Mill, 2012). Bee in the opinion of Farlex (2013) is defined as any of the several hairy bodied, winged, stinging insect with piercing and sucking mouth part for gathering pollen and nectar. A bee in this study is a hairy bodied stinging flying insect with piercing and sucking mouth part for gathering pollen grains and nectar for production of honey and other bee products. Such bees that produce honey can be referred to as honeybee.

Honeybee according to Michener (2007) is a subset of bees in the genus *Apis* primarily distinguished by the production and storage of honey in addition to construction of colonial nest. Honeybees in the view of Pestworld For Kids (PFK, 2013) live in colonies in natural cavity or man-made hives and have the tendency to produce honey and other products from pollen and nectar of plants. ONWARD Paper Mill (OPN) report (2012) explained that honeybees are known for their role in pollination and production of honey and other products like wax, propolis and others. Bee products according to Eric, Harry, Robbin and Lee (2002) include honey, wax, pollen and propolis among others. Ministry of Agriculture and Rural Development (MOARD) report (2006) gave examples of bee products as honey, wax, propolis, royal jelly and venom. Bee products in this study include honey,

wax, pollen, royal jelly and propolis. Bee products are highly valued throughout the world. Dalt (2001) stated that exporters as well as consumers value and constantly demand bee products. In the view of Leen, Willen, Piet and Hayo (2005) the demand for bee-products in many countries of the world is high. Ntega & Muogongo in Olaitan, Ifeanyieze and Omeje (2008) explained that bee products are highly valued because of their food, medicinal and industrial uses. Curtis (1982) noted that bee products like pollen is considered one of the most complete natural food for man and bee itself since it is rich in protein, vitamins and minerals. Albert (2012) explained that bee products like pollen are used as anti-fungal, anti-bacterial and anti-viral medicines. Jack (1996) stated that bee products like royal jelly regulates nerve impulses, enhances the ability to think clearly, alleviates pains and inhibits ageing. In the view of TimilNadu (TNAU) report (2008), viewed that many bee products are used in pharmaceutical industries for manufacturing candle, cosmetics, shoe polish, adhesive and others. Many individuals obtain these products through bee keeping.

Beekeeping (apiculture) according to Agrolod (1991) is the manipulation of bee colony by man based on understanding of the science of tapping the economic benefits of bees. In the opinion of Idris (1996) beekeeping is the art of rearing bees for their by-products to obtain income and medicinal values in addition to the benefit of pollinating agricultural crops. Olaitan, Ifeanyieze and Omeje (2008) viewed beekeeping as an agricultural activity whereby beekeeping farmers employ their understanding of bee biology to provide good housing, appropriate feeding in addition to needed management practices for the purpose of

harvesting the honey. Anie (2009) noted that beekeeping is the art of caring for and managing, nursing and manipulating bee colony so that they will store quantities of honey and other bee products. In the context of this study, beekeeping is an agricultural activity whereby interested rural farmers apply their knowledge of bee biology to provide good housing, appropriate feeding and needed management practices to bees for the purpose of harvesting their products for income. A bee colony could be established and managed by a farmer.

A Farmer according to Mugan (2010) is a person engaged in agriculture with bias in livestock or crop production for food and raw materials. Ben (2010) viewed a farmer as any individual who owns and manages an area of land for growing crops and or keeping animals either for food or income. A farmer therefore a person who grows crops and rear animals for food and income. Some of the farmers that raise crops and or animals live within the city (urban) while others live in rural area.

Rural farmers as explained by Emenyonu (1995), live in open swath of land with few homes or other buildings. US Census Bureau (UCB) report (1995) identified rural areas as territories, population, and housing units not in urban area and places with less than 2,500 persons. Wiconoc (2013) defined rural area as population, housing, territories not included in the urban area. In this study, rural areas refer to places that are not included in urban area where majority of the inhabitants are farmers. Most of these farmers work hard in order to overcome poverty.

Poverty according to. National Planning Commission of Nigeria report (2004) refers to a situation whereby an individual has less than \$1per day. The report indicated that about 70% (2/3) of the Nigerian population live below the poverty line. Krugman, Paul and Robbin (2009) viewed poverty as a state of lacking certain amount of material possession or money. Anup (2013) stated that poverty is a state or condition of having little or no money, goods or support. In the view of International Centre for Alleviation of Poverty (ICAP) (2013) poverty exists when people lack the means to satisfy their basic need. Poverty in this study is the inability of the farmers to provide themselves and their family members with their basic needs such as food, clothing, and education.

In Enugu East Agricultural Zone, many farmers are poor because they lack adequate knowledge of improved methods of crop production and livestock farming activities especially the lucrative ones like beekeeping which has the ability to enhance their purchasing power. Farming is still perceived as a way of life that is handed over from generation to generation without significant improvement. In the view of Osinem (2008), farming in most communities in Nigeria has low output because the occupation is perceived as a way of life rather than a business venture. Although there are few bee farmers in the study area with long history of beekeeping, the business is still underdeveloped. Most of the farmers that engage in beekeeping business have low output as a result of low knowledge of bee biology and inadequate skill for effective management. Ministry of Agriculture and Rural Development (MOARD) report (2006) stated that the knowledge and skill of beekeeping is still very traditional in most parts of

the world. Nuru (1999) indicated that low productivity of bee products is the major economic impediment for rural beekeepers. There is low output of honey compared to its demand in Enugu East. This makes the farmers to adulterate the little harvested so as to meet up with the demand and further to increase the amount that could be realized from the output. The adulteration process brings about low quality honey and consequently leads to loss of confidence and withdrawal of customers from buying the product from the market in the zone. Further consequences of low output and adulteration of honey have added to the injury of low income and perpetual poverty of farmers. Many of these farmers therefore lost the interest of being in beekeeping business due to low output, few customers and the stinging experiences during honey harvesting from natural bee hives. These farmers therefore took to other farming enterprises, that is, the farmers that formerly left crop and macro livestock production to beekeeping now go back to former farming activities due to awful experiences. Many youths in the study area became discouraged and so opt for alternative means of survival and some of them moved to cities for 'greener pasture' in addition to running away from awful experience of their parents. However Central Agricultural Census Commission (CACC) report (2003) stated that in weak or harsh agro-ecosystem where crop production is marginal, and risk of crop failure is high, apiculture (beekeeping) provides a good alternative option for farmers. It is therefore necessary that rural farmers in Enugu East learn the modern method of beekeeping to boost their production and increase their income for poverty alleviation.

Poverty alleviation in the view of Zukeman and Elaine (2002) means improving living condition of people who are already poor. Ekwuruike (2005) referred to poverty alleviation as efforts geared towards reducing the magnitude of poverty. Information and Technology for Development (ICTD) (2008) explained poverty alleviation as any process which seeks to reduce the level of poverty in a community or among a group of people. In the view of Barde (2009), poverty alleviation means the act of promoting economic growth that could permanently lift as many people as possible out of the humiliating lives of poverty. Poverty alleviation therefore means the efforts geared towards enhancing the purchasing power of rural farmers in Enugu East Agricultural Zone so that they could satisfy their basic needs. These farmers could be enhanced to live better lives by engaging in beekeeping business after they might have gone through training.

Training according to Jucious (1990), is a process of acquiring knowledge and skills to perform a job better. Van (2002) explained training as a process of teaching, informing or educating people so that they can be well qualified to do a job better or perform in a position of greater responsibility. In the opinion of Dahama (2009), training involves helping people to become more qualified and proficient in doing some jobs. Training is therefore the act of using appropriate materials in teaching rural farmers in Enugu East Agricultural Zone how to keep bees so that they could harness bee products for poverty alleviation. That is, enhancing the knowledge, skills and attitudes (competency) of rural farmers to enable them understand bee biology and become proficient in using appropriate materials and methods in beekeeping for poverty alleviation. Training rural

farmers with appropriate materials and methods is a sure bait to greater productivity.

According to Central Agricultural Census Commission (CACC) report (2003) there is a great opportunity in reducing poverty in communities by training the inhabitants in a lucrative and easily adaptable business like apiculture which could lead to considerable gain in income. Nuru (1999) stated that training of people in beekeeping increases food availability especially for sick, children and those that perform heavy manual labour. Malichi (2005) noted that training in beekeeping generates income for people and makes them become less vulnerable to poverty. Ministry of Agriculture and Rural Development (MOARD) report (2006) noted that training of farmers in beekeeping helps to provide raw materials for industries as the harvested products are utilized in manufacturing other needed products. According to Charlote (2007), training in beekeeping can be a practical tool for creating awareness among community members on the importance of good forest management for improving biodiversity. Hatter (2010) opined that training poor farmers in beekeeping helps to increase the scope of their farming since the business requires little space above the ground and small capital investment. Gurung, Charl and Elis (2012) stated that beekeeping contribute to rural development by supporting agricultural productive capability of farmers. The author added that training in beekeeping is an educational activity as it provides an understanding of honeybees in the environment and experience in modern beekeeping practices. Training of farmers in beekeeping requires certain processes. The processes include identification of objectives, content, appropriate

materials and methods for implementing the said objectives and evaluating it to know if the objectives are achieved. Objective according to Burbank and Pett (2007) are what learners are expected to know, do, create or feel after undergoing a learning process. Content according to Osinem (2008) means the knowledge, skills, attitudes and values to be learned while materials are all the skill developing resources that would facilitate teaching-learning process. Kosovo Education Center (KEC) report (2003) stated that materials include among others the things needed for carrying out the project. Method of training refers to approaches used in presenting the subject matter (beekeeping) to the trainees. Carr (2002) noted that training evaluation methods are ways of determining whether the objective of the training is achieved. That is, if what was intended was realized after the training. The training process in beekeeping is carried out by extension agents as the experienced person to help farmers adopt the information. The extension agents can only perform the function of training farmers in beekeeping effectively if the objectives, content, methods of delivering and evaluation are identified and packaged into a training programme.

A programme as stated by Olaitan, Nwachukwu, Igbo, Onyemachi and Ekong (1999) is a real plan of activities of what is to be done which requires manipulation. Olaitan and Ndomi (2000) defined programme as a planned list of instruction to be executed or carried out by an experienced person for the benefit of the less experienced individual. In the opinion of Murah (2010), a programme is a structure created to coordinate, direct and oversee the implementation of a project. When the objective, content, method of implementation and evaluation of

the beekeeping programme are identified, it can be used as a training programme. A training programme in the view of Roy (2007) is a package designed for training individuals in a specific skill. Romanov (2008) viewed a training programme as a specific structure of items high in volume and intensity used for equipping people with knowledge, skill and attitude required in a job. Asogwa (2010) defined a training programme as a specific structure that shows a step by step procedure of training. Training programme in the context of this study is a specific structure of items created to co-ordinate, direct and oversee the training of rural farmers in Enugu East Agricultural Zone. Training programme for poverty alleviation of rural farmers through beekeeping can be developed.

Development in the view of Yerkes (1994) is the organization of skills into a sequence of several steps or actions towards an end. Development according to Amugwuamu (2004) is all about creativity which brings an idea into existence. Romanov (2008) maintained that development is a process of creating ideas which brings an event into existence. Development therefore means bringing about the idea of training rural farmers in beekeeping into existence in form of a training programme. Some steps are followed to ensure that training reach the target audience. In developing a training programme, several models are available which can be adopted. Osinem and Nworji (2010) identified the following steps: (a) establishment of objective, (b) identifying training strategies, (c) identification of materials and equipment (d) delivering and evaluating training. Asogwa (2010) identified the five major activities in developing a training programme as identification of objective, content, materials, methods of training and evaluating

the training. This study is designed based on five major steps identified by the author. It is therefore necessary to utilize these steps in the development of a training programme in bee keeping for rural farmers in Enugu East Agricultural Zone of Enugu State; hence the study.

Statement of the Problem

In Enugu East Agricultural Zone, some farmers practice beekeeping but depend on natural harvesting of honey from the bush. They also use traditional method learnt from their forefathers. They regard beekeeping as part of hunting and a game of luck thereby paying less attention to the needed requirements and management in modern beekeeping for high productivity. Consequently they experience low out of bee products.

In the rural areas of the zone, there are local markets where agricultural products like garri, sweet potatoes, yam, different kinds of vegetables and honey are sold at cheap prices. Due to the abundance of some of these products, traders from different areas of Enugu and other states visit the market with the aim of purchasing the products at give away prices. The demand for honey is higher than the supply which made many farmers to devote their night searching for hive in order to harvest honey for sale. Due to the inability of the farmers to meet up with the demand, some dubious individuals started adulterating the little output in order to make more profit. This action made many of the patronizing customers to loose confidence in them for obtaining good quality honey and other bye-products. As a result of low yield of crops and decreased demand for honey in the area, the income of farmers becomes very low to meet up with family needs while farming

becomes less attractive to youths in the area. Most farmers resorted to managing with the little realized from crop or animal farming waiting for any opportunity in beekeeping that could help them increase their income. The problem made the researcher to interact with the extension agents to find out the possibility of helping the farmers in beekeeping business. The interaction of the researcher with some of the extension agents in the area revealed that they want to train the farmers in beekeeping but need to lay hand on developed training programme in beekeeping. This necessitated the development of a training programme in beekeeping to enable these extension agents to impart these required skills to the rural farmers to alleviate their poverty; hence the study.

Purpose of the Study

The major purpose of the study was to develop a training programme in beekeeping for poverty alleviation of rural farmers in Enugu East agricultural zone of Enugu State.

Specifically, the study sought to:

1. Identify the objectives of beekeeping training programme.
2. Determine the content areas of beekeeping training programme
3. Identify materials required in beekeeping training programme
4. Determine the methods of training farmers in beekeeping programme
5. Identify methods of evaluating farmers' performance in beekeeping training.

Significance of the Study

The findings of this study will be of immense benefits to various groups of people. These are the farmers, extension workers. Skill acquisition centres administrators of Enugu East Zone and researchers.

The study provided information to the farmers on beekeeping practice. The information could be utilized to equip the farmers with knowledge, skill and attitude needed in beekeeping through the extension agents or any relevant skill acquisition centres for entry into or enhancement in commercial beekeeping.

The Study provided information on the objectives and skills required in beekeeping to extension agents. The extension agents could utilize the information in solving the problems of farmers that are interested in beekeeping business.

The study also provided information on the objectives, contents and methods of training and evaluation of individuals in beekeeping to teachers of Agricultural science in secondary schools and skill acquisition centres. The teachers could then utilize the information in teaching learners effective method of beekeeping.

The study provided information to the administrators of Enugu East on the objectives, content, materials and methods required for training individuals in beekeeping enterprises. The training programme could be utilized by the Local Government administrators to organize conferences and workshops for teachers, farmers and youth among others to equip them with beekeeping competencies.

The study further provided information to the researchers on how to develop a training programme. The information could be utilized by researchers as reference material and so becomes a base for further research on programme development.

Research Question

The following research questions guided the study

1. What are the Objectives of beekeeping training programme?
2. What are the content areas of beekeeping training programme?
3. What are the materials required in beekeeping training programme?
4. What are the methods of training farmers in beekeeping programme?
5. What are the ways of evaluating farmers' performance in beekeeping training programme.?

Hypothesis

The following null hypotheses were formulated and tested at the probability of 0.05 level of significance.

1. There is no significant difference in the mean ratings of extension agents and teachers of agriculture on the objectives of beekeeping training programme.
2. There is no significant difference in the mean ratings of teachers of agriculture and extension agents, teachers of agriculture and beekeeping farmers on the content of beekeeping training programme.

3. There is no significant difference in the mean ratings of teachers of agriculture extension agents, and beekeeping farmers on the materials required in beekeeping training programme.
4. There is no significant difference in the mean ratings of extension agents and teachers of agriculture on the methods of training farmers in beekeeping programme .
5. There is no significant difference in the mean ratings of extension agents and teachers of agriculture on the methods of evaluating farmers' performance in beekeeping training programme.

Scope of the Study

The study is delimited to the development of a training programme on beekeeping for poverty alleviation of rural farmers in Enugu East Agricultural Zone of Enugu state with bias in determining the objectives, content, materials and methods of training and evaluating performance of the programme. The study is further delimited to drafting and validating the training programme package.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The literature reviewed for this study was organized under the following sub-headings:

Conceptual Framework of the Study

Concepts of farmer, poverty alleviation and developed beekeeping

Approaches to identification of competencies

Process of developing a training programme.

Objectives of beekeeping training programme.

Content areas of beekeeping

Methods of training farmers in beekeeping .

Materials required in Beekeeping .

Methods for evaluating performance in beekeeping

Theoretical Framework

Training theories

Adult learning theory

Related Empirical Studies

Summary of Related Literature

Conceptual Framework

Concepts of Farmer, Poverty Alleviation and Beekeeping

Farmers have been known to be the primary producers of food on which the life of people in different parts of the world depend. A farmer according to Ben (2010) implies any individual who owns or manages an area of land for

growing crops or rearing animals. Farmers are people who engage in the production of crops and or animals for consumption and income. Most of these farmers live in rural areas which are distant from urban areas or cities. Rural areas as viewed by Emenyonu (1993) is an open swart of land with few houses or buildings and having very few people. US Census Bureau (1995) described rural areas as territories, populations and housing units not within the urban areas and in places with less than 2,500 persons. The author further noted that agriculture is the main occupation of people in the rural area. Rural area in this study means territories and houses not included in the urban areas. Most farmers in the rural area earn little income from farming which is usually too small for their family up-keep and are therefore not always satisfied with the faming enterprise. The young ones among them are discouraged to follow the footsteps of their aged parents who are very poor because of the type and method of job they engage in. The youth are afraid of poverty and in most cases run away from farming and go to cities in search of other jobs. Poverty has become the major problem of the people.

Poverty in the view of Ebo, Okoye and Ayichi (1995) means lack of purchasing power. According to Krugman, Paul and Robbin (2009), poverty is a state of having little or no material possession or money for support. It may include lack of food, shelter, health care, education and other means of living and improving one's own life. Poverty therefore means lack of money for meeting the basic necessities of life such as balanced diet, decent building, appropriate health

care and proper education. It is important to help farmers have access to balanced diet, good shelter, health and education through poverty alleviation.

Poverty alleviation in the opinion of Zukerman and Elaine (2002) entails improving the living standard of people who are already poor. Information and Communication Technology for development (ICT4D) report (2008) stated that poverty alleviation is any process which seeks to reduce the level of poverty in a community or amongst a group of people or country. Barde (2009) referred to poverty alleviation as a means of promoting economic growth that would permanently lift many people to the level that could enable them satisfy their basic needs. The author also stated that an Economic growth has direct potential to alleviate poverty by enhancing the purchasing power of people so as to satisfy their basic needs. Poverty alleviation therefore means an economic growth that enhances the purchasing power of the people of Enugu East Zone so that they can satisfy their basic needs with ease. Among rural farmers in Enugu East Agricultural Zone an effort which can enhance their purchasing power can be through training in beekeeping.

Beekeeping has been in practice since ages. Beekeeping as discovered by Agrolod in Olaitan, Ifeanyieze and Omeje (2008), is the manipulation of bee colonies by man based on the understanding of the economic benefits of honeybee. Olaitan, Ifeanyieze and Omeje (2008) viewed beekeeping as a farming activity where farmers employ their knowledge of bee biology to provide good housing, appropriate feeding in addition to needed management practices to the bee for the purpose of harvesting bee products. Wikipedia (2013) defined

beekeeping as the maintenance of honeybee colonies in hives by man. It therefore means that beekeeping is an agricultural activity whereby interested farmers employ their knowledge of bee biology to provide adequate housing, good feeding, and other needed management practices to honeybee for the purpose of harvesting bee products to generate income for the family members and for export purposes.

Approaches to Identification of Competencies

Different approaches have been adopted for the identification of competencies during the development of training programme in different occupational fields. In this study, the following approaches were used.

Job Analysis Approach

Job analysis approach involves the determination of the training content of work in order to provide the basis for selection and placement of workers. According to Olaitan et al (1999), a job is a position or a total array of responsibility which may comprise a few or many tasks. For example, in beekeeping occupation, there are many tasks and some total of all the responsibilities is geared towards production of honey, beeswax, propolis, pollen and royal jelly.

In bee keeping, some of the specific task include: choosing of suitable site for bee-keeping, construction of hives, stocking of bees, management of bees such as feeding, controlling swarming, controlling robbing, queen replacement and so on form the responsibilities of the beekeeper.

Clerk (1978) considered job analysis as a scientific study and statement of all facts about a job which reveals its contents and the modification factors surrounding it. He further contended that job analysis approach attempt to list or analyze all the skills, knowledge, and attitude the learner must learn if he must function in the job he intends to do.

Olaitan et al (1999) stated the following as steps in job analysis approach.

1. Identify criteria of success on the job.
2. Identify what a worker does

The authors also listed the functions of job analysis approach as follows

1. It establishes traits of job success
2. It establishes a priority system for selection and replacement of workers on the job.
3. It provides preliminary estimation of the traits which may be evaluated in selecting persons for the job.
4. It estimates trait which differentiate success on the job from success on another job.

With reference to this study, job analysis will entail critical examination of beekeeping competencies to enable the researcher identify and arrange the content, sequentially in order of performance for effective training of rural farmers in beekeeping operation. Hence job analysis is relevant to this study. With reference to this study, job analysis will entail critical examination of beekeeping competencies to enable the researcher identify and arrange the skills sequentially

in order of performance for effective training of rural farmers in beekeeping occupation, hence it is relevant to the study.

Task Analysis Approach

Task analysis is the listing of tasks which must be performed by a practitioner of an occupation. In the view of that, Wheeler (1978) defined task analysis as a logical related set of actions needed for a completion of a job objective. He maintained that a task analysis has two steps of operation. Step one is task listing i.e. that is listing of all the steps involved in each task in terms of what the learner does when performing the task and step two is the actual operation of the task in action. In support of this concept, Olaitan et al (1999) explained that task analysis is the identification of classes of learning behaviour expected to be performed by an individual and that it is concerned with the process of breaking work into smaller components which make up an occupational area. The occupational area into tasks which are further subdivided into sub-tasks

Olaitan et al (1999) identified 4 major steps identifying tasks namely:

- 1) Task identification
- 2) Task clarification
- 3) Task detailing
- 4) Task fixing

In task identification, the authors explained that, skills to be taught are identified in unambiguous terms. For instance, driving a bicycle is a task but there are different skills within driving. Task clarification involves critical examination of the basement of the skills identified as relevant for task to be

accomplished. Task detailing involves breaking of skills into their minute parts for handling during training. Task fixing or sequencing is where tasks are arranged logically for easy management during training or learning.

Some of the strength of task analysis identified by Olaitan et al (1999) are as follows:

1. It provides basis for collecting inter-related information about work in order to allocate priorities.
2. It help to make decision about structuring or learning environment
3. It makes content selection in any work valid
4. It helps in specifying instructional objectives.
5. It is useful in the designing of instructional activities
6. It helps in determining teaching strategies
7. It is useful in evaluating performance.

This study strongly identifies with task analysis approach in developing a training programme in beekeeping because of its characteristics, steps and relevance to the study. This approach is relevant to this study because the rural farmers in Enugu East Agricultural Zone lack the skills required in modern beekeeping. The study will therefore make use of the task analysis approach to identify the skills required in each tasks of beekeeping for effective performance of trainees at graduation.

Modular approach

Modular approach to curriculum design according to Olaitain et al (1999) is a unit of curriculum based on the development of entry level competencies of

students. Module is a unit of standard of measurement. In a modular design, the student and the occupational goals forms the basis for programme planning. With the modular approach, the total curriculum of a particular field is divided into units referred to as modules. These modules are of equal lengths that will take approximately specific hours of instructional time to achieve with the average group of students. According to Olaitan, one of the characteristics of modular approach is that each module is developed around knowledge, skill and attitudes a student need for entry level development in the job cluster of his choice. The author further noted that modular approach provides immediate goal attainment when students know what skills to learn and under what condition he or she must operate. It is not difficult to attain an immediate goal. This can be explained by having a pre-knowledge of what is to be achieved, he becomes more interested and aims at achieving the goal in record of time.

One of the importance of modular approach identified by the author is that it lends itself to a continuous revision to meet the changing occupational demand on the learner due to advancement in technology. Here, the module is meant to be able to incorporate new knowledge practice and improvement in occupation. Also the modular design provides students with diverse ability level, hence, it believes in no rejection of occupation. At least, every student will be able to develop minimum entry level skills in one occupation or the other.

The modular approach to curriculum groups competencies in an occupation into modules each having its own knowledge, skills and attitudes that may be used for training of the learner. It is suitable for grouping competencies in beekeeping

for a training programme. Therefore this approach was utilized for this study for grouping competencies in beekeeping in different jobs that can be performed by the rural farmers during beekeeping for effective success in the occupation.

Modular approach is relevant to this study because it divides contents into teachable units; a learner is expected to master each unit before he/she is allowed to learn the next. The approach will therefore, help the researcher to organize the content of beekeeping into logical teachable unit for effectiveness in delivery to the farmers. Modular approach will enable the researcher to identify skills required in beekeeping such as choosing site, construction of beehives, hiving the bees, management of the bee colony, harvesting, processing and marketing bee products as will be needed by an effective trainer that will train people in the programme. This approach will also induce the researcher to go to apiary at Okpatu to study and identify skill in beekeeping enterprise and to arrange them logically for use by trainers for effective training of the rural farmers in beekeeping enterprise. Therefore the approach is relevant to the study

Competency Based Approach

Taba (1982) contented that competency approach places its emphasis on knowledge, skills, attitude and judgment generally required for successful performance of a task. It involves the identification of the relevant skills needed in order to carry out a particular operation effectively and using the identified skills as a basis for teaching and learning in vocational areas like beekeeping in agricultural science curriculum. Olaitan et al (1999) stated that competency based approach is a process of designing and developing strategies which help a learner

to acquire knowledge skills and attitudes needed for successful entry into an occupation, and that it involves arranging these knowledge, skills and attitudes to be learnt in hierarchy of difficulty. They went further to state the steps, strength and constraint in using the competency based approach as follows:

Steps in using competency based approach

- 1) Identification of all tasks to be learnt
- 2) Determine what one will need to know and do in order to perform the identified task or job.
- 3) Arrangement of task and job in appropriate course
- 4) Determine knowledge and skill for each task or job into a hierarchy
- 5) Determine what one needs to know and do for mastery of each knowledge

Strengths

1. Competency based approach helps the educators in providing vocational education.
2. It helps teachers to make decisions relative to what to teach, when to teach and how much time to spend on it.
3. It also helps teachers to know how to arrange learning experiences in such vocational subjects area like fishery, poultry or beekeeping.
4. It facilitates the imparting of skills by teachers to students.

Constraints

1. Learning tasks must be arranged in sequential order for success to be achieved.
2. The learner must be able to master specific skill before going to the other.

Competency-based approach could be used in vocational training where learning is mostly based on acquisition of skills and knowledge with the right attitude and habit formed. This approach is suitable for identification of skills in beekeeping for training of farmers in Enugu East Agricultural Zone.

Functions of Industry Analysis

Function of industry Analysis is defined by Finch and Crunkilton (1984) as operations that must be performed somewhere in the total business or industry in order for it to be successful or contribute to operation. They listed the characteristics of function of industry analysis as

- 1) It focuses on the identification of content in terms of the unifying characteristics across a particular industry or business.
- 2) It focuses on a broad based business or industry rather than a specific job title.

They enumerated the steps in function of industry analysis as

- 1) Define the purpose of the industry and identify the essential functions to be performed in line with the purpose
- 2) Develop a list of activities for each function
- 3) Develop the list of various competencies needed by persons performing the activities of a function.
- 4) Group the activities and competencies into a compatible area for the purpose of developing proper educational mix required to prepare personnel for the industry.

- 5) Identify a jury of expert to examine the curriculum content and verify its appropriateness.

Olaitan (2003) explained that functions of industry analysis can be used to develop a programme where non exist to refocus the direction of a programme to occupational needs. The author further stated that it involves going to the industry to seek information about the subject matter. Olaitan and Ali (1997) explained that the function of industry approach employs both consensual and judgment procedure for content selection. Basically, this approach attempts to identify all the functions that is processing, transporting, selling and purchasing) which are performed at various level within the industry.

Clark in Olaitan and Ali (1997) defined functions of industry as the operations that must be performed somewhere in the total business or industry in order for it to achieve an outcome which is essential to the whole in terms of overall purpose of the industry. Good in Olaitan and Ali (1997) defined functional analysis as

- 1) Breaking items to be taught into specific use.
- 2) Varying the conditions under which a phenomenon takes place to ascertain the conditions necessary for its existence.
- 3) Induction method as interpreted in the Gestalt theory of learning by insight

This study identifies with the functions of industry because it developed a training programme by going to industry to obtain information from beekeepers on the functional areas and technical operations of beekeeping

such as choice of site, construction of longstroth beehive, management, harvesting, processing and marketing of bee products.

Research and Development (R&D)

Research and Development according to Gall, Gall and Barg (2007) is an industry-based development model in which the findings of research are used to design new products and procedures which then are systematically field-tested, evaluated and refined until they meet specified criteria of effectiveness, quality or Similan Standered. Postlethwaite (2005) stated that R & D focuses on the interaction between research and the prodiction and evalutation of a new product. The author explain that this type of research can be formative (by collective evaluative information about the product while it is being G20 developed with the aim of using such information to modify and improve the development process).

In the view of Eric and Martin (2001) R & D has two phase; a knowledge generating phase and a learning or knowledge using phase. The author explained that the knowledge using phase deals with the have stock of knowledge that is exploited in productive activities while the knowledge generating phase provide additional knowledge to the stock of knowledge. The author emphasized that technology using organizaino such as farms, health care institutions and industrial firms needs R & D is to obtain new knowledge applicable to the industry business needs that eventually will result in new or imporved products, processes, system or services that can increase the industry or company sales or profit.

Gall, Gall and Barg (2007) enumerated ten steps (10) involve in the use of R & D design as follows:

- 1 Identification of goals for the instructional programme or product.
- 2 Undertake instructional analysis to identify the specific skills, procedures and learning task that are involved in reaching the goal of instruction.
- 3 Identify the learners entry level skills, attitude, character of instructional setting and the settings in which the new knowledge and skills will be used.
- 4 Translate the need and goal of instruction into specific performance objectives (provide a means for communicating about th goal of the instructional programme or product at different level with different types of stakeholders).
- 5 Development of assesement instrument (it should be related with knowledge and skills specified in the performance objectives).
- 6 Develops specific instructional strategies for assisting learners with achieving each performance objective.
- 7 Develop instructional materials which may include printed materials such as books and teachers training manual or other media.
- 8 Design and conduct formative evaluation of instruction.
- 9 Revise the instruction.
- 10 Conduct summative evaluation (to find out the worthwhile of the programme usually in comparison with other competing programmes).

Process of Developing a Training Programme

Hornby (2006) looked at process as entailing a series of actions or operations performed in order to do, make or achieve something. Quirk (1995) stated that process is a series of actions that someone takes in order to achieve a particular result. Within the context of this study, processes therefore are those series of actions carried out step-by-step in developing a training programme in bee-keeping. They are those logically arranged steps in a developed programme of bee-keeping. The processes in developing training programme involve several sequentially organized steps.

National Employee Development Centre (NEDC) report in Osinem and Nworji (2010) identified important steps required in developing a training program. The steps are:

1. Establishment of performance objectives.
2. Establishment of training strategies.
3. Identification of materials and equipment for the programme.
4. Delivery of the training.
5. Evaluation of the training programme.

In the view of Caluss (1997), training designers should ask themselves the following questions while designing a programme to be used in training.

About the course

1. What training need has been identified?
2. What learning outcomes are planed?

3. Is there a range of teaching methods to maintain interest and encourage participation?
4. Have suitable and lively assessment methods been included in the programme?
5. Has the course been planned carefully and discussed with any other organizer?
6. Is an evaluation and reflection session planned afterwards to identify areas of improvement?

About the participants

1. Who is the training for? Who are the target group?
2. Do participants have similar skills or do different groups need to be developed?
3. Will all participants be able to get individual involvement in exercise and periodical?

About the resources needed for the course

1. Are the training facilities sufficient for the level of course offered?
2. Are there enough occupied space for practical demonstration?
3. What resources needed are available?
4. Are sufficient training materials available for the participants?
5. Are there new resources needed? Who will prepare them? and has enough time been left for this?

The process of developing performance based training as included in the report by World Health Organization (WHO) report (2005) has 10 steps. The first

four steps constitute the task analysis while steps 5 to 10 constitute the design and development process. The steps include:

1. Define target population for training.
2. List the task to be performed by the target population
3. List the skill and knowledge needed to do the tasks.
4. Select the skills and knowledge to be taught with.
5. Are the new resources need? Who will prepare them and has enough time been left for this
6. Organize the selected skills and knowledge into suitable teaching units (modules) and develop the training design (including brief outline of the module content and planned training method).
7. Draft expanded outline of modules, including instructional objectives, body of the text, (skills in each beekeeping practices, description of training provide realistic examples and exercise).
8. Expert provide realistic examples and information for use in the exercise.
9. Draft the complete module, facilities or guidelines and course director guidelines.
10. Field test the training materials.
11. Revise and finalize training materials based on the field test.

Asogwa (2010) has five major key steps that are common to all the above mentioned authors. These steps include:

1. Definition of instruction objectives of the programme.
2. Selection of content based on the objectives of the programme.

3. Method of teaching or training the target group.
4. Material required for teaching or training.
5. Evaluation of the programme.

This study is designed based on the five major key steps that are identified by Asogwa

Objective of Beekeeping Training Programme

An objective is an intent communicated by a statement describing a proposed change in learner. According to Mager (2009) an objective is a statement of what the learner is to be like when he or she has successfully completed a learning experience. It is a description of a product of what the learner suppose to be like as a result of the process. In the view of Nwachukwu (2006) objectives are those attainable goals which the learner aspires to achieve at the end of their learning. It is stated in terms of the learner's achievement and at different levels such as knowledge, skills and affects. Burbank and Pett (2009) stated that objectives are what the learner should know, do, think or feel after undergoing a learning process.

During training programme, it is necessary that the trainer states the training objectives. According to Francis and Rowland (2000), training objective can be explained as measurable intended result of a training programme expressed in terms of the desirable behaviour or skill level; condition under which it has to occur and; the bench mark against which it will be measured. Romanov (2008) noted that training objective define what is to be learnt, how well it is to be performed and under what condition it is to be performed after a training

programme. Eli (2010) stated that objectives of a training programme for adult learners are designed to answer the questions like what will people be able to know and do or create at their job site after the adult learning programme?

Stating objectives by a teacher before teaching or training is very important because it has a lot of advantages. Bonym (2005) noted that the advantages of stating objectives include helping in the selection of content, and instructional materials for effective teaching; determination of appropriate methodology for instruction and selection of evaluation methods. Mager (2009) viewed that objectives are essential for designing effective training. According to the author, without understanding the purpose and expected result of training, things can go badly wrong. JSBM &E (2013) noted that if clearly defined objectives are lacking, learners will not know precisely in which direction they are traveling and trainers will not know whether or not they are getting there. The author added that an objective is a check point on a road map. Eric (2013) explained that objectives in a training programme will help the instructors to know exactly what is to be taught and measure the progress of trainees; help learners to know what is to be learnt and so reduce anxiety in them because they know where they are going and help managers know what they are investing their training money in. According to Eric, good objective for effective training and development must be well stated. Such objectives the author said, must meet SMART criteria which include:

- 1 Specific i that is, each objective has a key result
- 2 Measurable that is, each objective relates to behaviour that can be measured

- 3 Attainable that is, each objective must be realistic in terms of available resource.
- 4 Relevance that is, each objective is central to district or job
- 5 Timely that is, each objective should be able to be accomplished within the time frame for the trainee development.

The objective of embarking on a productive enterprise training as viewed by Joseeh (2007) include the followings

- 1 Empower people to own and manage enterprises and have sustainable management control of business.
- 2 Promote access to finance and employment
- 3 Empower rural and local communities by enabling their access to economic activities.
- 4 Promote human resource development.
- 5 Assist in the development of the operational and financial capacity of business enterprises.

Hatter (2009) identified the objectives of beekeeping training programme as:

1. To educate people in the art of beekeeping and promote a better understanding of honey bees in their environment and the food chain; to provide an avenue for people to engage in a vocation and gain the potential; to pursue beekeeping as a sideline or full time vocation and; to provide an opportunity for people to experience responsibilities through beekeeping:.

Supporting Hatter, Bangladesh Small Scale and Cottage Industries Corporation [BASCIC, (2009)] outline the following as the objectives of beekeeping training programme:

- 1 Assisting the learner to become competent in beekeeping
- 2 Production of honey through the country
- 3 Increase in the production of fruits, vegetables and seeds by honey bee pollination.
- 4 Develop bee products by way of beekeeping.
- 5 Develop plant environment through plantation for beekeeping
- 6 Employment and income generation through modern method of beekeeping.

Rank (2011) opined that the objectives of beekeeping training programme include to:

- 1 Acquire appropriate knowledge, skills and attitudes that are necessary for effective and efficient performance in their apiculture.
- 2 Resolve resolution that will empower them in facing challenges associated in honey beekeeping industries.
- 3 Have generated through interaction of information on beekeeping ñcommunity groupsò and establish bee farmer associated that will facilitate their cohesion and collaboration.
- 4 Develop understanding between them through beekeeping.

In the context of this study the objectives of beekeeping training programme could be to enable rural farmers to: appreciate the value of beekeeping,

Identify the best site for beekeeping; construct beehive such as longstroth beehive; stock bees in the hives; feed bees colony; control swarming; prevent robbing; replace lost queen bee; harvest bee products; process bee products; and market bee products.

Content Areas of Beekeeping

Content implies the knowledge, skills, attitudes and values to be learnt. According to Osinem (2008), content refers to those related facts, observations, data, perceptions, discernments, sensibilities, designs and solutions drawn from what mind of men have comprehended from accumulated experience and those construct of mind that reorganized and re-arranged those product of experience into core ideas, concepts, generalizations, principles, plans and solutions. Miffin (2010) stated that content is all that is contained in or dealt with in a course or area of a study. ASSOCIATE (2013) noted that content in agriculture is associated with information or subject matter related to a specific area in agriculture. Osinem (2008) added that the content in agriculture are facts, topics which make up the subject taught to learners. Olaitan (2001) noted that the content of a programme implies description of expected capabilities of the learner in specific domain of human activities. The domains according to the author are cognitive, psychomotor and affective. In the context of this study, the content of beekeeping training programme is as follows: value of beekeeping; choosing of site for beekeeping; construction of langstroth beehives; hiving the bees; management of bees (such as feeding, controlling, swarming, preventing robbing

and replacing lost queen bee); harvesting of bee products; processing the bee products; and marketing the bee products.

In the view of FPCS (2009) a programme can be developed using content segments or module. World Health organization (WHO) report (2005) stated that selected knowledge and skills to be taught to learners are developed into logical teaching units called modules. According to FPCS, one should analyze the tasks when developing training modules for any training programme. Olaitan and Ekong (2002) are of the opinion that training developers should adopt the functions of industry approach. According to the authors, this approach involves going to the industry to source for information about a particular occupation with respect to the skills, procedures and other relevant information required for performance of the tasks in the occupation. Dick and Carey (2003) stated that the development of each module progress from brief design outline and includes writing the step-by-step procedure for carrying out skill activities. In this study, the outline and the step-by-step procedure for carrying out activities involved in beekeeping include the following: choosing site, construction of beehives, management of the bees, harvesting, processing and marketing of bee products.

The value of beekeeping

Beekeeping is practiced in most part of the world, both in the tropics and arctic, in the rain forest as well as in deserts because of its values. Leen, Williem, Marieke, Piet and Hayo (2005) stated that beekeeping is mainly practiced because of the honey gotten from it. Honey the author said consists of sugars that are readily absorbed by the body and is therefore an extremely suitable food for

children, sick people and those that perform heavy manual work. Curtis (1982) noted that beekeeping yields product like pollen, which is considered one of the most complete food for man and bees since it is rich in proteins, vitamins and minerals. According to TimilNadu (TNAU) report (2008), beekeeping leads to the production of product like wax which is used in the manufacture of both local and industrial products. The authors noted that beeswax can be used for the manufacture of cosmetics, candles, and foundation sheet for hives, medicine and polishes.

Propolis as stated by Albert (2012) is a resin that bees collect from plants which they use to cover the inside of the hive. Leen et al (2005) noted that the market trend for propolis is increasing as it has some therapeutic and antibiotic characteristics. The author also noted that the queen bee in a colony of bee, produces royal jelly. Jack (1996) explained that beekeeping yields royal jelly which can be used to regulate nerve impulses alleviate arthritic pains, enhance ability to think and inhibit ageing process. In the view of Anie (2009), the greatest added value of beekeeping lies the fact that bees pollinate agricultural crops. Beekeeping the author said increases the yield of crops through cross pollination by bees.

In the context of the study, the value of beekeeping include: the production of honey, beeswax, pollen, propolis, royal jelly and increased pollination of agricultural crops.

Choosing of site for beekeeping

Bees can perform well in any available conducive space. According to Olamson (2010), apiary could be kept in any small space and so beekeeping do not demand wide area of land before it can be embarked on successfully and profitably. EooL (2007) viewed that beehives could be kept in small gardens, or in a tiny backyard. Bush (2008) noted that beehives could be sited in residential areas provided that the bees flight path are not hindered and there are good source of pollen and nectar for the bees to feed on.

In the opinion of smith (1960), apiaries should be sited on a fenced plot of land. This, the author explained, will first secure the children and livestock from bee stings as well as secure the colonies from thieves and other hazards. Attified (1998) demanded that bees should be in area where they will not be disturbed too often to avoid upsetting the life of the colony and consequent abandonment of their home in search of a quieter place.

Bees must be kept in areas rich in bee foods and available source of water for maximum production. In the opinion of Odutan (1999), the best site for apiary is in orchards, on the river banks or where the bees could have easy access to water. Odutan viewed that there is a symbiotic relationship existing between some fruit, plants and bees when a farmer sites beehive in his orchard which makes the citrus farmer to have double gain. On one hand the author stated that the bees will help pollinate the flowers of the citrus plants while on the other hand the bees will makes use of the nectar and juice of the citrus pants to produce honey and other bee products. Hilmi (2008) opined that when choosing a site for beekeeping, the

beekeeper should consider the availability of the type of nectar for the particular type of bee product needed and the nectar flow in the local area. Kilm and Criang (2012) noted that beehives can be kept in tropical orchards, home gardens, plantations and many agro-forestry system including coconut, coffee, pineapple and other native forest and conservation areas. Leen, William, Mainek, Piet and Hayo (2005) explained that nearness to flowering plants which serve as source of food, help the bees to breed and increase in population.

Beekeeping is practiced in cool, open spaces that are not exposed to bad weather condition. Dadant cited in Gront (1963), advised that apiary should be in an environment conducive to the bees for maximum performance. The author suggested that beehives should be kept in an open space away from extreme weather condition such as direct sun and rain. In support of this view, Hilmi (2008) noted that the site for beekeeping must have enough shade to avoid excessive heat as extreme weather makes the bees inactive and reduces their foraging efficiency. Smith (1960) opined that vegetation that will bring about damp, chilly and windy condition in the apiary should be removed or avoided.

Beehives are kept in areas free from pests and diseases. Cutis (1982) advises that apiary should be sited in a disease free environment. The author explained that the greatest enemies of bees are both small and large ants with black, brown or red colors. The author further maintained that some trees are homes for ants and so the beekeeper should make sure that the trees are ant free before hanging the hives on the tree. Michener (2007) suggested the painting or greasing of the wire used for hanging the hives or the table or any structure that supports the hive.

In the context of this study, the choice of site for beekeeping production enterprise will be areas having good source and enough water, adequate flowering plants with large and appropriate type of nectar. The area will also be free from ants, chemicals, noise and other forms of pollution and will be in open space that is shaded enough to prevent excessive heat, damp and windy conditions.

Construction of Beehive

Beehives are hollow containers that can be closed and made to house bees. Akachukwu in Ohagwu (2005) explained that beehive is the home for bees, inside which they raise their young ones, build wax, store pollen and nectar as well as a place made to protection them from dangers, bad weather conditions, pest and diseases. Leen et al (2005) viewed hive as a container provided by man for bees to rest in based on the knowledge of bees requirements.

There are different kinds of hives that can be used for keeping bees. Agrolod (1998) identified the earthen pot hives, fixed combs hives, the movable comb hives and, the moveable frame high tech Langstroth beehive. However, during the training of rural farmers in Enugu East Zone on beekeeping, the langstroth hive will be used for beekeeping. This is because the Langstroth beehive is the modern and the most recent beehive in Nigeria. According to Eric, Harry, Leen, Robbin, Norman and Leen (2002), the Langstroth hive is the modern beehives mostly used in tropics now. According to the Ministry of Agriculture, Animal Industry and Fishery (MAAIF, 2012), langstroth hive is the type of removable comb hive with frames. In the view of Leen et al, (2002) Langstroth

hive has basic components such as the bottom board, brood chamber, queen excluder, honey super, top ventilation screen, inner cover and outer cover.

In constructing Langstroth beehive, Leen et al (2005) stated that it is carried out in the following ways:

- 1 Construct and place a bottom board and a flight board with a loose board leaving ventilation hole 15 x 30cm on the bottom board.
- 2 Construct a bottomless brood chamber with ten frames and place it on top of the bottom board.
- 3 Place a queen excluder horizontally on the top of the brood chamber.
- 4 Add one or more honey supers with 9 ÷ 10 frames each on the top of the brood chamber.
- 5 Place a top ventilation screen consisting of 2 ÷ 3mm wire screen for ventilation during transport.
- 6 Place an inner cover of 0.5 ÷ 1.0mm thick.
- 7 An outer cover made of wood and zinc or aluminum is made to easily fit over the honey super. For better ventilation, place four little blocks of wood (1 cm high) on the inside corner of the outer covering for the air to pass underneath.
- 8 Introduce baiting material to the hive and place the hive on a stand.

According to Agrolod, (1998) when constructing langstroth hive, appropriate size and type of wood selected are made to be parts of a box using the following specifications.

- 1 construct the bottom of the hive (the bottom board) by cutting two pieces of wood 55.88cm long x 41.28cm wide x 1.91cm thick each nailing them together. Along the bottom edge of the sides, nail a wooden strip 55.88cm x 1.91cm x 1.27cm and another wooden strip that is 37.47cm x 1.911cm x 1.29cm with an entrance of 7.62cm at the back edge. The front is provided with another wooden strip of 37.47 x 1.91cm in height.
- 2 Construct the brood chamber. This is a rectangular box without top or bottom and is made of 1.91cm thick wood. Its length on outside is 50.80cm and on the inside is 37.4cm and a height of 24.46cm; a shelf 1.27 deep and 0.97cm wide is cut along the entire inside to the edge of the both width of the board.
- 3 Place brood chamber wooden frames that will support the wax comb. Add one or more honey supers to increase the space for the bees.

In training rural farmers in Enugu East, construction of beehives will involve: identifying modern beehives like langstroth, selection of ant free wood for constructing the hive and reducing the wood into parts of a box. It will also involve placing the bottom board with a flight board and leaving a ventilation hole, introducing the hive chambers and accessories, placing baiting material on the hive and placing the hive on a table or any other stand.

Hiving the Bees

Introducing a swarm into a beehive is necessary in modern beekeeping as this will boost productivity. Before a swarm can be hived, the bee need to find the

beekeeper's intended site and then decide that it is the best place in the area for them to make their home (Bees for Development, 2013). According to Bush (2008), there are different ways of capturing a swarm into a hive. Curtis (1982) indicated that a swarm can be captured through baiting or cutting out branch with swarm or using bee vacuum and a cone to capture clustered bees or by buying package bee from a beekeeper or marketer.

In hiving a swarm by baiting, Bush (2008) identified certain necessary fundamental conditions. Cushman (2002) stated that most beekeepers in the world depend on natural swarming to stock their beehives and so deem it necessary for the beekeeper to identify the swarming season and provide the conditions necessary to attract the bees. In baiting a swarm, Leen et al (2005) noted that a bait is placed in an old beehive or an empty chamber with a cover and a bottom board such as a carton box. Odutan (1999) explained that when stocking bees, boxes with baits are usually placed in a suitable site, preferably along the route to the nectar and source of water to some feral colonies. According to the author, some baiting materials such as mango fruits, pineapple, plantain peels, palm wine etc. are put around or inside the box and kept on a tree to attract passing bees.

Beehives can be stocked by cutting out a swarm of bees that have settled on a branch of tree. Marieke (1991) noted that when the population of bees in a hive becomes too much and the queen has no room to lay her eggs, a prime swarm may issue with the old queen, resulting in halving of the population within the hive leaving the old colony to a distant place with a large number of energetic young bees who create a new set of brood comb from scratch in a very short time.

Such bees moving in a large number sometimes land in a branch of tree where they cluster as a swarm. The author therefore opined that such a swarm of bees can be captured and hived. Leen et al (2005) suggested that when capturing and hiving a swarm that settled around a branch of a tree, one should wear suitable clothing and follow these procedures:

- 1 sprinkle cool water over the bees with a brush or with a spray bottle to prevent them from moving away.
- 2 hold a small hive or a box without frame under the swarm;
- 3 give a firm blow to the branch on which the swarm is hanging and this will make the bees drop into the hive;
- 4 cover it with a thin cloth and
- 5 put it under a shade. If the firm blow does not have any effect, you can also drive the bees into the hive with a bee brush or smoke. As soon as the queen is inside, all other bees will follow on their own. The author suggested that the bees should be transferred into bigger hive later in the evening when the weather is cooler.

Eool (2007) suggested that hived swarms should be given combs containing unsealed broods from already established hives. He added that combs containing eggs and young larvae gives the swarm chance to rear new queen incase the old queen is killed during the hiving process. The author warned not to transfer combs containing adult bees during the hiving process since they could fight with the young bees in the swarm.

When the bees become settled in the hive, the hive entrance is closed and the colony moved away from the place to the apiary. Curtis (1982) warned that such settled bees should be moved out of the old site for at least two kilometers to avoid the bees from drifting back to the old site. The author also warned not to leave the colony under the sun. If the colony is to be moved more than fifteen minutes, some type of screen material should be used to close the entrance. Also sprinkle water to cool the hive and bees.

Management of the Bee Colony (feeding, controlling swarming, preventing robbing and replacement of lost queen bee)

Good management practices are necessary for successful beekeeping. This involves all the activities carried out in the apiary for the purpose of obtaining good harvest of bee products. In the view of Yate (1999), bee colony management involves all the day-to-day activities carried out in the apiary for maximizing bee products production. Ohagwu (2005) observed that bee colony management is very much like any other kind of animal husbandry demanding regular care, maintenance, time, skill and knowledge obtained from experience. Curtis (1982) noted that bee colony management involves feeding the colony as and when needed, inspecting the bees to know their needs, preventing robbing and controlling swarming, replacing lost queen, controlling pests and diseases and other activities that will help the bees to be comfortable and healthy for maximum production. Agrolod (1998) stated that timing of operations, knowledge of apiary bee calendar dos and don'ts, preventing robbing and controlling swarming are necessary in the management of apiary. Leen et al (2005) explained that the

keeping of records and timing of operations are important management practices that should not be neglected if one is to follow all the activities correctly throughout the year.

Feeding is an important management practice in modern beekeeping for survival and good productivity of the bees. MOARD (2006) noted that it is important that the beekeeper provides supplement feeds to the bees when natural food source is unreliable. Yate (1999) stated that supplementary feeding of colony will involve providing bees with water, protein and energy giving feeds to make up for their inadequate natural source of food supply. According to the author, there are different types of supplements that can be fed to the bees.

In the view of Dalt (2001), the beekeeper can supply feed to a bee colony in form of sugar solution as energy source to the bees. Cutis (1998) explained that such sugar solution can be prepared by dissolving 500grammes of sugar in a half a litre of water. Leen et al (2005) noted that in feeding the bees with sugar solution, equal parts of good quality crystal sugar and water are heated until the sugar is dissolved. The solution is poured into a jam jar which, is turned upside down in a shallow container where enough of the sugar syrup will be allowed to trickle out for the bees.

Pollen substitute according to Dalt (2001) is another supplement feed that can be fed to bees. Pollen in the view of the author is a good source of protein to the adult bees and the brood. Leen et al (2005) stated that soya bean flour should be given to the bees as pollen substitute. In preparing this supplement, the authors

stated that soya bean flour is mixed with a little sugar to make a protein rich cake. This is kept on top of the bars of the hive for bees. Marieke (2005) noted that despite the fact that bees can be fed with supplements such as sugar syrup and pollen substitutes, it should be noted that planting of trees that produce flowers with good scent and sweet nectar are good natural way of providing feeds to the bees. Crane (1975) explained that good forest establishment and use of favourable cultural practices to encourage vegetative and flower growth is always useful way of maintaining the supply of bee food in an environment.

In line with feeding the bees with sugar and pollen, is the provision of water to the bees. Gront (1963) observed that bees could be provided with water using different water containers. This, the author said could be done by placing sponges or twigs inside a container full of water. The bees upon reaching the container will land on the twigs or sponges, chip their proboscis into it and collect water. This prevents the bees from falling into the water and drowning. Yate (1999) stated that when feeding bees, the beekeeper should administer feed only in the evening just before dark and handle feed carefully to avoid spilling on the around the hive to reduce attraction of robbers to the apiary.

Inspecting the colony is an important practice in beekeeping but needs carefulness, patience and experience. Bajawa (1998) suggested that bees are inspected to check if there are eggs, larvae, capped worker brood or drone brood, wax moth larvae, foods, space for the brood and to know whether the bees and the broods are healthy. Agrold (1998) stated that the hive is approached through the rear or side and never in front during inspection. Marieke (2005) opined that

colonies are inspected during the day when the weather is sunny and not when there is thunderstorm on the way. Akachukwu (1995) advised that to succeed with hive inspection, the beekeeper could approach the bee colony gently without fear, maintain quietness and avoid disturbing the bees because, excessive disturbance and noise easily annoys the bee consequently resulting to stinging or absconding of the bees.

When inspecting hive, according to Leen et al (2005), it is important to follow such procedure as: gather all the necessary tools and materials needed for the inspection; put on a protective cloth preferably white bee suit; stand on the side of the hive; carefully open the hive and blow a little smoke under the cover, or take away the cover and place a wet cloth over the frames; wait a while, and then place a cover cloth in such a way that the handle of the frames are free. Use the hive tool to loosen the frames; blow a little smoke from time to time; lean the first frame on one handle against the hive and then take the other frames out one by one and inspect them and then; make sure that the moist cover clothes cover the rest of the frame as much as possible; return the frames and close up the hive quietly without much noise at the end of the inspection. The author demanded that bees should not really be disturbed too often to avoid upsetting the life of the colony and the consequent abandonment of their home in search for a quieter place or abode.

Preventing robbing is another practice a beekeeper need to be mindful of because robbing is a major characteristic behaviour of bee colony. Ohagwu (2005) pointed out that colonies have no respect for each other when it comes to the

possession of honey. The author added that strong colonies rob weak colonies of their honey at the least opportunity especially during the dearth period when bee food is scarce. Rant (2011) indicated that robbing can be suspected when bees are observed fighting. The author then noted that robbing can be prevented by observing the following: working fast during making inspection to minimize the time the colony is exposed; avoiding dripping of honey and leaving honey comb exposed to avoid attracting robbers; designing hive with adjustable entrance; feeding bees inside the hive; using repellant to chase robbers away and; repairing cracked hives.

Controlling swarming is a necessary management practice if the beekeeper expects to maintain the colony population and regular yield of bee products. Peter (2010) observed that if a colony grows too larger, it can raise a new queen in the presence of the old queen. This, the author added allows the colony to split itself up into groups with more number of bees leaving the colony to other places. Rant (2011) viewed swarming as a natural way in which bee colonies can increase and disperse in an area. This however, the author remarked, can affect the beekeeper through reduction in the productivity of the colony if not controlled. Too little space in the broad nest limiting the number of eggs that can be laid by the queen is often given as an important factor that aid swarming (Marieke, 2005).

Peter (2010) stated that the following are signs which will tell the beekeeper that a colony is preparing for swarming. First, only worker brood can be found in growing brood nest. Later, the drone eggs will appear which later hatch into large number of drones just before the swarming period. The author

also added that preparation for swarming also starts with the building of swarm cup which will later lead to the production of new queen cells. Peter explained that the moment the queen lays eggs in the swarm cup and the swarm cells are capped, the old queen is forced to leave the hive and a part of the colony leaves with her. Smith (1960) observed that when new queen cells are seen in a strong colony, it shows that the colony is preparing for swarming. The author noted that the management skill needed by the bee farmer to prevent the loss of the entire swarm is to destroy the queen cells or initiate artificial swarming by purposefully dividing the colony.

Queen replacement is also an important management practice in beekeeping. If a colony's queen is lost or too old, it means that the colony is without a producing bee and cannot continue since the queen is the only laying female and also produces pheromone that controls the colony. Curtis (1982) stated that a queen may die either naturally or by accident. Curtis stated that the important sign of absence of a capable queen include restlessness and more aggressive behaviour of the bees. Leen et al (2005) stated that a failing or dead queen can naturally be replaced through supercedure process and through raising of emergency queen by the bees respectively. Crushman (2002) noted that if the queen is lost, the following solutions are possible for the beekeeper as a way of artificially raising good new queen:

A. If the lost queen is an older egg laying queen, the following should be done:

- 1 Remove all emergency queen cells except for one of the good form or

- 2 Remove all emergency queen cells and introduce a young queen from another colony. or
- 3 Combine the colony with another that does not have a laying queen.

B. If the loss of the queen is irrevocable:

- 1 Provide a frame with eggs or young larvae (for building emergency queen cells) from another colony with a queen or introduce a new queen or merge the colony with another colony that does not have a laying queen.
- 2 If there is a laying worker, shake all bees off the combs at least 50 meters from the apiary. The bees will return to the hive and often the laying worker will remain behind

When this is done,

- 3 Remove all emergency queen cells except for one of the good form or
- 4 Remove all emergency queen cells and introduce a young queen from another colony. or
- 5 Combine the colony with another that does not have a laying queen.

In the context of this study, management of bee colony will involve feeding the bees, inspection of the hive, preventing robbing and controlling swarming, queen replacement and keeping records of observations and activities during inspection

Harvesting of Bee Products

Good harvest of bee products is the target of every beekeeper. However, Leen et al (2005) warned that harvesting should be done at the appropriate time. The author added that beekeepers should avoid harvesting bee products at the moment when bees cannot replace them to avoid starving the colony to death. The time to harvest bee products in the view of Kilm and Craig (2012) depends on the flowering period of the bee forage plant and the extent of honey flow. Abubakar and Siebert (1990) suggested that bee products harvesting can start after about four weeks of a good honey flow period.

According to Odutan (1990), the moisture content of the bee products is an important parameter to be considered before harvesting. The author noted that high moisture content is a problem that makes the bee product to spoil in a very short time. Gurung , Charl and Elis (2012) stated that bee products like honey should be harvested when it is mature, that is, when more than 75% of the comb cells are sealed. Mizrahi and Yaocov (1997) advised that honey combs containing broods should not be removed during harvest and that only the combs at the sides of the hive should be harvested.

During harvesting, the beekeeper should be equipped with suitable materials and equipment. Abubakar (1990) stated that during harvesting, the beekeeper should wear a protective cloth preferably white and try to avoid black wears. The author advised that the beekeeper should collect together all the necessary tools for harvesting such as knife, feather, bucket and smoker before harvesting. The

Ministry of Agriculture, Animal Industry and Fishery (MAAIF, 2012) viewed that the beekeeper should be equipped with materials such as smoker, bee suit, bee veil, bee glove, hive opener, knife and bee brush during harvesting. Ministry of Agriculture and Rural Development (MOARD, 2003) advised that clean containers made of plastics or nickel should be used to collect bee products as they do not add odour to harvested products.

When harvesting honey from hive like Langstroth, Abubakar (1990) noted that the following procedure should be followed by the beekeeper:

- 1 First blow some smoke under the lid and later blow at the entrance of the hive. Watch out for the worker bees that gorge themselves with honey. This indicates that the hive is ready for harvesting. However, if the bees rush and pounce on the harvester when open, it shows that it is not yet ready for harvesting.
- 2 Open the cover after puffing the smoke.
- 3 Use knife or hive tool to knock the frame to determine the occupied and empty side of hive (empty side will make the greatest noise).
- 4 Remove the frame from the empty side using knife.
- 5 Use the knife to separate the frame and take the frame out to remove the honey combs.
- 6 Use a feather and brush to sweep all the bees off the comb back to the hive.
- 7 Use knife to remove the sticky black propolis from the top bars.
- 8 Organize the top bar into its position as they were before and

9 Close the hive carefully after harvesting.

10 Squeeze the harvested honey combs to separate the honey from the wax.

In harvesting pollen, Timil Nadu (2008) said that it can be collected by using pollen trap for ingoing pollen foragers. Curtis (2005) noted that this can be done by allowing the ingoing pollen bearing bee to pass through a mesh of wire below which is a container that will receive the fallen pollen. Royal jelly harvest is very technical and requires skill. Cushman (2002) explained that to harvest royal jelly, the queen is trimmed to the level of royal jelly. After 2 or 3 days of grafting larva, the jelly is gently removed with royal jelly spoon. This is stored under refrigerated condition. According to Cushman, 200mg of royal jelly is obtained from a queen cell. Bee venom is a very important product of bees and is highly used in Apitherapy. TNAU (2008) noted that the bee venom can be commercially obtained by the use of electric shock. An electric current is passed through copper wire at 12 volts. The bees get shocked, irritated and release venom by inserting it into a thin layer nylon cloth below the copper wire. The venom, the author said is deposited on the glass plate placed below the nylon sheet.

Processing of Bee Products

Processing bee hive products such as honey, bees wax, pollen, propolis etc. uses different techniques, devices and skills depending on the locality and tools available to the bee farmers. According to Agrolod (1998), bee products processing involve removal of any other materials from the products and separation into individual products. This according to the author requires different

methods. However, this study is concerned with the pressing method or technique. In processing honey through pressed technique, the author suggested that the honey comb is first decamped, chopped into pieces in a container and placed inside in a clean cloth, wrapped up and then subjected to pressure to force out the honey. In this process, the wax-comb is lost and the colony has to build another comb.

In processing bee-products, Nuru (1999) opined that bee farmers should be guided by the following steps or procedures:

- 1 Collect the combs using container and squeeze out the honey with fine cloth by wrapping and subjecting to pressure.
- 2 Melt the comb in a container with equal volume of clean water and stir.
- 3 Skim off the wax and pour into a desired mould
- 4 Collect royal jelly and filter through fine cloth.
- 5 Dry wrapped pollen in the sun
- 6 Collect black propolis by rendering

For jelly preparation, Cale (1963) stated that after collecting the jelly, they should be filtered through the fine cheese cloth and stored immediately at refrigerator temperature until ready for sale.

In extracting pollen, Farrar cited in Gront (1963) maintained that this is done through trapping. A pollen trap consist of a grid made from 5 mesh hard-wares cloth, cover a trap and cover with 7 mesh wire cloth when the bees pass through as they leave or enter the hive. Most of the pollen from their legs is scrapped off

and falls into a tray. Yield or trapped pollen obtained from good colonies may range from 20kg to 30kg depending upon the flora in different geographical location and the season. Farrar noted that trapped pollen, when properly dried can be stored for years in closed container without appreciable loss in its value for brood rearing.

In propolis, Gront (1963) stated that propolis is processed by rendering. Rendering according to Agrolod (1998) is the process of preparing a wax whereby wax is washed with clean water before it is melted after which the melted and filtered wax is further purified. Gront (1963) noted that in rendering comb material high in propolis content, a large amount of propolis settles to the bottom of the container while the beeswax rises to the surface. The settled propolis which is gummy and sticky becomes hard and brittle when cold and could be collected for sale.

Marketing of Bee Products

Marketing of bee products is always a very important activity in beekeeping enterprise. Sanusi (2000) explained that bee products market is a place where bee products are exchanged for money. Such market the author said can be a location such as a market place, a retailer's shop or a road side stall, where "suppliers" of bee products meets the "demanders" of bee products. Bee product marketing, according to Olayide and Heady (1982) is the sum totals of all the business activities that direct the sale of products and services from the producer (farmer) to the consumers or the end users. Martins (2008) refer to marketing of

bee products as the carrying out of all the operations that enable the beekeeper to sell bee products.

Marketing of bee products as explained by Chandler (2013) starts not at the end of production but starts when the beekeeper chooses nectars and bees for products. This is because all production must be ultimately in line with both what the final and consumer market need and want. Stanson (1996) stated that marketing activities include grading, advertising, recording of all financial transactions and calculating profit and loss.

Olaitan et al (2008), noted that marketing of bee products involves the following activities:

- 1 Making of market survey.
- 2 Putting the quantity of product required in a container eg. Lucozade bottle.
- 3 Fixing price of each container.
- 4 Selling on the spot or transporting to buyers.
- 5 Receive payment at the selling spot.
- 6 Calculate income and expenditure.

There are many ways of selling bee products. Both cited in Olaitan et al (2008) affirmed that there is more than one way of selling bee products. This, the authors explained can be transported to the customers at the open market or sold immediately to the customers at farm gate prices or the customers coming to the farmer's house to buy in containers. In selling bee products, Thomas (2006)

pointed out that many beekeepers develop reputation for keeping bees and people flock their homes to buy bee products directly with containers. He added that some enterprising farmers also set up shops of their own selling honey in bottles and even buying from other beekeepers for sale. Malichi (2005) supporting Thomas maintained that processed honey are mainly sold in containers in shops, roadside stalls, markets and even motor parks while unprocessed honey is sold in local markets directly to consumers or middle men.

In selling bee products, Chandler (2013) noted that some beekeepers send their products to local markets and sell to men and women local wholesalers who sell them to consumers or to exporters. TimilNadu (2008) pointed out that bee product wholesalers and beekeepers who produce in commercial quantities sell to pharmaceuticals and cosmetic industries. Among rural farmers in Enugu East Zone, marketing of bee products will involve making of market survey to ascertain current prices of different bee products, grading the different bee products into containers, fixing prices for each container, selling immediately at farm gate or transporting to local buyers or exporters, receiving payment immediately at the selling spot and calculating profit and loss.

Materials Required in Beekeeping Training Programme

Relevant and related materials are necessary part of any good training programme or activity that involves knowledge acquisition and retention. Materials according to Bonyo (2005), refers to matter from which something can be made. Such materials in view of the author include but not limited to raw

materials, components parts, small tools and accessories. Training Material in the view of Nwachukwu (2006) include all the practical and skill developing resources that would facilitate the process of teaching, learning and evaluation in technical and vocational skills. Dow (2012) stated that training materials can be seen as devices acquired to assist teachers in transmitting organized knowledge, skills and attitudes to the learners. These materials store information needed by the learner to perform task. Training materials are the resources the adult educator uses to implement the transfer of knowledge, skills and attitudes to participants (Romanov, 2008).

The importance of material in any training endeavour is many. Onwuka in Nwachukwu (2006) opined that when material is available in learning, they will accomplish many objectives. Such material, the author stated, will help students develop interest in subject, offer a reality of experience, develop a community of taught, contribute to growth, provide experience not easily obtained through other material and contribute to efficiency and variety of learning. Dow (2012) noted that materials used in training will generate interest with the audience, support teaching, facilitate communication, provide guidance to trainers and learners, illustrates, gain time, make for self learning and future reference.

Material for training in the opinion of Bonyo (2005) may be in form of models, diagrams, charts or real object. Burbank and Pett (2007) viewed that materials for training may be inform of tools, equipment, and other resources needed for directing and reinforcing the teaching and learning of specific skills. According to Kosovo Education Center (KEC, 2003), materials for training will

include power point presentation, books, articles, and material for the project. In the context of this study, training material means facilities such as tools, equipment and other resources needed in project.

The appropriateness of facilities needs to be considered when choosing material for training. KEC suggested that the following factors need to be considered before selecting materials for training:

1. Support for the achievement of the goals and objectives.
2. Support for achievement of content standard of the learning result.
3. Consideration for varied interest, ability and maturity level of the learner served.
4. Foster respect and appreciation for cultural diversities and varied opinions.
5. Give accurate, comprehensive and balanced representation and contribution of ethnic, religious and cultural groups.
6. Present a balanced opposing side of controversial issues to develop critical thinking in learners.
7. Stimulate growth in factual knowledge, literacy appreciation, aesthetic value and ethical standards.
8. Provide background information that will enable learners make intelligent decisions in their daily issues.

Several materials are needed in beekeeping production enterprise training programme. In the view of Asogwa (2010), materials needed for training in animal production (including beekeeping) are: housing facilities, feeds,

feeding and drinking equipment, harvesting and processing equipment and records and record keeping materials.

Mid-Atlantic Apiculture and Extension Consortium (MAAREC, 1999) explained that materials for training in beekeeping will vary with the size of the operation and the number of colonies that is to be maintained. MAAREC however added that the basic material needed for training in beekeeping production are hives and its components, protective gears smoker, hive tools and materials needed to handle the honey crop and other bee-products. Dalt (2001) noted that materials necessary in beekeeping which must be present when training people in any scale of bee production include the hive, the smoker, hive tools, brush, coverall, hat and veil. Eric, Harry, Len, Robin, Worman and lee (2002) indicated that materials for beekeeping should include welded wire queen excluder, frame, vertical wired beeswax foundation, wire for frame and spur embedder, hat and veil, hive tools, bee brush and glove and one storey ten frame hive and smoker. In the view of Ministry of Agriculture Animal Industry and Fishery (MAAIF, 2012), materials used in beekeeping which beekeeping training providers will make use of include:

1. Production materials such as beehives, feeds and feeding gear (such as sugar syrup, pollen, feeder and water holder).
2. Harvesting gears such as smokers, bee veil and bee suit, bee gloves and hive tools and

3. Processing gears such as air tight buckets, food grade drums, refract meter, weighing scale, straining cloth, centrifuge extractor, honey setting tank and honey jars.

In the context of this study, materials that will be used for training rural farmers in beekeeping will include beehives, smokers, bee suits, hats and veils, bee gloves, sugar syrup, soybean cake, feeding and water containers, bee brush, hive opener, knife, buckets, straining clothes and locozade bottles.

Materials are very important in any training activity (including beekeeping training). Kraf (1999) viewed that materials used during adult training programme will provide guidance to trainers and learners, illustrate what the instructor is teaching, save time, provide self learning and provide future references. Nwachukwu (2006) noted that when materials are available during instruction, they will help learners develop interest on the subject matter; offer reality of experience which stimulate self activity on part of the learner; develop a community of taught; contribute to growth and learning; provide experience not easily obtained through other means; and contribute to the efficiency and variety of learning.

Methods of Training Farmers in Beekeeping programme

The methods selected for a training programme is critical to the effectiveness of that training. A method as stated by Lonsdale and Associates (2013) refers to an approach used in presenting subject matter with the aim of achieving specific objectives. This according to the author can be an approach to

the teaching of the subject, instructional method, teaching learning activity or how a required skill is developed. A method is an established, habitual, logical or prescribed practice or systematic process for achieving certain ends with accuracy and efficiency, usually in an ordered sequence of fixed steps (Wendy, 2013). According to Eric (2013) training methods means a series of steps, or collection of approaches taken to acquire knowledge, skill and attitude in a particular subject matter. Dow (2012) stated that training methods are ways that information is presented to the learner. This, the author stated can be teacher centred or learner centred.

Choosing appropriate methods of teaching requires certain considerations. Odebode (2004) opined that selection of training methods must be based on the target participants, the subject matter, the steps involved in the teaching, the available resources, the teaching skills and knowledge and the teaching situation. Pant (2012) noted that the choice of training methods for a particular adult section will consider the suitability for the objectives, the background knowledge or skill that the participants possess, how much time it will take to prepare and use in the learning section. According to the author, the method also considers the appropriateness to the size of the learning group, the kind of learning materials, special skills to apply and, whether the adult educator possess the skill.

Method is important in any training endeavour. Chidimma and Nwauko (2013) stated that methods unlock the difficulties of comprehension and vocabularies. Sardar (2013) viewed that methods provides every student equal chance to learn and can make you study efficiently.

There are varied training methods that can be used in training rural farmers in beekeeping. Pant (2012) identified the training methods to include lecturers, field visits, demonstration, self study, role plays, small group discussion, case study, simulation, learning games, structured exercise and videos. In the view of Nepal (2011), the latest training methods include experimental learning, case study learning, live projects, role play, interactive workshops, management games, storytelling, lab classroom, mentoring, extempore, stress interview, panel discussion, simulation and book review. Eric (2013) viewed that training methods include: technology based methods, interactive video, simulators, on-the-job training, coaching/mentoring, lectures, group discussions and tutorial management games, outdoor training film and videos, and case study.

According to Tshiuba (2005), training methods for farmers should be based on the principles of adult learning since farmers are adult learners. The author noted that training methods that can be used for training farmers will include demonstration, practice, discussion, brainstorming, buzz group, case studies, role play, games, visualization in participatory programming (VIPP) and presentation. Lansdale and Associates (2013) viewed that methods of training include lectures, discussion, demonstration and exercise, Charlote (2013) stated that training methods include lectures, classroom discussion, recitation, debate, gaining and simulation, role playing, oral report, use of technology and instructional resources.

In the view of Kangave (2012), training method used in beekeeping training include: Lectures, brainstorming, group discussion and field exercise. In the opinion of Ministry of Agriculture, Animal Industry and Fisheries (MAAIF,

2012), beekeeping training methods should include lectures, brainstorming, demonstration, group discussion, field and practical exercise, group work and presentations. In training Enugu East rural farmers in beekeeping, the trainer will use lectures, demonstration, group discussion, fieldtrip, and practical exercise for the training.

Methods of Evaluating Performance in Beekeeping Training Programme

Evaluation is a way of determining whether an initiative has been worthwhile in terms of what is intended. Okoro (2006) expressed that evaluation is the appraisal of the worth or value of a thing or action and the making of appropriate decision on the basis of such appraisal. Evaluation in the opinion of University College London (UCL) (2013) is a systematic review and assessment of benefits, quality and value of a programme or activity.

Training programme evaluation involves the assessment of the effectiveness of a training programme. Raab, Ben and Darl (1987) noted that training programme evaluation is a systematic process of collecting information about a training activity which can be used in guiding decision making and for assessing the relevance and effectiveness of various training component. Okoro viewed that programme evaluation is the evaluation of the whole programme to determine the extent to which it was established. Brown, Rust and Gibbs (2004) stated that training programme evaluation is the collection of data on whether the participants are satisfied about the training programme; whether they learned something and whether they can apply the skills.

The importance of evaluation is high in every aspect of a training programme. Ezeji (2004) asserted that evaluation is necessary because it is important to gather data about the achievement of the objectives. Okoro stated that information obtained from programme evaluation may be used in programme planning, programme improvement and accountability. In the opinion of Rea (2010), the general reason why we need to evaluate a training programme is to justify the existence and budget of a training programme by showing how it contributes to the trainee's improvement; to decide whether to continue or discontinue a training programme; and to gain information on how to improve future training programme.

There are some important factors which need to be considered when choosing any evaluation method for a training programme. Innovative Centre for Community and Youth Development (ICCYD) report (2005) noted that it is important to consider the method context of the community in which the programme evaluation operates to ensure that it is appropriate for the group. Dick and Carey (2003) explained that when selecting an evaluation method, the evaluator should consider the relevance and cultural sensitivity of the data collection method; how the group will prefer to share the information, the potential language barriers that may inhibit some people from understanding the evaluation questions, and the use of multiple method so that the information may be analysed in a variety of ways.

Different methods can be used in evaluating a training programme. Brown et al noted that evaluation methods consists of qualitative methods such as

surveys, questionnaire that ask close ended questions, performance tests, clinical tests, observation and checklist and quantitative methods such as key informants or individual interviews, focus group, open ended, questions, logs, journals, diaries, observation and document review. Eseryel (2004) viewed that evaluation method for a training programme will include observations, interviews, testing and self assessment. Carr (2002) suggested that evaluation methods will include questionnaire, knowledge review, observation, gap analysis, analysis of organisational performance measures and analysis of training return on investment.

According to Livesysolar (2013), training programme evaluation methods include observations, questionnaire, interviews, self diaries and self recording of specific incidents. University College London (UCL) (2013) stated that those that engage in group training activities have the following methods to evaluate the delivery and impact of their activities. These, the author said will include interviews, questionnaire, observations, walk and talk, focus groups, personal logs (diaries, logbooks, reports), workshops and creative methods. Evaluation Trust (2013) noted that training programme can be evaluated through methods such as counting, observations, looking at documents and records, interviewing, case studies, group exercises and review meetings, questionnaires, visual and projective techniques.

In evaluating beekeeping training programme for rural farmers in Enugu East Agricultural Zone, the methods to use will include: observation of practise to correct errors, interviewing to identify areas of difficulties, rating scales for

grading skill practise and follow-up visits to assess the independent practise of bee farmers. The conceptual framework of the study is summarised by the schema below:

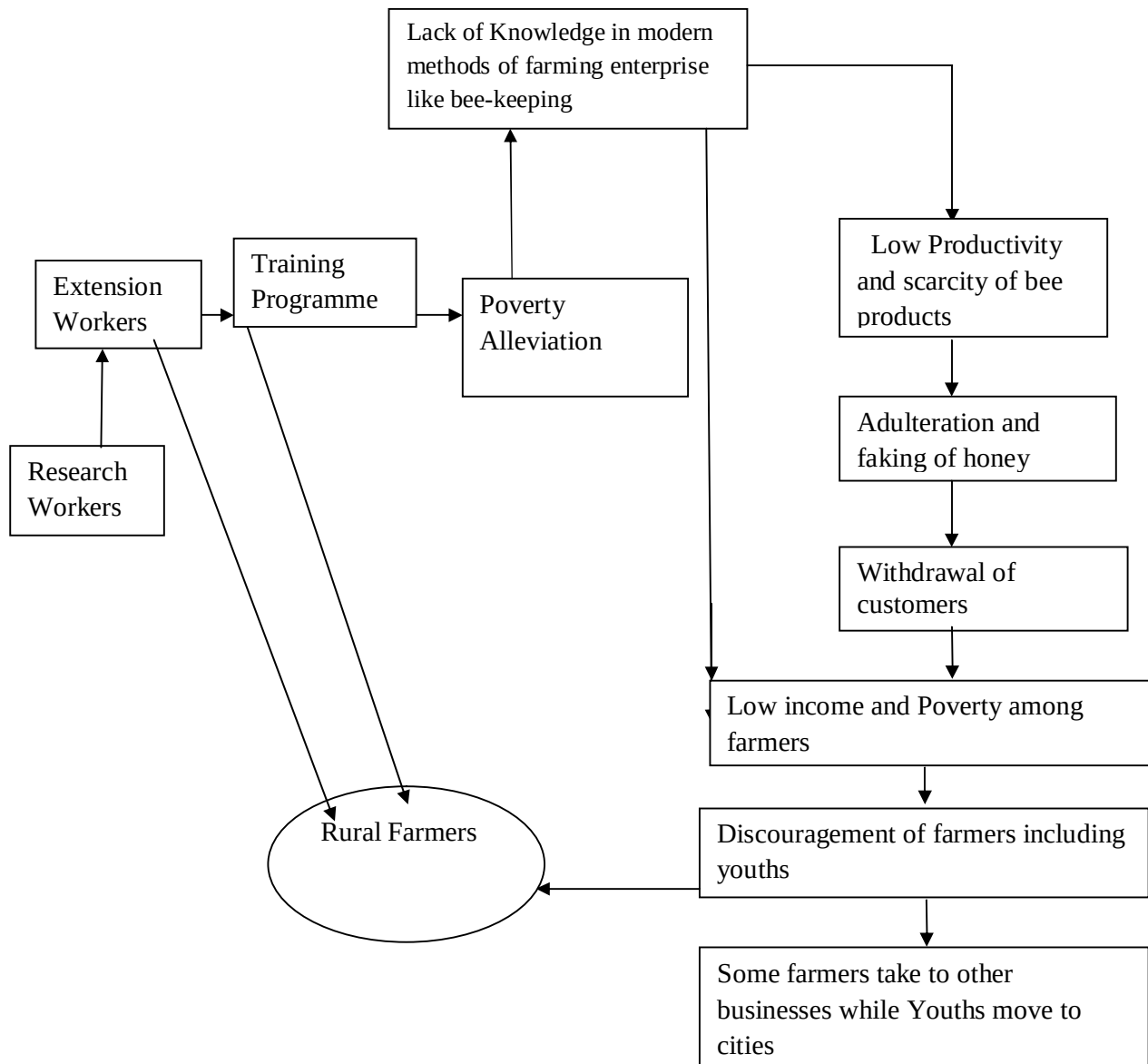


Figure 1. Beekeeping training and poverty alleviation of rural farmers.

Source: The Researcher

Form the schema above, many farmers in the rural communities in Enugu East Agricultural Zone of Enugu State are poor due to their lack of knowledge in modern/improved method of farming enterprises like beekeeping. Although there are some few beekeepers in the area, these beekeepers lack knowledge of modern techniques in beekeeping. These farmers use traditional methods which do not

yield much, thus making their output from bee farming low. This low output cannot meet the high demand for bee products in the area thus making room for some mischievous individuals to adulterate and fake bee products especially honey which the area is known for. Many patronizing customers lost confidence in obtaining good quality honey and other by-products from them. Consequently, the income of farmers become very low and farming becomes less attractive. This makes some farmers to resort to other businesses including some youths who move into the cities in search of better jobs. However, most of the farmers live with the little realized from other farm produce waiting for any opportunity that can help them increase their income.

The above make for the need to engage the effort of the farmers who directly bear the brunt for improving the condition. Thus, the need for the extension agents and other trainers who can identify and solve farmers's problems and who can form links between the farmers and research agency to use new technological information generated on beekeeping from research to train farmers to alleviate their poverty.

Theoretical Framework

A theory according to Olaitan (2003) is a set of related statements that are arranged so as to give functional meaning to a set or series of events. The author further explained that such sets of related statements may take the form of descriptions, operational constructs, assumptions, laws and theories. A theoretical framework is therefore a set of principles or ideas that serve as the basis for one's

judgement and decisions concerning the concepts of the subject matter. The theories that guide this study are:

Training Theories

Adult learning Theory

Training Theories

Training involves an expert working with learners to transfer to them certain area of skill to enable them improve in their current job. It is an organized efforts aimed at helping individuals acquire basic skills required for efficient execution of their functions. The following theories of training guided the study:

1. Identical Element theory: Identical element was propounded by Thorndike and Woodworth (1901). This theory states that, transfer of learning is improved by increasing the degree of correspondence among the training setting, stimuli, responses and conditions and those related factors operative in the performance settings. According to the theory effective training can only be given s going to work: that, where the learner is going to make use of the training to earn a living. The training environment as indicated by the propounder is determined by the conditions necessary to get the work done. Some of these conditions are physical, such as tools and machines and place of work while others are personal such as personnel involved in the operations. It therefore means that employees will perform efficiently well in their regular jobs if their training experiences were structures in the likeness of real work environment outside training. So, trainers are expected to expose learners to knowledge and

skills in job related situations using functional teaching models in an environment that depicts real work situation.

Identical element theory is relevant to the study because it enabled the researcher to develop a training programme that will help the rural farmers to create a smooth transition from training to actual practice on any of the occupational areas in modern beekeeping. This involves identifying for trainers similar environment, methods of operations and materials as in actual job of beekeeping enterprise during the development of the training programme.

2. Theory of Experience Instructor: The experience instructor theory was propounded by Prosser and Quinigley in 1914. This theory states that trainees will be effective in proportion as the instructor has had successful experience in the application of skills and knowledge to the operations and processes he undertakes to teach. According to the propunders, the only person who is competent to instruct and train is the individual who has had habit formation experiences, who himself is a master of his craft and has handled the equipment. This means that learners in an occupation learn faster and more effectively if the master trainer is himself skilled or expert in the occupation. Work habit is developed and learning becomes effective when the individual maximizes his interest, aptitude and intrinsic intelligence at the highest possible degrees.

This study is related to experience instructor theory because the study has exposed to the extension agents and other trainers who train individuals in beekeeping, the content areas, materials and methods of training and evaluation in

beekeeping. This will equip them and make them become efficient during the training of the farmers.

Adult Learning Theory:

Adult learning theory also known as andragogy was propounded by Malcolm Knowles in 1970. The theory stated that adults learn when they relevancy oriented; internally motivated and self directed; that adults bring life experiences and knowledge to learning experiences; adults are practical, goal oriented and like to be respected. According to the propounder, these assumptions about adults influence their rate of learning, what to learn and the desire to learn. Therefore, part of being an effective farmer educator involves understanding and taking into consideration how adults learn best while designing adult learning programme. The assumptions of this theory are explained below..

1. Adult are relevancy Oriented: According to Malcom Knowles, adults spend a considerable amount of time and energy exploring what the benefit they will have in learning something and the cost of them not learning it before they are willing to invest on it. This theory assumption has relevance to this study because beekeeping provides a lot of relevant products that provides the farmers with means of livelihood such as honey, beeswax, pollen propolis and royal jelly.

2. Adults are internally motivated and self-directed : Knowles's theory maintained that adults are capable of taking responsibility for themselves and that adults are motivated mainly by intrinsic motivators. This has relevance to the study because rural farmers will be motivated to learn modern method of beekeeping since it will lead to larger productivity and higher standard of living.

3. Adults bring life experience and knowledge to learning experiences:

Adult learning theory also explained that adults have broader base of experience on which to attach new ideas and skills and give them richer meaning. The relevance of this theory assumption to this study is that many rural farmers in Enugu East Zone have one or more ideas about beekeeping which will help them learn more about modern method of beekeeping

4. Adults are Goal Oriented: Adults become ready to learn when they experience in their life situation, a need to know and be able to do in order to perform effectively and satisfyingly. This study will provide the farmers in Enugu East the opportunity to learn beekeeping when there is high demand for bee products.

5. Adults are practically Oriented: Malcolm Knowles stated that adults enter into learning experience with a task centered orientation to learning. Youths according to the propounder, have subject centered orientation to learning where they focus on learning content to pass test while adults by virtue of their experiences develop a task-centered orientation to learning. This aspect of the adult learning theory is applicable to this study as the researcher identified practical methods of teaching that will be used to train the farmers such as demonstration, field trip, practical exercise etc.

6. Adult learners like to be Respected: this theory is relevant to the study because the findings will be packaged into a programme for use by experienced trainers such as extension agents who understands the needs and how to teach adults.

Related Empirical Studies

Onah (2002), carried out a study on developing Supervised experience programme in secondary schools in Enugu State. The study was mainly carried out to enable the researcher develop suitable supervised agriculture experience programme for secondary schools in Enugu State to redress the issue of incompetence and lack of vocational skills in agricultural fields. In carrying out the study, six research questions and three hypotheses were formulated based on the purpose of the purpose of the study. The population for the study was 925 from where a sample of 519 was selected using proportionate simple random sampling technique. The data were collected using questionnaire administered to 519 sampled agricultural science teachers out of which 223 were located in urban area while 296 were located in the rural areas. The data collected were analysed using mean to answer the six research questions and T-test to answer the three hypotheses at 0.05 level of significance. It was found out that ten needs and values: ten objectives; five guidelines for implementation; ten major activities and seven criteria for evaluation of supervised agriculture experience programme were identified by the agricultural science teachers. The author found out that the teachers, students, parents, and employers have great role to play in the programme. There were no significant differences in the mean responses of agricultural teachers on statement of objectives, activities and roles of teachers, students, parents, and employers in the supervised agriculture experience programme. This study relates to the present study in the sense that both of them developed a programme in areas of agriculture. However, supervised experience

is a school based vocational education programme while beekeeping training programme can be for any group of people.

Amugwanwa (2004) undertook a study on the development of Task Instructional Sheet (TIS) for teaching selected animal production skills to senior secondary school students in the Federal Capital Territory Abuja. The purpose of the study was to find out the teaching methods predominantly in use by teachers of agriculture in Federal Capital Territory Schools. A survey research design was adopted because the study sought information and opinion from the respondents using questionnaire. Data was analysed using percentage and mean to provide answers to relevant research questions. Among the major findings are the lectures and demonstration methods of teaching were predominantly in use while task instructional sheets are not in use in the federal capital territory schools. Furthermore, the author identified a step-by-step procedure for carrying out pre-brooding activities, brooding, de-beaking/disburding, ear notching, deworming and artificial insemination . The implication of the findings are that with continued use of lecture and demonstration method as only methods of lesson delivery, teachers in the Federal Capital Territory Schools will not cope with the projected population explosion in schools due to the rural-urban drift. Also variety in the use of methods will also be eliminated since methods like task instructional sheet are never in use. The condition according to the author, continue to have negative effect on students performances. The author also recommended that teachers should be sent on training on how to develop and use Task Instructional Sheets. This study has a relationship with the present study because as the Task

Instructional Sheet shows a step-by-step approach to imparting knowledge to the learner; so also does a training programme show step-by-step approach to training. Task Instructional Sheet dealt with some skills in macro-livestock production while this study deals with micro-livestock.

Ohagwu (2005) studied the skills required by secondary school leavers for entering into bee-keeping occupation in Enugu state. The study identified skills required by secondary school leavers for entering into bee-keeping occupation in Enugu state. Finding from the study revealed that secondary school leavers in Enugu state required the following skills in bee-keeping; six skills in selection of site for bee-keeping; twelve skills in the construction of beehives; six skills in the stocking of bees; four skills in the feeding of bees; ten skills in the management of bees; five skills in the harvesting of bee products. The findings on the hypothesis tested by the author revealed that: there was no significant difference in the mean rating of the responses of Agricultural Extension Officers and Bee-farmers on the six areas of bee-keeping skills that were required by secondary school leavers in Enugu State. The study has a relationship with the present study because all of them are interested in studying beekeeping.

Ogbu (2006) developed and validated Individualized Instructional Package (IIP) for teaching selected embroidery skills to junior secondary school (JSS) students in Ebonyi State. Six research questions and four related null hypotheses were formulated and tested at 0.05 level of significance. An embroidery skills identification questionnaire was developed and used to identify embroidery skills. Five embroidery skills were chosen and used to develop the IIP. The IIP were

used to teach 205 JSS 3 students while another group of 205 JSS 3 students were taught using lecture/demonstration method. The two groups were evaluated by criterion reference measures on each embroidery skills. Means, percentages, standard deviation and t-test statistical tools were used in data analysis. The findings of the study revealed among others that: thirty nine embroidery skills are important and necessary for teaching embroidery skills to JSS students Individualized Instructional Package is a more effective teaching strategy than lecture/demonstration method in acquiring embroidery skills and IIP will be useful to all involved in fabric production. This relates to the present study in that both of them identify skills to be used in developing an instructional programme for teaching a group of people.

Olaitan, Ifeanyieze and Omeje (2008) carried out a study on development of entrepreneurial skill training program in Micro-Livestock (Beekeeping) for reengagement of retirees in a sustainable occupation in Enugu State. In the study, five research questions were developed and answered while five hypotheses were formulated and tested at 0.05 level of significance and 284 degree of freedom. A 60 item structured questionnaire was developed and validated by experts. It was administered on respondents made up of 120 extension agents and 164 bee-keeping farmers in Enugu State. Weighed mean and standard deviation were used to answer the research questions while the t-test statistics was used to test the hypotheses. The findings of the study revealed that: 11 skills were required in planning for beekeeping enterprise, 18 skills in the site selection and construction of beehives, 10 skills in stocking and feeding of bees, 10 skills in managing bees

and 11 skills in harvesting and marketing of bee products. With reference to the hypothesis tested, there was no significant difference in the mean ratings of the responses of the two groups of the respondents on all the entrepreneurial skills identified by the study. It was recommended that the identified skills should be used to train retirees in Enugu State for establishment of beekeeping enterprise for sustained livelihood. The study relates to the present one in that both of them identified skills needed for training different groups of people in beekeeping production enterprise for improved livelihood. The major difference was that the former dealt on entrepreneurial skill for retiree and so developed the skill items while the present study is focused on identifying the objectives, methods of teaching and evaluation among others which teacher could utilize to impart the skills to the learner.

Mohammed (2008) carried out a study on the entrepreneurship skill required by secondary school graduates for success in rice production enterprise in Kwara State. Three sets of structured questionnaire were developed from the related literature reviewed for the study. The questionnaires were used for collecting data from 250 respondents. The data were analysed using the mean and standard deviation to answer the research questions and t-test statistics to test the null hypotheses. The major finding of the study by the author revealed seven (7) modules with 89 skills in rice growing enterprise and two (2) modules with 113 skills in rice processing enterprise and two (2) modules with 25 skills in rice marketing enterprise. The result of the null hypotheses tested revealed that there were no significant differences in the mean rating of the responses of group of

respondent on the entrepreneurial skill modules with their corresponding skills required by secondary school graduates for success in rice production enterprise in the state of study. He recommended that entrepreneurial skill modules with their corresponding skills identified by the study could be packaged into training programme and integrated into state's skill acquisition centres in Kwara State Government for training secondary school graduates and other interested youth in rice production enterprise. The study identified vocational occupational skills which can be packaged into a training programme for training people in the area of agriculture and therefore relates to the present study . However,the present study in addition to identification of skills also identifies materials and methods of teaching the skills

Asogwa (2010) conducted a study on the development of entrepreneurial competency-support programme in goat production for enhancing the income of teachers of agriculture in secondary school in Enugu State. Survey research and function of industry design were adopted. The study was carried out in Enugu State. The population of the study was 3,122, made up of 3,040 goat farmers, 38 extension agents and 44 lecturers. The sample for the study was 386 consisting 304 goat farmers, 38 extension agents and 44 lecturers. A random sampling technique was used to select the sample of goat farmers while the whole population of extension agents and lecturers were studied. A hundred and two structured competency items was developed from the literature reviewed and industries and used for data collection by the study. The data collected were analysed using mean and standard deviation to answer the research questions and

t-test statistic for testing the null hypothesis. The findings of the study revealed that 11 competency items were required in planning for goat production enterprise, 17 in providing housing, 29 in breeding goat, 29 in rearing weaned goat to market weight, 6 in health management of goat, 10 in marketing of goat and 27 in packaging competency item in goat production enterprise into a competency based programme. The result of the null hypothesis tested showed that there was no significant difference in 24 competency items required in goat production enterprise in developing a training programme in Enugu State. It was recommended that the identified competencies be used to re-train teachers in agriculture in goat production. The author also recommended that teachers of agriculture should use identified skills to teach students goat production in schools. The study is related to the present study because both of them have developed a production training programme in an occupation but differed in the subject on focus.

From the review, it can be observed that very little study have been generally carried out on beekeeping in Nigeria. These studies have been carried out on the identification of skills needed in beekeeping. However, to the knowledge of the researcher, none have been done on the identification of materials and methods necessary for imparting these beekeeping skills to the farmers.

Summary of Literature Reviewed

The literature reviewed under approaches covered job analysis, task analysis and modular approach among others. These approaches helped the researcher to break beekeeping enterprise into different tasks which were packaged into modules. The literature reviewed generally guided the research in identifying content areas of in beekeeping which could be utilized in training the farmers.

Theoretical frame work guided the researcher in identifying better ways of training the farmers in beekeeping to help them derive meaningful values for better performance to enhance their living standard. The theory also provided a framework for the study.. Related empirical studies reviewed revealed the methods adopted by other researchers in carrying out their study. This helped the researcher to select appropriate methodology for the study. Related empirical study reviewed also helped the researcher to identify area of beekeeping that need further study. From the review of empirical studies, it could be observed that some studies have been carried out in beekeeping on the identification of skills. However to the best knowledge of the researcher, non had been done on the materials and methods necessary for imparting the identified skills. Therefore this study was initiated to fill the gap on the objectives, materials and methods of training and evaluation of performance in beekeeping training programme in training farmers in Enug East of Enugu State.

CHAPTER THREE

METHODOLOGY

This chapter presented the procedure adopted in conducting the study. The procedure was organized under the following sub-headings: design of the study, area of the study, population for the study, sample and sampling technique, instrument for data collection, validation of the instrument, reliability of the instrument, method of data collection and method of data analysis.

Design of the Study

This study adopted Research and Development (R & D) design. Research and Development (R&D) design according to Gall, Gall and Borg (2007) is an industry-based development model in which the findings of research are used to design new products and procedures which then are systematically field-tested, evaluated and refined until they meet specified criteria of effectiveness, quality or similar standard.

In the view of Ali (2006) R&D design involves the preparation and systematic try out, in which feedback is gathered and they can lead to a perceptible improvement in the education of students. Nworgu (2006) stated that the R&D design is aimed at developing and testing more efficacious educational products which could be textbooks, equipment and curricula. The author stated further that these products are trial tested in the field in order to ensure their effectiveness.

Thus, R&D design were combined with modular approach in the development of beekeeping training programme for poverty alleviation of rural farmers in Enugu East Agricultural Zone of Enugu State.

The steps involved in the research and development (R&D) design according to Gall, et al (2007) is presented in pg 27.

Area of the Study

The study will be carried out in Enugu East Agricultural Zone of Enugu State. The zone is located in the eastern part of Enugu State and is made up of six local government areas which include: Enugu East, Enugu North, Enugu South, Isi-Uzo, Nkanu East and Nkanu West, (Enugu State Agricultural Development Project, ENADEP 2013). The area is endowed with season rainfall pattern and the major occupation of the people especially the inhabitants in the rural area is farming. Part of the income of these farmers is gotten from beekeeping. Honeybees thrive well in the area because it is endowed with many bee pollinating flowering plants which serve as source of food for bees. Rivers, lakes and streams also abound in the area which, serve as source of water for the bee while providing honey for the farmers. The area has quiet zones and open spaces with tree shades that prevent excessive wind. The rural areas in the zone are free from pollution from industries and infestation by bee pests and diseases. The area is chosen for the study because it is observed that in the zone some of the farmers drift to the state metropolis in search of other jobs as farming is no more lucrative. The study area is also chosen because the area is well suited for beekeeping and is

near the city where the demand for bee products are high due to large number of consumers, exporters and industries that make use of bee products.

Population for the Study

The population for the study consists of 432 made up of 307 Agriculture science teachers, 75 registered beekeepers and 40 extension agents. The population of teachers was obtained from the Post primary school management Board Enugu while the population of extension agents and beekeepers were obtained from Enugu State Agricultural Development Project (ENADEP, 2013).

Sample and Sampling Technique

The sample for the study was two hundred and thirty-three (213) made up of 98 teachers of agricultural science, 75 registered beekeepers and 40 extension agents. The entire population of the extension agents and that of the beekeepers were used for the study because of their small size. However, proportionate stratified random sampling techniques were used to obtain the sample of teachers of Agriculture using 20% as Bonym (2005) recommended that for a population of 2000,-5000, a minimum of 10% may be used. If the population is 1000-2000, 20% can be used while 20- 50% may be used in respect of 100 and when in tens, the entire population may be used.

Instrument for Data Collection

Beekeeping questionnaire for poverty alleviation of rural farmers was a structured items developed from the literature reviewed by the researcher and was used to obtain information from the teachers of Agricultural Science, Extension agents and registered beekeeping farmers. The questionnaire was divided into two

parts. Part A sought information on personal data of the respondents such as local government area and occupation. Part B was made up of five sections 1-5. Section 1 was designed to obtain respondents' view on the objectives of beekeeping training programme while section B sought information on the content of beekeeping training programme. Section 3 obtained information on the materials used in beekeeping training programme while section 4 was designed to elicit information from the respondents on methods used in beekeeping training programme. Section 5 gathered data on the method of evaluating beekeeping training.

Section 1 of the questionnaire was assigned four response options of Highly Relevant (HR), Averagely Relevant (AR), Slightly Relevant (SR) and Not Relevant (NR). Also, each questionnaire item in Sections 2, 3, 4 and 5 was further assigned a four response options of Highly Required (HR), Averagely Required (AR), Slightly Required (SR) and Not Required (NR). Each of the sections has the response option assigned values as 4, 3, 2 and 1.

Validation of the instrument

The instrument was face validated by five experts. These include two lecturers from department of Vocational Teacher Education, University of Nigeria, Nsukka; one Lecturer from Department of Educational Foundations and Technology, Enugu State University of Science and Technology and two experts in beekeeping industry, one from Chinonyelum Farm investment Venture Okpatu and one from Ben Odo Bee Home and Horticultural Garden Limited, Imilike, Enugu State. The validates were requested to add, modify, restructure or re-

organize the items or delete irrelevant ones to make the instrument meet the stated objectives.

Reliability of the Instrument

The researcher administered copies of the questionnaire to sample size of 10 reproduces comprising of four teachers, three and three beekeeping farmers as a pilot study. The completed copies were collected and analysed using cronbach Alpha formula to determine reliability coefficient of each cluster of the questionnaire. The reliability coefficient values obtained were 0.84 for the objectives of beekeeping training programme; 0.91 for content areas of beekeeping training programme; 0.90 for materials required in beekeeping training programme; 0.89 for methods of training farmers in beekeeping programme; and 0.97 for methods of evaluating farmers's performance beekeeping training programme.

Method of Data Collection

Two hundred and thirteen (213) copies of the questionnaire were administered to the respondents at their various locations with the help of six research assistants who are conversant with the terrain and can speak and interpret the questionnaire items into the common language of the environment. The assistants were requested to ask all the groups of respondents to respond to part one of the instruments. Part two had five sections in which all the respondents reacted to section 2 and 3 while the agricultural science teachers and extension agents only reacted to sections 1, 4 and 5. That is, all the respondents reacted to part 2 and sections 2 and 3 of Part 2 of the instrument while extension agents and

Teachers of Agricultural in addition were further asked to respond to sections 1, 4 and 5 of part 2. Copies of the questionnaire were retrieved from the research assistants after five (5) days at an agreed time and location. A total of 213 copies of the questionnaire were administered to the respondents and a total of 213 were retrieved which represents 100% return rate for data analysis

Method of Data Analysis

Data collected for the study were analyzed using weighted mean to answer the research questions while standard deviation was used to validate the mean. Analysis of variance (ANOVA) and t-test statistics were used to test the null hypotheses at the probability of 0.05 and level of significance and appropriate degrees of freedom. The four point response options in sections 1-5 were assigned real limit of number thus:

Response option	nominal value	real limit
Highly Relevant/required =	4 =	3.50 ÷ 4.00
Averagely Relevant/required =	3 =	2.50 ÷ 3.49
Slightly Relevant/required =	2 =	1.50 ÷ 2.49
Not relevant/required =	1 =	1.00 ÷ 1.49

In taking decision for the research questions answered, any item with a mean of value of 1.50 or above was interpreted as relevant/required while any item with a mean value below 1.50 was interpreted as not relevant/required. For standard deviation, any item with a standard deviation value of 1.96 or below indicated that the respondents were close to the mean and to one another in their responses while any item with a standard deviation value above 1.96 showed that

the respondents were not close to the mean and to one another in their responses. With reference to the hypothesis, the null hypothesis of no significant difference was accepted for any item whose p-value was above 0.05. However, the null hypotheses was rejected for any item whose p-value was less than 0.05.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

This chapter presented the analysis of data collected for the research work. The analyzed data were organized based on research questions answered and hypothesis tested for the study.

Research Question and Hypothesis 1

Research Question 1

What are the objectives of beekeeping training programme?

Hypothesis 1

There is no significant difference in the mean ratings of Teachers and Extension Agents on the Objectives of Beekeeping training programme

The data for answering research question and testing hypothesis one were presented in table 1

Table 1

Mean Ratings and t-test statistic of Teachers and Extension Agents on the Objectives of Beekeeping Training Programme. N = 138

S/N	Item Statement on Objectives of Beekeeping Training Programme	$\bar{X}$	SD	Rem	Teachers		Ext. Agents		p-value	Rem
					$\bar{X}_1$	S^2_1	$\bar{X}_2$	S^2_2		
a	Appreciate the value of bee keeping	3.50	0.71	H R	3.53	0.35	3.42	0.86	0.43	NS
b	Identify the best site for bee keeping	3.87	0.43	H R	3.90	0.17	3.90	0.23	0.74	NS
c	Construct beehive such as langstroth	3.49	0.83	A R	3.56	0.51	3.33	1.14	0.15	NS
d	Stock honey bees into hives	3.65	0.55	H R	3.70	0.28	3.62	0.34	0.71	NS
e	Feed bee colony	3.57	0.73	HR	3.68	0.43	3.30	0.72	0.01	S
f	Control swarming of bees	3.51	0.64	HR	3.56	0.33	3.40	0.60	0.18	NS
g	Prevent robbing among bee colonies	3.52	0.74	HR	3.54	0.45	3.48	0.76	0.64	NS
h	Replace lost queen in a bee colony	3.65	0.66	H R	3.78	0.27	3.35	0.69	0.00	S
I	Harvest bee product.	3.84	0.39	HR	3.85	0.13	3.83	0.19	0.76	NS
J	Process the harvested bee products	3.45	0.70	AR	3.40	0.48	3.60	0.45	0.12	NS
k	Market bee product	3.44	0.76	AR	3.45	0.54	3.45	0.66	0.99	NS

Key: SN= serial number; $\bar{X}$ = mean; SD = Standard deviation; Rem = Remark; $\bar{X}_1$ = mean of teachers; S^2_1 = variance of teachers; $\bar{X}_2$ = mean of extension agents; S^2_2 = variance of extension agents; p-value = probability value.

Table 1 presents the mean ratings and standard deviation of teachers of agriculture and extension agents on objectives of beekeeping training programme. The data revealed that 8 out of 11 objectives had mean values that ranged from 3.50 to 3.87. The values were within the real limit of 3.50-4.00 indicating that the 8 items were highly relevant objectives of beekeeping training programme. The items were numbers a, b, d, e, f, g h, and i. This implies that to appreciate the value of beekeeping; identify the best site for bee keeping; stock honey bees into hives; feed bee colony; control swarming of

bees; prevent robbing among bee colonies; replace lost queen in a bee colony; harvest bee product were highly relevant as objective of beekeeping training programme. Three items out of 11 objective had mean values that ranged from 2.50-3.49; the values were within the real limit of 2.50-3.49; indicating that items were averagely relevant objective of beekeeping training programme. The item numbers were c, j, and k. This implies that to construct beehive (langstroth); process the harvested bee products; and market bee product were averagely relevant as objectives of beekeeping training programme. Generally, the 11 objectives were within the real limit of 2.50 to 3.87 and are above 1.50; indicating that all the objectives are relevant in beekeeping training programme.

The standard deviation of the 11 items ranged from 0.39 to 0.83 and were below 1.96; indicating that the respondents were close to the mean and to one another in their responses.

The table also revealed that 9 out of 11 items had p-value that ranged from 0.12 to 0.99. The values were greater than 0.05; indicating that there was no significant difference in the mean ratings of teacher and extension agents on the 9 out of 11 objectives. The hypothesis of no significant difference was accepted for the 9 items. This implies that teachers and extension agents did not vary in their responses on; appreciate the value of bee keeping; identify the best site for bee keeping; construct beehive such as langstroth; stock honey bees into hives; control swarming of bees; prevent robbing among bee colonies; harvest bee product; process the harvested bee products; market bee product . The data also revealed that p-values of two items (e and h) were 0.01 and 0.00. They were less than 0.05, indicating that there was no significant

difference in the mean ratings of the 2 respondents on the 2 items. The hypothesis of no significant difference was rejected for items e and h. This implies that teachers and extension agents vary in their responses on to feed bee colony and replace lost queen in a bee colony as objectives relevant in beekeeping training programme.

Research Question and Hypothesis 2

Research Question 2

What are the content areas of beekeeping training programme?

Research Question 2

Data for answering research question and testing hypothesis two were presented in table 2

Table 2

Mean ratings and ANOVA Statistic of the responses of Teachers, extension agents and farmers on the content areas of Beekeeping training Programme N=

SN	Items Statement the content areas of beekeeping training programme	$\bar{X}$	SD	Rem	B/w group	Within groups	Total sum of squares	p-value	Rem
a	Value of beekeeping (6 items)	3.57	0.70	H R	7.65	238.58	229.56	0.41	NS
b	Choosing of site (6 items)	3.56	0.60	„	2.59	105.06	107.64	0.18	„
c	Construction of Langstroth (7 items)	3.74	0.61	„	3.08	150.42	154.94	0.58	„
d	Hiving the Bees (11 items)	3.64	0.67	„	2.48	129.96	132.43	0.34	„
e	Management of the bee colony (9 items)	3.58	0.78	„	5.97	197.64	204.50	0.10	„
f	Harvesting of bee products (11items)	3.64	0.80	„	6.92	186.84	179.81	0.10	„
g	Processing of bee products (9 items)	3.41	0.73	A R	2.48	118.29	120.77	0.17	„
h	Marketing of bee products (6 items)	3.66	0.63	HR	1.44	82.92	84.35	0.27	„

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Key: SN. = serial number; $\bar{X}$ = Mean, SD = standard deviation; Rem = Remark; B/W group = between group; P- value = Probability value.

Table 2 presents the mean ratings and standard deviation of teachers, extension agents and beekeeping farmers on the content areas of beekeeping training programme. The data revealed that 7 out of 8 clusters of items had their mean values ranged from 3.56 to 3.74. These values were within the real limit of 3.50 - 4.00, indicating that the 7 clusters of items were highly required as the contents of beekeeping training programme. The clusters were numbers a, b, c, d, e, f, and h. This implies that values of beekeeping; choosing of site; construction of Langstroth beehive 7 items; hiving the Bees (11 items); management of the bee colony (9 items); harvesting of bee products (11 items); processing of bee products (9 items); marketing of bee products (6 items) were highly required in the content of beekeeping training programme. One of the clusters of items had the mean values as 3.41. The value was within the real limit of 2.50-3.49, indicating that the cluster item was averagely required as the content areas of bee training programme. The cluster number was g. This implies that processing of bee products was averagely required in the content of beekeeping training programme. Generally, all the 8 clusters of items within the real limit of 2.50 to 3.74 and were above 1.50; indicating that the item were required as the contents of beekeeping training programme. The standard deviation of the 8 clusters of items ranged from 0.60 to 0.8 and was below 1.96, indicating that the respondents were close to the mean and to one another in their responses on the content areas of beekeeping training programme. The eight clusters with their 65 items corresponding items include: (value of beekeeping 6 items, choice of site 6 items , construction of beehive 7 items, hiving bee 11 items, management of the bee

colony 9 items, harvesting the bee products 11 items, processing the bee products 9 items and marketing bee products 6 items (see appendix g pg. 167). The mean values of the corresponding 65 items ranged from 3.4 to 3.85. The values of the 47 items were within the real limit of 3.50 - 4.00, indicating that 47 items were highly required as the contents areas of beekeeping training programme. The remaining 18 of the 65 items had the mean values ranged from 3.51 to 3.85. The values were within the real limit of 2.50-3.49 items, indicating that the 18 items were averagely required as the content areas of bee training programme. Generally, all the 65 items had mean values above 1.50 and were required as the content areas of beekeeping training programme.

The table 2 also revealed that all the 8 clusters of items had their p-values ranged from 0.10 to 0.58 and were greater than 0.05; thus indicating that there was no significant difference in the mean ratings of teachers, extension agents and beekeeping farmers on the content of beekeeping training programme. Therefore the hypothesis of no significant difference was upheld for all the cluster items. The 8 cluster items had 65 corresponding items of which 59 had their p-values ranged from 0.06 to 0.99 and were greater than 0.05; thus indicating that there was no significant difference in the mean ratings of the three groups of the respondents on the 59 items. Therefore the null hypothesis of no significant difference was upheld for 59 items. However 6 of the 65 corresponding items had their p-values ranged from 0.00 to 0.01 and were less than 0.05; indicating that there was a significant difference in mean ratings of the three groups of the

respondents on the 6 of the 65 items. Therefore the null hypothesis of no significant difference was rejected for 6 items.

Research Question and Hypothesis 3

Research Question 3

What are the materials required in beekeeping training programme?

Hypothesis 3

There is no significant difference in the mean ratings of the teacher, extension agents and beekeeping farmers on materials required in beekeeping training programme

Data for answering research question and hypothesis three were presented in table 3

Table 3

Mean Ratings and ANOVA statistic on the Responses of Teachers, Extension Agents and Beekeeping Farmers on materials required for Beekeeping Training Programme. N = 213

S/N	Item Statement on materials	$\bar{x}$	SD	Rem	B/w group	Within groups	Total sum of squares	f-ratio	p-value	Rem
a	Beehive (langstroth)	3.94	0.48	HR	0.49	47.72	48.21	1.10	0.35	NS
b	Smoker	3.78	0.65	„	3.42	143.21	146.63	2.48	0.21	NS
c	Bee suit	3.74	0.60	„	0.24	76.56	76.80	0.32	0.72	NS
d	Hat and veil	3.78	0.58	„	0.13	72.50	72.63	0.19	0.83	NS
e	Gloves	3.80	0.58	„	0.08	70.24	70.32	0.12	0.89	NS
f	Bee brush	3.66	0.63	„	0.66	83.00	83.66	0.84	0.44	NS
g	Hive opener	3.70	0.63	„	4.98	179.79	184.77	2.92	0.07	NS
h	Knife	3.79	0.58	„	2.25	169.24	171.49	1.29	0.54	NS
i	Bucket	3.70	0.62	„	1.73	79.04	80.77	2.30	0.10	NS
j	Honey extractor	3.57	0.81	„	0.98	139.15	140.12	0.74	0.48	NS
k	Straining cloth	3.57	0.69	„	3.77	198.50	203.26	2.00	0.32	NS
l	Water	3.50	0.83	„	3.51	125.74	129.25	2.93	0.08	NS
m	Locozade bottle	3.51	0.81	„	2.83	125.39	128.22	2.37	0.10	NS
n	Feeder	3.55	0.71	„	2.62	104.01	106.63	2.64	0.07	NS
o	Pollen	3.81	0.60	„	2.54	173.95	176.49	1.54	0.63	NS
p	Sugar syrup	3.80	0.64	„	3.40	182.10	185.49	2.00	0.20	NS
q	Mold	3.69	0.78	„	12.14	115.78	127.93	11.01	0.00	S
r	Pollen trap	3.63	0.79	„	13.12	118.33	134.44	11.63	0.00	S

Table 3 presents the mean ratings and standard deviation of teachers, extension agents and beekeeping farmers on the materials required for beekeeping training programme. The data revealed that all the 18 items had mean values that ranged from 3.50 to 3.94. The items numbers were, a, b, c, d, e, f, g, h, I, j, k, l, m, n, o, p, q, and r. Their values were within the real limit of 3.50-4.00; indicating that the 18 materials are highly required for beekeeping training programme. This implies that beehive (langstroth), smoker, bee suit, hat and viel, gloves, bee brush, live opners, knife, bucket, honey extractors straining cloth, water, lucozode bottle, feeder, bee pollen, sugar syrup, mold, pollen trap were required materials in beekeeping training programme. Generally all the items were within the real limit of 3.50 to 3.94 and were above 1.50 indicating that all the materials were required in beekeeping training programme. The standard deviation of the 18 items ranged from 0.48 to 0.83 and were below 1.96; indicating that the respondents were close to the mean and to one another in their responses.

The table also revealed that 16 out of the 18 items had p-values that ranged from 0.07 to 0.89 and were greater than 0.05, thus indicating that there was no significant difference in the mean ratings of the three groups of respondents on 16 out of 18 items. This implies that teachers, extension agents and beekeeping farmer did not differ in their responses on items such as beehives ((langstroth), smoker, bee suit, hat and viel, gloves, bee brush, live opners, knife, bucket, honey extractors straining cloth, water, lucozode bottle, feeder, bee pollen, and sugar syrup as ,materials required materials for beekeeping training programme Thus, hypothesis of no significant difference was accepted for the 16 items. However, 2 out of the 18 items had their p-values as 0.00, indicating that there was a significant difference in the mean ratings of the three groups of respondents on the 2 items (mold and pollen trap). Thus, the hypothesis of no

significant difference was rejected for the 2 items. This implies that the respondents significantly differ on mold and pollen trap as materials required in beekeeping training programme.

Research Question and Hypothesis 4

Research Question 4

What are the methods of training farmers in beekeeping programme?

Hypothesis 4

There is no significant difference in the mean ratings of teachers and extension agents on the methods of training farmers in Beekeeping Programme

Data for answering research question and hypothesis four were presented in table

4

Table 4

Mean Ratings of Teachers and Extension Agents on the methods of training farmers in Beekeeping Training Programme. N = 138

S/N	Item Statement on Objectives of Beekeeping Training Programme	Teachers					Ext. Agent			p-value	Remark
		$\bar{x}$	SD	Rem	$\bar{x}_1$	$S^2_{\bar{x}}$	$\bar{x}_2$	$S^2_{\bar{x}}$			
a	Lecture method	2.90	0.71	A R	2.87	1.35	2.95	1.32	0.71	NS	
b	Demonstration	3.91	0.43	H R	3.98	0.02	3.73	0.67	0.06	NS	
c	Group discussion method	3.66	0.83	„	3.72	0.19	3.50	0.77	0.06	NS	
d	Field trip	3.85	0.55	„	3.98	0.02	3.53	0.77	0.61	NS	
e	Practical exercise	3.85	0.73	,	3.97	0.02	3.55	0.72	0.21	NS	
f	Case study	3.45	0.64	A R	3.54	0.35	3.23	0.85	0.02	S	
g	Role play	3.25	0.74	„	3.38	0.49	2.93	0.64	0.00	S	
h	Excursion	3.25	0.84	„	3.39	0.45	2.93	2.20	0.60	NS	
i	Brainstorming	2.91	0.91	„	2.89	0.71	2.95	1.21	0.72	NS	
j	Oral report	2.71	1.12	„	2.63	1.25	2.90	1.12	0.20	NS	
k	Debate	2.67	0.93	„	2.72	0.86	2.53	0.86	0.26	NS	

Table 4 presents the mean ratings and standard deviation of teachers and extension agents on the methods of training farmers in beekeeping programme. The data revealed that 4 out of 11 item had mean values that ranged from 3.66 to 3.91. The values were within the real limit of 3.50 to 4.00; indicating that 4 items were highly required method of training farmers in beekeeping programme. The items were numbers b, c, d, and e. This implies that demonstration method, group discussion methods, field trip and practical exercise, were highly required method of training farmers in beekeeping programme. Seven items out of 11 had mean value that ranged from 2.67-3.45. The values were within the real limit of 2.50-3.49; indicating that the 7 items averagely required method of training beekeeping programme. The items numbers were a, f, g, h, I, j, and k. This implies that lecture method, case study, role play, excursion, brainstorming, oral report and debate were averagely required method of training farmers in beekeeping programme. Generally the 11 items were within the real limit of 2.50-3.91 and are above 1.5; indicating that all the method are required for training farmers in beekeeping programme. The standard deviation of the 11 items ranged from 0.47 to 1.16 and was below 1.96, indicating that the respondents were close to the mean and the one another in their responses.

Table 4 also revealed that 9 out of 11 items had p-values that ranged from 0.06 to 0.72. The values were greater than 0.05; indicating that there was no significant difference in the mean rating of teachers and extension agents on the 9 out of 11 methods of training. The items numbers were a, b, d, e, h, I, j and k. Thus, the hypothesis of no significant difference was accepted for the 9 items.

This implies that teachers and extension agents did not significantly vary in their responses on methods such as demonstration, group discussion, field trip, practical exercise, excursion, brainstorming, oral report and debate. The data also revealed that the p-values of 2 out of 11 items were 0.00 and 0.02. The item numbers were e and h and were less than 0.05; indicating that there was a significant difference in the mean ratings of teachers and extension agents on the 2 items. Thus the hypothesis of no significant difference was rejected for the 2 items (f and g). This implies that teachers and extension agents significantly vary in their responses on methods such as case study and role play as methods of training farmers in beekeeping programme.

Research Question and Hypothesis 5

Research Question 5

What are the methods of evaluating farmers' performance in beekeeping training?

Hypothesis 5

There is no significant difference in mean ratings of teachers and extension agents on the methods of evaluating farmers' performance in beekeeping training programme

Data for answering research question five were presented in table 5

Table 5

Mean Ratings of Teachers and Extension Agents on methods of evaluating Farmers' Performance in Beekeeping Training. N= 213

S/N	Item Statement on methods of evaluating farmers' performance on Beekeeping Training Programme				Teachers		Ext. Agent		p-value	Remark
		$\bar{x}$	SD	Rem	$\bar{X}_1$	$S^2_{\bar{x}}$	$\bar{X}_2$	$S^2_{\bar{x}}$		
a	Observation of practice to correct errors	3.72	0.64	H R	3.69	0.38	3.78	0.49	0.50	NS
b	Interviewing to identify areas of difficulty	3.85	0.55	„	3.88	0.23	3.78	0.49	0.32	NS
c	Rating scale for grading skill practice	3.68	0.69	„	3.71	0.40	3.60	0.70	0.38	NS
d	Follow-up visit to access independent practice	3.69	0.64	„	3.73	0.32	3.58	0.60	0.18	NS
e	Review meetings	3.47	0.73	AR	3.52	0.37	3.35	0.90	0.21	NS
f	Group exercise	3.49	0.72	„	3.54	0.39	3.38	0.49	0.27	NS
g	Self recoding of specific incident	3.28	0.90	„	3.23	0.77	3.37	0.90	0.41	NS
h	Self assessment report	3.30	0.84	„	3.29	0.64	3.35	0.96	0.67	NS

Table 5 presents the mean rating and standard deviation of teachers and extension agents on the methods of evaluating farmers' performance in beekeeping training programme. The data revealed that 4 out of 8 items had mean values that ranged from 3.68 to 3.85. The values were within the real limit of 3.50-4.00; indicating that the 4 items were highly required method of evaluating farmers' performance in beekeeping training programme. The items were numbers a, b, c, and d. This implies that items such as: observation of practice to correct errors; inter viewing to identify areas of difficulty; rating scale for grading skill practice; follow-up visits to assess individual practice were highly required methods of evaluating farmers' performance in beekeeping training programme. Four out 8 methods had mean values ranged from 3.48 to 3.49 the values were within the real limit of 2.50-3.49; indicating that the items were averagely required method of evaluating farmers' performance in beekeeping training programme. The items numbers were e, f, g, and h. This implies that methods such as review meetings, group exercise, self recording of specific incidents and self assessment reports were averagely required for evaluating farmers performance in beekeeping training programme. The standard deviation of the 8 items ranged from 0.55 to 0.90 and were below 1.96; indicating that the respondents were close to the mean and to one another in their responses.

The table also revealed that the 8 items had their p-value ranged from 0.18 to 0.67. The values were greater than 0.05; indicating that there was no significant difference in the mean ratings of teachers and extension agents on the 8 methods. Thus, hypothesis of no significant difference was accepted for all the 8 items. This

implies that teachers and extension agents did not significant vary in their responses on all the 8 items (a, b, c, d, e, f, g and h) such as interviewing to identify area of difficulty; rating scale for grading skill practice; follow-up visit to access independent practice; review meetings; group exercise; self recoding of specific incident; and self assessment report

Findings of the Study

The following findings emerged from the study based on the specific purposes and hypothesis:

1. Objectives of Beekeeping Training Programme

It was found out from the research question answered by the study that 11 objectives such as to appreciate the value of beekeeping; identify the best site for beekeeping; construct beehives such as langstroth; stock honeybees into hives; feed bee colonies; control swarming of bees; prevent robbing among bee colonies; replace lost queen in a bee colony; harvest bee product; process the harvested bee products; market bee products were relevant objectives of beekeeping training programme.

It was also found out from the hypothesis tested that there was no significant difference in the mean ratings of teachers and extension agents on 9 out of 11 objectives items. It was found out that there was a significant difference in the mean ratings of the teachers and extension agents on 3 out of 11 objective in items in beekeeping training programme.

2. Content Areas of Beekeeping Training Programme

It was found out from the research question answered by the study that 8 (eight) clusters of items in the content areas of beekeeping training programme with their 65 corresponding items were required in the beekeeping training programme for poverty alleviation of rural farmers in Enugu East Agricultural Zone of Enugu State. The eight (8) clusters and their corresponding items were listed below:

Clusters 2A: Values of beekeeping

- a. Production of honey
- b. Production of bee pollen
- c. Production of bee pollen
- d. Production of bee pollen
- e. Production of royal jelly
- f. Pollination of agricultural crops

Cluster 2B: Choosing of site for Beekeeping

- a. Selecting an area near the source nectar for the bees
- b. Selecting an area with good and available source of water
- c. Choosing a place free from pollution
- d. Selecting an area that is not affected by heavy wind and direct heat rays of the sun
- e. Choosing a fenced plot free from children and animal disturbances
- f. Selecting an area with established farm

Cluster 2C: Construction of Langstroth Beehive

- a. Identifying modern beehive adaptable to the area of operation.
- b. Selecting wood that is wasp and ant free
- c. Maintaining the required sizes of wood in forming a box following given specifications.
- d. Placing a bottom board with a flight board leaving ventilation hole
- e. Introducing appropriate chambers and accessories to build the hive
- f. Introducing a bait into the hive
- g. Placing the hive on top of a table or a tree branch

Cluster 2D: Hiving the Bees

- a. Selecting an appropriate bee specie like *Apis mellifera* for hiving
- b. Identifying the swarming season of the bees in the area
- c. Cleaning the beehive thoroughly
- d. Coating all the cracks and rough surfaces on the hive with beeswax
- e. Providing the hive with same baiting material
- f. Placing the water and baited hive along source of nectar
- g. Identifying a newly clustered swarm on a branch of tree
- h. Capturing the clustered swarm with swarm catcher or a small hive
- i. Transferring the captured swarm to a permanent hive
- j. Putting combs from established colony with unsealed brood
- k. Providing the bees with food and water

Cluster 2E: Management of the Bee colony

- a. Wearing a suitable clothing (preferably white) when working with the bees
- b. Inspecting colony carefully when needed using guided procedures
- c. Feeding bees with pollen and sugar solution during dearth periods
- d. Controlling swarming and robbing
- e. Producing new queen to replace dead or old queen.
- f. Initiating artificial swarming to prevent absconding.
- g. Using smoke and relevant tools to control the bees
- h. Approaching beehive from rear and with confidence when working with the bees.
- i. Keeping records of any observations during inspection

Cluster 2F: Harvesting of the Bee Products

- a. Wearing light coloured protective clothing for harvesting
- b. Collect harvesting tools
- c. Puffing smokes under the lid and entrance of the hive
- d. Opening of the hive using tools to separate frames from the honey combs
- e. Harvesting of combs with capped honey only
- f. Leaving of the combs with broods in the hives
- g. Squeezing of the honey combs to collect the honey and the wax
- h. Using pollen trap to collect pollen from in going pollen foragers

- i. Grafting the queen to collect royal jelly
- j. Collecting black propolis from the bottom and sides of the hive
- k. Returning the frames carefully into their position and closing of the hive

Cluster 2G: Processing of Bee Products

- a. Using of pressing techniques to collect honey
- b. Decapping and chopping off of the honey combs into pieces
- c. Placing chopped combs in clean cloth, wrapping and subjecting into pressure
- d. Collecting beeswax using containers and dissolving in equal volume of clean water
- e. Melting, Stirring and skimming the wax
- f. Pouring of the wax into the desired moulds
- g. Collecting royal jelly and filtering through fine cloth
- h. Drying trapped pollen in the sun
- i. Collecting propolis

Cluster 2H: Marketing of Bee Products

- a. Carrying out of market survey
- b. Grading of different products into containers
- c. Fixing of prices of bee products
- d. Selling immediately or transporting to local buyers and exporters
- e. Receiving payment at the point of sale
- f. Calculating profit or loss

It was also found out from the hypothesis tested that there was no significant difference in the mean ratings of the teachers of agriculture , Extension agents and Beekeeping farmers on 59 out of 65 items in the content areas of beekeeping training programme. Also, it was found out that there was a significant difference in the mean rating of teachers, extension agent and beekeeping farmers on 6 out of 65 items on the content areas of beekeeping training programme poverty alleviation of rural farmers in Enugu East Agricultural Zone of Enugu State.

3.Materials Required in Beekeeping Training Programme:

It was found out from the research question answered that 18 items such as beehives (langstroth), smoker, bee suit, hat and veil, gloves, bee brush, hive opener, knife, bucket, honey extractor, straining cloth, water, lucozade bottle, feeder, pollen, sugar syrup, mold and pollen trap, were materials required for beekeeping training programme for poverty alleviation of rural farmers in Enugu East Agricultural Zone of Enugu State.

It was also found out from the hypothesis tested that there was no significant difference in the mean ratings of Agricultural science teachers, Extension agents and Beekeeping farmers on all the eighteen (18) items in the materials required in beekeeping training programme for poverty alleviation of rural farmers in Enugu State Agricultural zone of Enugu state.

4. Methods of Training Farmers in Beekeeping Programme.

It was found out from the research question answered by the study that all the eleven (11) items such as lecture method, demonstration, group discussion,

field trip, practical exercise, case study, role play, excision, brain storming, oral report and debate were methods of training in beekeeping programme. For poverty alleviation of rural farmers.

It was found out from the hypothesis tested that there was no significant difference in the mean ratings of the teachers of agricultural and Extension agents on 9 out of 11 methods required for training farmers in beekeeping programme. It was also found out that there was a significant difference in the mean ratings of teachers of agriculture and extension agent on 3 out of 11 methods required for training farmers in beekeeping programme for poverty alleviation of rural farmers.

5. Methods of Evaluation farmers' performance in beekeeping training programme.

It was found out from the research question answered by the study that eight (8) methods were required for evaluating farmers' performance in beekeeping training programme. for poverty alleviation of rural farmers The 8 methods of evaluations were: observation of practice to correct errors; interviewing to identify areas of difficulty; rating scale for grading skill practice; follow- up visit to access independent practice; review meetings; group exercise; self recoding of specific incident; and self assessment report.

It was found out from the hypothesis tested that there was no significant difference in the mean ratings of the teachers of agriculture and Extension agents and on eight (8) methods of evaluating farmers performance in beekeeping training programme for poverty alleviation of rural farmers

Discussion of Findings

The findings of the study are discussed based on the research issues under the following sub-headings:

1. Objectives of beekeeping training programme.

The study found out that 11 items were the objectives of beekeeping training programme. These include: to appreciate the value of beekeeping; identify the best site for beekeeping, construct beehives such as langstroth, stock bees into hives; feed the bee colony; control swarming of bees; prevent robbing among bee colonies; replace lost queen in the colony; and to harvest; process and market bee products. The findings of the study on the objectives of beekeeping training programme were in agreement with the findings of Onah (2002) who carried out a study on developing supervised experience programme in secondary schools in Enugu State; where it was found out that 10 needs and values; 10 objectives; 5 guidelines for implementation; 10 major activities and 7 criteria for evaluation of supervised agriculture experience programme were identified by the agricultural science teachers for use in the developing supervised agricultural experience programme in secondary schools in Enugu State. The findings of the study are also in line with the opinions of Bangladesh Small Scale and Cottage Industries Corporation (BASCIC, 2009). Where it was stated that the objectives of beekeeping training programme include: assisting the learner to become competent in beekeeping; production of honey throughout the country; increase in the production of production of fruits, vegetables and seeds by honeybee pollination; develop bee products by way of beekeeping; develop plant

environment through plantation for beekeeping; employment and income generation through modern method of beekeeping

It was also found out that there was no significant difference in the mean ratings of the teachers of agriculture and Extension agents on 9 out of 11 objectives of beekeeping training programme. The implication of the findings was that the professional experience of teachers of agriculture in schools and the field work experience of extension agents with the farmers in the field did not significantly influence their opinion on 9 objectives items of beekeeping training programme. It was found out that there was a significant differences in the mean ratings of the two groups of respondents on 2 out of 11 objectives (to fee bee colonies and to replace lost queen in a bee colony) of beekeeping training programme for poverty alleviation of rural farmers. The implication of the above findings was that the professional experience of the teachers of agriculture in the school and the field work experience of the extension agents with farmers in the field significantly influence their opinions on 2 objective items of beekeeping training programme. The findings helped to authenticate the responses of the two groups of respondents on the 11 items on the objectives of beekeeping training programme

2. Content areas of beekeeping training programme

The study found out that 8 clusters with their corresponding 65 items (values of beekeeping 6 items, choosing of site for beekeeping 6 items, construction of langstroth beehive 7 items, Hiving the bees 11 items, management of bee colony 9 items, harvesting of bee products 9 items, marketing of bee

products 6 items) on the content areas of beekeeping training programme for poverty alleviation of rural farmers.

The findings of the study on the 8 clusters on the content areas of beekeeping training programme were in conformity with the findings of Olaitan, Ifeanyieze and Omeje (2008) in a study carried out on the development of entrepreneurial skill training program in micro-livestock (Beekeeping) for re-engagement of retirees in sustainable occupation in Enugu state where it was found out that 11 skill items, were required in planning for the enterprise, 18 skill items in site selection and construction of beehives, 10 skill items in stocking and feeding of bees, 10 skill items in managing bees and 11 skill items in harvesting and marketing of bee products. The findings of this study were also in consonance with the findings of Ohagwu (2005) who carried out a study on the skills required by secondary school leavers for entering into beekeeping occupations in Enugu state; the author found out that secondary school leavers required 6 skills in selection of site for beekeeping, 12 skill items in stocking of bees, 4 skill items in feeding of bees, 10 skill items in managing bees and 5 skill items in harvesting of bee products. The findings of the study on each of the eight clusters were discussed as follows:

The study found out that 6 items were the values of beekeeping. The items are production of honey, bee pollen, beeswax, propolis, royal jelly and pollination of agricultural crops. The finding on the values of beekeeping are in agreement with the views of Iken et al (2005), Curtis (1982), TamilNadu (2008), Albert (2012), Jack (1996) and Annie (2009) where it was found out that beekeeping is

mainly practical because of some products and other values gotten from it. This the authors said include production of honey, bee pollen, beeswax, propolis, royal jelly and increase in yield of crops through cross pollination. The study also found out 6 items in the choosing of site for beekeeping. The findings on the choosing of site are in line with the opinion of Odutan (1999) which stated that the best site for apiary is in orchard or river banks where the bees could have easy access to nectar and water. The findings are also in line with Smith (1960) and Ohagwu (2005) which explained that apiary should be kept in a fenced plot and in an open space away from extreme weather to avoid disturbances from children, animals, thieves and to keep away from extreme weather condition such as direct sun and rain.

The findings on the construction of Langstroth beehive is in consonant with the explanation of Leen, Willen, Marieke, Piet and Hayo (2005) which stated that Langstroth beehive is constructed through the following ways. The findings of the authors cited above helped to validate the findings of this study on content of beekeeping training programme.

The study also found out 6 items in the choosing of site for beekeeping. The findings on the choosing of site are in line with the opinion of Odutan (1999) which stated that the best site for apiary is in orchard or river banks where the bees could have easy access to nectar and water. The findings are also in line with Smith (1960) and Ohagwu (2005) which explained that apiary should be kept in a fenced plot and in an open space away from extreme weather to avoid disturbances from children, animals, thieves and to keep away from extreme weather condition such as direct sun and rain.

The findings on the construction of Langstroth beehive is in consonant with the explanation of Leen, Willen, Marieke, Piet and Hayo (2005) which stated that Langstroth beehive is constructed through the following ways: Construct and place a bottom board and a slight board leaving a ventilation hole; construct and place a bottomless chamber; add one or more honey supers; place top ventilation screen; place the inner cover; place an outer cover made of wood or zinc; and introduce baiting materials. The findings are also in line with Agrolod (1998) which stated that when constructing Langstroth beehive, appropriate size and type of wood are made to be a part of a box using some specifications.

The findings on hiving the bees are in line with Odutan (1999) which explained that when hiving bees, boxes with baits are placed in a suitable site, preferably along the route to the nectar and source of water to some feral colonies. The findings are also in line with Curtis (1982) who indicated that a swarm can be captured and hived through baiting or cutting out a branch of tree with a swarm or using bee vacuum and come to capture clustered bees or buying packaged bee from a beekeeper or marketer.

The study found out that 9 items that were required in the management of bee colony. The findings on the management of bee colony are in consonant with Curtis (1982) and Agrolod (1998) which stated that the bee colony management involve timing of operations; knowledge of apiary dos and donts; feeding the colony as and when needed; inspecting the bees to know their needs, preventing robbing and controlling swarming; replacing lost queen; controlling pests and diseases and other activities that will help the bees to be comfortable and healthy

for maximum production. The findings are also in line with Leen et al (2005) which explained that the keeping of records and timing of operations are important management practices that should not be neglected

The findings on the harvesting of bee products are in line with Abubakar (1990) who stated that the beekeeper should wear protective cloths preferably white and gather all the necessary tools for harvesting ripe honey, beeswax and black propolis. The findings are also in agreement with TimilNadu (TNAU, 2008) and Crushman (2002) where it was noted that the bee pollen and royal jelly can be harvested through pollen traps from in-going pollen foragers and by grafting the queen to collect royal jelly.

The findings on processing of bee products are in consonant with the opinion of Nuru (1999) where it was stated that in processing bee products, the bee farmer should be guided with the following procedures: collect the combs using container and squeeze out the honey with fine cloth by wrapping the honey and subjecting to pressure; melt the comb in a container with equal volume of water and stir; skim off the wax and pour into a desired mould. Collect royal jelly and filter through a fine cloth, dry tapped pollen in the sun and collect black propolis by rendering. The findings are also in agreement with Agrolod (1998) where it was stated that bee products processing involve removal of other materials from the bee products and the separation of the harvested hive product into individual products.

The finding on the marketing of bee products is in agreement with Stanson (1996) where it was stated that marketing activities involve grading, advertising, recording of all financial transactions and calculating profit and loss. The findings is also in line with the study carried out by Olaitan, Ifeanyieze and Omeje (2008) where it was found out that marketing of bee products involves: making of market survey; putting the quantity of products required in a container; selling on the spot or transporting to buyer; receiving payment at the selling spot; and calculating income and expenditure.

The findings of the authors cited above add value to the findings on the content areas of beekeeping training programme that was used to develop a training programme on beekeeping for poverty alleviation of rural farmers.

It was also found out from the study that there was no significant difference in the mean ratings of teachers of Agricultural Science, Extension agents and beekeeping farmers on 59 out of 65 items on the content of bee keeping training programme. The implication of the finding was that the professional experience of teachers of agriculture field experience extension agents and beekeeping farmers in the field did not significantly influence their opinions on the 59 items. Also, it was found out that there was a significant difference in the mean ratings of the responses of the teachers of agriculture, extension agents and beekeeping farmers on the content areas of beekeeping training programme. The implication of the above findings was that the professional experience of the teachers of agriculture and field experiences of Extension agents and farmers significantly influence their opinions on 6 items on

content areas of beekeeping training programme for poverty alleviation of rural farmers.

3. Materials required in beekeeping training programme

It was found out that all the 18 materials identified were required for use in the bee keeping training programme. These materials include beehive, smoker, bee suit, hat and veil, gloves, bee brush, hive opener, knife, bucket, honey extractor, straining cloth, water, lucozade bottle, feeder, pollen, sugar, syrup, mould and pollen trap. The findings of the study on materials required in beekeeping training programme were in agreement with the assertion of Dalt (2001) who noted that some materials necessary in beekeeping which must be present when training people in any scale of the production include the hive, smoker, hive tools, brush, coverall, hat and veil. The findings of the study were also in line with the view of Ministry of Agriculture Animal Industry and Fishery (NAAIF, 2012) who stated that materials used in beekeeping which the training providers need to utilize include production materials such as beehives, fees and feeding gears like sugar, syrup, pollen, feeder and water holders; harvesting gears such as smokers, bee veil and bee suit, bee gloves and hive tools and processing gears such as air tight buckets, food grade drums, refractor meter, weighing scale, straining cloth, centrifuge extractor, honey setting tank and honey jars.

It was also found out from the study that there was no significant difference in the mean ratings of teachers of agricultural science, extension agents and beekeeping farmers on all the 18 materials identified by the study as required

in beekeeping training programme for poverty alleviation of rural farmers. The implication of the above findings was that the professional experience of the agricultural science teachers and field experiences of Extension agents and farmers did not significantly influence their opinions on the 18 materials identified for beekeeping training programme for poverty alleviation of rural farmers.

4. Methods of training farmers in beekeeping programme

The study found out that 11 methods of training farmers in beekeeping programme which include; lecture, demonstration, group discussion methods, field trip, practical exercise, case study, role play, excursion, brainstorming, oral report, and debate were required. The findings on the methods of training were in conformity with the report of (MAAIF, 2012) that beekeeping training methods were lecture, brain storming, demonstration, group discussion, field and practical exercise, group work and presentations. The findings of the study were further in line with the statement of Ishiuba (2005) that methods that could be utilized for training farmers were demonstration, practice, discussion, brain storming, buzz group, case studies, role play, games, visualization in participatory programming (VIPPP) and presentation. The reports and statements of the authors cited above added value to the findings of the study on the methods to adopt during beekeeping training programme.

It was also found out from the study that there was no significant difference in the mean ratings of teachers of Agricultural Science and Extension

agents on 9 out of 11 methods identified by the study for training farmers in beekeeping programme. The implication of the findings was the professional experience of teachers in schools and the field experience of the extension agents did not significantly influence their opinion on 9 methods of training farmers. Also, it was found out that there was a significant difference the mean ratings of teachers and extension agents on 2 methods of training of farmers in beekeeping programme. The implication of the above findings on the teaching methods was that the professional experience of the Agricultural science teachers and field experiences of Extension agents significantly influence their opinions on the 2 items on the method of training farmers in beekeeping programme for poverty alleviation.

5. Methods of evaluating farmers' performance in beekeeping training

The study also found out that eight (8) methods were required for evaluating farmers in beekeeping training programme. These methods were observation of practice to correct errors, interviewing to identify areas of difficulty; rating scale for grading skill practice; review meetings; group exercise; self recording of specific incidents and self assessment reports. The findings of the study in these directions were in agreement with the view of Evaluation Trust (2013) who stated that training programme can be evaluated through methods such as counting, observation; checking at documents and records; interviewing, case study; group exercise; review meetings, questionnaire, visual and project techniques. The findings of this study on methods of evaluation were further in line with the report of Livesolar (2013) which stated that training evaluation

methods includes observation, questionnaire; interviews, self dairies and self recording of specific events.

The study found out that there was no significant difference in the mean ratings of teachers of Agricultural Science and Extension agents on all the 8 methods identified by the study on evaluating farmers in beekeeping programme. The implication of the above findings on the teaching methods was that the professional experiences of the Agricultural science teachers and Extension agents did not significantly influence their opinions on the 8 items on the method of evaluation farmers in beekeeping programme for poverty alleviation of rural farmers in Enugu East. The above findings helped to authenticate and add values to the findings of the study on the development of training programme on beekeeping for poverty alleviation of rural farmers in Enugu East Agricultural Zone of Enugu State. The implication of findings was the professional experience of teachers of agriculture in schools and the field experience of the extension agents did not significantly influence their opinion on all the 8 methods of evaluating farmers performance in beekeeping training programme

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter presented the summary, Restatement of the problem, purpose of the study, procedure used in the study, findings of the study, conclusion, educational implications, recommendations and suggestion for further study.

Re-statement of the Problem

In Enugu East Agricultural zone, there are many farmers that live in the rural areas of the zone away from the city. Many of these farmers are poor and cannot meet the basic needs of life such as balanced food, good shelter, education etc. because they lack the knowledge, skills and attitudes required in modern methods of some lucrative farming enterprise such as beekeeping. In Enugu East, beekeepers lack competence in modern method of beekeeping which boast productivity of the bee farmers. They use traditional method of beekeeping which does not yield enough bee-products for income . The demand for bee products especially honey are high in the rural markets of Enugu East because the area is known for selling agricultural products (including bee products) at give away prices. The low productivity of the beekeepers cannot meet the high demand for bee products and this made room for adulteration of bee products like honey. The consequent withdrawal of customers of bee products compounds the problem of poverty among these farmers and many of the farmers withdrew from the business in order to escape the humiliation of poverty. There arose the need to train these farmers in modern method of beekeeping in order to achieve high yield of bee

products above the traditional method. If these rural farmers could achieve in large scale production of the bee products through training in modern method, it could go a long way in boosting their income and eradicate poverty among them.

Purpose of the Study

The major purpose of the study was to develop training programme in beekeeping for poverty alleviation of rural farmers in Enugu East Agricultural zone of Enugu State. Specifically, the study sought to identify the:

- (a) objectives of beekeeping training programme
- (b) content areas of beekeeping training programme ;
- (c) materials required in beekeeping training programme;
- (d) methods of training farmers in beekeeping programme and
- (e) ways of evaluating farmers' performance in beekeeping training programme.

Description of Procedures Used for the Study

The study adopted research and development design and was carried out in Enugu East Agricultural Zone of Enugu State. The zone is made up of six local government areas which include: Enugu East, Enugu North, Enugu South, Nkanu East, Nkanu West and Isi-Uzo. The population for the study was 423 comprising 307 teachers of Agriculture, 40 extension agents and 75 registered beekeeping farmers. The sample for the study was 213 made up of 98 teachers of agriculture, 40 extension agents and 75 beekeeping farmers. The entire population of

extension agents and beekeeping farmers were studied while proportionate stratified random sampling techniques were used to select 50% of teachers.

Two sets of structured questionnaire were developed to obtain data from the respondents on the objectives, content areas of beekeeping training programme, materials required and methods of training and evaluation of farmers's performance in beekeeping training programme. The questionnaire item had four point response options Highly Relevant/Required; (HR), Moderately Relevant/Required (AR), Slightly Relevant/Required (SR) and Not Relevant (NR) with values as 4, 3, 2 and 1 respectively. The two sets of the questionnaire was face validated by five experts. Cronbach Alpha reliability method was used to determine the internal consistency of the two sets of the questionnaire which yielded a coefficient of coefficient 0.84, 0.91, 0.90, 0.89. and 0.97 were obtained for the five clusters of the questionnaire items in objective, contents, materials. method of training and evaluation of farmers's performance.

Six assistants helped the researcher to administer 213 copies of the questionnaire to the respondents in their various locations. A total of 213 copies (100% return rate) of the questionnaire were retrieved and analyzed. The data collected from the respondents were analyzed using weighted mean to answer the research questions while standard deviation was used to validate the mean and t-test statistic and analysis of variance were used to test the null hypotheses at the probability of 0.05 and level of significant appropriate degrees of freedom.

Major Findings of the Study

The following were the major findings of the study:

1. Teachers of agriculture and extension agents identified: to appreciate the value of beekeeping; identify the best site for beekeeping, construct beehives such as langstroth, stock bees into hives; feed the bee colony; control swarming of bees; prevent robbing among bee colonies; replace lost queen in the colony; and to harvest; process and market bee products as objectives that are relevant in beekeeping training programme. They did not significantly differ in their opinions on 9 out of the 11 objectives items but significantly differ on 2 out of the 11 items in the objectives of beekeeping training programme.
2. Teachers of agriculture, extension agents and beekeeping farmers identified 8 clusters with 65 corresponding items (values of beekeeping 6 items, choosing of site for beekeeping 6 items, construction of langstroth beehive 7 items, hiving the bees 11 items, management of bee colony 9 items, harvesting of bee products 9 items, marketing of bee products 6 items) as the content areas of beekeeping training programme. They did not significantly differ in their opinions on 59 out of the 65 items but significantly differ on 6 out of the 65 items on the content areas of beekeeping training programme.
3. Teachers of agriculture, extension agents and beekeeping farmers identified beehive, smoker, bee suit, hat and veil, gloves, bee brush, hive opener, knife, bucket, honey extractor, straining cloth, water, lucozade bottle,

feeder, pollen, sugar, syrup, mould and pollen trap as materials that are required for training farmers in beekeeping programme. They did not significantly differ in their opinions on the 18 materials required in beekeeping training programme.

4. Teachers of agriculture and extension agents identified: lecture, demonstration, group discussion methods, field trip, practical exercise, case study, role play, excursion, brainstorming, oral report, and debate as methods that are required for training farmers in beekeeping programme. They did not significantly differ in their responses opinions on 9 out of 11 methods but significantly differ on 2 out of the 11 methods required in training farmers in beekeeping programme.
5. Teachers of agriculture and extension agents identified: observation of practice to correct errors, interviewing to identify areas of difficulty; rating scale for grading skill practice; review meetings; group exercise; self recording of specific incidents and self assessment reports as methods that are required in evaluating farmers' performance in beekeeping training programme. They did not significantly differ in their opinions on the 6 methods of evaluating farmers' performance in beekeeping training program.

Conclusion

Based on the findings of the study, the following conclusions were drawn.

1. Eleven items were relevant in formulating objective of beekeeping training programme.
2. Eight clusters with 65 corresponding items were required as content areas of beekeeping training programme.
3. Eighteen (18) items were materials required in beekeeping training programme.
4. Eleven (11) items were required as methods of training farmers in beekeeping training programme.
5. Eight (8) items were required as methods of evaluating farmers' performance in beekeeping training programme.

Implications of the Study

The findings of this study have educational implication for farmers (rural farmers), extension agents, teachers of agriculture, skill acquisition centers and government of Enugu East Zone of Enugu state. From the outcome of the study, it implies that:

1. If the identified contents and materials in beekeeping are made available to the rural farmers and other youths through the extension agents, skill acquisition centers, media and other sources, it could improve their knowledge and skills in beekeeping occupation and enterprise. It further implies that if the rural farmers in Enugu East zone are trained in the

modern method of beekeeping, they could boast their production of bee products and alleviate their poverty.

2. If the identified contents, materials and methods of training and evaluation in beekeeping training are made available to the extension agents, they could utilize them to organize training for farmers to solve their problems in beekeeping.
3. If the identified objective, content, materials and methods of training and evaluation are made available to teachers of agricultural science and skill acquisition centers, they could utilize them to provide training to students and unemployed youths to engage them in a meaningful venture.
4. If the identified objectives, content, materials and methods of training and evaluation are made available to administrators of Enugu East zone, they could direct the local governments and skill acquisition centers, to integrate them into their programme for training youths in beekeeping production enterprise. The administrators can also use the identified objectives, content, material and methods of training and evaluation to organize conferences, and workshops for retraining of the extension agents and teachers in beekeeping.

Recommendations

Based on the findings and conclusion of the study, the following recommendations were made:

- 1) The government of Enugu East Agricultural zone should use the beekeeping training programme to organize workshop and conferences for farmers, youths, extension agents and teachers to equip them with beekeeping knowledge and skills.
- 2) The extension agents and other trainers who train farmers should use the findings of the study as a guide to train farmers to update their knowledge in beekeeping.
- 3) The Entrepreneurs should make use of the study to establish a profitable enterprise in beekeeping to increase their income and to contribute to the availability of bee products.

Suggestion for Further Studies

The following suggestion are made for further studies:

1. Strategies for managing beekeeping risks by farmers for greater productivity of bee products
2. Development of strategies for quality control of honey in Enugu State markets.
3. Assessment of gender influence on availability of bee-products in Enugu East Agricultural zone of Enugu state.
4. Development of motivational training programmes for enhancing the entry of women farmers into beekeeping production occupation in Enugu state.

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APPENDICES

APPENDIX A

EVIDENCE OF VISITS TO APIARIES FOR FUNCTIONS OF INDUSTRY



Communications to be
Addressed to the Manager

BEN-ODO BEE HOME AND HORTICULTURAL GARDEN LIMITED

Date: 15th July 2014

The Dean,
School of Postgraduate Studies,
University of Nigeria Nsukka.

Sir,

**RE: AGBO PRISCILLA (PG.MED/10/52737) ON FIELD
RESEARCH EXERCISE**

This is to testify to the university authority that, the above bearer has been on field research with our organization, enabling him direct access and interaction with beekeepers (farmers) in the zone, exposing him to the accumulation of rich knowledge and experience on beekeeping as she interacts with farmers.

I therefore, hope subsequent students of higher degrees will take interest in doing their research taking our organization as a case study. Thanks!

Yours faithfully,

 Odinaka
 Secretary
 or; Zonal Project Manager

APPENDIX B

Population of Agricultural Science Teachers in Enugu East Agricultural Zone

S/N	Local Government	Population	Sample
1	Enugu East	89	29
2	Enugu North	70	22
3	Enugu South	84	27
4	Nkanu East	28	9
5	Nkanu West	19	6
6	Isi-Uzo	17	5
Total		307	98

Source: Enugu State Post-Primary School Management Board, 2013.

APPENDIX C

Population of Agricultural Extension Agents in Enugu East Agricultural Zone

S/N	Local Government	Population
1	Enugu East	8
2	Enugu North	7
3	Enugu South	9
4	Nkanu East	6
5	Nkanu West	6
6	Isi-Uzo	4
Total		40

Source: Enugu State Agricultural Development Project (ENADP,2013)

APPENDIX D

Questionnaire

Department of Vocational Teacher Education
University of Nigeria,
Nsukka
Date -----

Dear Sir/ Madam

Request for Validation of Research instrument

I am a postgraduate student in the above department and university currently undergoing a research project titled **Developing Training Programme in Beekeeping Poverty Allieivation of Rural Farmers in Enugu East Agricultural Zone of Enugu State**

Attached is a draft copy of the questionnaire designed for the study. You are please requested to spare tight schedule to vet the items for clarity, relevance and total coverage for use in collecting data for the study. You are also requested to put down your comments and suggestions for improving the quality of the instrument.

A copy of each of the purpose of the study and research question is also attached.

Please append your name, signature and date.

Thanks for your co-operation.

Yours faithfully

Agbo Priscilla. N.
(Researcher)

APPENDIX E

Questionnaire

Department of Vocational Teacher Education
University of Nigeria,
Nsukka
Date -----

Dear Sir/ Madam

Request to Respond to Questionnaire

I am a postgraduate student in the above department and university and currently undergoing a research project titled **“Developing Training Programme on Beekeeping for Poverty Alleviation of Rural Farmers in Enugu East Agricultural Zone of Enugu State”**

The attached questionnaire schedule is to elicit the necessary information for the purpose of the study. You are please requested to respond to the items as objectively as possible. Every information supplied will be treated as confidential and will be used strictly for this research.

Thanks for your co-operation.

Yours faithfully

Agbo Priscilla. N.
(Researcher)

APPENDIX F Questionnaire

Beekeeping Questionnaire for Teachers of Agricultural Science and Extension Agents

Part one: General Information

Please check (✓) the appropriate response that is most applicable to you

Personal Data

Sex male ☐ female ☐

Profession

- a. Teacher of agriculture ☐
- b. Agricultural Extension Agent ☐

Place of work

- a. Extension department ☐
- b. Secondary school ☐

Local Government Area, -----

Part two

Please check (✓) the response options that best represent your opinion on the level of relevance of each of the stated objectives and the degree to which each skill item is relevance /required for beekeeping programme

KEY: Highly Relevant = HR, Averagely Relevant= AR, Slightly Relevant = SR
and Not Relevant = NR

Section1: Objectives of Beekeeping training Programme

SN	Items on the objectives of beekeeping training programme : To	HR	AR	SR	NR
a	Appreciate the value of beekeeping				
b	Identify the best site for beekeeping				
c	Construct beehive such as langstroth				
d	Stock honey bees into hives				
e	Feed bee colony				
f	Control swarming of bees				
g	Prevent robbing among bee colonies				
j	Replace lost queen in a bee colony				
i	Harvest bee product.				
j	Process the harvested bee products				
k	Market bee product				

KEY: Highly Relevant = HR, Averagely Relevant = AR, Slightly Relevant = SR and Not Relevant = NR

Section2: Content Areas of Beekeeping Training programme

SN	Items Statement	HR	AR	SR	NR
2A	Content areas of beekeeping training programme are Value of beekeeping				
a	Production of honey				
b	Production of bee pollen				
c	Production of bee wax				
d	Production of propolis				
e	Production of royal jelly				
f	Pollination of agricultural crops				
2B	Choosing of site				
a	selecting an area near the source nectar for the bees				
b	Selecting an area with good and available source of water				
c	Choosing a place free from pollution				
d	Selecting an area that is not affected by heavy wind and direct heat rays of the sun				
e	Choosing a fenced plot free from children and animal disturbances				
f	Selecting an area with established farm				
2C	Construction of Beehive				
a	Identifying modern beehive adaptable to the area of operation.				
b	Selecting wood that is wasp and ant free				
c	Maintaining the required sizes of wood in forming a box following given specifications.				
d	Placing a bottom board with a flight board leaving ventilation hole				
e	Introducing appropriate chambers and accessories to build the hive				
f	Introducing a bait into the hive				

g	Placing the hive on top of a table or a tree branch				
2D	Hiving the bees				
a	Selecting an appropriate bee specie like <i>Apis mellifera</i> for hiving				
b	Identifying the swarming season of the bees in the area				
c	Cleaning the beehive thoroughly				
d	Coating all the cracks and rough surfaces on the hive with beeswax				
e	Providing the hive with same baiting material				
f	Placing the water and baited hive along source of nectar				
g	Identifying a newly clustered swarm on a branch of tree				
h	Capturing the clustered swarm with swarm catcher or a small hive				
i	Transferring the captured swarm to a permanent hive				
j	Putting combs from established colony with unsealed brood				
k	Providing the bees with food and water				
2E	Management of the bee colony				
a	Wearing a suitable clothing (preferably white) when working with the bees				
b	Inspecting colony carefully when needed using guided procedures				
c	Feeding bees with pollen and sugar solution during dearth periods				
d	Controlling swarming and robbing				
e	Producing new queen to replace dead or old queen.				
f	Initiating artificial swarming to prevent absconding.				
48	Using smoke and relevant tools to control the bees				
49	Approaching beehive from rear and with confidence when working with the bees..				
50	Keeping records of any observations during inspection				
2F	Harvesting of bee products				
a	Wearing light coloured protective clothing for harvesting				
b	Collect harvesting tools				
c	Puffing smokes under the lid and entrance of the hive				
d	Opening of the hive using tools to separate frames from the honey combs				
e	Harvesting of combs with capped honey only				
f	Leaving of the combs with broods in the hives				
g	Squeezing of the honey combs to collect the honey and the wax				
h	Using pollen trap to collect pollen from in going pollen foragers				
i	Grafting the queen to collect royal jelly				
j	Collecting black propolis from the bottom and sides of the hive				
k	Returning the frames carefully into their position and closing of the hive				
2G	Processing of bee products				
a	Using of pressing techniques to collect honey				
b	Decamping and chopping off of the honey combs into pieces				
c	Placing chopped combs in clean cloth, wrapping and subjecting into pressure				

d	Collecting beeswax using containers and dissolving in equal volume of clean water				
e	Melting, Stirring and skimming the wax				
f	Pouring of the wax into the desired moulds				
g	Collecting royal jelly and filtering through fine cloth				
h	Drying trapped pollen in the sun				
i	Collecting propolis				
2H	Marketing of bee products				
a	Carrying out of market survey				
b	Grading of different products into containers				
c	Fixing of prices of the bee products				
d	Selling immediately or transporting to local buyers and exporters				
e	Receiving payment at the point of sale				
f	Calculating profit or loss				

Section 3: Materials required in beekeeping training programme

S/N	Items statement on materials for beekeeping training programme	HR	AR	SR	NR
a	Beehive				
b	Smoker				
c	Bee suit				
d	Hat and veil				
e	Gloves				
f	Bee brush				
g	Hive opener				
h	Knife				
i	Bucket				
j	Honey extractor				
k	Straining cloth				
l	Water				
m	Lucozade bottle				
n	Feeder				
o	Pollen				
p	Sugar syrup				
q	Mold				
r	Pollen trap				

Section4: Methods of training farmers in beekeeping programme

S/N	Item statement on methods of training farmer in beekeeping programme	HR	AR	SR	NR
a	Lecture method				
b	Demonstration				
c	Group discussion method				
d	Field trip				
e	Practical exercise				
f	Case study				
g	Role play				
h	Excursion				
i	Brainstorming				
j	Oral report				
k	Debate				

Section 5: Methods of evaluating farmers' performance in beekeeping training programme

S/N	Item statement on methods of evaluating farmers' performance in beekeeping training programme	HR	AR	SR	NR
a	Observation of practice to correct errors				
b	Interviewing to identify areas of difficulty				
c	Rating scale for grading skill practice				
d	Follow-up visit to access independent practice				
e	Review meetings				
f	Group exercise				
g	Self recoding of specific incident				
h	Self assessment report				

APPENDIX G

Beekeeping Questionnaire for Beekeeping Farmers

Part one: General Information

Please check (✓) the appropriate response that is most applicable to you

Personal Data

Sex male ☐ female ☐

Profession

Registered Beekeeper ☐

Place of work

Farming (beekeeping) ☐

Local Government Area, -----

Part two

Please check (✓) the response options that best represent your opinion on the level of relevant of each of the content areas and materials required for beekeeping

KEY: Highly Required = HR, Averagely Required= AR, Slightly Required = SR and Not Required = NR

Section B: Content areas of Beekeeping training programme

SN	Items Statement	HR	AR	SR	NR
2A	Content areas of beekeeping training programme are				
	Value of beekeeping				
a	Production of honey				
b	Production of bee pollen				
c	Production of bee wax				
d	Production of propolis				
e	Production of royal jelly				
f	Pollination of agricultural crops				
2B	Choosing of site				
a	selecting an area near the source nectar for the bees				
b	Selecting an area with good and available source of water				
c	Choosing a place free from pollution				
d	Selecting an area that is not affected by heavy wind and direct heat rays of the sun				
e	Choosing a fenced plot free from children and animal disturbances				
f	Selecting an area with established farm				

2C	Construction of Beehive				
a	Identifying modern beehive adaptable to the area of operation.				
b	Selecting wood that is wasp and ant free				
c	Maintaining the required sizes of wood in forming a box following given specifications.				
d	Placing a bottom board with a flight board leaving ventilation hole				
e	Introducing appropriate chambers and accessories to build the hive				
f	Introducing a bait into the hive				
g	Placing the hive on top of a table or a tree branch				
2D	Hiving the bees				
a	Selecting an appropriate bee specie like <i>Apis mellifera</i> for hiving				
b	Identifying the swarming season of the bees in the area				
c	Cleaning the beehive thoroughly				
d	Coating all the cracks and rough surfaces on the hive with beeswax				
e	Providing the hive with same baiting material				
f	Placing the water and baited hive along source of nectar				
g	Identifying a newly clustered swarm on a branch of tree				
h	Capturing the clustered swarm with swarm catcher or a small hive				
i	Transferring the captured swarm to a permanent hive				
j	Putting combs from established colony with unsealed brood				
k	Providing the bees with food and water				
2E	Management of the bee colony				
a	Wearing a suitable clothing (preferably white) when working with the bees				
b	Inspecting colony carefully when needed using guided procedures				
c	Feeding bees with pollen and sugar solution during dearth periods				
d	Controlling swarming and robbing				
e	Producing new queen to replace dead or old queen.				
f	Initiating artificial swarming to prevent absconding.				
g	Using smoke and relevant tools to control the bees				
h	Approaching beehive from rear and with confidence when working with the bees..				
i	Keeping records of any observations during inspection				
2F	Harvesting of bee products				
a	Wearing light coloured protective clothing for harvesting				
b	Collect harvesting tools				
c	Puffing smokes under the lid and entrance of the hive				
d	Opening of the hive using tools to separate frames from the honey combs				
e	Harvesting of combs with capped honey only				
f	Leaving of the combs with broods in the hives				
g	Squeezing of the honey combs to collect the honey and the wax				
h	Using pollen trap to collect pollen from in going pollen foragers				
i	Grafting the queen to collect royal jelly				

j	Collecting black propolis from the bottom and sides of the hive				
k	Returning the frames carefully into their position and closing of the hive				
2G	Processing of bee products				
a	Using of pressing techniques to collect honey				
b	Decamping and chopping off of the honey combs into pieces				
c	Placing chopped combs in clean cloth, wrapping and subjecting into pressure				
d	Collecting beeswax using containers and dissolving in equal volume of clean water				
e	Melting, Stirring and skimming the wax				
f	Pouring of the wax into the desired moulds				
g	Collecting royal jelly and filtering through fine cloth				
h	Drying trapped pollen in the sun				
i	Collecting propolis				
2H	Marketing of bee products				
a	Carrying out of market survey				
b	Grading of different products into containers				
c	Fixing of prices of the bee products				
d	Selling immediately or transporting to local buyers and exporters				
e	Receiving payment at the point of sale				
f	Calculating profit or loss				

Section C: Materials required in beekeeping training programme

S/N	Items statement on materials for beekeeping training programme	HR	AR	SR	NR
a	Beehive				
b	Smoker				
c	Bee suit				
d	Hat and veil				
e	Gloves				
f	Bee brush				
g	Hive opener				
h	Knife				
i	Bucket				
j	Honey extractor				
k	Straining cloth				
l	Water				
m	Lucozade bottle				
n	Feeder				
o	Pollen				
p	Sugar syrup				
q	Mold				
r	Pollen trap				

APPENDIX H
Format for packaging the programme

Name of the Programme

Objective of the Programme

Content Areas of Beekeeping Programme

Materials Needed

Methods of Training

Assessment Techniques to Determine Performance.

Appendix I

Programme

1. Name of Programme: Beekeeping Enterprise
2. Objective of the Programme: The Objectives of the programme are:
 - To appreciate the value of beekeeping
 - To identify the best site for beekeeping
 - To construct beehive such as Langstroth
 - To stock honey bees into hive
 - To feed bee colony
 - To control swarming of bees
 - To prevent robbing among bee colonies
 - To replace lost queen in a bee colony
 - To harvest bee products
 - To process the harvested bee products
 - To market bee product
3. Content areas of Beekeeping Programme: The Content of beekeeping programme are arranged in modules as follows:

Module B₁: Value of Beekeeping

1. Production of Honey
2. Production of bee pollen
3. Production of bee wax
4. Production of Propolis
5. Production of royal jelly
6. Pollination of agricultural crops

Module B₂: Choosing of Site

1. Selecting an area near the source of nectar for the bees.
2. Selecting an area with good and available source of water.

3. Choosing a place free from pollution.
4. Selecting an area that is not affected by heavy wind and direct rays of the sun.
5. Choosing a fenced plot free from children and animal disturbances.
6. Selecting an area with established farm.

Module B₃: Construction of beehives

1. Identifying modern beehives adoptable to the area of operation
2. Selecting wood that is wasp and ant free.
3. Maintaining the required sizes of wood in forming a box following a given specifications
4. Placing a bottom board with a flight board leaving ventilation holes
5. Introducing appropriate chambers and accessories to build the hive
6. Introducing a bait into the hive
7. Placing the hive on top of a table or a tree branch

Module B₄: Hiving the Bees

1. Selecting an appropriate bee specie like *Apis mellifera* for hiving
2. Identifying the swarming season of the bees in the area
3. Cleaning the beehive thoroughly
4. Coating all the cracks and rough surfaces on the hive with beeswax
5. Providing the hive with some baiting materials
6. Placing the water and the baited hive along source of nectar
7. Identifying a newly clustered swarm on a branch of tree
8. Capturing the clustered swarm with swarm catcher or a small hive

9. Transferring the captured swarm to a permanent hive
10. Putting combs from established colony with unsealed brood
11. Providing the bees with food and water

Module B₅: Management of the bee colony

1. Wearing a suitable clothing (preferable white) when working with the bees
2. Inspecting colony carefully when needed using guided procedures
3. Feeding bees with pollen and sugar solution during dearth periods
4. Controlling swarming and robbing
5. Producing new queen to replace dead or old queen
6. Initiating artificial swarming to prevent absconding
7. Using smoke and relevant tools to control the bees
8. Approaching beehive from rear and with confidence when working with the bees
9. Keeping records of any observations during inspection

Module B₆: Harvesting of bee products

1. Wearing light coloured protective clothing for harvesting
2. Collect harvesting tools
3. Puffing of smokes under the lid and entrance of the hive
4. Opening of the hive using tools to separate frames from the honey combs
5. Harvesting of combs with capped honey only
6. Leaving of the combs with broods in the hives
7. Squeezing of the honey combs to collect the honey and the wax
8. Using pollen trap to collect pollen from in-going pollen foragers

9. Grafting the queen to collect royal jelly
10. Collecting black propolis from the bottom and sides of the hive
11. Returning the frames carefully into their position and closing of the hive

Module B₇: Processing of Bee products

1. Using pressing technique to collect honey
2. Decapping and chopping of the honey combs into pieces
3. Placing chopped combs in a clean cloth, wrapping and subjecting into pressure
4. Collecting beeswax using containers and dissolving in equal volume of clean water
5. Melting, stirring and skimming the wax
6. Pouring the wax into the desired moulds
7. Collecting royal jelly and filtering through fine cloth
8. Drying trapped pollen in the sun
9. Collecting propolis

Module B₈: Marketing of Bee Products

1. Carrying out of market survey
2. Grading of different products into containers
3. Fixing of prices of bee products
4. Selling immediately or transporting to local buyers and exporters
5. Receiving payment at the point of sale
6. Calculating profit or loss

C: Materials Needed in Beekeeping Training Programme

4. Beehives
5. Smoker
6. Bee suit
7. Hat and veil
8. Gloves
9. Bee brush
10. Hive opener
11. Knife
12. Bucket
13. Honey extractor
14. Straining cloth
15. water
16. Lucozade bottle
17. Feeder
18. Pollen
19. Sugar syrup
20. Mold
21. Pollen trap

D: Methods of training farmers in Beekeeping

- 1) 1 Lecture method
- 2) Demonstration
- 3) Group discussion

- 4) Field trip
- 5) Practical exercise
- 6) Case study
- 7) Role play
- 8) Excursion
- 9) Brain storming
- 10) Oral report
- 11) Debate

E: Methods of Evaluating Farmers Performance in Beekeeping Training Programme

- 1) . Observation of practice to correct errors.
- 2) Observation of practice to correct errors.
- 3) Rating scale for grading skill practice.
- 4) Rating scale for grading skill practice.
- 5) Review meetings.
- 6) Group exercise.
- 7) Self recoding of specific incident.
- 8) Self recoding of specific incident

APPENDIX J

Mean Ratings and ANOVA statistic of the Respondents on the Content of Beekeeping Training Programme

S/N	Items Statement the content areas of beekeeping training programme	$\bar{X}$	SD	Remark	B/w group	Within groups	Total sum of squares	f-ratio	p-value	Remark
2A	Value of beekeeping									
a	Production of Honey	3.76	0.64	HR	10.73	604.06	614.79	2.00	0.80	NS
b	Production of Bee pollen	3.57	0.65	HR	0.47	87.80	88.26	0.60	0.57	NS
c	Production of bee wax	3.54	0.76	HR	7.36	221.55	128.91	2.36	0.20	NS
d	Production of Propolis	3.5	0.67	AR	0.96	92.26	93.22	1.10	0.33	NS
e	Production of royal jelly	3.59	0.73	HR	5.14	206.50	211.64	2.77	0.42	NS
f	Pollination of agricultural crops	3.44	0.73	AR	21.24	219.28	240.52	2.98	0.10	NS
	Cluster Total	3.57	0.70	HR	7.65	238.58	229.56	1.97	0.405	NS
2B	Choosing of site									
a	selecting an area near the source of nectar for the bees	3.66	0.61	HR	1.65	76.01	77.66	2.28	0.105	NS
b	Selecting an area with steady and unpolluted source of water	3.68	0.60	HR	0.81	75.85	76.65	1.12	0.330	NS
c	Choosing a place free from pollution	3.74	0.63	HR	3.43	81.85	85.28	4.40	0.013	S
d	Selecting an area that is not affected by heavy wind and direct heat of sun	3.66	0.61	HR	0.68	79.30	7.98	0.90	0.407	NS
e	Choosing a fenced plot free from children and	3.49	0.70	AR	5.59	99.65	105.24	5.89	0.003	S

	animal disturbances									
f	Selecting an area with established farm	3.14	1.02	AR	3.36	217.69	221.05	1.62	0.200	NS
	Cluster Total	3.56	0.60	HR	2.59	105.06	107.64	2.70	0.176	NS
2C	Construction of Beehive									
a	Identifying modern langstroth beehive adaptable to the area of operation.	3.78	0.57	HR	0.49	68.69	69.18	0.75	0.474	NS
b	Selecting wood that is wasp and ant free	3.81	0.48	HR	1.82	196.67	208.49	1.09	0.89	NS
c	Maintaining the required sizes of wood in forming a box following given specification	3.69	0.64	HR	0.11	85.44	85.55	0.13	0.876	NS
d	Placing a bottom board with a flight board leaving ventilation hole	3.65	0.71	HR	13.2 3	293.06	306.29	2.93	0.07	NS
e	Introducing appropriate chambers and accessories to build the hive	3.81	0.51	HR	4.74	205.37	210.12	2.57	0.57	NS
f	Introducing a bait into the hive	3.78	0.57	HR	1.19	67.44	68.63	1.86	0.159	NS
g	Placing the hive on top of a table or a tree branch	3.68	0.80	HR	0.00 2	136.29	136.29	0.00	0.998	NS
	Cluster Total	3.74	0.61	HR	3.08	150.42	154.94	1.33	0.58	NS

2D	Hiving the bees									
a	Selecting an appropriate bee specie like <i>Apis mellifera</i> for hiving	3.43	0.95	HR	3.65	176.47	180.12	2.12	0.33	NS
b	Identifying the swarming season of the bees in the area	3.59	0.61	HR	2.26	79.39	81.64	2.99	0.06	NS
c	Cleaning the beehive thoroughly	3.85	0.49	HR	3.23	146.66	149.89	1.96	0.40	NS
d	Coating all the cracks and rough surfaces on the hive with beeswax	3.75	0.66	HR	6.57	283.25	289.81	2.44	0.43	NS
e	Providing the hive with some baiting material	3.72	0.51	HR	1.09	53.57	54.66	2.14	0.12	NS
f	Place water and baited hive along source of nectar	3.51	0.80	HR	1.67	133.57	135.23	1.31	0.271	NS
g	Identifying a newly clustered swarm on a branch of tree	3.57	0.80	HR	2.64	131.49	134.12	2.12	0.124	NS
h	Capturing the clustered swarm with swarm catcher or a small hive	3.62	0.65	HR	0.44	89.99	90.43	0.51	0.59	NS
i	Transfer the captured swarm on a permanent hive	3.65	0.65	HR	0.03	88.57	88.59	0.03	0.97	NS
j	Putting combs from established colony with unsealed brood	3.56	0.72	HR	1.99	108.52	110.52	1.93	0.148	NS
k	Providing the bees with food and water	3.80	0.63	HR	3.66	138.06	141.72	2.79	0.31	NS

	products									
a	Wearing light coloured protective clothing for harvesting	3.58	0.90	HR	15.0 3	154.94	169.97	10.19	0.000	NS
b	Collecting harvesting tools	3.85	0.68	HR	3.38	160.12	98.49	2.31	0.34	NS
c	Puffing smokes under the lid and entrance of the hive	3.70	0.74	HR	5.13	191.24	196.37	2.82	0.09	NS
d	Opening of the hive using tools to separate frames from the honey combs	3.59	0.79	HR	5.21	197.43	202.64	2.73	0.08	NS
e	Harvesting of combs with capped honey only	3.57	0.80	HR	5.56	227.62	233.26	2.53	0.20	NS
f	Leaving of the combs with broods in the hives	3.54	0.89	HR	4.45	163.54	167.99	2.86	0.08	NS
g	Squeezing of the honey combs to collect the honey and the wax	3.70	0.74	HR	6.05	234.72	240.77	2.91	0.08	NS
h	Using pollen trap to collect pollen from in going pollen foragers	3.43	0.99	AR	5.61	194.51	208.12	2.83	0.07	NS
i	Grafting the queen to collect royal jelly	3.49	0.84	AR	6.30	241.43	151.22	151.22	2.27	NS
j	Collecting black propolis from the bottom and sides of the hive	3.40	0.92	AR	10.6 3	170.65	181.28	6.54	0.002	S
k	Returning the frames carefully into their position and closing of the hive	3.73	0.78	HR	8.76	118.99	127.75	7.73	0.001	S
	Cluster Total	3.64	0.80	HR	6.92	186.84	179.81	4.16	0.095	NS

2G	Processing of Bee Products									
a	Using of pressing techniques to collect honey	3.85	0.49	HR	1.15	50.05	51.19	2.41	0.093	NS
b	Decamping and chopping off of the honey combs into pieces	3.23	0.85	AR	3.24	149.02	152.26	2.28	0.104	NS
c	Placing chopped combs in clean cloth, wrapping and subjecting to pressure	3.41	0.68	AR	0.84	96.62	97.47	0.92	0.402	NS
d	Collecting beeswax using containers and dissolving in equal volume of clean water	3.31	0.73	AR	5.54	198.38	203.93	2.94	0.07	NS
e	Melting, Stirring and skimming the wax	3.44	0.73	AR	2.34	110.18	112.52	2.23	0.11	NS
f	Pouring of the wax into the desired moulds	3.45	0.70	AR	0.99	101.75	102.75	1.02	0.363	NS
g	Collecting royal jelly and filtering through fine cloth	3.45	0.75	AR	2.73	115.90	118.63	2.47	0.087	NS
h	Drying trapped pollen in the sun	3.34	0.77	AR	4.57	171.41	175.98	2.81	0.07	NS
i	Collecting propolis	3.28	0.88	AR	0.90	71.30	72.21	1.33	0.27	NS
	Cluster Total	3.41	0.73	AR	2.48	118.29	120.77	2.05	0.174	NS
2H	Marketing of bee products									
a	Carrying out of market	3.73	0.58	HR	0.90	71.30	71.21	1.33	0.267	NS

	survey									
b	Grading of different products into various containers	3.71	0.56	HR	0.34	67.19	67.53	0.53	0.587	NS
c	Fixing of prices of the bee products	3.63	0.66	HR	1.61	90.10	91.70	1.87	0.157	NS
d	Selling immediately or transporting to local buyers and exporters	3.58	0.71	HR	2.52	105.45	107.92	2.51	0.084	NS
e	Receiving payment at the point of sale	3.54	0.70	HR	2.75	100.24	102.99	2.88	0.058	NS
f	Calculating profit or loss	3.77	0.55	HR	0.49	63.24	63.73	0.81	0.446	NS
	Cluster Total	3.66	0.63	HR	1.44	82.92	84.35	1.66	0.27	NS

APPENDIX K

RESULT OF DATA ANALYZED

Descriptives for research question 1

[DataSet1] C:\Users\CHIJJINDU\Documents\SPSS Analysis\Mrs Agbo Pricilla VTE\Agbo Priscilla.sav

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
itema1	138	1.00	4.00	483.00	3.5000	.70711
itema2	138	2.00	4.00	534.00	3.8696	.43271
itema3	138	1.00	4.00	481.00	3.4855	.83915
itema4	138	2.00	4.00	504.00	3.6522	.54908
itema5	138	1.00	4.00	493.00	3.5725	.73383
itema6	138	2.00	4.00	485.00	3.5145	.64203
itema7	138	1.00	4.00	486.00	3.5217	.73710
itema8	138	1.00	4.00	504.00	3.6522	.65793
itema9	138	2.00	4.00	530.00	3.8406	.38676
itema10	138	1.00	4.00	477.00	3.4565	.69534
itema11	138	.00	4.00	476.00	3.4493	.75525
Valid N (listwise)	138					

Descriptives for research question 2

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
itemb1	213	.00	4.00	801.00	3.7606	.63983
itemb2	213	.00	4.00	760.00	3.5681	.64524
itemb3	213	.00	4.00	754.00	3.5399	.77979
itemb4	213	.00	4.00	743.00	3.4883	.66311
itemb5	213	.00	4.00	764.00	3.5869	.72569
itemb6	213	.00	4.00	733.00	3.4413	.72201
itemb7	213	.00	4.00	780.00	3.6620	.60525
itemb8	213	.00	4.00	783.00	3.6761	.60129

itemb9	213	.00	4.00	796.00	3.7371	.63423
itemb10	213	.00	4.00	779.00	3.6573	.61422
itemb11	213	.00	4.00	744.00	3.4930	.70457
itemb12	213	.00	4.00	668.00	3.1362	1.02113
itemb13	213	.00	4.00	804.00	3.7746	.57126
itemb14	213	.00	4.00	812.00	3.8122	.47824
itemb15	213	.00	4.00	786.00	3.6901	.63524
itemb16	213	.00	4.00	778.00	3.6526	.70808
itemb17	213	.00	4.00	811.00	3.8075	.50985
itemb18	213	.00	4.00	805.00	3.7793	.56897
itemb19	213	.00	4.00	784.00	3.6808	.80180
itemb20	213	.00	4.00	730.00	3.4272	.94700
itemb21	213	.00	4.00	764.00	3.5869	.60518
itemb22	213	.00	4.00	819.00	3.8451	.48510
itemb23	213	.00	4.00	799.00	3.7512	.65088
itemb24	213	.00	4.00	793.00	3.7230	.50776
itemb25	213	.00	4.00	747.00	3.5070	.79870
itemb26	213	.00	4.00	761.00	3.5728	.79539
itemb27	213	.00	4.00	770.00	3.6150	.65312
itemb28	213	.00	4.00	777.00	3.6479	.64644
itemb29	213	.00	4.00	758.00	3.5587	.72201
itemb30	213	.00	4.00	810.00	3.8028	.62841
itemb31	213	.00	4.00	754.00	3.5399	.86032
itemb32	213	.00	4.00	769.00	3.6103	.76064
itemb33	213	.00	4.00	742.00	3.4836	.94468
itemb34	213	.00	4.00	777.00	3.6479	.77274
itemb35	213	.00	4.00	787.00	3.6948	.74341
itemb36	213	.00	4.00	723.00	3.3944	.86568
itemb37	213	.00	4.00	778.00	3.6526	.76569
itemb38	213	.00	4.00	742.00	3.4836	.78666
itemb39	213	.00	4.00	783.00	3.6761	.74810
itemb40	213	.00	4.00	762.00	3.5775	.89541
itemb41	213	.00	4.00	821.00	3.8545	.68159
itemb42	213	.00	4.00	789.00	3.7042	.74088
itemb43	213	.00	4.00	764.00	3.5869	.79397
itemb44	213	.00	4.00	760.00	3.5681	.80172

itemb45	213	.00	4.00	753.00	3.5352	.89281
itemb46	213	.00	4.00	788.00	3.6995	.74216
itemb47	213	.00	4.00	730.00	3.4272	.99081
itemb48	213	.00	4.00	743.00	3.4883	.84457
itemb49	213	.00	4.00	725.00	3.4038	.92471
itemb50	213	.00	4.00	795.00	3.7324	.77626
itemb51	213	.00	4.00	820.00	3.8498	.49140
itemb52	213	.00	4.00	689.00	3.2347	.84748
itemb53	213	.00	4.00	726.00	3.4085	.67804
itemb54	213	.00	4.00	706.00	3.3146	.73306
itemb55	213	.00	4.00	733.00	3.4413	.72852
itemb56	213	.00	4.00	735.00	3.4507	.69612
itemb57	213	.00	4.00	734.00	3.4460	.74804
itemb58	213	.00	4.00	712.00	3.3427	.77088
itemb59	213	.00	4.00	698.00	3.2770	.87593
itemb60	213	.00	4.00	794.00	3.7277	.58361
itemb61	213	.00	4.00	791.00	3.7136	.56439
itemb62	213	.00	4.00	773.00	3.6291	.65768
itemb63	213	.00	4.00	762.00	3.5775	.71365
itemb64	213	.00	4.00	753.00	3.5352	.69698
itemb65	213	.00	4.00	803.00	3.7700	.54827
Valid N (listwise)	213					

Descriptives for research question 3

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
itemc1	213	.00	4.00	839.00	3.9390	.47685
itemc2	213	.00	4.00	805.00	3.7793	.65383
itemc3	213	.00	4.00	797.00	3.7418	.60188
itemc4	213	.00	4.00	805.00	3.7793	.58531
itemc5	213	.00	4.00	809.00	3.7981	.57593
itemc6	213	.00	4.00	780.00	3.6620	.62820
itemc7	213	.00	4.00	788.00	3.6995	.63234
itemc8	213	.00	4.00	807.00	3.7887	.58072

itemc9	213	.00	4.00	788.00	3.6995	.61724
itemc10	213	.00	4.00	761.00	3.5728	.81299
itemc11	213	.00	4.00	760.00	3.5681	.69453
itemc12	213	.00	4.00	745.00	3.4977	.82773
itemc13	213	.00	4.00	748.00	3.5117	.81037
itemc14	213	.00	4.00	757.00	3.5540	.70920
itemc15	213	.00	4.00	812.00	3.8122	.60066
itemc16	213	.00	4.00	807.00	3.7887	.63503
itemc17	213	.00	4.00	785.00	3.6854	.77680
itemc18	213	.00	4.00	774.00	3.6338	.78739
Valid N (listwise)	213					

Descriptives for research question 4

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
itemd1	138	.00	4.00	399.00	2.8913	1.15692
itemd2	138	.00	4.00	539.00	3.9058	.46620
itemd3	138	.00	4.00	505.00	3.6594	.61009
itemd4	138	.00	4.00	531.00	3.8478	.52530
itemd5	138	.00	4.00	531.00	3.8478	.51122
itemd6	138	.00	4.00	476.00	3.4493	.71555
itemd7	138	.00	4.00	448.00	3.2464	.81779
itemd8	138	.00	4.00	449.00	3.2536	.83763
itemd9	138	.00	4.00	401.00	2.9058	.91131
itemd10	138	.00	4.00	374.00	2.7101	1.10871
itemd11	138	.00	4.00	368.00	2.6667	.93069
Valid N (listwise)	138					

Descriptives for research question 5

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
iteme1	138	.00	4.00	513.00	3.7174	.63922
iteme2	138	.00	4.00	531.00	3.8478	.55240
iteme3	138	.00	4.00	508.00	3.6812	.69393
iteme4	138	.00	4.00	509.00	3.6884	.63706
iteme5	138	.00	4.00	479.00	3.4710	.72688
iteme6	138	.00	4.00	482.00	3.4928	.71732
iteme7	138	.00	4.00	452.00	3.2754	.90229
iteme8	138	.00	4.00	456.00	3.3043	.84239
Valid N (listwise)	138					

T-Test for Hypothesis One

Group Statistics

	Profession	N	Mean	Std. Deviation	Std. Error Mean
itema1	Teacher	98	3.5306	.59559	.06016
	Extension agent	40	3.4250	.93060	.14714
itema2	Teacher	98	3.8776	.41282	.04170
	Extension agent	40	3.8500	.48305	.07638
itema3	Teacher	98	3.5510	.71971	.07270
	Extension agent	40	3.3250	1.07148	.16942
itema4	Teacher	98	3.6633	.53619	.05416
	Extension agent	40	3.6250	.58562	.09259
itema5	Teacher	98	3.6837	.65167	.06583
	Extension agent	40	3.3000	.85335	.13493
itema6	Teacher	98	3.5612	.57556	.05814
	Extension agent	40	3.4000	.77790	.12300
itema7	Teacher	98	3.5408	.67608	.06829
	Extension agent	40	3.4750	.87669	.13862

itema8	Teacher	98	3.7755	.52819	.05335
	Extension agent	40	3.3500	.83359	.13180
itema9	Teacher	98	3.8469	.36190	.03656
	Extension agent	40	3.8250	.44650	.07060
itema10	Teacher	98	3.3980	.69963	.07067
	Extension agent	40	3.6000	.67178	.10622
itema11	Teacher	98	3.4490	.73390	.07413
	Extension agent	40	3.4500	.81492	.12885

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
itema1	Equal variances assumed	13.991	.000	.795	136	.428	.10561	.13285	-.15711	.36833
	Equal variances not assumed			.664	52.540	.509	.10561	.15897	-.21330	.42452
itema2	Equal variances assumed	.490	.485	.338	136	.736	.02755	.08145	-.13353	.18863
	Equal variances not assumed			.317	63.451	.753	.02755	.08702	-.14632	.20142
itema3	Equal variances assumed	14.504	.000	1.441	136	.152	.22602	.15683	-.08412	.53616
	Equal variances not assumed			1.226	53.951	.226	.22602	.18436	-.14360	.59564
itema4	Equal variances assumed	.610	.436	.370	136	.712	.03827	.10335	-.16611	.24264
	Equal variances not assumed			.357	67.097	.722	.03827	.10727	-.17585	.25238
itema5	Equal variances assumed	6.909	.010	2.859	136	.005	.38367	.13422	.11825	.64910
	Equal variances not assumed			2.556	58.445	.013	.38367	.15013	.08321	.68414
itema6	Equal variances assumed	10.818	.001	1.342	136	.182	.16122	.12011	-.07630	.39875
	Equal variances not assumed			1.185	57.227	.241	.16122	.13605	-.11118	.43363
itema7	Equal variances assumed	3.567	.061	.475	136	.636	.06582	.13869	-.20846	.34009
	Equal variances not assumed			.426	58.837	.672	.06582	.15453	-.24341	.37504
itema8	Equal variances assumed	22.600	.000	3.594	136	.000	.42551	.11841	.19136	.65966
	Equal variances not assumed			2.993	52.265	.004	.42551	.14219	.14022	.71080

itema9	Equal variances assumed	.546	.461	.301	136	.764	.02194	.07281	-.12204	.16592
	Equal variances not assumed			.276	60.957	.784	.02194	.07950	-.13704	.18091
itema10	Equal variances assumed	.831	.364	1.557	136	.122	-.20204	.12979	-.45871	.05463
	Equal variances not assumed			1.584	75.246	.117	-.20204	.12758	-.45618	.05210
itema11	Equal variances assumed	1.324	.252	-.007	136	.994	-.00102	.14223	-.28228	.28024
	Equal variances not assumed			-.007	66.179	.995	-.00102	.14866	-.29781	.29577

Oneway ANOVA for Hypothesis Two

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
itemb1	Teacher	98	3.5204	.86429	.08731	3.3471	3.6937	.00	4.00
	Extension agent	40	3.9000	.30382	.04804	3.8028	3.9972	3.00	4.00
	Bee Farmer	75	4.0000	.00000	.00000	4.0000	4.0000	4.00	4.00
	Total	213	3.7606	.63983	.04384	3.6741	3.8470	.00	4.00
itemb2	Teacher	98	3.5918	.70106	.07082	3.4513	3.7324	.00	4.00
	Extension agent	40	3.6250	.66747	.10554	3.4115	3.8385	2.00	4.00
	Bee Farmer	75	3.5067	.55443	.06402	3.3791	3.6342	2.00	4.00
	Total	213	3.5681	.64524	.04421	3.4809	3.6552	.00	4.00
itemb3	Teacher	98	3.3571	.89960	.09087	3.1768	3.5375	.00	4.00
	Extension agent	40	3.5500	.67748	.10712	3.3333	3.7667	2.00	4.00
	Bee Farmer	75	3.7733	.58294	.06731	3.6392	3.9075	.00	4.00
	Total	213	3.5399	.77979	.05343	3.4346	3.6452	.00	4.00
itemb4	Teacher	98	3.5102	.72147	.07288	3.3656	3.6548	.00	4.00
	Extension agent	40	3.3500	.69982	.11065	3.1262	3.5738	2.00	4.00
	Bee Farmer	75	3.5333	.55345	.06391	3.4060	3.6607	2.00	4.00
	Total	213	3.4883	.66311	.04544	3.3987	3.5778	.00	4.00
itemb5	Teacher	98	3.7551	.64314	.06497	3.6262	3.8840	.00	4.00
	Extension agent	40	3.4500	.67748	.10712	3.2333	3.6667	2.00	4.00
	Bee Farmer	75	3.4400	.80940	.09346	3.2538	3.6262	.00	4.00
	Total	213	3.5869	.72569	.04972	3.4888	3.6849	.00	4.00
itemb6	Teacher	98	3.6837	.66731	.06741	3.5499	3.8175	.00	4.00
	Extension agent	40	3.6500	.62224	.09838	3.4510	3.8490	2.00	4.00
	Bee Farmer	75	3.0133	.64710	.07472	2.8644	3.1622	2.00	4.00
	Total	213	3.4413	.72201	.04947	3.3438	3.5388	.00	4.00

itemb7	Teacher	98	3.6633	.60826	.06144	3.5413	3.7852	.00	4.00
	Extension agent	40	3.8250	.38481	.06084	3.7019	3.9481	3.00	4.00
	Bee Farmer	75	3.5733	.68128	.07867	3.4166	3.7301	.00	4.00
	Total	213	3.6620	.60525	.04147	3.5802	3.7437	.00	4.00
itemb8	Teacher	98	3.6327	.67941	.06863	3.4964	3.7689	.00	4.00
	Extension agent	40	3.8000	.51640	.08165	3.6348	3.9652	2.00	4.00
	Bee Farmer	75	3.6667	.52847	.06102	3.5451	3.7883	2.00	4.00
	Total	213	3.6761	.60129	.04120	3.5948	3.7573	.00	4.00
itemb9	Teacher	98	3.8571	.55613	.05618	3.7456	3.9686	.00	4.00
	Extension agent	40	3.7500	.49355	.07804	3.5922	3.9078	2.00	4.00
	Bee Farmer	75	3.5733	.75647	.08735	3.3993	3.7474	2.00	4.00
	Total	213	3.7371	.63423	.04346	3.6514	3.8228	.00	4.00
itemb10	Teacher	98	3.6020	.71421	.07215	3.4589	3.7452	.00	4.00
	Extension agent	40	3.7500	.43853	.06934	3.6098	3.8902	3.00	4.00
	Bee Farmer	75	3.6800	.54920	.06342	3.5536	3.8064	2.00	4.00
	Total	213	3.6573	.61422	.04209	3.5743	3.7402	.00	4.00
itemb11	Teacher	98	3.6633	.60826	.06144	3.5413	3.7852	.00	4.00
	Extension agent	40	3.2750	.78406	.12397	3.0242	3.5258	1.00	4.00
	Bee Farmer	75	3.3867	.73325	.08467	3.2180	3.5554	2.00	4.00
	Total	213	3.4930	.70457	.04828	3.3978	3.5881	.00	4.00
itemb12	Teacher	98	3.1939	1.05183	.10625	2.9830	3.4048	.00	4.00
	Extension agent	40	2.8750	1.11373	.17610	2.5188	3.2312	.00	4.00
	Bee Farmer	75	3.2000	.91533	.10569	2.9894	3.4106	1.00	4.00
	Total	213	3.1362	1.02113	.06997	2.9982	3.2741	.00	4.00
itemb13	Teacher	98	3.7959	.60852	.06147	3.6739	3.9179	.00	4.00
	Extension agent	40	3.6750	.61550	.09732	3.4782	3.8718	2.00	4.00
	Bee Farmer	75	3.8000	.49320	.05695	3.6865	3.9135	2.00	4.00
	Total	213	3.7746	.57126	.03914	3.6975	3.8518	.00	4.00
itemb14	Teacher	98	3.7653	.55243	.05580	3.6546	3.8761	.00	4.00
	Extension agent	40	3.7000	.56387	.08916	3.5197	3.8803	2.00	4.00
	Bee Farmer	75	3.9333	.25112	.02900	3.8756	3.9911	3.00	4.00
	Total	213	3.8122	.47824	.03277	3.7476	3.8768	.00	4.00
itemb15	Teacher	98	3.7143	.57437	.05802	3.5991	3.8294	.00	4.00
	Extension agent	40	3.6750	.57233	.09049	3.4920	3.8580	2.00	4.00
	Bee Farmer	75	3.6667	.74132	.08560	3.4961	3.8372	.00	4.00
	Total	213	3.6901	.63524	.04353	3.6043	3.7759	.00	4.00
itemb16	Teacher	98	3.5408	.85154	.08602	3.3701	3.7115	.00	4.00
	Extension agent	40	3.3250	.72986	.11540	3.0916	3.5584	2.00	4.00
	Bee Farmer	75	3.9733	.16219	.01873	3.9360	4.0107	3.00	4.00
	Total	213	3.6526	.70808	.04852	3.5569	3.7482	.00	4.00
itemb17	Teacher	98	3.8980	.46506	.04698	3.8047	3.9912	.00	4.00

	Extension agent	40	3.5000	.67937	.10742	3.2827	3.7173	2.00	4.00
	Bee Farmer	75	3.8533	.39227	.04530	3.7631	3.9436	2.00	4.00
	Total	213	3.8075	.50985	.03493	3.7386	3.8764	.00	4.00
itemb18	Teacher	98	3.8061	.62025	.06265	3.6818	3.9305	.00	4.00
	Extension agent	40	3.6250	.66747	.10554	3.4115	3.8385	2.00	4.00
	Bee Farmer	75	3.8267	.41503	.04792	3.7312	3.9222	2.00	4.00
	Total	213	3.7793	.56897	.03898	3.7025	3.8562	.00	4.00
itemb19	Teacher	98	3.6837	.68258	.06895	3.5468	3.8205	.00	4.00
	Extension agent	40	3.6750	.76418	.12083	3.4306	3.9194	.00	4.00
	Bee Farmer	75	3.6800	.96086	.11095	3.4589	3.9011	.00	4.00
	Total	213	3.6808	.80180	.05494	3.5725	3.7890	.00	4.00
itemb20	Teacher	98	3.2959	1.08608	.10971	3.0782	3.5137	.00	4.00
	Extension agent	40	3.1250	.88252	.13954	2.8428	3.4072	1.00	4.00
	Bee Farmer	75	3.7600	.65430	.07555	3.6095	3.9105	1.00	4.00
	Total	213	3.4272	.94700	.06489	3.2993	3.5551	.00	4.00
itemb21	Teacher	98	3.4898	.67724	.06841	3.3540	3.6256	.00	4.00
	Extension agent	40	3.5750	.63599	.10056	3.3716	3.7784	2.00	4.00
	Bee Farmer	75	3.7200	.45202	.05220	3.6160	3.8240	3.00	4.00
	Total	213	3.5869	.60518	.04147	3.5051	3.6686	.00	4.00
itemb22	Teacher	98	3.8673	.54937	.05549	3.7572	3.9775	.00	4.00
	Extension agent	40	3.6000	.59052	.09337	3.4111	3.7889	2.00	4.00
	Bee Farmer	75	3.9467	.22621	.02612	3.8946	3.9987	3.00	4.00
	Total	213	3.8451	.48510	.03324	3.7796	3.9106	.00	4.00
itemb23	Teacher	98	3.7857	.69237	.06994	3.6469	3.9245	.00	4.00
	Extension agent	40	3.4000	.87119	.13775	3.1214	3.6786	1.00	4.00
	Bee Farmer	75	3.8933	.31077	.03588	3.8218	3.9648	3.00	4.00
	Total	213	3.7512	.65088	.04460	3.6633	3.8391	.00	4.00
itemb24	Teacher	98	3.6531	.59382	.05998	3.5340	3.7721	.00	4.00
	Extension agent	40	3.7250	.45220	.07150	3.5804	3.8696	3.00	4.00
	Bee Farmer	75	3.8133	.39227	.04530	3.7231	3.9036	3.00	4.00
	Total	213	3.7230	.50776	.03479	3.6544	3.7916	.00	4.00
itemb25	Teacher	98	3.4490	.88658	.08956	3.2712	3.6267	.00	4.00
	Extension agent	40	3.4250	1.00989	.15968	3.1020	3.7480	.00	4.00
	Bee Farmer	75	3.6267	.48695	.05623	3.5146	3.7387	3.00	4.00
	Total	213	3.5070	.79870	.05473	3.3992	3.6149	.00	4.00
itemb26	Teacher	98	3.5000	.88807	.08971	3.3220	3.6780	.00	4.00
	Extension agent	40	3.8000	.56387	.08916	3.6197	3.9803	2.00	4.00
	Bee Farmer	75	3.5467	.75861	.08760	3.3721	3.7212	.00	4.00
	Total	213	3.5728	.79539	.05450	3.4653	3.6802	.00	4.00
itemb27	Teacher	98	3.6224	.65038	.06570	3.4921	3.7528	.00	4.00

	Extension agent	40	3.5250	.90547	.14317	3.2354	3.8146	1.00	4.00
	Bee Farmer	75	3.6533	.47911	.05532	3.5431	3.7636	3.00	4.00
	Total	213	3.6150	.65312	.04475	3.5268	3.7032	.00	4.00
itemb28	Teacher	98	3.6531	.59382	.05998	3.5340	3.7721	.00	4.00
	Extension agent	40	3.6250	.80662	.12754	3.3670	3.8830	1.00	4.00
	Bee Farmer	75	3.6533	.62587	.07227	3.5093	3.7973	.00	4.00
	Total	213	3.6479	.64644	.04429	3.5606	3.7352	.00	4.00
itemb29	Teacher	98	3.4592	.85154	.08602	3.2885	3.6299	.00	4.00
	Extension agent	40	3.7000	.72324	.11435	3.4687	3.9313	1.00	4.00
	Bee Farmer	75	3.6133	.49027	.05661	3.5005	3.7261	3.00	4.00
	Total	213	3.5587	.72201	.04947	3.4612	3.6562	.00	4.00
itemb30	Teacher	98	3.7857	.70711	.07143	3.6439	3.9275	.00	4.00
	Extension agent	40	3.5750	.84391	.13343	3.3051	3.8449	1.00	4.00
	Bee Farmer	75	3.9467	.22621	.02612	3.8946	3.9987	3.00	4.00
	Total	213	3.8028	.62841	.04306	3.7179	3.8877	.00	4.00
itemb31	Teacher	98	3.5918	.78434	.07923	3.4346	3.7491	.00	4.00
	Extension agent	40	3.1000	1.19400	.18879	2.7181	3.4819	.00	4.00
	Bee Farmer	75	3.7067	.65292	.07539	3.5564	3.8569	1.00	4.00
	Total	213	3.5399	.86032	.05895	3.4237	3.6561	.00	4.00
itemb32	Teacher	98	3.5714	.68864	.06956	3.4334	3.7095	.00	4.00
	Extension agent	40	3.3250	1.22762	.19410	2.9324	3.7176	.00	4.00
	Bee Farmer	75	3.8133	.39227	.04530	3.7231	3.9036	3.00	4.00
	Total	213	3.6103	.76064	.05212	3.5076	3.7131	.00	4.00
itemb33	Teacher	98	3.3367	1.03490	.10454	3.1293	3.5442	.00	4.00
	Extension agent	40	3.2750	1.26060	.19932	2.8718	3.6782	.00	4.00
	Bee Farmer	75	3.7867	.41242	.04762	3.6918	3.8816	3.00	4.00
	Total	213	3.4836	.94468	.06473	3.3560	3.6112	.00	4.00
itemb34	Teacher	98	3.7755	.65062	.06572	3.6451	3.9060	.00	4.00
	Extension agent	40	3.2500	1.25576	.19855	2.8484	3.6516	.00	4.00
	Bee Farmer	75	3.6933	.46421	.05360	3.5865	3.8001	3.00	4.00
	Total	213	3.6479	.77274	.05295	3.5435	3.7523	.00	4.00
itemb35	Teacher	98	3.7857	.61342	.06197	3.6627	3.9087	.00	4.00
	Extension agent	40	3.2000	1.22370	.19348	2.8086	3.5914	.00	4.00
	Bee Farmer	75	3.8400	.36907	.04262	3.7551	3.9249	3.00	4.00
	Total	213	3.6948	.74341	.05094	3.5944	3.7952	.00	4.00
itemb36	Teacher	98	3.3776	.89114	.09002	3.1989	3.5562	.00	4.00
	Extension agent	40	3.1500	1.23101	.19464	2.7563	3.5437	.00	4.00
	Bee Farmer	75	3.5467	.50117	.05787	3.4314	3.6620	3.00	4.00
	Total	213	3.3944	.86568	.05932	3.2774	3.5113	.00	4.00
itemb37	Teacher	98	3.6429	.67732	.06842	3.5071	3.7787	.00	4.00

	Extension agent	40	3.2500	1.25576	.19855	2.8484	3.6516	.00	4.00
	Bee Farmer	75	3.8800	.32715	.03778	3.8047	3.9553	3.00	4.00
	Total	213	3.6526	.76569	.05246	3.5492	3.7560	.00	4.00
itemb38	Teacher	98	3.7143	.59204	.05981	3.5956	3.8330	.00	4.00
	Extension agent	40	3.2250	1.20868	.19111	2.8384	3.6116	.00	4.00
	Bee Farmer	75	3.3200	.64010	.07391	3.1727	3.4673	2.00	4.00
	Total	213	3.4836	.78666	.05390	3.3773	3.5898	.00	4.00
itemb39	Teacher	98	3.6735	.68527	.06922	3.5361	3.8109	.00	4.00
	Extension agent	40	3.4000	1.21529	.19215	3.0113	3.7887	.00	4.00
	Bee Farmer	75	3.8267	.38108	.04400	3.7390	3.9143	3.00	4.00
	Total	213	3.6761	.74810	.05126	3.5750	3.7771	.00	4.00
itemb40	Teacher	98	3.7041	.67670	.06836	3.5684	3.8398	.00	4.00
	Extension agent	40	3.0250	1.42302	.22500	2.5699	3.4801	.00	4.00
	Bee Farmer	75	3.7067	.65292	.07539	3.5564	3.8569	1.00	4.00
	Total	213	3.5775	.89541	.06135	3.4565	3.6984	.00	4.00
itemb41	Teacher	98	3.9490	.41549	.04197	3.8657	4.0323	.00	4.00
	Extension agent	40	3.3750	1.33373	.21088	2.9485	3.8015	.00	4.00
	Bee Farmer	75	3.9867	.11547	.01333	3.9601	4.0132	3.00	4.00
	Total	213	3.8545	.68159	.04670	3.7624	3.9465	.00	4.00
itemb42	Teacher	98	3.7245	.57042	.05762	3.6101	3.8389	.00	4.00
	Extension agent	40	3.4000	1.33589	.21122	2.9728	3.8272	.00	4.00
	Bee Farmer	75	3.8400	.36907	.04262	3.7551	3.9249	3.00	4.00
	Total	213	3.7042	.74088	.05076	3.6042	3.8043	.00	4.00
itemb43	Teacher	98	3.6122	.65224	.06589	3.4815	3.7430	.00	4.00
	Extension agent	40	3.2500	1.35401	.21409	2.8170	3.6830	.00	4.00
	Bee Farmer	75	3.7333	.44519	.05141	3.6309	3.8358	3.00	4.00
	Total	213	3.5869	.79397	.05440	3.4796	3.6941	.00	4.00
itemb44	Teacher	98	3.6531	.64380	.06503	3.5240	3.7821	.00	4.00
	Extension agent	40	3.1500	1.35021	.21349	2.7182	3.5818	.00	4.00
	Bee Farmer	75	3.6800	.46962	.05423	3.5720	3.7880	3.00	4.00
	Total	213	3.5681	.80172	.05493	3.4598	3.6764	.00	4.00
itemb45	Teacher	98	3.4490	.89814	.09073	3.2689	3.6290	.00	4.00
	Extension agent	40	3.3500	1.35021	.21349	2.9182	3.7818	.00	4.00
	Bee Farmer	75	3.7467	.43785	.05056	3.6459	3.8474	3.00	4.00
	Total	213	3.5352	.89281	.06117	3.4146	3.6558	.00	4.00
itemb46	Teacher	98	3.6837	.58498	.05909	3.5664	3.8010	.00	4.00
	Extension agent	40	3.3750	1.33373	.21088	2.9485	3.8015	.00	4.00
	Bee Farmer	75	3.8933	.31077	.03588	3.8218	3.9648	3.00	4.00
	Total	213	3.6995	.74216	.05085	3.5993	3.7998	.00	4.00
itemb47	Teacher	98	3.3265	1.03322	.10437	3.1194	3.5337	.00	4.00

	Extension agent	40	3.0750	1.40306	.22184	2.6263	3.5237	.00	4.00
	Bee Farmer	75	3.7467	.43785	.05056	3.6459	3.8474	3.00	4.00
	Total	213	3.4272	.99081	.06789	3.2934	3.5611	.00	4.00
itemb48	Teacher	98	3.5510	.65994	.06666	3.4187	3.6833	.00	4.00
	Extension agent	40	3.0500	1.33877	.21168	2.6218	3.4782	.00	4.00
	Bee Farmer	75	3.6400	.62903	.07263	3.4953	3.7847	.00	4.00
	Total	213	3.4883	.84457	.05787	3.3742	3.6023	.00	4.00
itemb49	Teacher	98	3.3265	.92809	.09375	3.1405	3.5126	.00	4.00
	Extension agent	40	3.0750	1.34712	.21300	2.6442	3.5058	.00	4.00
	Bee Farmer	75	3.6800	.46962	.05423	3.5720	3.7880	3.00	4.00
	Total	213	3.4038	.92471	.06336	3.2789	3.5287	.00	4.00
itemb50	Teacher	98	3.8776	.48195	.04868	3.7809	3.9742	.00	4.00
	Extension agent	40	3.3250	1.45686	.23035	2.8591	3.7909	.00	4.00
	Bee Farmer	75	3.7600	.42996	.04965	3.6611	3.8589	3.00	4.00
	Total	213	3.7324	.77626	.05319	3.6275	3.8372	.00	4.00
itemb51	Teacher	98	3.8980	.46506	.04698	3.8047	3.9912	.00	4.00
	Extension agent	40	3.7000	.72324	.11435	3.4687	3.9313	.00	4.00
	Bee Farmer	75	3.8667	.34222	.03952	3.7879	3.9454	3.00	4.00
	Total	213	3.8498	.49140	.03367	3.7834	3.9161	.00	4.00
itemb52	Teacher	98	3.1020	.85542	.08641	2.9305	3.2735	.00	4.00
	Extension agent	40	3.3750	.92508	.14627	3.0791	3.6709	.00	4.00
	Bee Farmer	75	3.3333	.77692	.08971	3.1546	3.5121	.00	4.00
	Total	213	3.2347	.84748	.05807	3.1203	3.3492	.00	4.00
itemb53	Teacher	98	3.3673	.64836	.06549	3.2374	3.4973	.00	4.00
	Extension agent	40	3.3500	.92126	.14566	3.0554	3.6446	.00	4.00
	Bee Farmer	75	3.4933	.55443	.06402	3.3658	3.6209	2.00	4.00
	Total	213	3.4085	.67804	.04646	3.3169	3.5000	.00	4.00
itemb54	Teacher	98	3.1939	.72735	.07347	3.0481	3.3397	.00	4.00
	Extension agent	40	3.2000	.93918	.14850	2.8996	3.5004	.00	4.00
	Bee Farmer	75	3.5333	.55345	.06391	3.4060	3.6607	2.00	4.00
	Total	213	3.3146	.73306	.05023	3.2155	3.4136	.00	4.00
itemb55	Teacher	98	3.4796	.70681	.07140	3.3379	3.6213	.00	4.00
	Extension agent	40	3.2250	.97369	.15395	2.9136	3.5364	.00	4.00
	Bee Farmer	75	3.5067	.57829	.06677	3.3736	3.6397	2.00	4.00
	Total	213	3.4413	.72852	.04992	3.3429	3.5397	.00	4.00
itemb56	Teacher	98	3.5102	.67724	.06841	3.3744	3.6460	.00	4.00
	Extension agent	40	3.3250	.91672	.14495	3.0318	3.6182	.00	4.00
	Bee Farmer	75	3.4400	.57516	.06641	3.3077	3.5723	2.00	4.00
	Total	213	3.4507	.69612	.04770	3.3567	3.5447	.00	4.00
itemb57	Teacher	98	3.4592	.74845	.07560	3.3091	3.6092	.00	4.00

	Extension agent	40	3.2250	.97369	.15395	2.9136	3.5364	.00	4.00
	Bee Farmer	75	3.5467	.57641	.06656	3.4140	3.6793	2.00	4.00
	Total	213	3.4460	.74804	.05126	3.3450	3.5470	.00	4.00
itemb58	Teacher	98	3.3367	.70263	.07098	3.1959	3.4776	.00	4.00
	Extension agent	40	3.0750	1.07148	.16942	2.7323	3.4177	.00	4.00
	Bee Farmer	75	3.4933	.62327	.07197	3.3499	3.6367	2.00	4.00
	Total	213	3.3427	.77088	.05282	3.2386	3.4468	.00	4.00
itemb59	Teacher	98	3.1633	.91600	.09253	2.9796	3.3469	.00	4.00
	Extension agent	40	3.0750	1.07148	.16942	2.7323	3.4177	.00	4.00
	Bee Farmer	75	3.5333	.62240	.07187	3.3901	3.6765	2.00	4.00
	Total	213	3.2770	.87593	.06002	3.1587	3.3953	.00	4.00
itemb60	Teacher	98	3.6939	.63259	.06390	3.5671	3.8207	.00	4.00
	Extension agent	40	3.6500	.73554	.11630	3.4148	3.8852	.00	4.00
	Bee Farmer	75	3.8133	.39227	.04530	3.7231	3.9036	3.00	4.00
	Total	213	3.7277	.58361	.03999	3.6489	3.8065	.00	4.00
itemb61	Teacher	98	3.7551	.55726	.05629	3.6434	3.8668	.00	4.00
	Extension agent	40	3.7000	.72324	.11435	3.4687	3.9313	.00	4.00
	Bee Farmer	75	3.6667	.47458	.05480	3.5575	3.7759	3.00	4.00
	Total	213	3.7136	.56439	.03867	3.6374	3.7898	.00	4.00
itemb62	Teacher	98	3.7143	.64216	.06487	3.5855	3.8430	.00	4.00
	Extension agent	40	3.6250	.77418	.12241	3.3774	3.8726	.00	4.00
	Bee Farmer	75	3.5200	.60090	.06939	3.3817	3.6583	2.00	4.00
	Total	213	3.6291	.65768	.04506	3.5403	3.7179	.00	4.00
itemb63	Teacher	98	3.6837	.63566	.06421	3.5562	3.8111	.00	4.00
	Extension agent	40	3.5750	.93060	.14714	3.2774	3.8726	.00	4.00
	Bee Farmer	75	3.4400	.66251	.07650	3.2876	3.5924	2.00	4.00
	Total	213	3.5775	.71365	.04890	3.4811	3.6739	.00	4.00
itemb64	Teacher	98	3.5918	.68619	.06932	3.4543	3.7294	.00	4.00
	Extension agent	40	3.6750	.76418	.12083	3.4306	3.9194	.00	4.00
	Bee Farmer	75	3.3867	.65540	.07568	3.2359	3.5375	2.00	4.00
	Total	213	3.5352	.69698	.04776	3.4411	3.6293	.00	4.00
itemb65	Teacher	98	3.7959	.53649	.05419	3.6884	3.9035	.00	4.00
	Extension agent	40	3.8250	.71208	.11259	3.5973	4.0527	.00	4.00
	Bee Farmer	75	3.7067	.45836	.05293	3.6012	3.8121	3.00	4.00
	Total	213	3.7700	.54827	.03757	3.6959	3.8440	.00	4.00

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
itemb1	Between Groups	10.730	2	5.365	2.002	.803

	Within Groups	604.059	210	2.362		
	Total	86.789	212			
itemb2	Between Groups	.468	2	.234	.559	.572
	Within Groups	87.795	210	.418		
	Total	88.263	212			
itemb3	Between Groups	7.364	2	3.682	2.362	.202
	Within Groups	221.547	210	1.157		
	Total	228.911	212			
itemb4	Between Groups	.964	2	.482	1.097	.336
	Within Groups	92.256	210	.439		
	Total	93.221	212			
itemb5	Between Groups	5.141	2	2.570	2.768	.417
	Within Groups	206.502	210	.985		
	Total	211.643	212			
itemb6	Between Groups	21.236	2	10.618	2.975	.100
	Within Groups	219.281	210	1.425		
	Total	240.516	212			
itemb7	Between Groups	1.653	2	.826	2.283	.105
	Within Groups	76.009	210	.362		
	Total	77.662	212			
itemb8	Between Groups	.806	2	.403	1.115	.330
	Within Groups	75.842	210	.361		
	Total	76.648	212			
itemb9	Between Groups	3.430	2	1.715	2.141	.103
	Within Groups	181.847	210	.8390		
	Total	185.277	212			
itemb10	Between Groups	.682	2	.341	.903	.407
	Within Groups	79.300	210	.378		
	Total	79.981	212			
itemb11	Between Groups	5.590	2	2.795	2.890	.203
	Within Groups	199.649	210	.9475		
	Total	205.239	212			
itemb12	Between Groups	3.360	2	1.680	1.621	.200
	Within Groups	217.691	210	1.037		

	Total	221.052	212			
itemb13	Between Groups	.490	2	.245	.749	.474
	Within Groups	68.693	210	.327		
	Total	69.183	212			
itemb14	Between Groups	1.820	2	.910	1.094	.888
	Within Groups	196.669	210	.892		
	Total	208.488	212			
itemb15	Between Groups	.108	2	.054	.132	.876
	Within Groups	85.442	210	.407		
	Total	85.549	212			
itemb16	Between Groups	13.233	2	6.616	2.931	.068
	Within Groups	293.058	210	1.443		
	Total	306.291	212			
itemb17	Between Groups	4.742	2	2.371	2.585	.088
	Within Groups	205.366	210	.924		
	Total	210.108	212			
itemb18	Between Groups	1.191	2	.596	1.855	.159
	Within Groups	67.438	210	.321		
	Total	68.629	212			
itemb19	Between Groups	.002	2	.001	.002	.998
	Within Groups	136.289	210	.649		
	Total	136.291	212			
itemb20	Between Groups	3.649	2	1.824	2.121	.330
	Within Groups	176.473	210	.840		
	Total	180.122	212			
itemb21	Between Groups	2.258	2	1.129	2.99	.065
	Within Groups	79.385	210	.559		
	Total	81.643	212			
itemb22	Between Groups	3.225	2	1.613	1.962	.399
	Within Groups	146.662	210	.8222		
	Total	149.887	212			
itemb23	Between Groups	6.566	2	3.283	2.436	.433
	Within Groups	283.247	210	1.348		
	Total	289.812	212			

itemb24	Between Groups	1.092	2	.546	2.140	.120
	Within Groups	53.566	210	.255		
	Total	54.657	212			
itemb25	Between Groups	1.673	2	.836	1.315	.271
	Within Groups	133.567	210	.636		
	Total	135.239	212			
itemb26	Between Groups	2.635	2	1.318	2.105	.124
	Within Groups	131.487	210	.626		
	Total	134.122	212			
itemb27	Between Groups	.440	2	.220	.513	.599
	Within Groups	89.992	210	.429		
	Total	90.432	212			
itemb28	Between Groups	.026	2	.013	.031	.970
	Within Groups	88.566	210	.422		
	Total	88.592	212			
itemb29	Between Groups	1.993	2	.997	1.928	.148
	Within Groups	108.523	210	.517		
	Total	110.516	212			
itemb30	Between Groups	3.657	2	1.828	2.786	.309
	Within Groups	138.062	210	.657		
	Total	141.718	212			
itemb31	Between Groups	10.091	2	5.045	2.716	.411
	Within Groups	286.820	210	1.571		
	Total	296.911	212			
itemb32	Between Groups	6.496	2	3.248	2.787	.133
	Within Groups	246.162	210	1.179		
	Total	252.657	212			
itemb33	Between Groups	7.743	2	3.872	2.728	.097
	Within Groups	298.449	210	1.419		
	Total	306.192	212			
itemb34	Between Groups	8.084	2	4.042	2.585	.111
	Within Groups	218.508	210	1.564		
	Total	226.592	212			
itemb35	Between Groups	5.184	2	2.592	2.142	.213

	Within Groups	254.980	210	1.210		
	Total	259.164	212			
itemb36	Between Groups	4.156	2	2.078	2.820	.062
	Within Groups	154.717	210	.737		
	Total	158.873	212			
itemb37	Between Groups	3.371	2	1.686	2.314	.229
	Within Groups	153.920	210	.728		
	Total	157.291	212			
itemb38	Between Groups	3.897	2	1.949	2.677	.106
	Within Groups	121.295	210	.728		
	Total	131.192	212			
itemb39	Between Groups	4.750	2	2.375	2.717	.114
	Within Groups	183.898	210	.874		
	Total	188.648	212			
itemb40	Between Groups	5.032	2	2.516	2.872	.121
	Within Groups	184.940	210	.876		
	Total	189.972	212			
itemb41	Between Groups	3.382	2	1.691	2.307	.344
	Within Groups	160.107	210	.733		
	Total	98.488	212			
itemb42	Between Groups	5.125	2	2.562	2.815	.091
	Within Groups	191.241	210	.910		
	Total	196.366	212			
itemb43	Between Groups	5.211	2	2.563	2.732	.079
	Within Groups	197.432	210	.938		
	Total	202.643	212			
itemb44	Between Groups	5.563	2	2.782	2.531	.200
	Within Groups	227.624	210	1.081		
	Total	233.263	212			
itemb45	Between Groups	4.454	2	2.227	2.858	.082
	Within Groups	163.532	210	.779		
	Total	167.986	212			
itemb46	Between Groups	6.054	2	3.527	2.905	.077
	Within Groups	234.716	210	1.214		

	Total	240.770	212			
itemb47	Between Groups	5.609	2	2.805	2.831	.073
	Within Groups	194.513	210	.991		
	Total	208.122	212			
itemb48	Between Groups	6.296	2	3.148	2.273	.101
	Within Groups	241.425	210	1.148		
	Total	151.221	212			
itemb49	Between Groups	10.631	2	5.315	6.541	.002
	Within Groups	170.646	210	.813		
	Total	181.277	212			
itemb50	Between Groups	8.761	2	4.380	7.731	.001
	Within Groups	118.986	210	.567		
	Total	127.746	212			
itemb51	Between Groups	1.146	2	.573	2.405	.093
	Within Groups	50.046	210	.238		
	Total	51.192	212			
itemb52	Between Groups	3.242	2	1.621	2.284	.104
	Within Groups	149.021	210	.710		
	Total	152.263	212			
itemb53	Between Groups	.843	2	.421	.916	.402
	Within Groups	96.622	210	.460		
	Total	97.465	212			
itemb54	Between Groups	5.542	2	2.771	2..939	.065
	Within Groups	198.383	210	.943		
	Total	113.925	212			
itemb55	Between Groups	2.336	2	1.168	2.226	.111
	Within Groups	110.181	210	.525		
	Total	112.516	212			
itemb56	Between Groups	.988	2	.494	1.019	.363
	Within Groups	101.745	210	.484		
	Total	102.732	212			
itemb57	Between Groups	2.731	2	1.365	2.474	.087
	Within Groups	115.898	210	.552		
	Total	118.629	212			

itemb58	Between Groups	4.572	2	2.286	2.808	.072
	Within Groups	171.409	210	.814		
	Total	175.981	212			
itemb59	Between Groups	3.828	2	1.914	2.597	.116
	Within Groups	154.829	210	.737		
	Total	158.657	212			
itemb60	Between Groups	.904	2	.452	1.331	.267
	Within Groups	71.303	210	.340		
	Total	72.207	212			
itemb61	Between Groups	.341	2	.171	.534	.587
	Within Groups	67.189	210	.320		
	Total	67.531	212			
itemb62	Between Groups	1.605	2	.802	1.870	.157
	Within Groups	90.095	210	.429		
	Total	91.700	212			
itemb63	Between Groups	2.523	2	1.261	2.512	.084
	Within Groups	105.449	210	.502		
	Total	107.972	212			
itemb64	Between Groups	2.751	2	1.375	2.882	.058
	Within Groups	100.235	210	.477		
	Total	102.986	212			
itemb65	Between Groups	.488	2	.244	.810	.446
	Within Groups	63.240	210	.301		
	Total	63.728	212			

Oneway ANOVA for Hypothesis Three

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
itemc1	Teacher	98	3.9184	.56848	.05742	3.8044	4.0323	.00	4.00
	Extension agent	40	3.8750	.64798	.10245	3.6678	4.0822	.00	4.00
	Bee Farmer	75	4.0000	.00000	.00000	4.0000	4.0000	4.00	4.00
	Total	213	3.9390	.47685	.03267	3.8746	4.0034	.00	4.00
itemc2	Teacher	98	3.5816	.82391	.08323	3.4164	3.7468	.00	4.00
	Extension agent	40	3.8750	.64798	.10245	3.6678	4.0822	.00	4.00
	Bee Farmer	75	3.9867	.11547	.01333	3.9601	4.0132	3.00	4.00
	Total	213	3.7793	.65383	.04480	3.6910	3.8677	.00	4.00
itemc3	Teacher	98	3.7143	.67350	.06803	3.5793	3.8493	.00	4.00
	Extension agent	40	3.7250	.71567	.11316	3.4961	3.9539	.00	4.00
	Bee Farmer	75	3.7867	.41242	.04762	3.6918	3.8816	3.00	4.00
	Total	213	3.7418	.60188	.04124	3.6605	3.8231	.00	4.00
itemc4	Teacher	98	3.8061	.63665	.06431	3.6785	3.9338	.00	4.00
	Extension agent	40	3.7500	.70711	.11180	3.5239	3.9761	.00	4.00
	Bee Farmer	75	3.7600	.42996	.04965	3.6611	3.8589	3.00	4.00
	Total	213	3.7793	.58531	.04010	3.7003	3.8584	.00	4.00
itemc5	Teacher	98	3.8163	.63159	.06380	3.6897	3.9430	.00	4.00
	Extension agent	40	3.8000	.68687	.10860	3.5803	4.0197	.00	4.00
	Bee Farmer	75	3.7733	.42149	.04867	3.6764	3.8703	3.00	4.00
	Total	213	3.7981	.57593	.03946	3.7203	3.8759	.00	4.00
itemc6	Teacher	98	3.6020	.69963	.07067	3.4618	3.7423	.00	4.00
	Extension agent	40	3.7250	.71567	.11316	3.4961	3.9539	.00	4.00
	Bee Farmer	75	3.7067	.45836	.05293	3.6012	3.8121	3.00	4.00
	Total	213	3.6620	.62820	.04304	3.5771	3.7468	.00	4.00
itemc7	Teacher	98	3.5816	.73110	.07385	3.4351	3.7282	.00	4.00
	Extension agent	40	3.6000	.74421	.11767	3.3620	3.8380	.00	4.00
	Bee Farmer	75	3.9067	.29286	.03382	3.8393	3.9740	3.00	4.00
	Total	213	3.6995	.63234	.04333	3.6141	3.7849	.00	4.00
itemc8	Teacher	98	3.7449	.66288	.06696	3.6120	3.8778	.00	4.00
	Extension agent	40	3.6500	.73554	.11630	3.4148	3.8852	.00	4.00

	Bee Farmer	75	3.9200	.27312	.03154	3.8572	3.9828	3.00	4.00
	Total	213	3.7887	.58072	.03979	3.7103	3.8672	.00	4.00
itemc9	Teacher	98	3.6020	.69963	.07067	3.4618	3.7423	.00	4.00
	Extension agent	40	3.7750	.69752	.11029	3.5519	3.9981	.00	4.00
	Bee Farmer	75	3.7867	.41242	.04762	3.6918	3.8816	3.00	4.00
	Total	213	3.6995	.61724	.04229	3.6162	3.7829	.00	4.00
itemc10	Teacher	98	3.5000	.82799	.08364	3.3340	3.6660	.00	4.00
	Extension agent	40	3.6500	.83359	.13180	3.3834	3.9166	.00	4.00
	Bee Farmer	75	3.6267	.78454	.09059	3.4462	3.8072	1.00	4.00
	Total	213	3.5728	.81299	.05571	3.4630	3.6826	.00	4.00
itemc11	Teacher	98	3.4286	.77326	.07811	3.2735	3.5836	.00	4.00
	Extension agent	40	3.6250	.80662	.12754	3.3670	3.8830	.00	4.00
	Bee Farmer	75	3.7200	.45202	.05220	3.6160	3.8240	3.00	4.00
	Total	213	3.5681	.69453	.04759	3.4743	3.6619	.00	4.00
itemc12	Teacher	98	3.2551	.92292	.09323	3.0701	3.4401	.00	4.00
	Extension agent	40	3.3250	.97106	.15354	3.0144	3.6356	.00	4.00
	Bee Farmer	75	3.9067	.29286	.03382	3.8393	3.9740	3.00	4.00
	Total	213	3.4977	.82773	.05672	3.3859	3.6095	.00	4.00
itemc13	Teacher	98	3.3571	.84035	.08489	3.1887	3.5256	.00	4.00
	Extension agent	40	3.2500	1.10361	.17450	2.8970	3.6030	.00	4.00
	Bee Farmer	75	3.8533	.35616	.04113	3.7714	3.9353	3.00	4.00
	Total	213	3.5117	.81037	.05553	3.4023	3.6212	.00	4.00
itemc14	Teacher	98	3.5510	.76148	.07692	3.3984	3.7037	.00	4.00
	Extension agent	40	3.3500	.89299	.14119	3.0644	3.6356	.00	4.00
	Bee Farmer	75	3.6667	.47458	.05480	3.5575	3.7759	3.00	4.00
	Total	213	3.5540	.70920	.04859	3.4582	3.6498	.00	4.00
itemc15	Teacher	98	3.7755	.65062	.06572	3.6451	3.9060	.00	4.00
	Extension agent	40	3.6500	.83359	.13180	3.3834	3.9166	.00	4.00
	Bee Farmer	75	3.9467	.27964	.03229	3.8823	4.0110	2.00	4.00
	Total	213	3.8122	.60066	.04116	3.7311	3.8933	.00	4.00
itemc16	Teacher	98	3.6939	.69472	.07018	3.5546	3.8332	.00	4.00
	Extension agent	40	3.7000	.82275	.13009	3.4369	3.9631	.00	4.00
	Bee Farmer	75	3.9600	.34641	.04000	3.8803	4.0397	1.00	4.00
	Total	213	3.7887	.63503	.04351	3.7030	3.8745	.00	4.00
itemc17	Teacher	98	3.4694	.93284	.09423	3.2824	3.6564	.00	4.00
	Extension agent	40	3.6250	.89693	.14182	3.3381	3.9119	.00	4.00
	Bee Farmer	75	4.0000	.00000	.00000	4.0000	4.0000	4.00	4.00
	Total	213	3.6854	.77680	.05323	3.5805	3.7904	.00	4.00
itemc18	Teacher	98	3.4082	.93980	.09493	3.2197	3.5966	.00	4.00
	Extension agent	40	3.5750	.87376	.13815	3.2956	3.8544	.00	4.00
	Bee Farmer	75	3.9600	.19728	.02278	3.9146	4.0054	3.00	4.00

Total	213	3.6338	.78739	.05395	3.5275	3.7402	.00	4.00
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ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
itemc1	Between Groups	.485	2	.242	1.066	.346
	Within Groups	47.722	210	.227		
	Total	48.207	212			
itemc2	Between Groups	3.421	2	1.710	2.482	.212
	Within Groups	143.209	210	.689		
	Total	146.629	212			
itemc3	Between Groups	.236	2	.118	.324	.723
	Within Groups	76.562	210	.365		
	Total	76.798	212			
itemc4	Between Groups	.133	2	.066	.192	.825
	Within Groups	72.496	210	.345		
	Total	72.629	212			
itemc5	Between Groups	.079	2	.039	.118	.889
	Within Groups	70.241	210	.334		
	Total	70.319	212			
itemc6	Between Groups	.661	2	.330	.836	.435
	Within Groups	83.001	210	.395		
	Total	83.662	212			
itemc7	Between Groups	4.976	2	2.488	2.920	.070
	Within Groups	179.794	210	.852		
	Total	184.770	212			
itemc8	Between Groups	2.251	2	1.125	1.398	.535
	Within Groups	169.242	210	.805		
	Total	171.493	212			
itemc9	Between Groups	1.729	2	.864	2.296	.103
	Within Groups	79.041	210	.376		
	Total	80.770	212			
itemc10	Between Groups	.975	2	.488	.736	.480
	Within Groups	139.147	210	.663		
	Total	140.122	212			
itemc11	Between Groups	3.768	2	1.884	1.985	.319
	Within Groups	198.495	210	.949		
	Total	203.263	212			
itemc12	Between Groups	3.505	2	1.752	2.925	.077
	Within Groups	125.744	210	.599		

	Total	129.249	212			
itemc13	Between Groups	2.834	2	1.417	2.374	.100
	Within Groups	125.387	210	.597		
	Total	128.221	212			
itemc14	Between Groups	2.618	2	1.309	2.642	.074
	Within Groups	104.012	210	.495		
	Total	106.629	212			
itemc15	Between Groups	2.540	2	1.270	1.541	.629
	Within Groups	173.948	210	.824		
	Total	176.488	212			
itemc16	Between Groups	3.397	2	1.698	1.959	.204
	Within Groups	182.096	210	.867		
	Total	185.493	212			
itemc17	Between Groups	12.142	2	6.071	11.011	.000
	Within Groups	115.783	210	.551		
	Total	127.925	212			
itemc18	Between Groups	13.108	2	6.554	11.632	.000
	Within Groups	118.328	210	.563		
	Total	131.437	212			

T-Test for Hypothesis Four

Group Statistics					
	Profession	N	Mean	Std. Deviation	Std. Error Mean
itemd1	Teacher	98	2.8673	1.16334	.11751
	Extension agent	40	2.9500	1.15359	.18240
itemd2	Teacher	98	3.9796	.14212	.01436
	Extension agent	40	3.7250	.81610	.12904
itemd3	Teacher	98	3.7245	.44907	.04536
	Extension agent	40	3.5000	.87706	.13868
itemd4	Teacher	98	3.9796	.14212	.01436
	Extension agent	40	3.5250	.87669	.13862
itemd5	Teacher	98	3.9694	.17315	.01749
	Extension agent	40	3.5500	.84580	.13373
itemd6	Teacher	98	3.5408	.59497	.06010
	Extension agent	40	3.2250	.91952	.14539
itemd7	Teacher	98	3.3776	.69631	.07034
	Extension agent	40	2.9250	.99711	.15766
itemd8	Teacher	98	3.3878	.66786	.06746
	Extension agent	40	2.9250	1.09515	.17316
itemd9	Teacher	98	2.8878	.83583	.08443
	Extension agent	40	2.9500	1.08486	.17153
itemd10	Teacher	98	2.6327	1.12505	.11365
	Extension agent	40	2.9000	1.05733	.16718
itemd11	Teacher	98	2.7245	.92815	.09376
	Extension agent	40	2.5250	.93336	.14758

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
itemd1	Equal variances assumed	1.656	.200	-.380	136	.705	-.08265	.21775	-.51327	.34796
	Equal variances not assumed			-.381	73.037	.704	-.08265	.21698	-.51508	.34978
itemd2	Equal variances assumed	37.093	.000	1.94	136	.063	.25459	.08503	.08643	.42275
	Equal variances not assumed			1.961	39.969	.057	.25459	.12983	-.00782	.51700
itemd3	Equal variances assumed	14.257	.000	1.902	136	.059	.22449	.11327	.00050	.44848
	Equal variances not assumed			1.539	47.574	.131	.22449	.14591	-.06894	.51792
itemd4	Equal variances assumed	91.107	.000	1.050	136	.610	.45459	.09092	.27479	.63439
	Equal variances not assumed			3.262	39.839	.002	.45459	.13936	.17290	.73628
itemd5	Equal variances assumed	73.931	.000	1.696	136	.211	.41939	.08930	.24279	.59599
	Equal variances not assumed			3.110	40.341	.003	.41939	.13487	.14687	.69190
itemd6	Equal variances assumed	4.846	.029	2.393	136	.018	.31582	.13200	.05478	.57685
	Equal variances not assumed			2.007	52.847	.050	.31582	.15732	.00025	.63138
itemd7	Equal variances assumed	1.403	.238	3.037	136	.003	.45255	.14903	.15783	.74727
	Equal variances not assumed			2.621	55.192	.011	.45255	.17264	.10661	.79849
itemd8	Equal variances assumed	9.852	.002	1.031	136	.603	.46276	.15267	.16085	.76466

	Equal variances not assumed			2.490	51.264	.016	.46276	.18584	.08972	.83579
itemd9	Equal variances assumed	2.293	.132	-.363	136	.717	-.06224	.17153	-.40146	.27697
	Equal variances not assumed			-.326	58.800	.746	-.06224	.19119	-.44483	.32034
itemd10	Equal variances assumed	1.222	.271	1.288	136	.200	-.26735	.20753	-.67774	.14305
	Equal variances not assumed			1.323	76.781	.190	-.26735	.20215	-.66990	.13520
itemd11	Equal variances assumed	.079	.779	1.144	136	.255	.19949	.17443	-.14545	.54443
	Equal variances not assumed			1.141	72.112	.258	.19949	.17484	-.14904	.54802

T-Test for Hypothesis Five

Group Statistics

	Profession	N	Mean	Std. Deviation	Std. Error Mean
iteme1	Teacher	98	3.6939	.61608	.06223
	Extension agent	40	3.7750	.69752	.11029
iteme2	Teacher	98	3.8776	.48195	.04868
	Extension agent	40	3.7750	.69752	.11029
iteme3	Teacher	98	3.7143	.62590	.06323
	Extension agent	40	3.6000	.84124	.13301
iteme4	Teacher	98	3.7347	.56625	.05720
	Extension agent	40	3.5750	.78078	.12345
iteme5	Teacher	98	3.5204	.61308	.06193
	Extension agent	40	3.3500	.94868	.15000
iteme6	Teacher	98	3.5408	.62867	.06351
	Extension agent	40	3.3750	.89693	.14182
iteme7	Teacher	98	3.2347	.88284	.08918
	Extension agent	40	3.3750	.95239	.15059
iteme8	Teacher	98	3.2857	.78648	.07945
	Extension agent	40	3.3500	.97534	.15421

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
iteme1 Equal variances assumed	.707	.402	-.675	136	.501	-.08112	.12017	-.31877	.15653	
Equal variances not assumed			-.641	65.135	.524	-.08112	.12663	-.33402	.17178	
iteme2 Equal variances assumed	3.214	.075	.989	136	.324	.10255	.10365	-.10243	.30753	
Equal variances not assumed			.851	54.842	.399	.10255	.12056	-.13906	.34417	
iteme3 Equal variances assumed	2.974	.087	.877	136	.382	.11429	.13031	-.14341	.37198	
Equal variances not assumed			.776	57.436	.441	.11429	.14727	-.18058	.40915	
iteme4 Equal variances assumed	4.251	.041	1.340	136	.183	.15969	.11919	-.07600	.39539	
Equal variances not assumed			1.174	56.496	.245	.15969	.13606	-.11281	.43220	
iteme5 Equal variances assumed	5.660	.019	1.252	136	.213	.17041	.13610	-.09874	.43956	
Equal variances not assumed			1.050	52.812	.298	.17041	.16228	-.15511	.49593	
iteme6 Equal variances assumed	3.977	.048	1.234	136	.219	.16582	.13433	-.09983	.43147	
Equal variances not assumed			1.067	55.314	.291	.16582	.15539	-.14555	.47718	
iteme7 Equal variances assumed	.254	.615	-.828	136	.409	-.14031	.16949	-.47548	.19487	
Equal variances not assumed			-.802	67.800	.426	-.14031	.17501	-.48956	.20894	
iteme8 Equal variances assumed	1.263	.263	-.405	136	.686	-.06429	.15854	-.37781	.24924	

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
iteme1 Equal variances assumed	.707	.402	-.675	136	.501	-.08112	.12017	-.31877	.15653	
			Equal variances not assumed	-.641	65.135	.524	-.08112	.12663	-.33402	.17178
iteme2 Equal variances assumed	3.214	.075	.989	136	.324	.10255	.10365	-.10243	.30753	
			Equal variances not assumed	.851	54.842	.399	.10255	.12056	-.13906	.34417
iteme3 Equal variances assumed	2.974	.087	.877	136	.382	.11429	.13031	-.14341	.37198	
			Equal variances not assumed	.776	57.436	.441	.11429	.14727	-.18058	.40915
iteme4 Equal variances assumed	4.251	.041	1.340	136	.183	.15969	.11919	-.07600	.39539	
			Equal variances not assumed	1.174	56.496	.245	.15969	.13606	-.11281	.43220
iteme5 Equal variances assumed	5.660	.019	1.252	136	.213	.17041	.13610	-.09874	.43956	
			Equal variances not assumed	1.050	52.812	.298	.17041	.16228	-.15511	.49593
iteme6 Equal variances assumed	3.977	.048	1.234	136	.219	.16582	.13433	-.09983	.43147	
			Equal variances not assumed	1.067	55.314	.291	.16582	.15539	-.14555	.47718
iteme7 Equal variances assumed	.254	.615	-.828	136	.409	-.14031	.16949	-.47548	.19487	
			Equal variances not assumed	-.802	67.800	.426	-.14031	.17501	-.48956	.20894
iteme8 Equal variances assumed	1.263	.263	-.405	136	.686	-.06429	.15854	-.37781	.24924	
			Equal variances not assumed	-.371	60.729	.712	-.06429	.17348	-.41120	.28263

APPENDIX L

EVIDENCE OF VALIDATION OF THE PACKAGED PROGRAMME