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MASTER OF SCIENCE IN COMMUNITY ECONOMIC DEVELOPMENT

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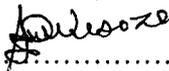
**VIABILITY OF BEEKEEPING PROJECT AS A MEANS OF INCOME
GENERATION AND ENVIRONMENT CONSERVATION AT MATIPWILI
VILLAGE, BAGAMOYO DISTRICT**

**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
REQUIREMENTS FOR THE MASTER OF SCIENCE IN COMMUNITY
ECONOMIC DEVELOPMENT IN THE SOUTHERN NEW HAMPSHIRE
UNIVERSITY AT THE OPEN UNIVERSITY OF TANZANIA**

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SUPERVISOR'S CERTIFICATION

I, the undersigned, certify that I have read this project report titled, "viability of beekeeping as a means of income generation and environment conservation in Matipwili village, Bagamoyo District", and accept it as a partial fulfillment of the requirements for the Master of Science Degree in Community Economic Development of Southern New Hampshire University of the United States of America and the Open University of Tanzania.



.....
Dr. James L.A. Kisoza

Date *12th October, 2007*
.....

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DECLARATION

I Mariki Belington E. hereby declare that this Project is the result of my own work and has not been presented for the similar award in any other University or Institute of higher learning.

Signature: *Mariki*

Date: *12th October 2007*

DEDICATION

This work is dedicated to my parents Mr. and Mrs. Nikanory Jackson Lengaki Mariki and family.

GLOSSARY

“**Apiary**” is a bee farm which contains several honeybee colonies kept in hives.

“**Bee forage or Bee fodder**” refer to nectar-producing plants which are also called “*Melliferous plants*” that is plants from which bees collect nectar and or pollen.

“**Beekeeping**” is referred to an art and science of keeping honeybees (sometimes referred to as Apiculture and or Meliponiculture).

“**Beekeeping equipment**” includes hives; hive tool; bee protectives; beesmoker; honey and beeswax strainers, honey extractors; honey and beeswax storage facilities; other honey and beeswax processing and grading equipments.

“**Beekeeping Product**” includes honey, beeswax, pollen, propolis, royal jelly, brood, live bees and pollination services.

“**Colony**” is the society of honeybees composed of one queen, thousands of worker bees and a few tens or hundreds of drones capable of reproducing itself as a biological unit.

ABSTRACT

A research project was carried out in Matipwili village area in Bagamoyo District, Coast Region to assess the viability and implementation of beekeeping as a means of income generation and environment conservation. The project comprises of community needs assessment supplemented by socio-economic study and a project implementation. Data were collected using interviews, questionnaires, observation, and documentary search. The socio-economic study established that beekeeping project is viable and there was a need for capacity building to MEDEC a CBO engaged in beekeeping for income generation and environment conservation. The implementation of the beekeeping project aimed at training MEDEC members and sensitizing community on beekeeping, adopting beekeeping techniques using *Longstroth* hives and planting *Melliferous* trees for bee foraging. The project objectives attained includes planting 420 *Melliferous* trees, keeping 10 *Longstroth* hives, training of all MEDEC members; sensitizing and mobilizing community members for beekeeping and environment conservation. It was recommended further studies on the role of beekeeping in generating income for rural communities.

EXECUTIVE SUMMARY

This paper consists of six chapters: Community Needs Assessment; Problem Identification; Literature Review; Implementation; Monitoring, Evaluation and Sustainability; Conclusion and recommendation.

Community Needs assessment (CNA) revealed that unemployment is a major problem in the village and people are in need of income generating projects. People had no income generating projects and as a result they tend to destruct environment by cutting down trees for charcoal burning which is a threat to environment. It was also revealed that beekeeping was considered as an alternative project in the village prior this study. Sanctuary Tanzania Limited -- an investor in the village, was planning to support the villagers on beekeeping project. The village had plenty of bee colonies in the area that were yet to be taped for income generation. Some villagers use to harvest honey from the village forest and bushes traditionally using destructive methods involving burning grasses in the hives. Through this practice the villagers were able to scavenge honey from wild bees, but at the same time killing almost the whole bee colony in a hive. This was an indication that bees were going to disappear in the near future otherwise a sustainable solution was to be initiated. The research was then conducted looking on the viability of beekeeping project in the area for income generation. Findings proved that this project was viable and was therefore recommended.

Matipwili Environmental and Development Club (MEDEC), a Community Based Organization (CBO) in the village started the implementation process of the project in December 2005 aiming at creating self-employment among members and other interested villagers. The project also aimed at conserving environment since it involved planting *Melliferous* trees for bees' forage. Matipwili villagers were the targets for this project via MEDEC.

The Community Economic Development goal under this project was to encourage beekeeping activities in the village that will act as a useful source of supplementary income to individual villagers and the community at large to cater for social and economic needs. The project objectives were: i) to train all 20 MEDEC members on beekeeping and the use of *Longstroth* hives by the end of the year 2006, ii) to keep twenty (20) *Longstroth* hives by the end of the year 2006 and iii) to plant four hundred (400) *Melliferous* trees alongside Wami river (at the village area), at the village center, and around the apiary till the end of the year 2006.

Capacity building was conducted to all members to the extent that they were all competent to participate in each stage of the project. The project managed to keep 10 fully operating *Longstroth* hives out of which eight were about to be harvested when evaluation was undertaken.

Conclusion for this project is that, the project was successful in achieving its objectives and it will sustainably prosper other factors being constant. The project covered only the introduction of the project to village, apiary preparation, catching

bees, and hive management but not honey production and selling. It also covered planting of *Melliferous* trees in which it's output were not yet seen. Therefore, the author recommend for other researchers attempting or wishing to attempt similar project to base on role of bee-keeping in providing income to the people.

ACKNOWLEDGEMENT

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Special thanks should also go to my course instructors Mr. Michel Adjibodou and Mr. Felician Mutasa for their roles played in the class and my fieldwork to ensure I am equipped with the necessary skills and knowledge for research and project.

Lastly but not least, I would like to thank my lovely parents Mr. and Mrs. Nikanory Jackson Lengaki Mariki and family together with the entire family of Uncle Danford J. Mariki for their enormous support during this study.

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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|--------------------------|---|
| CED | Community Economic Development |
| GDP | Gross Domestic Product |
| HCA | Honey Care Africa |
| IGA_(s) | Income Generation Activity (ies) |
| KTB | Kenya Top Bar Hive |
| LGA | Local Government Authority |
| MEDEC | Matipwili Environment and Development Club |
| NSGRP | National Strategy for Growth and Poverty Reduction |
| SANAPA | Saadani National Park |
| SPSS | Statistical Package for Social Scientist |
| STLtd | Sanctuary Tanzania Limited Company |
| UN | United Nations |
| UNDP | United Nations Development Program |
| USD | United States Dollar |
| VEO | Village Executive Officer |
| URT | United Republic of Tanzania |

CHAPTER ONE

1.0 COMMUNITY NEEDS ASSESSMENT

1.1 Background Information

The Sanctuary Tanzania Limited (STLtd) an Eco-tourism and Nature Conservation Company together with her friends in business is highly interested in supporting rural community development through environmental friendly projects. The company has since embarked in supporting a beekeeping project in Matipwili village, Bagamoyo District in Coast Region, Tanzania. This village was purposely selected for this research project because of the interests of the investors in the village who wanted the researcher to find out as to whether the community beekeeping project is viable in the area.

1.2 Community Profile

1.2.1 Geographical location and administrative framework

Matipwili village is located approximately at $38^{\circ}42'36''E$ and $6^{\circ}13'00''S$. In the south, Matipwili is bordered by the villages of Kidomole (Southeast) and Fukayosi (Southwest). In the east, the village shares a border with Makurunge Village while in the west, it shares a border with Kiwangwa Village and Mihuga Village (northwest). In the north, Matipwili shares a boundary with the Proposed Saadani National Park. The village has seven sub villages namely: Msikitini, Mkunguni, Mzambarauni, Tumbilini, Gongo, Biga and Kisauke.

1.2.2 Demographic data

According to national population census (URT, 2002), Bagamoyo District has a total population of 230,164 of which 114,699 are male and 115,465 are female. Out of these 55% are people aged between 19 to 45 years, 6.5% are elderly (above 60 years) and about 40% are children under 18 years. The District has a population growth rate of 2.4% (from 1988 to 2002). Matipwili village has a population of about 4,800. The population data shows that since 1988 the population in the village has doubled, whereby the village population rate is 2.9% (East Africa Ecosystem, 2005).

The overall district statistics shows that 74.7% of the labor force is engaged in agriculture, 15.3% as non-agriculture, 7.5% as employees, 2.2% as contributing family workers and 0.3% in the rest of the categories.

1.2.3 Social factors

According to the Village Executive Officer (VEO's) office, more than 75% of the Matipwili villagers are Muslims and the rest are Christians. Girls are getting married at a very early age (from 12 years old) soon after completion of primary school education and also the majority of males get married at below 20 years of age. VEO said that this affects village development since youths are engaging into family responsibilities too early.

1.2.4 Economic activities

It is the habit of the villagers to prepare their shambas/farms at the beginning of rain season. Main crops grown in the village are rice, maize, cassava and pineapples. The villagers practice subsistence agriculture production. Fishing along Wami River is

another main economic activity practiced by men. About three immigrant villagers are involved in extensive livestock keeping.

1.3 Community Needs Assessment (CNA)

Between September and November 2005, the researcher conducted community needs assessment. Observation, interviews and focus group discussion techniques with villagers were used. Observation revealed the presence of unemployment in the area especially self-employment among people. The researcher observed a big number of villagers-women and men loitering around the village center during daytime with nothing to do. However, during cultivation season most villagers spent their daytime in their farms. Also whenever there is a high demand for casual labor workers by the companies; STLtd and The Tanzania Railway Company in the village, most youths and some elders were observed struggling to get that opportunity in order to earn income. The casual labor works normally are for a short period of time, hence not reliable.

The researcher conducted interview and discussion so as to come up with problem ranking in the community. The problem ranking involved 35 villagers, 20 MEDEC members, and 15 village government members. Several problems were mentioned but unemployment was ranked higher than other problems. Table 1 shows a summary on the problems' scores as obtained from the field.

Table 1: Villagers' Problem Ranking

| Respondents | Malaria | Unemployment (self-employment) | Poor infrastructure | Lack of education | of Total | Total (%) |
|----------------------------------|----------------|---|--------------------------------|------------------------------|-----------------|----------------------|
| MEDEC members | 2 | 13 | 3 | 2 | 20 | 28.6 |
| Village government members | 0 | 10 | 2 | 3 | 15 | 21.4 |
| Other villagers | 2 | 26 | 6 | 1 | 35 | 50 |
| Total | 4 | 49 | 11 | 6 | 70 | - |
| Total (%) | 5.7 | 70 | 15.7 | 8.6 | - | 100 |

Basing on the votes of majority as in Table 1, the researcher revealed that self employment is a major problem that needs intervention since it was ranked high followed by poor infrastructure that was ranked second.

Villagers were of opinion that an environment friendly project could be implemented in the area so as to create self employment to the villagers that will prevent them from destructing environment owing to lack of an alternative income generating activity. Villagers suggested that since they have already heard of beekeeping project that is supported by an investor in the village (STLtd), it is on their advantage to sustaining the project. The villagers observed that the project was good in conserving environment, generating income to the people and at the same time acting as an alternative environmental friend income generation activity. However, the viability of bee keeping project in the village was yet to be established.

The results from the problem ranking exercise necessitated CNA to find out whether the implementation of a bee-keeping project by MEDEC in the area was viable and worthy income-generating project to the villagers that could lead to self-employment. Bee-keeping project is believed to be effective than other Income Generating Activities (IGAs) in rural areas because it consumes less time of the farmer and doesn't need him or her to spend the whole daytime looking after bees. It therefore doesn't interfere with day-to-day activities of the beekeeper/villager.

1.3.1 Study objectives

The general research objective the study was to assess the viability of beekeeping project as a means of income generation activity and environment sustainability in Matipwili village.

1.3.2 Specific objectives

- i. To establish the socio-economic characteristics of respondents in the study area.
- ii. To determine community members attitudes, skills and knowledge towards beekeeping in the study area.
- iii. To determine the market, sources of information and extension services on beekeeping available in the study area.
- iv. To examine the community members attitude and knowledge of STLtd and MEDEC activities.
- v. To assess the factors affecting adoption and viability of beekeeping project in the area as a means of income generation activities.

1.3.3 Study questions

- i. Is the lack of beekeeping equipments and exposure to new technology related to poor harvesting methods in the study area?
- ii. Does lack of beekeeping knowledge and expertise contributes to poor adoption of beekeeping technology in the study area?
- iii. Is beekeeping an effective Income Generation Activity (IGA) and a viable project in the area?

1.3.4 Significant of the study

This study will provide answers as to whether beekeeping is viable in the study area and could be used for income generation and environment conservation. It will also act as a baseline data for beekeeping project if recommended. Furthermore the study will be useful to different community stakeholders for different community development projects especially the projects recommended by this study. Lastly this study is a good source of literature for the researchers and academicians who will develop interest on similar study.

1.3.5 Study methodology

This section describes the research design and explains the sampling techniques and methods employed in data collection, processing and analysis during community needs assessment.

1.3.5.1 Research design

The general notion of research design refers to a plan of action, stating the activities which the researcher proposes to undertake. In a narrow sense of the word it refers to a written account of choices that the investigator makes in collecting, processing and analyzing the required data. Rwegoshora (2006) defines research design as a conceptual structure within which research is conducted. Kothari (2004) add that, research design constitutes the blueprint for the collection, measurement and analysis of data.

This study was about beekeeping and environmental conservation for income generation to the rural poor. It aimed at assessing the viability of beekeeping as a means of income generation and environmental conservation in Matipwili village, Bagamoyo District. MEDEC a CBO in the village dealing with environmental conservation and beekeeping was the host organization for this study that was involved in data collection process. Data was obtained from the villagers, honey harvesters, MEDEC members and key informants like village leaders, investors in the village and government officials working in the study area. A total sample size of 40 respondents was employed. To ensure reliability of data this study was designed to use questionnaire surveys, interviews, and documentary search methods to gather primary and secondary data. These methods were designed to gather information from villagers regarding their perception towards viability of beekeeping project in the study area. The questionnaires were pre-tested to 10 villagers in Kiwangwa village, a village that borders the study village to the east and there after employed in the study area. Both random and purposive sampling was used to get respondents.

Most information was gathered from villagers through self-administered questionnaire as well as face-to-face interview. Data collected were then analyzed using Statistical Package for Social Scientists (SPSS). Other qualitative data were analyzed through logic and consistency basing on the actual picture obtained from the field and secondary data obtained. The report was prepared according to CED Programme guideline as per the Southern New Hampshire University standards.

1.3.5.2 Target Population

The target population for this study included all MEDEC members and the community members in which the CBO operates. Other people were the village and MEDEC leaders that were key informants.

1.3.6 Sample Size

The sample composed of forty (40) respondents from three sub-villages in the study area. Table 2 shows the distribution of a sample of respondents interviewed during needs assessment.

Table 2: Distribution of Sample Population

| Respondents' Category | Respondents' Title | Number of respondents |
|------------------------------|---------------------------|------------------------------|
| Village leaders | Chairman | 1 |
| | VEO | 1 |
| MEDEC leaders | Chairmen | 2 |
| | Secretary | 1 |
| Villagers | Honey harvesters | 5 |
| | Ordinary villagers | 30 |
| Total | | 40 |

1.3.7 Sampling Techniques

Sampling is a process of choosing a group that is small enough to be a true representation of the entire population. The study used both random and purposive sampling basing on the different characteristics of the respondents.

The village is composed of seven sub villages namely Msikitini, Mkunguni, and Mzambarauni, Biga, Gongo, Kisauke and Tumbilini. The names of the sub villages were written each on separate pieces of paper and a rotary method was adopted in selecting sub-villages for the study. Three pieces were picked at random to represent the entire population and they happened to be Msikitini, Mkunguni and Mzambarauni subvillage names.

As indicated in Table 2 the five (5) leaders from the village and MEDEC were chosen purposively due to their positions in the community while the five (5) honey harvesters were chosen due to their knowledge and experience on the research problem.

Random sampling was conducted to other thirty (30) villagers in whom ten (10) respondents were picked at random from each sub-village with maximum consideration of gender and age of respondents. A sex ratio of 1:1 was applied to avoid gender bias and a mixture of different age levels was attentively considered so as to get unbiased information.

1.3.8 Data Collection Method

Both primary and secondary data were collected during this study. Questionnaires, interviews, observation and documentary search methods were used to collect data.

1.3.8.1 Primary data collection

Primary data were collected from Matipwili villagers. They were gathered from honey harvesters, the village government members and other villagers so as to get the broad understanding of the problem. The following instruments were used:

1.3.8.1.1 Questionnaire survey

The survey applied structured questionnaires administered to both honey harvesters and other villagers. This was done due to different characteristics among the respondents. Most of the questionnaires were filled in by respondents themselves except for the few respondents who were unable to read and write in which the researcher had to assist them through personal interview to avoid missing some information. Appendix 3 and 4 shows the questionnaires employed in the study.

1.3.8.1.2 Observations

Observation technique was used to access the physical environment of the area regarding beekeeping. Such physical environment included; the forest in which bees are living in, natural bee hives in the forest and the honey harvested sites. This gave room for the researcher to compare the information provided by respondents with the actual situation observed.

1.3.8.1.3 Interviews

Interviews were conducted to MEDEC and village leaders aimed at gathering information regarding the plans by the village and MEDEC towards beekeeping project in the area. Also this was done regardless of questionnaires given to these leaders so as to obtain more information since leaders are key informants.

1.3.8.2 Secondary data

Secondary data was obtained from MEDEC meeting minutes, village meetings minutes and village annual plans. The copies of other studies carried out in the village in the past were also good source of information. The documentary search gave information on the community profile, other on-going social projects in the area and beekeeping plans for the area.

1.3.9 Data Analysis and Presentation

Data collected were analyzed using SPSS 10.0 for windows and Microsoft excel chart wizard while qualitative data were analyzed descriptively. Microsoft Excel and SPSS were used for accuracy and effective data analysis.

1.3.10 Study Findings

1.3.10.1 Demographic and socio-economic characteristics of Respondents

The survey involved forty (40) respondents that were all above twenty (20) years of age. It composed of 60% men and 40% women. The sample was gender unbalanced because the honey harvesters and village leaders who were purposeful chosen were

only men and there were no women of that category in the village. Table 3 presents the age-sex characteristics of respondents.

Table 3: Age distribution of respondents by sex

| Age categories of respondents (Years) | Sex of respondents (%) | | Total |
|---------------------------------------|------------------------|------------------|-------------------|
| | Male | Female | |
| 20-29 | 4 (10.0) | 2 (5.0) | 6 (15.0) |
| 30-39 | 6 (15.0) | 4 (10.0) | 10 (25.0) |
| 40-49 | 5 (12.5) | 5 (12.5) | 10 (25.0) |
| 50-59 | 5 (12.5) | 2 (5.0) | 7 (17.5) |
| 60 and above | 4 (10.0) | 3 (7.5) | 7 (17.5) |
| Total | 24 (60.0) | 16 (40.0) | 40 (100.0) |

Of the total respondents the age group between 20 – 29 years were 15% of the sample. Respondents aged between 30 - 39 and 40 - 49 years of age were 25% each and between 50 – 59 and 60 and above were 17.5% each as displayed in table 3. Of the total, 12.5% of respondents were honey harvesters and other 12.5% were MEDEC and village leaders and the rest comprised 75% of respondents who were the other villagers. Table 4 shows the categories of respondents.

Table 4 : Respondents' categories

| Respondents' Categories | Respondents' Title | Number of respondents | Total (%) |
|-------------------------|--------------------|-----------------------|--------------|
| Village leaders | Chairman | 1 | 12.5 |
| | VEO | 1 | |
| MEDEC leaders | Chairmen | 2 | 12.5 |
| | Secretary | 1 | |
| | Honey harvesters | 5 | |
| Villagers | Ordinary villagers | 30 | 75.0 |
| | Total | 40 | 100.0 |

Table 5 shows the occupation profile of the respondents showing their respective formal and informal occupations.

Table 5: Distribution of respondents' occupation

| Respondent's Occupation | | Percent of respondents | Total (%) |
|-------------------------|--------------------------|------------------------|------------|
| Informal | Small scale agriculture | 32.5 | 85 |
| | Agriculture and fishing | 15.0 | |
| | Agriculture and business | 32.5 | |
| | Charcoal and business | 5.0 | |
| Formal | | 15 | 15 |
| Total | | 100 | 100 |

Table 5 shows that very few respondents (15%) were engaged in formal employment in the study area where as the majority of respondents (85%) rely on informal employment and mostly on account of agriculture and petty business. About one third of respondents (32.5%) practice small-scale agriculture while similar number of respondents (32.5%) practices agriculture in combination with petty business. Fifteen percent of respondents practice fishing and 5% depend on charcoal burning in combination with petty businesses. Petty businesses undertaken in the area were mentioned to be weaving, carpentry, masonry, and small retail shops. These results is implies that the community in the study area highly depending in small scale agriculture except for 5% who depends on charcoal burning and other petty business.

1.3.10.2 Lack of beekeeping equipments and new technology

The study revealed that lack of beekeeping equipments is related to poor harvesting methods in the study area. Table 6 illustrates the existence of beekeeping equipment by honey harvesters.

Table 6: Responses distribution on owning of beekeeping equipments

| Description | Percent of respondents | Respondents using burning (%) | Reasons for burning | |
|--------------------------------|------------------------|-------------------------------|---------------------|----------------|
| | | | Protection (%) | Technology (%) |
| Respondents without equipments | 100 | 100 | 20 | 80 |
| Respondents with equipments | - | - | - | - |

Table 6 shows that 100% of the honey harvesters do not have beekeeping equipments for harvesting instead they use burning method. Honey harvesters do not have such equipments like smoker, bee suit, hive tool, gloves and boots instead local method of harvesting honey by burning grasses at the hives' bee entrance is used. 20% of the honey harvesters said they use burning method to protect themselves from being stung by the bees while 80% said they use burning both because of protection from bee stings and it is the only available and known technology in the area. However harvesters still get stung because they don't have the protective gears and this cause death to many bees as a result of loss of their bee stings. Bees die within half an hour after stinging so allowing bees to sting means killing bees. Burning technology allows smoke to get in the hives and disrupt communication between bees. By this effect it means bees cannot receive attack commands from the queen because of the communication barrier of the smoke.

These results are the implication that lack of beekeeping equipments is related to poor harvesting methods (for this case burning method) that cause burning of lots of bees to death in the hive and also affects the quality of honey.

1.3.10.3 The beekeeping knowledge in the study village

Results in Table 7 shows that a majority of respondents (88.6%) had no knowledge on beekeeping where as only about 11.4% of the respondents had beekeeping knowledge.

Table 7: Respondents' knowledge on beekeeping

| Category of respondents | Number of respondents | |
|-----------------------------|-----------------------|--------------|
| | Frequency | Percent |
| Have beekeeping Knowledge | 4 | 11.4 |
| No any beekeeping knowledge | 31 | 88.6 |
| Total | 35 | 100.0 |

However, the few respondents with beekeeping knowledge have just heard it from other people in other areas and observed their relatives practicing it in other villages but in actual sense they have never practiced it because they are not competent in the field. In the case of the total respondents, neither honey harvesters nor other villagers were familiar with the beekeeping technology. Villagers are eager to know how the new beekeeping technology works so as to try to engage themselves to the project for their development.

1.3.10.4 Beekeeping experts in the village

The study revealed that there is no beekeeping experts living in or working in Matipwili village for facilitating beekeeping in the area. 100% of both honey harvesters and other villagers responded that there are no such experts in the village. These results therefore are the implication that people do not keep bees in the village because they are lacking not only new beekeeping skills and knowledge but also general/local beekeeping knowledge. There are also no beekeeping experts working in the village for facilitation of beekeeping activities which implies that there is no one to direct the villagers towards utilizing the available bees' resources even though people are willing to conduct beekeeping.

1.3.10.5 Viability of beekeeping as a means of income generation

A study question was made to find out whether beekeeping is an effective Income Generation Activity' (IGA) and a viable project in the study area. The study revealed different information focusing on key aspects that were market and market price, cost of production, percentage number of people accepting beekeeping as a means of IGA, and availability of bees and bees' forage in the study area.

1.3.10.5.1 Market and Market Price

The results in table 8 show that all respondents (100%) agree that there is a reliable market for honey in the village.

Table 8: Responses distribution on availability of honey market in the study village

| Respondents' Responses | Frequency | Percent |
|-------------------------------|------------------|----------------|
| Strongly agree | 30 | 75.0 |
| Agree | 10 | 25.0 |
| Total | 40 | 100.0 |

Furthermore, results in Table 9 show that the market prices for raw honey in the area ranges from Tshs 1000 to 2000 per kilogram.

Table 9: Responses distribution on market prices for honey in the study village

| Prices/kg (Tshs) | Frequency | Percent |
|-------------------------|------------------|----------------|
| 1000 – 1500 | 17 | 42.5 |
| 1500 – 2000 | 23 | 57.5 |
| Total | 40 | 100.0 |

These results imply that beekeeping project is likely to sustainably generate income to villagers because of the guaranteed market and good prices. This is one of the indications for viability of beekeeping project in the study village.

1.3.10.5.2 Cost of Production

The results in table 10 show that beekeeping is a costly activity only in terms of the initial capital. It shows the minimum honey cost of production (per minimum of four hives).

Table 10: Responses distribution on minimum honey cost of production (Tshs)

| Narration | The cost | Total cost |
|--------------------------|-----------------|-------------------|
| Cost per 4 hives | 180,000 | 180,000 |
| 10% initial installment | 18,000 | 18,000 |
| Days required per month | 3 | 3 |
| Hours required per month | 2 | 2 |
| Bee kit | 150,000 | 150,000 |

Findings show that one hive costs Tshs 90,000/=. STLtd was prepared to offer the hives to villagers at half the price i.e Tshs 45,000/= that totaled to 180,000/= per four hives. However, a beekeeper had to pay only 10% cash of the price offered (i.e. 4,500/= per hive) for a minimum of four hives as a starting point which totaled to 18,000. STLtd allows a minimum of four hives per person to ensure economic viability of the project. After the ten percent deposit then the beekeeper had to be deducted 25% of his/her total sale each harvest for loan repayment. Findings from MEDEC documents show that STLtd pledged to offer protective gears (i.e. bee suit, rain boots, and gloves) free of charge to beekeepers. This make the initial payment by a beekeeper to be Tshs 18,000 per four hives purchased.

The study also reveals that the beekeeping consumes less time than other many projects because bees themselves do almost all the whole work of honey production. A beekeeper has to only inspect the hives every after fortnight in which it will take him or her about ten (10) minutes only at a time to inspect a hive. This means a beekeeper will utilize a maximum of two hours for average of three days in a month for beekeeping when operating a minimum number of four hives. Appendix 5 shows the project budget in totality.

1.3.10.5.3 Beekeeping as a means of income generation activity (IGA)

Most respondents said that beekeeping is economically important and that if introduced in the village it is a potentially good source of income.

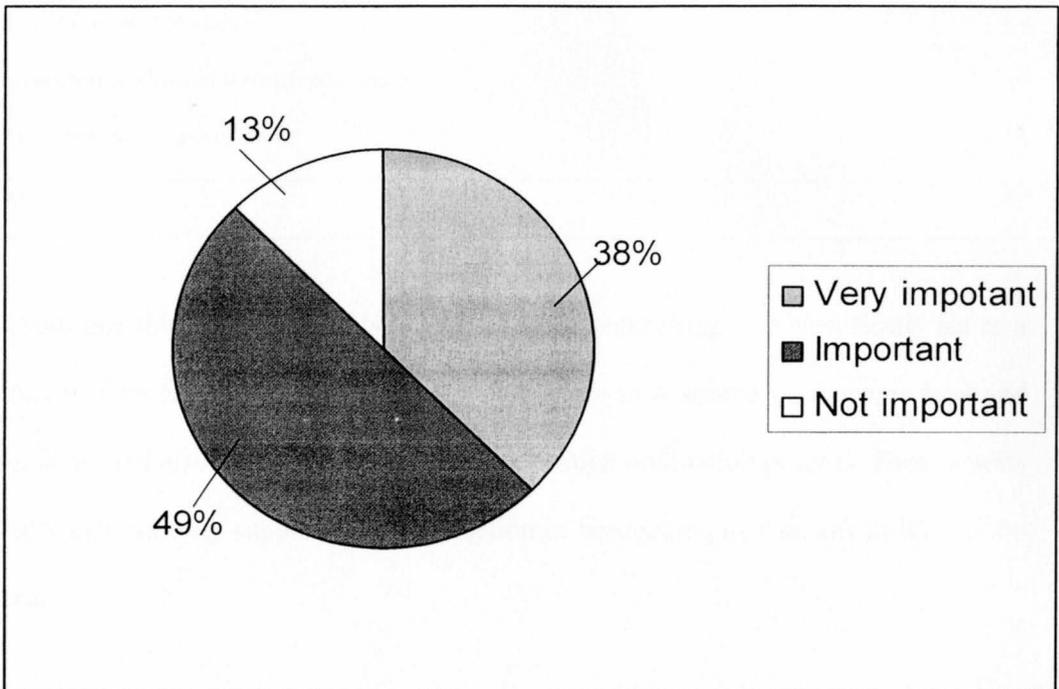


Figure 1: Respondents' views on the importance of introducing beekeeping in the study village

Results in Figure 1 shows that only 13% of the respondents thinks that beekeeping is not important to be introduced in the village and the rest 87% supports the importance of beekeeping in the area though in different ranking.

Results in Table 11 shows that 87% of respondents think that beekeeping should be introduced in the village because of number of reasons.

Table 11: Responses distribution on advantages of introducing beekeeping in the study village

| Advantages of beekeeping | Percent |
|--|----------------|
| Source of Income | 32 |
| Source of food and medicine | 7.5 |
| Increase crop production through pollination | 5.0 |
| All the mentioned reasons above | 42.5 |
| Total | 87 |

About one third of respondents (32%) said that beekeeping will specifically act as a source of income while 42.5% said it would act as a source of income, food and medicine and also increase crop production through pollination process. These results imply that majority supports the introduction of beekeeping as a means of IGA in the area.

Results as in Table 12 shows that 7.5% of the respondents said that beekeeping should not be introduced in the village because bees are dangerous to human being while 5% argued that beekeeping involves too much time to earn cash or realize profit (that means, pay back period is too long).

Table 12: Responses distribution on disadvantages of introducing beekeeping in the study village

| Reasons | Frequency | Percent |
|------------------------------|------------------|----------------|
| Bees are dangerous to people | 3 | 7.5 |
| Long payback period | 2 | 5.0 |
| Total | 5 | 12.5 |

The climate of Matipwili village allows for a maximum harvest of honey twice a year. This is because there are two rain seasons, during which there is high abundance bees' forage. This implies that one can harvest up to 80 kilograms a year at a rate of 10 kilograms per hive. With the prevailing minimum market price of Tshs. 1,000 per kilogram of honey, pay back period is estimated to be two to four years other factors being constant (MEDEC 2004).

1.3.10.5.4 Local knowledge on availability of bees and bees' forage in the study village

Table13 shows local knowledge on bee availability in the village. Respondents described bees' availability in the area as plenty all over the area. It is a normal thing to see resting swarms of bees on trees and moving swarms crossing from one place to the other in the village especially during rain seasons when bee hives in the forest get wetted by rain water.

Table 13: Responses distribution of honey harvesters on bee availability in the study village

| Bee availability | Frequency | Percent |
|-------------------------------|------------------|----------------|
| Bees are plenty | 37 | 93 |
| Bees are available on average | 3 | 7 |
| Bees are rarely available | 0 | 0 |
| No bees at all | 0 | 0 |
| Total | 40 | 100.0 |

The results in Table 13 shows that bees are available in the area since none of the respondents described bee availability as “rare” or “no bees at all” instead all claimed that bees are available in the area whereby 93% said bees are plenty in the area.

Figure 2 shows the respondents reasons with regards to viability of beekeeping in the area.

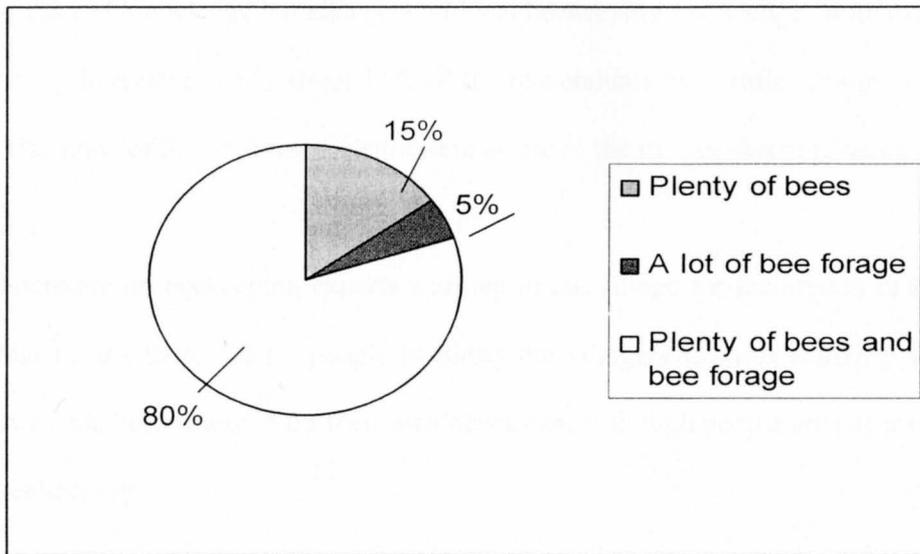


Figure 2: Respondents' reasons on viability of beekeeping project in the study village

The majority of respondents (80%) said that beekeeping is viable because there are plenty of bees and bees' forage (i.e. forest and crops) in the area.

1.3.10.6 Summary of the study findings

The main findings for this study summarizes as follows:

There are no any beekeeping equipments/protective gears (such as bee suit, gloves, boots and smoker) used by honey harvesters during harvesting for safe and proper harvesting. This being the case the only method employed is burning grass at the bees' hive entrance so as to protect the harvester from bees.

Since all the honey harvesters have no any idea of the new beekeeping technology, they employ traditional technology for harvesting that is harmful to bees and threaten resource sustainability.

People do not keep bees in the village because they lack not only new beekeeping skills and knowledge but also general/local beekeeping knowledge. With exception of honey harvesters, only about 11% of the respondents have little idea of beekeeping. Also none of the total respondents were aware of the new beekeeping technology.

There are no beekeeping experts working in the village for facilitation of this sector that means there are no people to direct the villagers towards utilizing the locally available bees resource for their own development though people are eager to practice beekeeping.

The project is viable and an IGA because there is a guaranteed market for any beekeeping product by STLtd in the village that is based on the prevailing market price at the time of sale. In addition a local shop in the village is another market for honey. In other words this means that there is already an existing market in the village putting aside other market opportunities that may arise outside the village.

Beekeeping involves less cost of production in terms of time and resources. It requires mostly the initial capital and there after it is bees themselves who makes honey while beekeepers has to only spend few days in a month in maintaining the hives. Beekeeping is therefore cost effective and a viable project in the study village.

Only 12.5% of the respondents think that beekeeping is not important in the area because bees are dangerous to human being and the payback period for the project is too long. However these respondents agreed that beekeeping is viable in the village. Other remaining 87.5% agrees that beekeeping is important because it is a source of income, food and medicine and also increases crop production through pollination process by bees.

The study showed that eight percent (80%) of the total respondents said that beekeeping is viable because there are plenty of bees and bees' forage (i.e. forest and crops) in the area.

1.3.10.7 Conclusions of the study

From the study findings it can be concluded that:

- i. Villagers (honey harvesters) kill bees when harvesting honey in the forest from the bees' natural hives due to poor beekeeping equipments and lack of new technology. The method applied in honey harvesting involves burning grass on the hives entrance that kills bees and threatens their sustainability.
- ii. Beekeeping is not practiced in the area because there are no experts to initiate and facilitate beekeeping projects. The villagers also lack beekeeping knowledge and expertise to implement such a project.
- iii. Beekeeping is a viable project and a potential means of income generation in the area. People are willing to practice it and the environment is conducive for the project. There is a guaranteed market by STLtd an eco-tourism investor in the village, cost of production is

almost negligible except for the initial cost of investment and bees are plenty in the area together with reasonable amount of bees' fodder for foraging.

1.3.10.8 Recommendations from the study

- i. There is a need for Capacity Building for MEDEC to implement beekeeping for environment protection and income generation in the study area. This will enable MEDEC to mobilize and create awareness among villagers adopt beekeeping as income generating activity as well as for protecting the environment.
- ii. The village government with the help of the Local Government Authority (LGA) for this case Bagamoyo District Council, have to ensure that beekeeping extension workers are available in the village.
- iii. Since agriculture is the main activity of the villagers, the government and other interested parties should provide training to the villagers on the importance of bees in the area. The villagers need to know the symbiotic relationship that exists between bees and plants. They should be well trained, mobilized and facilitated on conducting beekeeping and creating good environment for bees in the area for best performance.
- iv. Another research is needed to study on the type of bees that exists in the area, their productivity in relation to the type and amount of bee fodder available in the area and then a comparison should be made with other type of bees in other areas to measure efficiency. This will help beekeepers and other stakeholders on how to improve beekeeping in the area.

Out of four recommendations from the socio-economic study, recommendation number one that calls for capacity building of MEDEC on economical beekeeping activities had been selected for implementation in the study area.

CHAPTER TWO

2.0 PROBLEM IDENTIFICATION

2.1 Problem Statement

Matipwili village is located in the woodland area and crossed by Wami river, thus the available natural resource endowment renders the village ecological suitable for bee keeping activities. During CNA the study revealed high abundance of wild bee colonies in the village land. Villagers also reported on honey collection by some village members, which has a ready market in the village and other areas in Tanzania. But, these resource endowments were yet to be tapped for income generation in the area. MEDEC is a local CBO that has been formed in the village for the purpose of engaging in economic beekeeping activities and environmental conservation. By considering the available market in the village and else where in the country, it is everybody's expectation that MEDEC could take this advantage to engage in commercial beekeeping so as to achieve their group objective and hence their livelihood.

The practices for honey harvesting in the village involved burning grasses in the hives to smoke the bees, a practice which results into high bee mortalities and is not environmentally benign. This is not sustainable method because it leaves the hive with 'a dying colony' since most of the bees in the colony die due to burning and suffocation. This contravenes the National Beekeeping Policy objective which calls for improving conservation of the honeybees and their environment so that the nation can sustainably harness the symbiosis that exists between honeybees and plants.

With the ongoing poor and unsustainable method of honey harvesting and absence of beekeeping in the area, it is obvious that bees are likely to disappear in the near future. Community Needs Assessment recommended capacity building for implementation of a beekeeping project that could provide a solution for the problem -- community is lacking knowledge, technology and facilities to run a beekeeping project.

2.2 Target Community

The project was targeted for Matipwili village community in Bagamoyo District, Coastal Region. It is completely owned by village beekeepers' organization called Matipwili Environmental and Development Club (MEDEC) in the village area. The group members participated in all activities of the project initiation and implementation. They also contributed initial funds used for the establishment of the group bank account. Beekeeping is among the group development objectives, therefore all the members participated fully and willingly in the project.

2.3 Stakeholders

Other major players that had stake in this project were the Matipwili village government, Matipwili village community, and Sanctuary Tanzania Limited (STLtd) Company (an eco-tourism investor in the village). STLtd Company supported the project by providing bee-keeping training to members and assisted in seeking donors and interested people to support the project. The group initially had to pay only 10% cash of the hive price that were supplied by STLtd. The rest of the amount was to be paid on installment upon each sale of honey. Matipwili village community, and the village government have been involved in this project starting from needs assessment

and were always informed of the whole process of project implementation so as to create awareness on the ongoing activities. Table 14 presents a summary of stakeholders' analysis indicating their participation in the project, benefits/costs from the project and opinions regarding the project.

Table 14: Stakeholder Impact analysis

| Stakeholder | Benefits/costs from the project | Stakeholder,s participation in the project | Stakeholder's opinion on the project & its goals |
|------------------------------|--|---|---|
| Matipwili village government | -Acquired beekeeping and environment conservation knowledge | -Provided land free of charge for the project -Provided social support to the project. | It is a sustainable project but financial assistance is needed for the expansion of the project to the rest of the community members. |
| Community | -Acquired new skills on beekeeping. -Sensitized on environment conservation | Participated in all stages of the project via MEDEC | Financial assistance is needed to increase people's hive purchasing power. |
| Sanctuary (T) Ltd | -Achieved part of its community development objective. -Incurred cash and man hours costs for the project | Sold hives and provided training to MEDEC members. | -The project was participatory. -Villagers need to invest more on the project. |

2.4 Project Goal in CED Terms

The village community in general lacked beekeeping practices although some villagers use to harvest honey locally from wild bees in the forest. A method which is destructive to environment and unsustainable. Also other villagers have not yet realized the beekeeping potential that could be used for economic development. This project aimed at transforming this community from this situation by encouraging

beekeeping activities in the village that will act as a useful source of supplementary income to individual villagers and the community at large to cater for social and economic needs. The MEDEC members who are the owners of the project initiated this project. The planned goal was to be achieved through concerted efforts of the members themselves in participating in the implementation process. Monitoring indicators were set (see monitoring section) so as to verify whether this project is progressing towards achieving the goal or not.

2.5 Project Objectives

The objectives of the project were:

1. To train all twenty (20) MEDEC members on beekeeping and the use of *Longstroth* hives by the end of the year 2006.
2. To keep twenty (20) *Longstroth* hives by the end of the year 2006.
3. By the end of year 2006, to plant four hundred (400) *Melliferous* plants alongside Wami River (at the village area), at the village centre, and around the apiary sites.

2.6 Host Organization

Matipwili Environmental and Development Club (MEDEC), formally known as Kikwete Group, is the organization hosting the project. The then Kikwete group was initiated by the community members in 2003 and was registered with the Village Executive Officer (VEO) in the same year. Initially the group had 31 members but now has 20 members due to deaths and transfer of some other members. Membership was free to any villager who was willing and able to join and participate in the group activities. The members established this neighborhood group with the aim of

generating income through commercial charcoal making and sales of firewood. The group had no sponsors but rather gathered their efforts to work together on the activities that do not need money but own labor like the firewood business that they use to do.

In the year 2005 the group changed its name from Kikwete to MEDEC and switched its activities to beekeeping and environmental conservation activities aiming at not only income generation but also conserving the environment. The idea of environmental conservation rose from the members after observing that in a long run with their former activities they were going to destruct environment very badly. It was at this stage when STLtd Company (an eco-tourism investor in the village) developed an interest with this group since the company already had a plan of introducing beekeeping in the village as part of its contribution to Matipwili village development. The company pledged to buy *Longstroth* hives from Honey Care Africa a Kenyan company and offer them to the group and any other interested villager. One hive costs Tshs 90,000/= excluding transport costs from Kenya but STLtd was decided to sell them to the group without charging them transport charges. Due to financial constraints of the villagers, the company promised to offer the hives on credit but upon 10% deposit of the total cost of the hive (i.e. Tshs. 9,000 per hive). The agreement was that after this initial payment (i.e. the 10% deposit), the group will be repaying the loan balance on installment in which for each sale of honey, 25% was to be deducted for loan repayment. To make this project work and sustainable the company guaranteed to buy all beekeeping products from the beekeepers. From this point the group decided to introduce a single installment contribution fee of Tshs. 5,000.00 per group member that would help them acquire at least 10 hives from

STLtd. It was clearly stated by the group that, for any other villager who was interested to join the group was welcomed but had to pay the stated fee.

The group organization structure (Figure 3) starts with the board of trustees that is composed of: the Matipwili primary school head teacher, STLtd Managing Director, Village Veterinary Officer, two religious leaders (Christian and Muslim), two village reputable elders and one staff from Saadani National Park (SANAPA). Under the board of trustee is the general assembly that composes of all group members. The group chairperson chairs the general assembly. The General assembly is the top decision making body, while the board of trustees serve as advisors for the group. After the general assembly is the executive committee which in a descending order of seniority composes of: chairperson, vice chairperson, secretary, deputy secretary, treasurer and deputy treasurer. The group chairperson is also the chairperson for the executive committee.

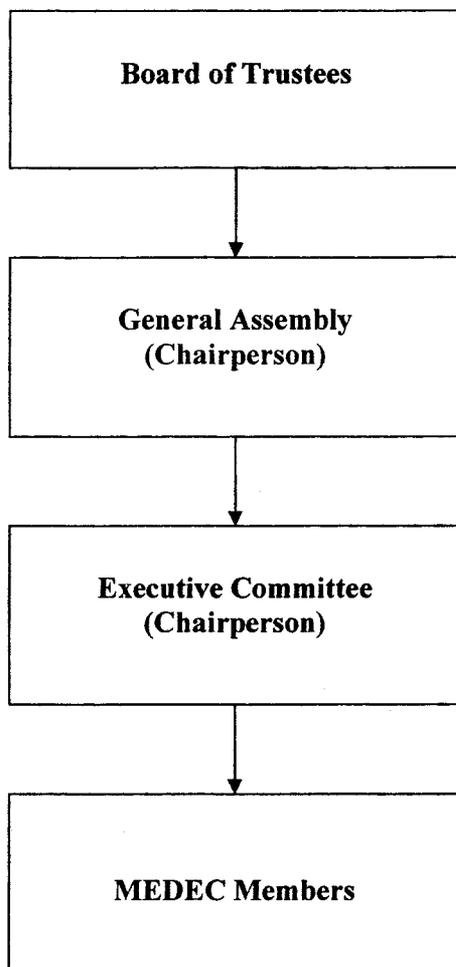


Figure 3: MEDEC Organization Structure

2.6.1 SWOT analysis of host organization

The main strength of MEDEC is the use of good leadership procedures in its operations. It is a registered organization and with a constitution. Decisions on key issues are made by the general assembly which is the highest governing body in the group. In addition there is the group Executive Committee that deals with day-to-day activities of the group. The committee constitutionally assumes group activities for a period of two years and thereafter an election is to be done by the general meeting for new leadership. Another strength of the group is the unity among group members putting into consideration that, they used to work together for about two years ago.

The group however lacks skills and knowledge on project planning and management. It also lacks some leadership skills on specialization and division of labor that makes every one accountable and responsible on his/her respective job area.

The main opportunities, among others, was the existence of the STLtd Company that was willing to support the group and the presence of large village forestland in the area in which the group could carryout a number of environmental conservation activities including beekeeping. Permanent water source in Wami River was another opportunity that could support a number of economic activities in the area including beekeeping. This water can be used for irrigation incase of tree planting activities and also is a good source of water for bees incase of beekeeping project.

Important threats to the group are wild fires as well as wild animals abundant in the area that might hinder group performance in beekeeping and environmental conservation activities.

CHAPTER THREE

3.0 LITERATURE REVIEW

This chapter covers different literatures on similar studies done by other researchers. It will cover theoretical, empirical and policy literature reviews.

3.1 Theoretical Literature

3.1.1 Beekeeping as a source of income and food

Beekeeping has been explained as an effective way for poor people to improve their livelihoods through increased income. Beekeeping is therefore potentially valuable in poverty alleviation, as well as for the maintenance of biodiversity. By providing beekeepers in developing countries with advice about simple, sustainable methods, it could help them increase their income without destroying the environment (Bradbear, 2006).

Beekeeping is a source of food (honey, pollen and brood); raw material for various industries (beeswax candles, cosmetics, textiles, lubricants etc.), medicine and income for the people (URT, 1998).

Both honey and brood are important sources of food. For instance, a mixture of honey and sorghum is an emergency food in parts of southern Tanzania because it can be stored for a long time. In several old publications it was recorded that amongst the Masai honey was the main food of the warriors when they were on hunting excursions, only young children would normally eat honey, whilst old men would eat

the brood. The Wanika people, living between Lake Tanganyika and Lake Malawi, were reported as appreciating the young brood more than honey (Fischer, 1993).

Fischer, (1993) also argue that the experience and observations made by beekeepers shows that beekeeping is increasingly becoming an opportunity to earn additional income to farmers and this gave rise to initiatives aimed at improving the efficiency and productivity of traditional methods. However, Fischer says that the social-economic constraint involved with the introduction of modern methods is that, the risk involved in investing in new technology is too high for many subsistence farmers and beekeepers.

According to Marigat, 2004 beekeeping is a good source of income and food to rural communities. Honey could be used as part of food security programme when facilitated well through funding and trainings to community groups interested in beekeeping projects. Citing Tukum women development group in Pokot Kenya that received a grant of 150 beehives, Marigat said the project is expected to provide food and income to women and youth in the village resulting from surplus income from honey being sold. "These women belong to The Pokot tribe, they are among the poorest ethnic groups in Kenya, the environment in which they live is hostile, eroded by the daily sun and wind and when it rains the community is inaccessible" (Marigat, 2004). These people's lives are expected to improve as a result of the beekeeping project in their area. Beekeeping has been proved being supporting the rural poor secure themselves and their families from hunger and send their children to school using the extra income from honey sold.

Beekeeping is a good example of a project that uses natural resources in a sustainable manner. Bees are probably the best natural pollinating agents for trees, shrubs and grasses. Also there is a connection between beekeeping and watershed protection, soil conservation, and biodiversity conservation in a long run.

3.1.2 Beekeeping in development

Beekeeping is a good and useful source of supplementary income to farmers to cutter for expenditures like school fees for kids, medical expenses for the family and other socio-economic costs in life. This hence speeds up people's development (Latham, 2000).

Beekeeping contributes a lot in development when properly managed and seriously taken as an economic activity in a specified area. Beekeeping can therefore change people's life socially and economically when introduced to a community with proper training and facilitation (*Ibid*).

3.1.3 Beekeeping techniques

The use of different hive types however has their pros and cons. For example the use of open colony is of low cost, interms of investment capital because these are natural hives created by bees themselves on caves or trees in the forest. Another advantage is that the management of these hives is simple and they are difficult to still. On the other hand yields from these types of hives are relatively low and mostly with unripe honey. Also open hives could easily be invaded by invaders such as animals, human being, insects and other bee enemies. During the rain season it is also easy for rainwater to get in the hives and cause bees to abscond.

The use of log hives provides protection of bees from invaders such as animals, insects, rainwater and other bees' enemies. Log hives' yield potential is also high. The disadvantage with this type of hive is the high initial cost. It is also attractive to thieves and bees tend to abscond. Kenya Top Bar Hives (KTBs) have higher yield potential and as opposed to log and open hives, honey combs here are recycable because of the use of frames in hives. Furthermore With KTB hive, bees are protected against external elements and invaders. The negative features with KTB almost are similar to those of log hives. They involve high cost especially the initial investment capital. Also they are attractive to thieves and bees tend to abscond. Different from log and open hives KTB hives are complex to manage. (*Ibid*).

3.1.4 The use frame hives technology in Africa

3.1.4.1 Beekeeping technology

Frame hives are being used successfully in North Africa and also in South Africa. They are and have been used intermittently throughout Africa with varying degrees of both success and failure. In Tanzania frame hives was promoted in 1960s but despite the extensive work with experts from the Forest Department there is no significant use of frame hives in the country remaining. In Kenya, enthusiasts mostly hobbyists have used frame hives successfully over many years but on a very limited scale and today there is virtually no frame hive except for one outfit Honey Care International that is endeavoring to promote *Longstroth* frame hives. In Rwanda and Burundi *Longstroth* frame hives have been used to some good advantage and produce excellent honey. There are good tamer in Rwanda and Burundi but even so the use of frame hives are still limited (Paterson, 2000).

Oliver, (2000) refers to KTB hive as a very productive hive in Africa in which most places are temperate. Oliver however insists on move forward from KTB hive to *Longstroth* hive which is more sophisticated, most reliable and most recommended world wide. Beekeepers must make a step forward by adapting *Longstroth* hives for sustainability since honey extracted from *Longstroth* hives is of the best quality in the world market. The use of *Longstroth* hives will therefore guarantee exportation of the honey to international market and hence improve the livelihood of the farmers. Oliver however, recommends for effective use of local available skills of the indigenous people to make the *Longstroth* hives so as to reduce investment cost. Also training of the farmers on how to effectively utilize the new beekeeping technology (use of *Longstroth* hives) is essential for best results. This will eliminate the absconding problem that is a daily cry by the African beekeepers.

3.2 Empirical Literature

3.2.1 Beekeeping experience in Tanzania

In Tanzania beekeeping plays a major role in socio-economic development and environmental conservation. It is a source of food (e.g. honey, pollen and brood), medicine (e.g. honey, propolis, beeswax, bee venom), raw materials (e.g. beeswax candles and lubricants) and source of income for beekeepers. Beekeeping employs about 2 million rural people and estimated to generate about US\$ 1.7 million each year from sales of honey and beeswax (Mwakatobe, 2005).

Approximately 95% of all the hives in the country are traditional including log and bark hives and this account for 99% of the total production of honey and bees wax in the country. During colonial and early independence period the production of bee

products was higher than what it is today and was an important non-wood product from forests with higher contribution to the national Gross Domestic Product (GDP). In 1950s honey was estimated at an annual average production of 10,000 tons, all consumed locally. After independence Tanzania exports averaged 368 tons of beeswax and 467 tons of honey per year. In the year 1996/1997, the country exports totaled to 359 tons of beeswax and 2.46 tons of honey worth US\$ 1,019,020 and US\$ 2058 respectively (*Ibid*).

It is estimated that Tanzania has about 9.2 million honey colonies where production potential of bee products is about 138,000 tons of honey and 9,200 tons of beeswax per annum (URT, 1998). These are worthy US\$ 138,000 million and US\$ 18.4 million, respectively (using average prices of the year 2003, i.e. US\$ 1 per kg of honey and US\$ 2 per kg of beeswax) (Mwakatobe, 2005).

The current production level of beekeeping sector of Tanzania is only about 3.5% of the actual potential, which is mainly from apiaries managed by individual beekeepers or organized beekeepers economic groups. The bee colony productivity is dependent on the following factors: size (volume) of the hive; amount of bee fodder (bee forage) available within the vicinity of the apiary, protection of colony against damage - by fire, honey badger (*Mellivora capensis*) and other pests. Another factor is apiary management techniques (URT, 1998).

3.2.1.1 Beekeeping experience with Njiro Wildlife Research Centre (NWRC)

NWRC is the only institute in Tanzania with responsibility for research on bees and functions as a centre for appropriate technology and information on tropical

apiculture (Bradbear, 2006). NWRC occupies an area of 23 ha, out of which 70% is reserved as unique *Acacia* forest, where honeybee colonies are maintained in 13 small apiaries. Apart from the main apiary at Njiro, the Centre also has two field stations in different ecosystems: Mount Kilimanjaro (West) and Rift Valley (Magugu). Beekeeping in these areas protects the land from degradation and provides income to the people at the same time through the sale of beekeeping products (*Ibid*). NWRC insists that beekeeping for income generation and environmental conservation is possible especially when appropriate technology is employed. Also this center reserved acacia forest for its beekeeping project; this implies that in the study area in Bagamoyo where acacia trees are indigenous in the area, beekeeping is very potential.

3.2.1.2 Beekeeping in Pemba Island

In Pemba Island, there has been a long time tradition of beekeeping for particularly in combination with clove production; since clove honey commands high prices and is in high demand in Oman. However, honey production has recently declined due to the decline of clove industry resulted by the competition from Indonesia. Regardless of this competition from international market, still the demand for clove honey in Pemba exceeds its actual supply. This calls for a need for improving beekeeping in the area so as to take advantage of the available market.

Ellman (2000) observed that steps taken to raise the quantity and quality of clove honey production would not only increase rural incomes with relatively little investment but also give farmers an incentive to improve clove plantations in Pemba. The challenges for small-scale beekeepers are on the choice of the appropriate hive type to use in terms of cost, productivity and manageability. Other constraints are

selection of optimal colony management and honey harvesting techniques and also improved procedures and channels for marketing honey and other bee products.

Most of bees in Pemba are kept traditionally in open colonies up to 1.5m long with combs drawn down from the branch of a tree and minimal protection against wind, rain and invaders (particularly ants). Some farmers use Kenya Top-bar hive (KTB) and log hives (Ellman, 2000).

3.2.2 Beekeeping experience in other developing countries

3.2.2.1 Kenya Experience

Honey Care Africa Limited (HCA) in Kenya has demonstrated the important links between environmental conservation, poverty reduction and beekeeping. It gives emphasis that beekeeping is an appropriate enterprise in many parts of rural East Africa because the vegetation and climate are near perfect for the activity. HCA was established in 2000 as a private company in Kenya with a 'tripartite' agenda: to simultaneously generate economic, social and environmental value through beekeeping. HCA mobilized the communities across Kenya by training them on modern beekeeping technology using *Longstroth* hives. The communities were facilitated to acquire loans from donors to buy the pine wood *Longstroth* beehives produced by HCA. The company guaranteed to buy all the honey produced by the communities on a fair price by paying cash on the spot on delivery of honey. Honey Care helped to establish 14,000 hives across Kenya, and about 2,500 small-scale subsistence farmers in villages in Kenya were involved in beekeeping (UNDP, 2004).

It was estimated that with four hives and about 15 minutes of work every fortnight, most of the farmers are able to earn an income of around US \$ 250 per annum – an amount that often makes the difference between living above or below the poverty line (*Ibid*).

Honey Care Africa Ltd has succeeded to use beekeeping for environmental benefits. The company has now embarked on an intensive tree/beekeeping program called *Bees for Trees* as a more attractive and sustainable enterprise than cutting down trees for charcoal burning in areas where these activities are common (*Ibid*).

3.2.2.2 Democratic Republic of Congo experience

Honey hunting has been a traditional activity in Bas Congo, as in much of Africa. Modern beekeeping technologies were introduced in 1980s. Christian Aid Organisation funded training to the villagers near Mbanza Nzundu in the Bas Congo region. This was followed by villagers adoption of beekeeping technology and by 1990 there were nearly 400 bee-keepers each with a hive; producing an average honey surplus for sale of 7.3kg per year. In the year 2000 Bas Congo had over 1000 beekeepers with an estimated production of 14 tons of honey per year. Some villagers possessed up to 40 KTB hives, while the majority had one or two KTB hives. The money obtained from sale of honey was a significant supplementary household income (Latham, 2000).

It was not uncommon to find up to ten hives in a hectare of forest yielding from 50 - 100 liters of honey per annum in which in the year 2000 it was selling at USD 2 per liter (*Ibid*).

Latham also adds that, beekeeping is worthy especially when villagers are committed with the project. Beekeeping can act as a useful supplementary income and cutter for most necessary socio-economic expenses. However it is the reality that external assistance is essential at the initial capital investment due to the poverty situation of the rural people.

3.2.2.3 Ethiopia Experience

According to Paterson (2000), statistics available for Ethiopia between 1980-1983 shows that Ethiopia was producing a first class honey and yields were increasing from year to year. The apiaries in Ethiopia are in group ownership with up to 40 Zander frame hives per apiary and with average yield of 20 kg of honey per hive. In 1980 Ethiopia harvested 30 hives with a total yield of 914kgs of honey at an average yield of 30kgs per hive. Between 1981 and 1982 the hives harvested were 112 and 138 with a total yield of 1,823 and 2,694 kg; and with average yield ranging from 16 to 19 kg of honey respectively. For the year 1983 the country harvested 241 hives that gave a yield of 4,637 with an average yield of 19 kg of honey per hive.

3.2.2.4 Iran Experience

Frame hive beekeeping in Iran has increased substantially since the mid 1960s and by 1986 it was estimated that there were 1.3 million colonies of bees. Out of these, about one quarter is in traditional hives; and it is estimated that there were approximately 40,000 beekeepers owning between 12 and 1,000 colonies each (Paterson, 2000).

The hives are estimated to yield 10kg of honey for modern hives and 3kg for traditional hives. However, management of the fixed comb hives especially cleaning is difficult since they are not moveable (*Ibid*).

3.3 Policy Review

3.3.1 The national beekeeping policy

The Tanzania beekeeping policy states that the production potential of bee products in the country is about 138,000 tons of honey and 9,200 tons of beeswax per annum from an estimated potential number of 9.2 million honeybee colonies, using the average production of 15 kilogram of honey and 1 kilogram of beeswax per colony per year with cylindrical log hives. The current national honey and beeswax production is estimated to be 4,860 tons and 324 tons per year, respectively, which is about 3.5% of the production potential (URT, 1998).

Beekeeping sector plays a major role in socio-economic development and environmental conservation. The policy discloses the high demand of beekeeping products and income generation potential. Furthermore, the policy mentioned beekeepers, farmers and local communities as main stakeholders in implementing the policy. Their main roles and responsibilities in implementing the policy among others are:

- Conservation and management of honeybees and beefodder plants in village and private bee reserves. This involves planting of beefodder plants (Planting for bees)
- Selecting and erecting apiaries
- Making beekeeping equipment

- Protecting colonies against fire, pests, and pesticides.
- Sustainable harvesting and utilization of bee and floral resources by using appropriate bee protectives, beesmokers and hives.
- Production and processing of bee products for both local and export markets.
- Maintaining high quality standards for the bee products in order to be competitive in international markets (URT, 1998).

3.3.1.1 Policy on gender issues

The policy statement number seven states that effective participation of women and the youth in carrying out beekeeping activities, extension packages whose aims and objectives are to make beekeeping a simple and attractive economic venture will be designed and rendered to the women and the youth (URT, 1998). The policy emphasised women participation in the beekeeping. This is a challenge to all beekeeping stakeholders to implement the policy statement by incorporating women in beekeeping activities for sustainable development and environmental conservation.

3.3.2 National strategy for growth and poverty reduction (NSGRP)

NSGRP addresses cross cutting issues especially environment, income generation and poverty reduction. The strategy emphasizes that; poverty, environment and natural resources destruction has a clear link. Such cross cutting issues magnify the causes or manifestation of poverty (URT, 2005). Beekeeping could be used as a means to address these cross cutting issues since it will reduce poverty, conserve environment and prevent natural resources destruction like deforestation.

3.3.3 The Rio de Janeiro conference on environment and development

According to UN (1992), forests are an integral part of sustainable development and are essential to many indigenous people and other forest-dependent people practicing traditional lifestyles, forest owners and local communities. It also adds that, all aspects of environmental protection and social and economic development as they relate to forests and forest lands should be integrated and comprehensive. These statements imply that conducting beekeeping project in an area would mean sustainable development of forests and hence social and economic development of the people. This is due to reality that, forest conservation and management is one of the major roles of beekeepers in trying to maintain bees' forage.

3.3.4 Millennium development goals (MDGs)

United Nations describes that by the year 2015, all 191 United Nations Member States have pledged to meet the eight-millennium development goals. Among these goals to be achieved, goal number two reads; 'eradicating extreme poverty and hunger' and it focus on reducing by half the proportion of people living on less than a dollar a day and also reducing by half the proportion of people who suffer from hunger.

Goal number seven advocates environmental sustainability, and focuses on integrating the principles of sustainable development into country policies in order to reverse loss of environmental resources. Conducting beekeeping projects in communities will mean participating in attaining the MDGs mentioned above at village and national level at large. Beekeeping can contribute to poverty reduction and conservation of environmental resources and hence changing lives of the poor.

CHAPTER FOUR

4.0 PROJECT IMPLEMENTATION

Project Title: Capacity Building of MEDEC on economical beekeeping activities in the study area

This section provides both the original plan and the actual implementation and reports that were accomplished in this project. It summarizes the project planning in terms of products, outputs, inputs and activities that were needed to achieve the set goals. Project Implementation plan and Gantt chart are also detailed in this chapter.

4.1 Project Implementation Matrix

This project intended to run 20 full operating hives, train MEDEC members and plant 400 *Melliferous* trees so as to reach the goal of facilitating beekeeping activities in the area. Inputs needed to attain the project goal were facilitator, *Longstroth* hives, poles, wild ropes, and tree seedlings. Table 15 shows the project implementation matrix (logical-framework matrix) that shows the project's goal, purpose, outputs, activities and inputs required. The table also shows the objectively verifiable indicators, means of verification and assumptions set for each goal and outputs.

Table 15: Project Implementation Matrix

| Narrative Summary | Objectively Verifiable Indicators | Means of verification | Assumptions |
|--|---|--|--|
| Goal: To facilitate beekeeping activities in the area as a means for IGA and environment conservation | Ongoing beekeeping activities in the area | -Village reports -MEDEC reports -Physical verification | -National policies do not change. -Community will participate in the project |
| Effect/Purpose: Implement beekeeping activities in the village | Beekeeping activities implemented in the village | MEDEC statistics reports | Experts will be available. Community will participate |
| Outputs: -20 full operating hives -MEDEC members trained -400 <i>Melliferous</i> (beefodder) trees planted in the area | -Number of operating hives -Number of trained people -Number of trees planted. | -Physical verification -MEDEC reports | -MEDEC will willingly participate in the project. -Seedlings and hives will be available |
| Activities: -Training of MEDEC members -Conduct beekeeping in the area -Plant trees (beefodder) in the area | Inputs: -Facilitator - <i>Longstroth</i> hives, poles, wild ropes, -Seedlings | -MEDEC minutes -MEDEC reports -Physical verification | -Availability of the facilitator -Trained members remain in the group. -No socio-economic and political interference on the project. |

Table Format Source: NORAD (1994)

4.2 Project Planning

This section describes the plan that was set out for this project. Table 16 shows the lists of planned activities, responsible person for each activity, the resources required and planned delivery timeline.

Table 16: Project Implementation Plan

| Activities | Project Month | | | | | | | | | | | | Resources Needed | Person Responsible | |
|--|---------------|---|---|---|---|---|---|---|---|----|----|----|------------------|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| 1. Introduce the project to the community. | x | | | | | | | | | | | | | Full set of beekeeping equipments and a consultant. | The executive committee and facilitator |
| 2. Conduct bee-keeping training to group members. | x | | | | | | | | | | | | | Full set of beekeeping equipments and a consultant. | Facilitator. |
| 3. Acquire project land and prepare apiary. | | x | x | x | | | | | | | | | | Poles and wire rolls of string. | MEDEC members |
| 4. Purchase hives and catch bees | | | x | x | x | x | x | x | | | | | | Funds, wire rolls of strings and hives. | MEDEC members |
| 5. Hive inspection and placing beehives with bees at the apiary. | | | x | x | x | x | x | x | x | x | x | x | x | Stationery and bee kit | MEDEC members |
| 6. Prepare tree nurseries and planting trees | | x | x | x | x | x | | | | | | | | Water, seeds and seedlings | The MEDEC members |
| 7. Ongoing monitoring | x | x | x | x | x | x | x | x | x | x | x | x | x | Stationery | The Executive committee and facilitator |
| 8. Evaluation | | | | | | | x | | | | | | x | Stationery | MEDEC members and facilitator |

Because during introduction the project had no hives purchased already, the project borrowed one hive from Sanctuary Tanzania Limited for demonstration purpose.

STLtd field assistant and the researcher offered free facilitation and consultation services to the project because they were both beekeeping experts trained by Honey Care Africa, Nairobi Kenya.

4.3 The Actual Project Implementation

The executive committee with the assistance of the facilitator introduced the project in the study village. The STLtd field assistants demonstrated the use of the *Longstroth* hives. This was aimed at sensitizing the community on what were actually to be undertaken and its importance. This involved all stakeholders; the community members (interested individuals), STLtd, and the village government members. Training of group members was undertaken by at the STLtd's bee-keeping site, where demonstration on how to operate the hives was done. Figure 4 is the STLtd beekeeping field assistant demonstrating to villagers the use of a beekeeping outfits and equipments. This figure demonstrates how beekeeper appears when inspecting hives.



Figure 4: STLtd field assistant with beekeeping outfits and equipments

In this project group members contributed own labor (human capital) in the whole process except for the purchase of the hives that needed cash whereby all members contributed Tshs. 5000 per head. The village government offered the group the village forest reserve area for implementing the project on agreement that no deforestation or any other kind of environmental destruction should be conducted in the area. The group members prepared an apiary by cutting and collecting poles from the village forest and made goal posts for hanging the hives under the guideline of their chairperson and STLtd field assistant who provided technical advice. The poles were 3m high and were fixed on the ground 3m apart from each other in 0.7m deep holes because the goal posts need to be 3m wide 2.3m high. Two to three hives were hanged in one goal post. The wire roles of strings were used to hang the hives. The

hives needed to be hanged at 1.2m above ground and 0.5meters distance apart between the hives. Also the hives were hanged at 0.5meters distance away from the standing poles of the goal post. Figure 5 shows the *Longstroth* hive used in the project.



Figure 5: A *Longstroth* hive used in the project.

The setting of the hives was aimed at preventing destructive animals especially honey badger from reaching the hives. It was also intended to helping women access the hives easily without a need to climb trees like is the case of traditional hives which are placed on trees.

The members cut thorn tree branches and used them to make a fence around the apiary to protect the hives from animals. The beekeepers also made firebreaks by digging a path two meters wide around the fence to protect the apiary from being affected by seasonal fire burning practice by farmers in the area.

Ten *Longstroth* hives were set at random in trees in the forest close to the river to catch bees. Group members conducted daily inspection to know if there were any bee swarms in the set hives. Whenever bee swarm moved in to the hive, the respective hive was moved to the apiary after a fortnight. From there the hives were inspected every after fortnight to monitor the progress of the hives.

On tree-planting objective, the group members prepared a tree nursery by planting locally available tree seeds. The *Melliferous* trees planted include: mangoes, guavas, oranges, and other flowering trees known to be bees' forage. The Saadani National Park (SANAPA) experts were consulted on the types of trees to plant. Furthermore the project used seeds and seedlings of the local naturally growing trees available in the bush and village forest in the area. The group also got donation of tree seedlings from SANAPA via the park neighborhood programme. Tree planting activity started during the third month of the project that was February 2006 the rain season in the area. Table 17 summarizes the actual project implementation including timeframes, resource used, and unmet resource needs. Appendix 2 also shows the actual project implementation Gant chart depicting the narrative and outline on the project implementation report.

Table 17: Project Actual Implementation

| Activities Carried | Project Month | | | | | | | | | | | | Resources used | Remarks | |
|--|---------------|---|---|---|---|---|---|---|---|----|----|----|----------------|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| 1. Introduce the project to the community. | x | | | | | | | | | | | | | Full set of beekeeping equipments and a consultant. | Resources were met and the purpose achieved |
| 2. Conduct bee-keeping training to group members. | x | | | | | | | | | | | | | Full set of beekeeping equipments and a consultant. | All 20 members were covered and resources were met. |
| 3. Acquire project land and prepare apiary. | | x | x | x | | | | | | | | | | Poles and wild rolls of string. | Resources and objective were met |
| 4. Purchase hives and catch bees | | | x | x | x | x | x | x | | | | | | Funds, wild rolls of strings and hives. | Only ten hives were purchased due to lack of funds |
| 5. Hive inspection and placing beehives with bees at the apiary. | | | x | x | x | x | x | x | x | X | X | x | | Stationery and bee kit | Activity accomplished |
| 6. Prepare tree nurseries | | x | | | | | | | | | | | | Water, watering cans, seeds and seedlings | Activity accomplished |
| 7. Planting trees | | | x | x | x | | | | | | | | | Water seedlings and | Resources were available abundantly |
| 8. Ongoing monitoring | x | x | x | x | x | x | x | x | x | X | X | x | | Stationery | Monitoring was done each month as planned |
| 9. Evaluation | | | | | | | x | | | | | x | | Stationery | Formative and summative evaluation was done. |

CHAPTER FIVE

5.0 PROJECT MONITORING, EVALUATION AND SUSTAINABILITY

This chapter presents how monitoring and evaluation was conducted. It includes reasons, objectives, indicators, questions research methodologies used and results for monitoring and evaluation. It also shows the planned and actual monitoring and evaluation conducted. Lastly this chapter justifies the sustainability of the project

5.1 Project Monitoring

Monitoring is a systematic process of collecting and analyzing information to track the efficiency of the organization in achievement of goals. Monitoring provides regular feedback that helps an organization track costs, personnel, and implementation time. Others are organizational development, economic and financial results in order to compare what was planned to actual outcomes. In its simplest terms monitoring is collection and analysis of information to track what's going on.

5.1.1 Reasons for monitoring

The main objective of monitoring was to determine whether the activities were progressing as planned and leading towards attaining objectives of the project. This was to allow for early adjustments of the project activities where necessary.

Table 18 presents logical sequence for the systematic project monitoring. The table summarizes the list of activities planned to be monitored (obtained from the plan), time duration for each activity to be completed (obtained from the plan), and the

methods planned to be used in monitoring the activities. The table also shows the measure of progress, anticipated barriers and their solutions.

Table 18: Original Project Activities Monitoring Plan

| Activities | Duration | Methods | Current Progress | Barriers | Solutions |
|--|--|---|--|---|--|
| 1. Introduce the project to the community. | 1 st month | Review on the group minutes | -official courtesy call and other process should be undertaken | Negative perception by some people | Assure provision of information on project implementation to these people |
| 2. Conduct bee-keeping training to group members. | 1 st month | -Review the training material -Review the trainees register | -Venue and the members should be ready for the training | Poor retention of the skills due to lack of education | Encourage them for more practical participation |
| 3. Acquire project land and prepare apiary. | 2 nd , 3 rd , and 4 th month | -Review the agreement with the village and -Physical observation | Formal procedure and site preparations has to be undertaken | Delay in apiary preparation | To mobilize members to work as a team |
| 4. Purchase hives and catch bees | 3 rd to 9 th month | Physical verification of the hives purchased and catching bees | Hives set out in the field for catching bees | Invasion of intruders: predator insects in the hives that repel bees from getting into hives. | Conduct hive inspection every after two weeks |
| 5. Hive inspection and placing beehives with bees at the apiary. | 3 rd up to 12 th month | -Review hive inspection book -Observation at the apiary. | Hives has to be at the apiary with bees in. | Invasion of insects like ants and caterpillar causing bees to transfer from the hive. | Inspect the hives and clean them every after 14 days. |
| 6. Prepare tree nurseries and planting trees. | 2 nd , 3 rd , 4 th , 5 th , and 5 th month. | Physical verification | Active tree nursery and Live trees growing in the area | Drought | -Each member should assigned with trees for irrigation. -Stop the activity till rain season |

The Table Format Source: Gajanayake (1993)

5.1.2 Monitoring questions

- i. Was the project introduced to the community as planned?
- ii. Has the training being conducted to the group members?
- iii. Are there bees in the hives?
- iv. Is the inspection properly conducted in an acceptable manner?
- v. Is the apiary being maintained to the required standard?
- vi. Are trees planted as planned and maintained?

5.1.3 Indicators and tools.

Table 19 summarizes the indicators, tools/method and data source used in the actual monitoring of the activities of the project as well as the person who conducted the monitoring.

Table 19: Activities monitoring indicators and data source

| Activity | Direct indicators | Indirect Indicators | Tools/method used | Data source | Person responsible monitored |
|---|---|-------------------------------------|--|--|---------------------------------------|
| 1. Introduce the project to the community | Information available from village office | Project acceptance by the villagers | Interview and documentation | Village reports and meeting minutes | MEDEC chairperson and researcher |
| 2. Members training | Number of members trained | Members performance | Interview and documentation | Group records | MEDEC chairperson and researcher |
| 3. Buying hives | Number of hives purchased | Hive inspection activities | Interview, documentation and observation | Receipts and group records | MEDEC chairperson and researcher |
| 4. Catching bees | Number of hives with bees in. | - | Observation and interview | Group records | MEDEC chairperson and secretary |
| 5. Keeping of beehives | -Number of hives on the apiary | - | Observation and interview | Hive inspection records | Chairperson and secretary |
| 6. Hives inspection | -Presence of hive inspection records -Tidiness of the hives. | Presence of bees in the hives. | Observation and interview | Hive inspection records | Researcher, chairperson and secretary |
| 7. Maintenance of the apiary. | - Existence of fire breaks. - Condition of the apiary i.e. clean and tidy. | - | Observation and documentation | Hive inspection records | Researcher and MEDEC secretary |
| 8. Tree planting and maintenance. | No. of trees planted, trees' survival rate & nursery existence. | | Observation and documentation | Group records & Minutes of the group meetings. | Chairperson and secretary |

5.1.4 Monitoring team

The group general meeting with the help of key stakeholders appointed the monitoring team. The monitoring team included three group leaders and one outsider (a specialist in beekeeping). The group representatives conducted the monitoring as part of their responsibilities while the specialist/consultant who was the researcher, carried out the monitoring with the team as part of his requirements for the study.

5.1.5 Monitoring research methods

The study employed different research methods in monitoring as follows:

(i) Observation method

Observation method was employed in monitoring to physically verify that project activities: hives inspection, trainings, purchase of hives, catching bees and planting trees were implemented as planned and at required standard.

(ii) Documentary search

Review of documents: village meeting minutes, group reports, receipts, hive inspection record book, quarterly reports and group meetings minutes were used to verify efficiency of the group in implementing the set activities.

(iii) Interview

Interview was conducted to MEDEC members so as to obtain information regarding the progress of the project. A checklist was prepared to guide the interview in which five group members who were picked at random each month were interviewed to

know whether the activities were in line with the original plan and identify barriers if any.

(iv) Focus group discussion (FDG)

FGD was conducted each month for monitoring purpose in which five MEDEC members were randomly selected to participate. All stakeholders who were available were invited. This gave chance to stakeholders contribute what they had in mind for the improvement of the project. Group members were given chance to give out the difficulties observed during implementation and propose for solutions.

5.1.5 Monitoring Results

Monitoring results shows that all activities were carried out as planned. It was found that all anticipated barriers mentioned earlier in Table 18 did not happen to be a problem in the actual implementation of the project. Table 20 shows the summary of monitoring results for all activities conducted in the area.

Table 20: Summary of monitoring results

| Activities | Duration planned | Indicators | Remarks |
|---|---|---|--|
| 1. Introduce the project to the community | 1 st month | Information available from village office | -Project was introduced as planned |
| 2. Members training | 1 st month | Number of members trained | -20 members were trained in the 1 st month -Revealed poor skill retention by MEDEC members |
| 3. Prepare apiary and Buy hives | 2 nd -4 th month | -Number of hives purchased -Presence of apiary | -Hives were purchased on 2 nd month. -Only 10 out of 20 hives were purchased -Apiary was prepared prior to planned time |
| 4. Catching bees | 3 rd -9 th month | Number of hives with bees in. | -Up to 9 th month all 10 hives had bees in |
| 5. Keeping of beehives | 3 rd -12 th month | -Number of hives on the apiary | -All 10 hives were placed on the apiary on the measurements and manner required |
| 6. Hives inspection | 3 rd -12 th month | -Presence of hive inspection records -Tidiness of the hives. | -Hive inspections were done every fortnight as planned -Hive inspection records were kept |
| 7. Maintenance of the apiary. | 3 rd -12 th month | - Existence of fire breaks. - Condition of the apiary i.e. clean and tidy. | -Apiary is properly managed -- it was tidy and clean -There was a maintained fire break and thorny fencing |
| 8. Tree planting and maintenance. | 2 nd -5 th month | No. of trees planted, trees' survival rate & nursery existence | -Tree planting started on the 3 rd month -One small nursery existed -Survival rate was 97% -- only 12 seedlings dried out of 420 planted. |

Table 20 also shows that during the first month project implementation in the village was conducted according to plan. Monitoring also revealed that training on beekeeping technology was done in the first month of the project as planned.

However because the project was in its initial stages some members found it difficult to retain the skills and knowledge taught due to lack of practice, as there were no bees in the hives yet. It was recommended for more practical training during implementation.

During the second month the apiary was being prepared and completed in the third month of the project. The preparation of the apiary was completed one month prior the planned time. Ten hives were then purchased all in the third month and catching of bees started, and the hives set out were in a good condition.

It was also observed in each monitoring that, hives inspection was conducted every after fortnight as planned. In order to monitor the process some inspections were conducted by the researcher in company of the group members to confirm members' inspection skills and to check the condition of the hives. During the tenth month of the project (i.e. September 2006), all the hives were about to be harvested since the super boxes were put on brooder boxes already and each had on average seven out of ten frames full of honey. Figure 6 shows a MEDEC beekeeper on hives inspection duty carrying hive tool and smoker to the right and left hand respectively. Behind her are three hives with super boxes on.



Figure 6: MEDEC beekeeper on duty of hive inspection

Monitoring shows also apiary was properly maintained and clean. No wild animals that entered the apiary due to a good thorny fencing (*Acacia zanzibarica*) that are plenty in the area.

In the second month of the project, the preparation of the tree nursery began as planned. SANAPA nursery supplied 250 seedlings free of charge upon request, and the remaining were obtained locally in the village area. However during monitoring it was discovered that the actual planting of trees began in the third month of the project instead of second month due to delays in the seasonal rainfalls. Notwithstanding this delay did not affect the project implementation plan. Four hundred and twenty trees (*Melliferous*) were planted in the village area as per the schedule. The tree survival rate was as high as 97 percent since out of 420-planted trees, only 12 died.

5.2 Project Evaluation

Evaluation is a systematic process of collecting and analyzing information to assess the effectiveness of the project or programs in achieving its goals. It is objectively designed to assess the impact and accomplishments of the project.

This project's evaluation covered four dimensions: (1) What information was needed? (2) What were the sources of information? (3) What techniques used in getting the information? (4) What tools were necessary to get the information? Table 21 shows the evaluation worksheet used in the project evaluation.

Table 21: Project Evaluation Worksheet

| Objectives to be accomplished | Information needed | Sources | Techniques/Methods | Instruments |
|--|--|--|---|--|
| 1. Explore whether training was conducted to members to enable them run the project. | -Members knowledge on beekeeping. -Members' perception on their capability. | -Members to be interviewed. | -Interviews -Focus Group Discussion (FGD) | -Interview checklist -FGD guidelines |
| 2. Assess whether the group managed to keep bees as planned | Group performance in keeping bees | -Project records -Site visit -Meeting minutes | -Documentation -Observation at the apiary | -Reviewing checklist -Observation guideline |
| 3. Explore whether trees were planted as planned. | Group performance in tree planting objective. | -Meeting minutes -Village leaders -Tree planting record book | -Interviews, -Review of minutes, -Review the records on tree planted -Observation at the tree planted area | -Interview checklist -Observation guideline -Reviewing framework |

The Table Format Source: Gajanayake (1993)

5.2.1 Reasons for Evaluation

The reason for conducting participatory evaluation was to check whether the activities of the project were relevant to the objectives and hence be able to decide whether to continue, terminate the project or do some adjustments.

5.2.2 Evaluation Questions

The facilitator administered the following questions to the group members so as to allow for group participation.

- i. Has the capacity building for the group conducted as planned?
- ii. Are the members of the group competent in running the project on their own?
- iii. How many hives the group managed to have?
- iv. Are the hives active?
- v. How many trees were planted? Are they surviving?

5.2.3 Composition of Evaluation Team

The general meeting of the group members and key stakeholders appointed the evaluation team. The evaluation team consisted of two group members and one outsider. The outsider was the researcher who volunteered to help members retain their knowledge where as the members participated as part of their duty as project owners. Members were already trained on how to conduct evaluation for their project. The results of the evaluation team were presented to the same meeting within a week after evaluation to allow timely decision.

5.2.4 Summary of evaluation criteria

Table 22 shows summary evaluation presents the evaluation objectives, their performance indicators, and the expected and actual outcomes for each.

Table 22: Summary of the project evaluation criteria

| S/No. | Evaluation Objectives | Performance Indicators | Outcome | |
|-------|---|--|--|---|
| | | | Expected | Actual |
| 1. | Explore whether training was conducted to members to enable them run the project. | -Conducted trainings -Members participation and knowledge in beekeeping | -Training conducted to all members -All members are competent | -Training was conducted to all members -good members participation -Members are knowledgeable |
| 2. | Assess whether the group managed to keep bees as planned | -Number of hives kept. -Hives with bees in. | -20 bee hives kept -20 hives with bees in. | -Only 10 hives were kept and with bees in. |
| 3. | Explore whether trees were planted as planned. | -Number of trees planted. -Survival rate of trees | 400 planted and live trees | -420 trees were panted. -12 of the seedlings dried out. |

5.2.5 Data collection methodology used in evaluation

Research methodology employed in evaluation exercise includes; observation, documentary search/record review, interview and Focus Group Discussion.

5.2.5.1 Observation

Observation was employed to observe whether the hives were placed at the apiary and fully operating and trees planted as planned. It was aimed at assessing specific issues like the number of hives at the apiary, number of active hives, apiary

management, number of trees planted, number of surviving trees and the type of trees planted. Observation helped the evaluation team to compare the group records with the actual outcome observed.

5.2.5.2 Documentary search/record review

Documentary search was used to acquire information on hives and trees planted. The review was done on the village government meetings' minutes obtained from the briefing meetings with the group, the group meeting minutes, group hive inspection records, and tree planting records. Also training register was reviewed to see to it if all members attended training. Furthermore routine hives' inspection record was also reviewed to know if each member participates in the project.

5.2.5.3 Interviews

Interviews were conducted to all members of the group and village officials (the chairman and VEO) so as to acquire information on each individual perception and the village government towards performance of the group. Interviews allowed to gain insight on individual rating of their competence in running the project basing on the training conducted. It was a good method to test the individual skills and knowledge about the project as well as his or her participation in the whole process.

5.2.5.4 Focus Group Discussion

Focus group discussion was conducted separately to two groups one of which was all five female members of MEDEC and another one the five male members who were randomly chosen from the group. This gave room to have information from both men

and women separately so as to also assess gender issue in the project. FGD guideline was used to guide the discussion.

5.2.6 Evaluation results and implications

Table 23 shows the evaluation results as obtained from the survey that based on the evaluation criteria (derived from the evaluation questions). These criteria were: (1) capacity building that aimed at whether training was conducted as planned; (2) members competence that aimed at assessing as to whether members are competent on their own to run the project; (3) hives kept that was looking on the number of hives the group managed to keep; (4) active hives which aimed at exploring active hives out of the hives kept; and (5) trees planted and the surviving ones that aimed at assessing the achievement of tree planting objective.

Table 23: Summary on evaluation results

| Evaluation criteria | Indicators | Results | Average ranking by members |
|----------------------------|--|---|-----------------------------------|
| 1.Capacity building | -Members knowledge -members trained | -All members were trained and knowledgeable on beekeeping | Satisfactory |
| 2.Members competence | -Members participation | -Members are competent and participated in each stage | Satisfactory |
| 3.Hives kept | -Number of hives kept | -Only 10 hives were kept | Unsatisfactory |
| 4.Active hives | -Number of active hives | -All 10 hives had bees in and with super boxes on. | Satisfactory |
| 5.Trees planting | -Trees planted | -420 trees were planted out of 400 planned | Satisfactory |
| 6.Surviving trees | -Number of live trees | -408 trees survived | Satisfactory |

Evaluation as in table 23 revealed that capacity building was conducted as planned to the group in which all members were trained for beekeeping project implementation. Evaluation findings show that members were knowledgeable and competent enough after training, and in addition they practically participated in each stage of project circle. The interview with individual members showed that each one is knowledgeable in catching bees, managing the apiary, (i.e. cleaning hives, inspecting hives) and honey harvesting. Members ranked one criteria (hives kept) unsatisfactory because the group only kept 10 hives since they could not afford keeping the planned 20 bee hives. Though the group failed to obtain the planned 20 hives, the 10 hives obtained were in good condition and all with bees in. Furthermore there have been no absconding problems among members something which led to success in beekeeping. At time of project evaluation the group was about to harvest honey from these hives. Out of the ten hives, eight were to be harvested within a month after the evaluation time. It was also reported that the group members had already contributed some money to buy ten more hives.

Table 24 shows a copy of the part of an actual hive inspection record kept by MEDEC that was found during evaluation. This information shows that there is a good record keeping by MEDEC group, an indication that training was properly done. These records include hive inspection record, tree planting record and group meeting minutes. Hive inspection record for instance was designed in such a way that it indicates the date of inspection, identity number of the hive inspected, insects/foreign bodies detected, action taken, remarks and a date for the next inspection. A series of all inspection records that were conducted fortnightly were available with the group.

Table 24: A copy part of an actual MEDEC's hive inspection record

| Date | Hive no. | Intruders detected | Action taken | Hive status | Remarks |
|-------------------------------|----------|-------------------------|--|--|---|
| 14 th Aug. 2006 | 21 | Caterpillars and cobweb | -Removed the caterpillars and cobweb -Super box was put on. | 8 frames in the brooder box are full of honey | Next inspection on 21 st Aug. 2006 |
| | 25 | None | -checked all frames | 7 frames in the brooder box are full of capped honey | Super box is needed in the next inspection 21 st Aug. 2006 |
| | 22 | Honey beetles | Cleaned out honey beetles | 2 frames in the super box have combs built but with no honey | Next inspection on 21 st Aug. 2006 |
| | 29 | Honey beetles | Cleaned out honey beetles | 4 frames in the super box have combs partially filled with honey | Hive should next be inspected on 21 st Aug. 2006 |

Source: MEDEC's hive inspection record book (2006)

The assessment done on the tree-planting objective, found that, the group managed to plant more than the planned four hundred (400) trees and the survival rate was 97%. Four hundred and twenty (420) *Melliferous* trees were planted out of which 300 were indigenous trees donated by Saadani National Park and 120 were the mixture of 70 indigenous trees and 50 mango trees obtained in the village by the group.

Based on the findings obtained from this evaluation, it is concluded that the project was successful in achieving its objectives and it will sustainably prosper other factors being constant.

5.3 Project Sustainability

This project is considered sustainable due to the reality that it is a community-initiated project. It is a demand from the group themselves after participatory needs assessment conducted by both the researcher and the group. The group decided to opt to this project because it is within their goal, mission and vision. The group feels the ownership of the project and hence it will take measure for its development.

Secondly the initial funds for the implementation of this project were contributions by members. This proves that the group doesn't depend solely on external funding implying that the project could be sustainable regardless the changes in external funding sources. This make us assume that the group is capable of adding more hives as time goes putting into consideration that harvesting and selling of honey will generate supplementary income to members.

Lastly, the project members were involved in each stage of the project to ensure knowledge acquisition among themselves on project planning, implementation, monitoring and evaluation. In addition the training on bee keeping assured new skills on the project and developed more interest to the group members. This implies that even in the absence of a facilitator the group can run itself sustainably.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

This chapter presents the conclusion and recommendations for the beekeeping project implemented by Matipwili Environmental and Development Club (MEDEC) members. Conclusion is made right from the evaluation of the project in relation to objectives attained.

6.1 Conclusion

It was the hope for this study that the goal and/or objectives for the project won't change for the life of the project and would be met in full extent. However due to external factors the group could not obtain the planned 20 *Longstroth* hives by the year 2006. MEDEC instead was able to obtain 10 *Longstroth* hives and planted over 400 trees that were planned. The project also succeeded to attain the training objective in which all MEDEC members were trained on beekeeping.

6.2 Recommendations

The project could not evaluate the impact of the project to the income of the people since the period for the project assignment was too short for bees to make honey that could be harvested and sold and within the assignment time frame. The project covered only the introduction of the project to villages, apiary preparation, catching bees, and hive management but not honey production and selling. It also covered planting of *Melliferous* trees in which its output were not yet to be seen. Therefore the author recommend for other researchers attempting or wishing to attempt similar project to base on bee-keeping contribution to people's livelihood and environmental conservation.

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