

## **BIBLIOGRAPHY**

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## **ABSTRACT**

The study was conducted to assess the beekeeping project in the sitios of Tadayan and Toplac, Kapangan, Benguet. There were 5 beneficiaries that were taken as respondents of this study. The study was conducted from December to February 2009.

Findings showed that majority of beneficiaries are male, married and attained high school education with household size of 3 to 6 members and most of them stayed in the place for 20 years. Majority of the beneficiaries started with one colony each having ten frames per box. Income derived ranged from P1000 to P5000.

In the management of their colonies, the beneficiaries had knowledge in the selection of location for colonies like source of food and water. Inspection of colonies was regular. Majority of them used one part sugar and two part water concentration for supplemental feeding. In production, the beneficiaries harvested honey once a year. Due to the small volume of production, the harvested honey was sold to the Municipal Agriculture Office (MAO) who took charge of packaging and labeling.

The problems encountered by the beneficiaries were more on biophysical and other problems such as marketing system. The strategies employed by the beneficiaries to solve the problems were chemical method and technical method.

The role of project implementers in the project was to monitor the development of the colonies given and provided trainings and seminars to enhance the capability of the beneficiaries to provide solutions to the problems they encounter in the operation of the project.



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## INTRODUCTION

### Rationale

Honey, the world's oldest sweetener, was the major sweetener until sugar cane was cultivated on a large scale in the New World. In ancient literature honey and honey bees are mentioned with much feeling and gratitude for their bounty. The Bible speaks of a land "flowing with milk and honey." In the early days, honey was gathered from the hives of wild bees in rock crevices and trees. Later, bee-hives were part of every monastery, castle and farm garden. With honey the principal sweetener until the 19th century, almost every small rural house-hold kept bees. Old English books tell how hams were cured in honey, and fruits preserved in honey solutions. The rinsing of the combs was used to make mead, the ancient honey drink known to all the people of antiquity (MAAREC, 2004).

Wikipedia defined beekeeping as the practice of intentional maintenance of honey bee colonies, commonly in hives, by humans. A beekeeper (or apiarist) may keep bees in order to collect honey and beeswax, or for the purpose of pollinating crops, or to produce bees for sale to other beekeepers. A location where bees are kept is called an apiary.

Beekeeping is an important component of agriculture. Aside from its nutritional and economic contributions, it also contributes to ecological balance. This venture is viewed as a potential industry (small scale industry) for development in the localities because it can provide employment to people in the rural communities. Beekeeping can be a dependable agricultural occupation only when the beekeeper has the technical know



how in beekeeping or honey production together with effective marketing and financial management and farm record keeping skills (Bulso, 2006).

The Philippine Inter-University Center (PIUC) is a partnership between Benguet State University, Saint Louis University and the Flemish Universities in Belgium. This partnership aims is to develop Information and Communication Technologies in education, library development, research and capability building and faculty development. PIUC has conducted several livelihood projects especially in Benguet. One of this livelihood projects is the Beekeeping Project and Goat Raising in Kapangan, Benguet including several Medical Missions implemented in different places in Benguet (Lee, 2007).

The members of the Beekeeping project in Kapangan, Benguet specifically in Sitio Toplac and Tadayan has decreased in number which according to Mrs. Lilia Palaca was caused by swarming of bees. This could be attributed to the lack of experience of beekeepers in taking care of their bee hives.

### Statement of the Problem

In view of the above, it is important to assess the beekeeping project in Kapangan, Benguet and document the impact of this project to the beneficiaries. This study was conducted to answer the following questions:

1. What is the profile of the beekeeping beneficiaries of beekeeping project in Kapangan, Benguet?
2. What are the management and production practices of the beneficiaries?



3. What are the problem encountered by the beneficiaries and the strategies employed as solution to the problem?

4. What is the role of the implementers in the beekeeping project?

#### Objectives of the Study

1. To determine the demographic profile of the beekeeping beneficiaries.
2. To identify the management and production practices of the beneficiaries.
3. To identify the problem met by the beneficiaries and the strategies employed to solve the problems.
3. To identify the role of the implementers in the beekeeping project.

#### Significance of the Study

The result of this study will provide relevant information regarding the condition or status of Beekeeping project in Kapangan, Benguet. Findings of this study will give recommendations to improve the management system of the project. This study will also help other researchers as a reference for other research purposes in beekeeping.

#### Scope and Delimitations of the Study

This study was confined to the beneficiaries and local government unit in Kapangan, Benguet under the PIUC project. It was focused on the assessment of the project especially on production and management practices of the beneficiaries in Kapangan, Benguet. It also included the contribution of the project in income generation of the project and determining the problems and strategies applied by the beneficiaries.





The study was conducted from January to February 2009. The data or information was gathered through personal interview with the use of structured interview schedule. The investigations covered the assessment of the project of beekeeping from beneficiaries to project co-implementers.



## REVIEW OF LITERATURE

### Beekeeping in the Philippines

Lowe (1982) identified the four species of honeybee that thrive well in the Philippines. The a.) *Apis mellifera* is also called the European Honeybee. Among the different species, this is considered to be the best honey producer. It thrives well in almost all countries of the world, so much so that it is now the major source of commercial honey in the world market. Some of its characteristics that make it best suited for commercial propagation are: it maintains a prolific queen, it makes multiple combs and produce honey efficiently, it has a gentle temperament, and it swarms less frequently and guards the hive vigilantly against enemies or pests. The problem a beekeeper must face when brooding this species is its vulnerability to a number of diseases. The *Apis indica* is smaller than the *Apis mellifera*. It is found practically throughout the Philippines and is locally called “laywan”. It constructs multiple combs in sheltered places like hollows of tree trunks or rocks. Unlike *Apis mellifera*, it is prone to heavy swarming and abandoning of hives (absconding), stealing from other colonies (robbing), and does not collect propolis. It is also helpless against the wax moth which frequently attacks during the rainy season. However, this species is resistant to diseases that affect *Apis mellifera*. The *Apis dorsata* also called rock bee or giant honeybee is also found in most parts of the country and is commonly called “pukyutan”. It builds a single comb, suspended from rocks or branches of tall trees and reaching a maximum length of six (6) feet. Its honey and wax are sought after by daring mountain people despite its reputation as a ferocious stinger. The *Apis floralae*, though a native of the Philippines,



colonies of this species are quite hard to find. It is also known as the dwarf honeybee and builds single combs the size of the hand's palm, suspended from branches of trees and bushes.

Baconawa (1995) stated in his study that the Philippines is one of the net importers of honeybee products. An average of 200 tons of honey is imported every year aside from other bee products such as royal jelly, pollen, propolis, queen bees, etc. The country could produce only 50 tons from cultured hives of *Apis Mellifera*, *Apis Cerana* and *Trigona* sp. *Apis dorsata* is hunted for its honey by rural folks. Its honey is consumed by them and some are sold to the towns and cities. He stated also that 500 beekeepers are registered in different Beekeeping associations in the Philippines. The country is also exporting beekeepers in other country like Australia, Canada and New Zealand.

#### Beekeeping in the Cordillera

There are 150 backyard beekeepers but most of them are concentrated in Benguet. Collective production is pegged from eight to twelve tons of honey being produced by the local beekeepers annually. About 70% of the total honey production in the country comes from this province. According to Toby Tamayo (Presidential Adviser for Alternative Livelihood) the potential areas in Benguet Province are the town of La Trinidad, Tuba, Itogon, Sablan, Tublay, Buguias, Atok, Kapangan and Baguio City (Sales, 1987).



### Development Gaps

Pacio, *et. al* (2005) stated that there are some problems encountered in beekeeping. One of the problems is the non-maintainance of the volume of production. This is due to destruction and extinction of some flora in natural environment. Another problem is the incessant application of pesticides to flowering plants which leads to the decimation of bees at the same time water systems are being contaminated and bees do not have any access to clean and safe water. In the locality, beekeepers do not grow plants for foraging bees. Bees only rely on the existing vegetation that nature provides. Aside from pest and disease, changing weather conditions and unavailable food for bees cause low productivity of the bees.

Another major problem in the Beekeeping Industry is lack of government support. This hinders the development of what can be regarded as a key to food security and environment conservation. According to Patricio Ananayo (N. D), chief of Agribusiness and Marketing Assistance Services (AMAS) of the Department of Agriculture (DA) the country is importing 90 to 95% of its honey requirement. He also said that DA has no specific funds to support the beekeeping industry.

### Beekeeping as an Integral Activity

Beekeeping is an activity which meshes well with agricultural and rural development projects. Some plants in the environment benefit from bee pollination of honeybees. A study conducted by Benguet State University was reported by Sales (1987) in determining the effect of honeybee pollinators in strawberry and pechay. Results revealed that strawberry yield significantly increased at 5% at marketable produce.



Pollinated plants had bigger fruits mostly with normal shapes while those that were not fully pollinated had smaller and deformed fruits because of the failure of some of the seeds to be fertilized. In pechay, plants pollinated by honeybees produced longer pods fully filled with seeds. The yields significantly increased by 85% while those excluded from honeybee pollination failed to produce normal pods and were seedless.

### Planning a Beekeeping Project

Beekeeping is an activity that fits well with the concept of small-scale agricultural development. It is a labor-intensive undertaking which can be easily integrated into larger agricultural or forestry projects. Bees not only aid in the pollination of some crops used in such projects, but they make use of otherwise unused resources - nectar and pollen. A small beekeeping project can be profitable from the beginning. After a project is started and expertise is gained it is easy for a beekeeper to increase the number of hives. A dependence on outside resources or input is not necessary to do this (Gentry, 1982).

Gentry (1982) in planning an effective beekeeping project, according to the first step is to become familiar with the bee-human relationship in an area. Talking to the people who are involved in beekeeping. Knowing how they work can be of help as regards to appropriate beekeeping technology in the area. The second step is to plan the laborers to work in the project and select the appropriate equipment and type of colony to manage. In planning a project, set realistic goals must be set. A small project which succeeds is more meaningful than a large one but fails. The successful presentation of an idea is a realistic expectation for introducing improved methods to the bee-human relationship in the area. The final plan that Gentry stated is to check local outlets for



marketing hive products in nearby areas. It is also important to check with those who may provide potential markets for bee products.

### Beekeeping as an Educational Activity

Vocational and agricultural training center and rural teacher training institutes make good sites to mount beekeeping projects. The trainees can have a multiplier effect in introducing beekeeping at the village level and the centers themselves serve as excellent demonstration sites. Exhibits of bees, equipment and hive products in regional fairs and meetings also serve to promote beekeeping and honey sales. Demonstrations actually working with colonies can help counter many popular fears of bees. A glass sided observation hive can create a lot of enthusiasm for bees. It affords a chance to study the bees at their hives activities, thus it is a great educational tool since such a small hive often needs close attention and care to maintain, it gives many opportunities for teaching the management needs and practices of the colony (Gentry, 1982).

Although the government cannot fully support the Beekeeping Industry in the country, there are educational institutions and non-government agencies to lend and give support to the industry. One the Philippine Inter-University Center (PIUC) in partnership between Benguet State University, Saint Louis University and Flemish University in Belgium. This partnership is towards the development of Information and communication technologies in education, library development, research and capability building and faculty development (Lee, 2007).



### Role of Environmental Impact Assessment

Environmental Impact Assessment (EIA) could form a major instrument in decision making and for measurement of sustainability in the context of regional carrying capacity. It provides the conceptual framework which extends to the cumulative assessment of developmental policies, plans and projects on a regional basis. EIA is potentially one of the most valuable, inter disciplinary objective decision-making tools with respect to alternate routes for development process technologies and project sites. It is an ideal anticipatory mechanism, which establishes quantitative values for parameters indicating the quality of the environment before, during and after the proposed development activity, thus allowing measures that ensure environmental compatibility. It presents a clear and concise picture of all benefits and costs associated with alternative courses of action and provides a mechanism for merging the concerns for environment and economics in the process of decision-making (Samar, 2005).

Impact assessment is the process of identifying the future consequences of a current or proposed action. It is used to ensure that projects, programmes and policies are economically viable, socially equitable and environmentally sustainable (Anonymous, 2009).

Impact Assessment is both a continuous process to help the policy-maker fully think through and understand the consequences of possible and actual government interventions in the public, private and third sectors; and a tool to enable the government to weigh and present the relevant evidence on the positive and negative effects of such interventions by reviewing the impact of policies after they have been implemented (Anonymous, 2009).



## Economic Impact Assessment

Economic impacts affect the level of economic activity in a municipality- either positively or negatively. For instance, it directly affects the economic well-being of area residents and businesses by changing employment levels and retail expenditures. It has also impact on the municipal financial situation by increasing or decreasing the assessment base and the demand for services. An economic impact assessment traces spending through an economy and measures the cumulative effects of that spending. The impact in the region is determined by the nature of the proposal which can be in the entire country, province, an individual municipality or a combination of municipalities. Defining the area of influence is an important first step in the process (Anonymous, 2009).

Estimating the economic impact of a project or development can be a very helpful process for understanding the potential benefits of various forms of growth. It should be noted, however, that the means of estimating these benefits are more useful in understanding the likely order of magnitude of impact rather than specific amounts. Economic impact assessment generates an estimate of the economic consequences of a particular project on the local economy. However, this provides only one piece of the puzzle in a broader evaluation or decision-making process. For example, there may be social benefits and ecological consequences that need to be taken into account, which would require a different methodology. In some cases a more general cost benefit analysis will attempt to place a monetary value on environmental and social impacts (Anonymous, 2009).





Socio-Economic impact assessment. The purpose of socio-economic impact assessment is to inform policy and decision makers about the potential benefits, as well as the probable adverse impacts, that may occur as the result of any given development. Utilising both qualitative and quantitative techniques, and frequently requiring an element of consultation, such assessments take into consideration both economic prosperity and social well-being for ‘healthy communities.’ In addition to forecasting what the impact will be, assessments should recommend ways to enhance the positive effects and reduce the adverse ones. The tools that are developed may also be used monitor and evaluate any socio-economic impact over time (SERI, 2009).

Social impact assessment. Social impact assessment (SIA) is a sub-field of the social sciences that is developing a knowledge base to provide a systematic appraisal in advance of the impacts on the day-to-day quality of life of persons and communities whose environment is affected by a proposed project, plan or policy change. This refers to changes to individuals and communities due to a proposed action that alters the day-to-day way in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. This is done to help individuals, communities, as well as government and private sector organizations understand and be able to anticipate the possible social consequences on human populations and communities of proposed project development or policy changes (Anonymous, 2009).

The PIUC livelihood projects as an activity of the strengthening the Institute of Social, Research and Development in consultation with the Kapangan Local Government Unit, other Barangay Pudong officials and community members. Beekeeping and goat raising were identified as alternative projects to eliminate the marijuana production in the



far flung barangays. The project sites for these specific activities are the two sitios of Tadayan and Toplac in Barangay Pudong, Kapangan, Benguet. These two sitios can hardly be reached by land transportation due to undeveloped roads. As a part of the drive against this illegal production activity, the Municipal Government of Kapangan requested the PIUC Programme to focus its assistance on livelihood development in sitios Tadayan and Toplac (VLIR-PIUC, 1998).



## **METHODOLOGY**

### Locale and Time of the Study

The study was conducted in the Sitios of Tadayan and Toplac, Barangay Pudong, and the project co-implementers in Barangay Lomon, Kapangan, Benguet. The study was conducted from December to February 2009.

### Respondents of the Study

The respondents of this study were five beekeeper beneficiaries and one project co- implementer in Kapangan, Benguet.

### Research Instrument

A survey questionnaire was used to gather relevant data and information from the target respondents. A field visit in the beneficiaries bee farms was also done to gather additional information.

### Data Gathered

The survey questionnaires were administered to the respondents. After the survey, a follow up interview were undertaken to clarify responses in the survey questionnaire.

### Data Analysis

The data collected were tabulated, analyzed using frequency, percentage and data were interpreted according to the objectives.



## **RESULTS AND DISCUSSION**

This portion of the study presents the results and discussion based on the objectives: to determine the profile of beneficiaries, their management and production practices and problems encountered as well as the strategies employed in the solution of problems met.

### Demographic Characteristics of Respondents

The demographic characteristics of the respondents are presented in Table 1. As to age, 80% of the respondents ages ranged from 25-45 years old. This implies that most of the beekeepers are generally young, thus they are more interested in apiculture as compared to older people in the community.

As to gender, there are more male beneficiaries than their female counterpart, which implies that male respondents had interest in apiculture. As regards to marital status, majority (80%) of the respondents are married and widowed. Hence, the project is considered as a source of additional income for the family. Most beneficiaries had a family size ranging from 3-6 members.

All the respondents finished high school level. Education is not really important. Hard work and dedication to work are the main ingredients that spell in any endeavour.



Table 1. Distribution of respondents by demographic characteristics

CHARACTERISTICS	FREQUENCY	PERCENTAGE
Age		
25-35	2	40
35-45	2	40
56-65	1	20
TOTAL	5	100
Gender		
Female	1	20
Male	4	80
TOTAL	5	100
Marital Status		
Single	1	20
Widowed	1	20
Married	3	60
TOTAL	5	100
Family size		
3 - 6	4	80
7 – 12	1	20
TOTAL	5	100



### Residence Information

Most respondents live in sitio Tadayan and sitio Toplac. Majority of the people are farmers. Root crops like sweet potato and cassava are common crops grown in the area. They also grow other vegetable and fruit crops like cucumber, chayote. Aside from farming, beekeeping serves as a livelihood project of the beneficiaries as other source of income.

One or 20% of the respondents lives in the place in less than 10 years. However, it was noted that majority of the respondent have a residence duration of more than 20 years in the place.

Result also showed that, 40% or 2 of them are still involved in the beekeeping project while 60% are no longer part of the project activities. This result explains that majority of the beneficiaries migrate to other places to search for better jobs to give them more income.

Table 2. Residence duration and occupation

RESIDENCE DURATION	FREQUENCY	PERCENTAGE
Less than 10 years	1	20
10 to 20 years	1	20
More than 20 years	3	30
<b>TOTAL</b>	<b>5</b>	<b>100</b>



### Number of Colonies

All the beneficiaries were given colonies to manage through the Municipal Agriculture Office (MAO). Before the beneficiaries were given with colonies, they had to qualify by attending beekeeping training in Saint Louis University-EISSEF Project in Bakakeng, Baguio City by PIUC.

In terms of number of colonies managed, 80% started with 1 colony; while 20% started with 2 to 5 colonies. Each colony consisted of 10 frames. The distribution of the colonies to the beneficiaries was based on the ability to manage.

At present, however only one beneficiary (20%) was able to increase the colonies from the initial of 1 to 2-5 box of colonies. Each colony having 10 frames per box. This implies that out of the five respondents only one beneficiary has successfully increased the number of colonies since it started.

Table 3. Number of colonies managed and number of frames since it was started up to present

	STARTED		PRESENT	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Number of colonies				
1	4	80	-	-
2	1	20	-	-
4	-	-	1	20



Moreover, additional colonies were distributed to the beneficiaries from the Department of Labor and Employment (DOLE) including new members in support to the beekeeping activities in the Cordillera. Each beneficiary is given one colony.

### Average Income

Since majority of the respondents have experienced harvesting honey in their colonies, 80% or 4 of them had a starting income of less than P1000.00. As shown in Table 4, one of them did not experience harvesting honey in his colonies. At present, 20% of them an average income of P1000 to P5000 per harvest and 80% of them have no income from their colonies. This is due to swarming of bees to other places. Other reasons are lack of time to manage their colonies. This result implies that only one respondent has successfully increased his income from beekeeping aside from the earnings from the farm.

Table 4. Average income level based on the number of harvest

INCOME	INITIAL		CURRENT	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
No income	1	20	4	80
Less than P1000	4	80	-	-
P1000 - P5000	-	-	1	20





### Management Practices

Factors considered. In establishing the location of a colony in a certain place, three factors were considered. All respondents considered the source of food for the bees in the area. Three or 60% considered the source of water in the area. Four or 80% selected the location with enough windbreaks like trees and plants around the area, especially during typhoons and three or 60% considered a location that was far from high pesticide or insecticidal spray that can cause colony poisoning. This implies that beneficiaries have been taught the factors to be considered in establishing their colonies. In management of colonies are adopted from the seminars given by the Municipal Agriculture Office. This seminar trains and enhances the skills of the beneficiaries before they start the project.

Inspection of colonies. As shown in Table 6, 40% of the respondents did weekly inspection in their colonies. A regular inspection of the colonies was done to check the status of the colonies, arrangements of food and also to observe predators or intruders

Table 5. Factors considered in location of colony

FACTORS	F	%
Source of pollen	5	100
Source of clean water	3	60
Enough windbreaks (especially during typhoon)	4	80
Distance from pesticide application areas	3	60

\*Multiple Responses



present in the colonies. However, majority of the respondents did a twice a week inspection of the colonies especially during swarm season to ensure that the honeybees do not leave their colonies.

Supplemental feeding. Since stored honey in the food frames is not enough to sustain bees especially during the rainy seasons, the beneficiaries supplemented their bees with sugar-solution for maintenance, comb building and brood rearing purposes. In the application of supplemental feeding, Table 7 shows that 40% used 1 part sugar + 1 part water concentration in comb building and maintenance. One respondents (20%) used 60% sugar + 40% water for maintenance. In comb building, one (20%) used 2 part sugar + 1 part water concentration while in brood rearing 60% of the respondents used 1 part sugar + 1 part water concentration. However, majority of the respondents used 1 part sugar + 2 parts water in comb building, maintenance and Brood Rearing.

Table 6. Frequency in inspecting colonies

FREQUENCY	F	(%)
Weekly	2	40
Twice a month	3	60
TOTAL	5	100



Feeding apparatus. For feeding apparatus used, all respondents used polyethylene bag feeder. On the other hand, commonly 20% used a division board feeder.

Preparation of colonies for honey flow. When the colonies were ready for harvest, 60% inspected the colonies once a week. Another 40% inspected the colonies twice a week. Inspections were done to be able to know the schedule harvest of the colonies.

Table 7. Supplemental feeding concentrations used

CONCENTRATIONS	COMB BUILDING		MAINTENANCE		BROOD REARING	
	F	%	F	%	F	%
60% sugar + 40% water	-	-	1	20	-	-
2 part sugar + 1 part water	-	-	-	-	1	20
1 part sugar + 1 part water	2	40	2	40	3	60
1 part sugar + 2 part water	3	60	3	60	3	60

\*Multiple Responses

Table 8. Distribution of respondents according to feeding apparatus used

FEEDING APPARATUS	F	%
Division Board Feeder	1	20
Polyethylene Bag Feeder	5	100



Table 9. Frequency of inspecting colonies for honey flow

INSPECTION OF COLONY FOR HONEY FLOW	FREQUENCY	PERCENTAGE
Once a week	3	60
Twice a week	2	40
TOTAL	5	100

### Production and Marketing

Production. Since these beneficiaries are the first batch to join the project, 60% had experience in harvesting honey for a year. On the other hand, 20% respondents did not experience harvesting honey. Interviews conducted reveals that the pests that attacked the colonies. Moreover, the beneficiaries had no time to manage the colonies.

Honey is the only common product derived from the project. With regard to volume of production, 60% harvested less than 10 bottles of honey per harvest and 20% harvest 10 to 15 bottles of honey per harvest. The volume of production of honey depended on the number of colonies managed by the respondents. The table indicates that the project beneficiaries produced a small volume of honey. This is caused by the decreased number of their colonies due to lack of time to manage and pests and diseases.



Table 10. Distribution of respondents based on production

PARTICULARS	STARTED		PRESENT	
	F	%	F	%
Experienced number of harvest within a year				
Once	4	80	1	20
Twice			1	20
None	1	20	3	60
Volume of production				
> 10 bottles	4	80	-	-
10 - 15 bottles	-	-	1	20

Marketing. In the disposal of the products, the Municipal Agriculture Office (MAO) became the market outlet of the beneficiaries. Project beneficiaries sold their honey products to the Municipal Agriculture Office at P200.00 per kilo. Since the Municipal Agriculture Office is the outlet of the beneficiaries, they will be in charge in packing and labelling the honey produced under the name of Kapangan Gold Honey Products as another by-product of Kapangan.

#### Problems Encountered

Pests and diseases. In relation to the problem on pests and diseases, 100% of the respondents encountered Varroa Mites, the most common pest of bees. According to Baldo (2000). These mites can cause shrivelled and deformed wings and bodies of young bees which eventually lead to the death of bees. Wax moth is also one of the common



problems of the 60% of beneficiaries. The larvae of the wax moth usually live in beehives and feed on wax and young bees and fill the tunnels of the hive with silken threads (Britannica, 2009). Birds are a problem of 80% of the beneficiaries. Wasps are called “alimpapaso” which are much bigger than the bees. They attack the colonies by capturing the bees and killing them. As shown in Table 11, the respondents most or have serious problems. Main concerns are the Varroa Mites, birds and wasps that affect their colonies. Swarming is also one of the common problems of the beneficiaries. This indicates that project beneficiaries did not usually use the knowledge learned from the seminars and trainings they attended to be applied in their colonies.

Table 11. Problems encountered in pest and diseases

PEST AND DISEASES	FREQUENCY	PERCENTAGE
Varroa Mites	5	100
Wax Moth	3	60
Birds	4	80
Wasp and other pests	5	100
Swarming	5	100



Biophysical problems. The location of the place is one of the problems in the area. The place contains environmental factors that are being encountered by the beneficiaries. Lack of food source in the area is a problem encountered by 100% followed by near high pesticide usage (80%) and strong wind and disturbance of animals and human beings at 40% each.

Other problems. The project beneficiaries wanted to sell their products to other outlets for a higher price since the Municipal Agriculture Office brought their product for only P200.00 per kilo.

Moreover, 80% of them have problems on the lack of tools and equipment which they needed especially during harvest since the co-implementer suggests that the honey product will be brought to the Municipal Agriculture Office for assistance and also for the extraction of the product produced. Lack of resourcefulness and no initiative were the other problems encountered by the beneficiaries.

Table 12. Biophysical factors affecting beekeeping operations

BIOPHYSICAL PROBLEMS	FREQUENCY	PERCENTAGE
Strong wind	2	40
Lack of food source	5	100
Near from high pesticide usage	4	80
Disturbance of animals and human	2	40



### Strategies Employed

Pest and diseases. To eliminate the pest and diseases encountered in the colonies the respondents used chemical and organic or Bio-Technical Methods. Some of the beneficiaries adopt the technology learned from the seminars aside from their knowledge to eliminate the problem they encountered. To eliminate Varroa Mites, 40% used Miticide Fluvate (Apistan) a synthetic pyrethoid, while majority of them are applying 100% applied Formic Acid. According to the respondents they used Peotraco Powder, a powdery substance applied to the colonies that is used for baking purposes. This is applied especially during pre harvest.

For wax moth, 60% cleaned the bottom boards while 40% kept unused combs from the colonies. 20% burned the infested wax to minimize infestation.

Due to location of the place, 40% installed net trap near the colonies to trap the birds. While 100% used air gun. To control or eliminate wasp and other pests, the respondents hit mechanically by hitting them with slippers or any piece of wood. One of the strategies was the dispersion of the colonies to other places.

Biophysical problems. To cope with the biophysical factors affecting the beekeeping operations, 40% of the respondents used local hives to support the colonies from the strong wind during typhoon. There were 80% considered that the presence of natural vegetation and tree planting to help to solve the problem on food source of the bees. All of the respondents practiced the transfer of colonies to other places to solve the problems on the disturbances caused by human beings and animals.





Table 13. Strategies applied on pest and diseases

STRATEGIES	FREQUENCY	PERCENTAGE
a. Varroa Mites		
Miticide fluvalinate	2	40
Formic Acid	5	100
b. Wax Moth		
Cleaning bottom boards	3	60
Burning of infested wax	1	20
Keeping unused combs	2	40
c. Birds		
Placing a trap	2	40
Wasps and other pests		
Destroying mechanically	5	100
TOTAL	5	100

\*Multiple Responses

Table 14. Strategies applied to biophysical factors affecting beekeeping

STRATEGY APPLIED	FREQUENCY	PERCENTAGE
Using of local hives	2	40
Presence of natural vegetation	4	80
Tree planting	5	100
Transferring the colonies to other places	5	100

\*Multiple Responses

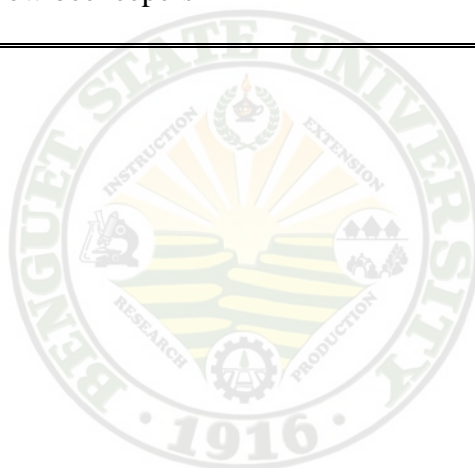


Other problems. Table 15 shows that to be able to address the problem in poor marketing system, all of the respondents tried to contract direct buyers. As shown in Table 16, 80% of the respondents borrowed tools from fellow beekeepers to address the problem due to lack of equipment to use.

Table 15. Strategies applied to other problems

STRATEGY	FREQUENCY	PERCENTAGE
Lack of equipments		
Borrowing tools from fellow beekeepers	4	80

\*Multiple Responses



## The Project Co-Implementors

### The Philippine Inter-University Cooperation (PIUC)

Philippine Inter-University Cooperation (PIUC) is a partnership between the Benguet State University, Saint Louis University and the Flemish Universities in Belgium. The partnership between these universities is toward the development of Information and Communication Technologies (ICT) in education, library development, research and capability building and faculty members development (Lee, 2007).

The PIUC has established livelihood projects like beekeeping and goat raising in the Municipality of Kapangan, Benguet through a memorandum of agreement. The willingness of the LGU to cooperate with the PIUC in establishing livelihood projects provided additional income to residents who were recipients of training and funding (Lee, 2007).

The PIUC program through its socio-economic component (Project 5), plays a proactive role in the development of the priority needs of the communities in its service areas through extension in collaboration with the respective Local Government unit in identified areas in Kapangan as its adopted municipality.

The role of Benguet State University and Saint Louis University as a part of the project is to monitor the development of the project. Visitation of demo farms and the beneficiaries are done by representatives of Benguet State University and Saint Louis University to monitor the development of this project.

The Local Government Unit of Kapangan welcomes the partnership with other agencies in providing alternative livelihood projects for the people. And these are apiculture, goat raising and carabao raising, which all possible livelihood projects that



would create self-employment and provide additional farm income of beneficiaries through the production and sale of products. The Municipal Agricultural Office (MAO) is the implementing arm of the local government unit.

Kapangan Gold Honey Beekeepers Organization (KAGHOB) is an association of all the beekeepers in Kapangan, Benguet. The objective of this project is to promote beekeeping activities in the locality and also serve as one source of income by the beneficiaries. The Organization is under the supervision of the Municipal Agriculture Office located at Lomon, Kapangan, Benguet. Other government agencies like Department of Labor and Employment (DOLE) are few departments who give support to the beekeeping activities in Kapangan.

The Municipal Agriculture Office (MAO) where initially started with 8 members. They started with 15 to 20 boxes of colonies for demo and production of more colonies for dispersion to target beneficiaries. At present, there are about more than 35 boxes of colonies in the demo farm. Each colony has ten frames for each box.

The MAO conducts seminars and trainings two to three times a year. They also conduct seminars and trainings through the request of the beneficiaries.

### Seminars Conducted

Table 16 shows the seminars conducted by the co-implementers in 2006, workshop on simplified farm record keeping at Chrysanthemum Hall, BSU, La Trinidad, Benguet and Beekeeping Technical Forum, Bridging gap, Sustaining and Upgrading the Cordillera Beekeeping Industry Through Shared knowledge, Skills and Technology were held at Benguet State University, La Trinidad, Benguet. Participants of these seminars



Table 16. Seminars attended by the beneficiaries

YEAR	TITLE	LOCATION	HOST
2006	Simplified Farm Record Keeping	Chrysanthemum Hall, BSU, La Trinidad, Benguet	Benguet State University
	Beekeeping Technical Forum, Bridging Gap, Sustaining and upgrading the Cordillera Industry through shared knowledge, skills and Technology	Benguet State University, La Trinidad, Benguet	Benguet State University
2007	Hands on Training and Seminar on Basic Beekeeping	Lomon, Kapangan, Benguet	Municipal Agriculture Office
	Seminar of farmers on Proper Pesticide and Insecticide Management and Introduction of Beekeeping	Lomon, Kapangan, Benguet	Municipal Agriculture Office
	Commercial Beekeeping Operations	Beekeeping Service Center, Baguio City	Saint Louis Univeristy

included the project implementors and other beneficiaries from Kapangan who were available at that time.

In 2007, seminars conducted by the MAO were Hands-on Training and Seminar on Basic Beekeeping, Seminar of Farmers on Proper Pesticide and Insecticide Management and Introduction of Beekeeping at Lomon, Kapangan, Benguet. They also attended several seminars and trainings in Baguio City like Commercial Beekeeping Operation Seminar held at Beekeeping Service Center, Bakakeng, Baguio City.

MAO visited the beneficiaries to monitor the performance of their colonies and to give suggestions or any help regarding their observations. Technical assistance was given by the organization especially at harvest time. Other assistance being offered to the



beneficiaries included lending of equipment or tools. Most of the time beneficiaries bring the harvested honey to the MAO to be processed and to be assisted by the project implementers due to lack of equipment to be used. Meetings, reports and purchase of materials were also done by the MAO two to three times a month for sustainability and maintenance of the projects.

Aside from trainings and seminar given by MAO, they were given some sugar, medicines and materials that were used in beekeeping for further development of this project. The LGU in Kapangan also offered small loans to beekeepers for financial assistance.

#### Colonies Dispersed

Table 17 presents the colonies given to the beneficiaries. The MAO gave in 2004 22 colonies from the PIUC to the first batch of beneficiaries. This consisted of seven members from Sitio Toplac and Tadayan. In the succeeding year, the number of members in the Organization increased. In 2006, MAO released 35 colonies given by the PIUC to the second batch. Since DOLE also supported beekeeping projects in the Cordillera. They distributed about 36 colonies to the MAO in 2008, as additional colonies given again to the beneficiaries. The schedule of disposal of colonies to the beneficiaries is scheduled twice a year or every after seminars and trainings conducted by the Municipal Agriculture Office.



Table 17. Number of colonies being dispersed by the Municipal Agriculture Office

BATCH OF DISPOSAL	NUMBER OF COLONIES	YEAR
1 <sup>st</sup> Batch	15 colonies	2004
2 <sup>nd</sup> Batch	35 colonies	2006
3 <sup>rd</sup> Batch	36 colonies	2008



## **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### Summary

This study was conducted in Sitio Tadayan and Toplac to determine the status of the PIUC Beekeeping Project along the specific problems 1) determine the profile of beneficiaries; 2) management and production practices involved 3) problems encountered and strategies applied in the solution of the problems encountered, and 4) the role of implementers in the project.

The respondents of the study were five beneficiaries from Sitio Tadayan and Toplac and one project co-implementor from Barangay Lomon, Kapangan. The beneficiaries were composed of four (4) male and one (1) female, majority were married and with household size of three (3) to size (6) members. They all attained high school education. Most of them lived in the place for more than 20 years and their major source of income was farming. Majority of them started with one colony each having ten (10) frames per box. Most beneficiaries (80%) had a starting income of less than P1000 and only one beneficiary is earning P1000 to P5000 per harvest.

In the management of colonies, the beneficiaries had knowledge in selecting the location for their colonies like source of food and water, enough windbreaks to protect the colonies especially during typhoon and location far from the use of pesticides. In inspection of the colonies, was regular inspection specially during swarming season. Majority of the beneficiaries used 1 part sugar and 2 part water concentration in supplemental feeding for comb building, maintenance and brood rearing. Along production practices, majority experienced harvesting honey once in a year and honey





products were disposed to the Municipal Agriculture Office for labelling and packaging as Kapangan Gold Honey product.

The problems encountered by the beneficiaries were more on pests like Varroa Mites, wax moth, birds and others indication of any disease near reported. Biophysical factors like swarming and lack of food source were common problems of the beneficiaries. Other problems included the location of the colonies affected by high pesticide use that cause colony poisoning. Other problems in the area were poor marketing system and lack of tools and equipment used were the major problems affecting the beekeeping in the locality.

To eliminate these problems, strategic methods were applied by using Chemical Method especially in Varroa Mites. For wax moth, birds and other wasps, the technical method was employed by cleaning the colonies, burning of infected wax and using traps. With regard to biophysical factors, majority of the respondents considered the presence of natural vegetation in the area and transferring the colonies to other places to solve the problem regarding food source and disturbance caused by human and animals. To minimize the problems concerning poor marketing system, the beneficiaries contacted other market outlets and direct buyers for their products. Borrowing tools from fellow beekeepers were one strategy to address the problem in the lack of tools and equipment to use. The Municipal Agriculture Office helped the beneficiaries in the use of tools and equipment.

The co-implementers of the project were the Philippine Inter-University Cooperation (PIUC) in partnership with the Benguet State University, the Saint Louis University and the Flemish Universities in Belgium; The Local Government Unit (LGU)



of Kapangan and other government agencies like the Department of Labour and Employment (DOLE). These agencies conducted seminars-workshops on beekeeping, distributed colonies, and also some financial assistance to beneficiaries.

### Conclusions

Based on the findings the following conclusions are made:

1. Educational attainment of respondents is an important criterion in the choice of beneficiaries to enable them to understand the requirement for a beekeeping project especially in attendance to seminars and training.
2. Seminars and training attended by the beneficiaries of the beneficiaries provide solution to problems not in the operations of the project.
3. Supervision of co-implementers promotes success in the project.

### Recommendations

In line with the findings of the study, the following recommendations are forwarded:

1. The beekeeping project be extended to more sitios or far flung areas especially those planted with marijuana.
2. To focus more on the trainings and seminars be given to the beneficiaries by the LGU-MAO to focus more on the management and production practices.
3. In demo farm, additional financial support to the project be provided to be able to continuously conduct seminars and trainings to the beneficiaries for in information



dissemination not only to the beneficiaries but to other farmers to encourage them to join the project.

4. Co-implementers should make available financial assistance with affordable rates for the sustainability of the project.



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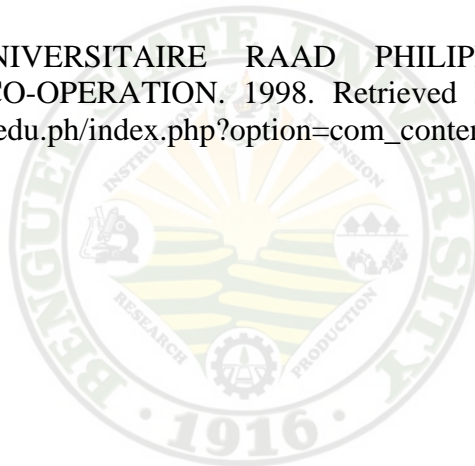
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## APPENDIX A

Benguet State University  
COLLEGE OF AGRICULTURE  
La Trinidad, Benguet

Dear Sir/Madam:

Greetings!

I am a graduating student of Benguet State University taking up Bachelor of Science in Agribusiness major in Enterprise Management. As a part of this course requirement. I am presently conducting a research study titled, “ASSESSMENT OF THE BEEKEEPING PROJECT UNDER PHILIPPINE INTER-UNIVERSITY COOPERATION (PIUC) IN KAPANGAN, BENGUET”, in partial fulfillment of the requirements of the course.

May I request assistance and information about the beekeeping project and the demo farm in your place. Rest assured that all information you provide will be treated with outmost confidentiality.

God Bless!

Very truly yours,

JUDITH LA-ONGAN  
Researcher

NOTED BY:

LEOPOLDO TAGARINO  
Adviser



## APPENDIX B

### Interview Schedule (Project Co-Implementors)

Instruction: Please fill in the blank/check and supply the needed information below:

Name:

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Age:

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Address:

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#### ABOUT THE PROJECT

	START	PRESENT
Numbers of colonies of the farm		
Number of frames in each colony	<input type="checkbox"/> 10 frames <input type="checkbox"/> 15 frames <input type="checkbox"/> 20 frames <input type="checkbox"/> others, pls. specify _____	<input type="checkbox"/> 10 frames <input type="checkbox"/> 15 frames <input type="checkbox"/> 20 frames <input type="checkbox"/> others, pls. specify _____
Numbers of members of the project	<input type="checkbox"/> 5 members <input type="checkbox"/> 5-10 members <input type="checkbox"/> 10-15 members <input type="checkbox"/> other, pls. specify _____	<input type="checkbox"/> 5 members <input type="checkbox"/> 5-10 members <input type="checkbox"/> 10-15 members <input type="checkbox"/> other, pls. specify _____

- Are you still conducting seminars or trainings in to the beekeepers beneficiaries?

yes            no

If yes, how many times you conduct in a year?

never                                    two times a year

three times a year                    more than three times a year



\_\_others; pls. specify \_\_\_\_\_ If no, why?

---

- Is any representative from your office currently monitoring the colonies of your beneficiaries?

\_\_yes, there is \_\_none

- Are they giving suggestions regarding their observations?

\_\_yes \_\_no

- What are the form of assistance do you offer to the beneficiaries?
- 
- 

**DEMO FARM**

**I. MANAGEMENT PRACTICES**

**COLONY HIVE MANAGEMENT**

- Inspection of colonies

How many times in a month do you inspect your colonies?

\_\_once a month \_\_twice a month  
 \_\_thrice a month \_\_weekly  
 \_\_ others, pls. specify \_\_\_\_\_

- Brood Rearing

Type of feeding apparatus used:

\_\_ division board feeder \_\_bottle feeder  
 \_\_ polyethylene bag feeder \_\_ other, pls. specify \_\_\_\_\_

Application of supplemental Feeding	Concentration applied:					
	60% sugar + 40% water	40% sugar + 60% water	50% sugar + 50% water	2 part sugar + 1 part water	1 part sugar + 1 part water	2 part sugar + 2 part water
Comb building						
Maintenance						
Brood Rearing						





Preparation of colonies for honey flow:

How many times do you check your colonies in preparation for honey flow?

once a week                       once a month                       twice a  
month  twice a week                       others, pls. specify

\_\_\_\_\_

- Queen Rearing

Are you practicing queen rearing?

yes                                       no

If yes, when? \_\_\_\_\_

If no, why? \_\_\_\_\_

Requirement for a good queen rearing:

colony with a good record in nectar gathering  
 good performance in pattern of laying  
 gentle not hostile breeder colony

How many years engaged in queen rearing?

2-3 years                                       3-5 years  
 5-10 years                                       others; pls. specify

What are the materials used in queen rearing

queen cap made of common reed or tanubong  
 bamboo splints                                       anes  
 brush     wax or plastic splints  
 carabao horn     other, pls specify \_\_\_\_\_



- Pest management

Pests	Management and remarks
Varroa Mites	
Ants	
Wax moth	
Chalk Brood	
Chalk brood	
European Foul Brood	
American Foul Brood	
Lizards	
Swift	
Other pests	

#### IV. PRODUCTION PRACTICES

Experienced number of harvesting of honey in a year?

once                       twice                       others; pls. specify

\_\_\_\_\_

What type of honey did you produced?

honey                       bee pollen

bee wax                       propolis

others, pls. specify \_\_\_\_\_

#### PROBLEMS AFFECTING THE FARM:

Which of the following problems considered affecting the farm?

Small production area                       late release of funds

Late arrival of supplies and materials                       high cost of production

Insufficient number of personnel                       Lack of support from the agency

others, pls. specify \_\_\_\_\_



What can you suggest to solve the stated problems above?

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APPENDIX C

Interview Schedule  
(Project beneficiaries)

I. Respondents Profile

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Age: \_\_\_\_\_

Gender:     \_\_ male                   \_\_ female

Educational Attainment:

\_\_ No formal education

\_\_ Elementary education

\_\_ High school education

\_\_ others; pls. specify \_\_\_\_\_

Marital Status:

\_\_ Single     \_\_ married           \_\_ widowed           \_\_ separated

Family size:

\_\_ 2 members                   \_\_ 3-6 members           \_\_ 7-12 members

\_\_ others; pls. specify \_\_\_\_\_

II. RESIDENCE INFORMATION

a. Residence duration in the place:

\_\_ less than 10 years   \_\_ 10-20 years           \_\_ More than 20 years

b. Still involved in beekeeping?

\_\_ yes                                   \_\_ no

b.1. If yes, how many years engaged in beekeeping?

\_\_\_\_\_



b. 2. If no, please write the reason:

\_\_\_\_\_

c. Occupation aside from beekeeping:

farmer                       government employee  
 businessman  
 laborers                       other; pls. specify \_\_\_\_\_

III. NUMBER OF COLONIES

Started colonies:	No. of frames	Present colonies:	No. of frames
<input type="checkbox"/> 1 colonies	<input type="checkbox"/> 10 frames/colony	<input type="checkbox"/> 1 colonies	<input type="checkbox"/> 10
<input type="checkbox"/> 2 colonies	<input type="checkbox"/> 10-15	<input type="checkbox"/> 2 colonies	frames/colony
<input type="checkbox"/> 2 - 5 colonies	frames/colony	<input type="checkbox"/> 2 - 5 colonies	<input type="checkbox"/> 10-15
<input type="checkbox"/> others, specify	<input type="checkbox"/> 15-20	<input type="checkbox"/> others, specify	frames/colony
_____	frames/colony	_____	<input type="checkbox"/> 15-20
<input type="checkbox"/>	<input type="checkbox"/> others, specify	<input type="checkbox"/>	frames/colony
	_____		<input type="checkbox"/> others, specify
	_____		_____
			<input type="checkbox"/>

IV. AVERAGE INCOME ON BEEKEEPING PRODUCTION

Started income:	Present income:
<input type="checkbox"/> less than P1000	<input type="checkbox"/> less than P1000
<input type="checkbox"/> P1000 to P5000	<input type="checkbox"/> P1000 to P5000
<input type="checkbox"/> more than P5000	<input type="checkbox"/> more than P5000
<input type="checkbox"/> others, pls. specify	<input type="checkbox"/> others, pls. specify

V. BEE PROJECT INFORMATION

a. Did you attend seminars/ trainings related to beekeeping project?

yes                       no

a.1. if yes, please write the seminars/ trainings attended:



Title

Date

_____	_____
_____	_____
_____	_____

b. Are the things learned from the seminars/trainings attended was being applied on your colonies?

\_\_yes                      \_\_no

b.1. If yes, what are these learning's applied?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

b.2. If no, why?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### VI. MANAGEMENT PRACTICES

What did you consider in establishing the location of your colony?

- source of food for the bees
- source of water
- enough windbreaks especially during typhoon seasons
- far away from areas with high pesticide/insecticidal spray usage
- others pls, specify \_\_\_\_\_

### COLONY HIVE MANAGEMENT

- Inspection of colonies

How many times in a month do you inspect your colonies?

- once a month               twice a month
- thrice a month               weekly
- others, pls. specify \_\_\_\_\_



- Brood Rearing

Application of supplemental Feeding	Concentration applied:					
	60% sugar + 40% water	40% sugar + 60% water	50% sugar + 50% water	2 part sugar + 1 part water	1 part sugar + 1 part water	2 part sugar + 2 part water
Comb building						
Maintenance						
Brood Rearing						

- Type of feeding apparatus used:

division board feeder                       bottle feeder  
 polyethylene bag feeder                       other, pls. specify \_\_\_\_\_

- Preparation of colonies for honey flow:

How many times do you check your colonies in preparation for honey flow?

once a week                       once a month  
 twice a month                       twice a week  
 others, pls. specify \_\_\_\_\_

## VII. PRODUCTION PRACTICES

a. Experienced number of harvesting of honey in a year?

once                       twice                       others; pls. specify \_\_\_\_\_

b. What type of honey did you produced?

honey                       bee pollen  
 bee wax                       propolis  
 others, pls. specify \_\_\_\_\_

c. Volume of production produced?

less than 10 bottles                       10-15 bottles  
 more than 15 bottles                       others, pls. specify \_\_\_\_\_

d. Where do you disposed or sell your honey produced?

directed to contact buyers                       market  
 municipal office                       Others; pls. specify \_\_\_\_\_



## VIII. PROBLEMS AND STRATEGIES

PROBLEMS	STRATEGIES
Pest and diseases	
a. Varroa Mites	Chemical Treatment: __miticide fluvalinate(Apistan) __apicure __formic Acid __folbes (chlorobenzilate) __others,pls. specify _____
	Bio-Technical Method __changing the bottom board of a hive __encouraging worker bees to make drone __using alagaw __others, pls. specify _____
b. Wax Moth	__cleaning bottom boards __keeping unused combs __burning infested wax __application of pesticide __others, pls. specify _____
c. Birds	__placing a net trap __dispersing the colonies __others, pls. specify _____
d. Wasps and other pests	__using traps __destroying mechanically __making metal hive stand __caught using insect nets __others, pls. specify _____
e. Chalk brood	__young productive queens, new comb, strengthening the colonies __good colony management





	__ others, pls. specify _____
f. Sac brood	__ requeening is practiced __ removal of infected brood __ others, pls. specify _____
g. American foul Brood/European foul Brood	__ feeding the colonies with oxytetracycline hydrochloride __ infected colonies burned __ other, pls. specify _____
h. Nosema	__ adult bees transferred on the clean combs __ partial replacement of combs __ other, pls. specify _____
Problems affecting beekeeping in the area	
i. poor marketing system	__ contracting direct buyers __ promotion of the products __ others; pls. specify _____
j. lack of appropriate equipment	__ acquiring loans from public or private used to buy equipments __ borrowing tools from fellow beekeepers __ other, specify _____
k. Kinds of biophysical factors affecting the beekeeping operations:	
__ strong wind during typhoon __ lack of food source __ too far water source for bees __ swarming of bees __ prone to disturbance caused by human and animals __ near from areas with high pesticide usage	__ use of local hives __ presence of natural vegetation __ tree planting __ laying of traps __ transferring the colonies to other places __ other; pls. specify _____



## IX. RECOMMENDATION

Please write some suggestions or recommendation on how the project implementers should improve the status of beekeeping in the locality?

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