# Sarteneja Honey Producers Association

***"Producing and Harvesting Organic Honey in Belize"***

# Environmental Management Plan
# June 2015

# Contents

## 1.0 Project Background:

Sarteneja is a community of approximately 1,824 habitants located on the northern coast of Belize, east southeast of Corozal Town. It is approximately 30 by road and 18 miles by sea from Corozal Town and 40 miles by road from Orange Walk Town. While fishing has been the mainstay of the local economy in recent years, farming is has been a traditional source of income. Farmers plant a variety of crops that include but are not limited to mango, pineapple, plums, avocado, sweet potato, yams, beans and corn. The community also makes use of the natural resources found in the area.

The Sarteneja Honey Producers Association was registered in 2010. The group is comprised of mainly fishermen who in recent years have been experiencing gradual decline in landings of fisheries products. The group decided to seek alternative sources of income in an effort to maintain their livelihood. After much discussion the group decided to venture into wild flower honey production as the Shipstern Nature Reserve is located four miles from the village. The group a SSEDAT grant and started to produce honey in 2011. The group has one experienced beekeeper and 50 hives. With the assistance of the Ministry of Agriculture's extension services the group has adopted several management practices that has allowed it to be successful.

The Sarteneja Honey Producers Association has been working for more than four years with limited resource as of that of little management, infrastructure and little hygiene equipment. However, it is a great opportunity that this project will strengthen the association capacity in management skills, financially and structurally. Also, the other part of the project is focused mainly in training the beekeepers in the topic, the expansion of the present apiary of bee colonies to a 100%, the establishment of storage room with all proper materials which will serve both as an extracting room and a collection center which will mend to meeting and fulfilling all National and international honey food handling and safety standards. The association understands the need of a proper establishment.

## 2.0 Objectives:

2.1 Project purpose:

- reduction of the dependence on extractive activities in the rural communities located next to protected areas of Belize

2.2 Project Purpose:

- implementation of an alternative livelihood initiative that is socially, environmentally and economically sustainable; organic honey production.

2.3 Specific Objectives:

- Increase awareness of group members regarding conservation of environment. Develop awareness on members and the community of the importance of the natural environment in regards to the project
- build capacity of Sarteneja Honey Production Association to develop and sustainably manage a natural resources-based income alternative.
- Develop best practices for the production and sale of forest honey
- Produce high quality honey under hygienic conditions for sale locally and regionally.

## 3.0 Activities

**Activity 1:** Capacity building for the SHPA –SHPA recognizes the need to build its organizational capacity for organization and project management since it is a young organization with lack of institutional capacity.

Provision of five series of training in specialized areas that are key in beekeeping and honey industry; abstraction of honey production, production of byproduct of honey bee, Queen rearing and integrated hive management, Training of SHPA members and Beekeepers in packaging of honey-all this to provide high standard of honey production, and ensure a sustainable business operation.

**Activity 2:** Establishing the SHPA as a business that provides a variety of activities for its members in Sarteneja, and establishing the SHPA office through purchase of essential office equipment for SHPA's administration also in beekeeping and honey harvesting and hiring of a part time project coordinator to oversee project.

**Activity 3:** Development of the Sarteneja Honey producers Association website for marketing the production of Honey as an industry in Sarteneja, and through development, production and distribution of flyers and posters.

**Activity 4:** Construction of storage facility-warehouse with multi-use purpose building a key Storage facility for extraction of honey, storage of high quality hone ready to distribute, for the maintenance of equipment used for all purposes of beekeeping and honey harvesting, and place used for business operations.

**Activity 5:** Care and Maintenance of bee colonies and honey production. Provide members of the SHPA with access to equipment and training to enable them to conduct quality beekeeping and honey production following basic practices

## 4.0 Expected Environmental Impacts:

**Activity 1:** Capacity building for the SHPA – This has no environmental impact.

**Activity 2:** Establishing the SHPA as a business that provides a variety of activities for its members in Sarteneja – This will be dependent on Activity 5 below.

**Activity 3:** Development of the Sarteneja Honey producers Association website. - This has no environmental impact.

**Activity 4:** Construction of storage facility-warehouse with multi-use building – There is no anticipated environmental impact as this building will be built in the village where there is no need to do any land clearing or other modifications. There is also no discharges or effluents that are anticipated from the facility which will be used primarily for packaging and storage..

**Activity 5:** Care and Maintenance of bee colonies and honey production. - Hives will be located in natural clearings that already exist within the targeted forest areas.

An exhaustive search of the literature has uncovered no known negative impacts to biodiversity from beekeeping activities. On the contrary, bees are considered to be essential for a healthy environment. Bees are important pollinators and many ecosystems depend on the pollination of bees for their existence and for increasing their genetic diversity (cross-pollination). Some types of plants depend uniquely on their pollination by bees. However, the true ecological value of the pollination service of bees in forest communities is unknown. Bees also play an important role in pollinating crops. About one third of all plants or plant products eaten by humans depend directly or indirectly on bees for their pollination. Crops pollinated by bees have been proven to produce higher yields and better quality, often at no extra cost for the farmer.

The excessive use of pesticides in agriculture can harm bees directly and indirectly. Bees bring the pesticide-contaminated pollen and nectar to their hive and slowly poison their offspring as the pollen and nectar are fed to the bees. One of the possible causes of Colony Collapse Disorder (CCD), a phenomenon that recently hit many beekeepers throughout the world, is exactly the use of certain types of pesticides.

In Belize one of the prevailing threats from beekeeping is to human and domestic animal populations from the Africanized bees. The bees are hard workers and aggressively defend their hives. As a result they will swarm any potential threat and have been known to kill domestic animals and seriously injure humans. Unlike the more docile European Honey Bee

(EHB) that is used for honey production in Belize, the Africanized Honey Bee (AHB) quickly defends its hive and will pursue intruders longer distances. The venom from an AHB sting is no more potent than the venom of a single EHB sting. Most AHB stinging incidences have involved animals, but on rare occasions humans have been attacked. Stinging attacks occur only when the AHB's nest or territory is threatened by an intruder. In some cases, the noise or vibration of tractors or motor boats has provoked the bees to sting. However, chance encounters with individual AHBs on blossoms pose no greater threat than encounters with EHBs.

## 5.0 Bacterial Diseases

American (AFB) and European (EFB) Foulbrood disease are caused by a spore-forming bacterium, *Paenibacillus larvae*, and non-spore forming *Mellissococcus pluton* respectively, which only affect bee broods. A 'search and destroy' strategy may be adopted with AFB infections in an attempt to minimize damage to apiaries. However, while effective, the practice of burning AFB infected colonies and equipment is costly. Nonetheless, the destruction of brood combs and food combs is absolutely necessary and any remaining parts of the hive must be thoroughly disinfected.

EFB attacks younger broods and the diseased larvae die when they are four to five days old. If the infection is weak, it is often sufficient to stimulate the hygiene behaviour of the bees. Either they are placed at a good foraging site or they are fed with honey or sugar water. An even better result is achieved if the individual combs are sprayed. If the infestation is stronger it makes sense to reduce the number of pathogens in the colony by removing the most infested brood combs. Empty combs or healthy brood combs then replace these. Since the bees' hygiene behaviour is also genetically determined, replacement of the queen is also possible.

## 6.0 Fungal Disease

Chalkbrood is a disease caused by the fungus *Ascosphaera apis*. As its name implies, it affects honey bee brood. This fungus only forms spores during sexual reproduction. Infection by spores of the fungus is usually observed in larvae that are three to four days old. The spores are absorbed either via food or the body surface. EFB control, is sufficient for Chalkbrood control.

## 7.0 Viral Diseases

At least 18 virus types and strains have been recorded as disease pathogens of adult bees and bee brood, and nearly all are RNA viruses. *Sacbrood* disease is the most common. Diseased larvae fail to pupate after four days. No chemotherapeutic agent is effective in preventing or

controlling *Sacbrood* disease. Colonies often recover from the infection without the beekeeper's intervention. Response is primarily hygienic.

Black queen cell virus is closely associated with *Nosema* infection. It is unique in that the virus only replicates in the larvae of queens. Diseased larvae or prepupae die after the queen cell has been capped.

While few of these viruses produce visible symptoms, an exception is deformed wing virus (DWV), which when present in high levels causes developing bees to have malformed wings. When large numbers of bees in a colony have DWV, the colony likely has a high *Varroa* mite population, requiring immediate intervention to control the infestation.

Chronic paralysis virus produces two sets of symptoms. Some bees infected with chronic paralysis virus are unable to fly and can be seen crawling, often climbing up stems of grass. The individual bee's body and wings often tremble abnormally, and the abdomen may appear distended. Infected bees die within a couple of days of symptoms appearing, and colonies can suddenly collapse if large numbers of bees are infected.

Some bees infected with chronic paralysis virus appear smaller than other bees, are dark to black in color, and have a shiny, greasy appearance. Symptomatic bees are unable to fly, will begin to tremble, and die within a couple of days. This condition is referred to as Hairless black syndrome

Some bees infected with chronic paralysis virus tremble uncontrollably and are unable to fly. In addition, they lose the hair from their bodies and have a dark, shiny, or greasy appearance. This condition is referred to as greasy, hairless bees

When chronic paralysis virus is serious, large numbers of afflicted bees can be found at the colony entrance crawling up the sides of the hive and/or blades of grass around the hive and then tumbling to the ground. Infected bees may also exhibit abnormally positioned wings that look disjointed (the K-wing symptom). A colony may recover from paralysis after a short time, or the condition may continue for a year or more without killing the colony. Research has shown that susceptibility to the disease is often inherited. If paralysis persists it may become necessary to re-queen colonies with a different strain of bees.

## 8.0 Protozoan Disease

Nosema disease is generally regarded as one of the most destructive diseases of adult bees, affecting workers, queens and drones alike. The disease is caused by the protozoan *Nosema apis*, whose 5 to 7 mm spores infest the bees, are absorbed with the food and germinate in the midgut. After penetration into the gut wall the cells multiply forming new spores that infect new gut cells or can be defecated. The nutrition of the bees is impaired, particularly protein metabolism. Nosema can best be controlled by keeping colonies as strong as

possible and removing possible causes of stress. Colonies and apiaries should receive adequate ventilation and protection from the cold and from humidity.

## 9.0 Parasitic Bee Mites

There are five species of mites that are parasitic on honey bees but two are prevalent in the Americas, *Varroa destructor and Acarapis woodi*. All the responses include chemical control. This is of some concern because (i) the mites develop resistance to the chemicals and (ii) some of the chemicals are toxic to bees and humans. These include: Organic acids (oxalic, lactic and formic), etheric oils (Menthol and Thymol) and synthetic chemicals (pyrethroids and amitraz). Treatment also includes hive manipulation. Fumigation with synthetic chemicals is the most effective but most toxic to bees and humans. There is also the possibility of chemical residue in the honey.

## 10.0 Insects

Insect pest of honey bees include some species of beetles, ants, wasps, hornets and moths. Primary response is proper management to maintain strong healthy colonies that are well fed and in a healthy environment. Occasionally fumigation and be used for wasps, hornets and ants. However, it will affect the bees as well.

## 11.0 Vertebrates:

A number of different vertebrates are opportunistic feeders on adult bees, broods and honey. These include amphibians (frogs and toads), reptiles (lizards and skinks), birds (primarily insect eaters), coatimundis, skunks, opossums, mice (they nest in the boxes) and monkeys. Response to these predators is primarily through management and placement of the hives.

## 12.0 Mitigation Measures:

All of the pest and diseases of bees are best addressed through cultural, management and natural measures. As a result there is no impact on the environment from the accepted responses.

In the case of the Africanized bees, the primary mitigation measure is to ensure that the community is not panicked by the possible presence of these bees. The recommended response to the presence of Africanized bees is:

- Education – provide the people in the immediate area with information about the nature of the bees and where they are located. This should include information on how to respond and who to contact in the event of a swarm or attack.

- Management – locate bee colonies in areas where they are less prone to noises, vibrations and other forms of disturbance.
- Monitor – check regularly to ensure that bees have not swarmed and respond to any reports of possible swarms.

## 13.0 Monitoring Program:

The monitoring program will be primarily to ensure that there is no threat to residents and domestic animals.

| **Indicator** | **Response** | |
|---|---|---|
| | **Yes** | **No** |
| 1. Colonies are located away from populated areas | | |
| 2. No land was cleared to place the colonies | | |
| 3. Colonies are monitored on a weekly basis | | |
| 4. Information is provided to the community on how to respond to bees | | |
| 5. A hotline or similar mechanism has been set up to receive information on swarms or attacks | | |
| 6. A response protocol is in place for dealing with swarms and attacks | | |
| 7. The response protocol is tested once per month | | |
| 8. Incidences of swarms and attacks are recorded and reported to the relevant authorities | | |
| 9. Known pests and/or symptoms of known diseases observed? | | |
| 10. Disease or pest identified? | | |
| 11. Appropriate response initiated | | |
| 12. Any agrochemical used for disease control is properly documented | | |
| | | |

## 14.0 Lines of Responsibility:

The project will train members of the group in the handling of bees. The first line of response on any matter will be the members who are trained in the particular area of concern. The final authority is the president of the group, Mr. Ivan Perez, or any person that is properly delegated to assume responsibility for a particular activity.

## 15.0 Cost estimates and sources of funds:

It is important to provide public awareness information on the nature of bees and how to respond to them. This will be done through a pamphlet that is distributed within the community.

| | |
|---|---|
| Development and printing of 1,000 pamphlets | $1,500.00 |

## 16.0 Additional Information:

The Ministry of Agriculture maintains an Apiary Unit. It is important that this information be made available also.

When it becomes available a copy of the Beekeeper's manual from the Ministry of Agriculture will form part of this Plan and will be attached as an annex.