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**HONEY VALUE CHAIN ANALYSIS**

**IN NORTHERN BELIZE**

**Project Code:**

GCP/BZE/001/EC

**Project Title:**

Economic Diversification of Micro, Small and Medium Enterprises in Northern Belize

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**PROMOTING AGRIBUSINESS DEVELOPMENT IN NORTHERN BELIZE**

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# ACRONYMS AND ABBREVIATIONS

FAO Food and Agriculture Organization

EC European Community

MSMS Micro, Small and Medium Enterprises

MAF Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable

Development

ESTM Escuela Secundaria Tecnica Mexico

NGO Non-governmental organization

PCB Pesticides Control Board

PfB Programme for Belize

BAHA Belize Agricultural Health Authority

IICA Inter-american Institute for Cooperation on Agriculture

SIRDI Sugar Industry Research and Development Institute

USA United States of America

UK United Kingdom

LICU La Immaculada Credit Union

DFC Development Finance Cooperation

BEST Belize Enterprise for Sustainable Technology

CIF Cost, insurance and freight

PACT Protected Areas Conservation Trust

BSCFA Belize Sugar Cane Farmers Association

BELTRAIDE Belize Trade and Investment Development Service

BBoS Belize Bureau of Standards

GST General Sales Tax

APAMO Association of Protected Areas Management Organizations

CSME Caribbean Single Market Economy

NASAU National Apiculture Strategy Administration Unit

CDB Caribbean Development Bank

LAADSA Latin American Agribusiness Development S.A.

NAFS National Agriculture and Food Strategy

CABEI Central American Bank for Economic Integration

IADB Inter-American Development Bank

MIF Multilateral Investment Fund

IIC Inter-American Investment Corporation

BCCI Belize Chamber of Commerce and Industry

COTED Council of Trade and Economic Development

NAFP National Agriculture and Food Policy

SPS Sanitary and Phyto-Sanitary

BFR Belize Farm Registry

# EXECUTIVE SUMMARY

**Introduction**

Belize has a suitable climate for agriculture along with abundant water resources. Approximately, 800,000 hectares or about 38 percent of Belize’s total land area is considered potentially suitable for farming and raising livestock. Sugar production has been traditionally the largest industry in the agricultural sector and particularly in the Northern districts of Orange Walk and Corozal, providing direct employment for about 6,000 registered cane farmers and 4,800 workers. However, it is expected that as a result of the sugar reform regime, some small scale farmers will leave sugarcane production due to their inability to remain competitive.

FAO in partnership with the EU and in collaboration with the Ministry of Agriculture of Belize, commissioned a project in ‘*Promoting Agribusiness in Northern Belize*’, towards the diversification of the economic base of the communities in Northern Belize. This project aims to facilitate commercial agriculture-based enterprises, so as to improve income and employment opportunities in the sugar belt of Belize. This will be achieved through a multi-faceted value chain based approach targeting three existing areas of production, namely, onion, honey and sheep production. These commodities have been chosen by MAF as target commodities for their agricultural diversification programme because they are deemed to have good potential for expansion in growth and income opportunity, along with good local market potential.

This assignment elaborates a value chain and market analysis of the honey industry in Northern Belize. The honey industry in Northern Belize has significant potential for growth, but is constrained by competition from illegally imported honey, high prices, inconsistent quality, poor packaging and presentation, availability and technical support. The value chain analysis of the honey industry therefore seeks to map all actors and stakeholders in the value chain, determine the total demand and supply of honey to the local market, elaborate on support services and the enabling environment and conduct a SWOT analysis of the chain. Based on the findings, an action plan for interventions focused on production, marketing, governance and policy is elaborated for development of the industry.

**Main Findings**

The study estimates that the total population consumes around 13,585 gallons of honey or 247 units of 55-gallon drums per year. National production is estimated at around 120 units of 55-gallon drums (or 6,600 gallons) per year, while illegal importation is estimated at 127 units of 55-gallon drums (or 6,985 gallons) per year. Honey is used by lower, middle and upper-income groups. Lower income consumers usually purchase the product in smaller bottles and use the honey almost exclusively for medicinal purposes, mixing it with lime to treat children for cough and cold symptoms. Middle and upper income consumers also use it for medicinal purposes and for cooking special recipes, such as spreads for waffles and pancakes. It is also used as a sweetener in baking pastries and in coffee and tea.

Corozal and Orange Walk districts have an estimated 35 established beekeepers and 35 new beekeepers. Of the 35 established beekeepers, less than 10 have extensive experience and skills in construction, efficient management of Africanized bee hives and harvesting of honey. The other 25 have low to medium experience and skills. They are learning from their own experiences and other senior beekeepers.

Beekeeping is not a popular economic activity in Northern Belize, evidenced by the low numbers of active beekeepers. The honey industry in Northern Belize is representative of the Belizean honey industry, in that it is not organized and is mostly a subsistence-based operation. Additionally, Belizean honey is less competitive than contraband honey, which supplies nearly half of the national consumption. There are adverse factors affecting local demand for honey which include high prices, inconsistent quality and availability and poor packaging and presentation. In order to grow local demand, these factors would need to be addressed for there to be greater uptake by consumers. Given its small scope, the honey value chain does not benefit from support services and policies to aid its development.

**Recommendations**

The development of the honey value chain in Northern Belize will require the implementation of specific interventions targeted at improving production, processing and market development for apiculture products, governance mechanisms and policies to support the development of the value chain. As an outcome of the participatory value chain analysis exercise, a strategy in support of the development of the honey value chain in Northern Belize has been developed. This strategy is a comprehensive way to address critical factors that impact on the development of this particular chain. It is based on the market situation for honey and apiculture products in Belize and identifies value chain issues that impede efficiency and growth.

The implementation of the strategy will be guided by the Value Chain Coordination Committee (VCCC) and has been designed for a 3 years period. The focus of the strategy is on process upgrading: improved value chain efficiency and increased output volumes, marketable yields and reduced costs per unit of output will be achieved through the introduction of improved genetic material, improved management of hives, supply of construction material for hives and access to processing technology. Group training and support to the formation of beekeeper groups will complement these activities. Agriculture extension services will have to play a key role in knowledge transfer.

This work is complemented by elements linked to product upgrading (enforce honey standards, labeling, introduction of geographic indications, etc.), as well as functional upgrading (regular beekeeper and buyer meetings to agree on who is doing what best, like packaging and marketing of honey through a commercial company) and improvement in value chain coordination and governance, and the enabling environment.

# INTRODUCTION

Belize is located on the Caribbean coast of northern Central America, with a population of 370,300 in 2015. The country shares a land and sea border on the north with the Mexican state of Quintana Roo, a land border on the west with the Guatemalan department of El Petén, and a sea border on the south with the Guatemalan department of Izabal. Belize is classified by the World Bank as an upper middle income country with a GDP per capita of US$8,486 in 2014. Main economic activities centre on agriculture, industry and services. The World Bank notes that the country has undergone a significant transformation over the last decade resulting from the first commercial oil discovery in 2005 and emergence of the tourism industry. The economy grew by 3.6 percent in 2014, supported strongly by the agricultural and tourism sectors.

**The Agricultural Sector in Belize**

Belize has a suitable climate for agriculture along with good water resources. Approximately 800,000 hectares or about 38 percent of Belize’s total land area is considered potentially suitable for farming and raising livestock. However, only 9.7 percent of the land (about 78,000 hectares) is used for agricultural practices (Martin and Manzano 2010). The agricultural sector is important to the national economy, contributing to 15.3 percent of Gross Domestic Product and 17.9 percent of total employment. In 2015, the mid-year population of the Northern districts was estimated to be 94,996 or 25.8% of the Belizean population.

Agriculture in Belize is defined as having three main sub-sectors, namely, a well-organized traditional export sector for sugar, banana, citrus and marine products; a small scale farm sub-sector, producing food for local consumption; and a well-integrated large scale commercial sector. The principal cereal grains produced as annual crops are mainly rice, corn and sorghum, while vegetables, root crops and beans are important for the domestic market. The Mennonite community, which comprises 3.6 percent of the population, plays an important role in the agricultural sector, producing a variety of commodities and livestock. A recent census of farms in Belize shows that 24 percent of farms have less than 5 acres, 33 percent between 5 and 20 acres and 74 percent of farms in the country are below 50 acres (FAO, 2011).

Traditionally, sugar production has been the largest industry in the agricultural sector and particularly in the Northern districts of Orange Walk and Corozal, providing direct employment for about 4,800 workers and 6,000 registered cane farmers. However, it is expected that as a result of the sugar reform regime, some small scale farmers will leave sugarcane production due to their inability to remain competitive.

**Background and Purpose of the Value Chain Analysis**

Mixed farming systems that are market-driven provide opportunities for these farmers as an alternative to sugarcane production. Providing support to the diversification of the non-sugarcane agricultural activities is currently a focus of the Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development (MAF). FAO in partnership with the EU and in collaboration with the MAF of Belize, commissioned a project in ‘*Promoting Agribusiness in Northern Belize*’ towards the diversification of the economic base of the communities in Northern Belize.

This project aims to facilitate commercial agriculture-based enterprises, so as to improve income and employment opportunities in the sugar belt of Belize. This will be achieved through a multi-faceted value chain based approach targeting three existing areas of production, namely, onion, honey and sheep production. These commodities have been chosen by MAF as target commodities for their agricultural diversification programme because they are deemed to have the most potential for expansion in growth and income opportunity, along with good local market potential.

The interventions under the project will target key constraints that prevent small- scale farmers from maximizing production and earnings from onion, sheep and honey production, as well as increasing value chain efficiency in the rural communities of Orange Walk and Corozal. Strengthening the overall chains will in turn result in improved market accessibility and coverage for farmers’ products and improved earning potential. The use of a value chain approach will include a market appraisal, participatory value chain analysis, the design of upgrading strategies and activities and supporting value chain governance and management.

This assignment elaborates a value chain and market analysis of the honey industry in Northern Belize. The value chain analysis identifies and maps all actors and stakeholders, along with their roles and impact on the chain. It recognizes the status of the local market demand and potential for further development. It also identifies strengths, weaknesses, opportunities and threats to the chain and based on findings, proposes an action plan to upgrade the industry.

# METHODOLOGY

The value chain analysis of the honey industry was developed using the following methods:

1. **Literature Review**

Secondary research was done using existing literature from the internet and government and cooperation agencies archives, to gather available information on the Belizean honey industry.

1. **Meetings With Stakeholders**

Internal meetings were held at the Corozal Project Office with the project administration team to understand the objective of the intervention, scale and scope of the project, clarify the terms of reference and required outputs, gather information and contacts already available, and construct a general road-map to achieve the best results possible.

The project team coordinated a meeting in Progresso with the principals of the Northern Beekeepers Cooperatives. This was followed up with a general meeting in Little Belize, with a wider representation of actual and potential beekeepers and MAF personnel.

Another meeting was held at the La Immaculada Credit Union conference facilities in Orange Walk with the established and new beekeepers from Orange Walk and MAF personnel.

A meeting was held at Escuela Secundaria Tecnica Mexico (ESTM) with the agriculture curriculum staff and head of department for the junior college and high school to gather information on the scale and scope of their beekeeping programme and to assess their interest in participating with the wider beekeeping community for development of the industry.

1. **Face to Face Interviews**

Over 50 personal interviews were conducted with buyers at restaurant and hotels, street-side barbeque vendors, produce market vendors and small, medium and large retail outlets in the Corozal, Orange Walk, Belize and Cayo districts to gather information on the demand for honey, market structure of the sector and other market information such as honey usage, packaging, pricing, availability, branding and merchandizing.

1. **Field Visits to Honey Value Chain Stakeholders**

The consultant made personal visits to 20 apiaries across Orange Walk and Corozal districts to gather information on production systems being used, accessibility to and condition of hives, factors influencing cost-of-production, factors contributing to productivity, results being achieved, harvesting and storage conditions and selling and market positions.

Through group meetings and farm visits, contact was made with over 50 new and established beekeepers .

A visit was made to Quintana Roo, Mexico and another to Santa Elena, Peten, Guatemala, to gather information on honey bulk-sale prices, production, storage and processing systems, packaging, distribution and retail sales of honey.

1. **Written Correspondence With Key Stakeholders**

The consultant also engaged relevant private, public and non-governmental organizations (NGO’s) managers through written correspondence, requesting specific information relevant to their areas of involvement with the honey industry. Some of those contacted were FrutaBomba (largest papaya producer), Pesticide Control Board (PCB), Programme for Belize (PfB), Customs Department, MAF Policy Unit, Belize Agriculture Health Authority (BAHA), Ministry of Trade, Inter-American Institute for Cooperation on Agriculture (IICA) and Archives Department.

1. **Convening of Stakeholders’ Meetings and Workshop**.

A validation workshop was held at the Sugar Industry Research and Development Institute (SIRDI) conference facilities, where a draft of the value chain report, its recommendations and a power-point summary was presented for validation to honey industry stakeholders and senior representatives from the MAF. Discussion and debate was encouraged and recommendations received from all participants.

1. **Finalization of the Report**

A final meeting was then held with the Project Team, FAO Technical Officers and the visiting FAO International Value Chain Consultant where further recommendations were made for improvement of the final document to bring it closer to stakeholder recommendations and FAO criteria. The draft was then presented and reviewed with the project team before forwarding to the FAO Representation. The draft was then technically edited, with input from the Lead Technical officers.

# HISTORY OF THE HONEY INDUSTRY IN BELIZE

**Introduction of European Bees**

European bees were first brought in from Mexico in 1957, as pollinators for the sugar industry in Corozal and Orange Walk. Subsequently, seven beekeeping cooperatives were formed to develop a honey industry. In 1977, the Belize Honey Producers Federation of Cooperative Societies Limited was formed and registered. It was comprised of four cooperatives.

**Honey Production in the 1980s**

In 1983, Belize reached the peak number of hives at 11,000, with productivity[[1]](#footnote-1) of around 0.9 unit/ 55-gallon drum per 10. However, spraying of marijuana fields with chemicals which were toxic to bees led to a rapid decline of bee colonies between 1983 and 1984. Thereafter, the industry recovered to record exports of 1,000 units of 55-gallon drums of honey to the United Kingdom (UK), Canada, Saudi Arabia and United States of America (USA) in 1985. Productivity was estimated at 1.1 unit/55-gallon drum per 10 hives. Orange Walk alone had 120 beekeepers and accounted for around 60 percent of total honey production.

Around 1987, the industry was faced with the appearance of aggressive Africanized bees, which took over and decimated some hives. Beekeepers were not trained to deal with these bees, so were discouraged from doing beekeeping. Since the decline of the late 1980’s, there have been only sporadic efforts to stimulate and grow the honey industry.

**Honey Industry in the 2000s**

Beekeeping saw a revival in the 2000s. In 2001, Belize was estimated to have a total of 129 beekeepers, with 1,791 hives, producing 320 units of 55-gallon drums of honey. Orange Walk and Corozal accounted for 44 percent of beekeepers, 63 percent of hives and 65 percent of honey production respectively.

Individual beekeepers have recorded productivity levels of 1.67 units/55-gallon drums per 10 hives during a year of good conditions, and as low as 0.3 units/55-gallon drums per 10 hives during a bad year.

***Processing and Distribution of Honey***

Verena Foods, a honey processing company, operated between 2002 and 2007 as a major processor of honey. The company packaged filtered-clean raw honey in convenient squeeze bottles with safety-seal, flip-caps and properly labeled, purchasing the first drums of honey from beekeepers at BZ$500 per 55-gallon drum. Verena Foods made available a high-quality honey with standard packaging and pricing was made available across Belize in stores and supermarkets, when previously, it could only be found in produce markets in reused containers.

Demand grew quickly, such that by 2006, the company sold 60 units of 55-gallon drums of honey, which was limited only by lack of supplies. The company estimated that it accounted for approximately 35 percent of the total supply of honey in Belize that year (170 units of 55-gallon drums), while it estimated that it supplied around 50 percent of the market for honey in stores/supermarkets, restaurants and resorts, based on figures obtained from more than 450 customers across Belize. Approximately 70 percent of its sales came from stores/supermarkets and 30 percent was derived from direct sales to restaurants and resorts. Verena Foods withdrew from the market when it became unprofitable for them to continue to purchase honey at BZ$1,300 per 55-gallon drum from farmers.

Another processor, Hot Mama’s, which is located in Cayo District, produces and bottles its *Orange Blossom Honey* and *a Spicy Orange Blossom Honey* from its apiary. The honey is sold in bottles of 1.25 and 10 ounce bottles and 8 ounce jars.

**Impact of Commercial Agriculture on Beekeeping**

Expansion of commercial agriculture (sugar, cattle ranching, rice and papaya) and residential housing and tourism developments has brought about deforestation in the northern districts, which has put pressure on the honey industry, limiting its ability to consolidate and grow.

More recently, the sugar industry started aerial spraying of agro-chemicals, which has caused more problems for beekeepers. The papaya industry also sprays chemicals, which are toxic to bees, and in some areas, there are no buffers between papaya fields and fresh water streams and creeks that run into the lagoons and ground water. No formal assessment has been done to determine the effects on the honey industry from the use of pesticides and other chemicals by commercial agriculture. After having received concerns from honey producers, some adjustments have been made by both the sugar and papaya industries, such as changing spraying periods, choice of “safer” chemicals and location of fields at minimum distance from residential areas.

There has been continuous introduction of European bees from Mexico over the years by the beekeepers that have remained active. Most established beekeepers have also been trained in the management of Africanized bees. Honey producers report that the bee population is now mostly hybrids of European and Africanized bees. These bees are not as aggressive and are more manageable than Africanized bees. Their productivity is generally higher than European bees. The only registered cooperative in northern Belize is the Northern Beekeepers Cooperative with 13 members.

# Overview of the Honey Value Chain

The honey value chain is comprised of input suppliers, beekeepers, processors, packagers, importers, retailers and consumers. There are also entities that provide support services to the value chain, as well as enablers that impact the policy environment in which the chain operates. This section will provide a map of the value chain, present its cost structure and describe the main value chain actors.

## Value Chain Map

Figure 1 depicts the value chain map for the honey value chain in northern Belize.

**Figure 1: Honey Value Chain Map**

70 beekeepers in Corozal, Orange Walk and Little Belize

Northern Beekeepers Cooperative

Mixed producer-packager/trader; mixed importer-packager/trader; pure packager/trader

Contraband Imports **Guatemala, Mexico**

-Farmers

-Belizean suppliers

-Suppliers in Chetumal, Mexico & Peten, Guatemala

Bee-keepers

**CHAIN ACTORS**

**CONSUMPTION**

**FUNCTION**

***Retailers:*** Produce market, supermarkets, pharmacies, convenience stores, street vendors

***Consumers:***

Households, hotels, restaurants, bakeries, food processors, street-side barbeque grills

Financial: Credit Unions- Saint Francis Xavier – Corozal Town, La Inmaculada – Orange Walk Town DFC,  Commercial Banks

**CHAIN SUPPORTERS/SERVICE PROVIDERS**

Technical: MAF Extension Services, Department of Cooperatives, BEST, ESTM

**CHAIN ENABLERS**

MAF, MTICP, MFED, Land Department, BAHA, PCB, Bureau of Standards, Supplies Control, BELTRAIDE, DFC

## Cost Structure of the Value Chain

The cost structure of the value chain is shown in Figure 2 below. The calculations are based on the consultant’s review of existing prices and informant interviews with key stakeholders. In the honey value chain in Belize, and for this report, productivity is measured in units of 55 gallon drums. Also profit margins and cost have been allocated to the 55 gallon drum unit. Such a drum contains the equivalent of 208 litres of honey or 660 lbs. (300kg) of honey.

Producers obtain the highest share of profit, 21 percent, followed by retailers, 20 percent and packagers/traders, 19 percent. In other words, of the final sales price to the consumer of BZ$4,590 per drum, the retailer retains BZ$918, the trader receives BZ$3,672 and retains BZ$1,672 (minus his costs of BZ$810, this leaves a profit estimated at BZ$862). Finally, of the BZ$2,000, the farmer receives for a 55 gallon drum of honey, he/she retains a profit of BZ$800 (after the deduction of all of his/her costs of production and for storage, transport, etc.).

**Figure 2: Share of Consumer Price in the Current Honey Value Chain (Calculations based on one 55- gallon drum)**

## Description of Main Value Chain Actors

Table 1 details the main value chain actors along the honey value chain.

Table 1: Value Chain Actors along the honey value chain

| ACTOR | DESCRIPTION |
| --- | --- |
| Input Suppliers | Farmers make their own boxes. Queens are sourced from existing hives or purchased from Mexico. Mr. Margarito Lebia also produces boxes for hives and other services, like stamping of the wax. Hive tools are mostly sourced from Mexico. |
| Beekeepers | Corozal and Orange Walk districts have 35 established beekeepers and 35 new beekeepers.  Oftentimes, small beekeepers also process, package and market/distribute their own honey. |
| Processors | Beekeepers normally process their own honey. |
| Packagers/Traders | There are three types of packagers/traders, namely, mixed producer-packager/trader, mixed importer-packager/trader, pure packager/trader, who bottle and distribute honey to the retail stores, market vendors and the hospitality industry. |
| Importers | Honey is imported illegally from the regions of Peten, Guatemala and Quintana Roo, Mexico, by traders who sell it to retailers in the local market. |
| Retailers | Both locally produced and illegally imported honey is widely distributed to small, medium and large stores and supermarkets, who sell it in bottles to consumers. |
| Consumers | Honey is used by lower, middle and upper-income households for medicinal and cosmetic purposes and in meal preparation. Resorts also use honey as a spread. Patrons of restaurants and resorts use honey for natural spreads. Bakeries, food processors and street-side barbeque grills utilize the honey in their final products to consumers. |

# MARKET SITUATION

## Sales and Demand

Honey is widely distributed with direct sales to restaurants, hotels, produce markets, street side vendors, as well as small, medium and large stores and supermarkets.

The Cayo District, with around 23 percent of the Belizean population, has 35 middle/large supermarkets which each currently sell on average 20 litres of honey per month, or 40 units of 55-gallon drums per year. With these stores selling around 70 percent of total honey sales, the total Cayo district sales could be estimated at around 57 units of 55-gallon drums. Assuming that the Cayo District consumption is representative of national consumption, the total population can be estimated to consume around 247 units of 55-gallon drums or 13,585 gallons of honey per year.

The consumption of honey in Belize City, San Pedro, Caye Caulker, Placencia and Cayo would be higher during the December to May months of the winter tourist season, since these centers have highest participation in the sector. However, this was not factored into the computation in the previous paragraph.

In validating the above computation, the USA market was used as a benchmark. The USA per capita consumption of honey is around 1.3 pounds. If Belize’s consumption is 25 percent of that amount, given that Belize’s per capita income is around 25 percent that of the USA, a population of 360,000 would demand 117,000 pounds or around 185 units of 55-gallon drums. The “sweet tooth” culture of Belize could explain the higher than expected 247-drum national consumption estimate above.

## Uses of Honey by Consumers

Honey is used by lower, middle and upper-income groups. Lower income consumers usually purchase the product in smaller bottles and use the honey almost exclusively for medicinal purposes, mixing with lime to treat children for cough and cold symptoms. Middle and upper income consumers also use it for medicinal purposes and for cooking special recipes, such as spreads for waffles and pancakes. It is also used as a sweetener in baking pastries and coffee and tea.

Consumers are generally aware of the good health qualities of honey. However, their perception is that the quality of honey is not consistent and its packaging in reused containers is not very wholesome or attractive. The relatively high price of honey also limits their ability to consume more of the product.

## Retail Presentation/Pricing

During this study, the consultant observed that honey available for retail sale was packaged in reused glass or plastic containers of no standard volume. Volumes ranged from 250ml, 300ml, 330ml, 500ml, 750ml to 1 litre of honey. Oftentimes, the containers were not filled to normal level.



Approximately 50 percent of the packaged honey had some sort of home-made label affixed to the container with tape, 15 percent had a sticker label and 35 percent had no label or the same label of the original product from the reused package.

Figure : Honey for sale in re-used glass bottles at a major supermarket

The branding of honey shows a high degree of fragmentation, with no obvious leading brands observed.

The retail price of a 250ml bottle ranged from BZ$4.50 to BZ$6.00, while a 750ml (quart) bottle ranged from BZ$14.00 to BZ$22.00. The prices were generally lower in the produce market and from street-side vendors, but higher in the larger supermarkets.

There is no special merchandizing of honey in the stores and its location is usually on the higher or lower shelves that have lower sales rotation and visibility.

## Quality of Honey

There is no standard enforced for quality of honey being sold. Honey is widely varied in color, viscosity and taste. Some of the honey is strained, while others show dust particles settling at the bottom, or floating at the top. In some stores a small amount of product was observed fermenting on the shelf, with bubbles at the top. There is some crystallization of the honey, especially in air-conditioned supermarkets.

Many beekeepers and consumers believe that much of the honey being sold is adulterated or diluted honey that is not pure.

## Competition

****There is direct competition between the various honey “brands” and indirect competition from substitute products such as table syrups. There are no imported honey brands for retail sale, as Belize does not allow the legal importation of honey.

While most restaurants and resorts prefer natural honey for spreads, they mostly use table syrups because of their availability, lower pricing and better presentation.

Figure : Wide variety of imported syrups get better shelf space in stores

Based on estimates of retail outlet purchasing personnel, a wide variety of brands of table syrups (maple, strawberry and chocolate) sell almost five times the volume of honey. In comparison to honey, these syrups are half the price, much better in presentation, consistent in quality and better merchandized, with greater and superior shelf space.

## Conclusion

There is clear market potential for local honey. However, there are factors restricting its demand, namely, high prices, inconsistent quality and availability, poor packaging and presentation. In order to grow local demand, these factors would need to be addressed for there to be greater uptake by consumers.

# SUPPLY SITUATION

This section presents an overview of the supply of honey in Northern Belize. It gives an estimate of the share of domestic production and illegal importation to total supply, number of beekeepers, productivity of local production, as well as the cost of production.

## Honey Supply

National consumption of honey is estimated at 247 units of 55-gallon drums or 13,585 gallons per year. Since the national production is estimated at around 120 units of 55-gallon drums (or 6,600 gallons) per year, then the estimate of supply from illegal importation, or contraband honey, would be around 127 units of 55-gallon drums (or 6,985 gallons) per year.

Honey is mostly harvested and with highest availability between the drier months of January to May. In good years, there can be smaller harvests in August to September and in November to December. There is lower quantity of honey available in the market between September to November. During this period, it becomes easier for local producers to sell their honey at the higher range of prices.

The price of contraband honey landed in Belize is around BZ$1,300 per 55-gallon drum. Since the harvesting season in the source regions, Peten, Guatemala and Quintana Roo, Mexico, is almost the same as Belize, the availability is higher and prices lower from January to May, with lower availability and higher price during the June to December period.

**Location of Hives**

The majority of hives are located along the southern Orange Walk district and southern and eastern periphery of the Corozal district, where forested areas with ample fresh water streams, rivers and lagoons still exist. Beekeepers live within a range of 3 to 45 miles from where they keep hives. The hives are usually kept in an area where the forest is cleared to allow naturally filtered sunlight in clusters of 2-20 hives per apiary. Typically, beekeepers would visit hives at an average of once per week.

All of the beekeepers depend on forest flower for natural feeding of the bees. Some leave honey and wax in the hives for feeding during off-bloom periods, while others harvest all the honey from the hives and feed sugar syrup and/or other meals during these periods. Forest flower is increasingly scarce as deforestation has accelerated with the expansion of commercial agriculture, forcing beekeepers further away from where they live and pushing up their cost of operations. In some years the region experiences two forest flower blooms, while for other years they experience very short, light blooms due to longer periods of lower temperatures and higher rainfall.

## Producers, Skills and Organization

Corozal and Orange Walk districts have an estimated 35 established beekeepers and 35 new beekeepers. The new ones are being established in and around San Felipe and Sarteneja villages, on the periphery of protected forested areas, with help from a project being implemented by Belize Enterprise for Sustainable Technology (BEST), with financial support from the Japanese government.

Figure triple box hives are more productive than double and single box hives

Of the 35 established beekeepers, less than 10 have extensive experience and skills in construction, efficient management of Africanized bee hives and harvesting of honey. The other 25 have low to medium experience and skills. They are learning from their experiences and other senior beekeepers. The 35 new beekeepers are just starting operations. They have indicated that they get little to no help from the agricultural extension services. It is felt that the officers may not have the skills needed to train beekeepers in production and management.

The only registered cooperative in the north is Northern Beekeepers Cooperative with 13 members, most of them inactive. The others are mostly past members of the Orange Walk Beekeepers Cooperative, which is not currently registered, although the beekeepers remain in close contact with each other.

## Production and Productivity

Productivity is measured in 55 gallon drum units per 10 hives. The 2015 season was not considered a good one, with production in Orange Walk and Corozal estimated at around 70 units of 55-gallon drums, or around 60 percent of the national production estimate of 120 units of 55-gallon drums. The total number of hives in both districts was estimated between 800 and 1000. Between the two districts, there is an estimated 70 beekeepers, 35 established with years of experience and 35 new. This year, productivity measured in units of 55-gallon drums per 10 hives was reported from a low of 0.4 to a high of 1.2 (264 to 792 lbs), with an average of 0.7 unit/55-gallon drums (462lbs or 209kg) per 10 hives.

The production estimate of 70 drums for the northern districts is consistent with both the interview declarations of honey produced and the amount of honey 1000 hives would produce at a productivity rate of 0.7 units/55-gallon drums per 10 hives. These estimates of the number of active hives, productivity of honey per 10 hives, number of beekeepers and amount of honey produced, were obtained from verbal declarations of beekeepers at farm visits and meetings.

The Langstroth standard 10-frames production system is exclusively used, in single, double and triple-box hives, with 15 to 20 hives per apiary. Very few of the beekeepers know how to construct, populate and manage triple-box hives, which are the most productive when properly administered. All the hives are Africanized bees, many captured from trees and houses, and domesticated and mixed in some instances with European queens imported from Chetumal, Mexico and introduced into the hives over time.

The principal focus of beekeepers is the production of honey, with little to no harvesting of other marketable honeybee by-products, such as pollen, royal jelly, beeswax and propolis.

## Harvesting, Storage and Farm-Gate Pricing

Honey is harvested by scraping or using a manual or semi-automated honey extractor. In a bad year only two harvests can be taken, while in good years 4 to 6 harvests can be taken from the same hive, with the bigger harvests coming between the drier months, from January to May. When the raw honey is harvested, it is usually stored in re-used oil drums or 5-gallon plastic buckets with covers that have been washed with soap, rinsed and dried. Most of the times these containers are kept under a shed open to the elements. The raw honey is usually filtered with a cloth or sieve to remove some debris and dead bees before packaging. A 55-gallon drum of honey is sold at the farm gate for BZ$1,800 to BZ$2,200. A 5-gallon bucket is sold for BZ$175 to BZ$250. Most of the beekeepers also package honey in washed, re-used glass or plastic bottles and sell cases to retail outlets of 12x750ml bottles or 24x330ml bottles for BZ$100 to BZ$140.

Assuming drums are only sold to potential processors or wholesalers, this appears much less attractive than adding value at farm level by bottling it into used bottles and selling it in crates. However, this ‘cottage industry type’ of marketing hampers value chain efficiency gains and reduces the local honey value chains competitiveness. While a beekeeper has more ‘money in his/her pocket’ (67% more than for the wholesale price), the consumer price for local honey remains much higher than that for contraband honey. It will require considerable increases in the productivity of beehives and the marketing structure of beekeepers and their associations to become competitive with the contraband honey. The alternative options would be to negotiate with private sector processors, fair farm gate prices and let them lead the marketing campaign, branding and distribution of honey and other apiculture products and lead the way for the development of a honey industry in Belize.

## Cost-of-production and Profitability

Subsistence farming costs differ from commercial honey production operations.

A 50-hive commercial operation can be started with a loan of BZ$15,000, and four years annual expansion of overdraft by BZ$7,500 to reach 250 hives. In this case, cost-of-production in the first year would be BZ$1,536 per drum, such that a loss of BZ$236 per drum would result from sale of the drum for BZ$1,300. As scaling up occurs, in the fifth year cost-of-production for a drum of honey would decline to BZ$649, such that with annual inflation, adjustment in price of 2.5% would allow for sale of BZ$1,470 per drum. Based on 250 hives and 25 drums of honey produced, a net income of BZ$18,084 could be expected after financing costs.

A 10-hive subsistence farming operation can be started with a loan of BZ$2,000 and four years annual expansion of overdraft by BZ$750, to reach 30 hives. In this case, cost-of-production in the first year would be BZ$3,436 per drum, such that a loss of BZ$1,006 per drum would result from selling 270x750ml (quarts) at BZ$9 per unit, for a total revenue of BZ$2,430. As scaling up occurs, in the fifth year, cost-of-production for a drum of honey would decline to BZ$1,020.33, such that with annual inflation adjustment in price of BZ$0.05 per year, the wholesale price per 750ml would be BZ$9.15. Based on 30 hives and 3 drums of honey produced in the fifth year, a net income of BZ$4,351 could be expected after financing costs.

Annex I shows a breakdown of costs, profit and loss and balance sheets of commercial and subsistence operations, respectively.

## Conclusion

Despite the potential for honey in the local market, beekeeping is not a popular economic activity in Northern Belize, evidenced by the low numbers of active beekeepers. The honey industry in Northern Belize is representative of the Belizean honey industry, in that is not organized and mostly a subsistence-based operation. It is less competitive than contraband honey, which supplies nearly half of the national consumption. In going forward, the industry will need technical and financial support to exploit opportunities in local and potential export markets and engender greater participation of beekeepers for its sustainability.

# CHAIN SUPPORT SERVICES AND ENABLING ENVIRONMENT

Value chains are normally supported by service providers and policies to enable their development. However, the honey value chain is not well supported by either of these important functions. This section will outline the support services provided to the chain and the policy context in which it operates.

# Chain Support Services

All of the inputs required for honey production can be sourced in Belize. However many beekeepers source their inputs from neighboring Chetumal, Mexico and Peten, Guatemala. Those inputs that are sourced abroad include European queens (around BZ$100 each), stamped wax (around BZ$7 each), smokers (around BZ$100 each), and over-all gears with gloves and helmets. The timber used for boxes (around BZ$37 each), bottom and top boards (around BZ$12 each) and frames (around BZ$2.25 already wired) are all sourced locally, and the hives are constructed locally as well, with several of the established beekeepers having the equipment, tools and skills required, willing to provide the service of building the hives.

A few experienced producers also have the skills to produce queens, or to capture them from trees and houses, and these are sold at around BZ$35, BZ$5 or BZ$2 each, depending on whether they are mated, virgin or mature queens, respectively. Supers are sold at BZ$70 each, and an additional BZ$60 for the 20 waxed frames. Used drums (around BZ$50 each), buckets (around BZ$5 each), and glass/plastic bottles (around BZ$0.25 each) for packaging are also sourced locally from stores or are picked up from where they are disposed. Local service providers can make stamped sheet wax for a service fee of BZ$0.50 each, if the beekeeper provides the wax. Complete hives ready for production are sold at BZ$300, BZ$225 and BZ$175, depending on whether they are triple, double or single box hives, respectively.

There are local trainers willing to share their knowledge and experiences. However, training services are procured mostly by government or sponsoring partners. Many of them would share knowledge with beekeepers at the mere cost of transportation, if help was requested. The Escuela Segundaria Tecnica Mexico (ESTM) has basic beekeeping as part of their agriculture curriculum at high school and junior college levels, and they have also invested in 50 hives which they use for this education and training. Most of the training is in production operation, with very little, if any in business management.

The La Immaculada Credit Union (LICU) and the Development Finance Cooperation (DFC) have expressed interest in financing beekeepers. However, they do not have a clear understanding of the risks and potential profitability of honey production at different scales of operations.

# Enabling Environment

The MAF is responsible for setting policies for the agricultural sector. Honey is one of the commodities targeted under the Government’s diversification programme. This project forms part of this thrust to develop the honey value chain in order to improve rural livelihoods.

# Conclusion

Despite having a long tradition of beekeeping in the Northern districts, the production of honey primarily remains a subsistence activity. At present, the honey value chain in Northern Belize is underdeveloped and does not benefit from the types of services and policies necessary to facilitate its advancement. This situation needs to be addressed to enable value chain actors to provide quality apiculture products, including honey, to consumers.

# SWOT ANALYSIS OF THE HONEY VALUE CHAIN

The Northern Belize honey industry, though small, has great potential to expand production and diversify its offerings, if sufficient investments are made in improving capacity of producers to deliver wholesome and attractive products to the market. The following section analyses the strengths, weakness, opportunities and threats (SWOT) of the honey industry in Northern Belize.



## Strengths

1. There are a small amount of experienced beekeepers that have the ability and capacity to be trainer of trainers.
2. Most elderly beekeepers have at least one family member who is learning and keeping up the beekeeping tradition.
3. Beekeepers have accumulated many years of knowledge, experience and skill in startup, maintenance and propagation of hives (including Africanized bees). As a result, beekeepers have the ability to develop appropriate functional practices that allow them to work with materials available at hand, which can minimize start-up and operational costs.
4. All machinery and tools necessary for cottage industry beekeeping are currently owned by beekeepers, or can easily be built or supplied by the Mennonites who live in close proximity. Hence, a very high percentage of the value-adding gains from growing the industry can accrue to local actors.
5. Besides personal assets that each beekeeper owns, there are some valuable assets still owned by the cooperatives that can be capitalized, such as land and building.
6. The beekeepers are generally known to each other, having shared membership in beekeeping cooperatives over the years, or having attended training or meetings together. They are open-minded to sharing their knowledge, experience, skills and even supplying each other with services, materials, machinery, tools and complete hives.
7. Honey is widely distributed with availability in local markets, as well as small, medium and large retail outlets.
8. There is a broad range of consumers of all economic levels consuming honey, given the product’s use for food, health and cosmetic purposes.



## Weaknesses

1. Majority of beekeepers with valuable knowledge and experience are elderly (semi-retired or retired).
2. Most of the existing beekeepers have limited capital for further investment in apiculture.
3. There is a great sense of distrust and disappointment among cooperatives members, which has been reflected in poor attendance at meetings.
4. Poor conditions of access roads limit beekeepers’ access to hives for effective maintenance and harvesting of honey.
5. The packaging and presentation of honey is usually poor, with inconsistency in labelling and reuse of bottles.
6. There is very little to no technical assistance available to beekeepers in the production, processing, storage and marketing of honey.
7. There are weak supplier-buyer relationships with no significant brand-power valued by traders and consumers.
8. Honey is not given premium shelf space in local supermarkets and stores.
9. There are no quality standards required for the production, storage, packaging, labeling and trading of honey.
10. Locally produced honey is relatively high-priced in comparison to contraband honey and other substitutes such as imported bottled syrups.
11. Financial institutions have not focused on offering loans to the apiculture industry, given the limited knowledge of cost of production, financing requirements and markets for the by-products.
12. Absence of a cohesive policy framework and technical support for apiculture.



## Opportunities

1. Escuela Tecnica Segundaria Mexico (ETSM), located between Orange Walk and Corozal, has been established to provide basic beekeeping education and training as part of their high school and junior college agriculture curriculum. ESTM could be accessed by existing or potential Belizean beekeepers to build their technical capacity in apiculture, thus aiding in the development of the industry.
2. The domestic market potential demand for honey is much more than the current production, and there is a significant margin of profit to be made from a relatively small-scale investment.
3. Apiculture is wider than honey production. There are other marketable high valued by-products such as pollen, beeswax, royal jelly, stamped wax sheets and propolis that have not been explored. Appropriately packaged products can be marketed in the growing tourism sector and Belizean diaspora.
4. There is scope for continuous genetic development of Africanized, hybrids and European bees to achieve an optimal balance between the Africanized bee potential for higher levels of productivity and the European bee’s more manageable, less aggressive nature.
5. There are significant areas of forest cover that fall under protected areas, which are not currently threatened by commercial agricultural and residential expansion. These areas may offer avenues for production of high quality honey that can meet mixed-jungle-flower, organic certification and/or fair-trade criteria for increased value.

## Bee[1]Threats

1. Since most beekeepers have a diversified portfolio of income sources, increased demand or profitability from alternative income sources may cause them to reduce their focus and available resources allocated to beekeeping.
2. Contraband honey, of sometimes lower quality from Guatemala and Mexico, is sold at lower prices than domestically produced honey.
3. High import duties are placed on inputs for honey production.
4. Lower priced imported table syrups have reduced the demand for domestically produced honey.
5. Larceny of hives by thieves.
6. Damage to hives by neighbours of beekeepers who do not want bees close to where they live or have animals.
7. Damage to hives from forest fires, rain, wind storms, hurricanes and other natural causes.
8. Rapid deforestation in the northern districts is reducing the amount of food available for bees each year, and thus the natural capacity for producing honey.
9. Lands to locate bee hives is limited, especially since the managers of protected areas have not opened up the territories they control to beekeepers and the beekeepers themselves own very few acres of their own.
10. Commercial agricultural operations utilize aerial spraying and this is believed to cause problems for the honeybees’ health.
11. Honeybee hives are negatively impacted by ants, varoa mites and other pests.

## Conclusion

Despite its strengths of having a ready market and experienced producers, the honey industry is currently under threat from illegal honey imports from neighbouring countries, which create a disincentive for future investment by existing and potential stakeholders. Existing producers are elderly and there are insufficient new producers to undertake honey production to guarantee the sustainability of the local industry. The absence of a policy framework, as well as limited technical expertise has hampered the development of the industry.

Despite these challenges, it is felt that with significant capital investment, knowledge transfer and appropriate policies to support the industry, local producers can be empowered to supply the local markets requirements and also explore potential export markets.

# FINDINGS AND RECOMMENDATIONS

The domestic honey industry currently supplies approximately 49 percent of total national consumption, with illegal importation satisfying 51 percent. At present, there are only 70 beekeepers in Northern Belize, 35 of whom are new entrants. Existing beekeepers are aged, but possess skills gained from years of experience in beekeeping. Environmental challenges such as deforestation, excessive spraying of agricultural chemicals, along with natural hazards and disasters also have a negative impact on bee hives and honey production. Support services to beekeepers are inadequate for the growth and development the honey industry and more broadly, an apiculture sector. There is also an absence of a cohesive policy framework to support the sector, despite its potential for growth locally and also exports.

With respect to the marketing of honey, consumers are faced with high prices, inconsistent quality, poor packaging and presentation and availability. The infiltration of contraband honey into the market also impacts the sales of local honey, given lower prices and stronger market penetration.

In going forward, it is clear that there needs to be interventions taking place at the micro, meso and macro levels to support a viable, locally driven honey value chain. More broadly, industry stakeholders should change the language from “honey industry” to an “apiculture industry”, since honey is only one output of apiculture and other honeybee products and services (such as pollination services) of value need to be developed to improve the competitiveness and productivity of the industry, and thus the return on investments. The principal objective should be for local apiculturists to dominate a growing domestic market for honey, while setting a competitive foundation for entering into export markets with high quality honey bee products and by-products, presented in bulk and retail packages.

Micro level interventions would involve enhancing the technical capacity of beekeepers to produce honey and by-products of the hive and maintain food safety standards in the handling of honey. At the level of marketing, more effort needs to be dedicated towards standardization of quantities, whether, 750 ml, 500 ml, etc., improvement of bottling, labelling and quality of honey at an affordable price and to present an attractive product to the consumer.

Meso level interventions would involve instituting standards for the production, processing, storage and sale of honey and hive by-products, building capacity of extension services, providing technical support to the industry through the Government and forging greater collaboration with operators of protected areas where hives can be located. Macro level interventions should include having a clear policy direction and support for apiculture, public education campaigns to support local honey and other hive by-products and development and implementation of effective strategies to combat illegal importation of honey.

# UPGRADING STRATEGY AND ACTION PLAN

## Honey Value Chain Upgrading Strategy

As an outcome of the participatory value chain analysis exercise, a strategy in support of the development of the honey value chain in Northern Belize has been developed. This strategy is a comprehensive way to address critical factors that impact on the development of this particular chain. It is based on the market situation for honey and apiculture products in Belize and identifies value chain issues that impede efficiency and growth.

The implementation of the strategy will be guided by the Value Chain Coordination Committee (VCCC) and has been designed for a 3 years period. The focus of the strategy is on process upgrading: improved value chain efficiency and increased output volumes, marketable yields and reduced costs per unit of output will be achieved through the introduction of improved genetic material, improved management of hives, supply of construction material for hives and access to processing technology. Group training and support to the formation of beekeeper groups will complement these activities. Agriculture extension services will have to play a key role in knowledge transfer.

This work is complemented by elements linked to product upgrading (enforce honey standards, labeling, introduction of geographic indications, etc.) as well as functional upgrading (regular beekeeper and buyer meetings to agree on who is doing what best, like packaging and marketing of honey through a commercial company) and improvement in value chain coordination and governance, and the enabling environment.

***Vision Statement:***

To enhance the competiveness of the honey value chain and increase stakeholders’ income

***Component 1: Production and knowledge transfer***

Objective: To increase the production, productivity, quality and competitiveness of local honey.

***Component 2: Marketing***

Objective: To stabilize income and ensure fair profit margins for value chain actors and higher and regular market supplies of honey and other apiculture products.

***Component 3: Governance***

Objective: To effectively manage the honey value chain development.

***Component 4: Policy***

Objective: To promote beekeeping by reinforcing regulations and adopting new monitoring mechanism.

***Component 5: Knowledge***

Objective: To develop knowledge material and promote exchanges amongst stakeholders.

In order to guide the actors to improve their performance and get a larger profit share of the value added to the production and marketing of honey, support activities have been developed and grouped under each of the five components. A detailed action plan for the implementation of this upgrading strategy is provided in the following section. While the strategy implementation will be guided by the VCCC, there are specific roles and tasks for each of the actors and stakeholders in the value chain, including the Government. The responsible parties for particular actions are listed in the final column of the action plan table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **GCP/BZE/001/EC – PROMOTING AGRIBUSINESS DEVELOPMENT IN NORTHERN BELIZE**  ***Honey Value Chain Upgrading Action Plan***  ***2015-2017*** | | | | | | | |
| **Production** | **Strategy** | **Action** | **Means** | **Responsible party** | **Deadline** | **Location** | **Budget** |
| ***Objective 1: To competitively increase the production of honey*** | | | | | | |
| * 1. Increase food sources for honey bees | * + 1. Advocate access for beekeeper to maintain their hives in protected areas | Schedule meetings with protected areas managers | Sergio  Canto | April 2016 | Protected areas Orange walk (OW) and Corozal (CZL) - Program for Belize  -Rio Bravo  - Shipstern |  |
|  | * + 1. Support 20 beekeepers with 100 seedlings of recommended varieties to increase honey productivity and promote reforestation on lands of beekeepers | Yo Creek Agriculture Station to provide seedlings | Sergio  Canto  EO  District focal points | October – November 2016 | CZL and OW farmer beneficiaries |  |
| * 1. Improve capacity and participation of beekeepers and technicians in apiculture | * + 1. Establish 4 demo sites to train 30 beekeepers including extension officers in best practices and record keeping. | Criteria for beneficiaries  Regional Trainer | Sergio  Canto  Leiva  EO | April 2016 | 2 sites in OW and sites in CZL |  |
|  | * + 1. Conduct 1 field visit to Yucatan Mexico for 15 participants including farmers and extension officers on production practices and value adding possibilities | Arrange logistics with SAGARPA Mexico | Sergio  Canto | August 2016 | Felipe Carillo Puerto, Mexico |  |
|  | * + 1. Develop or revise and print 100 training manuals and 250 fact sheets that can serve as a training guide for new and existing beekeepers. | Local consultant  MAF | Sergio  Canto  Local consultant  EO | October 2016 |  |  |
|  | * + 1. Develop and monitor a beekeeper database | MAF | Sergio  EO  MAF  BAHA Customs | June |  |  |
|  | * + 1. Develop and implement a campaign strategy to promote beekeeping | Press Office | Sergio | July | National |  |
| * 1. Provide support to beekeepers to enhance production practices and productivity. | * + 1. Establish a queen rearing station in Corozal |  | Sergio  Canto  Leiva  EO | November | Corozal District |  |
|  | * + 1. Support 20 beekeepers with complete hives | Criteria of beneficiaries | Sergio  Canto  EO  District Focal Points | July | Corozal and Orange Walk |  |
|  | * + 1. Support 20 beekeepers with basic beekeeping tools | Criteria of Beneficiaries | Sergio  Canto  EO  District focal points | May | Corozal and Orange Walk |  |
|  |  | * + 1. Purchase one honey extractor and one wax stamper which should be used on a rent service bases and stationed at the agriculture department or a cooperative |  | Sergio  Canto  Tyrell | May | Yo Creek Agriculture Station |  |
| **Marketing** | ***Objective 2: Improve marketability of domestically produced honey*** | | | | | | |
| * 1. Explore market opportunities for honey | * + 1. Liaise with private stakeholders and government bodies to determine potential market channels. | Hold meetings with relevant stakeholders | MAF  Canto  Sergio  EO | March | Corozal and Orange Walk |  |
|  | * + 1. Liaise with private stakeholders and government to identify and promote the production of apiculture by-products. |  |  |  |  |  |
|  | * + 1. Promote farmer market linkages for better information exchange | Contact information exchange | EO  Sergio | March | Corozal and Orange Walk farmers |  |
|  | * + 1. Advocate with stakeholders/farmers to agree on price ranges for honey products | Hold meeting with relevant stakeholders | MAF  PMU | April | Corozal and Orange Walk |  |
| * 1. Improve quality standards | * + 1. Revise and implement the existing standards of quality for honey | Hold meeting with Bureau of Standards | MAF  Bureau of Standards | September |  |  |
|  | * + 1. Create attractive labeling and packaging for local honey which should also act as a certificate of geographic origin | Hold meeting with Bureau of Standard | MAF | September |  |  |
|  | * 1. Increase public awareness | * + 1. Develop and implement a campaign strategy to increase local honey consumption | Press Office | Sergio | July | National |  |
| **Governance** | ***Objective 3: To establish effective mechanisms for management of the value chain*** | | | | | | |
| * 1. Establish a coordinating mechanism | * + 1. Establish a Value Chain coordinating committee with stakeholders from the entire chain | Hold stakeholders meeting  Cooperative Department | Sergio  Canto | Every two months starting on January | Corozal and Orange Walk |  |
| * 1. Organize farmers into groups | * + 1. Advocate for farmer group formation through the Cooperative Department of Belize | Cooperative Department | MAF  Hector (Coops department)  Sergio | April |  |  |
| * 1. Formalize training | * + 1. Advocate institutionalization of beekeeping training in private and public institutions | Hold meetings with institutions | Sergio  Canto | September | Corozal and Orange Walk |  |
| Policy | ***Objective 4: To create an enabling environment to foster the development of the apiculture sector*** | | | | | | |
| * 1. Develop a policy framework for the apiculture sector | * + 1. Advocate for the development of a National Apiculture Policy and Strategy | MAF | Canto  MAF | September |  |  |
| * 1. Reduce illegal importation of honey | * + 1. Revise fines and reinforce existing laws on illegal importation | MAF | Canto  BAHA  Customs | May |  |  |

# ANNEX I- HONEY PROFIT & LOSS ESTIMATES

**Table 2: Profit and Loss Projection- Small Producer**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| PROFIT & LOSS PROJECTION (10 HIVES SUBSISTENCE PRODUCER) | | | | | | |
| 1-Sep-15 |  |  |  |  |  |  |
|  | YEAR #1 | YEAR #2 | YEAR #3 | YEAR #4 | YEAR #5 | YEAR #11 |
|  |  |  |  |  |  |  |
| HIVES (10 UNITS @ $200) | 2000 |  |  |  |  | 0 |
| BOXES (5 UNITS @ $150) |  | 750 | 750 | 750 | 750 | 750 |
| TRANSPORTATION | 468 | 515 | 566 | 623 | 685 | 1103 |
| LABOUR | 468 | 515 | 566 | 623 | 685 | 1103 |
| MATERIALS/GEARS | 100 | 110 | 121 | 134 | 147 | 237 |
| EQUIPMENT RENTAL | 100 | 110 | 121 | 134 | 147 | 237 |
| LOCATION RENTAL | 100 | 110 | 121 | 134 | 147 | 237 |
| FINANCING | 200 | 275 | 350 | 425 | 500 | 375 |
|  |  |  |  |  |  |  |
| TOTAL COST | 3436 | 2385 | 2595 | 2823 | 3061 | 4042 |
| TOTAL NUMBER OF HIVES | 10 | 15 | 20 | 25 | 30 | 60 |
| TOTAL HONEY OUTPUT | 1 DRUMS | 1.5 DRUMS | 2 DRUMS | 2.5 DRUMS | 3 DRUMS | 6 DRUMS |
| TOTAL COST PER DRUM | 3436 | 1590 | 1297.5 | 1129.2 | 1020.33 | 674 |
|  |  |  |  |  |  |  |
| PRICE PER QUART (750ML) | 9 | 9.05 | 9.1 | 9.15 | 9.15 | 9.45 |
| NO. OF QUARTS | 270 | 405 | 540 | 675 | 810 | 1620 |
| REVENUE | 2,430 | 3,665 | 4,914 | 6,176 | 7,412 | 15,309 |
|  |  |  |  |  |  |  |
| NET INCOME | -1,006 | 1,280.25 | 2,319 | 3,353 | 4,351 | 11,267 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| BALANCE SHEET STATEMENT |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| ASSETS | 1,994 | 5,780 | 8,319 | 10,853 | 13,351 | 29,267 |
|  |  |  |  |  |  |  |
| LIABILITIES | 3,006 | 2,750 | 3,500 | 4,250 | 5,000 | 7,500 |
|  |  |  |  |  |  |  |
| EQUITY | -1,006 | 3,030 | 4,819 | 6,603 | 8,351 | 21,767 |

**Table 3:** **Profit and Loss and Balance Sheet Projection- Commercial Producer**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PROFIT & LOSS PROJECTION (50 HIVES START-UP)** | | | | | | | | | |
|  | YEAR #1 | YEAR #2 | YEAR #3 | YEAR #4 | YEAR #5 | YEAR #11 | YEAR #12 | YEAR #13 | YEAR #14 |
|  |  |  |  |  |  |  |  |  |  |
| HIVES (50 UNITS @ $300) | 1500 | 1500 | 1500 | 1500 | 1500 | 0 | 0 | 0 | 0 |
| BOXES (50 UNITS @ $150) |  | 750 | 1500 | 2250 | 3000 | 2250 | 1500 | 750 | 0 |
| TRANSPORTATION | 2600 | 2600 | 2860 | 3146 | 3460 | 3806 | 4187 | 4606 | 5067 |
| LABOUR | 780 | 936 | 1123 | 1348 | 1617 | 1940 | 2134 | 2348 | 2583 |
| MATERIALS/GEARS | 500 | 550 | 605 | 666 | 732 | 769 | 807 | 847 | 890 |
| EQUIPMENT RENTAL | 500 | 550 | 605 | 666 | 732 | 769 | 807 | 847 | 890 |
| LOCATION RENTAL | 300 | 480 | 780 | 1080 | 1380 | 1449 | 1521 | 1597 | 1677 |
| FINANCING | 1500 | 2250 | 3000 | 3750 | 4500 | 3750 | 3000 | 2250 | 1500 |
|  |  |  |  |  |  |  |  |  |  |
| TOTAL | 7680 | 9616 | 11973 | 14406 | 16921 | 14733 | 13956 | 13245 | 12607 |
| TOTAL NUMBER OF HIVES | 50 | 100 | 150 | 200 | 250 | 250 | 250 | 250 | 250 |
| TOTAL HONEY OUTPUT | 5 DRUMS | 8 DRUMS | 13 DRUMS | 18 DRUMS | 23 DRUMS | 25 DRUMS | 25 DRUMS | 25 DRUMS | 25 DRUMS |
| TOTAL COST PER DRUM | 1536 | 1171 | 883 | 731 | 649 | 589 | 558 | 530 | 505 |
|  |  |  |  |  |  |  |  |  |  |
| PRICE PER DRUM | 1300 | 1333 | 1366 | 1400 | 1435 | 1470 | 1506 | 1544 | 1583 |
| REVENUE | 6,500 | 10,664 | 17,758 | 25,200 | 33,005 | 36750 | 37,650 | 38,600 | 39575 |
|  |  |  |  |  |  |  |  |  |  |
| NET INCOME | -1,180 | 1298 | 6,285 | 12,044 | 18,084 | 22,017 | 23,694 | 25,355 | 26,968 |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| **BALANCE SHEET STATEMENT** | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |
| ASSETS | 15,000 | 31,298 | 51,285 | 72,044 | 93,084 | 97017 | 98694 | 100,355 | 101,968 |
|  |  |  |  |  |  |  |  |  |  |
| LIABILITIES | 16,180 | 22,500 | 30,000 | 37,500 | 45,000 | 37,500 | 30,000 | 22,500 | 15,000 |
|  |  |  |  |  |  |  |  |  |  |
| EQUITY | -1,180 | 8,798 | 21,285 | 34,544 | 48,084 | 59,517 | 68,694 | 77,855 | 86,968 |

# ANNEX II- HONEY INDUSTRY STAKEHOLDERS CONTACT DETAILS

1. Ms. Milagro Matus   
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   Policy & Planning Unit  
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Head of Agriculture Department

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BELIZE

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# ANNEX III- RESULTS OF HONEY SURVEY

| **Name of Farmer** | **Location** | **GPS** | | **Number of Apiaries** | **Number of hives** | **Production of Honey (lb)** | **Pollen** | **Cooperative Member** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Northing** | **Easting** |
| Josue Tzib | San Antonio | 1890927 | 284725 | 1 | 12 | 520 |  |  |
| Isais Tzib | San Antonio | 1891311 | 284706 | 1 | 8 | 780 |  |  |
| Dean Tzib | San Antonio | 1889558 | 286156 | 1 | 2 | 0 |  |  |
| Aron Tzib | San Antonio |  |  | 0 | 0 | 0 |  |  |
| Daniel Mai | San Antonio | 1882205 | 291392 | 2 | 14 | 910 |  |  |
| Victor Mai | San Antonio | 1890143 | 286238 | 1 | 4 | 390 |  |  |
| Isais Tzib | San Antonio | 1890143 | 286238 | 2 | 21 | 163 |  |  |
| Carlomagno Tzib | San Antonio |  |  |  |  |  |  | x |
| Eliseo Tzib | Cristo Rey | 1894047 | 28165 | 1 | 6 | 0 |  | x |
| Sebastian Tun | Santa Familia | 1900731 | 278071 | 1 | 3 | 0 |  |  |
| Odavando Obando | Santa Familia |  |  | 1 | 5 |  |  | x |
| Rudy Obando | Santa Familia |  |  | 1 | 4 |  |  | x |
| James Neal | Seven Miles |  |  | 1 | 5 | 0 |  |  |
| Victor Balan | Seven Miles | 1893229 | 291126 | 1 | 1 | 0 |  | x |
| Amparito Itza | Seven Miles | 1893229 | 291126 | 1 | 2 | 100 |  | x |
| Roberto Perez | Seven Miles | 1894680 | 291340 | 1 | 2 | 0 |  | x |
| San Miguel Farms | Esperanza | 1899282 | 284276 | 2 | 92 | 2,847 |  |  |
| Carlos Galdamez | Seven Miles | 1894439 | 291587 | 1 | 8 | 325 |  |  |
| Thomas Moran | Camp six |  |  | 1 | 15 | 240 |  |  |
| Maximilliano Ortega | Bullet Tree |  |  | 1 | 16 |  |  | x |
| Angel Tzec | Bullet Tree |  |  | 1 | 3 | 0 |  | x |
| Ancelmo Galicia | Bullet Tree |  |  | 1 | 1 | 0 |  |  |
| Elias Melendez | Bullet Tree |  |  | 1 | 15 | 390 |  |  |
| Marlon Waight | Bullet Tree | 1899205 | 274282 | 1 | 15 | 780 |  |  |
| Arnoldo Melendez | Bullet Tree | 1899144 | 275065 | 1 | 2 | 0 |  |  |
| Carlos Melendez | Bullet Tree | 1891448 | 295260 | 1 | 10 | 120 |  |  |
| Domingo Landero | Bullet Tree |  |  | 0 | 0 | 0 |  |  |
| Virgilio Gracia | Bullet Tree |  |  | 0 | 0 | 0 |  |  |
| Monste Casademunt | Arenal | 1886686 | 273593 | 1 | 38 | 1,000 |  | x |
| Wendy Tesecum | Arenal | 1886686 | 273593 | 1 | 5 | 375 |  | x |
| Julio Ramos | Arenal |  |  | 1 | 20 | 1,500 |  | x |
| Vicente Cac | Arenal |  |  | 2 | 50 | 1,950 |  | x |
| Elvira Cac | Arenal |  |  | 1 | 13 | 260 |  |  |
| Eleodoro Perez | Succotz |  |  | 2 | 52 | 6,600 | 5lbs |  |
| Rodrigo Perez | Succotz |  |  | 5 | 180 | 10,400 |  |  |
| Rafael Perez | Succotz | 1888320 | 276389 | 3 | 67 | 3,900 | 6lbs |  |
| Eleodoro Perez Jnr. | Succotz |  |  | 1 | 30 | 1,625 |  |  |
| Santiago Can | Succotz | 1888279 | 276567 | 1 | 27 | 975 |  | x |
| Eric Can Jr. | Succotz (Negroman) |  |  | 1 | 20 | 2,600 |  |  |
| Christian Alfaro | Succotz |  |  | 1 | 3 | 0 |  | x |
| Marcotulio de la Fuente | Negroman |  |  | 1 | 10 | 650 |  |  |
| Carlos Serrano | Vaca Falla | 1872200 | 280055 | 2 | 15 | 780 |  | x |
| Dennis D Martinez | Teakettel Arizona |  |  | 1 | 3 |  |  | x |
| Nathan Harder (8 others) | Spring Field |  |  | 9 | 49 | 2,470 |  |  |
| Nicasio Cal | Upper Barton Creek |  |  | 1 | 31 | 780 |  |  |
|  | Lower Barton Creel |  |  | 6 | 37 | 575 |  |  |
| Fuasto Cabanias | Valley of Peace |  |  | 1 | 12 | 195 |  |  |
| Eber Blandon | Valley of Peace |  |  | 1 | 2 | 0 |  |  |
| Santos Albenio | Santa Martha |  |  | 1 | 14 | 530 |  |  |
| Max Ortega | Aqua Viva |  |  | 1 | 3 | 0 |  |  |
| **TOTAL** |  |  |  | **71** | **947** | **44730** | **11 lbs** |  |

**List of Beekeepers in Belize District**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BEEKEPER** | **LOCATION** | **CONTACT** | **NUMBER** | **NUMBER** |
|  | **OF APIARIES** | **NUMBER** | **OF APIARIES** | **OF HIVES** |
| Alfonso Morales | Sand Hill | 633-9967 | 1 | 16 |
| Barbara Johson | Sand Hill | 610-1371 | 1 | 4 |
| Robert Gongora | Isabella Bank | 610-4138 | 1 | 2 |
| Victor Pailla | Nagu Bank | 205-5563 | 1 | 2 |
|  | Saint Margarette |  | 1 | 8 |
|  | Corozalito |  | 1 | 5 |
| **TOTAL** |  |  | **6** | **37** |

**List of Orange Walk Honey Producers**

|  | **Farmer** | **Address** | **Contact** | **No. of Hives** |
| --- | --- | --- | --- | --- |
| 1 | Edigaso | San Juan | 6518945 | 2 |
| 2 | Hilberto Coba | Douglas | 6662702 | 3 |
| 3 | Edner Correa | Douglas | 6533240 | 2 |
| 4 | Daniel Martinez | Douglas | 6679386 | 4 |
| 5 | Sotero Chuc | San Jose | 6517807 | 14 |
| 6 | Francisco | Orange Walk Town | 6610560 | 25 |
| 7 | Nelson Martinez | Orange Walk Town | 6326730 | 5 |
| 8 | Julian Avila | Orange Walk Town | 6502858 | 30 |
| 9 | Domingo Gongora | Orange Walk Town |  | 2 |
| 10 | Margarito Leiva | Orange Walk Town | 6307681 | 200 |
| 11 | Eduardo Leiva | Orange Walk Town |  | 6 |
| 12 | Perla Leiva | Orange Walk Town |  | 214 |
| 13 | Owen Leiva | Orange Walk Town | 6501111 | 6 |
| 14 | Adriana Ayuso | Orange Walk Town |  |  |
| 15 | Fernando Ayuso | Orange Walk Town |  | 13 |
| 16 | Iliana Ayuso | Orange Walk Town | 6026584 | 30 |
| 17 | Ismael Peraza | San Antonio |  | 5 |
| 18 | Ramiro Guemes | San Antonio |  | 1 |
| 19 | Ubaldo Miranda | Yo Creek | 3032005 | 20 |
| 20 | Rember Seron | Yo Creek | 6616564 | 10 |
| 21 | Moise Lopez | San Lazaro |  |  |
| 22 | Santiago Lopez | San Lazaro |  |  |
| 23 | Pedro Sanchez | San Lazaro | 6100519 | 18 |
| 24 | Remijio Sanchez | San Lazaro | 6669229 | 18 |
| 25 | Cecilia Medina | Trinidad | 6505433 | 60 |
| 26 | Vicky Medina | Trinidad |  | 80 |
| 27 | Martin Medina | Trinidad |  |  |
| 28 | Natalio Medina | Trinidad | 6618440 | 8 |
| 29 | Everaldo Magana | San Felipe | 6509380 | 100 |
| 30 | Sarita Castellanos | San Felipe (new under BEST) |  |  |
| 31 | Jair Castellanos | San Felipe (new under BEST) |  |  |
| 32 | Noelia Domingues | San Felipe (new under BEST) | 6649985 |  |
| 33 | Carolina | San Felipe (new under BEST) | 6685942 |  |
| 34 | Brenda | San Felipe (new under BEST) | 6281660 |  |
| 35 | Omar Hernandez | San Felipe (new under BEST) | 6513954 |  |
| 36 | Maritza Castellanos | San Felipe (new under BEST) | 6514255 |  |
| 37 | Daniel Gomez | Guinea Grass |  | 2 |
| 38 | Noel Bol | Guinea Grass |  | 4 |
| 39 | Francisco Senaria | Marcos Canul |  | 14 |
| 40 | Yuri Senaria | Marcos Canul |  | 3 |
| 41 | Emely Joy Rempel | Blue Creek | 6536938 | 2 |
| 42 | Ricardo Flores | Santa Martha |  | 2 |
| 43 | Manuel Solares | Santa Martha |  | 4 |
| 44 | Marcos Cisneros | Santa Martha |  | 56 |

# ANNEX IV- LIST OF PARTICIPANTS FOR THE HONEY INDUSTRY VALUE CHAIN WORKSHOP – OW - LICU CONFERENCE CENTER

Date: July 15, 2015

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NAME** | **ADDRESS** | **PHONE #** | **# OF COLONIES** | **EST. OF HONEY PRODUCED THIS YEAR** |
| 1. Ubaldo Miranda | Yo Creek | 303-2005 | 20 | 1.5 drums |
| 1. Hilberto Coba | Douglas | 666-2702 | 3 | - |
| 1. Severo Chuc | San Jose | 651-7807 | 14 | 1 drum |
| 1. Francisco Sanabria | 0/W | 661- 0560 | 25 | 1 drum |
| 1. Pedro Sanchez | San Lazaro | 610-0519 | 18 | 2 drums |
| 1. Remijio Sanchez | San Lazaro | 666-9229 | 18 | 2 drums |
| 1. Cecilia Medina | Trinidad | 650-5433 | 60 | 6 drums |
| 1. Vicky Medina | Trinidad | 332-9014 | - | - |
| 1. Eder Correa | Douglas | 653-3240 | 2 | - |
| 1. Eutigiaso Chimag | San Juan | 651-8945 | 2 | - |
| 1. Rember Ceron | Yo Creek | 661-6564 | 10 | 1.25 drums |
| 1. Everaldo Magana | San Felipe | 650-9380 | 100 |  |
| 1. Nelson Martinez | O/W | 632-6730 | 5 | - |
| 1. Emily Joy Rempel | Blue Creek | 653-6938 | 2 | 9 gals |
| 1. Julian Avila | 0/W | 650-2858 | 30 | 5 drums |
| 1. Daniel Martinez | Douglas | 667-9386 | 4 | - |
| 1. Victoria Cruz | San Felipe | 668-2633 | - | - |
| 1. Ernestina Magana | San Felipe | 666-0735 |  |  |
| 1. Domingo Gongora | 0/W |  | 2 | 2 buckets |
| 1. Sarita Castellanos | San Felipe |  |  |  |
| 1. Jair Castellanos | San Felipe |  |  |  |
| 1. Maritza Castellanos | San Felipe | 631-4255 |  |  |
| 1. Noelia Dominguez | San Felipe | 664-9985 |  |  |
| 1. Carolina Canizales | San Felipe | 668-5942 |  |  |
| 1. Brenda Wicab | San Felipe | 628-1660 |  |  |
| 1. Omar Hernandez | San Felipe | 651-3954 |  |  |
| 1. Cynthia Patt | San Jose |  |  |  |
| 1. Arianny Blanco | O/W |  |  |  |
| 1. Emmanuel Flores | San Jose |  |  |  |
| 1. Federico Chi | Santa Cruz | 666-5616 |  |  |
| 1. Sandy Hernandez | San Felipe | 669-4508 |  |  |
| 1. Irene Magana | San Felipe | 620-7135 |  |  |
| 1. Kelvin Magana | San Felipe | 666-5089 |  |  |
| 1. Baldemar Hernandez | San Felipe | 666-2869 |  |  |
| 1. Assamar Hernandez | San Felipe | 660-2202 |  |  |
| 1. Natalio Medina | Trinidad | 661-8440 | 8 | 1 drum |
| 1. Martin Medina | Trinidad | 663-0280 |  |  |
| 1. Margarito Leiva | O/W | 630-7681 | 200 | 25 drums |
| 1. Owen Leiva | O/W | 650-1111 | 6 |  |
| 1. Iliana Ayuso | O/W | 602-6584 | 30 | 2.5 drums |

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1. Productivity is a measure of yield per unit of production. In the honey value chain in Belize, and for this report, productivity is measured in units of 55 gallon drums per 10 hives. Such a drum contains the equivalent of 208 litres of honey or 660 lbs (300kg) of honey. [↑](#footnote-ref-1)