CASE STUDY

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A Land of Hills and Honey

Case Study: Building the Resilience of the Honey Sector
The Saint Lucia Example

Background

Bees, industrious, meticulous, and vital in maintaining biodiversity across the globe, are being dramatically affected by climate change. Changing weather patterns, global warming, the indiscriminate cutting of trees and the use of pesticides all negatively affect bee populations in Saint Lucia.

Not only are bees affected by our activities, but they are also threatened by parasites that can wipe out entire hives. Additionally, there are several invasive (Africanised) species of bees which are not native to Saint Lucia and are low-honey producers. To exacerbate the problems bees are facing, bees are unable to adapt to fast-paced environmental changes easily; meaning they are especially in danger from the unexpected effects of climate change. Due to climate change, the seasons of production are changing - the flowering period of the natural forage is reducing which results in bees having a shorter period of time to collect nectar and pollen. Extended rainfall destroys blossoms and flowers and further reduces the bee's foraging opportunities.

Bees are losing the battle to climate change and without appropriate intervention their demise could mean disaster for the island's economy, specifically the honey industry, as well as damaging local food supplies (through reduced pollination of crops). To mitigate the effects of climate change on the bee populations in Saint Lucia, the government partnered with the J-CCCP to execute the "Building the Resilience of the Honey Sector to the Impacts of Climate Change Through Genetic Security and Adoption of the Best Proven, Climate Smart Production Methods" Project.

Beekeeper - Richard Matthias - shows the Perone Hive, which he's comparatively researching

Project Overview

Honey production declined by over 50% between 2015 and 2016 with many adverse weather systems, such as drought and high temperatures, that affected flower availability for production of nectar. As a subset of the agriculture sector, which contributes an average of 2-4% to GDP, decreases such as this can have extremely harmful impacts on the sector which has also seen declines in recent years

The overall objective of the project is to build a resilient apiculture industry in order to adapt to and mitigate the impacts of climate change. To save the bees and give them the necessary boost needed to navigate an increasingly volatile world, the project focused on three main areas.

The project concentrated on habitat restoration, forestation and reforestation of flowering plants, fruit trees and endemic species. Various long term and short term flora were planted. This was done to restore and protect the habitat and make more food available for bees.

Additionally, steps were taken to ensure sufficient water supply for the bees during dry periods. The project educated beekeepers on how to appropriately harvest water for bees and promoted the establishment of small-scale rainwater harvesting facilities at all apiaries.

In addition to these interventions, a large part of the project was focused on improving the breeding stock of bees for local and regional beekeepers through instrumental insemination and queen rearing. This was the beginning of continued steps to building beekeepers' capacity for the application of climate smart practices in the apiculture industry.

Beekeeper shows the insemination process

A Bee Paradise

The natural environment is very important for the successful bee population, and lack of habitat was negatively affecting the bees' ability to forage and collect sufficient pollen. During the project, the team identified various hardy plant species that are climate resilient, while still producing substantial nectar and pollen for the bees.

The Ministry of Agriculture, Caribbean Agricultural Research and Development Institute (CARDI) and other agencies took center stage in this area and developed additional forage efforts to increase the island's coconut stock, which is especially useful to bees. Additionally, they developed a large sunflower plot in the Praslin community. The sunflower was chosen because it is well-equipped to withstand drought, high salinity, vastly variable ecosystems, and requiring little fertilizer, making it one of nature's finest "apocalypse preppers".

In addition to the bees' natural environment, the project also focused on the hives. There are two main types of hives, the traditional Langstroth Hive, which has been in existence for more than 100 years, and the Perone Hive, based on a new technology developed within permaculture as a way to avert some of the diseases and pests that affect the bees. Although Langstroth Hives are designed to produce more honey, they are more costly to manage. In the Perone Hive (a hollow box) the bees naturally produce wax and honey. This method is less intrusive and substantially less expensive although the honey output is less per hive. However, honey produced in the Perone Hive has a lower per unit cost, still making it an attractive option. The project is continually monitoring the two types of hives to see which option is better suited to the changing climate.

Taking a Closer Look: Monitoring Systems

To get an accurate understanding of the impact of climate change on the bee population it was important that factual, real time data be recorded to accurately analyse the effects of climate change. A data-logger was used to continuously record the hives' humidity, temperature and acoustics. These hive characteristics were then correlated to atmospheric and environmental conditions to see how the hives were adjusting. This current data is vital to ensure that well-informed solutions can be implemented to protect the bee population.

Beekeeper showcases honeycomb

Monitoring system installed on a bee hive to track humidity, temperature and acoustics

Project Outcomes

The project achieved several outcomes which benefitted the Saint Lucian community as well as the apiculture industry. The below outlines the main outcomes:

Enhance the stock of local bee species to make them more tolerant to the changes fostered by climate change

There has been an increase in colonies as a direct result of the project. 207 queens were produced, of which 93 were introduced to colonies, 77 distributed to beekeepers, and 37 rejected due to quality control

Increased habitat

Coconut groves and a sunflower field were planted toward boosting foraging/ habitat for the bees

Apiculturist trained in small scale water harvesting techniques

Rainwater harvesting was implemented at Castries locations as well as at three additional locations: Mon Repos, Praslin, and Anse la Raye

Improved technology to monitor and support hives

Four sites have implemented the improved monitoring system and are online collecting valuable data. These include:

- Castries - 11 units online
- Anse la Raye - 7 units online
- Mon Repos - 4 units online
- Ma Kote - 11 units online

Beekeepers inspecting a hive

The project addressed the focal area of Sustainable Agriculture within J-CCCP's Outcome 2, and also addressed some of the Sustainable Development Goals (SDGs) as outlined below:

Goal 9:

Industry, Innovation and Infrastructure

- Through training of youth and various members of the community, the project created the framework for additional jobs in the growing honey sector.

Goal 13:

Climate Action

- The project began the journey to boost the climate-resilience of the local bees and in turn the honey industry.

Best Practices and Lessons Learnt

The following best practices were highlighted from the Saint Lucia example:

Collaboration with key stakeholders
The Ministry of Agriculture, UNDP J-CCCP team, beekeepers' association and other governmental agencies all worked together to execute the project. This collaboration assisted in achieving the various outcomes of the project.

Use of technology in agriculture
The project showcased the benefits of technology and technological advances in solving agricultural problems. The artificial insemination and selective breeding of climate-reliant bees improved the stock, while advanced monitoring systems provided beekeepers and decision makers with vital information to make any necessary changes to protect bees and in turn, the honey industry.

Final Thoughts

The apiculture industry is a largely untapped resource in Saint Lucia but is also very fragile as it relates to changing weather patterns. This project is the beginning of developing this industry which has the potential to create additional economic prosperity for Saint Lucia. However, as climate change continues to negatively impact the region, it is necessary to assist species (e.g. bees) and industries, like the apiculture industry, that are vulnerable. Through sustainable, responsible intervention we can boost the resilience of our natural resources.