Executive Summary

Agriculture is a critical component of the Indian landscape. While agricultural production only accounts for 20 percent of India’s gross domestic product, nearly 50 percent of Indians are involved in the agricultural sector in some way (2). Agriculture plays a critical role in the lives of many and yet countless still struggle to make ends meet. As small and marginal farmers live at or near the poverty line, they do not have extra funds to invest into their farm holdings. Because this is the economic reality, these farmers need a way to increase their incomes with little upfront investment while still being able to focus on their livelihoods.

This is where Apis Krishi can make an impact. Apis Krishi will install beehives on farmers’ land, leaving farmers to benefit from an increase in crop yields through a simple yet effective natural process: pollination.

Apis Krishi will own and maintain the beehives during the first phase of the initiative, allowing the farmer to benefit from pollination services with only a small annual cost. Apis Krishi will also collect the honey and beeswax from the hives to be sold at market during phase one. Through this model, farmers will benefit from higher quantities and qualities of yields with no additional labor and minimal financial investment. Apis Krishi’s goal is to build a financially sustainable business while helping farmers earn a greater income. Increasing the quantity and quality of farmer yields will give them access to services that would typically be too expensive for them to afford.
Background

**Agricultural Perspective**

Agriculture in India cannot be defined in a sweeping generality: the diversity of landscapes, climates, and crops create a system that is wide and varied. For the purposes of this enterprise, focus will be placed on farmers in Uttarakhand. Uttarakhand is a state in northern India. In this region, horticultural crops represent roughly one-fifth of the total crops that are produced. While this number may seem small, “horticultural development can be an effective tool for accelerating development...as well as boost[ing] the income of farmers beyond the subsistence level” (1). Horticultural crops in this region include but are not limited to: mangoes, citrus fruits, apples, walnuts, cauliflower, peas, ginger, and coriander. These crops all benefit from bee pollination—a critical component of Apis Krishi’s plan.

Throughout India, roughly fifty percent of the population is involved in the agricultural sector (2). This holds true in Uttarakhand where a large portion of the population engages in farming practices. While many people are engaged in farming, land holdings are typically small. The Agricultural Census estimates that nearly 82 percent of land holdings are smaller than 2 hectares (5 acres) (3). This shows that farmers do not have much room for error or experimentation on their plots; they must effectively manage the small amount of land that they have in order to generate an income.

**Economic Perspective**

In India, farming and poverty often come hand in hand. According to Poor Economics, a discussion about the reframing of global poverty, individuals “are trapped in poverty: They are poor because they are poor. They have the potential to become rich but they need to be dislodged from where they are stuck” (4). The Government of India Planning Commission has defined the poverty line at Rs 27 per day (5). And as small farmers and marginal farmers earn Rs 31 and Rs 15 per day, respectively, it is difficult for them to get out of this cycle of poverty. If farmers can only focus on getting by each day, they can never invest in their farm and family’s future, much less an unforeseen emergency cost. If a farmer is not able to make investments into his farm, his productivity on his small plot of land can not be maximized.

**Ecological Perspective**

Bees play an important role in the global ecosystem and can be an effective tool for improving harvests. And as farmers are always looking for ways to improve their yields (and thus their incomes), introducing bee pollination can be a simple and effective solution for them to implement. Bees are inadvertent pollinators. As they fly from plant to plant collecting pollen and nectar for their own nutritional needs, they pollinate flower-bearing crops and are
Background, cont.

the catalyst for fruit production. Yields for crops that require pollination can drastically improve if beekeeping practices are introduced in the given area. Through pollination, the quantity of yields not only increases (can be anywhere from 15% to 200% increases in yield depending on the crop), but the quality improves as well (7). With a greater quantity and quality of produce, farmers have the opportunity to bring larger quantities of produce to market and potentially sell their produce for a higher price if it is of better quality.

Problem and Solution

Problem Statement: As small plot farmers live at or below the poverty line, they have little room to improve their livelihoods and seek improvements on their farms. With small plot holdings, farmers must maximize the land that they have in a way that will generate the greatest profit. The most challenging hurdle that farmers face is poverty, and the inability to make money without first having it.

Solution: Apis Krishi will install beehives on farmers’ land, allowing them to benefit from pollination with only a small annual cost, eventually leading to hive ownership. This allows farmers to benefit from pollination services while the organic transfer of beekeeping knowledge occurs. The financial burden of starting a hive is not felt as intensely by the farmer.
**Business Description**

**Apis Krishi** is a social enterprise that uses beekeeping to increase agricultural productivity while improving incomes and livelihoods for farmers and their families. Apis Krishi will set up beehives on farmers’ land holdings where insect-pollinated crops are prevalent. As large capital investments are difficult for small plot farmers to make in one installment, the hives will be installed and maintained on farmers’ land for a small annual fee for the **first five years**. Apis Krishi will take care of the hives, allowing the farmer to focus on his crop rather than the beehives, but also creating a space for the farmer to learn the craft of beekeeping if they so choose. Apis Krishi will use the European honeybee species *Apis mellifera* in all locations as they have lower tendencies to leave the hive, produce nearly four times as much honey in comparison to native Indian bees, and are able to survive in the northern climates of India. Top-bar hives will be used as they are the least expensive beehive structures and produce larger quantities of wax than traditional box hives. As Apis Krishi manages the hives, it will also collect honey and wax to be sold at market. When the transfer of hives to farmer occurs, the farmer will have the option to sell to a third party, or back to Apis Krishi for our branding and market considerations. By offering farmers pollination services with only a small annual cost, farmers will have access to a practice that may typically be unaffordable to them. Below is the organizational model and revenue streams to Apis Krishi (as well as the farmer):

![Diagram of the business model]

The model begins with Apis Krishi sourcing bee equipment and bees from a third party. Apis Krishi will find farmers interested in keeping bees on their land and install the hives. Farmers will pay a small annual fee for this service to Apis Krishi. As the bees begin to thrive, farmers will experience an increase in the quantity of their yields and will then be able to earn more through market sales. This is the initial benefit seen by farmers. Apis Krishi will collect the honey and beeswax from the hives and sell it to socially-mindful retailers during the time that farmers are paying Apis Krishi. After the first phase has gone by, and the farmers are ready to bee keep on their own, benefiting from honey and wax sales, the hives will be transferred to the farmer, and the process begins again with a new farmer. Through this model, Apis Krishi earns from the farmer and the retailer, and the farmers earns first from produce sales, and then from the retailer.
Business Model Highlights

Key Partners and Competitors

*Bee Tools* -- key supplier.

*Under the Mango Tree* -- Under the Mango Tree is a social enterprise that provides farmers with beekeeping equipment and training while also selling honey. They could be an important partner both in providing us with valuable education and learned experience, as well as a potential collaborator on raising awareness and legitimizing the industry (through expansion of previous studies, or lobbying efforts, for example). We consider them a partner due to the geographical location of their business.

*Government programs* -- The government of India is interested in stabilizing bee populations and offers subsidies for farmers interested in taking up beekeeping. For this reason, these programs may compete with our business. We believe that our business model is much stronger as it requires minimal investment from the farmers. Additionally, we can provide a strong community built around beekeeping.

Key Activities

Distribution of beekeeping materials, sourcing of materials, establishing proof of concept to attract farmers to beekeeping, training laborers, providing ways to increase knowledge and skill, establishing channels to wholesale and/or retail market are all expectations of a successful Apis Krishi venture.

Channels

The primary anticipated distribution channel is company-procured transportation to a processing facility which will sell the product in retail markets. We will act as a wholesaler while the business and proof of its efficacy are being established. Paying for processing and bottling and selling the product under the Apis Krishi brand in the retail market is an attractive option once the scale exists to do so.

Part 1: Awareness
Through relationships with communities, local networks (family, farmers, etc.), Potentially government, academic sourcing agents. This will also be the time to establish markets for honey sales.

Part 2: Evaluation
Training, education, pilot program, establishing proof of concept in India -- all aimed toward giving potential beneficiaries and customers resources and data to evaluate our value proposition.

Part 3: Delivery and repeatability
Through establishment of additional marketable end product, relationships with farmers attracted to proof of crop concept, and response to market, Apis Krishi will easily expand the model to achieve greater impact.

In India honey is used both as a substitute for sugar and for its medicinal properties. Though not all local markets sell honey, there is definite potential for domestic market growth.

Customer Segmentation

The initial market for our product is established companies or institutional markets. We anticipate contacting sales departments for these companies directly, and marketing to universities with an interest in using a product that promotes a social impact as well as provide food sweetening options that are healthier than granulated sugar.
Secondary market:

-- Specialty stores, natural product retailers, cooperative storefronts, etc.

-- Buyers with discretionary income that are attracted to the social impact of Apis Krishi as well as beeswax products like premium personal care products and candles, as well as consumable honey for either nutritional or medicinal use.

Cost Structure

Costs are very low as beekeeping is a relatively inexpensive method for increasing farm productivity. We are cost-driven in our initial market because markets will see honey and beeswax as a commodity product. Our secondary market is more value-driven because customers want a specialty product and experience with the product.

Possible fixed costs: Transportation to meet potential/current customers, office space, labor, government licenses.

Possible variable costs: beehives and bees, goods sold as revenue, fuel and maintenance on transportation, advertising costs (inside sales for institutions, government for beneficiaries), labor (at market site).

The necessary beekeeping equipment is the largest cost to Apis Krishi. Top bar beehives cost Rs. 2000 per hive. The bees necessary to fill the hive will also cost Rs. 2000. However, the revenue earned for each hive through the sale of honey and wax will outweigh the costs within 18 months.

Revenue Summary

Apis Krishi’s major revenue comes from selling honey and beeswax products to:

-- Local universities such as University of Petroleum and Energy Studies, IIT Roorkee

-- Socially minded markets in the US and/or India

Revenue will also be earned from Rs. 400 yearly fee charged to farmers for pollination services provided by Apis Krishi

While the initial cost of beehives to Apis Krishi may be high, once a hive is established, there will be few maintenance costs involved over the long-term. Through the sale of honey and wax, one hive has the potential to earn
Value Proposition

Apis Krishi will establish beehives in rural farming communities to positively impact small farmers and the communities surrounding them. As farmers’ pay a small yearly fee for the placement of hives on their land, they will be the first customer that Apis Krishi interacts with. Once honey and wax is collected from the hives, it will be sold at market value.

Value Proposition: Socially-Mindful Retailers

Financial Value
As socially-mindful consumers purchase honey and other bee-related products from Apis Krishi, retailers will be able to charge a higher price for products that are sourced in an environmentally and socially responsible way. As the products are sold directly from Apis Krishi to retailers, wholesale prices would be competitive with other honey manufacturers.

Social Value
Retailers selling Apis Krishi products will be able to highlight their commitment to small farmers who maintain their farms in environmentally and socially responsible ways. Through the purchase of bee-related products, the retailers will also be showing support to a small, local social enterprise: Apis Krishi.

Value Proposition: Farmers

Financial Value
Through beekeeping practices, abundance and quality of farms yields will increase, bringing an extra 17% in sales revenue per year to an individual farmer during the first five years (see Appendix). This translates into an additional Rs. 14,000 earned each year. At a cost of Rs. 400 per year, services provided by Apis Krishi offer the farmer real potential to significantly change his family’s economic standing with little upfront cost. After the first phase of his involvement the farmer can earn roughly 6,000 Rs from end product sales.

Social Value
Beekeeping can be a daunting practice to undertake. Many farmers may be interested in keeping bees on their land but are concerned about bee stings, need more labor, etc. As Apis Krishi will maintain all of the hives, the farmer will be left to enjoy the benefits of beekeeping without having to undertake the practice on his own. This will allow the farmer to focus on his land rather than investing additional time into beekeeping. After 5 years have gone by, the farmer will have been acclimated and the transition will be seamless.
Market Research

A survey was conducted specifically in the village of Chharba with the help of a student organization called Students’ Initiative for Integrated Rural Development (SIIRD) based in the Indian Institute of Technology (IIT) Roorkee. The survey helped us in understanding the suitability of Chharba for piloting our project and the behavior analysis of small and medium farmers towards adopting beekeeping into their livelihoods. Survey findings showed that small and medium farmers in Chharba do not grow significant levels of fruit bearing crops in their lands. Mostly rice, wheat and sugarcane is grown to generate income. In the survey results, we also noted that small and medium farmers were reluctant to pay initially for the beekeeping because of the perception that bee-keeping will consume a lot of their time. Farmers were interested in beekeeping if it is provided at low price (subsidized).

Therefore, the survey was helpful in understanding farmers’ perceptions of beekeeping but also revealed that the actual pilot should be run in a different area where there are larger concentrations of insect pollinated crops. A map was generated (shown on page 10) showing potential zones in India where there are large concentrations of insect pollinated crops. There are small areas in Uttarakhand where beekeeping can potentially benefit the farmers especially in villages at higher altitudes in the districts of Uttarkashi and Chamoli. Major vegetables prevalent in Uttarakhand are peas, tomato, cabbage, beans, okra, cauliflower, bell peppers and radish. Fruit bearing crops include mango, apple, citrus, pear, litchi, peach and guava (8).

Through conversations with Mr. Manoj Sharma, a social entrepreneur in Dehradun & Member, Board of Governors at Leap Foundation, we found that universities with residential campuses such as IIT Roorkee & University of Petroleum and Energy Studies (UPES) would be our strong potential customers for honey and beeswax products. Universities have socially-mindful educators and students willing to pay for environmentally friendly and socially beneficial products. Honey is used as a sweetener in tea or milk, used as sugar substitute by diabetic patients, as spread on bread and used in cakes, fruit cakes, cookies and several types of bread. During Diwali festival season, beeswax candles will be in huge demand.

Canteens and campus shops in the universities like IIT Roorkee are coordinated by managing committees that are potential collaborative partners. In the upper region of Uttarakhand, lies the Dhanaulti Eco-park where through public-private partnership, NGOs sell products to the tourists. Such defined spots can be strong markets to sell our bee products.
Risks and Assumptions

There are still critical assumptions that Apis Krishi is making in estimating the success of the business. These assumptions are:

- Small plot farmers will allow Apis Krishi access to their land
- Pesticide use will not kill bees
- Farmers will pay for pollination up front
- Significant portions of bees will not be lost each year
- Pollination will lead to a substantial increase in yields
- Beehives will produce enough honey to make a profit

Numerous assumptions have been proved/disproved through primary and secondary research. However, in order to test the remaining assumptions, the best plan of action would be to implement a pilot project in an Indian village.

Pilot Project

Apis Krishi intends to launch an eventual pilot in the districts Uttarkashi and Chamoli located in the state of Uttarakhand in India. Based on the map generated below, these areas have been identified as having large concentrations of insect pollinated crops and could benefit from added pollination services. The pilot project will entail establishing 15 bee colonies of Apis mellifera on the land holdings of selected farmers. While the longer-term plan of Apis Krishi is to charge farmers a yearly rate for pollination services, the pilot will not require any payment as the pilot is meant to test assumptions rather than focusing on maximizing revenue. Apis Krishi is interested in knowing if there is enough interest on the part of the farmers for the business to be successful. Also, while measuring quantity changes in crop yields is challenging, Apis Krishi hopes to uncover quality changes in crops so farmers will be able to recognize the benefits that beekeeping has on their livelihoods.

Apis Krishi plans to procure equipment from BeeTools, a unit of Little Bee International Pvt. Ltd, based in Ludhiana, Punjab. Equipment costs for year one are estimated to be ₹ 66,000. To maintain the bees we will hire and train one local landless laborer. We will also hire landless laborers to process beeswax into products such as candles and lip balm. Apis Krishi plans to sell honey at ₹100/kg and beeswax in products that will make a return of ₹ 1500/kg. Beeswax will be sold as candles and lip balm
to socially minded university-based consumers and internationally by means of internet (for example, via etsy). Equipment prices and selling prices were estimated from a conversation with Spruce Impex (a beekeeping business in India).

After the Pilot and Year One, we plan to expand our business by 50% each year so that in five years we will own 75 hives. Upon expansion we also plan to expand our workforce and train more of the landless population. In year one, we project to operate at a deficit as we anticipate very little honey production. We will reach our break even point in the second year and become profitable. After the fifth year our annual profit is estimated to be just over ₹400,000 (further detail on expansion can be found in the Appendix).

Conclusion

Apis Krishi’s founders have extensive beekeeping knowledge and experience and an established network of beekeepers. With a relatively low startup cost and a straightforward initial profit-generation model, Apis Krishi is well-positioned to quickly establish a business that can provide value to customers. Apis Krishi hopes to improve the livelihoods of farmers and their families, provide retailers with honey and wax products that are sourced in environmentally and socially conscious ways, and create positive impact at large in India. I am committed to going to India to implement a research plan for Apis Krishi. The team in Minnesota did all the research it could from across the world. It is time to put feet on the ground and find out more. I will be spending the summer working in rural development and trying to compile as much information as possible. The entire team looks forward to furthering its work in creating a bee and farmer-focused social enterprise.

Acknowledgments

We greatly appreciate the efforts made by the Students’ Initiative for Integrated Rural Development (SIIRD) for voluntarily organizing the survey in Chharba and providing all necessary information to our team. We acknowledge Mr. Manoj Sharma from the Leap Foundation and Mr. Guruprasad Rao from Spruce Impex for providing their invaluable insights on beekeeping in India. The directions given by Fred Rose, Brian Bell, Aruna Raman, Toby Nord, Julian Marshal, Steele Lorenz, and John Reinhart to improve our business plan step by step have been greatly invaluable in shaping the business concept.
Works Cited

1. Indian Horticulture Database 2011.

2. “State of Indian Agriculture 2012-2013.” Ministry of Agriculture, Govt. of India. Chapter 1.


Image Sources


2. https://twitter.com/utmt


Appendix

Farmer Income Calculations

Let:

\[ x = \text{annual income from flowering crops (R.s.)} \]
\[ y = \text{annual income from non-flowering crops (R.s.)} \]

Annual income from agriculture = 81,395 R.s.

\[ x + y = 81,395 \text{ R.s.} \]

Define:

\[ n = \text{total number of crops (unit)} \]
\[ nx = \text{number of flowering crops (unit)} \]
\[ ny = \text{number of non-flowering crops (unit)} \]

\[ \frac{1}{3} \text{ of crops are flowering crops} \]

\[ nx + ny = n \]
\[ nx = \left(\frac{1}{3}\right)n \]
\[ ny = \left(\frac{2}{3}\right)n \]

Flowering crops are worth 5x more than non-flowering crops

\[ m = \text{worth per crop (R.s./unit)} \]

\[ x = 5m\left(\frac{1}{3}\right)n \]
\[ y = m\left(\frac{2}{3}\right)n \]

\[ x + y = \left(\frac{7}{3}\right) mn = 81,395 \]
\[ x = 58,139 \]

Assume that the presence of bees increase yield by an average of 25% per crop
Assume that yield increase is directly proportional to income

Additional income = 0.25 \( x \)

Additional income = 14,535

Financial Analysis

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<th>Value</th>
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<tr>
<td>Initial Number of Hives</td>
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<tr>
<td>Initial number of days worked (in one year)</td>
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<tr>
<td>Annual fee per farmer</td>
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<tr>
<td>Annual Honey Production per hive (kg)</td>
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<td>Annual Beeswax Production per hive</td>
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<td>Selling price beeswax per kg</td>
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<td>Selling price of honey per kg</td>
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### Equipment Costs (R.s.)

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<td>Bees</td>
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<td>Suit</td>
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<td>Smoker</td>
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<td>Tools</td>
<td>200</td>
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<tr>
<td>Extractor</td>
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<tr>
<td>Sugar per kg</td>
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<tr>
<td>Day Laborer</td>
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<tr>
<td>Storage Containers</td>
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<tr>
<td>Transportation/day</td>
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*Assume that labor and transportation costs increase linearly as business (# of hives) expands*

### Year One Analysis

#### Equipment

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#### Labor Costs

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**Total Cost** | 86,880

**Total Revenue** | 6,000

**Profit Margin** | -80,880

### Yearly Analysis

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