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Factors of Success in Beekeeping Development Projects and Their Application to South Africa's Beekeeping Industry

Deirdre Lee
Pomona College

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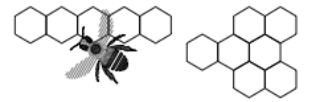
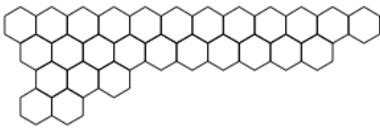
**Factors of Success in Beekeeping
Development Projects and their
Application to South Africa's
Beekeeping Industry**

Deirdre Lee

Pomona College

Environmental Analysis

December, 2013



Acknowledgements:

I would like to thank the following people for their help with my thesis...

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...I could not have done it without you.

* Name has been changed

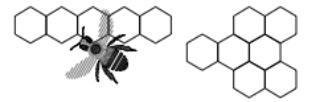
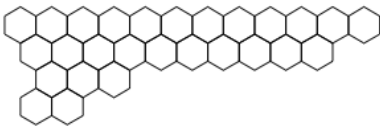
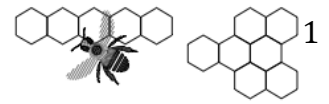
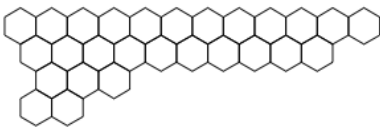


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Introduction

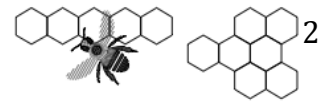
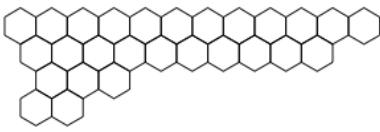
Nearly every country in the world has its own history of beekeeping. From the Swiss leaf hive to the Kenyan top bar hive, the number of ways to keep bees is practically limitless. Such diversity allows for a unique opportunity in the field of development. Many development projects are denigrated for relying on the knowledge and generosity of “white saviors.” Many beekeeping projects are the brainchildren of well-meaning people in developed countries looking for a charitable outlet and attempting to use their “superior” knowledge to enlighten and improve the lives of those less fortunate. While these intentions may well be good, expertise in and understanding of local communities and cultures are invaluable to any development project.

Beekeeping has a rich and vibrant history, allowing it the potential to be used successfully as a development tool. Beekeeping culture varies widely across the world. In any given location most beekeepers have proven the endeavor successful. Because success in beekeeping can be achieved through a variety of strategies, there is an excellent opportunity to utilize historical and cultural knowledge of beekeeping to expand and improve current industries. This, in turn, promises tremendous potential to improve livelihoods in developing countries. In order to accomplish this efficiently, however, the knowledge gap surrounding factors of success in beekeeping development projects must be closed.

The successes of beekeeping development projects vary. Ethiopia, for example, heavily invested in beekeeping development projects and was able to change from a net importer of honey to a net exporter while providing significant benefits to society.¹ Other countries, like South Africa, have been investing large sums of money for years hoping to improve honey production with the projects yielding few, if any, positive results.

The variance in these results reveals a gap in the knowledge and ability involved in beekeeping development projects. Paucity of available literature reveals that there have not been significant attempts to analyze data and

¹ Woldewahid, Gebremedhin, et. al. *Market-oriented Beekeeping Development to Improve Smallholder Income: Results of Development Experiences in Atsbi-Womberta District, Northern Ethiopia*. Tech. N.p.: International Livestock Research Institute, 2012. Print.



information to tease out inconsistencies in the projects. Doing so would help determine what components of a project are integral to its success regardless of project location versus which components must be examined more locally. This paper seeks to contribute to what should become a much larger wealth of knowledge surrounding the successes and failures of various beekeeping projects. This paper will examine the literature surrounding development, diffusion of innovations, bees and beekeeping as a business, and case studies of specific beekeeping development projects. From this literature, hypotheses and conclusions will be drawn in order to more specifically prescribe appropriate recommendations for South Africa's beekeeping development projects.

There is a long history of beekeeping within South Africa. The first indication of human interaction with bees is depicted by Khoisan rock art over 2000 years old. The first signs of more formalized beekeeping methods were from the mid-19th century and the first formal beekeeping associations were founded in the early 1900s.² Ferdie du Preez, a bee historian, notes, "Beekeeping in South Africa has a long history but its advancement has depended on the dedication of a handful of individuals." It is his hope that the government, in conjunction with "key role-players in the industry" will become more active in further developing South Africa's beekeeping industry.³

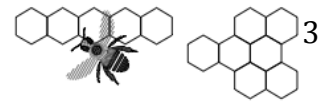
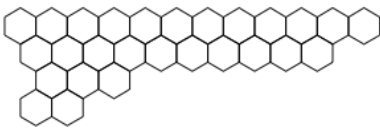
South Africa is currently working to meet the millennium development goals established by the United Nations—including the overarching goal of reducing extreme poverty by fifty percent. This has led to numerous development projects of all kinds in order to address the economic, social, and political issues facing the country.⁴ Throughout this endeavor, it has become apparent that the beekeeping industry in South Africa cannot meet the demand for bee-related products and services.⁵ There is ample room for this market to grow both environmentally and economically. South Africa's Agricultural Research Council has estimated that, environmentally, the beekeeping industry could expand to

² Du Preez, Ferdie, and John Moodie. "The History of Beekeeping in South Africa." *Bee World* (2011): 26-28. Print.

³ *Ibid.*

⁴ "UNDP South Africa." *United Nations Development Programme - South Africa*. United Nations, n.d. Web. 15 May 2013.

⁵ Conradie, Beatrice, and Bronwyn Nortje. *Survey of Beekeeping in South Africa*. Working paper no. 221. N.p.: n.p., 2008. Print.



twice its current size.⁶ Economically, South Africa is currently paying 20-30% more than the world honey price because demand is so high.⁷

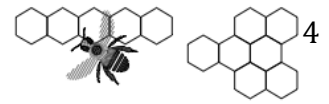
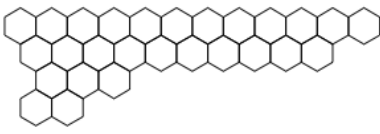
Many people have undertaken the task of instituting beekeeping development programs to bolster the industry and improve the livelihoods of numerous South Africans. The purpose of these projects is to increase, diversify, and stabilize incomes of individuals. But they also aim to improve the beekeeping industry countrywide.

Despite large sums of money being poured into such projects, however, the number of beekeepers and hives in South Africa remains surprisingly low. Many past beekeeping development projects have attracted few, if any, new beekeepers into the industry.⁸ These projects have also been unable to increase the number of beehives of current beekeepers or increase the country's honey production. This shows a lack of accountability within this system that allows resources to be wasted on failed projects. This paper will analyze the information surrounding beekeeping development projects and apply it to the current situation in South Africa in an attempt to make the industry more productive.

⁶ Johannsmeier, M. F. *Beekeeping in South Africa*. Pretoria: Agricultural Research Council of South Africa, Plant Protection Research Institute, 2001. Print.

⁷ *Looking at MHC's Marketing Strategy*. Rep. Chimoio: Zona Industrial, n.d. Print.

⁸ Allsopp, Mike. "Beekeeping in South Africa." Personal interview. Feb. 2013.



Chapter 1: The Basics Behind Bees and Beekeeping

Before delving into the depths of beekeeping development projects, it is important to first understand some of the basics of bees and beekeeping. In the summer of 2012 I spent two months on a farm in Jamaica helping them establish an apiary and implement a beekeeping development project. Prior to then, I had no experience with bees. This chapter is based largely on personal experiences and conversations with veteran beekeepers.

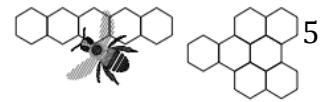
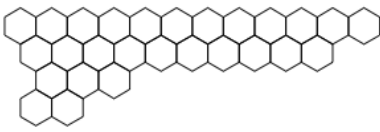
First, the importance of bees to both the environment and human society should be noted. Bees are essential because of their ability to pollinate. Currently, bees pollinate approximately 30% of our world's food supply and 90% of all wild plants.⁹ Colloquially, this means that every third bite of food we take was made possible by bees. It also means that much of our plant biodiversity depends on bees. Plant biodiversity provides many services to humans such as medicine and climate control. The goods bees produce, namely honey, also have numerous benefits to society. Honey is very nutritional and has medicinal properties, not to mention it is delicious. Because of this, there is a high demand for honey in society. Thus, it is important to maintain healthy bee populations and sustainable beekeeping practices for our own sake in addition to the sake of the world.

All bee colonies contain one queen, a handful of drones, and many worker bees, all of which have specific roles. Bee colonies can grow up to about 60,000 bees.¹⁰ Each type of bee in the colony has a different responsibility. Queen bees are in charge of laying eggs. A queen can lay up to 1500 eggs in one day.¹¹ Drones (male bees) are in charge of fertilizing the queen. Other than mating with the queen, they have no responsibilities. They spend most of their time in the hive, eating. While not all drones mate with the queen before they die, the ones that do, die immediately afterwards because their testicles explode. Worker bees are the busiest bees in the hive. They collect nectar and pollen, build comb, maintain

⁹ Sass, Jennifer. "Why We Need Bees: Nature's Tiny Workers Put Food on Our Tables." *Bee Facts* (n.d.): n. pag. National Resource Defense Council, Mar. 2011. Web.

¹⁰ Collison, Clarence, and Maryann Frazier. *Beekeeping Basics*. Publication. N.p.: Penn State College of Agricultural Sciences, n.d. Print.

¹¹ *Ibid.*



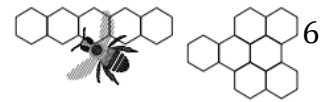
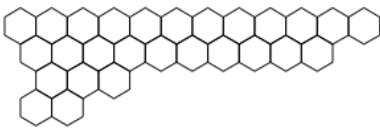
the hive, and make and store honey. The term “busy bee” comes from them. Worker bees and queen bees both have stingers while drones do not. A queen bee is unlikely to sting, however, because when a hive is threatened, the worker bees’ first priority is to protect and hide the queen. The stinger of a bee is barbed so when they try to fly away after stinging, they pull away from all of their internal organs and they die. Because a colony cannot survive without a queen, queens will rarely risk stinging.

Because bees sting, many people are afraid of them. While there are some cases where this makes perfect sense (e.g. severe allergies), most people’s fear of bees is irrational. Of the two larger subsets of bees, European and Africanized, only the Africanized bees are known for being aggressive and, still, there are appropriate ways to behave around them other than out of fear. It is commonly said that bees can smell fear. While this is not scientifically true, its general premise is accurate. Bees react to the people or animals around them. If someone exhibits very jerky, nervous movements, a bee is more likely to sting them. But if a person remains relaxed, and exhibits calm, deliberate movements, a bee is less likely to sting.

If bees feel threatened (e.g. being swatted at) they might attack. And if bees feel that their queen is threatened, they are more likely to attack. Someone who acts calmly and does not cause harm to a hive is not very likely to get stung.

Africanized bees are slightly different. They tend to be more aggressive and are more likely to sting unprovoked. However, someone who remains calm, keeps their distance, and does not block the entrance to the hive is much less likely to be stung than someone who panics. Bees are just like any other animal (or humans, for that matter), they tend to attack when they feel threatened. Bees should not have such a bad reputation for simply wanting to protect their homes and their families. While working daily with bees in Jamaica for two months, I was stung only once.

But beekeepers do enter beehives and can sometimes be threatening to bees. So there are methods to keep the bees calm while disturbing their hive. Smoke is the most important tool for any beekeeper. Bees communicate through pheromones. When they have been doused in smoke, they cannot communicate.



It confuses and dazes them. Thus, smoke can prevent even an aggravated bee from agitating the whole hive. Keeping a smoker up and running is the most important part of any contact with a beehive. In addition to a smoker, beekeepers wear protective clothing to keep from being stung. The complexities and importance of these suits vary depending on the type of bee you are working with. It is unwise to do anything with Africanized bees without a suit, but many small tasks with European bees can be done without much protective clothing at all.



A smoker in action

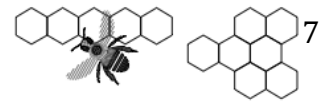
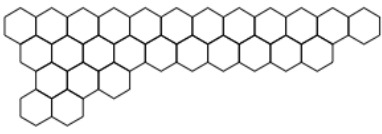


A beekeeper all suited up

In addition to a smoker and protective gear, the essential equipment needed for beekeeping is a hive tool and the hive itself. A hive tool is a simple tool that can be used to execute almost any action needed within a hive. This includes prying frames or top bar apart, scraping propolis (a substance bees use to seal cracks in their hives), or cutting comb. The type of hive a beekeeper chooses to use depends on their goals and what is inexpensive and available.

The two hive types discussed most in depth in this paper are movable frame hives (Langstroth) and top bar hives. Langstroth hives have frames into which foundation is inserted and the bees draw out their comb from the pre-structured wax. Top bar hives have bars from which the bees build their





own comb. Each hive type has its advantages and disadvantages. Langstroth hives are more stable (due to the frames) and can thus be moved more safely and easily. This makes them more suited for pollination than top bar hives because top bar hives cannot be moved without serious risk. But top bar hives create wax whereas Langstroth hives use large amounts of wax. These are just a few of the differences between the hives but overall neither hive is better than the other.



Comb from a top bar hive

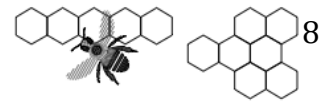
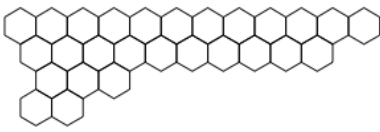


Inside a Langstroth hive

Once a beekeeper has chosen which type of hive they want to use, the next step is to fill the hive with bees. This can be done in many different ways. One could simply buy the bees or buy a hive containing bees. This, however, can be expensive. Other alternatives include capturing a swarm or taking down a wild hive. When bee colonies get too big they swarm, meaning that a new queen is raised and part of the colony leaves with her to establish a new colony. To capture a swarm, a beekeeper can hang trap hives, which are small hives that are meant to look attractive for new colonies looking for a place to live. If a swarm moves into a trap hive a beekeeper can then transfer them to a larger, permanent



A trap hive



hive.

Another method to fill a hive is to take down a wild hive and transfer the bees and some of their comb into a boxed hive. This is an intense (and fun!) process. First, a wild hive must be located. Then it must be determined how to get into the hive without damaging the bees or the comb. Because hives are frequently located in trees or termites' nests this can be very difficult.

After opening a hive the most important task is to find the queen. If the queen is not moved into the new hive, none of the bees will stay. To increase the chances of the bees staying, the queen is frequently put into a cage in the new hive and is left there for a few days until the colony gets used to their new home. So, while taking down a wild hive, everyone must be on the lookout for the queen (she is the one with big, non-striped butt). While dismantling the hive and looking for the queen, the team should be tying the bees' old comb into the new hive. It is especially important for the brood comb to be tied in because having their babies with them makes the colony more likely to stay.

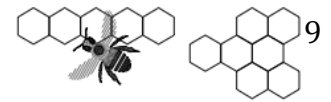
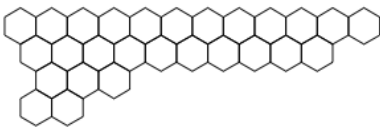


A queen in her cage

After some comb is tied in and the queen is in the new hive it is time to wait for the rest of the bees to make their way in. If the queen is inside the bees will signal to each other where their new home is. They do this by sticking their butts in the air and “dancing.” After all the bees have moved in, the beekeeper must wait a few days before moving the hive to its permanent location. Waiting a few days allows the bees adjust to their new home before they are relocated away from what they know.



Bees moving into their new home



Once the bees and the necessary equipment have been obtained, a beekeeper must maintain their hives. Hive maintenance differs greatly across regions. The difficulty and methods for keeping the bees happy and healthy depends largely on climate and prevalence of pests. In places with relatively extreme temperatures, a beekeeper must make sure their bees do not get too hot or too cold. Additionally, beekeepers need to be wary of when flowers bloom because, if there are no flowers for the bees to feed on, the beekeeper will have to provide a sugar-based substance so the bees do not go hungry. Sugar-water acts as a substitute for nectar when there is no nectar to be found. A beekeeper can feed their bees either with dry sugar (if there is a nearby source of water) or a sugar-water mixture.



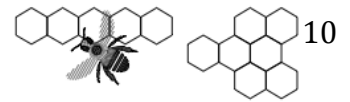
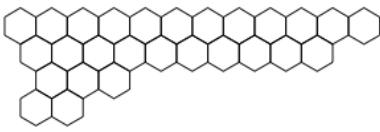
A bee feeder

Also, pests can be detrimental to beehives. The main pests inside hives are varroa mites and hive beetles. There are chemical applications to treating these pests, but most beekeepers do not like to use them because it can harm the bees and contaminate the honey. For example, one chemical treatment used against varroa mites renders bees more vulnerable to deformed wing virus infections.¹² Many natural ways to rid hives of these pests have been used with varying success rates around the world. The rate of success is largely dependant on the exact species of the pest and their evolved resilience to treatments.¹³ External pests such as baboons, honey badgers, and bears also pose a threat to beehives. The best way to avoid these is to place the hives strategically and, where necessary, build barriers around the hives to keep pests out.

Although there are numerous factors a beekeeper must be aware of in beehives, it is important to note that beehives are best left alone. They should be

¹² Locke, Barbara. "Acaricide Treatment Affects Viral Dynamics in Varroa Destructor-Infested Honey Bee Colonies via Both Host Physiology and Mite Control." *Applied and Environmental Microbiology* 78 (2011): n. pag. Print.

¹³ Hebert, Tom. "Beekeeping." Personal interview. June 2012.

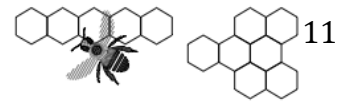
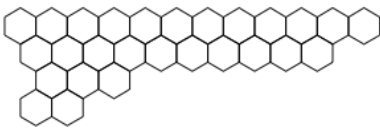


checked regularly but not too frequently. Many novice beekeepers make the mistake of opening their hives too often. The definition of “too often” changes depending on the season (you want to open the hives less frequently in cold months) but, generally, hives should not be opened more than once every two weeks.¹⁴ Opening the hive too often, however, can cause the bees to abscond. Frequent external visual hive checks are okay and are usually encouraged. When a beekeeper performs an external check they are looking for visible damage to the hive and a healthy amount of bee activity. As a beekeeper gains experience and knowledge, they can tell how a hive is generally doing without having to open it up. Once set up, beehives are relatively low maintenance throughout the majority of the year. This allows beekeeping to be viable as a supplemental form of income up to a certain size. Hobbyist beekeepers (less than 100 hives) are able to keep bees without much day-to-day distraction from their main income source.

But in my experience, even those who use beekeeping as a supplemental source of income seem to have truly fallen in love with their bees. This may sound silly, however, it is an important part of beekeeping success. Beekeepers who have fallen in love with what they do, even as a side project, are more likely to succeed because they have an internal drive to keep learning and improving their beekeeping practices. Learning how to keep bees is not stagnant. New techniques are being discovered regularly. Beekeepers who genuinely enjoy talking about their bees and the tactics they use are more successful because they develop communities of support and learning. These communities are important for disseminating knowledge, which helps all beekeepers involved.

In many places, these communities are formalized into beekeeping cooperatives. These cooperatives usually meet monthly to discuss everything from changes in the market to new technologies to recent pest problems. I have had the pleasure of attending a few of these meetings and it is clear that the participants love their bees in a way that provides a willingness to keep learning, even when there is uncertain or limited payoff.

¹⁴ *Ibid.*



Chapter 2: The Business of Beekeeping

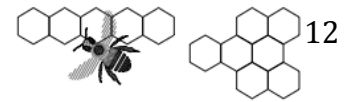
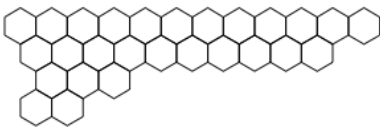
Beekeepers around the world have repeatedly proven that beekeeping can be successful as a business. Beekeeping is viable both as a primary and a supplementary form of income. There are many different ways to profit from keeping bees. Honey production and pollination are the two largest business ventures but many beekeepers also engage in queen rearing and the sale of other byproducts such as propolis, pollen, and wax.

Every beekeeper can choose which of these options they want to pursue. Typically, small-scale beekeepers focus mainly on honey production while large scale, professional beekeepers focus on honey production and/or pollination. It is the mid-sized beekeepers and specialty beekeepers that profit from sale of other hive products and sale of the bees themselves.

For the purpose of this paper professional beekeepers will refer to those operating between 1000 and 7000 hives (large-scale), commercial beekeepers will refer to those operating between 100 and 1000 hives (mid-scale), and hobbyist beekeepers will refer to those operating between 1 and 100 hives (small-scale).¹⁵ Although those operating fewer than 100 hives are frequently referred to as “hobbyist” in beekeeping literature, this can be a misnomer. It is important to remember that a “hobbyist” beekeeper by this definition can still be keeping bees to increase their income. Hobbyist does not necessarily mean someone who keeps bees merely as a hobby, but includes those for whom the additional revenue from even ten hives makes a big difference in their quality of life.

Professional beekeepers, while proving that beekeeping alone can provide a substantial income, are non-factors when it comes to development projects. Beekeeping development projects do not seek to help commercial beekeepers reach professional status but focus on helping hobbyists expand and bringing new beekeepers into the industry. Beekeeping is attractive as a development project because startup costs are minimal. The industry is cost-effective as the

¹⁵ SABIO. *Mentorship Business Plan for South African Bee Industry Organisation (SABIO)*. Business Plan. N.p.: n.p., 2006. Print.



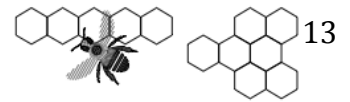
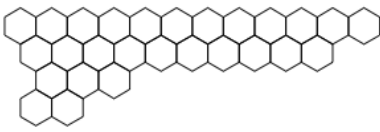
critical component is the dissemination of information, not equipment. It is possible to build your own hives, capture your own bees, and make the equipment necessary for honey extraction. Moreover, once established, a beekeeper does not need extensive ongoing capital investments. A beekeeper looking to invest very little in both monetary capital and time could build top-bar hives largely out of recycled material; either take down a wild hive or hang trap hives and wait for a swarm, check on the bees every month or so, and after the honey flow, cut the comb, jar it, and sell it as-is. Even protective clothing and materials like a smoker can be made out of mostly recycled materials. Because of low monetary investments required, beekeeping is an attractive option for those who wish to increase their incomes and, thus, improve their livelihoods without incurring significant startup costs.

Harvesting and selling honey tends to be the easiest way for beekeepers to enter the market because in order to do pollination, hives must be kept up to a certain standard.¹⁶ Thus, those with more experience and a higher willingness to invest tend to be the ones who attempt pollination. In contrast, even amateurs can successfully harvest honey.

The process of honey extraction differs for each kind of hive. This paper will largely consider two kinds of hives: the top bar hive and the Langstroth hive because these are the two most common hive designs in development projects. In a top bar hive, honey is collected by cutting the comb and either selling it in-comb or squeezing the honey out and separating it from the wax. A Langstroth hive does not have loose-hanging comb, it uses frames, which allows the honey to be collected using an extractor.

The benefits to the top-bar hive method are multi-fold. First, in-comb honey is the easiest and least time intensive way to package honey for sale. Second, if one chooses to press the honey out, wax is created as a byproduct, which can also be sold. The demand for beeswax spans industries. Beekeepers who use framed hives need wax for foundation, cosmetics frequently use beeswax

¹⁶ "The Bee Pilot Project and South Africa's Beekeeping Industry." Personal interview. 23 Apr. 2013. (Name withheld)



as an ingredient, and beeswax can be used to make things like candles for a retail market.

The benefits from using the extraction method, however, are also significant. Extractors have a higher honey yield and are much more time effective compared to the pressing method.¹⁷ Professional and commercial beekeepers, who engage in honey production always use an extractor. However, the cost of an extractor can be too large (sometimes upwards of \$500) for hobbyist beekeepers.¹⁸ The choice between these two options is an important one that is highly dependent on the market one is participating in and how many hives one expects to operate.

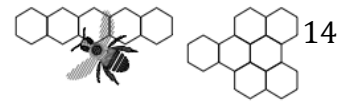
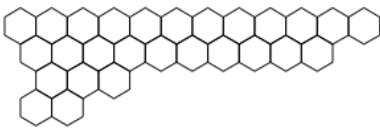
Where there are markets with a high demand for bee related services (pollination), a low relative demand for beeswax, and beekeepers have significant startup capital, Langstroth hives have an advantage. Where markets have a low demand for pollination, a high demand for beeswax, and beekeepers have little or no startup capital, top bar hives are more logical. The best hive type for a scenario depends on operation size as well. Extracting honey from top bar hives takes longer than from Langstroth hives. Thus, top bar hives might not be efficient for a commercial or professional beekeeper. It is important to note, however, that a mix of hives types can be used and can be beneficial in scenarios where there is significant demand for pollination and beeswax, for example.

Regardless of choosing the top bar or Langstroth method, honey is a relatively reliable source of income. Unlike farmers who face significant changes in production from a bad crop versus a good crop, fluctuations in honey production are less dramatic. Although bees need to be provided with ample flora, however, they will fly up to five miles in search of nectar.¹⁹ Honey can usually be harvested a couple of times a year (depending on location and the strength of hives), with a significant harvest after the honey flow. This reliability entices many farmers to take up beekeeping to help offset the impact of bad harvests and to minimize their cost of pollination.

¹⁷ Allsopp, Mike. "Beekeeping in South Africa." Personal interview. Feb. 2013.

¹⁸ Hebert, Tom. "Beekeeping." Personal interview. June 2012.

¹⁹ *Ibid.*



Farmers are very susceptible to disturbances in crop yields. While beekeeping is not without its unforeseen fluctuations, a farmer who participates in beekeeping can diversify their income so that down cycles in farming are less impactful on their well-being. Developing resilience to disturbances is important for smallholder farmers looking to develop. Participating in the honey market is one way to do so. Honey also has a long shelf life so those who are able can wait for high prices before selling. While most small-scale farmers do not have the luxury of stockpiling, in circumstances with an extraordinarily heavy honey flow, this could be an option for some.

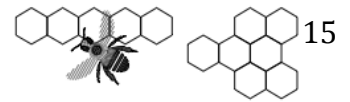
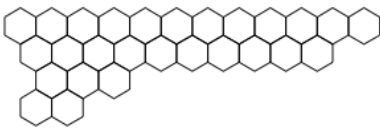
Reliable production is not the only factor in the market for honey. Consistent demand is also necessary for beekeeping to be a promising investment. Many reports have been done on the global market for honey and each report concludes that global demand for honey is growing faster than supply. The demand for honey has always been high because it has so many uses. In addition to being a natural sweetener, honey has long been used medicinally. Honey is antimicrobial, antibacterial, antiseptic, anti-inflammatory, and antifungal.²⁰

Additionally, honey is extremely healthy for the body. Sometimes called “food of the Gods,” honey contains vitamins B2, B6, C, lactic acid, formic acid, and acetic acid, many enzymes such as invertase and diastase, and minerals such as potassium, phosphorous, calcium, magnesium, and iron.²¹ These properties make the demand for honey high both for consumption and for medicinal uses. Honey’s health properties also make it attractive to developing countries where basic health needs are frequently unmet.

Aside from the normally high demand for honey, colony collapse disorder (CCD) has driven the global supply much lower. CCD is the occurrence of entire colonies disappearing from their hives. Recent studies have linked CCD and pesticide use, posing a significant problem for countries with high uses of pesticides. CCD has caused a significant decline in honey production in the US

²⁰ Kalan, Jonathan. "Honey Changes Everything." *BBC* 17 Dec. 2012, Future sec.: n. pag. Print.

²¹ Papadopoulo, P. "Honey--Food of the Gods!" *Rhodesia Agricultural Journal* (1965): n. pag. Print.



and the EU, which has forced them to significantly increase imports.²² With production decreasing and an increasing demand, now is a great time to get into the honey business.

Although more difficult, it is still possible for less experienced beekeepers to attempt pollination. Pollination is the cornerstone of our worldwide food production. Bees are needed to pollinate crops and farmers will pay handsomely for them to do so. In order to use your hives for pollination, one must keep them up to a standard (which differs country to country). These higher standards mostly have to do with the number of bees per hive and the overall health of the hive.²³ A farmer will not pay for a weak hive or infested.

Additionally, the strength of the physical hive itself is very important in pollination because the hives will have to withstand travel. The hives must be well crafted which means the beekeeper must either be a very good carpenter with the appropriate tools, or they must be able to purchase high quality hives. Also, the hives must have frames (as opposed to free hanging-comb) to withstand travel. This means that the beekeeper will also have to purchase or build the frames and purchase the wax foundation to fill them.

Overall, the startup costs for pollination hives are significantly higher than for honey production hives. However, because our food system relies so heavily on pollination, it can be very lucrative. In the United States, the current cost of renting one hive has reached \$200, due to bee shortages from CCD.²⁴ In South Africa the cost is currently about \$25 per hive.²⁵ However, taking into account the difference in each country's average annual income (\$52,762 for the US and \$7,176 for South Africa), it is evident that pollination can be a viable business venture in both countries.^{26,27}

Honey and pollination are not the only goods and services bees can offer. There are markets for nearly everything related to bees—even the bees

²² *The World Market for Honey*. Rep. N.p.: USAID: Capacity to Improve Agriculture and Food Security, 2012. Print.

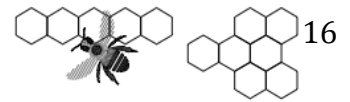
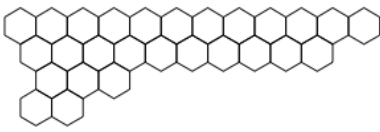
²³ "The Bee Pilot Project and South Africa's Beekeeping Industry." Personal interview. 23 Apr. 2013.

²⁴ Wines, Michael. "Mystery Malady Kills More Bees, Heightening Worry on Farms." *The New York Times* 28 Mar. 2013: n. pag. Print.

²⁵ "Pollination." *SA Orchard*. South African Orchard, 2012. Web. 15 Oct. 2013.

²⁶ *State & County QuickFacts*. Rep. N.p.: US Department of Commerce, n.d. *United States Census Bureau*. Web. 20 Nov. 2013.

²⁷ *Income and Expenditure of Households 2005/2006*. Rep. Pretoria, SA: Statistics of South Africa, n.d. Print.



themselves. Large, healthy hives can be sold whole, as can smaller hives known as *nucs*. Queens, also, command a high price because a queen is necessary for every hive. Known as queen rearing, some beekeepers choose to package the “extra” queens hives produce, and sell them to beekeepers with queen-less hives.

While out collecting nectar, bees also collect pollen. This pollen can be harvested with what is known as a pollen trap. Pollen, like honey, is very nutritious and so collecting it can be profitable. When bees fly from flower to flower, they take the pollen that is collected on them and ball it up into their pollen sacs. These sacs are a part of their hind legs and so, when they finish harvesting for the day, they have two little balls of pollen on their legs. In order for beekeepers to collect this they use a pollen trap, which is put over the hive’s entrance. The holes in the pollen trap are barely large enough for a bee to get through. When the bees squeeze through these holes the pollen in their pollen sacs are knocked off into a collection box. Like honey, bees consume pollen so pollen traps cannot be kept on the hive all the time but can be put on intermittently. The market for pollen is not huge but the process of collecting it is not very time consuming so it can be a worthwhile endeavor.

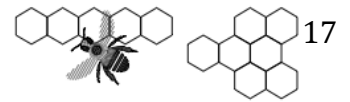
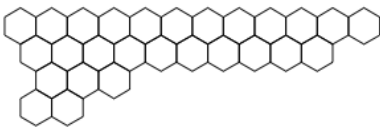
Another option available to bee farmers is to harvest the propolis bees make to close up their hive. Like honey, propolis has medicinal properties but it also is used in the production of goods such as stringed instruments, car wax, and occasionally chewing gum.^{28,29,30} All hives produce propolis so its economic benefit is a matter of collecting it and finding the appropriate market to sell it in.

Wax is another commodity that all hives produce. Wax can be gathered from cutting combs. Once the combs are cut, the wax needs to be separated out from the honey, brood, and other “contaminants.” This process can be done different ways but generally, the wax is heated, strained a couple of times and then is allowed to harden, is pressed into foundation sheets, or used to produce candles and other wax-based goods.

²⁸ Gambichler, Thilo. *Contact Dermatitis and Other Skin Conditions in Instrumental Musicians*. Tech. N.p.: BMC Dermatology, 2004. Print.

²⁹ "History of Zymol." *Www.zymol.com*. Zymol, n.d. Web. 1 Dec. 2013.

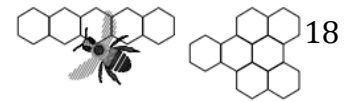
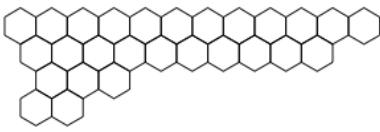
³⁰ Romerrassing, M. "Chewing Gum as a Drug Delivery System." *Advanced Drug Delivery Reviews* 13.1-2 (1994): 89-121. Print.



The most time-consuming hive product is royal jelly.³¹ Royal jelly is what the worker bees feed brood in order to turn that bee into a queen. It is also what the current queen eats. Only queens consume royal jelly and, because the quantity of royal jelly being produced at any given time in a hive is very low, it is painstaking to collect even a small amount. However, because it is so difficult to get, it commands a very high price. Collecting royal jelly is something that people with low opportunity costs of labor tend to engage in. Most beekeepers do not engage in the collection of royal jelly but those who do can see large profits from it.

Beekeeping can be a viable business venture at any scale. Because inputs, production costs, time commitments, and outputs vary so drastically, beekeepers find what works for them personally and what works for the markets accessible to them. The worldwide beekeeping industry is strong and has ample room to expand, allowing it to be very promising from a developmental standpoint.

³¹ Hebert, Tom. "Beekeeping." Personal interview. June 2012.



Chapter 3: Development and Beekeeping

The economic potential for beekeeping in developing countries renders it a logical project in many places. It is important to note, however, that beekeeping projects differ greatly from most other development work. Beekeeping operates on a small-scale and contributes to larger development goals. It does not constitute big-scale development nor can it reach these larger goals alone.

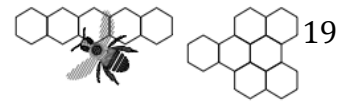
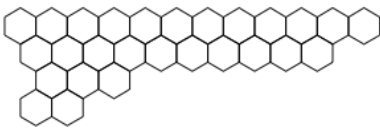
Improving the lives of those in developing countries has been a worldwide goal for many years. Increasing the standard of living for the world's poorest has benefits to the entire world. A healthier, more able population has greater potential in terms of innovation and human capital. Because bringing up standards of living in developing countries leads not only to a more productive workforce but also a more equitable society, the United Nations took it upon itself to address these issues formally.

In 2000 the member countries of the United Nations met, developed, and committed to achieving what they deemed the “Millennium Development Goals” (MDGs). These eight goals are to eradicate extreme poverty and hunger, to achieve universal primary education, to promote gender equality and empowering women, to reduce child mortality rates, to improve maternal health, to combat HIV/AIDS, malaria, and other diseases, to ensure environmental sustainability, and to develop a global partnership for development.³² All of these goals had specific targets to be met by 2015. Since 2000, many organizations (governmental, private, non-profit) have been working to achieve these goals. Yet the progress made has been unevenly distributed. Some countries have had great success with their development projects while others remain in the same place they were in 2000.³³

While the goals of beekeeping projects falls under the overarching Millennium Development Goals framework, the approach and on-the-ground work differs greatly. Most development projects work to transfer knowledge and

³² "United Nations Millennium Development Goals." *UN News Center*. UN, n.d. Web. 20 Sept. 2013.

³³ UN System Task Team. *Review of the Contributions of the MDG Agenda to Foster Development: Lessons for the Post-2015 UN Development Agenda*. Rep. N.p.: United Nations, 2012. Print.



resources from developed to developing countries; improved energy infrastructure and medicine, for example. Beekeeping, however, works to diffuse knowledge within a country. Aside from financial support, perhaps, developing countries do not need developed countries to make beekeeping projects a success.

Many different organizations and governments are working to achieve the MDGs. However, there is not one universal method for how development projects, large or small, should be run. There are no guidelines for how to ensure a project's success so much of the work being done is trial and error.³⁴ Additionally, a project designed for one country may not work in another. And because these projects span across the entire world, it is difficult to compile lessons from each project and apply it to future projects. Yet, with so much time and money invested in reaching these goals, it is important to learn as much from each project's successes and failures so that the goals may be reached in the most cost-effective way possible. Monitoring projects in this way applies to both small- and large-scale development projects.

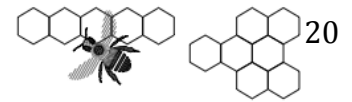
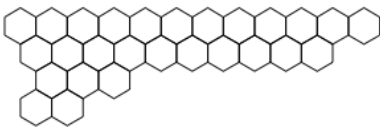
Interestingly, agriculture was not specifically mentioned in any of the Millennium Development Goals even though 75% of the world's poor live in rural areas. Today, only about 4% of official development assistance goes to agriculture.³⁵ Beekeeping, along with husbandry, falls under the agricultural development umbrella. Because so many people rely on agriculture, many scholars have argued for increased agricultural projects but without much success. Overall, there is more literature on agricultural development projects than beekeeping projects specifically. Mostly, such literature is not focused on the successes and failures of projects, but explains the nature of the projects.

The current approach to reaching the Millennium Development Goals is fragmented.³⁶ Information is not flowing effectively both within- and cross-countries. Because of its small-scale approach and prevalence throughout the world, beekeeping can demonstrate how to best diffuse knowledge and innovations for the purpose of development.

³⁴ *Ibid.*

³⁵ United States Government. *Food Security: Investing in Agricultural Development to Reduce Hunger and Poverty*. The White House, 10 July 2009. Web.

³⁶ UN System Task Team. *Review of the Contributions of the MDG Agenda to Foster Development: Lessons for the Post-2015 UN Development Agenda*.



Diffusion, as studied by Everett Rogers, is “the process by which an innovation is communicated through certain channels over time among the members of a social system.”³⁷ Rogers identifies four main elements in the diffusion of innovations: the innovation, communication channels, time, and a social system. While all applicable to beekeeping development projects, some elements are more pertinent than others.

Central to diffusion is innovation, which is “an idea, practice, or object that is perceived as new by an individual or other unit of adoption.”³⁸ Beekeeping has many innovations. There is no one “right” way to keep bees. New innovations are being developed regularly as the practice is constantly changing. The question then becomes, how to diffuse innovations effectively. This is done through communication channels.

Communication channels refer to “the process by which participants create and share information.”³⁹ In the case of beekeeping development projects, participants refer to those being trained, those doing the training, and those providing the funding. What the MDGs lack are effective communication channels between project designers, funders, and beneficiaries. It is essential that all parties can effectively convey their ideas to each other. Two barriers here are language (including technical language) and modes of communication (which technologies are available to all parties). The way to overcome these barriers differs greatly between countries so no one tactic can be applied everywhere. Communication can also refer to the channels maintained after the initial parts of the project are completed. Beekeeping requires continual learning so keeping communication channels open between novice and experienced beekeepers can contribute to a project’s success.

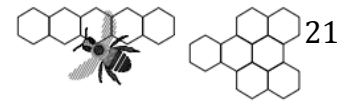
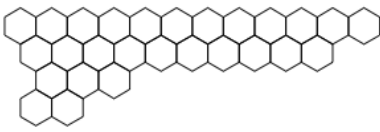
The third element of diffusion is time. Time generally refers to an innovation’s rate of adoption and the relative early or lateness of adoption among members of a society.⁴⁰ This is the least pertinent factor in beekeeping. While the rate of adoption can be important, the relative time of adoption is not. Whether a

³⁷ Rogers, Everett M. *Diffusion of Innovations*. New York: Free, 1983. 10. Print.

³⁸ *Ibid.* 11.

³⁹ *Ibid.* 17-18.

⁴⁰ *Ibid.* 20.



country chooses to pursue beekeeping development projects earlier or later than another country is irrelevant, as is an individual's choice to keep bees. While there is competition, like in any market, most developing countries have ample room to grow their beekeeping industry and, thus, a relatively late adopter can still experience numerous benefits from beekeeping.

The final aspect of the diffusion of innovations is the social system under which everything operates. A project's social system comprises all the units engaged in reaching a common goal.⁴¹ These units can be individuals, governments, corporations, or any other entity that has a stake in solving the stated problem. Rogers explains that innovations cannot be diffused if the social system is not working properly toward reaching a mutual goal. All parties must be involved in decision-making and must be willing to work with each other.

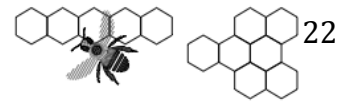
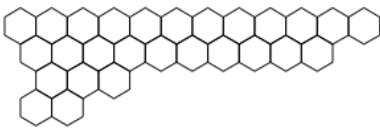
Many development projects lack attention to these four components, which could explain why many of the Millennium Development Goals have yet to be met.

There have been a few studies on how countries should begin designing projects. One of these studies focuses on the financial markets of Iran and how they would interact with development. This study concluded that in order for agricultural development to be successful, Iran must develop and distinguish services of financial and credit markets, hold exhibitions and conferences (communication), support exportation, use modern technology (innovation), and establish and develop statistical databases for the proliferation of information (communication). This study concluded by saying that Iran should pay more attention to husbandry, beekeeping, and fishing in its future development pursuits.⁴² This study highlights some aspects of the Rogers' *Diffusion of Innovations* demonstrating its applicability to real-world projects.

Reports like these are helpful in developing projects, however, it is also important to evaluate projects after they have been attempted. Both pre- and

⁴¹ *Ibid.* 23.

⁴² Ansari, Yaghoub, et. al. "Development of Agricultural Sector through an Increase in Investment and Relying on Credit & Finance Firms from the Viewpoint of Credit & finance Experts and Farmers of Kohgiluyeh & Boyer-Ahmad Province." *Life Science Journal* (2012): n. pag. Print.



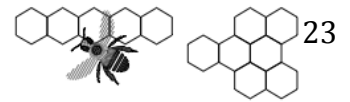
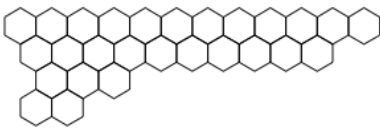
post- analysis is key in understanding the most cost-effective ways of pursuing development.

The Millennium Development Goals are one way of pre-evaluating development needs. While they are admirable goals, they are not without criticism. The main criticism is that they tend to ignore the input of the very people they are trying to help. The International Planning Committee for Food Sovereignty stated, “The major limitation of the MDGs by 2015 was the lack of political will to implement due to the lack of ownership of the MDGs by the most affected constituencies.” They have been hailed as trying to “introduc[e] local change through external innovations supported by external financing.”^{43,44} This issue can be solved with a more transparent and communicative social system. With open communication channels and a clear, united goal, developing countries can benefit from the philanthropy of developed countries and developed countries can efficiently and effectively use their resources to assist developing countries.

Many different parties are working to improve the lives of people in developing countries. But their good intentions are frequently not translated into effective programs. There are many reasons for this that vary across industries. Looking at the beekeeping industry specifically to tease out some of the successes and failures of projects will provide insights for how future projects should be designed.

⁴³ Rodrik, Dani. *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth*. Princeton: Princeton UP, 2007. Print.

⁴⁴ Marglin, Stephen A. *The Dismal Science: How Thinking like an Economist Undermines Community*. Cambridge, MA: Harvard UP, 2008. Print.



Chapter 4: Beekeeping Development Projects

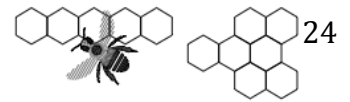
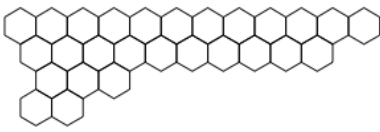
Beekeeping development projects have been implemented worldwide. Some have been successful while others have not. Two countries, Turkey and Ethiopia, have successfully implemented projects nation-wide, improving their beekeeping industries and helping raise the economic statuses of many of their citizens. There are also many organizations dedicated to the successful implementation of beekeeping development projects.

Bees for Development is one such organization dedicated to improving the lives of the world's poor through beekeeping. They are an NGO that is currently running projects in Uganda, Zanzibar, Ethiopia, and Kyrgyzstan. Their values, as stated on their website, are as follows:

1. We promote the use of local resources and we do not send equipment or bees to poor countries.
2. We advise the use of indigenous bees. This allows the maintenance of healthy strains of bees and helps to combat the spread of the bee health problems.
3. We believe building capacity through information and knowledge sharing leads to self-reliance and empowerment of the poor.
4. We believe the best hive type is one that is appropriate to the local context, is good for bees and affordable for beekeepers.
5. We believe incomes can be raised by teaching beekeepers to analyse and understand their local market environment.⁴⁵

These values show that Bees for Development is not a “savior”-type charity. They do not believe in going into another country, “solving” all their problems without first understanding the situation, and then leaving. They recognize the importance of working with the people they are trying to help and designing projects around their circumstances. Bees for Development also releases a quarterly magazine discussing beekeeping and development projects in order to proliferate knowledge in the beekeeping community.

⁴⁵ "Bees for Development." N.p., n.d. Web. 17 Sept. 2013.



Bees for Development has been working in Ethiopia which is a model country for success of beekeeping development projects. From 2005-2010 Ethiopia's honey production increased 26%.⁴⁶ While Ethiopia does not export much except to Sudan they are on track to expand exportation soon. USAID's World Market for Honey report suggests that Ethiopia should start exporting to the EU because EU has a high demand for honey and it's production is decreasing with CCD.⁴⁷ Also, because it is a developing country Ethiopia qualifies for many tax and tariff exemptions so there is a favorable price structure.⁴⁸ Ethiopia has been able to accomplish all of this through some very impressive development projects. A report on the projects in the Atsbi-Womberta district of northern Ethiopia studied why many of these projects were successful.⁴⁹

Ethiopia, especially the Atsbi-Womberta district, provides a suitable environment for beekeeping. There is ample foliage for the bees as well as unutilized space to keep many hives. There is also a long tradition of beekeeping in Ethiopia and a high demand for bee related products. Honey, for example, is highly demanded because Ethiopia's national drink, *Tej*, is a honey wine. These factors indicate that, if projects were properly implemented, Ethiopia would be able to vastly improve its beekeeping industry. And so it has. The history of beekeeping in this district can be divided into four phases: forest honey hunting (harvesting from wild hives), basic colony management around homes, the first intervention stage, and the second intervention stage. The first intervention was a management stage. It promoted the use of modern hives, accessories, and honey processing with the goal of increasing beekeeping productivity and production.⁵⁰

Traditional hives in Ethiopia are typically tube shaped and made out of branches, straw, cow dung, and clay.⁵¹ Hanging from trees, their goal is to catch swarms. Once a colony has moved in and established itself, a beekeeper harvests the honey by cutting out all the comb. The development projects aimed to move

⁴⁶ *The World Market for Honey*. Rep. N.p.: USAID: Capacity to Improve Agriculture and Food Security, 2012. Print.

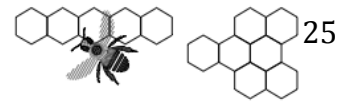
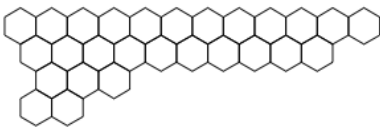
⁴⁷ *Ibid.*

⁴⁸ *Ibid.*

⁴⁹ Woldewahid, Gebremedhin, et. al. *Market-Oriented Beekeeping Development to Improve Smallholder Income: Results of Development Experiences in Atsbi-Womberta District, Northern Ethiopia*. Rep. Ethiopia: IMPS, 2012. Print.

⁵⁰ *Ibid.*

⁵¹ Gallmann, and Thomas. *Beekeeping and Honey Production in Southwestern Ethiopia*. Rep. Ethiopia: n.p., 2012. Print.



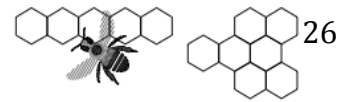
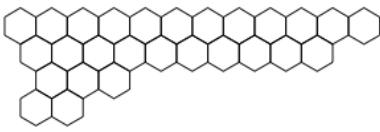
toward modern framed and top bar hives because there are many disadvantages to this traditional method. In terms of managing the bees, the traditional method is inferior because there is no way to inspect the comb for disease, all work must be done in complete darkness (because the bees tend to be very defensive), and there is no way to feed a colony in times of food shortage. There are also disadvantages in the harvesting process. Harvesting from tube-shaped hives tends to destroy the colony. There is a high chance that the queen will be killed and both brood and honey combs must be removed. Chances that a colony will stay after such disruption is very low. Thus, Ethiopia's first goal in beekeeping development was to move toward hives that did not suffer from these problems.

The second intervention was focused on market-oriented beekeeping. It helped beekeepers design their products for market with an emphasis on product quality. These projects were implemented using six different strategies: study tours, field days, technology exhibitions, access to knowledge sources, an annual beekeeping learning forum, and trainings. These different knowledge sharing approaches covered many of the different facets of beekeeping while providing access of information to nearly every beekeeper.

The market-oriented approach in these projects sets successful market interactions as a goal. Beekeepers can produce as much honey as they want and, even with high demand, they need an instrument to ensure they can get their honey to market. In Ethiopia, this meant setting up organizations that would follow the entire production chain. Support was provided at all levels of the beekeeping process and these organizations were able to connect suppliers with consumers.

There were many different participants in the design of these projects. However, it is important to note that the two biggest participants, Improving Productivity and Market Success (IMPS) and the Office of Agriculture and Rural Development (OoARD) were Ethiopian.⁵² Many other organizations, such as Bees for Development, have played an important part in implementing the projects, but the driving force behind beekeeping development in Ethiopia is Ethiopian.

⁵² Woldewahid, et. al.



These participants also paid close attention to the projects' outcomes. They closely monitored changes in production to see if their interventions were working. The study outlined the importance of this monitoring while adding other important factors in Ethiopia's success. It notes the importance of learning from more experienced beekeepers. These projects saw that in the trainings, the annual learning forum, and the technology exhibitions, however, more extensive networks could be formed for greater knowledge sharing.⁵³ Facilitating communities of learning that partners experienced beekeepers with novices has helped this project immensely. While there is always room for improvement in this area, acknowledging the value of experience and communication between beekeepers was a large factor in this project's success.

Like Ethiopia, Turkey has also seen success in its beekeeping industry. In 2010 Turkey was the second largest producer of honey, producing 81,115 MTs in one year—a staggering 5.3% of the global share by volume.⁵⁴ Sirali noted Turkey's successes in *The General Apicultural Situation of Turkey*, explaining that in 1985 Turkey exported only 4 tons of honey, this jumped to 5,306 tons exported in 1999, a number that is still growing today.⁵⁵ Although beekeeping has always been a part of Turkey's pre-modern history, it was only after WWII that Turkey turned from a net importer of honey to a net exporter. Turkey now has 40,000 professional beekeepers and beekeeping is the most important source of income for over 200,000 Turkish families.⁵⁶

Currently, there are many articles describing new projects that Turkey wants to undertake but they are descriptions of what might happen, not analyses of what has happened. Despite the lack of literature, it is known that Turkey has both the market and environmental accommodations for a strong beekeeping industry, which are the first two criteria for success.⁵⁷ In 1999, Turkey was environmentally and economically sustaining 4.3 million bee hives. The flora of

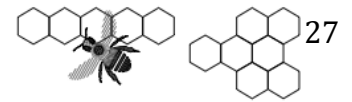
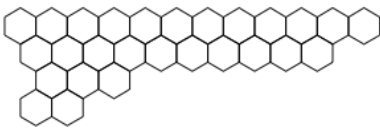
⁵³ *Ibid.*

⁵⁴ *The World Market for Honey*

⁵⁵ Sirali, R. *The General Apicultural Situation of Turkey*. Scientific Review ISSN 1330-7142. N.p.: n.p., 2002. Print.

⁵⁶ *Ibid.*

⁵⁷ Hebert, Tom. "Beekeeping." Personal interview. June 2012.



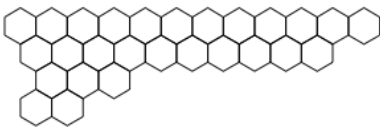
Turkey has been able to sustain the average of 5 colonies per km² and the global demand for honey has rendered the millions of hives economically profitable.

There is also a rich tradition of beekeeping in Turkey, demonstrating another factor of success. Similar to Ethiopia, traditional hives in Turkey are ones that are not conducive to production. Historically, Turks have used log hives, which must be destroyed to harvest the honey.

A tradition of beekeeping and an environment able to support a large beekeeping industry are two general trends in successful development projects that can be applied world-wide. Apiservices is an online international beekeeping archive containing databases, books, catalogues, and other beekeeping-related information. Among their archives is a report that looks at general trends in beekeeping development projects.⁵⁸ The following tables illustrate some of their conclusions:

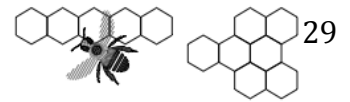
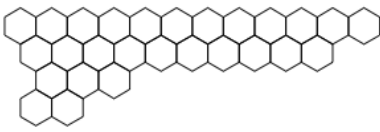
Hive Technology	Type of Bee	Area	Hive Cost and Ease of Production	Honey/Cash Returns
Frame	European	Temperate	Good	Good
Frame	African	Tropical	Possible	Fair
Top Bar	European	Temperate	Fair	Fair
Top Bar	African	Tropical	Fair	Fair
Fixed Comb	European	Temperate	Poor	Poor
Fixed Comb	African	Tropical	Relatively good to very good	Relatively good to very good

⁵⁸ Paterson, P. D. *The Basis for Success in Beekeeping within Development Projects*. Rep. Apiservices, 2000. Web.



Resource Available	Objective	Appropriate Technology
Excellent flora Tame bees Cash	Maximum return	Frame hive
Good flora Aggressive bees Limited cash	Medium return	Top bar hive or fixed comb hive
Less good flora Aggressive bees Very limited cash	Any return welcome	Fixed comb hive

These tables provide good technical starting points for designing a project. They help determine the innovations best suited for diffusion given certain conditions. These conclusions are helpful to the larger beekeeping community. Archives such as Apiservices are one way to spread information about beekeeping projects and their successes and failures. Unfortunately, there are large gaps in this archive. It is very incomplete and leaves out many countries and projects that could contribute to general knowledge. Including other case studies (such as the ones in the following two chapters) can provide more information with which to draw stronger conclusions about beekeeping development projects.



Chapter 5: Jamaica's Top Bar Project

Jamaica provides an interesting environment for beekeepers. The Jamaican Bee Control Act of 1918 banned the import of all bees and bee related products in order to prevent the local bees from disease.⁵⁹ A small island, Jamaica has been able to avoid the onslaught of colony collapse disorder though this ban.⁶⁰ While the ban states that the Minister may grant exceptions, the ban on the import of beeswax has remained firm.⁶¹ This poses many challenges for beekeepers but also presents opportunities. It allows for top bar beekeeping, a method that produces beeswax as well as honey, to be lucrative.

Honey is also a lucrative venture in Jamaica. Currently, 10% of Jamaica's honey harvest is exported.⁶² Despite global demand, most of Jamaica's honey is consumed locally, typically by the beekeepers themselves.⁶³ This means that a lot of honey never makes it into the market. Nevertheless, Jamaica's annual honey harvest is valued at approximately US\$3.76 million.⁶⁴ Additionally, Jamaica's unique local flora produces high quality honey with a unique taste, rendering it highly demanded, especially in the EU.⁶⁵ But because local demand is so high and many beekeepers consume the honey themselves, there is potential for increased production to yield high profits.

In the summer of 2012 I spent two months with a family who was looking to improve their livelihoods and their community through beekeeping. The patriarch of the family, Kwao, and the matriarch, Agape, both explained to me the importance of providing a healthy, sustainable environment for their bees. The debate over whether top bar beekeeping is truly a more "natural" way to keep bees is inconclusive. Proponents argue that allowing bees to draw out the comb

⁵⁹Jamaica. *The Bees Control Act*. N.p.: Government of Jamaica, 1918. Print.

⁶⁰ Adams, Agape, and Kwao Adams. "Beekeeping in Jamaica." Personal interview. Summer 2012.

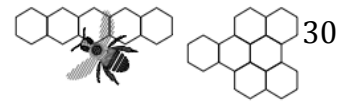
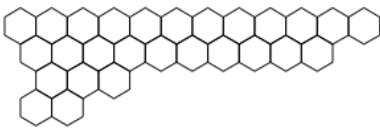
⁶¹ *Ibid.*

⁶² Solomon, Gladstone. "Challenges and Opportunities for Sustainable Beekeeping in the Caribbean." *Bees for Development Journal* (n.d.): n. pag. Print.

⁶³ Adams, Agape, and Kwao Adams. "Beekeeping in Jamaica." Personal interview. Summer 2012.

⁶⁴ Jamaica Promotions Corporation. *Investing in Jamaica's Agriculture Industries*. N.p.: Ministry of Agriculture and Fisheries, 2011. Print.

⁶⁵ Jamaica Social Investment Fund. *Jamaica's Honey Production Receives Boost*. N.p.: Jamaica Social Investment Fund, 2010. Print.



themselves instead of providing them with a sheet of pre-determined cell sizes is more natural.⁶⁶ Opponents argue that pre-determined cell size makes no difference to the bees.⁶⁷ There is no scientific evidence to support either claim, however, top bar hives are more sustainable in Jamaica because of the materials required to make them.

Top bar hives do not require wax foundation. They allow the bees to build the combs the way they would in the wild. Once the bees have drawn out the combs and filled them with honey, the beekeeper cuts the combs in order to harvest the honey. These hives require little to no wax to start; in Jamaica wax is expensive and difficult to find. There is also literature on the notion that requiring the bees to rebuild their combs keeps them healthier because wax that contains environmental toxins is periodically cycled out of the hive.⁶⁸

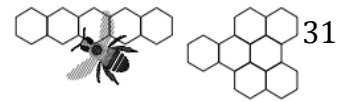
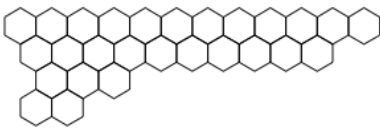
When collecting honey, wax can also be harvested, pressed into foundation sheets, and sold. Because beeswax is a limited resource in Jamaica, this can be a very viable business venture. Other advantages to top bar hives are that materials to build the beehive are significantly less expensive than Langstroth hives and the hives themselves do not need to be lifted, making them more viable for women, children, and seniors to work with. For these reasons, Kwao and Agape chose to pursue establishing a top bar apiary for themselves and to educate and train their community with the top bar method.

For other individuals, the top bar method is appealing because it has many input and output options. A plethora of input materials (i.e. hive construction materials) is attractive, especially to someone with limited capital, because the cheapest and most readily available options can be used. Likewise, numerous output options (honey, beeswax, pollen, etc.) allows for one to pick and choose what to pursue depending on the current economic environment. While global honey demand and local beeswax demand are likely to stay high, markets fluctuate and having backup options is appealing to those who are risk averse.

⁶⁶ Chandler, P. J. *The Barefoot Beekeeper: A Simple, Sustainable Approach to Small-scale Beekeeping Using Top Bar Hives*. N.p.: PJ Chandler, 2009. Print.

⁶⁷ Allsopp, Mike. "Beekeeping in South Africa." Personal interview. Feb. 2013.

⁶⁸ Chandler, *The Barefoot Beekeeper*.



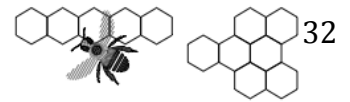
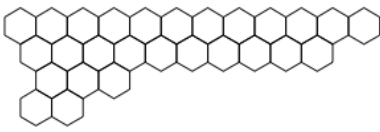
Before establishing a development project, Agape contacted and received funding from USAID's Farmer-to-Farmer program. The goal of the Farmer-to-Farmer program is to transfer knowledge of US farmers to farmers in developing and transitional countries. Through this program, Kwao and Agape got in touch with Tom, a top bar beekeeping expert. Tom began his work in beekeeping through the Peace Corps. After college he trained with the Corps and was then stationed in Honduras where he ultimately stayed. Tom was a huge asset to Kwao and Agape because not only did he know the ins-and-outs of top bar beekeeping but he also had experience working in a climate similar to Jamaica and working with people in similar economic situations as many Jamaicans.

The main goals of Tom's trip were to educate Kwao and Agape as much as possible and to establish a top bar apiary that would be used for their profit and to teach others in the community. During Tom's stay Kwao and Agape began reaching out to others, sparking interest in learning the top bar beekeeping method. With the help of a few interns (myself included), Kwao and Agape were able to establish a functioning apiary in two months. Establishing the apiary required architecturally designing the hives to be built with materials that were cheap and plentiful, actually building the hives, capturing wild hives to put into the constructed hives, moving the hives to their permanent location, and maintaining the hives. By the end of Tom's visit we had established nine hives and we continued to add to the apiary after he left.



Kwao and the beginnings of his apiary

Throughout Tom's stay we held a few informal beekeeping tutorials with people in the community. However, many people would accompany us on our beekeeping excursions or stop by the house to see how we were building our hives. It was not until after the summer of 2012 that Kwao and Agape's



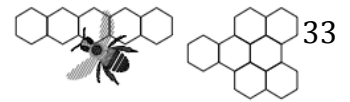
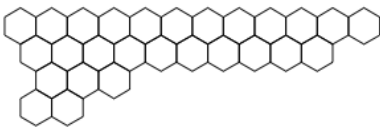
development project really took off. Kwao and Agape have since been arranging for more beekeepers to come through the Farmer-to-Farmer program. They utilize those beekeepers to expand their own knowledge but also to teach others. They have organized workshops for both groups of farmers (mostly those new to beekeeping) and groups of experienced beekeepers who are interested in learning the top bar method. They have worked closely with beekeeping cooperatives and the Jamaican government in order to establish these training sessions. They have also established a bee club at the local primary school to start teaching the children all about bees.

Each beekeeping professional brought through the farmer-to-farmer program has taken detailed notes of their stay, including lists of activities, skills taught, and recommendations for the future. These professionals were conducting trainings for all different levels of beekeepers. Some people had no previous experience and others had hundreds of hives and had been keeping bees for years. The top bar method, however, was largely new to everyone. As of March 2013, 745 beekeepers have been trained through their programs. Of these, about a third were women, which is much higher than the average number of women involved in beekeeping.⁶⁹

The trainings took on many different forms, as groups had different needs. A lot of beekeeping cooperatives were looking for an introduction to top bar hives as well as information on projects like queen rearing and pollen collection. Those beekeepers were looking for more cost effective ways to run their hives as well as expanding their business into other products. These trainings went well because the beekeepers were all very invested in themselves. Their drive to be at the trainings was their own and they knew first hand what maintaining a successful beekeeping business actually entails.

New beekeeper trainings were much more introductory. Participants learned some bee biology, the potential business opportunities of beekeeping, how to start a hive, and how to care for the bees. Feedback from the trainings was generally positive but the beekeepers desired more. The experts conducting the

⁶⁹ Adams, Agape, and Kwao Adams. "Beekeeping in Jamaica." Personal interview. Summer 2012.

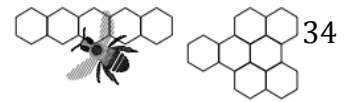
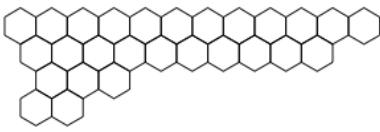


training recommended leaving them with books and other literature at the very least but highly suggested additional follow up trainings.

Kwao and Agape are wary, however, of expanding their trainings too fast. “Our growth is focused,” Agape wrote me. “It means that we focus on our core groups and go deep with the trainings, instead of spreading the training thinly over too many groups (everyone wants trainings, and we have to say no to most groups that show interest). We are going for depth rather than breadth, which means that members of the groups get more of the training they need to succeed.”

In addition to these training sessions, this development project has an added element that is rarely found in other projects. Kwao and Agape have been working with a Peace Corps volunteer to establish a “bee club” at the local primary school. This club is funded through the Peace Corps Small Projects Assistance Program and is focused on teaching the primary school children about bees and beekeeping. The club has worked to start its own teaching apiary where the children learn about bee biology and the how to care for the bees. While some adults are a part of the club (mostly parents) the club is focused on engaging the children. The children are regularly challenged. They are presented with scenarios and asked how they would respond as beekeepers. Kwao and Agape also inspect the club’s hives weekly to assess how the club is doing and to allow a dialogue about what has been happening in the hive.

Returns on involving children in development projects are unknown. However, I have much anecdotal evidence from beekeepers around the world who state that they believe their passion and success in beekeeping comes from learning about bees at a young age. Many of the beekeepers I have spoken with noted a beekeeper who they worked with as a child and attributed the majority of their knowledge to those experiences. Introducing children to beekeeping helps close the gender imbalance. The large majority of beekeepers are men, however, women are equally as capable in terms of keeping bees. At the schools, boys and girls learn alongside each other in relatively equal numbers. The returns on investment to this bee club are long-term but have the potential for the benefits to outweigh the costs. There are shorter-term benefits as well, however. Children

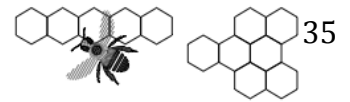
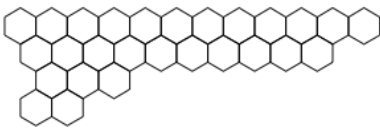


who engage in learning experiences around beekeeping can then help contribute that knowledge to benefit their family's beekeeping endeavors.

USAID's Farmer-to-Famer program monitors this project. Each farmer sent on this program is required to write a report so that USAID can determine whether or not to send more farmers. Formal monitoring as well as informal monitoring helps fuel the project to be successful. When something doesn't work, Kwao, Agape, and their other partners work to determine why it didn't work and what can be done to fix it. Reflection after each training session yields suggestions on everything from what tools and materials to bring, how to engage the beekeepers, and how to better coordinate communication between all parties. Kwao and Agape have also been collecting survey data on the beekeepers they train. This data includes (but is not limited to) level of interest, number of Langstroth and top bar hives before training, number of each kind of hive after training, skills learned through the trainings, future training interests, and what products each beekeeper produces (honey, wax, propolis, etc.).

While it is difficult to cull exactly what parts of this development project have a direct effect on its success without a full audit, one can make an educated guess about what the big contributors have been.

No project is perfect and mistakes will always be made, but it is the ingenuity and passion of the organizers that keeps the project successful. In the future, Kwao and Agape hope to form a non-profit focused on developing Jamaica's beekeeping industry. They are both very invested in this project not only for themselves and their family but also for the larger community. Development projects are born out of economic need and opportunity. But it is exceptional individuals who are supported systematically (through funding, access to markets, knowledge sources, etc.) who drive the success behind most projects. Projects need people who are personally invested in their success behind them. Kwao and Agape are these people. They have invested their time, money, and energy to seeing things through because it truly matters to them. This year they have lacked additional funding and have had to pinch pennies, which Agape says, "lets us know that we're doing this for the love of it—no confusion about motivation!"



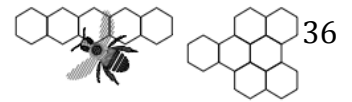
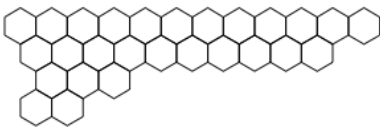
Additionally, the project has focused on the very specific needs of the communities. Jamaica is a very poor country with many people living on about \$10 USD per day. Because of these financial restrictions, it is important to introduce programs that are feasible within tight budgets. Top bar beekeeping is one way to do this because the hives can be made out of found materials or using very cheap materials. They also do not require large amounts of wax, which is very expensive due to the trade barriers.

The lessons learned from the Farmer-to-Farmer participants are to have as much hands on training as possible and many follow up trainings. It is important to keep the flow of information between participants and trainers open so that the beekeepers' needs can be met.

Kwao and Agape cannot, however, work individually with all the new beekeepers they train. Instead, they work with cooperatives and clubs. They have found that the best way for new beekeepers to be successful is for them to join a cooperative where they can learn from more experienced beekeepers. Working with groups is better because they are able to share their information and experiences with each other. For example, one person may try to build a wicker hive and someone else a bamboo hive. Both can then report the success or failure of those endeavors to others. This sharing of information is beneficial to everyone in the long run. Also, working within a group allows for better market access and sharing of expensive resources like honey extractors. This is an example of the cluster effect. In economics, the cluster effect explains the increase in productivity when businesses, suppliers, and associated institutions in a given region work together.⁷⁰ Beekeeping cooperatives are an example of a cluster where the whole is greater than the sum of all parts. Even though members within a cooperative can (and frequently are) competitors, everyone gains more from sharing information than from keeping to themselves. Because every beekeeper involved benefits from those around them a regional cluster becomes more competitive on a global scale.⁷¹

⁷⁰ Porter, M. E. "Location, Competition, and Economic Development: Local Clusters in a Global Economy." *Economic Development Quarterly* 14.1 (2000): 15-34. Print.

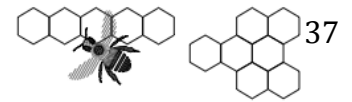
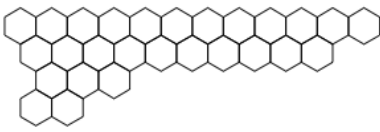
⁷¹ *Ibid.*



Another successful aspect of the top bar project has been the diversification of bee-related opportunities. Not everyone involved in the project has the ultimate goal of interacting directly with bees. The project addresses this by teaching people how to render and use wax to make different products such as candles and lip balm and how to collect pollen. There are a lot of possible ways to profit from bees and some are less hands on with the bees than others. Working in a hive with bees is not for everyone, yet processing wax, for example, can involve zero face time with the bees. This provides an opportunity for people who are afraid of bees to still benefit without causing themselves great stress. Even those who love interacting with bees see benefit in learning new ways to profit from their hives.

Another key takeaway from this development project is its investment in children. While it will be years before any concrete conclusions can be made regarding the bee club, one would expect that investing in the youth is worthwhile because it has the potential to impact Jamaica's beekeeping industry long-term despite minimal monetary investments.

Overall, Kwao, Agape, and I would all agree that the project has been a success. They are always looking for ways to improve but they are very happy with the work they have done so far. Since the summer of 2012, Kwao and Agape have seen an increase of over 500 hives among those they have trained. This is only one way to measure the success of the project, however, it is a strong indicator that the work Kwao and Agape have been doing has made a significant impact on the beekeeping industry in Jamaica.



Chapter 6:

South Africa and the Bee Pilot Project

There is ample room for South Africa's beekeeping industry to expand. Combined with a developmental need, beekeeping development projects have great potential in South Africa.

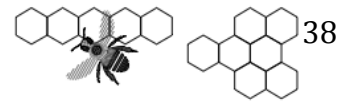
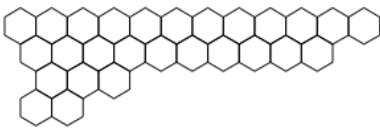
This chapter will review some of South Africa's unsuccessful and moderately successful projects before closely examining the Bee Pilot Project (one of South Africa's more successful beekeeping development projects) and delve into its motivations, successes, and failures.

The literature surrounding beekeeping development projects in South Africa is dominated by newspaper articles and project proposals. These sources provide insight to beekeeping development projects in South Africa. There is, however, no scholarly literature or assessment literature on successes and failures of such projects. In order to develop a better industry, one must be understand why projects are successful and why they fail. Beekeeping development has its place in South Africa, but it has yet to find a way to consistently produce successful beekeepers, a feat that other countries have been able to accomplish.

Many studies have been done outlining the state and potential of the beekeeping industry in South Africa. The South African Bee Industry Organization (SABIO) estimated about 2,030 beekeepers in South Africa in 2006.⁷² Of those, 20 were professional beekeepers operating between 1000 and 7000 hives, 10 were commercial beekeepers operating between 100 and 1000 hives, and 2000 were hobbyist beekeepers operating between 1 and 100 hives. Additionally, they estimated 88 groups of "developing beekeepers" with each group operating between 5 and 500 hives. SABIO's total estimate for number of hives in South Africa was between 90,000 and 110,000.⁷³ These numbers show that South Africa can sustain more beekeepers. Johannsmeier of the Agricultural

⁷² SABIO. *Mentorship Business Plan for South African Bee Industry Organisation (SABIO)*. Business Plan. N.p.: n.p., 2006. Print.

⁷³ *Ibid.*



Research Council (ARC) claims the natural resources in South Africa can support an industry two times larger than its current state.⁷⁴

Not only could South Africa environmentally support a larger industry, but economically as well. South Africa is a net importer of honey because the country cannot produce enough to meet demand. In 2011 South Africa produced 2,200 tons of honey and imported 2,100 tons.⁷⁵ In an interview with Richard Holmes of the *Sunday Times*, Robert Post of the Western Cape Bee Industry Association noted, “SA is a net importer [of honey] and there are people who pack honey from a variety of countries and sell it in our retail outlets.”⁷⁶ Simply, South Africa’s established beekeeping industry is unable to meet its domestic needs and other countries are taking advantage of this. China, for example, has been exporting honey to South Africa for years.⁷⁷ “According to the South African Bee Journal, honey products [within the country] are worth R100 million a year.”⁷⁸ With a viable market and an ample natural supply, it’s puzzling why beekeepers are not cropping up all over South Africa.

South African beekeeping development projects have been trying to fill the gap between local supply and its demand for years. The Department of Science and Technology has a project whose main objective is “to establish businesses based on beekeeping and associated crafts among historically disadvantaged and resource poor communities.”⁷⁹ This project was implemented across all 9 provinces and involves 633 members. In 2002 it was awarded the Platimun award by the Impumelelo Innovations Trust for developing a socially responsible program to improve the livelihoods of South Africans. And since its inception, three community beekeepers have been funded to go abroad to learn international techniques to bring back to their communities.⁸⁰

⁷⁴ Johansmeier, M. F. *Beekeeping in South Africa*. Pretoria: Agricultural Research Council of South Africa, Plant Protection Research Institute, 2001. Print.

⁷⁵ Trade and Industrial Policy Strategies. *Trade Information Brief: Honey*. Rep. N.p.: Australian Government, n.d. Print.

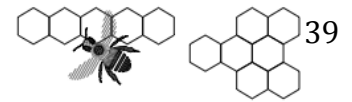
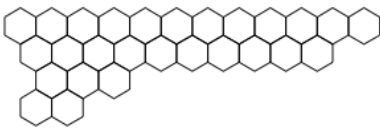
⁷⁶ Holmes, Richard. “The Business of Bees.” *Sunday Times* [Cape Town] 30 Sept. 2012, Food Weekly--Honey Special sec.: 9. Print.

⁷⁷ Stubbs, Guy. “Rethinking the SA Honey Chain: Fixing the Broken Links in the South African Beekeeping Industry Supply Chain.” (2012): n. pag. Web.

⁷⁸ Peters, Melanie. “Sweet Taste of Honey with a Difference.” *Weekend Argus* [Cape Town] 19 Apr. 2003, LIFEetc. sec.: 19. Print.

⁷⁹ Khumalo, Lucky, Annelie Forbes, and Elize Fourie, comps. *Technology for Poverty Reduction: Beekeeping*. Rep. South Africa: Department of Science and Technology, 2004. Print.

⁸⁰ *Ibid.*



The Marange Women in Agriculture and Development began as a group of unemployed women seeking an income. Supported by the Department of Agriculture, they were able to learn beekeeping and, one year later, were teaching it to other community members. In 2002 the women were invited by the National Development Agency to show their products at the World Summit on Sustainable Development.⁸¹ This success is significant because it both empowers women and boosts their economic standing through beekeeping. Empowering women has very significant and positive ramifications for developing nations, which is one of the reasons it was listed as one of the Millennium Development Goals. Projects that empower women are, thus, beneficial two-fold.

Sappi, a global pulp and paper company, has taken on a beekeeping development project in South Africa. "The Forest Honey Project" is a five year plan that takes beekeepers through an accredited commercial beekeeping course and a basic business management course; it also loans the beekeepers money to start up their hives, offers two free hives for every hive purchased, and develops a co-operative to assist in the sale of honey and other bee products.⁸² The estimated total income from the sale of honey over five years is R 6,731,050 of which R 2,019,315 will be used to as loan repayments. While the estimated cost of the project is R 6,785,094.^{83,84} The press surrounding the project is optimistic and uplifting, yet outdated. All the reports and newspaper articles are from 2001, 2002, and 2003. There is no further literature on the project's success or lack thereof.

The Agricultural Research Council (ARC) started its own poverty relief Beekeeping Development Program in 2002 with the stated goal that within five years they will "see at least 6,500 historically disadvantaged people trained and provided with adequate equipment to start their own businesses."⁸⁵ The estimated expenses for the project over the five years totaled R18-million. However, the project estimated that R30-million in honey and other hive

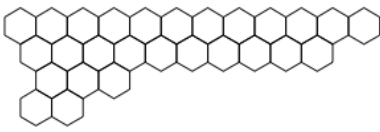
⁸¹ Friedman, Roger. "Women Taste Sweet Smell of Success." *The Star* [Johannesburg] 26 Sept. 2002: 10. Print.

⁸² Claasen, Gert. "Sappi Runs a Honey of a Project." *Farmer's Weekly* 20 June 2003: 63-64. Print.

⁸³ Gibson, Heidi. "Turning Their Honey into Money." *The Sappi Paper* Oct.-Nov. 2001: 8-9. Print.

⁸⁴ IPEB and Woodlands Apiaries Consortium. *Proposal and Business Plan for Sustainable Livelihoods from Beekeeping in SAPPI Forests*. Business Plan. N.p.: n.p., 2002. Print.

⁸⁵ Cox, Anna. "Beware of the Honey Hunters." *Johannesburg World Summit 2002* 8 Aug. 2002: 18. Print.



products would be produced.⁸⁶ As it is 2013 and there are still only about 2,000 beekeepers in South Africa, this project has failed by its own standards.

While there are some isolated success stories, most projects in South Africa have failed or disappeared. Without being able to assess aspects of each project, it is impossible to make any conclusions that could lead to improvements. From these examples, one can conclude that beekeeping development projects have cost South Africa millions of Rand while producing negligible positive results. The environmental carrying capacity for beekeepers is still unmet while the demand for bee products remains more than the country can supply.

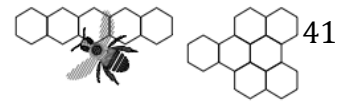
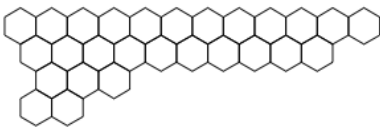
According to Mr. Mike Allsopp of South Africa's Agricultural Research Council, an assessment method is the best route for South Africa to take. He has anecdotally been deemed "the guy who knows the most about bees in all of South Africa" and has strong opinions about the projects being funded. He suggested that I study the Bee Pilot Project, run by Mr. Steenkamp, a development project he considers to be very successful. This project, Mr. Allsopp believes, is substantially different from most projects he encounters and he believes it to be successful and beneficial to the beekeeping industry. By studying the Bee Pilot Project, he explained, I would gain insight into the industry that other service providers may not be able to provide.

I spent two days interviewing Mr. Steenkamp and six of his project participants. My interview with Mr. Steenkamp followed a semi-structured form, which allowed him to answer freely. The questions were formed to give me a complete understanding of his background and project but also to allow him to



Mr. Steenkamp conducting a training

⁸⁶ *Ibid.*



steer the conversation as to what he thought was most important concerning his project and about his place in the grand beekeeping for development scheme. The six beekeepers we talked to, however, were asked a series of pre-determined questions that would help me understand their experience with the project. The questions were as follows:

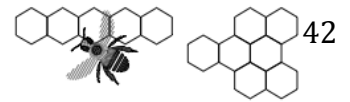
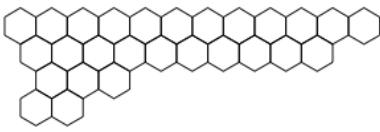
1. How did you hear about the Bee Pilot Program?
2. Why did you decide to pursue beekeeping?
3. Did you have any previous experience? Years? Number of colonies?
4. What were your expectations of the project?
5. Were your expectations met?
6. How long have you been involved with the project?
7. Were you satisfied with the amount of course work vs. field work?
8. Were you satisfied with the equipment provided?
9. How much time do you spend on beekeeping?
10. How many hives do you currently have?
11. How much income are you generating from your hives?
12. What percentage of your income comes from beekeeping?
13. What are your future plans concerning beekeeping?
14. Would you say the training was a success?
15. What could be improved about the program?

Prior to their interviews, Mr. Steenkamp and his beekeepers were given a brief overview of my project and its goals. Each participant then gave explicit permission for their interview to be used in the project. For ethical reasons, all names have either been omitted or changed in this paper.

Largely, Mr. Steenkamp's project has been successful (albeit on a small scale) and, where there have been failures, he has worked to improve the project. The Bee Pilot Project makes an excellent case study because the information gathered provides many insights to the South African beekeeping industry that can be used when developing other projects.

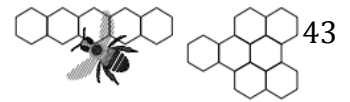
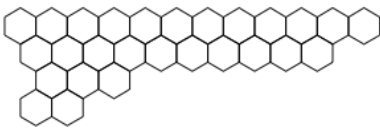
The Bee Pilot Project is Mr. Steenkamp's brainchild. Mr. Steenkamp himself has over sixteen years of beekeeping experience and currently keeps between 350 and 380 hives. He works for the Department of Agriculture, which is the entity the project is run through.

The project began for Mr. Steenkamp when several small-scale farmers started asking him for help with beekeeping. He decided that developing a formal project would be more effective in helping these farmers than just giving them



advice on his own time. The project began with twelve participants, most of whom Mr. Steenkamp had hand selected to participate in the program. He purposefully chose people who already had some beekeeping experience—even if it was just one hive. Eleven of the twelve had previously kept bees. He personally visited each participant before selecting them in order to determine their commitment to beekeeping. This selection process differs greatly from other projects that generally target producing new beekeepers (e.g. the ARC’s attempt to create 6,500 new beekeepers through their Beekeeping Development Program), not helping existing beekeepers expand. Mr. Steenkamp believes this is one of the keys to the success of his project. Currently, the project has worked with 26 people. They have all undertaken the same selection process except for two. Mr. Steenkamp’s colleagues pushed two people without any prior beekeeping experience into the program for political reasons. The idea being that they wanted the project to be developing new beekeepers as well. These two are the only two of the twenty-six who have since stopped keeping bees. This demonstrates the importance of selecting who participates in the projects. Judging from the Bee Pilot Project, participant selection is a crucial component of the project’s success.

Once the beekeepers have been chosen, they are given five hives with bees, protective gear, and are invited to several training days where they learn the basics of beekeeping. The participants interviewed found these training sessions to be invaluable, a good balance of theoretical course work and hands-on fieldwork. After the initial training days there are subsequent farmer days that allow the beekeepers to reunite, learn from each other, and learn from Mr. Steenkamp and other expert farmers and beekeepers. These trainings, however, are not the bread-and-butter of the project. At the project’s beginning Mr. Steenkamp visited each individual beekeeper every two months and now, due to time constraints, visits each beekeeper every four months or so. These are the times where he is able to pass on his knowledge about bees. The participants ask him questions pertinent to their hives and he looks at their hives with them to make sure things are going well. This interaction makes Mr. Steenkamp’s project a mentorship project as opposed to a training project. Mentorship projects are

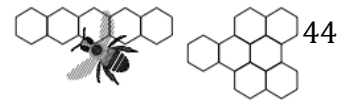
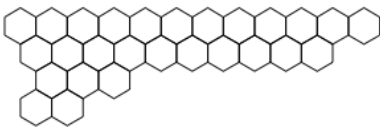


long-term, whereas training projects simply offer basic trainings and then leave the beekeepers to figure the rest out on their own. In the Bee Pilot program, the beekeepers who are really pushing themselves to advance and who want the help are not abandoned after a couple of training days. Mr. Steenkamp personally stays with them through the expansion of their business.

The mentorship nature of the Bee Pilot project is one facet that makes it unique. Mentorship programs in general are largely successful, yet there are some pitfalls that research such as the *Formal Mentoring Programs in Education and Other Professions: A Review of the Literature* (2004) notes.⁸⁷ This review looked at over 300 works on mentoring programs and concluded that there are many opportunities for success but, in some cases, mentorship programs can be worse than no program at all. The review, however, lists ways in which a detrimental mentorship program can be avoided and a beneficial one can be obtained. These ways include: program support at various levels, the importance of mentor training, the careful selection of participants, and the need for ongoing evaluations. The Bee Pilot Project meets all of these standards by garnering support at both the local and governmental level (though the Department of Agriculture), Mr. Steenkamp's extensive personal experience with beekeeping, his careful selection of participants, and his personal evaluations of the project. From this report, it is clear that the Bee Pilot Project falls under the "beneficial mentorship project" category but it also shows that things can be done, like instituting a formal evaluation process, to improve it even further.

Aside from the mentorship aspect, another key component to Mr. Steenkamp's project is his "sifting" process. The sifting process refers both to the selection of beekeepers initially and to how Mr. Steenkamp chooses to allocate his time and resources. He personally determines which people he is going to use the project's funding and his own personal time and expertise to help the most. In other words, he periodically "sifts out" the people who he feels are wasting his

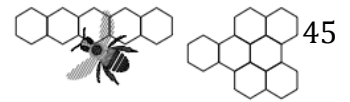
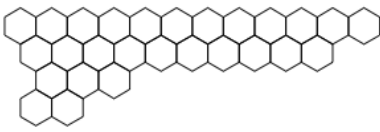
⁸⁷ Ehrlich, Lisa, Brian Hansford, and Lee Tennent. "Formal Mentoring Programs in Education and Other Professions: A Review of the Literature." *Educational Administration Quarterly* 40.4 (2004): 518-40. Print.



resources and then reallocates those resources to the people who use them more efficiently.

This does not mean he takes hives away from participants; he will though, for example, stop helping participants acquire more hives if they are not properly managing the ones they have or are not prepared to expand. In his words, he is looking “to help the people that want to help themselves.” This means he is more likely to help the beekeepers apply for additional free hives if they are willing to buy them themselves. He explained his belief that those who are willing to invest their own money into their business are the ones that are serious about growing. Developing an auditing system has the potential to show correlations between willingness to invest in oneself and overall success in beekeeping. Because of this perceived correlation, if a beekeeper shows Mr. Steenkamp that he is buying or making his own hives and will continue to do so regardless of the project, the project will look for ways to help him.

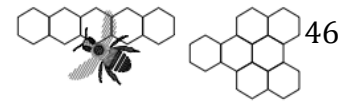
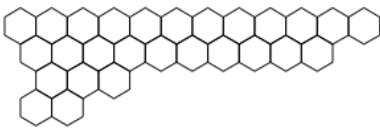
An illustrative example of this is a beekeeper from Oudtshoorn. Prior to the program he had 12-15 years of experience but only had two hives. He started with the program in 2008 and now has a total of 14 hives. He makes his own hives and buys the frames to fill them. He made his own veil and, during our interview, was asking Mr. Steenkamp the best way to build a solar wax extractor. His personal expectation for the project was to improve his income. Today, the honey he bottles and sells rewards him R1200-1300 per year, comprising about 10% of his income. He said that he “could see his life improving” through his involvement in the project. He clearly loves his bees and visits his hives every day (although he doesn’t open them because that would be bad for the bees) just to make sure everything is okay. When asked whether the equipment provided was sufficient he answered, “yes, but if I need something else, I make it.” This is the attitude that Mr. Steenkamp is looking for. Because of his personal investment and clear determination to make his honey business successful Mr. Steenkamp has agreed to help him with the paperwork to apply for more hives. His goal is to expand to 25 hives and Mr. Steenkamp’s faith in him is evident through his actions to continue helping him. In speaking with Mr. Steenkamp, he believes this beekeeper will be able to sustain his business, maintaining a 10%+ addition



to his income. However, with Mr. Steenkamp's help he can expand faster and gain more from beekeeping than if he were to do it on his own.

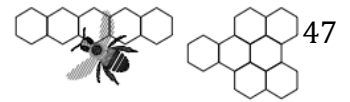
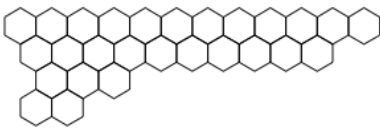
In contrast, another Oudtshoorn beekeeper we visited is someone who Mr. Steenkamp is much less willing to expend resources helping. This man had no prior beekeeping experience but in his own words, had a natural interest in beekeeping. He had also told Mr. Steenkamp that he was looking for an additional source of income. He said that he wanted to keep bees on his farm and wanted "to be fairly substantial." He was one of the original twelve in the program but has since stopped keeping bees. In the beginning, he was given five hives like everyone else. But unlike the more successful participants, he never looked to expand, nor did he visit his bees. He kept them in a shed and, according to Mr. Steenkamp and his colleague; the bees had been left unattended for over two years. Every time Mr. Steenkamp visited him he had to go to his home to find him because he was never with his bees. He currently has no hives because they were all stolen, however, Mr. Steenkamp says he was mismanaging his bees and would not have made it regardless. Since his hives were stolen he has not attempted to obtain any more and although he says he is "not really done" with beekeeping, he has no concrete plans for continuing. He says that he hopes future circumstances will better allow him to keep bees. So, although Mr. Steenkamp still checks in on him, he is not expending any great effort in helping him because he does not seem interested in helping himself.

The second Oudtshoorn beekeeper can be seen as a failure of the project. However, this is not the case. Ceasing to invest further in those who have failed is actually a success of the project. The Oudtshoorn beekeeper's experience supported Mr. Steenkamp's original belief that the project would do better to help those who had previous experience and a serious drive to expand their practices. Therefore, when Mr. Steenkamp is looking for new people to mentor—he has a better chance of picking those who will best use the resources the project provides and will not waste Mr. Steenkamp's time or the project's resources. Mr. Steenkamp is constantly looking for ways to improve the project and build on his own experience. He not only gets advice from people like Mr. Allsopp but he looks to his participants to tell him what they want.



I was fortunate enough to see this in action when we visited a group of beekeepers in Ladismith. The group in Ladismith consists of four beekeepers who are individuals in the eyes of the project (i.e. they each got their own five hives and if one was to drop out, the others would not suffer any consequences), however, they operate as a collective. They work on the same farm and send out their hives for pollination as a group. Two of the four were around to answer my questions. Their goal for the project was to become commercial beekeepers—to have 200 hives each for a total of 800 hives. Currently they collectively have between 120 and 140 hives. Both men I spoke with make approximately R5000 per year (R2300 of which is from honey as opposed to pollination) and beekeeping comprises about 10% of their income. They are currently in the process of applying for more hives and are very keen on expanding. Similar to the second Oudtshoorn beekeeper they have had problems with theft. In 2009 they cumulatively had 70-80 hives, 60 of which were stolen. But unlike the other beekeeper they have built themselves back up by building new boxes and buying frames. Now, they are considered Mr. Steenkamp's most successful participants. The last question in the interview was, "what could be improved about the program?" They answered this by saying they were very happy with the program but they want more hives and another set of protective clothing.

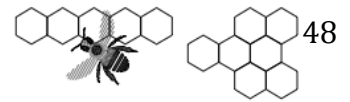
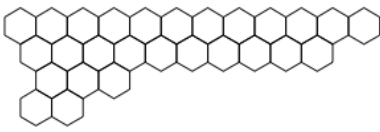
Mr. Steenkamp is in the process of helping them acquire these but that question launched the conversation into how Mr. Steenkamp could help them expand their business. Currently they cut combs to extract the honey. This method produces wax but is less effective at collecting honey than an extractor. Certain types of extractors are cheap and easy to build, Mr. Steenkamp explained. He said that he would provide them with instructions on how to build one. But another idea came out of that conversation that could potentially change the project's future. They began discussing ways to maximize efficiency for all the beekeepers in the area. They used a core economic principle: "there are always gains from trade" to brainstorm ways the project could run differently. The four Ladismith beekeepers are currently involved in many different aspects of beekeeping: building hives, extracting honey, and pollination. But it would be



more efficient for them to focus their time and energy on one of these components and trade with others in the field.

The idea was that an individual or group in the area would be trained in building hives and would sell their hives to all the neighboring beekeepers. Another group would be trained and have all the equipment for honey extraction. All the beekeepers in the area would then pay them to extract and bottle their honey. This could allow for the beekeepers to spend more time on ensuring their hives are up to pollination standards. The brainstorm yielded the idea of a mobile honey extractor—a way for those specializing in extraction to move from location to location and harvest honey. A few concerns about this idea came up—such as how to bring a mobile unit up to honey extraction standards but the idea is now being considered. None of South Africa’s aforementioned beekeeping development projects (Sappi’s Forest Honey Project, the ARC’s Beekeeping Development Program, e.g.) have discussed specialization as a component of their business plan.

A specialization technique for beekeeping development projects is innovative—however, the idea itself is not nearly as important as the process by which it was created. The service provider, Mr. Steenkamp, engaged in a conversation with his participants looking for ways to better the program and he takes their input and suggestions seriously. Mr. Steenkamp and his participants have a great rapport that allows them to be honest with each other and have fruitful discussions about ways to better the participants’ individual practices but also the program as a whole. This kind of relationship was evident in all the beekeepers we visited except for the one who was no longer keeping bees. Everyone was kind and very thorough in answering my questions but they were also much more interested in talking with Mr. Steenkamp. They talked about their hives, asking him specific questions about problems they were having and problems they might encounter. They also talked about the program and what they wanted from it in the future; and they all talked about expanding. They showed devotion to beekeeping as a practice and they all wanted to talk about the next step they could take to better their beekeeping practices.



Beekeeping is a practice where those involved benefit greatly from having a mentor. While it is possible to improve a beekeeping business through trial and error, that is a very slow and costly process. Continual learning is the best way to become a better beekeeper. Communities where beekeepers can ask questions of one another and share new innovations and techniques benefits everyone involved. And because beekeeping has such a long history, there is a wealth of knowledge that is best accessed through someone who has been in the business for a very long time. In the Bee Pilot Project, that person is Mr. Steenkamp.

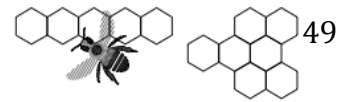
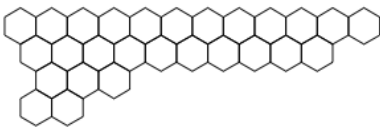
Mr. Steenkamp's personal investment in the project makes a huge difference in how he runs his project. Many other service providers allocate an "administrative fee," usually around 10% of the budget, for their own personal salary. Mr. Steenkamp, on the other hand works for the Department of Agriculture and his salary is not dependent on the funds for the project. Although both Mr. Steenkamp and other service providers get paid no matter the success of the program, the Department of Agriculture will not continue to fund Mr. Steenkamp's project if it is not producing results. He views the project as a reflection of his reputation. Mr. Steenkamp is currently working towards his B. Tech degree and wants to continue working in the development field. In his mind, the only way he can accomplish his goals are to put his best effort into making his projects successful so he can use that success to help him achieve his other life goals. Not all service providers see beekeeping development projects this way and, therefore, are not as serious about pushing their projects to work.

The personal investment seen in Mr. Steenkamp in relation to the Bee Pilot Project helps to explain its success. Projects whose managers have interests aligned with the goals of the project are far more likely to be successful than those who do not.⁸⁸ Evaluations of success factors on projects claim that this alignment coupled with a comprehensive assessment system is the best way to ensure future project successes.^{89,90}

⁸⁸ Cooke-Davies, Terry. "The "Real" Success Factors on Projects." *International Journal of Project Management* 20 (2002): 185-90. Print.

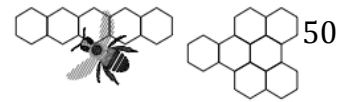
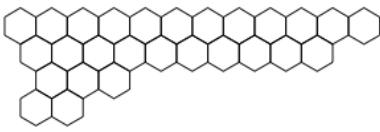
⁸⁹ *Ibid.*

⁹⁰ Schindler, Martin, and Martin Eppler. "Harvesting Project Knowledge: A Review of Project Learning Methods and Success Factors." *International Journal of Project Management* 21.3 (2003): 219-28. Print.



One evaluation illuminated an assessment method developed by Frank Gulliver, titled “The Post-Project Appraisal Method.” This method is a type of project review with the goal of supporting world-wide learning from errors and the repetition of successes. It accomplishes this by enlisting a third party that examines an entire project (not just the end result) and conducts as many interviews as possible.⁹¹ The Bee Pilot Project seeks to do some of its own evaluation, however. In order to gain the benefits of the Post-Project Appraisal Method, a nation-wide auditing system would need to be implemented so that failures are learned from and successes are replicated.

⁹¹ *Ibid.*



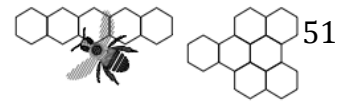
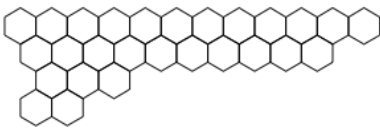
Chapter 7: Lessons Learned (Applications to South Africa)

There are many lessons to be learned from literature and case studies of beekeeping development projects. Many of them are general and can be applied loosely to most beekeeping development projects. Others can be applied more specifically to South Africa's beekeeping industry in order to help it reach its full potential.

The first trend that is seen in all successful projects is they are located in places with a suitable and plentiful environment for bees. This means that there is plenty of flora for the bees to forage from and there is ample space to keep the bees. Additionally, there must be a suitable market for bee related products. Typically, this is honey but can also include pollination, propolis, beeswax, and more. There is also a correlation between successful development projects and a strong history of beekeeping in the region. South Africa fits all of these criteria.

The key lessons from the projects in Ethiopia were to have market-oriented projects, different methods of knowledge sharing, local interest in the projects, and a monitoring system. Market-oriented projects worked in Ethiopia because they had already completed one intervention to equip the beekeepers with modern technologies and techniques. South Africa is somewhere between these two phases. Some beekeepers need help bringing their products to market while others are still relying on outdated management methods.

Two different projects should be implemented to target these goals. Something, however, that could be helpful across projects is a knowledge-sharing system. Ethiopia has shown that there are great benefits from connecting older, more experienced beekeepers with novices and that providing a forum for information sharing can be beneficial to all involved. How this is best implemented depends on the region. In South Africa, most farmers do not have consistent Internet access but they do have mobile phones. So, the best way to share information would likely be to compile a contact list and to host regular get-togethers so that the beekeepers can create a community where they feel comfortable asking each other for help.

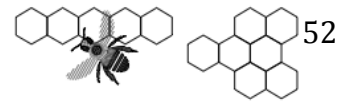
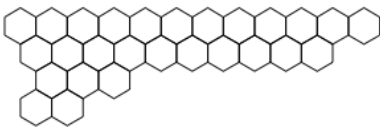


On a larger, countrywide scale, Ethiopia has shown that a country needs to be invested in itself. Projects cannot be driven by outside influences only. South Africa has dedicated itself to this. The government continually funds beekeeping projects and government entities have stated goals to improve South Africa's beekeeping industry. This is only the first step, however. An auditing system, like the one in Ethiopia, ensures that the government's resources are not being wasted on failed projects. This is a concrete step that South Africa needs to take in order to improve the efficiency of their projects.

Likewise, the case study of the project in Jamaica shows similar large-scale methods for ensuring successful projects. The Jamaican project also was monitored through an auditing system where the funders (USAID) required regular reports from the project. However, these funders were not the impetus behind the operation. The drive for the project is Jamaican, headed by two people invested in improving their lives and the lives of their community. They too have begun to establish a strong community of beekeepers who share their knowledge with each other. This has been done largely through the exchange of phone numbers and regular get-togethers (cooperative meetings, trainings, etc.) because most farmers do not have reliable internet connections. A criticism of the project is that there is a need for more literature on beekeeping. This is something all projects should consider. Sharing literature can easily be done once communication channels are set up, but acquiring the literature can be difficult.

Other lessons from Jamaica are pertinent to South Africa as well. The top bar hives in Jamaica were tailored to the environment. In South Africa, top bar hives are certainly feasible, but use of Langstroth framed hives may be more suitable there. South Africa does not have quite the demand for beeswax as Jamaica does, so it makes more sense to go for maximum honey yields and allow hives to be used for pollination. Therefore, Langstroth hives are more appropriate for South Africa's environment.

Another component to Yerba Buena's project is diversification of opportunities. They recognized that beekeeping isn't for everyone and they provided many opportunities for those looking to get involved in other ways. Workshops on how to make different wax products, for example.



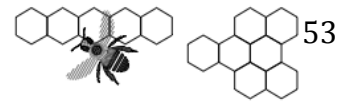
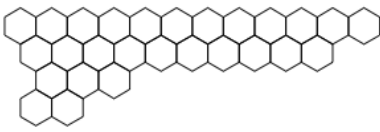
Additionally, the Jamaican project has a unique component that focuses on training children. Involving children in the industry is the best way to ensure its continued success. All of these ideas can apply to South Africa as well. South African projects should include a multitude of bee-related activities and should reach out to children. While training children and providing other opportunities could be very successful, they are not completely necessary for a successful program. Carefully choosing whom to invest in, on the other hand, is. It is an auditing system of sorts, in that it evaluates the participants and decides whom to keep helping.

The beekeeping experts brought to Jamaica through the Farmer-to-Famer program took extensive notes on the trainings they did which included recommendations for future endeavors. One such recommendation was to establish a formal mentorship program. The benefits of a mentorship program can be seen in the Bee Pilot Project in South Africa.

The Bee Pilot Program is unique in South Africa because it is one of the very few projects that has seen success. This means that South Africa should study it carefully in order to learn and apply its methods to future projects.

The Bee Pilot Project employed a sifting process where those who were less invested in the project were given less help. Conversely, those who put a lot into their own beekeeping ventures receive a lot of assistance from the development project.

This sifting process is executed by the project manager, Mr. Steenkamp. Mr. Steenkamp is very personally invested in this project because he sees it as his future. He cannot continue to get funding if his project is unsuccessful. Also, as a beekeeper, he is a part of the community himself. He has an interest in helping other members of his community beyond his own personal advancement. He finds the best way to manage his project is through a mentorship program. He sees himself as a mentor to all the beekeepers he works with and he wants to continue working with them for years to come. Mentorship, while applicable to South Africa, is not always feasible because of the one-on-one time commitment. Creating networks that encourage knowledge sharing, however, is both feasible

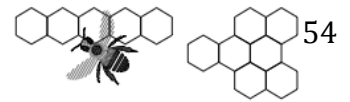
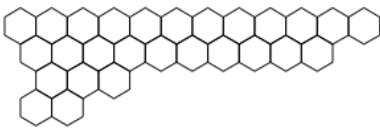


and practical. Benefits from the cluster effect are numerous while implementation costs are practically zero.

Mr. Steenkamp's funding is different than most other projects. There is an auditing system in place that is not present with most other projects. He cannot continue to get funded without showing results. Additionally, the work he does with this project is part of his job at the Department of Agriculture. He does not receive a salary based on the funding of the project. Most other projects in South Africa submit budgets with a 10% administrative fee which goes directly into the pocket of the project manager—whether the projects succeed or not. A project supervisor who has an unsuccessful project can continue to apply for funding. This calls for an auditing system that would disallow this kind of inefficiency.

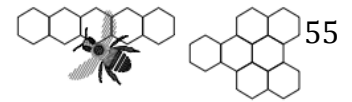
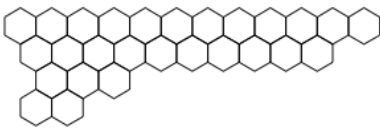
While an auditing system might seem simple, one reason it may not have taken hold is due to conflict within the industry. At times, the environment between beekeeping development project service providers (like Mr. Steenkamp) and research institutions and governmental entities (like Mr. Allsopp) is hostile. Mr. Steenkamp and Mr. Allsopp are an exception. Throughout this process I spoke with one service provider who explicitly asked me to keep our conversation confidential because he was afraid that speaking to me could jeopardize his projects. It is this kind of environment that requires intervention at a higher level.

South Africa has the potential to develop a flourishing beekeeping industry. Yet before any more beekeeping development projects are invested in, the country must utilize the knowledge gained from successful projects in order to yield the highest return on its investment. By following a few key parameters for successful projects and by learning from what has worked in other countries, South Africa could vastly improve the lives of its poorer citizens through beekeeping. Implementing a formal monitoring system is the most cost-effective way to do this. My recommendations for South Africa can be summed up in Agape's strong, but through provoking words, "If it's not grassroots, any project deserves to die a public death. Every project should only be rewarded with continued life because it serves a real need, not just because someone is throwing money at it."

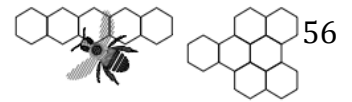
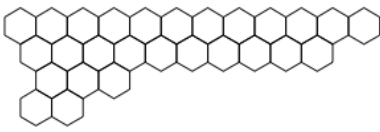


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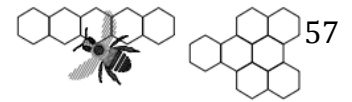
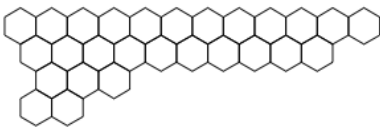
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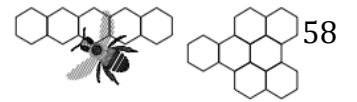
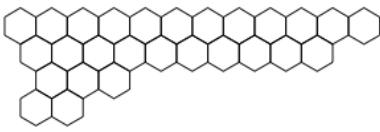
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