Let's Bee

A Social Initiative to Create Urban Bee Friendly Spaces

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June 2017

Let's Bee - A Social Initiative to Create Urban Bee Friendly Spaces

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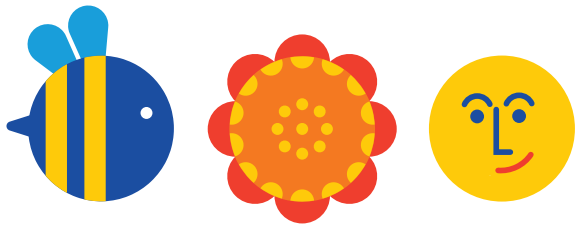
Printed by Grafische Werkstatt der Hochschule Anhalt

June 2017



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Bee Friendly Spaces

**To my family, friends,
advisors and bees
a huge thank you.**

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01
INTRODUCTION

1.1 Introduction

While you walk outside on a sunny day enjoying the flowers and smells, hundreds of little insects will be tirelessly working around you, as a group; as one. You might not see them at first, but you will definitely hear them...

My sister is a biologist and she has always loved bees. She has taught me about them, and now I love them too. Every time I try to draw one, she reminds me that they have six legs and two pairs of wings (after doing this project, now I also know they have five eyes). I believe she does this not because she thinks I have forgotten, but because she is marveled by them. As everybody should.

Bees are responsible for pollinating millions of flowers every year and we own them one-third of our food. I am in no position of saying we would die without bees, but I definitely know we would have a very boring and sad existence. Coffee, chocolate, avocados, tomatoes and mangoes (i.e., the best things in life) are just a small part of a long list of foods that would disappear.

As years pass, more bees (as well as other pollinators) decrease in numbers. The reason behind this is complicated to solve, because it is a combination of circumstances and factors that just one action, object or person, can't tackle alone.

I believe the best way to help bees is through sustainability. Communities need to come together and work as one (just like a hive) to add efforts and small actions that will improve their environment little by little. This way both bees and people will get synchronized again and they will have a better chance of survival.

Let's not allow our sunny days go quiet.

1.2 Motivation

I have always liked bees. I even dressed as one for Halloween, and almost got a heart attack the time I went to an only-honey store (my mom had to stop me from buying gallons of it). Nevertheless, this doesn't mean I have always understood them, or given bees much thought.

Coming to live to Germany, my curiosity started. As a honey consumer, I was marveled with all the different kinds and tastes available. Also, something else caught my attention. In different gardens or hanging from walls, you could see this tiny wooden houses.

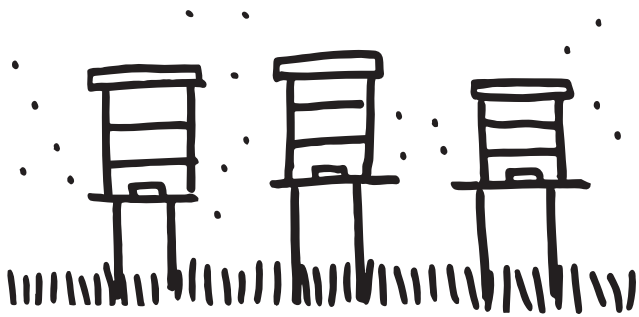
After some quick research, I learned they were called bee hotels. I continued reading and discovered that all these bees have been dying for different unknown reasons. And this was the moment the idea for my graduation project popped in my mind: I'm going to save all the bees!

I thought the way to fixing Colony Collapse Disorder (CCD) was with a new and improved bee hotel. But I was wrong. I can assure you that my first instinct and hypothesis were misguided. I understood that at the beginning of this journey, my mind was influenced by all the green washing surrounding bees.

The more I read, bees and their world became more complex and interesting. They all are so different, but similar. Depending on their social relationships, their needs are different, as are the hardships affecting them. The reality of my first impulse is that CCD cannot be solved with a bee hotel. This is because the

bees that are mainly affected by it, are honey bees, while solitary bees are the ones that live in the hotels. And to be more specific, not even all solitary bees do.

But instead of getting discouraged by this confusion, the more I researched and understood that I really new nothing about this little insects, the more interesting this flower lovers became to me.



1.3 Design Challenge

How might we design an environment that is more friendly to bees?

Challenge's Context

For many years now, even decades, we have heard that the world is suffering. Animal and plants go extinct, the poles are melting and ocean levels rising. The problem is that right now we are getting to a point when all this damage might become irreversible.

While doing the research for this project, it became common to come across article headlines like *Hawaiian bees are first on US endangered species list* or *One in ten wild bees face extinction in Europe*. The saddest part of this titles, is not only the fact that many pollinators are disappearing forever, but that it took researchers and scientists years of fighting to manage to get those names into those lists.

Only now, they are able to start making visible the crisis that is happening. Because it is necessary to understand that behind this articles, there are many more bees, butterflies, bats, wasps, etc., that are not even counted because there are not enough resources destined to obtain enough information about them. When you access the red lists of endangered animals, many of the bees are under the category of data deficient.

> "A large proportion of the species that have become extinct worldwide in the past century are insects and other invertebrates. For many animals, including most birds and mammals, the basic information that allows people to identify key species in need of conservation exists and is accessible. Unfortunately, for invertebrates, this information is often hidden in scientists' files or is lacking altogether" (The Xerces Society).

The fact that these Hawaiian and European bees made it to the official extinction lists ironically, can be seen as something positive. Actually, it is one of the best things that could happen to them. Now, scientists have the means to back up their demands for conservation efforts to be taken to try and save them.

1.4 Hypothesis

One way to help fight the decline of bee populations is by creating "bee friendly" spots throughout the urban area, that will give bees access to a variety of chemical free resources they need to survive.

In order to help bees survive, it is necessary to educate the communities and get them involved in the conservation efforts. This way, actions taken become visible and may be replicated by other groups.

1.5 Research Aim

To design an environment that is more friendly to bees by giving them access to quality resources and educate people on the importance of their conservation.

Research Objectives

- Analyze the current reality of bees to establish the reasons why they are dying.
- Identify and develop new spaces where bees can have access to quality resources.
- Generate a link between bees and people to promote protection of the former and thus to ensure their survival and the balance of ecosystems.
- Create a system that benefits bees and people, to encourage the development of conservation efforts in communities.

1.6 Methodology

1.6.1 Service Design

> "A wicked problem is a social or cultural problem that is difficult or impossible to solve for as many as four reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with other problems" (Austin Center for Design).

When it comes to bees, and their decreasing numbers, we come face to face with a wicked problem. There is no single reason why they are dying in such high numbers. Due to insufficient funds, scientists do not have access to vital information to track more populations and have a better understanding of the current reality of all these pollinators. And, to make it worse, causes that have been determined as culprits, are themselves wicked problems (e.g., climate change and the indiscriminate use of chemicals).

As a result, this project needed a broader and integral approach to a solution. Wicked problems cannot be solved with just one thing. The bee population decrease has many starting points and therefore needs many solutions working together to help solve it.

Service design, helped to clarify and understand the problematic as a whole and come up with different touch points where a difference can be made. In the end, this project doesn't pretend to be The Solution, but an effort that can be developed further in time, and in more locations.

> "In particular, the approach of service design refers to the process of designing rather than to its outcome. The outcome of a service design process can have various forms: rather abstract organisational structures, operation processes, service experiences and even concrete physical objects" (Stickdorn and Schneider, 2016, 14)

1.6.2 Research Methods

- **Bibliographic research:** When starting the bibliographical research, the first thing I noticed was the need to start from the most basic aspect: the bee. I didn't new much about them, their needs or problems. After covering the basics, I turned to scientific studies, to learn what is harming them, and what is being done.

- **Field research:** This point ranges from walking around looking into peoples gardens, to see if they had bee hotels, to going to different parks, fields, urban spaces, and even cemeteries to observe bees in their natural environment. This part of the process was one of the most fulfilling because it helped me appreciate this little insects even more, and realize how mistaken we are about them when we run from them.

- **Expert interviews:** Interviews were also conducted with two different types of experts. The first with professor Margot Steinel of Anhalt University, based in Bernburg, where she is in charge of the Bee House. The second interview was with beekeepers and lovers of bees, Kerstin and Martin Jütten in Dessau.

I wish to speak of the bees very simply, as one speaks of a subject one knows and loves to those who know it not.

(Maurice Maeterlinck,
The Life of the Bee)

02

RESEARCH AND FINDINGS

2.1 About Bees...

> "You will probably more than once have seen her fluttering about the bushes, in a deserted corner of your garden, without realising that you were carelessly watching the venerable ancestor to whom we probably owe most of our flowers and fruits (for it is actually estimated that more than a hundred thousand varieties of plants would disappear if the bees did not visit them), and possibly even our civilisation, for in these mysteries all things intertwine" (Maeterlinck, 1901).

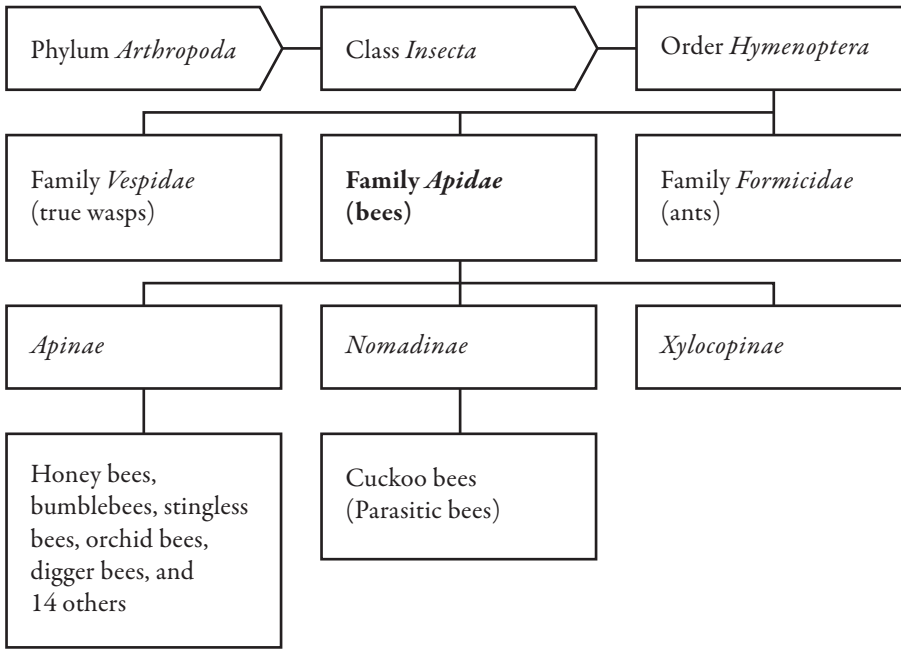
You do not have to be an entomologist to appreciate the amazing creatures bees are. They are simply fascinating and capable of unbelievable things. Not for nothing Maeterlinck, in his book *The Life of the Bee* refers to them as **heroins** and the "**virgin daughters of toil**" (1901). For example, honey bees can navigate through long stretches of land looking for the best resources, return to their hives and explain to their sisters the exact location of the flowers they found by performing a "waggle dance," so they can fly out and bring in pollen and nectar (Imhoof, 2012). Bees construct beautifully complex structures where they store food and take care of their larvas. They can be completely social, living under a monarchical structure, semi social, working as a team to procure a next generation, or completely solitary only building a nest for their unknown offspring.

Most probably, when many of us think about them, the first thing that comes into our minds are yellow and black stripes or honey. But actually, bees are much more. Or better said, many more.

2.2 Who Are They?

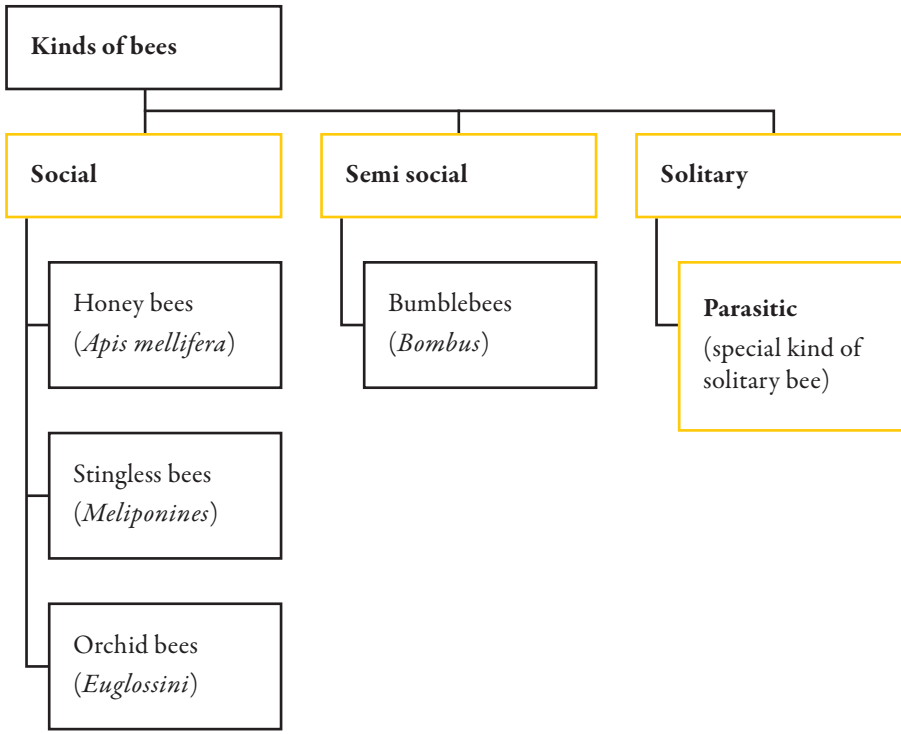
To understand something better, it is important to know where it comes from. And bees are not the exception to this rule. Biologically, they are part of the order *Hymenoptera*, next to wasps and ants. Because of this, people sometimes confuse them with wasps, and get unnecessarily scared (Jütten, M., Jütten, K., 2017). In Figure 1, bee taxonomy is better explained.

Figure 1 **Taxonomy of the *Hymenoptera* order.**



Another way of organizing and understanding bees, is by their social structures.

Figure 2 Social organization of bees.



2.2.1 Honey Bees

Honey bees are a system. Individually they may seem harmless but as a whole they are unstoppable. In the words of Dan Carr, previous apiarist at Stone Barns Center for Food and Agriculture, "A single worker bee produces about a twelfth of a teaspoon of honey in her lifetime. That's twelve bees per teaspoon. But a healthy colony might produce up to 200 pounds of honey in a year" (Ebersole, 2016, 56).

A beehive or colony is conformed by different kinds of bees:

- **Worker bees:** represent 90% of the population. They are infertile females in charge of all the labour. They take care of the queen and the larvae; collect pollen and nectar; make bee wax and honey; construct all the structures; and maintain the temperature of the hive by fanning their wings in case it gets too warm.
- **A single Queen bee:** in charge of the reproduction. She is the only bee capable of laying eggs (up to 1,500 eggs a day). Only once, she gets fertilized by a drone and she stores the sperm for all her life. Fertilized eggs produce female bees, while unfertilized males.
- **Drones:** stinger-less males. They leave the hive to mate with other queens. This way they spread the genetics of their hive. They copulate mid-air with a queen, and they die (Ebersole, 2016, 56).

From spring to early autumn, honey bees forage for pollen and nectar to transform into honey and wax (to contain the previous). They need them to be able to survive during the winter. To be able to collect the pollen, their rear pair of legs "is specially designed with stiff hairs to store pollen when in flying from flower to flower. This is why a heavily laden worker bee is seen to have two golden pouches in full season" (Friends of the Honey Bee, 2017).

As Kerstin Jütter (2017) explains, the larvae takes 21 days to develop. Then, for their first 21 days of life, worker bees stay inside the hive working, and then they fly outside the hive looking for flowers (for around 21 more days). This means that a regular summer working bee, lives around 40 days only.

2.2.2 Stingless Bees

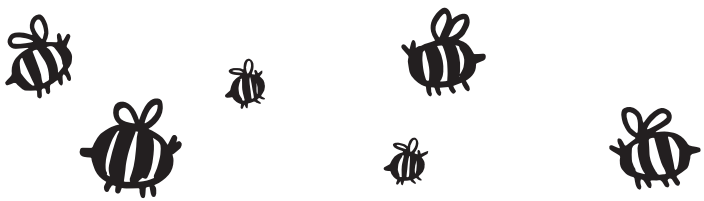
Stingless bees, are native to tropical and subtropical regions of the world. They are found in Mexico, Central and South America, some parts of Asia, Africa and Australia (Stout, 2016). Because they live in this warmer regions, they actually don't experience winter season, meaning they can be active all year around.

As their name explains, they do not have developed stings but they can still bite as a means of protection. But most probably they will annoy a predator by flying around their ears and eyes (in Costa Rica, they are actually called *hair tanglers* or *enreda pelos*).

There are around 500 different kinds of stingless bees. And they live in colonies but not hives. They can make their nest in different places like hollow branches and trees. Even crevices anywhere from rocks to walls, it all depends in their kind. They also produce honey, but because of this variety of nesting types, *meliponiculture* (beekeeping with stingless bees) is more specialized and less practiced than apiculture (Stout, 2016; Animal Corner).

> "Unlike a hive of commercial honeybees, which can produce 75 kilograms of honey a year, a hive of stingless bees produces less than one kilogram. Stingless Bees produce a different tasting honey which is a mix of sweet and sour with a hint of lemon. The taste comes from plant resins which the bees use to build their hives and honey pots and varies depending on the flowers and trees visited" (Animal Corner).

Still, this bees are a great option instead of honeybees for people that want to practice urban beekeeping. "The docile bees are much easier to work with than honeybees, and less susceptible to the diseases and parasites currently decimating global honeybee populations" (Stout, 2016). This makes them an excellent option in the fight to regenerate local populations of pollinators.



2.2.3 Bumblebees

Big, hairy, noisy bumblebees are close relatives to honey bees. And they also live in colonies. But, since they only last a season, they are considered eusocial.

There is one Queen, worker bees and drones, but the colonies only survive for one year. During this time, they share the workload of foraging and taking care of the larvae, but at the end of the summer only fertilized queens survive. As temperatures start do drop, queens leave the colonies to find a place to hibernate during winter.

When spring comes, bumblebees are the first bees to appear. Their hairy bodies allow them to resist colder temperatures, compared to other bees. All of this first individuals are queens that have woken up and need to establish a nest to lay their eggs and start a new colony. By herself she will construct the first cells in the nest and forage for food to raise her first brood. After this first bath of bumblebees are grown, they will become workers and take care of all this

tasks. The queen takes care of laying more eggs. At the end of summer, new queens and drones will hatch and mate. Only these new queens will survive (The Xerces Society).

2.2.4 Solitary Bees

Even if honey bees are the most popular and recognizable kind of bee, most bees are solitary. There are between 20,000 – 30,000 different species. Meaning that 90% of the bees in the world belong to this category (Animal Corner). They are native to the places they live in, and actually take care of most of the pollination processes.

As their name specifies, solitary bees live a lonely life. Depending on the specie, they construct their nests dome-shaped using mud or plant resins. Others, take advantage of empty tunnels created by beetles, hollow stems or twigs. But the majority, dig tunnels in the ground. (The Xerces Society).

Inside this nests, single mothers lay between one, ten, or even sixty eggs (depending of the specie). Each egg is placed in an independent cell that also has food (a combination of pollen and nectar called "bee bread") (The Xerces Society).

When the offsprings come out, they are already fully developed and are ready to start the cycle all over again.

2.2.5 Parasitic Bees

Parasitic bees are of extreme importance. They are the way to establish the health of the environment. They are a group of solitary bees that depend on others to reproduce. They do not build they own nests, but depend on the effort done by other solitary bees.

To reproduce, kleptoparasitic bees wait for another solitary bee to create a nest and lay their egg. They then wait until she leaves her nest, and procede to make a hole in it, and lay their own egg. They sometimes eat the original egg, or leave it behind to feed their own offspring. Another kind, the social parasites, enter other bees' nests and kill the queen. They lay their eggs and make the other bees take care of them(Animal Corner). "So they don't do any work. And so, in fact, if you know you have these kleptoparasitic bees, you know that your environment is healthy, because they're top-of-the-food-chain bees" (vanEngelsdorp, 2008).

2.2.6 Orchid Bees

Native to the American continent, there are more than 200 different orchid bees known. But, every year, new species are discovered. Although their name might suggest they pollinate orchids exclusively, only males seek these flowers.

Some orchids rely entirely on these bees to carry out their pollination process. So, they lure them with different scents. "Scientists aren't sure just why the males collect these smells, but they think it probably has to do with attracting mates and that females are more attracted to some scent mixtures than others" (Ihle, 2012).

To collect the smells, they have to go inside the flowers. And this way, their bodies get covered in pollen. When they visit the next same kind of orchid, they will pollinate it (Ihle, 2012).

2.3 Bees' Role in Nature

> "Bees are vitally important to the health of the planet: The more than 30,000 bee species around the world are the most important group of pollinators for farming and wild plants" (Fessenden, 2015).

In 2004, a film by Sergio Aranau called *A Day Without a Mexican* centered on the idea of what would happen in California if all of a sudden all hispanic people would disappear. It did not take too long for caos to overcome society, since Latinos represent a great part of the state's base economy and labour force.

While watching the documentary *More than Honey*, I could not avoid making connections between the two films. Bees are not only at the base of the economy, but at the base of our ecosystems, and they are disappearing in huge numbers. "Conservation of many habitats thus depends upon preservation of bee populations, for if the bee disappear, reproduction of major elements of the flora may be severely limited" (Michener, 2000, 3). With *More than honey*, Markus Imhoof gives us the chance to visualize the importance of bees' role in nature.

Imhoof traveled to China where he shows how, because of a lack of bees, apple trees have to be pollinated by hand. In his words, he took "a trip to the future..." A time when we will already have killed all of the planet's pollinators because of the excessive use of chemicals. One by one, apple blossoms on the south

of China are picked and opened to be able to extract the pollen. After it is processed and packed, it is sold to farmers in the Northern part of the country. Groups of people, armed with brushes and little flasks with the precious pollen, start stroking softly each and every one of the blossoms on the trees. It is a sad joke: How many people do you need to do the job of one bee? Hundreds...

> "Probably the most important activity of bees, in terms of benefits to humans, is their pollination of natural vegetation, something that is rarely observed by nonspecialists and is almost never appreciated. Of course the products of honey bees—i.e., wax and honey plus small quantities of royal jelly—are of obvious benefit, but are of trivial value compared to the profoundly important role of bees as pollinators." (Michener, 2000, 3).

If we translate into numbers the role bees play in nature, "they provide crop pollination estimated to be worth €153 billion globally and €22 billion in Europe every year" (IUCN, 2015). Also, of all the crops produced in Europe for human consumption, 84% benefit from insect pollination. Some plants can only reproduce with help of pollinators, even exclusively by only bees (like the case of the orchids pollinated by orchid bees). Others, are able to self-pollinate in case they need to in lack of pollinators. But the number of seeds produced and the sizes of the fruits are affected as result of inbreeding (IUCN, 2015; Michener, 2000, 3).

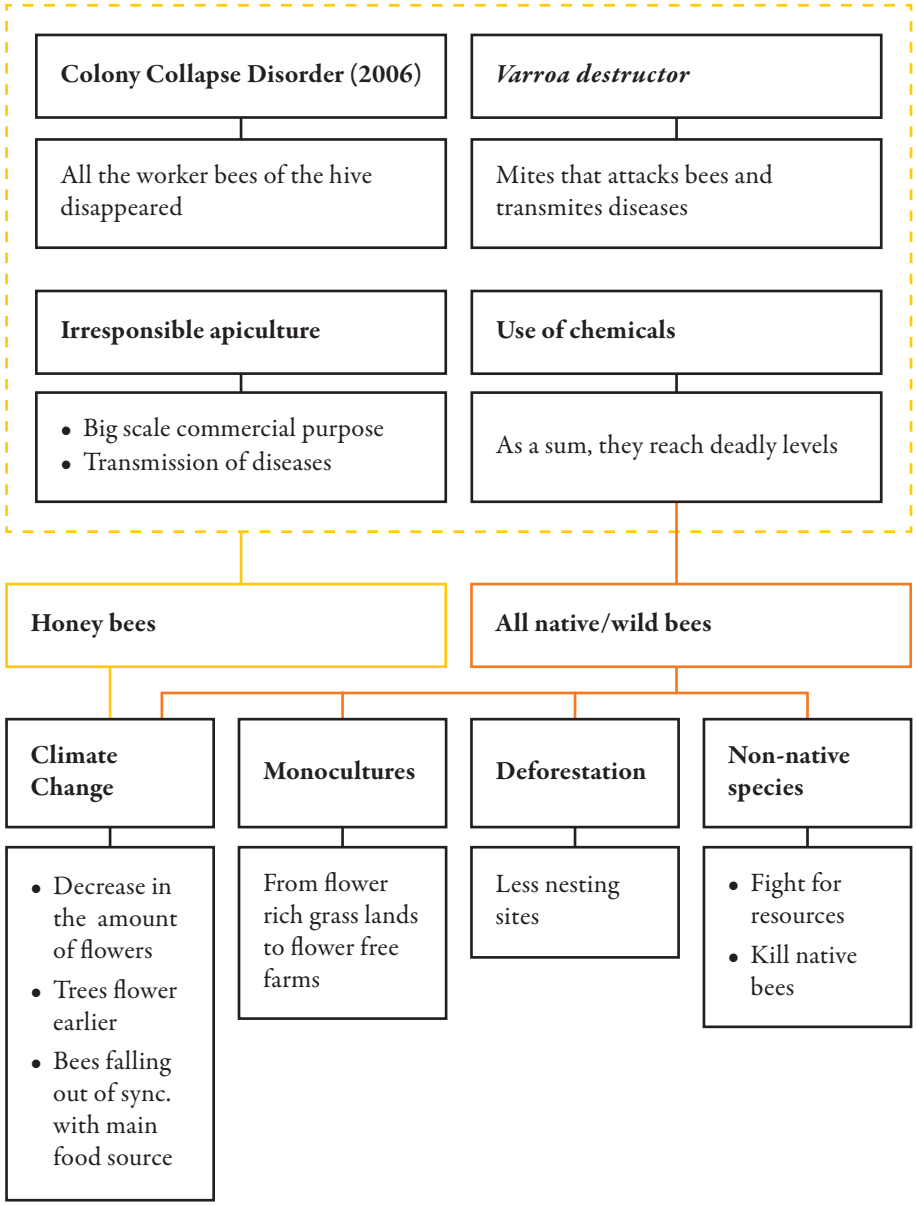
2.4 Declining Numbers

Bees are dying and, sadly, that is nothing new. The biggest challenge lies in the fact that scientists are still struggling to establish why. They are fighting the clock to find all the reasons that are part of this huge problem and how they interact with each other. During this investigation, I have been able to observe the urgency and passion with which they work and are continually publishing new findings in really short periods of time.

The most visible deaths are the ones corresponding to honey bees. Since they are domesticated, we are in close contact with them, It is obvious when they get sick, die, or mysteriously disappear (also, it doesn't hurt the fact that a multi-billion industry needs them to survive). However, this does not mean they are the only ones suffering, or the ones that need most of our help.

Figure 3 is a map with some of the problems bees are experimenting and reasons why they are dying in high numbers. It is important to note, that this is just a short summary. In reality, scientists, "(...) have identified at least 60 stress factors that may contribute to the phenomenon" (Ebersole, 2016, 56).

Figure 3 Why are they dying?



As can be seen, there is not a simple way to explain the decrease in bee populations. The problem is more like a "network of death," where all situations are interconnected. One is the result of another.

> "In many countries the populations of wild bees have been seriously reduced by human activity. Destruction of natural habitats supporting host flowers, destruction of nesting sites (most often in soil) by agriculture, roadways, etc., and overuse of insecticides, among other things, appear to be major factors adversely affecting wild bee populations" (Michener, 2000, 3).

For example, honey bees started disappearing from their hives in what is now known as "Colony Collapse Disorder" (CCD). There is no specific reason for CCD, but scientists believe that the use of chemicals like pesticides, insecticides, and fungicides have a lot to do with it.

Even if farmers use them in the suggested quantities, bees go to many different fields and get exposed to more kinds and volumes. "(...) Beekeepers need to consider not only pesticide regimens of the fields in which they are placing their bees, but also spray programs near those fields that may contribute to pesticide drift onto weeds" (Pettis et al., 2013).

Sadly, this means that not only honey bees get affected by these chemicals. While foraging, native/wild bees also get exposed to them. And not only by visiting weeds. Bees check many different flowers looking for the ones they are interested in.

Studies have shown that the sum of all these chemicals increases the susceptibility of bees to contract deseases. One of great importance is a gut pathogen called *Nosema ceranae* that has been proven to make colonies colapse (Pettis et al., 2013).

Many of the chemicals used are a consequence of the monoculture practices that are being applied to meet the increased demand for food production. Additionally, monoculture farms are the culprits of turning grasslands and fields full of variety and native plants, in the equivalent of a desert for a bee. "(...) We know for a fact that a big driver of the bumblebee decline has been the conversion of flower-rich grasslands to flower-free farm monocultures. Fragments of natural habitat that remain are often too small to support viable bee populations" (Goulson, 2015).

Changes in climate are also a key factor in the decrease of bee populations. Erratic climate patterns are making bees fall out of synchronization with the start of the blooming process. Nasa scientist Wayne Esaias explains:

> "Flowering plants and pollinators co-evolved. Pollination is the key event for a plant and for the pollinators in the year. That's where pollinators get their food, and that's what determines whether the plant will set fruit. Some species of pollinators have co-evolved with one species of plant, and the two species time their cycles to coincide, for example, insects maturing from larva to adult precisely when nectar flows begin" (Lindsey, 2007).

Abrupt changes in the weather during the first days of summer, kill many of the eggs that are laid in the outer parts of the hives. But, they don not affect the blooming cycle of trees. So, when the time for flowering comes, many of the bees are not ready to forage.

Another problem caused by climate change that has many ramifications is the increase in temperatures.

> "As temperatures rise, the southern limits of many North American and European bumblebee species' ranges are moving north — by as

> much as 300 kilometers in some cases, researchers report today (9 July) in *Science*. But the northern edges of the bees' ranges are staying in place, leading to an overall contraction of the insects' habitat" (Fessenden, 2015).

Bees, specially bumblebees are not only losing their habitats horizontally, but also vertically. When temperatures rise in mountainous regions, the problem is that the upper you go, the less surface you have. "Because surface area decreases as mountains taper off toward their peaks, this altitude-climbing effect has ultimately resulted in an estimated loss of millions of flowers" (Nuwer, 2015).

> Interestingly, a study that took place in Colorado, USA, showed how two native bumblebees are adapting to their new reality. Scientists found that "both of the species' tongues have declined in length over time, shrinking on average 0.61 percent each year. Cumulatively, the team found a nearly 25-percent decrease in tongue length between the bees collected decades ago and those living in the same region today.
>
> The scientists also found that the bees are visiting more species of flowers—including ones with shorter petal tubes—than they were in the past, and that they are covering greater ground while foraging."

As climate changes, the flowers that these bumblebees prefer are diminishing. This is causing the need for these bees to evolve to suit their new conditions. Proving once more that mother nature is wise.

2.5 Case Studies

2.5.1 Social Initiatives

City of Barcelona

Beekeeping patrol

In January 2016, the local government of the city of Barcelona started a project to protect its bees. It established an "Apiculture Patrol" that is available 24 hours throughout the year.

The function of this patrol is to control the swarms that occur within the urban space. In this way, new populations are prevented from installing in buildings or public space, as this can prove to be dangerous sometimes.

Expert beekeepers, are responsible for moving the swarms up to two apiaries that are located in a protected and secret area. Once in this place, the bees are kept in observation and an ecological treatment against the varroa is applied.

The conservation of bees is the only reason behind this project. Because of this, honey produced will not be marketed. Any surplus, will be kept as supplementary food in difficult times (Marchena, 2017).

It is important to note, that the local government also makes a huge effort to maintain sustainable and responsible green spaces. All the plants and trees selected are local varieties, that require less maintenance and are already used to the weather characteristics and sustain local fauna (Ajuntament Barcelona).

Bees Abroad

Empowering Zambian Women

Bees Abroad is a not-for-profit UK charity that aims "to provide education and technical advice in Beekeeping and suitable business skills. This is achieved by setting up and supporting field extension services, running training courses for local beekeepers and financing trainers" (Bees Abroad).

Their projects are intended to relieve poverty in developing countries. To manage this, all the initiatives they develop are planned to become self-funding. They don't want people to depend on donations to be able to sustain their lives.

An example of one of their projects is: **Empowering Zambian Women**.

A group of women with no prior beekeeping experience was encouraged to make a living with bee products. A small local NGO, was provided with seed capital to help educate and train them. Also, to start the construction of apiaries and eventually, get ready to sell honey.

A year into the project, the women were already running 32 beehives and ready to sell their first batch of honey (Bees Abroad, 2011).

2.5.2 Private Initiatives

Porsche

Porsche gives a home to 1.5 million bees in Leipzig

As part of an ongoing conservation effort, Porsche decided to place 25 bee colonies in their Leipzig plant's off-road area. This land is in a former military site bought by the company in 2000. Since then, they have made a huge effort to restore it to its natural state.

> "Specially established streams, wetlands and pasture areas created a natural habitat for numerous species of animals and plants. In addition to various types of flora and the newly introduced bees, the 99 hectares of grazing paddocks is home to countless species of birds, insects, frogs, hares and bats, as well as 27 wild horses and 75 aurochs" (Porsche, 2017).

The company plans to use the honey produced to supply its food services for employees. And there are even plans to sell it at its costumer center in Leipzig.

Grupo Puntacana Ecological Foundation

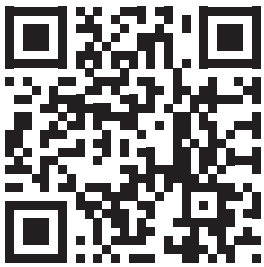
Beekeeping Project

> "The PUNTACANA Ecological Foundation is a not-for-profit foundation in the Dominican Republic. Our mission is to protect and restore the natural resources of the Punta Cana region and contribute to the sustainable development of the Dominican Republic. We do this in a variety of ways, most specifically in the implementation of pilot and experimental projects that can be replicated by businesses, individuals, and government" (Puntacana Ecological Foundation, 2008).

One of this projects, involves working with local beekeepers to produce high quality honey and other bee-related products. Puntacana Resort & Club offers luxury neighborhoods, and one of the services they provide, is handling beehives. Instead of destroying the hives, they have a professional team of apiculturists that offer assistance removing bee colonies from houses.

After a beehive is removed, it becomes part of the foundation's apiary and they offer the homeowners a liter of free honey. This way, the group has managed to transform a pest, into something positive for the community, and currently manages around 400 hives with the help of local beekeepers.

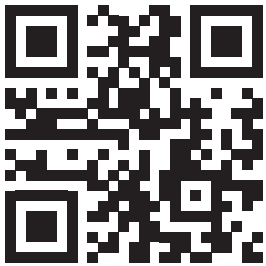
In 2016, for the third year in a row, Grupo Puntacana won Dominican Republic's National honey contest. "Once a month we carefully extract the honey from our colonies and bottle it for sale. We don't add any additives, chemicals, or colorants, our honey is 100% pure from the local forests of Punta Cana."



Barcelona

Zambia

Porsche



Puntacana

2.6 Important Findings

List of the important things I learned during my bibliographic research:

- I cannot tackle huge problems like the indiscriminate use of chemicals or monocultures.
- I have to be careful not to just green-wash the need to protect bees.
- It is necessary to include all kinds of bees in the solution. It cannot be a process that involves only honey bees. Specially if it wants to be applied in different parts of the world.
- Honey bees also pollinate wild flowers (they are native bees in Europe).
- Pesticides are not only present in fields. They disperse in all the environment.
- Wild native bees, do not only visit wild flowers. They enter crop fields looking for pollen and nectar, and get contaminated with chemicals.
- Wild flowers are the base of bee's food chain.
- Bees can thrive or suffer in both rural and urban environments. It depends on the circumstances.
- Maybe traditional bee hotels can be re-thought as wasp hotels.

“It’s said that for bees, the flower is the fountain of life, and for flowers bees are the messengers of love.”

(Dennis vanEngelsdorp, 2008)

03

CONCEPTU-ALIZATION

3.1 Bees and Services

As it was said before in the introduction, the decline in bee populations is a wicked problem, constructed by other wicked problems.

Considering this fact, my aim with this project is to design a sustainable service system that involves communities to achieve results together. Only by educating and training people, will it be posible to change bad practices and encourage conservation efforts.

Bees dying, is only a consequence of a lot of bad decision made by people through many years. Meaning only people con solve this problem.

But, in order to make a change and improve how we relate with bees, it is necessary to first understand the current network of interactions.

If we look at the service how it was originally intended (without any external intervention) bees can be understood as the service provider and flowers are their customers (Figure 4).

Some flowers need help to be able to reproduce. They need bees to transport their pollen into another flower so they can get fertilized. Or, they might just need a buzz to be able to self-fertilize. To repay bees for the help provided, flowers offer pollen (protein and fats) and nectar (carbs).

Figure 4 Basic pollination service

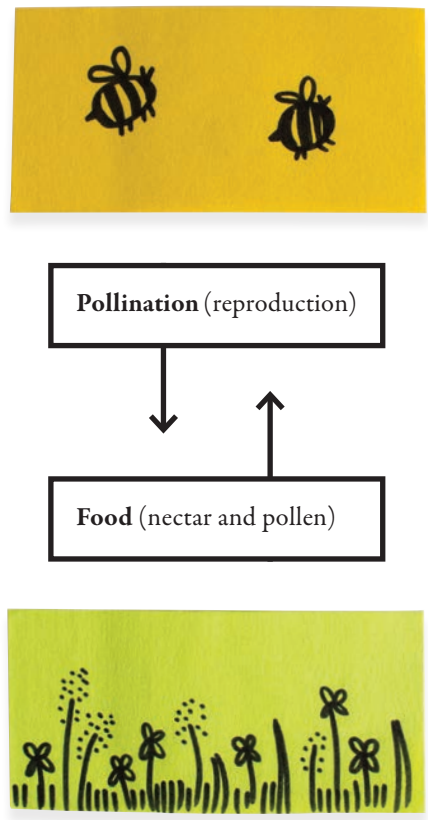
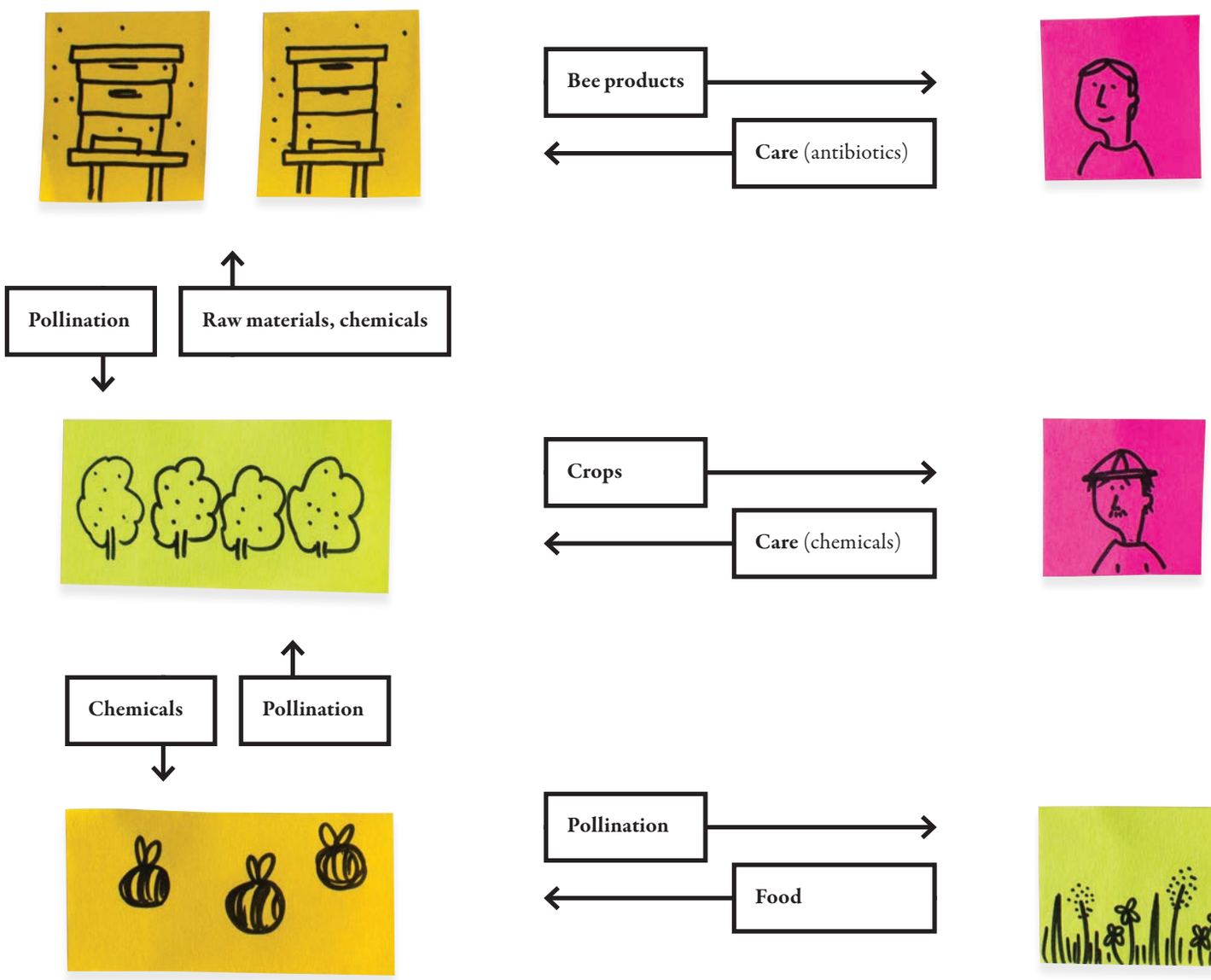


Figure 5 Current network of intercations between bees, plants, and people



If we take a step back to be able to look at a bigger picture, this basic pollination service is intertwined with other series of services. Agriculture and apiculture get thrown in the mix (Figure 5). The problem is that, with big scale practices, a new factor is introduced in the service: chemicals. They might be intended to help crops grow stronger, fight pests, avoid fungus from destroying leaves, or even trying to "help" bees' health. But we now know that, in the end they are just making things worse.

> Also, the basic pollination service is being hurt. "(...) technology and demand for increased food production meant that traditional agricultural practises were abandoned in favour of techniques which increased productivity but ultimately reduced the abundance of wildflowers in the countryside. Indeed, it has been estimated that we have lost 97% of our flower-rich grassland since the 1930s. As bees rely entirely upon flowers for food, it is unsurprising that their populations began to rapidly decline in most places (Bumblebee Conservation Trust).

If bumblebees, bees and other pollinators continue dying, it will be necessary to apply new pollination processes. This means that a free service, provided by Nature, will be exchanged for something that involves an economic transaction. In the end, this will be translated into an increase in the cost of food production and in food insecurity.

3.2 Looking for Solutions

"The health of honey bee colonies cannot be understood apart from the landscapes in which they live" (Sponsler et al., 2016, 1).

I decided that the best way to look for a solution for bees, was analyzing even a bigger picture.

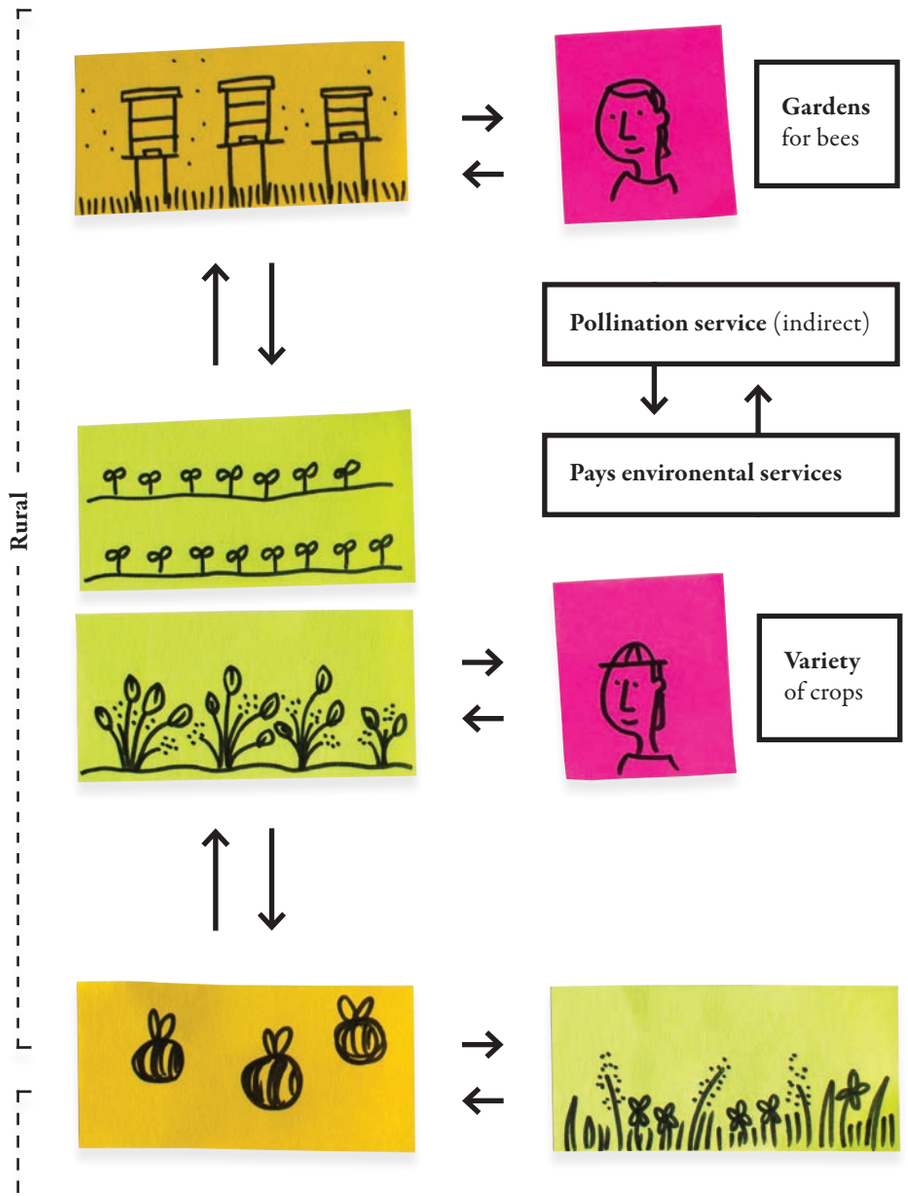
Bees don't live only in rural landscapes. "Understanding the suitability of different habitat types for honey bee foraging is of central importance in the task of improving honey bee health and productivity, and honey bee habitat utilization may also inform the conservation of other pollinator species" (Sponsler et al., 2016, 2).

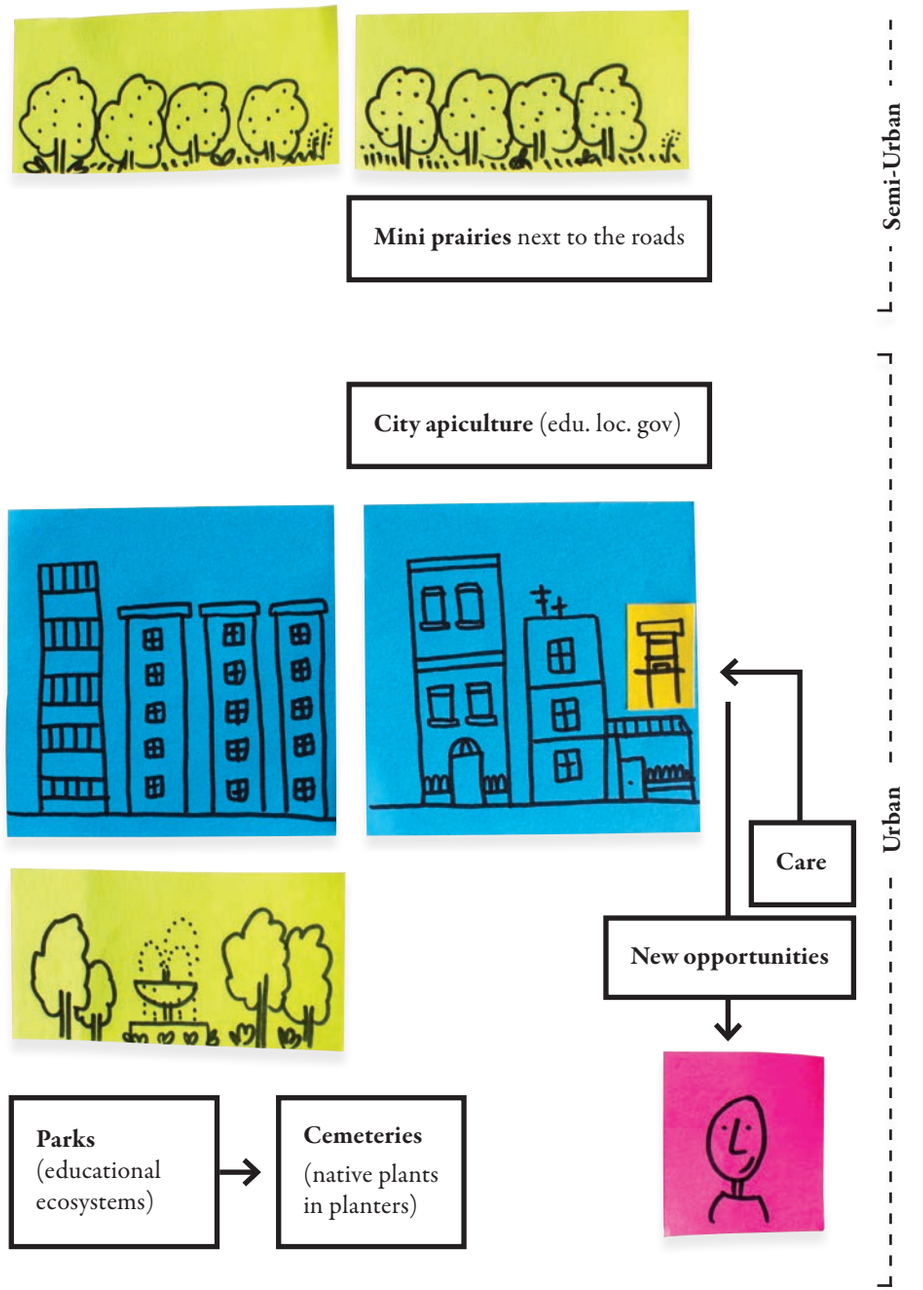
Martin and Krestin Jütter are urban bee keepers. In their opinion, with the current agricultural situation, the best place for bees is in the cities. In their backyard, they now have four different hives and have space for one more. During early spring, they move the hives to areas near their house so bees can have access to a bigger variety of resources without the need of competing for them.

Their intention for having bees is purely conservationist. They use hole-out tree trunks as the container for two of their hives. The others are allowed to grow freely inside the traditional woodenware for bees.

Figure 6 is an analysis of the rural, urban and semi-urban spaces and how they can provide resource options for bees.

Figure 6 Rural, urban, semi-urban spaces and bees





3.3 Key Aspects for Solution

- Bees need access to a variety of chemical-free bee-friendly flowers.
- Do not focus only in honey bees.
- Green urban spaces may be easier to modify as a starting point in contrast to huge plantations.
- Create micro ecosystems.
- Give new use to sub-utilize urban spaces.
- Education.
- **A lot of people are scared of bees**
- **Mix needs. Bees need the help of people that are willing to care for them. Many people need to find new opportunities to economically support their families.**

“It’s weird man. It’s like I’m turning into, not a crazy cat lady, but a crazy bee guy. I have the utmost respect for this six-legged insect.”

(Rob Keller)

04

DESIGN SOLUTION

4.1 Branding and Identity

4.1.1 The Concept

The idea behind Let's Bee is a non-for-profit organization that works with communities in order to save bees. The name was chosen with the intention of transmitting a sense of:

- Engagement
- Collaboration
- Active solutions
- Involvement of bees
- Encouragement

Vision

To bring people and bees together to support healthy, diverse and rich ecosystems.

Mision

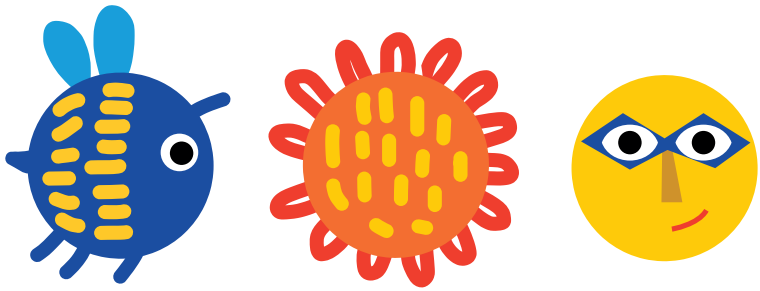
To be a sustainable organization that supports bee conservation by raising awareness about their current situation and educating communities to increase their understanding of the social, economic and environmental benefits of protecting bees and their habitats.

4.1.2 Initial Logo Proposals

The first proposals for the logo were leaning more towards the concept of the bee and the flower. Several illustrations were made by hand with different materials, until a geometric solution was obtained that fused both elements. However, this proposal was discarded since it simply conveyed a generic idea. It did not correspond to the specific needs of the organization.

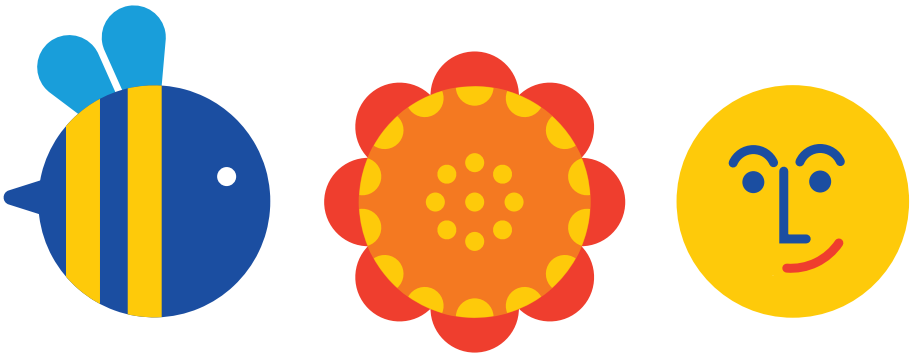
4.1.3 Logo Design

The final logo also came from a hand-made sketch. At first, I considered to mix digital and manual techniques by making an illustration on a tablet. But, in the end, the result was not the desired.



Despite this, the idea behind this design, did comprise all the needs of the organization. It put bees, flowers and people at the same level. All are represented from the same principle and have the same importance.

The order of the elements was also considered. The bee was placed first because it is the one who needs the most help from the organization. The flower was placed in the center of the composition because they are the link. It is through them that the bees and people are going to be able to help each other.



Let's Bee

4.1.4 Color Scheme

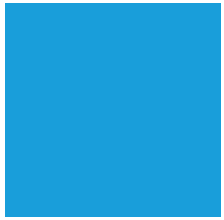
Primary color palette

CMYK
97/80/0/0

CMYK
0/90/90/0

CMYK
0/20/100/0

Secondary color palette



CMYK
74/21/0/0

CMYK
0/65/100/0

CMYK
20/45/100/0

4.2 The Service

The service is composed of three phases: short term, medium term and long term solutions.

4.2.1 Short Term

Funding for Planters

The project's first goal is to **set up planters with native plants in cemeteries (underused space)**. To achieve this, **Let's Bee** will contact local companies whose businesses are related to bees and raise the importance of strengthening bee populations in genetic numbers and diversity. This allows bees to better withstand problems and climate variability.

Companies can collaborate with economic incentives (social corporate responsibility). Also, social programs that involve employees can be developed (volunteering).

How to convince them?

The transition to a green economy brings social and environmental benefits. This can equally translate into economic benefits.

Youth Club

The project's second goal is to **involve the communities** starting with an ecosystem restoration club.

Young people will be responsible for taking care of the plants, as well as taking care of the little ones. Training is necessary so that they know the steps necessary to take care of the plants. It becomes a paid work opportunity during the summer. The parents of the smaller kids pay a fee for the care (similar to the system of the "park aunts" in Finland). Later on, during the winter, a space can be developed where young people interact with older people to learn more about ideal planting conditions, the best plants for the area in this way to compile knowledge through an inventory. This project also serves to strengthen social cohesion that is key to climate change. In case of an emergency, people know if someone in the community is in danger, lost or in need of assistance.

Young people learn to work for a common good, not just for individual gain. It offers a vulnerable population the opportunity for decent work and within the green economy. Jobs that carry a high level of personal pride, helping with the positive modification of the environment.

Re-branding of jobs that people are not interested in doing because they are considered outdated. Decent, paid work that focus on innovative options.

It is necessary to count with the help of the local universities to train the young people within biological and agronomic programs.

4.2.2 Medium Term

Create alliances with local universities to educate the teenagers involved with the program in beehive management.

This action becomes a long-term investment, as this population is going to be focusing on the direction of the STEM areas. It will also help to re-brand jobs that people are not interested in doing because they are considered outdated. Decent, paid work that focuses on innovative options.

4.2.3 Long Term

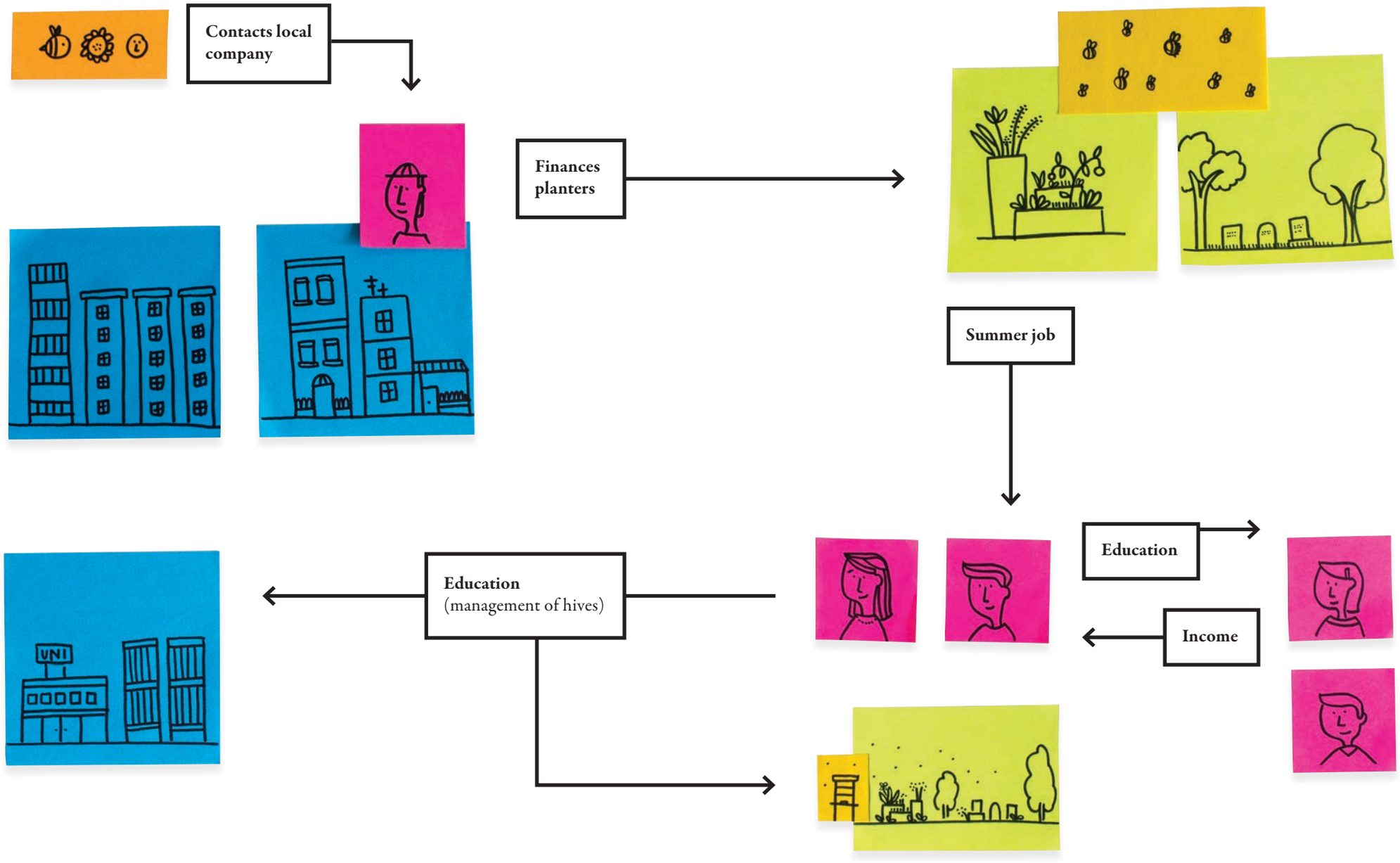
The project's third goal is to **certify entities**. The intention is to create a community certification process. Young people in the organization would be responsible for generating questionnaires, establishing environmental criteria and conducting monitors. Transparent, sustainable, standardized and independent certification, that does not depend on an economic payment.

Creation of an action plan to transition

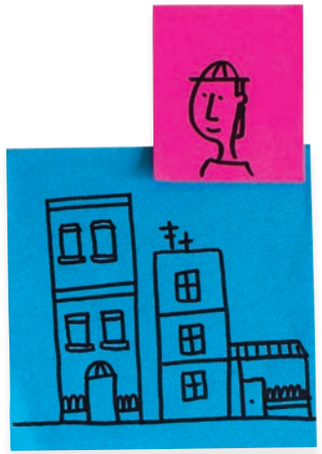
Small steps that are not only good for bees, but also for companies

1. "It is not necessary to make a huge change to have an impact" Companies can start improving the green spaces they already have and make them bee-friendly. Instead of areas covered with grass, plant bee friendly native plants.
2. Feasibility study of the company's spaces to design new bee-friendly areas. Observe and provide aesthetic solutions that work in the existing area.
3. Development of green roofs and walls of plants. These structures are a measure for reducing the use of energy resources.
4. Development of organic orchards that serve to feed the employees, in addition to the placement of hives. In Germany, after handling seven hives, local governments provide economic incentives (payment for environmental services).

4.2.4 The Service Map



Certification process



Contacts *Let's Bee*
(start certification process)

Community certification
(no economic payment)

1. Improve existing green spaces buy planting **bee-friendly flowers**

2. **Feasibility study** (design of new bee-friendly areas)

3. Development of **green roofs** and **walls of plants**

4. **Organic orchards** and **placement of hives** (payment for environmental services)

4.3 Planters

A very important element to start the implementation of this project are the planters. In theory, any pot can work. But, I wanted to be able to engage and educate people since the very start. Because of these I made two basic designs:

- Hexagon planter
- Ovoid planters

I chose these two options because honey bees and stingless bees contain their most precious and valuable thing in the world inside this shapes: their honey.

When considering the size, at the beginning I thought of making huge planters to contain as many plants as possible. However, they would be really difficult to build and even worse to transport. Here is when bees helped me again. I remembered that just one bee might seem insignificant, but when they all work together, they are capable of unbelievable things.

Because of this reason, I decided to make medium sized planters, that work together as a whole.

"I want to make you look at our world with new eyes; to persuade you to go out into your garden or a local park and get down on your hands and knees and *look*. There is so much to see."

(Dave Goulson,
A Buzz in the Meadow)

05
CONCLUSION

5.1 Conclusion

In conclusion, the decline in bee populations is generated by a large sum of circumstances. The problem is so big, that 10 years after the first honey bee hives collapsed, scientists are still discovering new reasons why it happens. A problem of this magnitud can only be solved if as many people as possible gets involved.

Let's Bee is an integral solution that creates a support system between communities and bees. The wellbeing of one, depends on the other.

The education of young people in areas related to conservation is primordial to solve this problem. As well as generating new green jobs that motivate people to develop in this field.

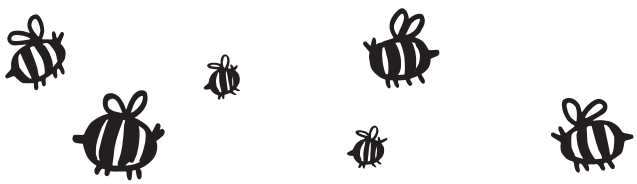
Furthermore, considering the fact that flowers are the only food source for bees, it is of extreme importance to garante they can access high quality resources. By using cemeteries as a staring point for the planter project: bees will be able to

find plenty of flowers at their disposition, a space that is sub-utilized most of the time, will be given a new function, and a bond between bees and the public will start to be created.

People that visit the cemetery, will be able to observe bees in their natural space; doing their jobs. This way, little by little, the public may start being less afraid of them.

Working with teenagers and kids is also a great way to dissipate fears. Since they are young, they will learn how important it is for the environment to have bees around, and will also know how to properly handle them.

Lastly, by creating a community certificate process, local businesses will get recognized and benefit from the fact of doing the right thing. Consumers acknowledge and reward this kind of efforts.



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5.3 Image Credits

Page 37. Inma Sainz de Baranda
Available from: http://www.lavanguardia.com/local/barcelona/20170107/413153376538/barcelona-lanza-un-sos-para-salvar-las-abejas.html [Accessed 20 June 2017]

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Page 41.
Available from: http://www.puntacana.org [Accessed 20 June 2017]

Declaration by Candidate

I hereby formally declare that the work submitted is entirely my own and does not involve any additional human assistance. I also confirm that it has not been submitted for credit before, neither as a whole nor in part and neither by myself nor by any other person.

All quotations and paraphrases but also information and ideas that have been taken from sources

used are cited appropriately with the corresponding bibliographical references provided. The same is true of all drawings, sketches, pictures and the like that appear in the text, as well as of all Internet resources used.

Violation of these terms will result in failure of the seminar and no credits will be awarded. I am aware that plagiarism is serious academic misconduct, which can lead to further sanctions on reoccurrence.

Laura Hidalgo Aguilar
22 June 2017

Let's Bee

A Social Initiative to Create Urban Bee Friendly Spaces