ACSF-Oxfam Rural Resilience Project

Case Study: Beekeepers in Tompkins County, New York, USA

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Introduction

This report explores the resilience of beekeeping in the Finger Lakes region of upstate New York, using the methods outlined in Oxfam's Conceptual Framework and Measurement Tools. The research that underpins the report has fostered discussions among beekeepers in this region of changing practices, as they question how well their traditional practices are working in a world that threatens the health of honeybees and the resilience of beekeeping as a hobby. The research also reveals, however, that some things never change: one participant mused, "It's as perennial as the grass. I think that every year, someone thinks, wow, keeping bees, I never thought of that -- that sounds so interesting."

There are no straightforward answers to complex questions: does beekeeping increase the resilience of the bees themselves, thus strengthening the ecosystems in which they live? Is it better for the bees to have a thousand beekeepers with two hives each or one beekeeper with two thousand? Some of these are questions for natural scientists. But there are also questions for social scientists: how can commercial beekeeping operators and hobbyists work together to promote the resilience of bees and beekeeping? What sorts of organizations and governance best support practices such as beekeeping? The research also raises questions about the nature of resilience: this report is unlike the others in this Oxfam series, insofar as it covers only a very small slice of social, ecological, economic, and cultural life in a given geographic area, rather than seeking to understand the resilience of the whole system in that area. But narrowing the research focus to this narrow topic still requires an understanding of the broader system: the degree to which local agriculture supports or depends on pollinators, the presence or absence of broad political support for regulation and inspection, the local culture that values local food and local businesses more...
generally, the local economic and educational landscape that furnishes individuals with the time and money to take up beekeeping, and of course outside forces that structure the cost of beekeeping and the value of goods and services derived from it, rules and regulations around bee genetics, regional agricultural patterns, and even the changing climate. Beekeeping thus emerges as a system within other nested systems, all of which affect the practice in some way. Of course, resilience more conventionally understood (as a measure of whole communities’ livelihoods and their sustainability – generally with a particular emphasis on their dependence on the land) is also very interconnected: global market forces, national elections, demographic patterns, etc. all structure to greater and lesser degrees the ‘resilience’ of particular communities. This report focuses on what is happening within the geographic area in question (Tompkins County and the Finger Lakes area more broadly), but these outside forces should nonetheless be evident to readers, in spite of or perhaps because a specific strand has been isolated for examination.

The threats facing beekeeping in the Finger Lakes area are manifold: a rise in introduced pests and diseases, a decline in formal/state support, commercial beekeeping practices that appear to be stressing honeybees, and changing landscapes that affect honeybee habitat, to name a few. At a community meeting, participants joked that they should be talking about perseverance rather than resilience, because hive losses have become so high, thanks to an uptick in summer problems (swarms, pests, etc) and winter deadouts (dead hives). One participant claimed that the “old model” does not work anymore, just like “we can’t farm like Dad did”.

To begin to manage these changes, participants described experimenting with a new strategy, at the individual level, that requires managing failure by anticipating and preparing for high numbers of lost hives. More broadly, one interviewee philosophized, “it’s better that a thousand beekeepers have two hives than one beekeeper have two thousand”. In other words, it is important to spread the risk around, through a diversity of beekeeping practices, in a diversity of locations. Many both rely on and support the local beekeeping club, which provides information and practical experience. Indeed, in the report below, civic capacity merits several pages, because of this very active club (although the role of that club might easily be filed under social learning). Each of the key sets of resources outlined in Oxfam’s Conceptual Framework and Measurement Tools is abundant, except governance, whose relative absence undoubtedly weakens the overall resilience of beekeeping in some ways, but may also indirectly support it.

I will begin with an overview of beekeeping and its requirements, followed by information about the resources for resilience and finally observations from individuals interviewed and the community meeting.

**Sector profile**

**Beekeeping**

1 For most reports in this Oxfam series, this is a “community profile,” but because of the unique nature of this study, a profile of the practice of beekeeping seems more appropriate.
Humans have been keeping honeybees for thousands of years. While some technical advances have been made in recent centuries, the bees’ needs, of course, have not dramatically changed. Bees require food in the form of pollen and nectar (which they convert into honey), which they gather themselves. One hive may be able to spare a few gallons of honey once or twice a year, for the beekeeper, although that depends on the bees’ health and their stores. When the honey is removed, the hives’ food stores may need to be replenished to allow the bees to survive the winter, usually with sugar syrup or other honey substitutes. Bees may fly several miles away from the hive to find pollen and nectar, so bee habitat must have varied flora, with flowers in bloom during every season but winter. Honeybees are very adaptable and can thrive all over the US, except a few inhospitable desert regions. They can fare well in urban areas, too: since New York City lifted its ban in 2010, hundreds of hives have been registered there. Finally, bees require shelter, which beekeepers provide in the form of a hive (in this report, the word ‘hive’ refers both to the boxes that house the bees and the colony itself, or the living organism of several thousand bees that live together in that hive, all offspring of the same queen). Hives can be placed nearly anywhere and can be moved around easily. Many commercial operators with pollination businesses move hives around in trucks, but even small-scale beekeepers might move beehives to a warmer climate over the winter.

Bees also require monitoring, although the frequency depends on how the beekeeper is managing his/her hives (for honey production, for pollination, for recreation, etc.). Monitoring allows a beekeeper to be sure that a hive’s queen is healthy and laying eggs, that the bees are collecting food and making honey, and that the bees have not succumbed to any disease (foulbrood, nosema, etc.) or pests (Varroa mites, small hive beetles, mice, etc.) to which they are susceptible. Some diseases and pests are fatal if left unchecked; others can be tolerated over a long period of time if they are kept at a low level. Hobbyists’ primary concern in the Finger Lakes area is the apparently worsening rate of winter losses, exacerbated by these diseases and pests. Bees do not forage in the winter, but rather consume the honey that they have made that year. They need to be kept dry and protected from weather and pests. National survival rates have been dropping: one national survey estimates that 30% of managed beehives in the US did not survive the winter of 2012-13, similar to the last five years but higher than the roughly 15% average in prior decades (vanEngelsdorp et al., 2013). This will be further discussed below. Much has been written about colony collapse disorder (CCD), a broad term referring to the disappearance of honeybees from hives. A cocktail of factors are blamed for CCD: the diseases and pests referred to above, changing beekeeping practices, certain classes of pesticides, loss of habitat, and many others. CCD is discussed briefly in this report, given that the widespread awareness of the problem fed several participants’ motivations for taking up beekeeping. But it is only one of many threats to the resilience of hobby
beekeeping in the Finger Lakes area, in spite of its hold on the popular imagination. The President of the local beekeeping club described below has called it a “big boys' problem,” for large-scale commercial beekeepers, and not local hobbyists. Commercial beekeeping operations can range in size from a dozen hives to thousands and sell a variety of bee products (honey, wax, pollen, propolis, etc.) and bee services (pollination). For the major pollination operations, migratory beekeepers move their hives every few weeks or months, so that one hive might pollinate California almonds in February, Washington apples in March, and Maine blueberries in May. Commercial pollination in the US has become a several billion-dollar industry. This study focuses on the hobbyist, stationary beekeepers in the Finger Lakes area, largely because of problems of access to large-scale commercial operators, although several participants have experience in these bigger operations. The interplay between hobbyists and commercial beekeepers is interesting and important and will be briefly explored below. It bears noting also that honeybees are not the only pollinators in the United States; a range of other insects such as moths, wasps, and bumblebees also do the job, but honeybees are the only insects managed at a significant scale for commercial crops that depend on pollination.

To provide for these needs of managed honeybees, a beekeeper needs the hives described above and a small amount of equipment to conduct inspections: a smoker to sedate the bees, protection from stings such as a veil or gloves, and tools to open up the hives, plus a few items for feeding bees, extracting honey, and pest management (such as mouse guards or chemical strips to combat mites, etc.). These all depending on the hives' needs and the beekeeper’s preferred management style and goals. An individual beekeeper can manage anywhere from one individual hive to dozens, although for greater numbers of hives, help may be necessary, depending on the management style and goals. Beginners usually start by reading a few books (and increasingly, watching a few YouTube videos). In the winter, many beekeeping clubs host workshops where beginners can learn the basics.

Beekeepers in Tompkins County and the Finger Lakes region

Tompkins County has had a long and distinguished history of beekeeping, revolving around Cornell University’s longstanding apiculture research program and commercial beekeeping in the 19th century. In 1908, a contributor to the magazine Gleanings in Bee Culture recalled meeting a man from a small town near Ithaca, NY, who was “probably the most extensive bee-keeper in the United States” (Root, 1908). Other local beekeepers from the late 19th century who have had a lasting impact on the practice include the designer of the nearly universally used bee smoker, a pioneer in queen rearing, and one enormously successful

Figure 2: Tompkins County beekeepers, 1897. Photo taken by Ernest Root.
businessman who reportedly sold over 100,000 pounds of comb honey in a single year (Borst, 2013). Some of the members of the local beekeeping club today are descendants of these 19th century innovators.

Today, individuals who keep bees on a commercial or hobby basis, however, are far from a representative subset of Tompkins County, but demographic statistics on this very small subset of the population are not available. Broadly speaking, Tompkins County and the Finger Lakes area more broadly is a rural, agricultural area, with a few scattered small towns and the City of Ithaca (population 30,000). Tompkins County boasts a very high level of education: nearly half of its 100,000 residents have a bachelor's degree and the majority of those have a graduate or professional degree, due to the presence of several colleges and universities. Employment figures reflect these investments: about 80% of jobs are white-collar work, and unemployment has long been very low. Residents’ median household income is about $44,000 (excluding students), which much higher than nearby rural counties (Tompkins County CHA 2005). Participants were not asked explicitly about their wealth and income or educational background, but those local beekeepers who agreed to be interviewed seemed to be a white landowner, older and less transient than the student and young professional population of Ithaca and the surrounding area. While anyone with a bit of time, resources (start-up cash or access to used equipment), and access to information can keep bees, taking up hobbyist beekeeping in this area seems to be predicated in part on these high levels of educational investment and wealth -- but this is an open question. In spite of the apparent surge of interest in keeping bees and the widespread concern about colony collapse disorder, it is not clear whether the number of beekeepers is actually increasing, here or across the US. Nor is it clear if these interventions (by individuals taking up beekeeping) are having an impact on the overall health of bees.

Resources

Five key sets of resources

Natural resources

The Finger Lakes area has a climate and landscape very well suited for beekeeping, although honeybees thrive across many latitudes. The biggest challenge is the long, cold winters: the first average fall frost is in early October and the last is in May. Bees are able to survive the cold, and plenty survive well north of the Finger Lakes, but their mobility and therefore their ability to produce food is limited in colder weather. They are consequently at risk of starvation in late winter and early spring, if not managed properly. Beehives are generally healthiest when they are observed closely, with more hands-on management. But they can also be left alone for weeks (in the summer) or months (in the winter), so proximity to hives is not a first-order concern for hobbyists; that is, a beekeeper can live in one place and set up his/her hive in another.
The county is about half rural and half urban. Beehives themselves need very little space – just a few square feet is sufficient. But the colony is dependent on several square miles of flora, so it is important that they not be entirely surrounded by a monoculture that only blooms for a few weeks each year, urban or industrial areas with absolutely no greenery, or, debatably, agricultural areas that are heavily sprayed with pesticides. All of these must be considered with a caveat: hives can be put near monocultures as long as they are moved when the bloom (say, the flowering of the apple trees) is over. Similarly, scientists are still working to establish the effects of pesticides and insecticides on honeybee behavior, although many would argue that the indirect or cumulative effects (such as a slow build-up of toxins in honeycomb) are just as important as direct and immediate effects (such as poisoning or interference with bee-to-bee communication), and those indirect effects are much harder to test in the controlled conditions of experimental science.

But good bee habitat is not sufficient by itself; the question of beekeepers’ access to that habitat is important. For a hobbyist without land of his/her own, it is not uncommon to informally “lease” a small patch of land from a landowner; many gardeners and farmers welcome hives because of the increased pollination in proximity to those hives. Everyone interviewed had had a positive experience in accessing land/bee habitat; one interviewee observed:

The biggest difference between California and here is I used to have the hardest time finding places to put bees when I was there. Here, everyone wants bees... of course, in the suburbs, most people, all they can think of is bees in their swimming pool. They don’t want bees. But here, everyone seems to want bees. I’ve found it extremely easy to find places to put bees. That’s one of the plusses for Tompkins County... everyone that I met had a favorable attitude towards bees. They understood that bees are part of country living, whereas if you’re in the suburbs, or ag areas, there’s some conflicts.

There is an interest in the Finger Lakes and Tompkins County more specifically in farmers markets and local food, which would seem to support directly and indirectly the practice of small-scale beekeeping. So, in spite of the relative powerlessness of beekeepers to prevent any number of other practices or changes that detract from the quality of bee habitat (e.g., spraying crops, building new housing developments), there are still an abundance of options for most beekeepers that make natural resources in this area a source of strength and resilience.

One very big unknown is the future effects of climate change – on the weather, the local flora that provide bees with pollen and nectar, the local fauna such as native bees and other pollinators, a range of pests, and a number of other ecological factors. Beekeepers are largely unable to do anything other than speculate about what a changed climate may bring. They are, however, keen watchers of weather and climate trends: beekeepers interviewed often exchanged such information, for example, through emails comparing average monthly temperatures to historical trends.

**Governance**

Broad questions around governance and the degree to which Tompkins County residents participate and are represented in government provide a context for beekeeping.
Local government is representative at the municipal and county levels, in line with the rest of New York State. Citizens have the right to vote for elected officials, petition the government, attend public meetings, protest, and otherwise seek to influence the make-up and mandate of the government. Such activities are naturally made easier by education, wealth, time, and social status, but not having such advantages does not preclude citizens’ rights to engage. Connections, however, to regional and national level governance, however, are quite limited; the right to vote and protest exist, but meaningful change increasingly requires vast amounts of money.

Formal governance of beekeeping in New York, particularly for hobbyists, is very limited, and the few laws are loosely enforced. For example, the ban on beekeeping in Ithaca (population 30,000) is observed largely in the breach: the single most common zip code for apiaries in a local beekeepers’ survey in early 2013 was 14850, or the City of Ithaca. Registering hives with the state is optional, and few beekeepers do so. Statewide oversight has been diminished since a general apiary inspection program for monitoring a particularly nasty and contagious bee disease (foulbrood) was discontinued in 2010. In some ways, however, the limited governance has supported small-scale beekeeping: the production and sale of honey is largely unregulated, particularly for farmgate sales, which has allowed a thriving cottage industry across the state and indeed the US more broadly.

Other important mechanisms of governance are institutions described in other sections: Cornell’s long history of research and development plays a role in governance, but that will be discussed under Social learning. Similarly, the Finger Lakes Beekeeping Club is an important institution that supports hundreds of hobbyist and commercial beekeepers in the area, but it will be discussed in the next section.

**Civic capacity**

Far and away, the most important institution of civic capacity is the Finger Lakes Beekeeping Club (FLBC). It is of course an important resource for social learning as well, but will be discussed in this section because of its tightly networked membership and outreach services for non-members. Its members come from a geographic range well beyond the county. Respondents to a 2013 survey on beekeeping provided information on where their hives are (not their personal addresses), plotted by zip code on the map to the right (one apiary is significantly off the map, in NC, and not included here). It is a key feature of the resilience of beekeeping in Tompkins County and the surrounding area.
The FLBC is a not-for-profit organization with elected volunteer officers (President, VP, treasurer, secretary, and publicity) whose purpose is education and the “promotion of beekeeping”. In November of 2013, 88 members had paid dues for 2013 or 2014, with several dozen more who had not yet renewed their membership. Members cite its support for its members through a range of activities: educational demonstrations, troubleshooting, conducting surveys, collective buying, and sharing expensive equipment, as well as services for the broader community. Sharon Astyk has suggested that organizations focused on community building should adopt the model of churches – not the religious components, but their welcoming structures, where there are low barriers to entry and something to offer participants immediately (2008). The FLBC does this very successfully: it provides immediate support for new members or even outsiders while remaining a closely connected network. It is centralized enough to maintain an effective structure and division of labor, but decentralized and flexible in drawing from members’ expertise and other engagements. It takes advantage of appropriate technologies (the email listserv is described below), but also emphasizes hands-on experience and the social nature of learning. Without a survey to determine who joins and why (or why not), it nonetheless seems that the club provides a certain kind of hands-on and collective support that members find both useful and enjoyable. One interviewee guessed, however, that clubs such as the FLBC do not attract more than a third of local beekeepers, and indeed, the make-up of members is always changing, with a longer-term core group and other members coming in and out as they have questions and other needs. The President of the FLBC remarked, in our interview, that the club is not for everyone: some people have “been there, done that” and others do not have time.

With members’ $10 annual dues, and profits from the honey from the club hives (described below), the FLBC had nearly $3000 saved up at the end of 2013. The money goes towards speakers, equipment, and other small expenses. General meetings are once a month: in the summer, they are held on the grounds of a nearby environmental organization that hosts the club hives (the Cayuga Nature Center). These are beehives that the club collectively takes care of. There were eight hives in 2013, but the number fluctuates from year to year, depending on the honeybees’ health. The summer meetings provide the occasion for collective inspections where new beekeepers can learn from more seasoned ones through demonstrations of inspection techniques, pest management, and troubleshooting. Several dozen members are usually present. In the winter, the group meets at the Cornell Cooperative Extension headquarters, but still organizes hands-on demonstrations on a range of topics such as making mead, planting a pollinator flower garden, or making soap and other toiletries. Once a year, there is an extended workshop for beginners and advanced beekeepers alike. The FLBC is currently in the initial stages of
planning for a more formal mentoring program that will pair novices with beekeepers who have at least three years of experience, drawing on Cornell Cooperative Extension for support with mentoring techniques.

The FLBC email listserv is also a resource in its own right that often doubles as a platform for ongoing debates about science and philosophy. To date in 2013, the FLBC listserv exchanged an average of over six emails a day, with nearly 2000 messages between January and October, going to the over 200 names on the email list. Many participants in this study pointed to the listserv as the number one resource for beekeepers in this area. The information shared is varied, including popular and scientific articles, advice on beekeeping practices and inspections, technical information on diseases and treatments (e.g., an announcement of an outbreak of disease in some parts of New York this summer), links to photos and videos, historical curiosities, information on honey sales and licensing, and weather statistics.

This constant conversation also supports activities and exchanges outside of the virtual world: the listserv includes invitations to work parties at the club hives and workshops (e.g., one on natural beekeeping held by a neighboring club, the Southern Tier Beekeepers), notices about academic and industry conferences, plans for sharing equipment, coordination for picking up bees from nearby apiaries, solicitations for donations of time/talent/money for supporting the club, and inquiries about general interest in setting up a meeting with a city official, to discuss permitting beekeeping within Ithaca city limits. The club’s internal activities are matched by its outreach. The listserv asks members to pitch in visiting classrooms in the Ithaca area, speaking to journalists, and mentoring for the Future Farmers of America. One member is starting a new called Speaking for the Bees on a local radio station. There are also nearly weekly requests from non-members in the summer, for help removing swarms from their yards. The club members are usually happy to get free bees from docile swarms out in the open; these swarms are bees that are looking for a new home. Take-out services, where an established colony is taken out of the walls of a house or barn, cost money.

Finally, the emails serve as a platform for philosophizing and debates about science, methods of beekeeping (e.g., chemical-free treatments), etc. One of these exchanges is worth quoting at length, for its relevance to the question of resilience:

Although it seems like the deck is stacked against beekeepers not only in this area, but in the whole US, given the incidence of new diseases/parasites/miscellaneous hurdles, I am confident. My confidence comes even in the knowledge that the federal, state, and local governments have all passed the buck regarding bee yard inspections, pest monitoring, financial support for apiary losses, etc. I am confident because of the support structure groups like the FLBC provide, because of the countless questions I have had answered by people with decades of experience. It is unfortunate that the research is largely falling to the wayside for lack of funds. But, with the devoted group we have and the many others like it that remain in this country, in spite of all the hurdles, I believe the bees have a shot. By bringing in new genetics and new methods/opinions and spreading them across many square miles, we are doing what we can to ensure the survival and hopefully the resurgence of the European honeybee (FLBC member, 2013).

This relative lack of governance and formal support, including research funded by public dollars, surfaced repeatedly throughout the research. At the present moment, this lack/loss seems to be matched by extensive marshaling of private and volunteer resources.
The decline in research is linked to the upcoming retirement of Cornell’s professor of apiculture, the last apicultural university research & extension position in the Northeast, and a position that Cornell has had filled for nearly 100 years. The Department of Entomology, as well as the College of Agricultural and Life Sciences, where it is situated, is considering whether or not to replace the position. The President of the FLBC has called on members to write letters to the department chair and the dean of the college, to request that the position be filled and that the Cornell Dyce Laboratory for Honeybee Studies and its beekeeping classes continue. This research is discussed below under Social Learning.

Aside from the FLBC, several other organizations in the area directly support beekeeping, both in terms of public awareness and practice, most notably Cornell Cooperative Extension of Tompkins County (CCE), the National Future Farmers of America Organization (FFA), and the farmers market (discussed under Economic resources). CCE supports the master beekeeping program at Cornell, described below, and provides space for the FLBC meetings in the winter. FFA is actively encouraging students to consider beekeeping as part of their agricultural experience projects and providing grants to youth to support those projects. Other organizations are indirectly involved, such as the Cayuga Nature Center, who hosts the FLBC club hives.

The FLBC is a very active and visible group, in part because of the legacy of beekeeping in Tompkins County and the scientific research conducted by Cornell. There is, however, an association for nearly every county or region in the US, which together make up a network of resources and support for beginners and more seasoned hobbyist beekeepers across the country. Across the western half of New York state, there is the Southern Tier Beekeepers Association, the Mid York Beekeepers Association, the Ontario-Finger Lakes Beekeepers Association, the Steuben County Honey Bee Association, the Syracuse Area Beekeepers Club, and the Western New York Honey Producers Association. These are organized by volunteers and largely cater to hobbyists; anyone is welcome. Bigger-scale commercial beekeepers are linked up separately. Those linkages are fostered in part by the statewide Empire State Honey Producers Association (ESPHA). At a larger scale than the hobbyist groups, ESHPA has been supporting the business end of beekeeping since 1868, including marketing honey and other bee products, and lobbying state and federal agencies on issues of concern, such as trade laws. The FLBC and these groups are linked only informally, but they do exchange information about news and events.

Economic resources

In 2012, New York State had an estimated 45,000 hives, with the tenth-highest honey production in the US. Pollination services (where farmers pay for hives to be brought to their fields, to help pollinate their crops and increase yields) contribute 300 million dollars to New York State’s agricultural income (Empire State Honey Producers Association, 2013). These figures, of course, are only the backdrop for Tompkins County beekeepers, as they describe much bigger commercial operations than the hobbyists in the area, notwithstanding a thriving cottage industry. But honeybees and their products and services are increasingly valued, quantitatively and qualitatively.

An important economic factor is that the individuals who keep bees as a hobby of course have the money and time to do so. Purchasing a hive and related equipment costs
several hundred dollars. The President of the FLBC advised one beginner, “A hive and bees to fill it will run you about $200-$250 per hive. This does not include any other beekeeping equipment, and this does NOT budget in... the hive equipment that you’ll use for generating honey. I think I spent about $1,000 my first year for three hives, bees, and equipment.” While used equipment is occasionally offered for sale, and swarms of bees can be captured, beginner beekeepers may not know how to take advantage of these resources.

In a 2012 survey of the FLBC, about a third of the 71 respondents described themselves as small-scale beekeepers who are making money from their hives. Indeed, roughly half of the participants who were interviewed or participated in the community meeting make or have made money in the past from their beekeeping enterprises. A range of products can be sold more or less straight from the hive (honey in different forms, pollen, propolis, and beeswax), or in value-added products (soap, lip balm, cream, candles, mead, even little carpenter bee houses). One mid-sized commercial operation is at the busy Ithaca farmers’ market, twice a week, nine months a year. Some beekeepers also sell take-out services, removing honeybee colonies that take up residences in the walls of houses; their names are listed for the public on the FLBC website. Among the beekeepers themselves, small-scale beekeepers can sell packages of bees, individual queens, and handmade equipment such as hives and woodenware. For most local beekeepers, however, these items are purchased from larger, out-of-state enterprises.

Social learning

If the resilience of beekeeping depends on the networks and resources that make up social learning, then its future is assured in Tompkins County. The FLBC has already been described at length under Civic capacity; it is difficult to categorize as either an institution of social learning or of civil capacity, since it of course is both. Knowledge in the form of advice, articles, events, experience, and even tall tales, is widely shared, in person and over email – although one interviewee complained, “There’s too much information... You talk about winterizing a hive -- get people started on that! -- everybody's got an opinion.”

Cornell provides an invaluable source of resources, ranging from cutting-edge scientific and technical research on genetics and disease, to master beekeeping workshops for novices. Indeed, Cornell’s master beekeeper program offers workshops for a range of levels several times a year, although this program is imperiled by the retirement of the professor of apiculture, described above. Indeed, no workshops were held in 2013. Cornell’s beekeeping library is also a valuable resource. At nearly 100 years old, the Everett F. Phillips’ Beekeeping Collection is one of the biggest apiculture libraries in the world. A growing number of the classic works are being digitalized, in an online collection called The Hive and the Honeybee. Finally, two labs at Cornell conduct research on honeybees: the Dyce Laboratory opened in 1968 under the direction of a famous American beekeeper, Roger Morse, and works on a range of projects, from evaluating commercial beekeeping products to large-scale studies on pollination and agriculture. The Danforth Lab studies bee phylogeny and genetics, as well as the population of other pollinator bees in New York. Such research does not directly impact hobbyists in the area, or at least will not for several years. But the research addresses new pests (described below), seeking advancements in pest and disease treatments.
## Rural resilience capabilities community assessment matrix

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Governance</th>
<th>Civic Capacity</th>
<th>Natural Resources</th>
<th>Economic Resources</th>
<th>Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Governance</strong></td>
<td>Limited: minimal oversight of beekeeping by the state. There are some restrictions, e.g. in Ithaca city limits. FLBC members are pushing Ithaca government to allow beekeeping in city limits.</td>
<td>It is not clear how natural resources for beekeeping affect local and state governance.</td>
<td>More funds are going to private research than public support: a state inspection program has been cut.</td>
<td>R&amp;D at Cornell (rather than learning by hobbyists) affects governance at the state level.</td>
<td></td>
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<tr>
<td><strong>Civic Capacity</strong></td>
<td>Civic capacity and social support networks are strong, arguably because of limited governance and formal support networks. High: FLBC members generally are highly educated and closely networked.</td>
<td>It is not clear how natural resources for beekeeping affect civic capacity of beekeepers, other than fostering general success.</td>
<td>Abundant resources (wealth and education) underpin high civic capacity among beekeepers.</td>
<td>Beekeepers with information and experience are key to strong support networks.</td>
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<tr>
<td><strong>Natural Resources</strong></td>
<td>Many beekeepers fear that industrial agriculture is not adequately regulated, with consequences for their bees. Beekeepers have the interest and ability to maintain (directly and indirectly) good bee habitat, although they may be severely affected by climate change. Abundant: the greatest challenge for beekeepers in Tompkins County specifically is the harsh winter, plus pests and diseases affecting most bees in the US.</td>
<td>Good bee habitat lends itself to ample production of honey and other bee byproducts, for hobbyists, sideliners, and commercial beekeepers alike.</td>
<td>Tompkins County’s good bee habitat is partially attributable to financial support for its rural character, e.g., land trusts.</td>
<td>Widely available research and experience inform land management practices for healthy bee populations.</td>
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<td><strong>Economic Resources</strong></td>
<td>With a lack of oversight by the state, projects are largely supported by volunteers or private funds. Conversely, few restrictions on honey sales allow a flourishing cottage industry. The FLBC’s strength and high civic capacity overall of local beekeepers help them appeal for economic resources from Cornell and the state. Relationships to other groups, e.g., Cayuga Nature Center, support beekeeping.</td>
<td>Good bee habitat lends itself to ample production of honey and other bee byproducts, for hobbyists, sideliners, and commercial beekeepers alike.</td>
<td>High: most FLBC members have leisure time and disposable income. Commercial beekeepers are more vulnerable.</td>
<td>The collective knowledge of hobbyists plus the research at Cornell lend weight to appeals for economic resources.</td>
<td></td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td>The end of the state inspection program limited the sharing of information and the prevention of disease. The FLBC’s twin pillars are civic capacity and learning. Some members are pushing Cornell to replace its apiculture professor. Good bee habitat enables experimentation with a range of new methods and techniques. Cornell’s apiculture professor is retiring; given funding limits, it is unclear if/how he will be replaced.</td>
<td></td>
<td>Abundant: there are many sources and types of information available (books, websites, expert advice, etc).</td>
<td></td>
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</table>
Community meeting (participatory assessment process)

The community meeting was held after an FLBC meeting in October 2013 at the Cornell Cooperative Extension Tompkins County headquarters. The meeting was composed of a small and shifting group (with people joining and leaving throughout the hour-long discussion). This make-up made it hard to run separate small group discussions, and it is possible that some members of the group were discouraged from participating, but quieter participants were drawn in with questions directed specifically to them. In spite of the old beekeeping saying (“Two beekeepers, three opinions”) several themes clearly emerged from the discussion. Without a perfect consensus, there was nonetheless a lot of apparent agreement within the group.

Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Sex</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>M</td>
<td>Tom runs an apiary called Sky Barn Bees. He is putting together a program for the local public radio station, to be called Speaking for the Bees.</td>
</tr>
<tr>
<td>Hilary</td>
<td>F</td>
<td>Hilary runs a business named after her daughter that sells honey, soaps, and other products in stores in the Ithaca area.</td>
</tr>
<tr>
<td>Chad</td>
<td>M</td>
<td>Chad runs a small business called Little Bear’s Bees that sells honey, as well as nucs (small starter hives) for other beekeepers. He also does cut-outs for hives living in the walls of houses. His father kept bees before him.</td>
</tr>
<tr>
<td>Dawn</td>
<td>F</td>
<td>Dawn is the President of FLBC. She sells honey and kits to make mead (honey wine). See the interview for more information.</td>
</tr>
<tr>
<td>Jason</td>
<td>M</td>
<td>Jason is a third generation beekeeper.</td>
</tr>
<tr>
<td>Frank</td>
<td>M</td>
<td>Frank is a beginner beekeeper; see the interview for more information.</td>
</tr>
<tr>
<td>Paul</td>
<td>M</td>
<td>Paul is a hobbyist.</td>
</tr>
<tr>
<td>Jim</td>
<td>M</td>
<td>Jim is a beginner.</td>
</tr>
<tr>
<td>Lisa</td>
<td>F</td>
<td>no information</td>
</tr>
</tbody>
</table>

Names have been changed.

The group was two-thirds male, although attendance at meetings is usually more balanced. This is in contrast to the old stereotype of a beekeeper: one interviewee remarked, “they used to say a beekeeper was a short old fat guy with a short beard... but it’s not like that anymore”. Another interviewee remarked, “a decade ago, or maybe two decades ago, I had the sense that it was the realm of the over-fifty white male... in the [19]20s, it was the women’s job... for the keeping of the bees. Then it skewed male and older, and now it’s coming in more mixed and younger.”

Challenges came up in discussion first, and the strengths and opportunities followed. An explicit inclusion or recognition of the idea of resilience was limited; participants were more interested in concrete experiences (their own or others’), general problems, and proposed solutions – rather than the abstraction of resilience. They began by joking that we should be talking about perseverance rather than resilience, because the
percentage of hives lost every year by individual beekeepers has climbed higher and higher. They collectively wondered how long hobbyists can endure, with this year’s club survey on winter losses showing that 30% of local colonies did not make it through the winter of 2012-13, on par with the national average. One participant noted that he had been keeping bees for 40 years: “it used to be simple” when he did not have to contend with small hive beetle or mites, pests that have wreaked havoc on hives in recent years. Today, the threats facing beekeeping are manifold: a rise in introduced pests and diseases, a decline in formal/state support, commercial beekeeping practices that appear to be stressing honeybees, changing landscapes that affect honeybee habitat, etc. He claimed that the “old model” does not work anymore, just like “we can’t farm like Dad did”. At an individual level, the new strategy requires managing failure, anticipating ad preparing for predictable losses. Two of them referred to a resources disseminated by a Vermont beekeeper named Mike Palmer, who is a vocal advocate for a “new kind of beekeeping” where beekeepers build up reserves of bees that they can add to weak colonies, essentially assuming high losses in advance.

The group noted that the threshold for “throwing in the towel” of course varies by individual beekeeper and that beekeeper’s motivations. One respondent noted that he kept bees because it was an enjoyable hobby and only wanted honey for himself (not sales), so he does not worry about profits or and losses. If he consistently fails and finds himself not having fun, he’ll get out of it, but losing a bit of money does not bother him. A certain amount of “sticktoitiveness” also depends on the rest of a beekeeper’s life, of course, for those hobbyists who have other priorities. They joked again that the club needs a resident therapist – or needs to serve more mead (honey wine) at meetings!

The group agreed that diversity is key for resilient beekeeping: having more hobbyists is a plus, echoing an interviewee, below, who philosophized, “it’s better that a thousand beekeepers have two hives than one beekeeper have two thousand”. Similarly, the group recommended that beekeepers have separate apiaries (so that any disease outbreaks only affect one subset of a keeper’s colonies). Most important to the question of diversity, however, is genetic diversity of bee stocks, which ensures suitability for varied local climates. “Poor genetics show up in poor years,” said one participant. This implies a definition of resilience that hinges on strength in the face of challenges, and an ability to respond to a range of conditions. Here in the North, one respondent claimed, beekeepers should stop using Southern bees that are not acclimatized to the weather and are more prone to swarming, which was a bad and somewhat mysterious problem this year. He suggested that local beekeepers need to raise their own Northern queens from strong, surviving colonies, and at the same time, bring in more stock from Europe and Asia to add to the limited genetic pool in the US, noting that the relevant laws were recently changed to allow such imports. Those present were open to the idea of experimental breeding, but not more direct genetic manipulation, preferring to “let nature do its thing” since “you can only bend nature so much before she breaks”.

Bee “pasture” (habitat) and the overall environment are key. One respondent shared an experience from this year, where the alfalfa field next to one of his best bee yards was replanted with corn. Alfalfa provides both nectar and pollen in abundance; corn only produces pollen and not as much as alfalfa. As a result, none of his nearby hives had any honey to extract this year. Both locally and more broadly, GMO crops are a big question mark for beekeepers. The group expressed skepticism about the safety of GMOs and neo-
nicotinoids (a class of pesticides linked to declining bee health) and more broadly, the limits of science in determining what is safe for bees, particularly in light of all of the other stressors on bees that cannot be included in controlled experiments. For example, large-scale migratory management of bees for pollination requires that they be trucked around the country to pollinate different crops at the time of their flowering (e.g., almonds in California, which bloom in February), which may stress the bees. Briefly, it is hypothesized that such practices disrupt the bees’ natural cycles, spread disease when thousands of hives are brought in at the same time, expose bees to pesticides and other chemicals used in conventional agriculture, limit their nutrition because of the extensive monocropping, and otherwise stress them in the long journeys from place to place (this did not come up in this conversation, but is important background information about commercial pollination that most of these beekeepers would be aware of and have an opinion on). According to one participant, in the early and mid-1980s, it was considered risky to move bees from Minnesota to Florida – he had been a driver for the truckloads of beehives at that time. Now, commercial pollination operations take bees much further -- 6000 miles at a time, from Southern California to Maine.

Many of the participants mentioned outside resources (a particular favorite was a collection of YouTube videos by FatBeeMan), but the group agreed as a whole that the number one resource in this area is the FLBC, where beekeepers that are facing the issues described above have the opportunity to hear different approaches/strategies that their neighbors are using for the same issues. The listserv/forum is a great way to get questions answered. The club’s hands-on approach is also hugely important: one respondent noted that she learns by doing and watching; she had read the books but didn’t “get it” until she started keeping bees herself. The books are good for beginners’ basics, where there is usually just one tried-and-true method, but for troubleshooting, it is best to come to the group and hear a range of ideas, what has worked and what has not.

Collectively, they are enthusiastic about the club President’s proposed idea for a mentorship program that will partner experienced beekeepers with beginners. The FLBC has invited a representative from Cornell Cooperative Extension to join the annual meeting and give workshops on becoming a mentor. One respondent related a comedy of errors from her attempts to mentor beginners this summer, and recommended that mentors get involved before the bees arrive, since it is of course easier to do things right the first time than correct mistakes later. They agreed that mentors must learn how to mentor, but that there is also a skillset for receiving mentorship – and that even the most experienced beekeeper could benefit from being mentored.

**Individual data**
Interviews yielded more personal woes and other stories. Out of the ten interviewees, four were female and all were white. They all fell between 45 and 65 years (estimated); most members of the FLBC are in this range, with a few younger visitors. Several were the son and daughters of beekeepers and had inherited equipment and know-how from their fathers. Nearly all of the interviewees are highly educated, in keeping with the Tompkins County statistics described above (Karen has a doctoral degree, Norm is a professor). Participants’ income and wealth were not asked about directly, but in several cases, it was clear that interviewees had deliberately chosen a life of less - although in most cases that was backed by savings, social/family networks, or high levels of education. A few were seeking to make significant amounts of money and for those few, keeping track of the balance was important and affected their day-to-day decisions about managing the bees. See the table for a list and further description of the individuals interviewed. I have sorted out the themes that emerged, quoting liberally from participants, in the following sections on threats and factors for resilience.

<table>
<thead>
<tr>
<th>Name</th>
<th>Sex</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Peter Loring Borst</td>
<td>M</td>
<td>Peter has keeping bees since 1974 and is the foremost expert in Tompkins County. His expertise stems from a long career in beekeeping and bee research, the latter giving him scientific credibility and a comfort with the technical literature, the former giving him an ability to pitch his advice to hobbyists at all levels. His first job was as a beekeeper’s apprentice; he later ran a beekeeping supply store in California. He was senior apiarist at the Cornell Dyce Lab for Honey Bee Research for seven years and an inspector for New York State's state apiary inspection program for two years. Closer to home, he was the President of the FLBC until 2012 and continues to manage the club hives. He is currently working on a history of beekeeping in the 19th century, its &quot;Golden Age&quot; that centered in great part around New York innovators and commercial operators. His expertise is matched only by his personality: Peter is gregarious and charismatic, always thoughtful and usually opinionated. His stance on several issues has rubbed members the wrong way: one interviewee complained that he rather offhandedly dismissed his experiments with a style of beekeeping that is not mainstream.</td>
</tr>
<tr>
<td>Dawn</td>
<td>F</td>
<td>Dawn is the current President of the FLBC. She has been keeping about a dozen hives for four years. She sells mead-making kits, along with honey, making a small but significant</td>
</tr>
</tbody>
</table>
amount of money from her bees and other diversified products from her land (shiitake mushrooms). This has been a dramatic shift away from the high-powered job she held in California until a few years ago. She and her family’s goal is to have their sixty acres reclassified as farmland, which require that they make a net income of ten thousand dollars over two years. This concrete goal has her weighing the costs and benefits of practices and equipment more than most hobbyists.

Bart  M  Bart and his father run one of the larger commercial apiaries in the Finger Lakes area, with hives across several counties. They sell a variety of products (honey, candles, pollen) across the Finger Lakes. His father is a resource for the FLBC, for example, giving a demonstration on how to make cut-comb honey in the spring of 2013.

Karen  F  Karen has kept bees for about fifteen years and raises sheep, alpacas, and bees as her primary source of income. She also does take-outs for money, removing swarms of bees that have taken up residence in people’s houses. Her motivations were simple: “I just like them” -- although she initially inherited the equipment from her father. She is retired from a professional research position at Cornell and makes her living farming, through sales and subsistence.

Frank and Rita  M/F  Frank is a beginning beekeeper who, along with his wife Kathy, was hoping to make a portion of his income from bees, but has been plagued with problems. The couple moved to the country a few years ago, intending to make a living from the land, but they have found it so far to be a losing proposition, and Frank has taken a part-time job at Cornell. After the failure of their organic vegetables to generate income and the losses of their two hives after the first year, the couple felt quite defeated, although they are trying to be hopeful. They have relied on the FLBC for guidance on a range of technical issues, although because they keep an unusual style of hive, they have not found as much support as they had hoped. He was able to build the hive himself more cheaply, and it has a more natural aesthetic than the more standardized hives (as in the photo on page 1).

Austin  M  Austin kept bees with his father decades ago, starting when he was just twelve years old. After learning about colony collapse disorder, he bought three hives a few years ago, and now keeps them as “pets,” rather than for honey production.

Mike  M  Mike is a hobbyist, weighing whether or not he will continue to keep bees after this summer, given the time, effort, and expenses.

Christie  F  Christie runs a small honey sales operation along with her husband. The profits provide financial support for a ministry program they run out of their church. Her biggest concern was the winter climate in this area; she said that they had been wintering their bees in Florida to avoid it, by moving the hives down to her in-laws’ property for several months out of the year.

Norm  M  Norm works at Cornell, with a research focus on agriculture, community development, and the environment. He has long been interested in beekeeping, but has never kept bees.

*Names have been changed, except for Peter Loring Borst’s, because he is a public advocate and resource for beekeepers in Tompkins County and more broadly.

**Threats and challenges**
Interviewees named a long list of challenges: winter losses and new pests, the end of the state inspection program, individual practices, and too much information. Each is discussed below in turn.

**Winter losses and new pests**

For Peter Loring Borst, the number one challenge is the long, cold Northern winter. Overwintering bees successfully is not a new challenge, but Peter observed that “the hard winters, that discourages people... New York State beekeepers, by and large, have opted to not stay here over the winter... instead of buying bees from the South, they just go South.”

This has long been the case:

In the 1800s, the center of beekeeping was in the Northeast, in Ohio. Bees were raised here, queens were raised here, honey was produced here. This was the epicenter of beekeeping. Then, as time went on, they realized it was a very uncertain prospect of getting bees through the winter. They tried cellars, they tried wrapping, they tried not wrapping; they tried everything. And they realized pretty early on, that on average, they're going to lose half the bees over winter... in the early part of the 20th century, this became perfectly normal. You would expect... I'll lose a third. So, you had a standing order to replace a third of your hives (Peter).

Winter losses have been exacerbated by the introduction of new pests to which weak hives are more susceptible. The Varroa mite in particular has been very destructive; it was first introduced to the US in the late 1980s or early 1990s and has become a major problem. While honeybees can tolerate the presence of mites and defend themselves against them if necessary, if a hive is weakened for other reasons, Varroa mites may overrun it. One interviewee recalled that as a child, he and his father only worried about a limited number of pests (wax moths, foulbrood), whereas now those pests are still present, along with several new ones: Varroa mites, tracheal mites, and small hive beetles. These were all introduced to the United States in the 1980s and 1990s. Another participant anticipates some necessary changes due to climate change, but is more optimistic: “I don’t think that the beekeeping will fail; I think it’s just going to change; we’re going to have to adapt to it. I’m not going to fret about it too much.”

One respondent noted that it is not only the diseases and pests that pose challenges, but the “toxic materials that are represented as being likely needed to manage [them]”. In the Finger Lakes area, as well as across the United States more broadly, there are ongoing debates about the treatment philosophies: whether non-organic treatments are a necessary evil, and relatedly, whether other options such as organic treatment or integrated pest management techniques are effective. One of the commercial beekeepers interviewed wants treatments to become more minimal, natural, and organic. He was proud to share that he had stopped treating his hives eight years ago and has not seen any more problems than usual. If he had the resources, he would buy all new equipment, starting with fresh hives, to eliminate the build-up of pesticides, chemicals, and other impurities in honeycomb and hives that are normally used year after year.

**The end of the state inspection program**
Peter was a state inspector for several years and remembers the suspicion of the program: “nobody wanted to be registered; they didn’t trust the state; they didn’t think the state was their ally... The state would come out and burn your hives; that’s what they thought... Less than ten percent were ever even registered [with the state].” Indeed, the state inspectors did burn hives that were infected, to halt the spread of disease – a practice that netted them some critics, but one that many beekeepers would say is necessary. Peter shared the story of one inspection where he found hives festering with foulbrood, a nasty disease that the beekeeper was also unwittingly spreading to his neighbors. The day of the inspection, Peter buried and burned nearly all of the negligent beekeeper’s hives. That is an example of the program at its best -- stopping the spread of contagious diseases -- but for those who only hear that the state has burned someone's hives and do not hear why, it may sound like government overreach. In other states (California in particular), such programs for information sharing and inspection are strong. But the New York program was dismantled in 2010 due to a lack of funds and support (described above). Other interviewees lamented the end of that program: “our government is letting us down by... not funding bee inspection.”

Other questions of governance are related to this lack of state support. One interviewee is concerned in particular about the lack of support from cooperative extension and the research station system for Cornell’s full-time faculty member who is a researcher and extension apiarist, described above. She objected, “the governance at that level affects the entire state and... the entire Northeast, because this has been the premier bee research station for the Northeast. I don’t see it getting re-established somewhere else easily.”

Individual practices

Expectations and attitudes are important: the other primary challenge that Peter saw was the “discouragement factor”: “It’s a steep learning curve and the lack of success... that’s what is crucial in having sustainable beekeeping, is that people don’t give up... Every year, I watch people give up.” Indeed, one interviewee was thinking of getting out of it (see below). On the flip side, Dawn, is trying to avoid being lulled into complacency, or what she called a “lack of ignorance”: “I’m in this period and I’m really trying to be aware of it. What I’ve heard is that there comes a time... you think you got all the answers.” Of course, nobody has all of the answers and even the most experienced beekeepers sometimes lose their hives.

The one large-scale commercial beekeeper interviewed spoke briefly about hobbyist beekeepers who do not spent the necessary time monitoring their one or two hives and who let diseases spread through neglect or ignorance. Another interviewee agreed, “What’s really bad is someone who starts a hobby and then just forgets about it.” These brief observations, combined with the story of the negligent beekeeper who had let his hives be overrun with foulbrood, raise doubts about the idea of it being better to have a thousand beekeepers with two hives each than one beekeeper with two thousand hives. It may be that these are rare, bad apple beekeepers – but it may be more analogous to recent outbreaks of tomato blight in the Northeast, where the geographic dispersion of tomato plants in gardens across a wide area seemed to help spread the disease. Without an enormous survey and examinations of a large number of hives, however, the relationship
between this geographic dispersion and diversity and the health of hives cannot be determined.

**Too much information?**

One interviewee provided an interesting counterargument to the overall celebration of the exchange of information: “actually, there’s too much information. Everyone has an opinion... You talk about winterizing a hive -- get people started on that! -- everybody’s got an opinion.” An old saying on beekeepers is “two beekeepers, three opinions.” The popular narratives around colony collapse disorder combined with a wealth of information from multiple media and self-anointed experts make hard work out of selecting, synthesizing, and distilling knowledge to the point that it is useful.

**Giving up beekeeping**

One interviewee provided a nice counterexample: someone who is thinking of getting out of keeping bees. He finds bees interesting: “it’s something to talk about.” His rural location was ideal and he did not find the winters particularly harsh. But he is getting out now for a number of reasons, namely “time and effort and expenses”. He is interested in other activities and new hobbies. He has new expenses: “I guess I have about 200-300 dollars’ worth of stuff I bought... I tend to get stung a lot so I really need a full suit but that’s 100 dollars or 50 dollars”. Getting stung from time to time is likely an important dissuasion for many potential beekeepers. Unlike Peter, who often works the hives with no protection and hardly notices if he is stung, Mike complained, “when I get stung, I get a big puffy spot - - it hurts!” Finally, the “bother of harvesting the honey” is too much, including borrowing the (expensive) equipment, the mess, and the difficulty using the manually powered extractor.

Similarly, an email exchange with an FLBC member but non-beekeeper revealed some reasons why people do *not* keep bees, in spite of the requisite time, money, and interest. While Norm conducts research at Cornell on agriculture, community development, and the environment, and he has long been interested in beekeeping, attending several FLBC meetings over the last few years, he has never kept bees. His contribution was a helpful counterweight to the other interviewees’ stories:

The reasons that I am not a beekeeper are several taken together:
- The investment required to get into it.
- The learning curve that would be involved (the FLBC would be a great resource in this).
- The labor time required to operate a bee enterprise (with an emphasis on the part of building equipment and extracting any honey)...
- Concerns about effectively managing a bee enterprise due to travel and other work schedules
- I am planning to move... in the next year or so, so am reluctant to start what I hope would be a long-term project.

These negative reasons are important for understanding the resilience of beekeeping locally and more generally across the US. Some have already been discussed in another light – the initial investment is indeed sizable, but small-scale honey production does not require much more money, and can over time yield a net gain. The learning curve, as Norm
points out, is not insignificant – indeed, insofar as that is one of the greatest challenges, the resilience of beekeeping depends on resources like the FLBC, and the bulk of this report has focused on that aspect. Some of Norm’s other concerns are relative (everyone values their time differently and for some, the labor time required may seem like a lot, while to others it would seem small). Finally, beekeeping is measured in years (honey can be extracted once or twice a year, and the major hurdle in beekeeping is winter survival). As a hobby or a moneymaking enterprise, it requires that beekeepers remain in one area for several years, which may exclude the young, the poor, or others who move regularly.

Factors for resilience

Of course, the interviewees are all beekeeping enthusiasts and largely agreed that in spite of these challenges, beekeeping was indeed resilient. Individuals’ fascination with bees, regional particularities, and the Finger Lakes Beekeeping Club emerged as the most salient themes.

Fascination with bees

One participant mused, “It’s as perennial as the grass. I think that every year, someone thinks, wow, keeping bees, I never thought of that -- that sounds so interesting.” For Peter, the intellectual fascination with complex and charismatic creatures goes a long way -- but an intellectual engagement is not always sufficient: “I’ve seen people come and go so much... people in this area are very active people... there’re interested in this, that, the other thing... they’re not obsessed with it like me!”

Regional particularities

One of the most important factor for bees in this area is that in spite of the harsh winters, honeybees are “extremely adaptable to every corner of the planet” -- and this corner is particularly welcoming. According to Peter, Tompkins County residents understand that “bees are part of country living, whereas if you’re in the suburbs, or ag areas, there’s some conflicts... There’s a burgeoning farmers’ market... People understand that to have a healthy agricultural region, area, there’s got to be bees whereas... in other areas they think well, there’s no bees, so much the better.” He mused:

It’s a low-key beauty [in this area]... People appreciate that and they want that to stay. Bed and breakfasts... bees, orchards, it’s all of a piece... Tompkins County is never going to change [laughs]! It’s 25 square miles surrounded by reality, right? There’s a very strong movement in this region, to keep things rural... [beepkeeping] will never die out as long as people have gardens and orchards.

Several others spoke about the local ethos that values local foods. The President had observations similar to Peter’s about the general character of the area: personally, she has very good bee habitat, with flowering plants near her hives all spring and summer long, and an abundance of goldenrod that flavors the honey in the fall. More philosophically, she agreed that there was a valuation of what beekeeping represents:
The general feeling in Tompkins County of local sourcing and supporting endeavors like beekeeping, agriculture... the whole area is sort of prejudiced towards supporting that kind of an endeavor and beekeeping falls well under that... small-scale, small production [has] gotten better, stronger, as the whole locavore movement has gotten stronger... the farmers market was flourishing even [five years ago].

She has benefitted from having a range of commercial and small-scale beekeepers in the area, who serve as models: “I’ve been able to look at each individual and say, is this what I want to do? Is there where I want to take my bees?”

**The Finger Lakes Beekeeping Club**

For several interviewees, the most important factor of resilience was the FLBC. Karen is grateful for the members who helped her during her first years of beekeeping, when she couldn’t keep the hives alive, and observed that it was even more vibrant now, although she wants to see it do more, such as act as a buying club. But membership and interest depends on individual practices, described above: “whenever there are more beekeepers around, that increases resilience... on the other hand, if they’re not taking good care of their hives, it may increase the incidence of foulbrood.” Neglect does not cause foulbrood, but it is an example of a disease that is both easy to spot and easy to treat, but can kill a hive and infect nearby ones if it is left untreated.

**Definitions of resilience**

Every interviewee provided a collective understanding of resilience, rather than an individual one, including the one individual (Peter) who has arguably done more than anyone else to support beekeeping in Tompkins County. He thinks that there are collective decisions to be made: “we’re at the crossroads where we’re going to decide, as a species, how much of nature we’re going to leave alone and it’s getting to be less and less. It’s getting to be less and less of a choice that we’re getting to make because you have to take land away and say this is going to be natural area and someone else wants to farm it.”

Another spoke of collective resources: when asked what resources she wished she had in light of a changing world, she described knowing the right people, pooling their resources, particularly their knowledge, noting that “no one person can know everything”.

Lastly, one participant described a changing concern for bees: “there’s a new sense of appreciation for [bees], plus a general concern about the environment overall... there’s an awareness that, okay, I can’t solve the polar bear issue but I can keep bees.”
Reflections

Two primary thematic concerns surfaced in researching and writing this report, namely questions of scale and the ability to measure resilience of a sector/segment rather than of a community more broadly.

Briefly, carving out a “community” to study always requires delineations that are somewhat artificial: how can I stop at the Tompkins County border when neither bees nor the people who keep them do (nor the ecosystem nor the relevant state laws nor any number of other things, for that matter)? And how can I analyze influences from “outside” and interactions among overlapping or nested scales? Beekeeping in this case depends on concerns about adulterated honey from China, the incidence of colony collapse disorder in the US more broadly, Tompkins County’s relative unemployment rate, and on and on. While this was a quandary for the study of beekeeping, I can only imagine that it poses major problems for more comprehensive studies of general community health and resilience.

Resilience of a specific issue or sector, may be less fraught with these issues of overlap and interaction – but I found it ultimately not very satisfying to study the resilience of a practice. Perhaps there are better ways to understand local beekeeping, but more to the point for this project, perhaps the best way to understand resilience is from a holistic perspective (rather than sector-specific), in spite of the difficulties named above. Rather than trying to assess the resilience of a sector or a practice, assessing the resilience of a community more broadly seems more useful. However, I had some difficulty categorizing different sorts of resources and capacities into corresponding “slots” in the five key sets of resources: is the FLBC an example of social learning or civic capacity? Does Cornell’s R&D count as governance or something else? Where does the increasingly problematic population of pests fit in -- natural resources? And if I had that trouble, how much more difficult would it be to configure a more holistic conception of resilience? So I am back to where I started....

Finally, a minor point is that the lack of emphasis in the methods instrument on preparedness planning and readiness (which was identified a theme in the literature) seemed in this case to be an important deficiency in the overall understanding of the resilience of beekeeping in this area. Some of the new styles of beekeeping that are being taken up (raising ‘reserves’ of bees) seek to bolster preparedness, although only at the timescale of a year. Other practices (Bart’s adoption of more natural/organic treatments for pests) are beginning to address bigger questions of preparedness, but how that works for him and his family on an individual (and commercial) level remains to be seen.
References


Photo credits: the first two photos are from the Flickr account of the FLBC President ([http://www.flickr.com/photos/55375210@N00/sets/](http://www.flickr.com/photos/55375210@N00/sets/)). The photo of Peter Loring Borst was taken by Max Kraft ([http://beeingpresent.wordpress.com/](http://beeingpresent.wordpress.com/)). Accessed 1 October 2013.