2016 Dilmun Hill Farm Report

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Introduction

This was Dilmun Hill’s 20th year in operation as Cornell University’s student sustainable farm. In early 2016 five managers were hired for the positions of Vegetable Production Manager, Wholesale Manager, Community Supported Agriculture (CSA) Manager, and Greenhouse/High Tunnel Manager. The managers operated two CSAs—in the summer and in the fall—with 45 and 46 members, respectively. A half-share option was added in an effort to make the CSA option more affordable to more members of the Cornell community. A main challenge that the managers faced this year was a record-breaking drought, which resulted in problems such as yield loss (and crop loss), but was also an opportunity for creative problem-solving.

This summer was the main construction period for a new high tunnel funded by a Toward Sustainability Foundation (TSF) grant spearheaded by steering member Alena Hutchinson. The high tunnel was part of a trend of significant growth and change in Dilmun Hill this season. The Dilmun Hill Steering Committee was restructured in order to further engage students and the public by turning to a project-based organization, where committees are formed around specific goals with a timeline of deliverables in an effort to have a more long-term and growth oriented focus at the farm. A General Body (G-body) was formed for the first time in the history of the organization to give students further access to research projects and field work. A media and public relations steering position was created and a priority was made to foster visibility and community engagement. With greater visibility there were more classes than ever before visiting the farm and getting hands-on experience, with the added benefit of stimulating more interest and bringing more volunteers to the farm.

We hope that this farm report will help more generations of Dilmunites and aid in furthering Dilmun Hill’s goals of hands-on agricultural education and limiting food insecurity in our community.
Manager Biographies

Noelle LaDue

Year: Class of 2019
Major: Development Sociology
Manager Position: Wholesale Manager

Dilmun Story: I started looking for summer work somehow vaguely related to sustainable food systems and the relationships between urban and rural communities, on which I'd like to focus my studies, and was attracted to the unique opportunity for both personal growth and connections to students with similar interests that Dilmun Hill presented. I'm excited to try my hand at growing veggies after spending the last four summers working with ornamental gardening and landscaping!

About Noelle: I am from Woodbury, NY and had no idea of what I wanted to study until discovering development sociology on a Cornell visit. Then I got here and took an economic botany class first semester and realized that I really liked the idea of the social side of food production as well as working directly with plants and having a more personal relationship to what I consume.

Nina Sannes

Year: Class of 2019
Major: Plant Sciences
Manager Position: Vegetable Production Manager

Dilmun Story: Out of nowhere, Dilmun became one of the most influential parts of my Cornell experience. I think that projects like these are incredibly important for aiding people in gaining a sense of the processes and communities that go into growing the food that we eat, and connecting with people with similar interests. Farming, doing manual labor and interacting with the earth and food, is an incredible release from the academic lifestyle.

About Nina: My mother and I have kept a garden for my whole life, so there is a tender spot in my heart dedicated to growing. I was born in a small town near Seattle, Washington and currently live in a smaller town close to the Outer Banks of North Carolina, both of which are communities that are very influenced by agriculture. After leaving home, I was searching to be able to connect with a community in that way again.
Katie Donnelly Moran

Year: Class of 2018  
Major: International Agriculture and Rural Development  
Manager Position: CSA Manager

Dilmun Story: I heard about Dilmun shortly after transferring to Cornell in the fall of 2015, and I went to the kimchi workshop that was held at the farm. During my first semester, I took a tour of the farm with one of my classes and went to a work party. I knew I wanted to become more involved in the Dilmun community, so I applied to be one of the managers.

About Katie: I grew up in suburb outside of Boston. During my high school years I gained an appreciation for the outdoors and food production by exploring the Maine coast. My dad has always gardened, but from my persistence, we now have a backyard flock of chickens and three beehives. I am very interested in learning to live simply and consuming locally produced food. After interning last summer on an organic 2-acre farm in Montana, I am excited to be growing food for the Cornell community.

Kirby Peters

Year: Class of 2017  
Major: Agricultural Sciences  
Manager Position: Vegetable Production Manager

Dilmun Story: Before I transferred to Cornell, I worked at the student farm at Saint Michael's College. Since I first heard about Dilmun, it immediately caught my attention. A few of my classes offered opportunities to experience working at Dilmun, which made me see the great educational opportunity Dilmun provides.

About Kirby: I have been fortunate to have many influential people that have aided me in cultivating my passion for agriculture. My passion started the day I decided to start a garden with plants that a very special person dropped off on my porch. This passion continued as I began working at the vegetable farm next door for the next four years. All of these experiences have shaped who I am and ultimately got me to Cornell to study Agricultural Sciences. Today, my specific interest in agriculture lies in vegetable production and how we can mitigate the ecological impacts.
Emily Ramsey

Year: Class of 2017
Major: Agricultural Sciences
Manager Position: Greenhouse and High Tunnel Manager

**Dilmun Story:** I learned about Dilmun Hill after transferring to Cornell in the fall of 2015, and grew more and more interested in getting involved with the farm community over the course of the semester. When I decided that I wanted to spend the summer in Ithaca, I applied for the farm manager position and couldn't be happier to have been given the opportunity to unearth my interest for farming and community engagement with other folks who are passionate about farming.

**About Emily:** My roots are on my parents' compost farm in New Sharon, Maine, where I was born and raised. I became passionate about great food and home production through eating the food my family produces each year in our large sustenance garden. I now hope to share the empowering knowledge that is growing food with others – nothing is better than home-grown food!
Reference Farm Maps

Pioneer Garden

Market Garden
Contaminated Land
CSA Vegetable Production

Preparation
The managers prepared beds by tilling with the BCS walk-behind tractor. In the long-term the farm would like to move to a no-till production system, but with current challenges in terms of transfer of knowledge it is not feasible. We would sometimes lay down black plastic for plants that thrive in heat or that would be difficult to hoe. We began by securing the plastic with rocks, but found it to be much more effective (though labor intensive) to bury the edges of the plastic between beds. Before tilling any bed, we laid down Cornell compost. This year we began a crude compost pile behind the dumpsters east of the Blair Barn and set a long-term goal is to be able to use Dilmun’s compost on our beds to cut down on inputs and cost.

Soil Fertility
Nutrient levels at Dilmun are consistently very high due to the organic matter (compost) amendments over the years. The pH is slowly moving upwards due to the compost having a high pH (near 8). We would recommend managers in the future to have a more comprehensive nutrient management plan.
Campus Area Farms (CAF)

Before the 2016 season, CAF brought a tractor and plow to realign the beds in the pioneer garden to run from West -> East to South -> North. This is so that the crops in a bed would get more even sun exposure during the course of a day. Campus Area Farms also plowed Block 1, so with little preparation the managers were able to plant ornamentals and corn there (referenced in the section below).

Irrigation

The summer of 2016 was a time of a record-breaking drought. This brought about many challenges but also decreased pathogen pressure. The irrigation was a huge issue at the beginning of the season due to a crushed water pipe under the high tunnel construction site. For the first week of the season, we had to haul truckloads of water from the Orchards to fill a tank for the day. After rigging it up, we used a system of hoses to transfer water from the Cornell Orchards for the entirety of the season. Due to a lack of sufficient pressure, we would switch irrigation to and from the pioneer garden to the market garden regularly, so that one could be irrigated at a time with sufficient flow. Even when we did switch between fields at times, there wasn’t enough pressure to effectively irrigate. Drip irrigation is used almost exclusively at Dilmun - a very efficient form of irrigation. Occasionally a sprinkler was set up to water the garlic in the worst of the drought. An alternate water source is the water tower next to the barn. Rainwater collected from the roof fills the lower tank, and later it could be pumped to the upper tank to utilize gravity’s pressure. It was regularly used to water seedlings.

Crop Loss Due to Drought

A lack of irrigation in combination with the drought resulted in a crop loss on the contaminated field west of the high tunnel. The managers had planned on planting popcorn on that field (the corn grows several feet off the ground and is protected by the husk, so it is safe from contamination) and selling it to Annabel’s Grocery in Willard Straight (something that we recommend doing in future seasons). The vast majority of the corn failed to germinate due to a lack of water. The same thing happened to the strawberry crop that was planted in the raised beds near the hazelnut grove on the contaminated land to the northeast of the high tunnel. This had great potential because berries are big earners at the farmstand. Because the raised beds did not have a setup for drip irrigation, they were not irrigated and the plants died.

Recommendation for next year’s managers: DO NOT plant anything without first making sure that the area can be irrigated, especially during a dry period.
Weed Management

Management of weeds at Dilmun Hill this season was very labor intensive, which is characteristic of an organic production system. For some crops, black plastic was laid down to combat weeds, but the use of black plastic in some cases with more heat sensitive plants could have contributed to the loss of several beds of crops that were fried from the heat (ex. cucumbers). However, it saved a lot of labor and was a large weight off our managers’ minds knowing that we didn’t have to worry about weeds for many of our crops. For the crops that did not have black plastic (direct seeded things such as beets, radishes and heat sensitive plants like lettuce) weeds were a large problem. During the season the farm had volunteer work parties twice a week and these 6 hours (with extra volunteer hands) were normally put towards weed management. One of our first purchases as managers was precision hoes, which were very useful for weeding between rows in a single bed, and cut down on the time required for hand weeding. Another strategy for managing weeds was laying down mulch and cardboard between beds. This kept weeds from creeping into the beds and meant that the managers didn’t have to spend time mowing between beds. However, this process was very labor intensive even with a large number of volunteers, so it was only done between a fraction of beds in the market garden. However, the managers would recommend it for future seasons if there are ever large groups of volunteers available.

The weed biology class sampled one of the fields this year to look at the soil weed seed bank. The results supported what we already thought was true, the density of weed seed is very high at the farm. In order to reduce weed
pressure at the farm certain practices can be put into place. We have talked about taking a field or a portion of a field out of production to fallow it or plant cover crops. By doing this we can effectively deplete the soil weed seed bank.

**Pest Management**

*Flea Beetle - Phyllotreta vittula*

As a farm that uses organic practices, Dilmun also has lots of troubles with pests. To start with the smallest ones, many of our crops were affected by flea beetles. The leaves of the eggplants in the Pioneer Garden were lacy in appearance. This keeps the plants from being able to photosynthesize as well, and causes aesthetic issues on leafy greens that in worse cases can cause them to be unmarketable. To protect our crops, we covered any susceptible crops with Reemay row cover and buried the edges. In one bed in the Market Garden there was not enough Reemay to cover the last two broccoli transplants in a bed, so we ran an experiment and monitored the effects of the row cover on this brassica. In a couple of weeks, the broccoli plants under the Reemay were large, leafy, and green and the uncovered plants were brown, shriveled, stunted, and unproductive. The difference was extreme - so we will echo a sentiment expressed in the Farm Report for 2015 - cover your brassicas!

*Cucumber Beetle - Acalymma vittatum*

We could not cover our cucumber plants once the cucumbers were mature because they required harvesting almost every day and they were beset by an infestation of the striped cucumber beetle. This pest damages the leaves and fruit (making it scabby) so we searched for a way to get rid of them. We contacted Jeffrey Gardner, Research Support Specialist, Department of Entomology at Cornell University who recommended that we use a ShopVac or leaf blower on a reverse setting to suck up the beetles. However, by the time we got the bug vacuum there was a generation gap where the beetles weren't prevalent. We didn't get to experience this method of pest control.

*Colorado Potato Beetle - Leptinotarsa decemlineata*

There was a large problem with Colorado potato beetles on Dilmun's eggplants this season. They were found on the leaves of the plants in every stage of development and in large numbers. To combat them, we went through every leaf every day for a few days and searched
for any beetles, larvae or eggs and crushed them. Since we were able to halt them at every stage of development they did not come back with very much force.

*Groundhog/Woodchuck - Marmota monax*

This pest was the most alarming and the most damaging. It took the 2016 managers a long time and lots of loss for us to realize what was causing the damage to our crops (for example, a groundhog ate all the leaves off of a 50 foot bed of broccoli in one night) and by that time there were already several groundhogs established living inside the farm. They are small enough to fit through the holes in the fence so they cannot be kept out. The managers were able to reduce the populations of woodchucks by using traps. Through scouting, we found their regular places to exit the fence and evidence that several were living or at least using the hole under the CSA shed. We placed traps there and caught about 10 during the season. We had similar damage from rabbits but never caught any in the traps. We would recommend to the 2017 managers to set traps at the beginning of the season to try to keep the damage to a minimum.

*Cover Crops*

The managers received a large quantity of cover crop seed (rye and clover mix) from Dr. Matthew Ryan, School of Integrative Plant Science, Cornell University. We used the seed spreader to seed beds. There is seed left over for future use. We made an effort to plant a cover crop whenever a bed didn’t need to be used but there was no clear method to our doing so. In a few beds, it was much too dry and the cover crop did not germinate. We had hoped to plant a winter cover crop but the managers became too busy toward the end of the semester and the weather got too cold before we had time. As briefly mentioned in the weed management section, a plan is being developed to take a field out of production and plant cover crops for the season. This plan will increase soil health and decrease weed and pest pressure. We would recommend that (1) future managers prepare in advance for a cover crop in the winter (2) create rotation plan that includes cover crops.

*Selling Fruit from Cornell Orchards*

On several occasions during the summer the managers picked blueberries from the Cornell Orchards and sold them for half the profit. We would highly recommend the next managers doing the same because we found that more people would stop at the farm stand for the blueberries and would buy them as well as other produce, and there was a large increase in profit on those weeks.
CSA Crops in Review

*Amaranthaceae*

**Beet**

Varieties: Chioggia, Red Ace, Touchstone Gold

Beets were planted biweekly and were consistent producers on the farm. The variety “Red Ace” was especially red and beautiful and a hit at the farmers market.

**Spinach**

Varieties: “Corvair” and “Flamingo”

Spinach grew well in the early season, and was available for several weeks of the summer CSA before it bolted from the heat. At the end of the season pest larvae were found living in the leaves that none of the managers had noticed. We would recommend that next year’s managers check the spinach carefully for discoloration (a marker of the larvae) before marketing it. Spinach is growing in the high tunnel in mid-December.

**Swiss chard**

Our Swiss chard produced very well in the western edge of field 1 in the Pioneer Garden. Mid-season, chard was also planted in the W - E beds between field 1 and 2 in the Pioneer Garden and was established enough as a transplant to produce well despite the motherwort problem plaguing those beds. Swiss chard was one of the top producers at the farm this season. CSA members reported either loving Swiss chard or not being its biggest fan. Recipes with Swiss chard were sent to CSA members.

*Amaryllidaceae*

**Bunching Onion**

Varieties: “White Spear” and “Deep Purple”

These grew well in the Pioneer Garden and sold reliably at the farm stand.
**Garlic**

Dilmun had a large crop of garlic this season but it was a challenge to market. Even at the end of the season there was plenty of unsold garlic. The previous managers had planted several large patches of garlic (in the Pioneer Garden South plot and the westernmost patch of Field 2). It required a fair amount of work to weed the garlic throughout the season and there was not enough time left before the end of the season to plant all of the seed garlic we had set aside. This may work out well for the next managers as they will have less garlic and may be able to sell it all. During the summer season when the garlic produced scapes we harvested them and were able to add them to the CSA for several weeks which some people really enjoyed.

**Leeks**

Varieties: “King Richard” and “Takrima”
Leeks grew well in the Market Garden.

**Onion**

Varieties: “Gold Coin”, “Red Hawk” and “Cortland”
Onions grew well wherever they were planted, stored nicely, and sold well.

**Apiaceae**

**Carrot**

Varieties: “Napoli”, “White Satin”, “Mockum”, “Sugarsnax” and “Hercules”

Hands down, carrots grew best at East Ithaca. The managers first planted them in the north plot of the Pioneer Garden but they were competing heavily with a patch of motherwort growing there. They regularly suffered damage from rabbits. An incredible number of weeding hours went into the North plot before we gave up and pulled the carrots and planted Chinese cabbage and Swiss chard in the North plot. Carrots grew pretty well in field 2 of the Pioneer Garden but faced the same rabbit damage. East Ithaca plots produced big beautiful carrots but they were ready to harvest after the fall CSA was over. We would recommend an early planting at East Ithaca.
**Celery**

Varieties: “Tango”

Even though we did not have high hopes for the celery because it is not known to do well in this area, we had a beautiful and plentiful celery crop. We planted two beds in the Market Garden, the one planted earlier produced very badly, but the later one very well. It was very popular in the CSA and the market, and gardeners around the area were very excited about it.

**Asteraceae**

**Lettuce**


Lettuce did well at the farm and was planted almost every Friday. It was quick-growing and had little damage from pests other than slugs. During the parts of the season with highest heat, we had trouble with lettuce bolting and turning bitter. We would mix all varieties of lettuce together along with mixed greens to make our salad mix which was popular with CSA members and sold relatively well at the market. For first harvest we were too excited and harvested too much lettuce and donated a lot because it was too much to include in the CSA. Washing lettuce (as well as other greens) was probably the most time consuming part of the wash process. CSA members in past years had said that they did not like receiving whole heads of lettuce so we always prepared a salad mix with ours.

**Brassicaceae**

**Arugula**

Arugula did very well, although is a polarizing crop (some people love it and some hate it) so it was spottily profitable and there were debates on whether or not to include it in the salad mix.

**Broccoli**

Varieties: “Green Magic”

“Green Magic” broccoli was planted at the farm and Arcadia was planted at East Ithaca. We found that it was very important to cover these, every single broccoli plant at East Ithaca was eaten almost all the way to the stem at the beginning of the season, but it bounced back completely, though there was a later harvest. We had issued with cabbage worms later in the season and had great difficulty getting them off of the marketable florets, so again it is important to cover these from the beginning of the season.

**Brussel Sprouts**

Varieties: “Diablo” and “Dagan”

Brussel Sprouts did better at East Ithaca, where the variety “Diablo” was planted
than at the farm where both “Diablo” and “Dagan” varieties were planted. They were ready to harvest mostly late in the season, after the CSA was over, so there was trouble finding a way to market all of the crop.

**Cabbage**

Varieties: “Rubicon” Chinese, “Farao” green, and “Omero” Red

The cabbage did well at the farm, and there was at least 1 bulk order later in the season. Chinese cabbage was a hit at the market, and there was potential for a kimchi making workshop as has happened at Dilmun in the past.

**Greens Mix**

Varieties: “Ovation”, “Spicy”, and “Premier”

The greens mixes planted were regularly incorporated into the salad mix throughout the season. They were affected by the flea beetles to a small degree but with row cover we were able to avoid too much damage. We had to be careful with the mixed greens going to seed in high heat.

**Kale**

Varieties: “Scarlet”, “Toscano”, “Siberian”

Kale transplants were put in the western edge of field 1 in the Pioneer Garden on our first day of planting. They flourished in this location, as well as the “Toscano” kale planted in the East Ithaca. However, the several beds of scarlet kale were planted in the market garden, and did not produce nearly as well as the crop in the pioneer garden.

**Kohlrabi**

Varieties: “Kolibri”, “Winner”

Our Kohlrabi did not produce much and was ready to harvest too late to market.

**Radishes**


Radishes were very successful and we planted them biweekly. They produced consistently for the majority of the season. The variety “Watermelon” took longer to develop than the others. CSA members received many radishes, but they did not attract much interest at the farmers market.

**Romanesco**

Varieties: “Veronica”

Romanesco did not produce at all due to the heat of the summer and pressure from woodchucks. We would not recommend planting it in the future.
Cucurbitaceae

Note: Most winter squash were not ready to harvest until after the CSA was over and we received little profit from them. They grew very well, but we would advise that a good market be found for winter squash early so that they do not go to waste. Another solution may be to transplant winter squash earlier.

Acorn Squash
Varieties: “Sweet Reba”, “Table Queen”

Buttercup/Kabocha

Cucumber
Varieties: “Marketmore”, “National Pickling”, “Tasty Jade”, “General Lee”
Cucumbers are sensitive to high heat so they did not really thrive in this hot, very dry summer. A whole bed of cucumbers under black plastic in an unshaded part of the market garden and covered in Reemay fried in under a day. The best place for cucumbers was in the easternmost beds of Pioneer Garden field 1 where there was shade for parts of the day. We planted the transplants under black plastic, which was good for weed management. However, for the cucumbers even one bed farther from the shade near the CSA shed, only half of them lived. We also had a problem with cucumber beetles, mentioned in the pest management section, which caused the cucumbers to be scabby. Even with all of this we had a good harvest and it was necessary to harvest every day during the peak season. We trellised the cucumbers with twine, which worked but could have been better. The cucumbers were delicious and popular at the market.

Hubbard
Varieties: “Baby Blue Hubbard”

Melon
Varieties: “Arava”, “Emerald Gem”, “First Kiss”
We had an issue with the melons splitting and rotting in the heat and were not able to market very many. Quality control was a challenge with the melons. It is hard to ascertain when they are ripe so while they might look nice on the outside, they might not have tasted good. One CSA member bought a melon and reported that sentiment to us the following week, so we sent him home with a free melon hoping that this one would taste better.

Pumpkin
Varieties: “Diablo”, “Winter Luxury”

Spaghetti Squash
Varieties: “Spaghetti”

Summer Squash
Varieties: “Patty Pan”, “Gold Star”, “Yellow Crookneck”, “Zephyr”
Summer Squash was popular at the farmstand and we had a good crop in field 2 of the Pioneer Garden, and needed to harvest every day. People were excited about the
“Patty Pan” squashes but did not often buy them because people didn’t know what to do with them.

Watermelon
We did not have enough watermelons to add in the CSA but they were popular at the market. We often split one at work parties and shared with the volunteers.

Zucchini
Varieties: “Raven”, “Tigress”
Zucchini was one of the most popular items at the farmstand over the summer. We had a good crop in field 2 of the Pioneer Garden with a harvest every day necessary.

Fabaceae
Beans
Varieties: “Jade”, “Provider”
The beans grew very well in field 2 of the pioneer garden and for much longer than we anticipated. They were popular among CSA members and at the farm stand but harvesting them was a huge time commitment.

Peas
Varieties: Shoots
Pea shoots were a good early season crop to include in the first few weeks of the CSA when little else was ready to harvest but they weren’t that popular among CSA members or at the market. Members didn’t know how to use large amounts of pea shoots that were included in their share. To remedy this, the managers cooked together with them and pea shoot recipes were sent out to the CSA members.

Lamiaceae
Basil
We grew purple as well as standard basil, but the purple did not produce very well. When it was mixed with the green basil, customers thought that the purple leaves were green ones that had been damaged. Basil was one of our most productive crops, but it was one of the most labor intensive in terms of harvest. We often had far too much for the CSA. We started doing bulk basil orders to move the excess product but did not receive that many orders and the managers ended up making lots and lots of pesto themselves, and still had too much! Be sure to plant in moderation!

Solanaceae
Eggplant
Varieties: “Barbarella”, “Galine Italian”, “Hansel”
Eggplants grew well wherever they were planted and were very productive beginning
at the end of the summer season. They were affected by flea beetles and potato beetles, but there was no damage to the fruit. They were very popular at the market.

**Husk Cherry**
Varieties: “Goldie”
Husk cherries were more of a niche crop. Some people loved them and some hated them so they were spottily profitable.

**Pepper**
For the amount of peppers we planted we did not get that large of a crop. The peppers were generally small but popular.

**Tomato**
The “Sun Gold Cherry” was one of the most profitable crops of the season. It was prolific and it produced for a long season. We would definitely recommend planting again in further seasons. It was a lot of labor to harvest the cherry tomatoes and it had to be done often but many CSA members and customers loved them. The “Indigo Cherry Drops” were good, but not as flavorful as the “Sun Gold Cherry”. The full size tomatoes also did well, but they were not ready until later in the season. The tomatoes at East Ithaca were bushy and many tomatoes developed on the ground and rotted. We would recommend pruning the suckers and trellising often so that there would be as little waste as possible because people loved the tomatoes. If we didn’t have them at the farm stand, people would ask for them.
Wholesale Vegetable Production in East Ithaca

Seeding and Harvest Timeline

The blue bars in the graph represent the months in which we had a successful harvest and were able to include these crops in one of our distribution methods.

Yield Data
The yield from the East Ithaca plots was bountiful and contributed steadily to our CSA during the second half of the summer. We purposefully designed the crop plan to treat this space as the main producer for our wholesale operations therefore planted large amounts of each crop. This may have sacrificed diversity in the choice of crops that we did plant. Notes on each specific crop are below, and a planting map of the site is below:

**Independent Study with Professor Michael Mazourek**

Course Summary: The Wholesale Production Manager along with two other interested students evaluated a learning experience on organic vegetable production in partnership with Dr Michael Mazourek. The other managers helped prepare a trial run of a four season harvest experience designed by the Wholesale Production Manager. In the fall we evaluated yields and crop choices for crops that are suitable for a fall harvest. Learning techniques and consideration in the infrastructure of the vegetable plot and documenting it and recommended changes for next season was the main objective. At the end of the semester the final product was a group portfolio with what was done and what could be improved.

**Wholesale Market Distribution and Access**

This season the Wholesale Production Manager was in touch with four main outlets:

- Manndible Café
- Cornell Cooperative Residences
  - Triphammer Cooperative
  - Von Cramm Cooperative (weekly orders)
  - Watermargin Cooperative (summer CSA share and a fall bulk order)
  - Prospect of Whitby Cooperative
  - 660 Cooperative
- Anabel’s Grocery
- Individual bulk orders

The manager sent weekly e-mails to Manndible Cafe with a list of vegetables that we had available for order in wholesale amounts. They ordered from us occasionally. Later in the season we decided to stop spending as much time trying to form a partnership with Manndible Cafe until the future. We also kept in touch with the on-campus residential co-operative houses, to which we also provided bulk orders on occasion throughout the season. Another outlet for items that we had in wholesale quantities was simply offering bulk orders through our listserv and social media. We did not restrict wholesale ordering to crops grown in East Ithaca but also included vegetables of which we had excess quantities of for the CSA. The goal for the future is to have a more regular relationship with all of these outlets and to foster the growth of our current relationship with Anabel’s Grocery once it is open for business.
East Ithaca Crops in Review

Amaranthaceae

Swiss chard
Varieties: “Bright Lights”
Healthy, lasted and was harvestable for a substantial time.

Apiaceae

Carrots
Varieties: “Napoli” and “Bolero”
Good, large, long carrots with very little weed pressure. Remember to thin. One storage and one fresh variety is recommended to grow in the future.

Brassicaceae

Broccoli
Varieties: “Arcadia”
The plants didn’t start out healthy but came back when black plastic was removed and lasted for a long time. Edible and arguably tastes better when flowered. The crop struggled with woodchucks as a pest but a very successful crop overall. Perhaps Romanesco varieties can be experimented with next year.

Brussel Sprouts
Varieties: “Diablo”
Struggled with flea beetles until August and were healthy overall and good to harvest in November.

Kale
Varieties: “Toscano”
The kale didn’t start out healthy but came back when black plastic was removed and lasted for a long time. Perhaps a different variety would have been more heat resistant.
A very successful crop overall.

Pac Choi
Varieties: “Mei Qing”
Lost crop due to flea beetles damage. Plants should be covered immediately and bed placement should be carefully considered. Look into other Asian greens for resistance.

Turnip
Varieties: “Hakurei”
This crop should be harvested earlier-data in planting schedule
**Cucurbitaceae**

*Melons*

Varieties: “Emerald Gem”
Subject to heat stress, many were lost before they were ripe to harvest. This variety had poor flavor, perhaps as a result of heat stress but we recommend to avoid this different variety in the future.

**Fabaceae**

*Dry Beans*

Varieties: “Vermont Cranberry” and “Midnight Black Turtle”
In the future it would be prudent to separate varieties when harvesting. The beans were harvestable fresh several weeks prior to dry harvest.

*Shell Peas*

Varieties: “Perfection”
Confirm that variety will germinate. Powdery mildew susceptibility.

**Poaceae**

*Flint Corn*

Varieties: “Abenaki Calais”
Find access to a grinder to make corn meal in the future. The plants became infested with corn smut. The corn is still edible when corn smut is white, but when smut is black it’s not edible. The kernels weren’t ripe even once the smut had turned black. This variety may need to be planted earlier.

**Solanaceae**

*Eggplant*

Varieties: “Machiaw”
Great harvest, look into an eggplant niche market in the future.

*Pepper*

Varieties: “Lunchbox”
Look into other varieties-this one was very small and laborious to harvest.

*Potatoes*

Varieties: “Upstate Andover” & “Keuka Gold”
9 other varieties were planted but did not germinate, perhaps due to badly stored seed. The other varieties were a donation, however so no profit was lost.

*Tomatoes*

Varieties: “Pruden’s Purple”
Look into better trellising and make sure to harvest in a timely manner as the tomatoes easily rotted and became messy. Tomatoes were ginormous!
Greenhouse & High Tunnel Production

Greenhouse Production Overview

Greenhouse production in the 2016 season was focused on starting seedlings for CSA vegetable production. A certified organic greenhouse in the Guterman Bioclimatic Laboratory was used for seeding and germination beginning in April and continuing through early August for lettuce varieties. After seeding, care of the young plants was taken over by greenhouse staff. In the early season, starts were hardened off in organic production cold frames before being transplanted outside.

High Tunnel Production Overview

The 2016 season was marked by the construction of a movable high tunnel, which was designed and whose construction was spearheaded by steering member Alena Hutchinson with funding from the Toward Sustainability Fund and Cornell University Agricultural Experiment Station. By designing the high tunnel to move over two production areas, multiple crops are able to be grown under the high tunnel in a year, with a heat-loving summer crop grown under the high tunnel followed by a cold-tolerant winter crop. Upon completion of the tunnel in July a late summer crop of tomatoes, peppers, and eggplant was planted under cover of the high tunnel. In October, a fall and winter crop of spinach and tatsoi (an Asian green) was started on the uncovered half of the high tunnel space. In mid-November, after the solanaceous plants had stopped being productive, the high tunnel was moved to cover the winter greens. In the coming seasons, the ability to move the high tunnel will help keep the soil from becoming salinized, a common problem in high tunnels due to lack of leaching from exposure to rain. It will also help with disease suppression as crops can be alternated between the sides of the high tunnel space. Similarly, cover cropping on the half of the high tunnel space not in production will allow for the continued improvement of soil health.
As part of the grant for the high tunnel awarded by the Toward Sustainability Fund, two workshops were held in conjunction with CUAES with Cornell Cooperative Extension vegetable specialist Judson Reid. The first workshop was focused on tomato production and was held on September 10th; the second workshop was a discussion on winter greens production and was held November 4th. Additionally, the grant provided for regular soil and foliage testing throughout the season. Results from these tests will be used as a baseline for future seasons.

**Growing in the High Tunnel**

Plants for the high tunnel were seeded early as the high tunnel was projected to be completed in early June. Unfortunately, the actual completion date of the high tunnel was late July which led to the starts being overgrown and undernourished when they were planted in the tunnel. Despite the rough start, the plants rebounded and were productive from August through November, however they never yielded as they could have were they planted earlier in the season. Harvested tomatoes were marketed as other produce.

The winter greens, spinach and tatsoi, were covered in mid-November and continue to grow. To date, they haven’t been harvested but will likely begin to be harvested in late January or early February as we are able to find a market. In the future, earlier seeding of winter greens would be recommend as they were slightly undersized going into the winter.
CSA and Farmstand

CSA logistics

Dilmun ran two separate CSAs this season: a summer and a fall program. Both were coordinated and facilitated by the CSA Coordinator Farm Manager.

Summer CSA

The summer CSA ran for 12 weeks from June 15 through August 31. CSA shares were picked up at the farm on Wednesday evenings between the hours of 4 and 7 pm. We offered two sizes this year: a full share ($350) and a half share ($175). This was done in response to feedback from last year’s program. We expected the full CSA shares to provide for a small family and that the half share would be the right amount for an individual. The half shares were popular with a total of 32 members receiving a half share. There were 13 full share members. Over 20 of the members were undergraduate students; around 12 were faculty and staff; and almost 10 graduate students. There were five CSA members that worked in exchange for a full CSA share.

The half shares were half priced and consisted of half of the vegetables, but they were more than twice the work. Managers made “half bunches” of greens, and would weigh out bags of salad greens that were half the weight. It was an added challenge to harvest two bunch sizes, but the large interest in half shares reflect that they are desired by the community. We strived to have the same diversity of vegetables in each size. Pictured on the next page are photos from week 9, and members received Swiss chard, radishes, onions, garlic, cucumbers, basil, salad greens, and cherry tomatoes.

Managers harvested for the CSA on Wednesday mornings in order to provide fresh vegetables to our members starting at about 6 am. With the pick-up ending at 7pm; Wednesdays were long work days. During the height of production, harvesting would begin on Tuesday.
Fall CSA

Dilmun’s fall CSA was six weeks long and went from September 8 through October 13. The share was timed to start one week into classes so that students returning to campus for the semester could participate. Only one size was offered due to logistics of transporting shares to the ag quad. There were 46 share members. 11 members volunteered in exchange for their vegetables, and around 25 members were undergraduates. Managers hoped to make the share accessible for undergraduate students by having pick-up on campus, offering more work for a share, and by having a sliding payment scale.

Vegetables were packed in wax boxes and brought to the Farmer’s Market at Cornell for pick-up on Thursdays between 11 and 2. Vegetables were harvested on Tuesday afternoons during the work party. They were also packed into boxes and brought to a cooler in Plant Science on either Tuesday or Wednesday.

CSA payment was offered as a sliding scale. We hoped that people who could would pay more for their share so that we could make the share more affordable to others. With that in mind, we valued the CSA at $120 for the six weeks, but people could pay anywhere between $100 and $140. How much members paid was kept confidential.
Work for a Share

Having volunteers work in exchange for their CSA was an asset to the managers. During the summer when weekly work parties were not well attended, having dependable volunteers helped managers to weed. Then in the fall, volunteers could only volunteer during the work parties, and once again, they were instrumental to having a CSA during the school year. Summer volunteers worked for four hours a week in exchange for $30 of produce, and fall volunteers volunteered for three hours a week in exchange for $20 of produce.

CSA Content

Both summer and fall CSAs were comprised of the vegetables that were in season at Dilmun during that week. They organized in different ways. Over the summer, the managers estimated the worth of the produce going into each share. The aim was to have $30 of produce for the full shares and $15 for the half shares. This approach was time consuming and after several weeks, we knew how to approximate how many vegetables to give to people each week. In advertising for the fall CSA, the managers said members would receive 6 to 8 vegetables a week. Some weeks when there were smaller quantities of produce, 9 or 10 different vegetables were given.

Customer Feedback

Surveys were sent to CSA members at the conclusion of both programs. Members expressed that the weekly emails sent by the CSA manager were helpful reminders, and people enjoyed when recipes were included. People appreciated the vegetables and expressed satisfaction. Someone particularly mentioned the vegetables kept well and that the salad greens were convenient. Two CSA members’ potlucks were held over the summer. Managers enjoyed talking to CSA members during weekly pick-ups but noticed that members were unable to interact with each other. The ten people who attended the potlucks enjoyed the community aspect of our CSA.

There are ways in which Dilmun’s CSA can improve in future seasons. Someone expressed how they would have purchased more from us in addition to the CSA if we were able to accept credit cards. There are some logistical hurdles to this, but should be seriously pursued and would most likely increase earnings from farm stands.

Size of share and freshness were also concerns. The fall CSA share was smaller this season than last year’s share. This size change should have been more explicitly described,
and sometimes the space in the fall CSA box was taken up by carrot greens and celery leaves. In choosing the logistics for next year’s CSA, the managers should evaluate the size. A horticulture graduate student expressed the CSA was lacking in diversity and quantity and offered to help Dilmun plan and start production earlier. Pursuing that assistance would greatly benefit Dilmun and help with long term crop planning. Overall the CSA has been considered a successful project, but there is always room to improve.

**Cornell Farmer’s Market**

The CSA was the farm’s main market throughout the season, but managers held a weekly farmstand over the summer and then attended the Farmers Market at Cornell. Over the summer, the farmstand was held on the Agriculture Quad, but due to construction, it was relocated to the lobby of Mann library. Despite not earning much income from the farmstand, it was good for visibility. Customers were often barred from making purchases because they didn’t have cash, and the managers discussed getting a Square Reader ([https://squareup.com/get-a-reader?gclid=CjwKCAiAnCeeBRBhEiwA5Gv06sYgg1VhqIa6tRZx7fOjQX2E61Oa8GwB1KT16QjBoToh2h2aPAw6IaAQ7EALw_wcB](https://squareup.com/get-a-reader?gclid=CjwKCAiAnCeeBRBhEiwA5Gv06sYgg1VhqIa6tRZx7fOjQX2E61Oa8GwB1KT16QjBoToh2h2aPAw6IaAQ7EALw_wcB)) for credit card processing - which is something for future managers to think about. Farm stands were held on Thursdays over the summer.
Special Projects/Infrastructure

Vegetable Donations with Friendship Donations Network

This season, the tradition of donating excess produce was continued by the managers. Over the summer, Dilmun donated produce six times. This was a perfect way to reduce food waste and helped us deal with produce that was left after our CSA pick up and farm stand. In the fall due to busy school schedules, we were unable to continue to donate. Our contact at the Friendship Donations Network was very responsive and could pick produce up at the farm with a day's notice.

Volunteer Work Days

Our volunteer work days happened twice a week throughout the season. For the spring, summer, and early fall we were joined by enthusiastic volunteers every Tuesday from 4pm to 7pm, and Sunday from 1pm to 4pm. Following Daylight Savings in the fall, we shifted the Tuesday work days to be from 3pm to 6pm, then 5pm.

The number of volunteers we saw fluctuated throughout the season, but we always had a solid basis from those who chose to work for their CSA shares. The number increased with the arrival of students on campus in August. Many of the students who joined us were interested in farming, but some had never done farm work before. Some volunteers were members of Alpha Phi Omega, a coed service fraternity that has students log work hours. It was nice to see the same people throughout the season and how they were so welcoming to newer volunteers!

The volunteers performed a variety of activities. Some of the more common tasks were weeding and harvesting, but we also had people help plant seedlings, prepare beds for planting, and wash veggies. The managers always looked forward to their visitors these two afternoons!
**Farm Tours**

The managers were often contacted, either directly or through Betsy Leonard, to give tours of the farm to different groups. There were often Cornell-related students, staff, or faculty who wanted to see what we were up to!

**CALS Staff Visits**
- CALS Communications Team (Craig Cramer, Samara Sit, Matt Hayes, Melanie Cordova) 7/12
- CALS Dean Kathryn Boor (with Glenn Evans and Jan Nyrop) 8/26

**CALS Agriculture or Plant Science Class Visits Spring/Fall 2016**
- Matt Ryan’s PLSCS 1900: Sustainable Agriculture
- Frank Rossi’s PLHRT 1101: Plant Sciences and Systems
- Jonathan Russell-Anelli Soil Science class
- Steve Reiners’ PLHRT 3500: Principles of Vegetable Production
  ➢ Extra credit offered for attendance at the high tunnel workshop

**Others**
- Amy’s Organic Kitchen 5/11

**Outreach Activities**

Dilmun Hill had tables at each of these events this year:
- ECO FallFest 8/28
  ➢ Natural dyeing
- Fall Fest 10/22
- Food Day Feast at Oakenshields 10/26
- Local Food and Fiber Fair 11/17
  ➢ “Taste of Dilmun”

**Farm Season Kick-Off 5/13/2016**

Attended by steering members and some friends of Dilmun

Event reflection: our goal was to engage members of the Cornell community and get further exposure for the farm, and this would have been more effective if we had had a less intimate setting than a potluck and open mic, which are both things that guests have to prepare for.
We offered free carrots in Mann Lobby to advertise both our produce and the 20th Anniversary celebration happening that weekend!

20th Anniversary Celebration 10/29/2016

At this event we had farm tours every hour, refreshments, Dilmun vegetable tasting, live music, and tabling by the bee club, insect club, and Red Jacket juice. Dilmun had a large advertising photo campaign for this event but attendance was still smaller than we had hoped. For an average student getting out to the farm is hard so we are thinking of ways to remedy that for the future: shuttles to the farm, or events on campus.

Flower Pressing Workshop 11/2/2016

This workshop was led by steering member Isabel Gareau and began with a forage walk around the farm and culminated in pressing herbal specimens.
**Anabel’s Grocery**

Anabel’s is a student-run store on campus “that seeks to combat food insecurity at Cornell by providing access to healthy, affordable food and programming.” Dilmun is very excited about the growing alliance between our organizations, and partnered with Anabel’s Grocery several times during Fall 2016 for meal kit builds where students can get free food to tide them over during school breaks, and for their pop up shop, at which students can purchase accessible, affordable, healthy food. For the meal kit builds Dilmun donated produce and volunteer hours, and sold produce for the pop up shops. Anabel’s Grocery is a fantastic and growing organization whose goals are very in line with Dilmun’s, and they are a great partner to have in the coming years.

**General Body**

A big point of growth for Dilmun this year was the creation of a G-Body, something that the club has never had before. The structure of the steering committee was changed to a project-based organization, in an effort to create a more focused timeline of deliverables and improvements to the farm. Along with this change came the decision to open up Dilmun’s G-Body to any member of the Cornell community. We hope with this that the organization can become more accessible and help in the education of more students than ever, and that the added hands can make our vision projects easier to reach. Dilmun had biweekly G-Body meetings in the fall, and had students from all colleges in attendance, and many signed up to aid in project committees in the spring. Our goal is to make Dilmun accessible to the Cornell community, so that others can benefit from the organization that has been so influential to us, the 2016 managers.
Acknowledgements

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