Dilmun Hill
2017 Farm Report

Authors: Brian Byun, Zoe Friedberg, Samantha Hackett, Erin Kehoe
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Manager Biographies:

Brian Byun
Year: Class of 2019
Major: Urban and Regional Studies
Manager Position: Vegetable Production

Dilmun Story: Serendipitously, all the managers from the previous year happened to live on the same street I was living on. I came to a couple work parties, a potluck, and was awed by the sense of community and passion among Dilmun members. Having practically no prior experience growing anything, I’m eternally grateful to Dilmun for the first hand learning experience of the struggles and joys of farming.

About Brian: I’m a city-boy at heart. I’ve always been searching for ways to bring people together, particularly in urban areas. Growing and sharing food I’ve learned is powerful in building a strong community.

Zoe Friedberg
Year: Class of 2019
Major: International Agriculture and Rural Development
Manager Position: Vegetable Production

Dilmun Story: I heard about Dilmun through a sustainable agriculture class I took my freshman year. Throughout my time at Cornell, I have developed a growing interest in local and global food systems. Dilmun provided a unique opportunity to grow, experiment, and interact with food in an intimate environment.

About Zoe: Way back in middle school, after returning from summer camp, I decided that I should have a home garden. The following summer, against my parents’ wishes, I dug up the front lawn and constructed my first garden.
Samantha Hackett  
Year: Class of 2018  
Major: Interdisciplinary Studies focusing in Agroecology and Policy  
Manager Position: Wholesale Production  

Dilmun Story: Transferring in as a Junior Pre-Vet major, in Fall 2016, led to a quick change after seeing what else Cornell has to offer. Viewing agricultural systems as a whole peaked my interest, and I changed my major to Interdisciplinary Studies with a focus in Agricultural Sciences, Animal Science, and Environmental and Sustainability Sciences. After hearing about Dilmun Hill Farm from a past manager, I was immediately intrigued especially because it was student run. I was very excited to have the opportunity to be a manager and work with such amazing people.

About Sam: As a child we always had animals in the house, and growing up immersed in nature allowed us to get ducks. It did not take long before I was very involved in my local 4H and began homesteading. After working in vet offices, I realized that conservation was another major passion of mine and that agriculture is how I can make an impact.

Erin Kehoe  
Year: Class of 2020  
Major: Nutritional Sciences  
Manager Position: CSA Coordinator  

Dilmun Story: Throughout high school I volunteered at a community garden, which I loved, so I was immediately intrigued when I found Dilmun. I’m incredibly grateful for the opportunity we had to run the farm and meet others interested in growing things.

About Erin: I’ve always loved vegetables and being outside so Dilmun was a great job and release for me. I’m studying nutrition, and want to work to improve access to healthy food, so Dilmun allowed me to learn more about the agricultural side of things.
Farm Photos
Reference Farm Maps

Pioneer Garden

Market Garden
Contaminated Land
CSA Vegetable Production:

**Preparation:**
The season began with cleaning up black plastic left in beds over the winter in the pioneer garden. Although the plastic was left to help prevent weed growth, we found it difficult to take out. We then decided to remake the raised beds, in an effort to increase uniformity, efficiency, and ease in beginning the growing season. Farm Services plowed, tilled, then shaped the beds with one of their larger tractors. All beds were laid with drip tape, and half were laid with black plastic. In the Market Garden we used the walk-behind BCS to till the soil and prepare beds.

**Soil Fertility:**
Nutrient levels and soil pH tend to be high in Dilmun soils due to additions of Cornell Compost in the past. Because of this, we decided to not add any additional compost in the beginning of the season. As we planted, we gradually added either chicken manure or blood meal to specific beds, dependent on crop needs. Overall, we found the soil in the Pioneer Garden to have good structure and overall fertility, while the Market Garden soil was more compacted with poor drainage. In the future, we hope that raised beds can be made in the Market Garden. With more defined beds, a fertility plan can be more effective and implemented.
Irrigation:
While 2016 was a record-breaking drought, we had a season full of rain in 2017! The heavy rain in the start of the season made it initially difficult to have Farm Services make our beds or use the BCS. After a slow start, we were able to catch up on our planting, and enjoyed the weekly rain that greatly reduced the need for irrigation. Farm Services had extended the irrigation from the orchards to the Market Garden, improving water pressure and water access to the farm prior to the start of the Spring 2017 Season. At the end of Fall 2017, Farm Services further extended the irrigation to the Pioneer Garden. This construction will greatly improve effective water usage, and allow for a more efficient washing process on market days.

Even with an abundance of rain, we still irrigated most of our beds. We placed header lines down the middle of both the Market and Pioneer Garden. Drip irrigation was laid in the Pioneer Garden by Farm Services, and laid in the Market Garden by hand.

Weed Management:
Because of all the rain, the weeds were abundant. To decrease hand weeding, we planted many crops into rows with black plastic and covered beds with straw. Even though the straw was seed free, we found that if we didn’t lay a thick enough layer, the straw would seed and begin to grow. Straw must also be reapplied as the season progresses to be effective in use. Black plastic was incredibly useful with heat tolerant plants, such as peppers, tomatoes and eggplant. The plastic warmed the soil, and allowed us to transplant earlier in the season. In the heat of the summer, the plastic was too warm for other plants, reducing growth and causing water stress--specifically for cucumbers and cabbage.
Most of the weeding was done by hand by both managers and volunteers during work parties. Although it was very time intensive, it was effective and improved crop growth. We mowed between beds and weed-wacked when possible. Halfway through the season we started to use a black tarp to reduce weed pressure, which provided a good reusable alternative to black plastic. The tarp was placed on a bed for about 3 weeks. With heat and lack of sunlight, weed seed germination was suppressed. After removal, planting into beds was easy and beds tended to have much lower weed pressure.

In the future, we hope to create a weed management plant to reduce the soil seedbank.

**Pest Management:**

Given the wet season and varying temperatures (warm one week and cool the next), we had very heavy pest pressure.

**Flea Beetle - Phyllotreta vittula**

Even though flea beetles are small, they had large effects, eating away at many of our crops’ vegetative growth. We were able to detect flea beetles by the lacy appearance of leaves. The damage prevented the leaves from photosynthesizing, and in cases of leafy greens (arugula especially), caused aesthetic issues which prevented us from including them in the CSA. We found that covering rows with Reemay immediately after transplanting was very effective, specifically with edible greens, eggplants, and brassicas. It was important to either bury the Reemay edges or place rocks along the sides to seal out the flea beetles.

**Colorado Potato Beetle - Leptinotarsa decemlineata**

Colorado Potato beetles were a large problem with Dilmun Hill’s eggplant. We first found their larvae underneath the leaves, and manually removed them. Each week we manually removed the beetles in every stage of development and crushed them. We found this approach most effective in lowering their impact. The larva is pictured to the right.

**Tiger Slugs - Limax Maximus**

Slugs were a huge issue in the Market Garden. They persisted throughout the season because of the rainfall and lack of persistent heat. We also think that the use of straw on beds with Brassicas helped aid slugs in persisting. We applied Sluggo, iron phosphate pellets that stops slugs and snails from feeding, weekly to the market garden. We also put small cups of beer in beds with Brassicas. We found both the Sluggo and beer moderately effective in deterring slugs.
**Cucumber Beetle - Acalymma vittatum**
Cucumber beetles appeared very early in the season in our high tunnel. Due to flooding issues in the high tunnel, the environment was very moist and wet, and thus our cucumbers began to suffer immediately after they were planted in the high tunnel. The beetles also appeared in our cucumber bed in the pioneer garden. We were able to mitigate the issue through entomology researcher Jeffrey Gardner’s reverse leaf-blower, and vacuumed the beetles off the leaves.

**Groundhog/Woodchuck - Marmota monax**
Woodchucks were persistent throughout the season, and managed to get into our plot through many holes dug underneath our deer fence. We set kill-traps at these holes, and managed to catch many. We had to be proactive in checking the traps, as we had many experiences with caught animals bloating up in the sun and exploding. We suggest purchasing more effective traps for the next season.

**Cover Crops**
Due to the Fall CSA and wholesale, it was difficult to coordinate and plan an effective cover crop plan without ceasing production. Cover crops are usually planted late summer or early fall to ensure adequate growth before the winter. The unusual warm weather up until the end of November, near the end of our CSA, allowed us to plant a last minute cover crop of oats in most of our beds. Efforts could be made next year to come up with a gradual cover crop plan that would encompass the CSA season as much as possible, allotting certain beds to be cleaned and covered earlier than others. For the high tunnel, a special cover crop, triticale, was chosen in early fall to deal with the soil and flooding issues.

**Oats - Avena sativa**
Oats were planted in most beds in the pioneer and market gardens in the late fall. Ultimately, we chose oats because they grow quickly and provide ground cover, suppressing weeds. They are also easy to deal with in the spring as they are winter-killed.

**Triticale - x Triticosecale**
Due to issues of soil compaction and resulting flooding, we put the high tunnel out of production late fall. With the help of professor Thomas Bjorkman, we chose triticale as a cover crop to plant in the uncovered west half of the frame. A hybrid between rye and wheat, triticale offers
extensive roots which would decompact the soil and allow for better water percolation in the future. Triticale will also provide a lot of biomass when we kill it at the end of spring, 2018.

CSA Crops in Review:

**Amaranthaceae**

**Beets**
*Varieties: Red Ace, Boulder, Cylindrea, Hybrid Round, Touchstone Gold, Chiogia*
Beets were seeded in the greenhouse for transplant in early April. Although transplanting was labor-intensive, larger beets were ready early in the season. Touchstone Gold was a favorite at market, and Cylindrea grew quickly and was extremely hardy. Direct seeded beets were thinned, and greens were used in a homemade stir-fry style mix.

**Spinach**
*Varieties: Green Malabar, Corvair, Smooth, Reflect*
The spinach that was directly seeded early spring (May) and fall (September) grew well. We seeded Malabar spinach in the summer, because it was heat tolerant. We found the variety to have poor texture and being slimy when eaten raw. We suggest that spinach be only grown in the cool months.

**Swiss Chard**
*Variety: Bright Lights*
Swiss chard was an all star, growing prolifically throughout the season. We found that CSA members preferred larger bunches of chard biweekly, instead of small bunches weekly. Swiss chard was not a CSA favorite, but it was a dependable crop that could be continuously harvested.

**Amaryllidaceae**

**Bunching Onions**
*Varieties: White Spear, Deep Purple*
We seeded 576 bunching onions in April, which allowed us to include them early in the CSA. We recommend transplanting even more, which would allow for larger bunches. Later in the season, bunching onions were direct seeded, which was also successful. While the Deep Purple bunching onions
were a CSA favorite, the White Spear had a higher germination rate.

**Garlic**
Garlic was planted by the previous year’s managers in the Market Garden. We lay a fair amount of straw down early in the season to reduce the amount of weeding needed. Garlic was harvested and layed in a greenhouse in Freeville to cure. Unfortunately due to high heat, the garlic was fried, and could not be stored. The garlic scapes were a huge CSA hit and should be utilized.

**Leeks**
*Varieties: Takrima, Gevaria, King Rich*
Leeks grew well in both the Market and Pioneer Garden.

**Onions**
*Varieties: Hybrid Yellow, Purplette, White Onion, Sierra Blanca*
Onions grew well in the beginning of the season. Given the wet soils, most onions were harvested prematurally to prevent rotting. We suggest planting more onions in the future.

**Apiaceae**

**Carrot**
*Varieties: Purple Haze, Sugarsnax, White Satin, Napoli*
Our first two direct seedings of carrots in the Pioneer Garden did not germinate. After, we decided to seed in East Ithaca which was much more successful.

**Celery**
*Variety: Tango*
Both plantings of celery produced very well in both the market and pioneer garden. It was a substantial addition to the CSA.

**Apiaceae**

**Lettuce**
Varieties: Salanova Red Butter, Butterhead, Salanova Red Oak, Salanova Red Incesto, Adriana Butterhead, Starfighter
Lettuce produced very well all season long. It was fast growing and relatively heat tolerant. We began offering lettuce in full heads, but found CSA members preferred having pre-washed and cut mixed bags of salad mix. CSA members expressed that they preferred to have lettuce mix each week. We tried to transplant new heads each week to keep up with this demand. We found all varieties easy to plant, harvest, and wash.

Brassicaceae
Arugula
Variety: Astro
Arugula grew very well when transplanted and direct seeded. It was a flea beetle favorite, and needed to be covered with Reemay immediately. We suggest bagging the arugula separately than the greens mix, as it was somewhat polarizing.

Greens Mix
Varieties: Spicy Greens Mix, Stir Fry Mix
Greens mixes grew very well throughout the season, especially when they were planted in the shade of the pioneer garden. We were able to get two cuttings out of most plantings.

Kale
Varieties: Toscano, Siberian, Scarlet, Red Russian
Kale was our rockstar of the season. It consistently grew in all weather and locations, with very low pest pressure. We alternated between bunching kale and making mixed bags. Both were well received by CSA members, but bunched kale did better at market. Both fall and spring plantings of kale grew well and supplemented the CSA when other crops were not available.
Broccoli
Varieties: Arcadia, Diplomat, Spring Raab, Mini Broccoli. Woodchucks LOVED broccoli. Transplant needed to be covered right away or they would be eaten. All broccoli was seeded in early spring, but did not head until early fall. Because of issues with swede midges, many heads were deformed, or had multiple smaller heads. A few Spring Raab were planted as a trial. They needed to be harvested daily to prevent from bolting and did not provide enough to be included in the CSA.

Brussel Sprouts
Varieties: Diablo, Hestia
We tried to seed brussel sprouts earlier this year in attempt to include them in the CSA. They were planted in the Market Garden and grew very slowly. They were ready until late November. We ended up selling the sprouts at the Mann Library Food and Fiber Fair.

Cauliflower
Variety: Graffiti, White Snow, Cheddar
Although they took a long time to head, cauliflower grew well in the Market Garden. The Graffiti (purple) was a huge hit at the farm stand.

Cabbage
Varieties: Rubicon Chinese, Ruby Perfection, Farao, Green Storage
While cabbage grew poorly in the Market Garden and never fully headed, it grew quickly and well in the Pioneer Garden. Chinese cabbage was a CSA hit, and we wish we had planted more.
Kohlrabi
Variety: Azur Star, Winner
The kohlrabi were a unique addition to the CSA. Members were excited to try a new vegetable and came back asking for more. They grew consistently well throughout the season.

Radishes
Varieties: Easter Egg, French Breakfast, Watermelon
Radishes were a great early crop to include in the CSA. We did not initially plant enough and had to include a single radish in the first CSA. After, we increased our direct seeding and were able to include radish bunches. Since radishes tended to be a polarizing crop, we put it in the “you pick” section of the CSA.

Cucurbitaceae

Cucumber
Varieties: Lemon, H-10 Little Leaf, Tasty Jade, Seedless
Cucumbers were difficult to grow, particularly because it was so wet this season. Our plants suffered from powdery mildew and cucumber beetles, especially those in the high tunnel. Powdery mildew in the high tunnel spread like wildfire, and there was not much we could do beyond spraying a baking soda solution. We recommend looking for varieties that are resistant to powdery mildew, and also finding an easy system to trellis the plants.

Watermelon
Varieties: Sugar Baby, Sunshine
We chose small varieties that would ripen quickly. Volunteers loved sharing watermelons during work parties. We sold out of melons quickly at the farmers market. We suggest planting more in the future!

Pumpkin
Varieties: Jill-be-little, Pie Pumpkins
Because of high disease pressure, specifically powdery mildew, most plants did not produce pumpkins. We planted only a bed of each variety. We initially chose the Jill-be-little to include in our CSA as a one-time special addition.

Summer Squash/ Zucchini
Varieties: Hybrid Yellow, Yellowfin, Dunja, Bush Baby
Both plantings of squash (late spring, mid summer) produced well. CSA members enjoyed trying different varieties and trying new recipes that we provided. We needed to harvest the squash multiple times per week to prevent the squash from getting too large.
**Winter Squash**  
**Varieties:** Honey Bear, Metro PMR, Spaghetti Squash  
Like the other cucurbits, winter squash suffered from powdery mildew and did not produce.

**Fabaceae**

**Beans**  
**Varieties:** Jade, Provider  
Beans grew very well in the Pioneer garden when direct seeded and transplanted. We found the Jade beans to be more tender and flavorful. While they were time intensive to harvest, they required very little weeding. Volunteers enjoyed harvesting beans during work parties.

**Peas**  
**Varieties:** Maxigold, Sugar Snap, Oregon Giant Snap  
We planted a half bed of peas in the southern plot. We included them in the salad mix to add some crunch.  
**Varieties:** Shoots  
Pea shoots were a filler for the CSA early in the season. Because they were not well known we included recipes in the newsletter that would help members prepare them. We also mixed with the pea shoots with beet greens and baby kale to create our own stir-fry mix.

**Lamiaceae**

**Basil**  
**Varieties:** Genovese, Citrus, Thai, Purple  
We planted most of our basil in the raised beds by the barn. It was extremely productive in the hot summer months. CSA members enjoyed choosing different varieties of herbs each week. Per advice from last years’ managers we planted in moderation!

**Solanaceae**

**Eggplant**  
**Varieties:** Traviata, Italian, Barbell, Hybrid Mini Eggplant, Machiaw, Orient Express  
Cover your eggplant! The flea beetles absolutely loved the young transplants and completely obliterated the Machiaw. Planting in the black plastic helped reduced weed pressure and warmed the soil, allowing us to transplant earlier. The diversity in varieties were well received and all grew well.

**Pepper**  
**Varieties:** Lunchbox, Hybrid Bell, Ace, Rocket, Hungarian, Jalapeno
Peppers grew really well in the Pioneer Garden. We planted lots of spicy peppers in the hopes of reducing pest pressure. As a result, we were left with too many spicy peppers. Peppers were a hit and we suggest planting the early varieties (Ace).

**Potato**

*Varieties:* Pike, Katahdin, Genesee, Keuka Gold, Upstate, and Red Potatoes

All these varieties produced well. Straw was used as a surface residue to prevent weeds, but hilling was also considered. Because the potatoes were planted about 4 inches down and a foot apart, it gave the opportunity to expand upward if there is compaction or other limits to space. Potatoes were stored in the basement of the barn with the grey close top bins, excess soil was removed from the potatoes but not rubbed to reduce the damage to the outer skin. Condensation collected on the inside of these bins, most likely because of the excess soil. Fans were set up to promote evaporation and turned on periodically. The majority of the seed potatoes were from Matthew Falise, who should be contacted early on through Betsy.

**Tomato**

*Varieties:* SunGolds, Rose, Cherry Bomb, Indigo Cherry Drops, Supersweet 100, Cherokee

Tomatoes were a big success this season, particularly the indeterminate cherry tomatoes. The variety of cherry tomatoes we had worked well for the CSA—we usually had mixed pints of SunGolds, Indigo Cherry Drops, Cherry Bombs, Supersweet 100. Once we had the trellising set up, the cherry tomatoes were very easy to maintain and clip, particularly in the high tunnel. For our determinate varieties, Rose tomatoes did fairly well. We had a lot of difficulty with our heirlooms such as the Cherokee, as we could not tell easily when they were ripe.
## Seeding and Harvest Timeline

<table>
<thead>
<tr>
<th>Crop</th>
<th>Date Seeded</th>
<th>T/D</th>
<th>Harvested</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>June</td>
<td>July</td>
<td>August</td>
</tr>
<tr>
<td>Beets</td>
<td>4/15</td>
<td>5/15</td>
<td>6/15</td>
</tr>
<tr>
<td>Radishes</td>
<td>5/15</td>
<td>5/22</td>
<td>6/2</td>
</tr>
<tr>
<td>Lettuce</td>
<td>Weekly</td>
<td>4/21-9/15</td>
<td>T</td>
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<tr>
<td>Swiss Chard</td>
<td>4/14</td>
<td>4/28</td>
<td>6/15</td>
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<tr>
<td>Kale</td>
<td>4/21</td>
<td>6/10</td>
<td>7/1</td>
</tr>
<tr>
<td>Bunching Onions</td>
<td>4/14</td>
<td>5/29</td>
<td>7/10</td>
</tr>
<tr>
<td>Leeks</td>
<td>4/18</td>
<td></td>
<td>T</td>
</tr>
<tr>
<td>Celery</td>
<td>4/15</td>
<td>5/15</td>
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</tr>
<tr>
<td>Broccoli</td>
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<tr>
<td>Storage Cabbage</td>
<td>4/14</td>
<td>6/25</td>
<td>T</td>
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<tr>
<td>Chinese Cabbage</td>
<td>4/15</td>
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<td>Brussle Sprouts</td>
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<tr>
<td>Summer Squash</td>
<td>4/14</td>
<td>4/21</td>
<td>5/3</td>
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<tr>
<td>Watermelon</td>
<td>5/3</td>
<td>7/17</td>
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<tr>
<td>Eggplant</td>
<td>4/21</td>
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<td>T</td>
</tr>
<tr>
<td>Peppers</td>
<td>4/18</td>
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<td>T</td>
</tr>
</tbody>
</table>

Image: A field with rows of green plants, possibly vegetables, indicating an agricultural setting.
Wholesale Vegetable Production:

I. **Seeding Timeline and Harvest Timeline**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Date Seeded</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
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<tbody>
<tr>
<td>Bok Choy</td>
<td>6/23/2017 T</td>
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<td>Tomato</td>
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<td>Potato</td>
<td>6/6/2017 D</td>
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<tr>
<td>Corn</td>
<td>From MM T</td>
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<tr>
<td>Carrot</td>
<td>6/9-8/1/17 D/T</td>
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<td>Winter Squash</td>
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<td>Basil</td>
<td>From MM T</td>
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<tr>
<td>Pepper</td>
<td>4/18/2017 T</td>
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<td>Eggplant</td>
<td>4/21/2017 T</td>
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<tr>
<td>Chard</td>
<td>6/23/2017 T</td>
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<td>6/23/2017 T</td>
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</tbody>
</table>

Above is a list of the crops grown at East Ithaca with the dates seeded, whether they were transplanted or direct seeded, and the green indicates the months that it was harvested.
II. Crop Plan

There was an original plan to have multiple successions, but because of the late seeding date, this was impractical. By the time that the kale and spinach were planted, they were unable to reach a maturity for harvest.

Cover crops were planted in mid-October as shown in the image below. We were not able to establish them well. The plastic was not removed before the end of the semester due to the weather and Farm Services was busy. The straw already covering the beds from the growing season was the most effective covering of the soil for the winter because of the status of cover crops.
East Ithaca Crops in Review

Dry Beans
Varieties: Vermont Cranberry, Midnight Black Turtle
Both varieties are better producers when direct seeded and should aim to be harvested in early September. Multiple harvests are necessary and should be done as they are ready because they are susceptible to disease. The Vermont Cranberry seemed consistently larger and more susceptible than the Midnight Black Turtle.

Broccoli
Varieties: Imperial, Diplomat
Both did great when grown on white plastic. This was most effective most likely due to the weed suppression and time of planting. Consider more sustainable surface residues, like straw, to avoid waste. Succession planting would be help in selling to markets and ensuring they do not brown.

Kale
Varieties: Siberian, Red Russian
Both were seeded too late, and especially transplanted too late. Siberian is not a favored variety in its appearance, and disease susceptibility.

Brussels Sprouts
Varieties: Diablo, Dagan
Seeding them earlier would help them be ready earlier and sell to more markets. They were grown on white plastic, for the same reason of broccoli, and a thick layer of straw may be used as a replacement. Trimming the tops during late July would have also helped them focus on growing the sprouts. This is a great crop and there is a market but it needs to be established earlier.

Bok choy
Varieties: Joi Choy
This crop was extremely successful but there was a limited market for it. A smaller variety may have . Successive planting should definitely be done due to the limited market and its taste quality may decrease.
Pepper
Varieties: Bell, Mixed
These were from both main Dilmun and Michael Mazourek. The smaller sized peppers did not grow well, but the Bell peppers thrived. There was not a steady market for peppers overall.

Eggplant
Varieties: Machiaw, Orient Express, Barbella, Italian, Traviata or Mini
Verticillium wilt impacted Barbella and Italian varieties the most. Verticillium wilt is a common soil-borne fungal pathogen that once it has infested soil can remain for a very long time. They all still produced otherwise, but the disease will persist in the soil for years and crop rotation must take this into account. This was a great crop and many enjoyed the varieties but also consistency is also necessary in wholesale.

Tomato
Varieties: Prudent’s Purple, Jasper, Sun Gold, Red Zebra
Many of these varieties were seeded and planted too late, especially the larger tomatoes. Even though they were planted in black plastic, many could not grow enough and ripen in time. Smaller tomato varieties sold well at stands, especially the Sun Golds. Red Zebra was appealing because of the coloration and size (medium versus the larger beefsteak tomatoes).
Potato
Varieties: Red Potato, Upstate, Pike, Katahdin, Genesee, Keuka Gold
All varieties produced well. Straw was used as a surface residue to prevent weeds, but hilling was also considered. Because the potatoes were planted about 4 inches down and a foot apart, it gave the opportunity to expand upward if there is compaction or other limits to space. Hill soil up around potato plants in the future to avoid getting green unmarketable potatoes. Potatoes were stored in the basement of the barn with the grey close top bins, excess soil was removed from the potatoes but not rubbed to reduce the damage to the outer skin. Condensation collected on the inside of these bins, most likely because of the excess soil. Fans were set up to promote evaporation and turned on periodically. Research better storage practices for potatoes in the future.
The majority of the seed potatoes were from Matthew Falise and should be contacted early on through Betsy.
Meetings with Zeus should be done as soon as possible and any other markets that will be particular about varieties. Ensure that what is provided is what they want, otherwise sell it in a market or CSA.

Onion
Varieties: Yellow Onion, Red Hawk, Evergreen Hardy
Evergreen Hardy bunching onions were great, transplanted and direct seeded. Other onions were planted later in the season and were very small and unable to bulb. We were able to sell them occasionally in the market or given in the CSA. The large onions should be planted earlier in the season. Biweekly succession planting of the bunching onion is suggested to avoid having an overflow.

Corn
Varieties: Sweet Corn, Painted Mountain
The sweet corn was from Michael Mazourek and were very productive. It would be suggested to grow more and successively plant them. The Painted Mountain flint corn was planted late in order to distribute for fall decorations. The hope was to further process them by grinding but this was difficult to arrange with Michael Mazourek. We suggest not to plant flint corn as it is a lot to deal with at the end of the semester.

Carrot
Varieties: Hercules, Deep purple, Napoli, Rumba, Purple Haze, SugarSnax, Hybrid Early Carrot, Bolero
These were great to grow. Do not transplant them, direct seeding works well because of the loose soil. They were best when weed free or production will suffer greatly.
Swiss Chard
Variety: Bright Lights
There was often an abundance. It is suggested to grow less unless there is a demand for the successful crop.

Spinach
Varieties: Gazelle, Woodpecker
They were direct seeded after the potatoes, but not watered in properly and only a few sprouted. This would also be very time consuming to harvest and most likely not worthwhile.

Winter Squash
Varieties: Golden Nugget, Delicata, Acorn Squash, Zucchini
From Michael Mazourek, they were transplanted onto black plastic, planted individually. These produced very well and had a long growing season, powdery mildew eventually took over despite preventative measures.

Basil
Varieties: Italian, Purple
The plants were from Michael Mazourek. Basil was very popular but storage before sale was difficult. When grown under straw, weeds were suppressed and the basil flourished.
III. Four Season Production Course Preparation
As of recently, the course is not likely to begin soon. The following are general outlines to the two courses:

Farm to Table Intro
This course will focus on harvesting and processing the foods, while also participating in the upkeep of the East Ithaca plot. Dedicated hours during the week and volunteer hours will be assigned part of the curriculum. The goal of this course is to introduce students to what is required to grow and process food. This course could be offered each semester and not require a full year commitment.

Wholesale Vegetable Production
Students involved will make a crop plan, with consideration to past crop plans and future rotations, and execute it. Other practices will be carried out to contribute to the health of the soil and maintaining a sustainable system. Wholesale markets will be obtained and sales will be delivered and arranged. This course would start in the Spring semester and require students to stay during the summer to carry out their plans, then continue to the Fall semester.

V. Notes for the Future
East Ithaca has a lovely sandy soil that is a pleasant change from the clay soils of Dilmun. This soil is extremely productive and is a large space where wholesale is possible. The Oggun tractor from Jesse Puk-Beals project was used once, as it was difficult to get Farm Services to till due to weather and their busy schedule. Although the tractor moves extremely slow, Betsy was able to drive it up the hill and as a team East Ithaca was finally ready for planting. Usage of the tractor and other mechanized tools at East Ithaca would drastically save on hours of labor.

The electric fence was extremely helpful in preventing all pests from entering and should be used in the future. The use of plastic mulch is ideal to reduce weeds, but conflicts with the goal for sustainability. Other mulches like straw were effective when applied in thick layers. Paper mulch can also be considered.
Crops for the future need to be well communicated to markets and buyers to ensure that they are able to arrange other orders and are receiving the desired variety. To reduce labor, as time is limited, “Set-it and Forget-it” crops are ideal especially because many of the markets are concentrated during the Fall semester. The Hill Harvest listserv was a valuable marketing tool to see if anyone was interested in excess produce. The planting of eggplant must be done wisely due to multiple year presence of the fungal disease.

Gleaning at the end of the season was necessary to avoid food waste. Volunteers were organized by a student doing a gleaning project. Bok choy and Swiss chard were harvested and donated to various food pantries in the community, and on campus.
Greenhouse & High Tunnel Production

Greenhouse Production Overview
Similar to last season, 2017 greenhouse production was focused on growing seedlings for CSA and wholesale vegetable production. We utilized a certified organic greenhouse in the Guterman Bioclimatic Laboratory for seeding in the beginning of April until September. We seeded varieties of lettuce every week to ensure we had enough for salad mixes that were included in our CSA. Other varieties were seeded in longer cycles, such as every three weeks. While we would periodically check on our seedlings, they were generally watered and taken care of by greenhouse staff. When the seedlings had adequately matured, we hardened them off in cold frames adjacent to the Guterman facilities before transplanting them in our fields.

High Tunnel Production Overview
The high tunnel provided a lot of opportunities for learning as we faced many issues. Only the second year in production after construction in the spring of 2016, the high tunnel was riddled with issues of pests, soil health, compaction, and flooding. The majority of production in the covered side of the high tunnel was dedicated to cherry tomatoes, a high commodity in wholesale and popular in our CSA, in addition to heirloom tomato varieties, cucumbers, peppers, eggplants. While the physical frame of the high tunnel was designed to allow production in late fall to be moved to the unutilized half of the tunnel and extend production until winter, we ultimately decided to keep the uncovered portion of the high tunnel out of production and plant cover crops.

Flooding Issues
Soon after the first of the tomatoes were planted in early June, we encountered and continued to experience a lot of flooding. Once flooded, the water would stay rather than percolate down. Fortunately, the raised beds kept the plants from being submerged, and the bodies of water generally remained in the lower-level walking paths between the beds. The tomatoes, nonetheless, looked extremely unhealthy throughout the beginning of summer.
Not realizing the source of the problem was compacted soil, we first attempted to manually pump out the water, which addressed the problem until it rained again. We then added some mulch to the paths to help absorb some of the water, which helped somewhat. We also observed during dry spells that when we simply watered for more than 15 minutes, using our drip tape irrigation, the rows flooded. With no recourse for immediate results, the best we could do was to water once a day for about 12 minutes. The irrigation timer allowed us to consistently water everyday for the specific length of time.

We consulted Glenn Evans, the Director of Operations of Cornell University Agricultural Experiment Station. Glenn observed that when it rained, the water that landed onto the actual plastic cover of the tunnel would slide off the sides. The southern side experienced minimal flooding, as the water sliding off the east of the frame percolated down a sloped hill. The northern side experienced the majority of flooding, as the water sliding off the west would fall to a flat surface and percolate into the soil of the high tunnel. Glenn suggested that a perforated tube be put into the soil on the western edge of the frame to divert the water elsewhere. Gene and farm services executed this early fall.

**Soil and Foliar Tests**
We have continued to receive support from Judson Reid, Cornell Cooperative Extension vegetable specialist, and Cordelia Machanoff, program aide. In their soil tests of our high tunnel, they discovered the extremely high pH of 7.9, likely from the large amount of compost added to the soil during construction. The water we used for irrigation was also at a pH of 8.3. To address this we utilized an injector to put in citric acid in our irrigation at the rates of 2 ounces per 100 gallons of water. This effort was to prevent any more hikes in the pH for the short-term, but not necessarily to bring it down. We also worked in 5 pounds of sulfur into the soil, including the unutilized, uncovered portion of the high tunnel. The sulfur reacts slowly and was a long-term effort in lowering the pH. Their foliar tests of our tomato plants showed deficiencies in nitrogen as well as Manganese. The Manganese levels resulted from the basic pH, while we mitigated the nitrogen by applying blood meal.

**Notes for the Future**
In an effort to address the difficulties we faced this season in the long-term, we opted to plant triticale as a cover crop rather than produce winter greens. This triticale will be killed in mid to late spring with a tarp in time for production next season. We strongly recommend keeping this year’s covered side of the high tunnel unutilized next year with a cover crop, and moving the plastic frame to the half that has triticale for production next season. We hope that in two seasons, soil health on both sides of the high tunnel will be good and allow us to utilize the high tunnel to the full extent. For this to happen, next year’s managers must be proactive in monitoring and addressing soil issues.

In terms of crops, we suggest continuing to grow majority indeterminate cherry tomatoes, particularly Sun Golds, next year. While they require a big investment of time and energy early in the season to set up trellising, maintenance and adding clips becomes easier as the tomato
plants become more established. Peppers also grew extremely well with little maintenance. We advise that cucumber varieties be selected cautiously, if chosen to be planted in the high tunnel because the damp atmosphere makes the plants very susceptible to powdery mildew.

Diagram of High Tunnel illustrating where each crop was planted
CSA

CSA Logistics
Dilmun ran a summer and fall CSA, both of which were overseen by the CSA coordinator (with help from the other managers). We had over 30 paying members for the summer and the fall season, in addition to work shares.

CSA Contents
We strived to include a diversity of vegetables every week in both the summer and fall CSA. It was much more challenging at the beginning of the summer. For the first few weeks we had a smaller variety which included a variety of greens (kale, lettuce, arugula, stir fry mix, swiss chard etc.), bunching onions, radishes, and garlic scapes. We supplemented the second week with strawberries grown by Marvin Pritts. Later on, when we had tomatoes, eggplants, cucumbers, beets, beans, zucchini, cabbages, peppers etc. providing greater variety became easier. The diversity fluctuated from week to week but we strived to consistently provide 8 or 9 different items. We were also able to provide blueberries and tart cherries, that we picked from Cornell Orchards. An additional item we put in the CSAs were teabags which we filled with dried lemon balm and camomile grown at Dilmun. The CSA is our major market, so whatever vegetables were ready that week were included.

Summer CSA
The summer CSA ran for 12 weeks, beginning on June 15th and ending August 31st. Pickup was every Thursday from 4-7 pm in the CSA shed at our farm. Two share sizes were offered: a full share ($350) and a half share ($185). Half shares were expected to provide enough vegetables for 1-2 people, while full shares were recommended for 3-4 people. The half shares were far more popular than the full share option. 25 people purchased half shares, while 8 purchased full shares. Additionally, 5 full-shares were provided to work for share participants. Seventeen of the CSA participants were undergraduates, nine were graduate students, and seven were faculty and staff. All work for a share participants were either current undergraduates, or had just graduated.
Managers began preparation for the CSA on Wednesday by washing produce bins and harvesting some of the hardier crops, like radishes. To ensure fresh produce, most of the vegetables were harvested early Thursday morning, for afternoon pickup. A few weeks into the summer we began offering a You-Pick section where members could choose a few items from a larger group of vegetables. This gave members more choice in what produce they had and allowed us to offer certain types of produce even when we did not have enough for all members. The You-Pick section was very popular, and it gave us another opportunity to talk with the CSA members.

We strived for half shares to have the same diversity, simply with half the produce. Despite this goal, when we had a limited number of certain crops occasionally just the full share would get them. Additionally, full shares were generally allowed to take more from the You-Pick section.

Every week a newsletter was sent out on Tuesday nights updating CSA members of what was happening on the farm, letting them know what would be in the share that week, and sharing a few recipes for that week's produce.

**Fall CSA**
We ran a 5 week fall CSA, beginning on September 7th and ending on October 12th. Pickup was every Thursday at the Farmers Market at Cornell from 11:00 am-2:00 pm. If participants were not able to make pickup, their shares were left in the Plant Science building cooler. We had 30 paying members, and 14 work for a share participants (for 11 work for a shares). Of our paying members, 24 of our members were undergraduates, 3 were graduate students, and 3 were faculty and staff. Of our work for a share participants, 13 were undergraduate students and 1 was a graduate student. The managers tried to make the CSA more accessible by offering more work shares, pricing on a sliding scale, and having on campus pickup. The estimated worth of the CSA was $100, and members paid on a sliding scale from $75-$150. Additionally, CALS Dean Kathryn Boor was generous enough to sponsor one share. Every Tuesday a newsletter similar to the one sent during the summer CSA was sent out to all members.

The CSA was harvested, washed, and packed on Wednesday afternoons during the work party. The work for a share volunteers were essential in helping the managers complete this. The CSAs were packed in the wax boxes that are stored upstairs in the barn. There are a few challenges with the wax boxes. They are small size, so it was often challenging to fit all of the produce into the boxes, and some of the boxes felt sticky or were falling apart.

Having CSA pick up at the Farmers Market at Cornell was challenging for members for a variety of reasons. First, it was in the middle of the day so many people could not make it, the arts quad is out of the way for much of our base, and members often had to carry produce around with them for the rest of the day if they were able to pick it up. It could be worth it for future managers to consider different pick-up times or locations for the fall CSA.
**Work for a Share**
The work for a share volunteers were instrumental to both the summer and fall CSA. Summer work for a shares were able to come whenever they scheduled during the week, but often came during the work parties. This allowed the Sunday work parties to continue to be productive during the summer, when they are more sparingly attended. During the summer we had multiple people share some of the work for a shares, and ended up having 8 volunteers to 5 work for shares. They were allowed to split the time between them, but often both volunteers would come together for the full amount of time. This was mutually beneficial, because it allowed more people to participate in the work for a share program, and we got more help around the farm. We also received feedback, that the full share had too many vegetables for one single volunteer. During the fall we offered 11 work for a shares, 2 of which were shared so we had 13 participants. The volunteers could only come to the farm during work party hours. The consistent presence of work for a share participants to help harvest, wash, and pack during Wednesday work parties allowed for the fall CSA to be possible during the school year. Summer work for a shares worked 3 hours a week for $30 worth of produce, while fall work for a shares worked 3 hours a week for around $20 worth of produce. The work for a share program also helps build the Dilmun community, as participants get to know the farm well, attend events, and help out other students and volunteers at work parties.

![Image of volunteers with vegetables]

**Customer Feedback**
After both the summer and fall CSAs a survey was sent out to all members, so they could provide feedback on how they thought the season went. The weekly newsletters alerting the members what produce they were getting were popular. Members of the Summer CSA loved the fruit, and all of our CSA members loved getting tomatoes.
A concern mentioned for the summer CSA was the use of plastic bags, which are non-recyclable. The managers took note of that concern, and tried to cut back on the number of plastic bags used in the fall CSA. That being said, trying to reduce or eliminate plastic could be something for future managers to consider. People really disliked getting one item of things, like one ear of corn or one large tomato. Some people noted that they got an overwhelming amount of kale and peppers, but this was mostly due to the fact it was a very good year for kale and peppers.

For both the summer and fall CSA’s many people responded that they received enough produce and a sufficient variety of produce depending on the week. This is something to strive for in future years with the CSA. Planning to have variety during the first few weeks of the summer is challenging and worth contemplating for future members.
Special Projects and Research

Jessie’s Tractor, Tatiana aka Big  Dilmun, through CUAES and the Toward Sustainability Foundation Grant to Jesse Puka-Beals ‘18, purchased the 20th Oggun tractor produced by the Alabama based company Cleber in order to investigate the cultivation tractor’s appropriateness for improving labor efficiency on small scale farms. With just a touch of our love, we named our tractor Tatiana, aka Big T. As Dilmun plans to expand its capacity for production, questions regarding weed management and soil quality were explored through this project. usual hand weeding approach. operation more efficient, as she was able to complete weeding jobs in 1/30th the time of the usual hand weeding approach. We found that Tatiana has a lot of potential to make our operation more efficient, as she did jobs in 1/30th the time of the usual hand weeding approach.

Dilmun Hill Barn Project  
The Barn Project was founded by former manager Alena Hutchinson, and is an interdisciplinary team of students working to bring to fruition a new barn. The team is made up of former Dilmun managers, student architects, designers, engineers, urban planners, and more. Our current barn is used for storage, and provide many spatial constraints for efficient operation of the farm. Throughout the summer and the fall, the Barn Project interviewed farmers, held discussions among farm managers and volunteers, and came up with a long-term vision and a concrete plan for a first phase. The first phase will consist of building a structure for the small tractor that we acquired this season through Jesse’s research, and will be placed near the southern edge of the Market Garden. The first phase of construction was made possible by the generous donation of alumnus Michael Wolfson, B.Ch.E ’65, LL.B. ‘67 and his wife Ellen Wolfson.
Outreach Activities

❖ CSA Kickoff Soiree Sourie
  ➢ Farm Tours
  ➢ Food and Beverage
  ➢ First CSA Pickup
❖ Farmers’ Market @ Cornell
  ➢ Sold a variety of produce weekly on the Arts Quad
  ➢ Fall CSA Pickup
  ➢ Weekly during fall semester
❖ Food and Fiber Fair
  ➢ Sold Brussel Sprouts
  ➢ Bean Counting Game
  ➢ General Outreach
❖ Vegetable Sales in Mann Lobby
  ➢ Pay-What-You-Can
  ➢ Great Publicity
  ➢ Twice in late fall
❖ Volunteer Work Parties
  ➢ Held twice per week over the summer and fall
  ➢ 5-10 volunteers per week

Farm Tours
Community
  ❖ 9/22/17 BOCES Special Education
Courses
  ❖ 9/6 and 9/17 PLSCS 1900 Sustainable Agriculture – Food, Farming, and the Future
  ❖ 10/2 - 10/5 PLSCS 2600 Soil Science
  ❖ 10/9 IARD 4020/6020 International Agriculture in Developing Nations
  ❖ 9/29 ENTOM 3410 Applied Entomology
  ❖ 11/1 PLHRT 1101: Plant Sciences and Systems
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