

Student Harvest CSA Management Guide.

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In the Market Garden at the UCD Student Farm we operate a community supported agriculture system (CSA), which provides a basket full of fruits and vegetables to 65 on-campus subscribers for approximately 46 weeks of the year. Our CSA serves three purposes. First, it provides a mechanism for educating students about a wide variety of vegetables in an experiential learning setting. Secondly, it generates income to support farm activities, employ students, purchase supplies and equipment. The CSA generates approximately 80% of total sales for the Market Garden. Finally, it increases support and recognition of the Student Farm throughout the campus. After a period of expansion, we have settled at 60 subscribers as a level that best meets these three purposes.

Background: Community supported agriculture began simultaneously in Germany and Switzerland, and Japan in the 1960s. In Japan, consumers who were concerned about the rise of imported food and the loss of farmland started *tei kei*. They contracted with farmers to dedicate their harvest to the members of the *tei kei*. In the 1980s, membership in one of the largest *tei kei* had reached 3,000, but by 2007 this number had fallen to 350. Organic growers in Japan are very concerned about the decline of *tei kei*, and attribute it to the increased availability of organic produce from other sources. In Germany and Switzerland CSA farms were developed by followers of Rudolph Steiner, the originator of Biodynamic farming, based on his economic principles. Their goal was to design a strategy to support local small farmers. The idea was that consumers would buy a share

in the farm's harvest for the year, and pay for it at the start of the season. This would give a grower an assured market for sales and the capital to fund agricultural operations for the year. CSAs first came to the U.S. in 1984, when Jan Vander Tuin brought the concept from Europe to Robin Van En's Biodynamic farm in up-state New York. Today in the U.S. there are between 2,000 and 3,000 CSA farms. Many of our local organic farms offer CSAs, such as Terra Firma, Riverdog, Full Belly, Good Humus, Eatwell, and Capay Fruits and Vegetables. Most of the local CSAs function more like produce subscriptions rather than shareholders dividing up the harvest. Thus, growing for CSAs is often referred to 'subscription farming.' These farms also sell retail, wholesale, and to farmers markets, so CSAs are just a part of their overall sales strategy. Nevertheless, CSAs are an increasingly successful part of small farm marketing.

Operating CSAs requires some special skills. They require a steady flow of produce, sufficient to fill many baskets with a wide range of crops each week, which necessitates multiple and diverse plantings. CSA farmers also have to maintain databases of subscribers and set up efficient billing systems. Most CSAs include a letter with each weekly basket that describes farm activities and offers recipes on how to use the produce. Many farms also have field days where their subscribers can visit the farm and see what's happening.

To summarize: the benefits of a CSA for a small farm include guaranteed sales, payment in advance, reusable sales containers, enhanced crop diversity, community support for the farm, improved local food security.

The UC Davis Student Farm Student Harvest CSA:

The two important functions that are essential to CSA operation are field operations and data base/subscriber management. The latter is divided into weekly functions related to basket delivery, and quarterly management of the database. Each week on Monday and Thursday we generate a check-off list so we know how many baskets to make and we can keep track of which subscribers pick up their baskets. In addition, we write a letter that is sent by email to each subscriber that provides some information about what is going on in the field, what is supposed to be in the basket, who picked the produce, some safety instructions, and a recipe for the week. (We have a file of recipes to choose from if necessary. They are in a file in the VanHornShared directory on the S drive of the computer in a folder called *Recipes*). We print and make available at the produce prison a couple of copies for those few who want a paper copy. Also, in order to fulfill our organic certification obligations, we record what went into the basket on another spreadsheet. The email we send to each subscriber is done through Gmail, because it provides easy access for multiple users. The gmail account name is ucdstudentfarm@gmail.com. Each quarter we have to determine who is going to renew for next quarter, and if there are drops, how many people on the waiting list can advance. It is critical to get a response on who is quitting early, so adds can be made at the beginning of quarter and income losses are minimized. It is best to send out a renewal email at least two weeks before the end of the quarter. In this email, we also indicate the cost for the upcoming quarter, the number of weeks and the delivery dates (See

appendix.). Because some subscribers indicate they want to renew, but don't send a check, we give people renewing an incentive to pay on time by offering a \$15 discount. This more than pays for itself in saved time and effort. Checks for each quarter are made out to *UC Regents* and sent to Sabrina Morgan in the Plant Sciences Dept. who graciously maintains a database of payments by subscribers, and informs us if anyone has forgotten to pay. . Each quarter it is important to keep Sabrina in the loop of the details of renewal so she can be sure the correct people have paid the correct amount. We cc her on the renewal email. Income from the CSA is transferred to our account to pay for supplies, equipment, and student employees.

CSA Field Operations:

Since we are intentionally growing a wide diversity of crops for educational purposes, there is a lot of diversity in the CSA. That said, we also aim to have a mix of seasonal essentials in the CSA. Depending on the season these include an onion family crop, root crops like carrots and beets, leafy greens, cucurbits, members of the solanaceae family, members of the chenopodiaceae, lettuce, sweet corn and pop corn, fruits, herbs, grains, beans, and sun-dried products.

Setting up for the Pick.

Mondays and Thursdays are our CSA pick days. The pick starts at 8 am and the baskets should be finished by 12, when subscribers start to arrive to pick them up. The equivalent of four full time people (workers there for the full four hours) are needed to get the pick done for 32 subscribers, and it is prudent to have more in order to get

everything done well. On a dry erase board we list the vegetables and fruits we plan to pick. When a student decides which vegetable he or she wants to pick, they draw a circle next to that name on the dry erase board. When harvesting is completed, they fill in the circle. This helps to prevent other students from picking the same produce.

We have chosen to use half bushel baskets to hold the produce for each pick. The baskets cost about \$5 each, including shipping, and last years with very little maintenance. The only problem with them is that people sometimes do not return them and they are lost from circulation. We have recently (5/08) added another column to our check off sheet indicating whether or not the subscriber returned their previous basket when they picked up their old basket. It seems to have stimulated people to return baskets. Environmental Health and Services requires that we use new liners in the baskets each time then are used. We have been using a sheet of butcher paper, torn from a roll, as a liner. If each piece is @ 12 inches long by 2 ft wide and the rolls are 1100 ft long and cost \$69.57, then a roll should last about 18 weeks ($1100 \text{ ft.}/60 \text{ baskets} = 18.3 \text{ weeks}$), and each liner costs \$0.063. It takes about 20 minutes to remove the old liners and replace them with new liners in preparation for the pick.

What goes into each basket?

Although amounts vary as the seasons progress, each pick we are aiming to put a useful amount of each product in the basket. What follows is a list of typical produce servings that are put in the basket.

Warm Season Options:

Tomatoes—6 to 8 medium sized fruits.

Peppers—two bells, one sweet Italian, one jalapeno

Eggplant—one large eggplant

Basil—a bunch, large enough to make a pesto meal for 4 people, about 10 large stems
bunched with a twist tie.

Sweet Corn—4 to 6 ears

Chinese long beans—15 to 20 beans bunched with a twist tie.

Melons—one per basket (larger melons may not fit in the basket and be placed separately
near the pick-up table in wheel barrow with a sign so subscribers will take one.)

Chard—8 stems, bunched with twist tie.

Cherry Tomatoes—one pint basket full, poured into a plastic bag without the basket.

Tomatillos—8 to 10 in plastic bag.

Potatoes—6 to 8 medium sized in plastic bag.

Jujubees—8 to 10 in a plastic bag.

Grapes—1/2 lb. in plastic bag.

Peaches, Nectarines, Plums, Apricots—4 to 6 fruit.

Summer Squash—two medium size.

Cucumbers—one or two.

Onions—1 to 3 depending on size.

Garlic—one bulb.

Green beans—12 to 15 beans in plastic bag.

Okra—5 to 10 fruits.

Figs—pint basket. Left in basket.

Sweet potatoes—two or three.

Winter Squash—one or two.

Cool Season Options:

Lettuce—one or two heads.

Carrots—8 to 10 carrots bunched with twist tie. Tops removed a hand width above tie.

Beets (with tops)—3 to 4 beets bunched with twist tie.

Red Russian Kale—8 or 9 leaves per bunch, tied with twist tie.

Lacinato Kale—10 to 12 leaves per bunch, tied with twist tie.

Carinata Kale—8 or 9 leaves per bunch, tied with twist tie.

Collards—6 to 8 leaves per bunch, tied with twist tie.

Chard—8 to 10 leaves per bunch, tied with twist tie.

Mustards—6 to 8 leaves per bunch, tied with twist tie,

Broccoli—one large head or two to three smaller heads, cut with long stems, perpendicular cut.

Cauliflower—one large head or two smaller heads. Almost no wrapper leaves.

Cabbage—one head.

Kohlrabi—one or two balls, with side leaves removed.

Spinach—can be loose or bunched depending on size. Smaller leaves loose in small plastic bag till full. Larger leaves bunched, with 10 to 12 leaves.

Rutabagas—two or three.

Parsnips, three or four, tied with a twist tie.

Turnips—3 or 4 bunched, tied with a twist tie.

Leeks—one or two.

Scunions—bunches of five or six stems.

Daikon, Watermelon or White—one or two.

Lemons—one or two.

Oranges—4 to 6.

Persimmons—two to 4.

Pomegranates—two to 4.

Celeriac—one or two roots.

Fava Beans—6 to 8 bunched with a twist tie.

Artichokes—two or three.

Asparagus—10 to 12 spears, tied with a twist tie.

Peas—10 to 12 in plastic bag.

Escarole—one head.

Radicchio—one or two heads.

Fennel—one or two stems.

Boc choi—one head.

Chinese cabbage—one head.

Crop Planning for the CSA.

The mantra for a CSA is ‘keep planting.’ There are three pivotal planting times of year: early spring, early summer and early fall. In addition, a few crops are planted in between these times

Planting Dates, Harvest Information, and Growing Practices, and Area Planted for

Early Spring Vegetables:

Asparagus—A perennial. Crowns were planted in 2003. Harvest begins in February and runs for 8 weeks. There are sometimes losses due to early frosts. The variety planted is UC157. A later maturing variety would be better. This is a great crop for the CSA because it comes at a time of year when other crops are usually in short supply. There are seven 200 ft. rows. They provide adequate harvests for 60 baskets/week for the optimal 8 week harvest period.

Potatoes—Plant February 15, for earliest harvest. Ground must be dry enough to plant. Later plantings work as well, up to the end March or so. We put potatoes in the baskets beginning in late May and continue until mid-Sept. when they start to sprout in storage—about 15 weeks. (60 baskets x 15 weeks x 2 lbs./basket = 1800 lbs. Potatoes yield about 10X what is planted, and we usually plant 200 lbs. It takes about 50 lbs. of potatoes to plant two rows on a 200 ft. bed, so we plant 4 beds.

Brassicas—Sow first week of January if possible, with the goal to transplant mid to end of February. Harvest would begin during the end of April, into May. Our goal is to have broccoli, cabbage, cauliflower, kohlrabi, kale, collards available for baskets for as many weeks as possible in the Spring. Of this group kale and collards usually mature first, around the beginning of April. One 200 ft. bed of each (two rows on a bed, 1 ft spacing between plants) is sufficient to provide 60 bunches of kale or collards/week until the beginning of June when high temperatures degrade leaf quality. Broccoli, cabbage, kohlrabi, and cauliflower begin to mature in late April or early May and are available until temperatures get too high. Cabbage is the most resistant to high temps and harvest

can extend well into June. One bed holds 200 plants of each of these brassicas. Since the spring season is short, we only harvest 8 weeks. (60 baskets/week x 8 weeks = 480 baskets that need each of these crops. Since we are also doing the farmers market in the spring, and the Coffee House will buy some these crops, we plant two beds of each, staggered a couple of weeks apart or plant different varieties that mature at different times. If we have made a sales commitment with the Coffee House for a specific vegetable like cabbage, we may plant another bed or so just for them.

Lettuce and Escarole—Sow first week of January if possible, with the goal to transplant mid to end of February. Harvest would begin in April. The lettuce matures by mid-March. We try to have lettuce until the end of May. (60 baskets/week x 10 weeks = 600 baskets) We usually plant 3 beds (two rows to a bed, 1 ft. spacing), staggered about two weeks apart.

Peas—direct seeded any time in January when the ground is dry enough. We have had problems growing peas due to disease and rabbits, and have rarely harvested enough for the baskets. Depending if bush peas or climbing peas are grown, two beds planted two weeks apart should be sufficient to provide a half/pound per basket for several weeks. Carrots, beets, spinach, turnips, etc. These direct seeded crops can be sown in January or February, depending on the weather, and if the beds they are planted in are essentially weed free. We don't have enough labor at the Student Farm during winter quarter to hand weed.

Beets--Generally, in the Spring we have only been planting beets (which are little more vigorous and competitive with weeds), unless there is an extra solarized bed available. One bed of beets, three rows on a bed, with the beets direct sown at 10 seeds/ft. will

result in about 6,000 beets. At three beets to a bunch, this is 2,000 bunches, which is enough for 33 weeks if they all went to the CSA. Some end up going to the farmers market. The CSA customers are often sick of beets by the time the harvest is over. (Beets hold up well in the heat and in the cooler).

Green beans--Can be sown in April or May as the weather warms up. Two beds are sufficient to provide a half pound of beans for each basket for a few weeks. Picking beans by hand is very slow, so we don't want to do more than a few weeks of harvest.

Tomatoes, Peppers, Eggplant, basil, Zucchini, Cucumbers—Can be sown Feb. 15th for transplanting on March 15th to April 1st, depending on weather and likelihood of frost. Successive plantings can also be made at 3 week intervals until the beginning of May. Early June is the last practical time for transplanting these crops as they will either struggle to grow in the summer heat, or they will mature too late to ripen effectively.

Tomatoes are mostly planted for the Coffee House. During the summer, from July 1st through the end of September (12 weeks), they will buy on average 14 cases/week. At 20 lbs./case, this is 2,800 lbs. Depending on the month and losses to stink bugs, sun burn, or blossom end rot, we need to pick at least ½ more fruit in order to ship marketable fruit, so the total needed is 4,000 lbs. for the CoHo. During this period we are also putting 2 lbs. of fruit in each basket. (60 baskets/week x 12 weeks x 2 lbs/basket = 1,440 lbs. Again, 50% more is needed for marketable fruit, so 2,180 lbs. are needed. This brings the total needed to 6,180 lbs. (The rejected fruit is sun dried and put in the baskets in the winter. It takes 20 lbs. of fresh fruit to make one lb. of dried tomatoes.) If each plant produces 7 lbs. of fruit, then we need to plant 883 plants. If we plant 150 plants/bed, then we need about 6 beds of red slicer tomatoes. This is divided into three staggered plantings about 3

weeks apart in order to spread the harvest over the season. For the sake of diversity we also plant a couple of beds of heirloom tomato varieties. They don't yield as well as the hybrid red slicers, but add color and uniqueness to our tomato sales.

We also sell cherry tomatoes to both the CSA and the CoHo. We usually can harvest cherry tomatoes longer than the red slicers, so we need (60 basket/week x 16 weeks x 1 lb./basket = 960 lbs.) We also sell approximately 2-12ct. cases each week for 12 weeks to the CoHo. (288 lbs.) We plant a mix of Sungolds and Red Cherry varieties, one bed of each and two plantings of each a month apart. This has been sufficient to meet our cherry tomato sales needs.

Eggplant harvest begins in July and continues into November (20 weeks). Each basket gets one or two fruit each week. (60 baskets/week x 20 weeks x 1 lb./baskets = 1,200 lbs.) Eggplants yield about 3 lbs./plant. In 2 row, 200 ft. bed, there are 200 plants (2 ft. spacing), the yield is about 600 lbs./bed. We plant two beds with a mix of varieties, Black Bell, Rosa Bianca, and a few others.

The CoHo buys gypsy and jalapeno peppers from us throughout the summer. Although sales vary, they can buy 20 lbs. of gypsies and 10 pounds of jalapenos on a regular basis for 12 weeks, so we need 240 lbs. of gypsy peppers and 120 lbs. of jalapenos for the CoHo. For the CSA we try to put 0.25 lb of peppers in each basket for 20 weeks (60 x .25 x 20= 300 lbs. Gypsy peppers yield about 0.75lb./plant. One bed of 400 peppers should yield 300 lbs, so we plant two beds of peppers each year, one of gypsy peppers and one bell pepper (Lantern or Cal Orange Wonder work well). Jalapenos yield 0.4

lbs./plant, so a bed of 400 plants should yield 160 lbs. This is enough for the CoHo and for the CSA, which only gets a pepper or two each week.

Melons--Can be sown in the greenhouse in March for transplanting in April, for July harvest. The next planting can be direct seeded into warm soils in April or May. A final can be sown in June. Our goal is to put one or two melons in each basket for 16 weeks. ($60 \times 2 \times 16 = 1,920$ melons). A 200 ft bed holds 150 plants. Each plant produces 3-4 melons or 450 to 600/bed., so we need a minimum of four beds. Because it is functionally easier to plant whole beds each planting, and because we want to have 3 plantings, we actually plant more than two beds. (Usually, two each planting). There are also losses to rodents and turkeys. In 2008 we transplanted melons into a black plastic mulch. This helped greatly to control weeds, and kept the drip line from being punctured by crows and rodents. We have experimented with laying down the 30 " wide, black plastic mulch in two different ways. First, we tried laying the mulch before plants were either seeded or transplanted. When it was time to transplant or seed, we made holes in plastic and for the new plants. The plastic had a tendency to lift up in the wind and cover the new plant. We had to put clods on top of the plastic to prevent the new plants from being covered and overheating. This method worked, but require extra vigilance and labor. For the second method we either direct seeded or transplanted the melons, waited for them to grow to a size of about 6 inches high, and then laid the plastic mulch over the top. We then cut or ripped holes in the plastic and pulled the plants through the hole. While this operation is a three person job and labor intensive, it only needs to be done once and the plants grow well. In both cases the edges of plastic were held down with soil shoveled every 4 feet on each edge, and drip tape was laid on the surface of the soil

beneath the plastic mulch, about 4 inches away from the plants. Both methods of laying the plastic worked, but latter method required less attention and was more flexible with regard to skips in the plant population. We successfully planted Arava and Ambrosia melons in 2008.

Onions—Summer onion varieties can be sown in March or April in the greenhouse for transplanting in May and harvest in August. We first did this in 2008 to try and extend our onion season. It worked reasonably well. The onions kept at least a month later in storage. Unlike winter onions that we plant with 3-4 seeds/cell in the plug trays, the summer onions did not size up well when planted the same way. In 2009, we will try fewer seeds/cell and an earlier transplant date. We planted two beds, with two rows on a bed, with six inches between each plant. (200ft./bed x 2 beds x 2 rows/bed x 2 onions/plug ==1600 onions. This is enough for approximately 12 weeks of baskets.

Planting Dates, Harvest Information, and Growing Practices for Early Summer

Plantings:

Early summer plantings include okra, long beans, winter squash, melons, cucumbers, summer squash, cow peas, sweet corn, pop corn and leeks.

Okra and Long Beans--need warm soils and higher temps to grow well. Late May or early June is usually when they are planted. One larger planting of okra (two beds) will produce long into the season. Long bean plantings (2) can be split by 3 weeks beginning in May. Both crops can be planted to moisture. Long beans are trellised using six foot

high sheep fence, that is tied to stakes spaces at 10 ft. intervals. After the beans have germinated and are about 8 inches high, the trellis must be put in to give the beans something to climb on. If the trellis is put in later, the long beans don't climb as well and many beans will form on the ground. Okra can be transplanted if desired. Rhizobium inoculum should be used with the long beans.

Winter squash--does well planted at the beginning of June. It can be planted as late as July 1st, but this planting will mature into October, when squash bug populations can be very high. We expect to put squash in the baskets from Sept. 1 to January 30, about 20 weeks. (60 baskets x 2 squash/basket x 20 weeks = 2,400 squash). Squash yields about 300 lbs./bed, so we need 8 beds minimum. We also sold some winter squash at farmers market. In 2008, we planted 2 rows each of acorn, delicata, spaghetti, and pumpkin, and 4 rows of butternut. We could have used more delicata and less spaghetti. I would recommend 4 beds of butternut, 3 delicata, 2 acorn, 1 pumpkin, and 1 spaghetti. We planted some our beds in 2008 with plastic mulch. These beds were much less weedy than the unmulched beds.

Melons and watermelons, cucumbers, and summer squash--can all be direct seeded again in late May and/or early June. In 2008 we started using black plastic mulch with these crops. Mulch greatly reduced weed competition, protected the drip lines from rodents and birds, and theoretically warmed early cool soils. These seeds can be planted to moisture. We usually sow three plantings of cucumbers and summer squash, about 3

weeks apart, one bed each/planting. (See Melons-Spring planting for demand and yield and mulching details.)

Cowpeas--like long beans, they need hot weather to grow well. They can be planted to moisture in May or June as temperatures rise. One bed/planting produces enough green pods for several harvests. Two plantings are sufficient for the baskets. Because they are so similar to long beans, it is better to have plantings that are earlier or later than the long bean plantings.

Leeks—can be sown as early as May for transplanting in July. We have been sowing 3-4 seeds per cell in 128 cell trays, for a multiple leek harvest. Harvest begins in late fall and continues through the winter. We would like to put leeks in the baskets from Nov. 1 through Feb. 29th. (60 baskets x 16 weeks x 2 leek/baskets = 1,920 leeks). Some leeks may be sold at farmers market in the spring. Leeks are planted 6 inches apart, two rows to a 200 ft bed, which yields 800 leeks. Three beds are sufficient to meet our needs. King Richard, Ifra, and Giant Musselburgh are good varieties.

Sweet Corn—since 2005 we have been growing supersweet corn varieties because our CSA customers complained about a lack of flavor in the Se variety we were growing. In general, the supersweet varieties don't germinate well in cold soils (below 55F), and we have had difficulty getting the early plantings (March 15th through April 14th) to germinate. Therefore, we started sowing sweet corn in the greenhouse in plug trays and transplanting it into the field. This has worked reasonably well. Transplanting seems to reduce the size of the plant, but the ears have remained large. The first three plantings (tens days apart) have been transplanted. After that, sweet corn can be direct seeded to moisture using the JD 71 planters. Even with warmer soil temperatures, a fine and even

seed bed, and high soil moisture is required to get the super sweet seed to germinate well. Using the Roterra or the Rotovator to form a fine seed bed is recommended, followed by long (8 to 12 hour) pre-irrigation sets. In 2008 we grew Vision, which is a very tasty variety. It seemed to have some resistance to smut, but up to 5% of the later plantings were infected. Two beds, with two rows on a bed, (1 ft. spacing) are planted for each planting. This should provide at least 800 ears of corn. We put 6 ears in each basket, so each planting should provide enough corn for two weeks (60 baskets x 6 ears x 2 weeks=720 ears). We try to have sweet corn to harvest from July 1st until Oct. 15th, or 13 weeks. This requires 7 plantings (14 beds) sow every two weeks from March 15th through June 15th.

Pop Corn—early May is a good planting time for popcorn. The goal of planting early is to avoid corn earworm infestations. We have had the best results with hybrid popcorn varieties such as Robust from Johnny's in terms of yield and earliness. We have planted 4, 200 ft. rows (two beds) and this has been enough to put popcorn in the baskets 6 to 8 times over the winter.

Early Fall Plantings.

At this time of year, all of the cool season crops are planted, including several that don't grow well in the Spring (Napa cabbage, daikon, boc choy).

Potatoes—fall potatoes can be planted in August. If they have not sprouted before they are planted they usually don't sprout until the soil cools off later in September. Also, it is difficult to find seed potatoes this time of year, so potatoes often come out of the cooler instead, and diseases can be an issue. Yield is uncertain for fall potatoes, but 3 or 4, 200 beds should yield enough to provide several weeks of potatoes in the winter.

Brassicas— sowings brassicas in the green house can start in August or even late July, for transplanting in late August and early September. They can be transplanted August until early October. We try to harvest broccoli from Nov. 7th through Jan. 30th (11 weeks). (60 baskets/week x 11 weeks x 2 heads (heads or side shoots)/basket = 1,320 heads needed). Some broccoli is also sold at farmers market. Broccoli yields about 250 lbs./bed, so 5 beds, planted 10 days apart starting late August (or using broccoli with different maturity dates), should be enough for the CSA, with some extra for the farmers market.

Lettuce and Escarole—can be sown in the GH starting in late August and transplanted beginning in mid Sept. and more or less continuously through the winter. They are the most bolt resistant vegetables for the fall and winter in that late plantings of lettuce will usually produce a full size head before bolting. If members of the brassica family are planted late in the fall, they go to flower before they reach a mature size. We want to put lettuce in the baskets from Oct. 15th through March 1st, or 18 weeks. (60 baskets/week x 18 weeks x 1 head/basket = 1,080 heads). We plant 400 heads/beds, so three beds of lettuce would be enough for the CSA, except some is sold at farmers market, and the beds don't hold well in the field, so 5 or 6 plantings are needed throughout the fall to provide lettuce until March 1st. One of the plantings goes into the cold frame (transplanted 11/7

in 2008), where it is much better protected and produces much nicer heads. Covering beds in field with plastic also improves the quality of winter lettuce. Red leaf varieties do better in the winter.

Peas—can be direct seeded in October to grow over the winter. During wet winters there maybe disease problems. Rabbits like them a lot too. Two beds are sufficient.

Carrots, beets, spinach, turnips, etc.--re sown at the beginning of September in solarized beds. We have used the Stan-hay belt planter and pelleted carrot seed for many years. With the new NOP regulations, the pellets must be organically approved as well. For some varieties this resulted in a different sized carrot pellet than what fit in our belts. In 2008, the Bolero carrot seed had the larger pellets that fit with our Stan-hay belts and we used the Stan-hay to plant them. Using the Stan-hay, 8, 150 ft. rows were planted with the triple shoes. The pelleted Nelson carrot seed was much smaller and was planted with the Planet Jr. planter, set on hole number 9, using the scatter shoe, with five rows on a bed. It took a little more than 10,000 seeds/200 foot bed using the Planet Jr. We also planted raw carrot seed with the Planet Jr., hole number 8, scatter shoe (Purple Haze and Parmex carrots). Since pelleted seed is more expensive, we will evaluate this year whether there is any advantage to using it. The Stan-hay planter gives you very straight rows that are easy to cultivate, but with the solarized beds you don't need to cultivate, so planting five rows on a bed with hand push Planet Jr. may be more efficient and less expensive. Beets, spinach, turnips, rutabagas, etc. can also be planted efficiently with the hand push Planet Jr. on solarized beds.

Number of beds needed. Carrots are harvested from November 21st to April 1st, or 17 weeks. 60 baskets x 17 weeks x 10 carrots/bunch = 10,200 carrots. The germination rate

is not 100% for carrots, so we sow 25% more. On the Stan-hay planted beds, there are 6 rows of carrots, 1.5 inches between each carrot in the row, (9 seeds/foot) and the beds are 200 ft. long. So, 6 rows/bed x 9 carrots/ft. x 200 feet =10,800 carrots/bed. Or if planted with the Planet Jr., 5 rows/bed x 10 carrots/ft. x 200 feet = 10,000 carrots/bed. One or two beds of carrots should be enough, but we have been planting more to provide more varieties, stretch out the harvest, and insure enough yield throughout the season.

Onions—are sown in the greenhouse as the beginning of Sept. for transplanting in November. We have been planting Stockton Early Red and Stockton Early Yellow OP varieties from Lockhart's. In 2008, Early Red Hamburger replaced Stockton Early Red. These varieties grow over the winter and are harvested first as Spring onions in May, and then as dried bulbs in June. The entire crop is harvested in June and put into storage. Each basket receives 2 onions/week until they are gone or begin to rot. Rotting onions can be replanted in the fall for “scunions”, which are green onion-like vegetables. They can be harvested throughout the winter.

Number of Beds Needed: Onions are put into the baskets from May 15th through October 15th, about 20 weeks. We put two onions in 60 baskets each week, so we need 2,400 onions for the season. Onions are planted two rows to a bed, with six inches between each onion cluster. Each cluster averages 2 onions. In a 200 ft bed., there will be 400 onion/row x 2 rows x 2 onions/plug = 1600 onions/bed. So for just the bulb onions, we need 1.5 beds, but to be on the cautious side, we plant two beds. Then, it is good to have some extra onions for scunions as well. To grow scunions, it takes 300 onions for each 200 ft of row, and takes approximately two scunions to make one bunch. Scunions are harvested from November 1st through February 15th, or about 10 weeks, so we need (60 x

10 weeks x 2 scunions/bunch or 1200 onions to be planted, which is four beds. So 1200 more bulbing onions are needed for scunions, since we produce 1600 onions/bed, this means we need one extra bed for scunions, so in total for both the bulbs and the scunions we need three beds of onions.

Number of Beds needed for our 60 member CSA.

Spring

Asparagus—7

Potatoes—4

Red Russian Kale—1

Collards—1

Carinata Kale—1

Chard—1

Cabbage—2

Broccoli—2

Cauliflower—2

Kohlrabi—1

Lettuce—3

Escarole—1

Peas—2

Green Beans—2

Parsley—1

Beets—1

Total for Spring Green Crops—32

Spring Planted Summer Crops.

Tomatoes—8 beds (mostly for CoHo). Two beds, with 4 planting dates would probably provide enough for the CSA.

Cherry Tomatoes—first planting: 1 Sungold, 1 Red Cherry. Second planting: 1 Sungold, 1 Red Cherry. About half the harvest goes to the CoHo.

Melons—6 beds, 3 planting dates.

Onions—2 beds

Tomatillos—2 beds, split into 2 plantings

Sweet corn—6 beds, 3 plantings of 2 beds each, transplanted.

Total--28 beds.

Early Summer Plantings:

Okra—2 beds

Chinese long beans—2

Winter Squash—11

Cowpeas—2

Leeks—3

Sweet corn—6 beds.

Total--26 beds.

Early Fall Plantings:

Potatoes—4 beds

Broccoli—5 beds

Cabbage—3

Cauliflower—3

Red Russian Kale—2, split 2 plantings.

Carinata Kale—1 bed

Chard—1 bed

Arugula—1, split 2 plantings

Lettuce—3, split 3 plantings

Escacrole—1

Peas—2 beds

Fava Beans—3 beds

Carrots—4 beds

Onions—4 beds

Beets—2 beds

Spinach—3 beds

Scunions—4 beds, single row, can be mix planted with lettuce or fava beans.

Garlic—4 beds

Boc Choi—2 beds

Chinese Cabbage-1 bed

Brussels Sprouts—2 beds

Kohlrabi—1 bed, split into 2 plantings

Fennel—1 bed

Radicchio—1 bed

Celery Root—1 bed

Turnip—1 bed

Rutabaga—1 bed

Daikon—1 bed

Total 63 beds.

Total for year: 149 beds, which at 43 beds/acre, is 3.5 acres.

Since we have 4.5 acres, this leaves 1.0 acres that can be cover cropped at various times of the year (mostly the winter).