
Index Roxbury Farm Harvest Manual

Arugula	page	2
Basil	page	3
Beans	page	4
Beet greens	page	5
Beets, storage	page	6
Beets, bunching	page	7
Broccoli	page	8
Broccoli Raab	page	9
Brussels Sprouts	page	10
Cabbage Green, Mini and Red	page	11
Carrots, bunching	page	12
Carrots, storage	page	13
Cauliflower	page	15
Celeriac	page	16
Chard	page	17
Cilantro	page	18
Collards	page	19
Corn, sweet	page	20
Cucumbers	page	21
Dill	page	22
Eggplant	page	23
Fennel	page	24
Garlic and scapes	page	25
Joi-Choi	page	26
Kale, Green, Toscana	page	27
Kale Flowering	page	28
Leeks	page	29
Lettuce, head	page	30
Lettuce, salad-mix	page	31
Mei-Ching-Choi as braising greens	page	32
Mei-Ching-Choi full size	page	33
Melon, Cantaloupe	page	34
Onions, green	page	35
Onions, storage	page	36
Parsley	page	37
Parsnip	page	38
Peas, sugarsnap, snow-pea	page	39
Peppers, green and red	page	40
Potato	page	41
Pumpkin	page	42
Radish	page	43
Rutabaga	page	44
Scallions	page	45
Sorrel	page	46
Spinach	page	47
Strawberry	page	48
Summer-squash/Zucchini	page	49
Squash, Winter	page	50
Sweet Potatoes	page	51
Tatsoi	page	52
Tomato, beefsteak, plum, cherry	page	53
Turnip	page	55
Watermelon	page	56

Arugula

Yield	¼ lbs per row foot at 9000 lbs per acre.
Value	\$2.50 per lbs at \$22.500 per acre
Standards	Harvesting: 5 bins per hour at 12 lb @ approximately 150 hrs per acre plus time to load and unload boxes to washing area. When bunched add at least 100 hrs per acre. Machine harvest up to 50 bins per hour or 15 hrs per acre.
	Washing: 12 bins per hour @ 65 hrs per acre
Tools needed	Orthomec Harvester or knives, regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ Plants 3-4 inches tall for salad or 5-6 inches tall for cooking green, deep green, and without pungency.
- ◆ Leaves should not have excessive holes due to flea-beetle damage.

Harvest Procedures

- ◆ Arugula is harvested in kneeled position.
- ◆ It is harvested in the same bin it is distributed in.
- ◆ Hold a small bunch of leaves at the top of the plant with one hand and cut with one motion with the other hand.
- ◆ Shake vigorously to remove any yellow leaves or stems from previous cuttings.
- ◆ Place in box with the stems facing the same direction
- ◆ Leave behind 1-2 inches for re-growth. For salad mix, the leaves should be small and tender. Cut high enough that only the leaf part is harvested.
- ◆ For braising mix, the leaves can be larger and not as tender, but leave long stems behind.
- ◆ After harvesting re-cut excess stems if re-growth (in the fall) is desired.

Washing Procedures

- ◆ Dunk box into both washing tubs unless leaves are dirty. If the leaves are very dirty, dump out into the 1st tubs and repack after the first washing, then dunk box into second tubs of ice water.
- ◆ Do not leave greens in 2nd tub for longer than 15 seconds. Leaves tend to get waterlogged after a few minutes, which causes them to deteriorate faster.

Cleaning in the field	Pull out weeds and yellow leaves.
Packing in the field	12 lbs per regular 1½ bushel box
Packing for delivery	12 lbs in regular 1½ bushel box
Storage	At 32° – 41° F, 95 -100% humidity. Pack in closed containers or plastic bags for storage longer than a few days. If you are using plastic bags, remove excess water.

Basil

Yield	½ lbs per foot at 6500 lbs to the acre
Value	\$2.50 per lbs at \$16,250 per acre
Standards	Harvesting: 4 bins per hour @ approximately 150 hrs per acre plus the time to load and unload boxes out of field to packing area
	Basil is not washed
Tools needed	Scissors, knives, regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ Plants 10-15 inches tall, deep green, without holes due to eating damage by Japanese beetle or black spots (downy mildew).
- ◆ Basil downy mildew is a new problem. Purple varieties are less susceptible.
- ◆ Harvest before frost.
- ◆ Do not harvest flowering stems.

Harvest and Cleaning Procedures

- ◆ Basil is harvested in standing up and bending over position.
- ◆ Basil is one of the last things we harvest in the morning. To avoid damage basil is harvested in the same box it is distributed in.
- ◆ If desired, leave 3-4 inches behind for re-growth; plants can be cut the height of the box (up to 12").
- ◆ Place green box on end and stack stems so the leaves are facing you. When the box is full, the stems will be standing up straight in the bin. Hold the stems with one hand & cut with the other.
- ◆ Before placing the basil in the box remove all yellow and dead leaves.
- ◆ Do not get wet. Do not harvest in the rain, since leaves will turn black in storage.

Cleaning in the field	Pull off dead or yellow leaves. Avoid plants that are eaten by Japanese beetle or with black spots (downey mildew) on the leaves.
Packing in the field	Loosely fill regular (1½ bushel) green box, all leaves up, stems down
Packing for delivery	Regular (1½ bushel) Green box
Storage	At 41° F, 95 -100% humidity but needs good air circulation, don't pack in closed containers for long-term storage. Do not put in cooler

Beans Snap

Yield	½ lbs per foot at 4800 lbs to the acre
Value	\$1.50 per lbs at \$7,000 per acre (handpicked Haricot-Vert beans are worth more than fibrous machine picked beans)
Standards	Harvesting: up to 25-30 bins per hour @ approximately 7-8 hrs per acre for two people plus the time to transport boxes to picker and back to packing barn.
	Sorting up to 10 bins per hour
Tools needed	Beanpicker, old large green box (1½ bushel)

Ready to Harvest Indicators and Quality

- ◆ Most beans are mature but the pods are not filled in with beans.
- ◆ Immature beans lower the overall yield and get easily scratched.

Harvest and Cleaning Procedures

- ◆ Beans are dumped by hand in a conveyor that leads to a sorting line.
- ◆ Pin beans and stems that do not fall through the sorting line are taken out by hand
- ◆ If necessary wash beans in cold water. This also tends to take some of the scratching out. Do not store beans wet as they will quickly form a mold. Washing is only allowed when the beans will be delivered within a day.



Cleaning in the field	Adjust blower so only pin beans and leaves blow out of the stack
Packing in the field	One person rides on the bean picker to switch bins and to adjust the machine or signal to the driver to speed up or slow down (depending on yield, and other conditions).
Packing for delivery	Regular (1½ bushel) green box, 25 lbs per bin
Storage	At 41° F, 95 -100% humidity but needs good air circulation, don't pack in closed containers for long-term storage.

Beet Greens

Yield	0.2 lbs per foot at 7200 lbs to the acre
Value	\$2.50 per lbs at \$18,000 per acre
Standards	Harvesting: 6-7 boxes per hour per person @ approximately 100 hrs per person in cutting plus 100 hours per acre to load and unload boxes from and to washing area
	Washing: When dunked 12 boxes per hour, when part of a salad mix, 7 boxes per hour per person
Tools needed	Orthomec harvester or knives, regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ Greens 3-4 inches tall for salad or 5-7 inches tall for cooking green, with good color.
- ◆ Only harvest leaves with very little insect damage or spots due to Cercospora (Leaf blight).

Harvest and Cleaning Procedures

- ◆ Beet greens are harvested while in kneeled position.
- ◆ They are harvested in the same box they are distributed in.
- ◆ Hold a small bunch of leaves at the top of the plant in one hand and cut with one motion with the other hand.
- ◆ Shake vigorously to remove any yellow leaves or stems from previous cuttings.
- ◆ For braising mix place in box with the stems facing the same direction
- ◆ Leave behind 1-2 inches for re-growth. For salad mix, the leaves should be small and tender. Cut high enough that only the leaf part is harvested. For braising mix, the leaves can be larger and not as tender, but leave long stems behind. After harvesting re-cut excess stems if re-growth (in the fall) is desired.

Washing Procedures

- ◆ Dunk box into both washing tubs unless leaves are dirty. If the leaves are very dirty, dump out into the 1st tubs and repack after the first washing, then dunk box into second tubs of ice water. Do not leave greens in 2nd tub for longer than 15 seconds. Leaves tend to get waterlogged after a few minutes, which cause them to deteriorate faster.

Cleaning in the field	Pull out weeds and diseased or yellow leaves.
Packing in the field	12 lbs per regular (1½ bushel) green box
Packing for delivery	12 lbs in regular (1½ bushel) green box
Storage	At 32° – 41° F, 95 -100% humidity. Pack with ice in closed containers for storage longer than a few days. Make sure product has no excess water in it for longer storage.

Beets, storage

Yield	1 lbs per row foot at 21,600 lbs to the acre
Value	\$0.80 per lbs at \$14,500 per acre (includes storage and sorting loss)
Standards	Harvesting: Depends on size, but 200 lbs per hour is not unusual @ approximately 120 hrs per acre in harvesting plus loading and unloading boxes from and to washing area.
	Washing: 350lbs per hour per person (includes cleaning bins and weighing)
Tools needed	green ¾ bushel buckets and bulk bins or regular 1½ bushel boxes

Ready to Harvest Indicators

- ◆ Beets are 2-3 inches in width, round and unblemished. Leave beets in field that have markings (black incisions) due to Boron deficiency.

Harvest Procedures

- ◆ Beets are pulled out of the ground in kneeled position. The leaves are twisted off and packed into buckets.
- ◆ Make sure your bucket is placed so that you do not have to twist your body to pull out beets or to place beets into the bucket.
- ◆ Place full buckets next to the harvest lane.
- ◆ If you are harvesting for only one day, dump the beets into regular green boxes when all of the buckets are full.
- ◆ If bulk harvesting, drive by with the bulk bin on the tractor and carefully dump the beets into the bulk bin.



Washing and Sorting Procedures

- ◆ Wash in conveyor washer or if very dirty in barrel washer.
- ◆ Sort for size if needed at the sorting table also sort out culls at the sorting table.

Cleaning in the field	Remove leaves, leave damaged roots in the field
Packing in the field	45 lbs per regular (1½ bushel) green box (box almost full) or 1000 lbs per bulk bin
Packing for delivery	45 lbs per regular (1½ bushel) green box OR by count
Storage	At 32° – 41° F, 95 -100% humidity. Pack in closed containers or bags for long-term storage

Beets, bunching

Yield	½ bunch per foot at 7200 bunches to the acre
Value	\$1.50 per bunch at \$10,800 per acre. Remainder is harvested for beets without tops at a value of another \$4,000
Standards	Harvesting: 30-40 bunches per hour per person depending on quality of the leaves @ approximately 200-250 hrs per acre in cutting plus loading and unloading boxes from and to washing area
	Washing: 100 bunches per hour
Tools needed	twisties, regular 1½ bushel green boxes

Ready to Harvest Indicators and Quality

- ◆ Beets 2- 3 inches in width with healthy tops. Leave beets in field that have Cercospora (leaf blight), or black incisions on roots due to Boron deficiency.

Harvest and Cleaning Procedures

- ◆ Bunching beets are harvested and cleaned in kneeled or standing up position.
- ◆ Select beets out of rows, clean off the dead leaves, and put 3-5 beets per bunch. Make sure the tops of the beets are even with each other and wrap the twistie around the stems just above the beets.
- ◆ Then hold the twistie in place and twist the bunch to tighten the twistie. It is important to have neat and tight bunch for washing and distribution. All bunches should be uniform in size.
- ◆ Bunches are left in the wheel-track (5 bunches to a pile) to be picked up and boxed periodically to avoid over-harvesting. Don't bunch and count at the same time as this can lead to mistakes in counting.
- ◆ When bunching is not necessary, pull beets, clean and pack in regular (1½ bushel) box.

Washing Procedures

- ◆ Use the bunch washer to wash the beets. Two people are needed for this job. They should switch tasks every 5 boxes are so. Soak the bunches in the grey tub. One person places 2 or 4 bunches at a time on the table. The second person grabs 2 or 4 bunches at a time (depending on how dirty the roots are) and places the root ends into the bunch washer. That person then places the cleaned bunches into the second wash tub. The first person rinses out the box and places 15 bunches into the box (5 bunches to a layer).
- ◆ When five boxes are re-packed the first person brings them into the barn and puts the boxes into the cold water tank. The beets soak in the cold water until the next 5 boxes are cleaned. The beets go into the cooler after they have soaked in the cold water tub.
- ◆ Repeat until all beets are washed and cooled.

Cleaning in the field	Pull off damaged or yellow leaves
Packing in the field	15 bunches per regular (1½ bushel) green box packed beet to beet
Packing for delivery	15 bunches in regular green box packed beet to green so boxes can stack
Storage	At 32° – 41° F, 95 -100% humidity. Pack with ice in closed containers for storage longer than a few days

Broccoli

Yield	½ bunch per row foot at 5000 bunches to the acre
Value	\$1.50 per bunch at \$7,500 per acre
Standards	Harvesting: 100 heads of broccoli, not including small ones, all stripped from leaves in pickle barrel @ approximately 120 hrs per acre in cutting plus loading and unloading boxes from and to washing area. Bunching takes place in washing area.
	Washing: Includes counting and possibly bunching, 200 bunches per hour
Tools needed	Knives & pickle barrels and old large green boxes (1¾ bushel)

Ready to Harvest Indicators

- ◆ For a full head: Florets are a dark green and still tightly bunched, about 2 mm in size. Once the florets are loose they may flower in cooler and do not store very long. Do not harvest heads with traces of head rot or black bead.

Harvest Procedure

- ◆ Broccoli is harvested in standing up and bending over position. Two people work together.
- ◆ Two rows are harvested at once.
- ◆ The first person walks through the two rows and finds the heads that are ready. This person strips the leaves off using both hands.
- ◆ The second person follows behind and harvests the heads with the stripped leaves. Hold the head with one hand and with a smooth motion slice the head off with the other hand. The cut should be straight across. Make sure to have a 5-6 inch stalk on each head of broccoli.
- ◆ Once the pickle barrels are full, count 20 heads into a large green box in the harvest lane. When all of the broccoli is harvested drive down the harvest lane to pick up the boxes.
- ◆ Once broccoli is mature it must be walked through every other day until the crop is finished.

Washing and Sorting Procedures

- ◆ Dump broccoli out of pickle barrel into a washing tub filled with iced water. Let soak for a 20-30 minutes to remove field heat.
- ◆ Smaller heads are bunched together with a strong rubber band, or can be sorted out and counted at a higher rate per box, as long as each head in the box is about the same size and weight.

Cleaning in the field	Remove leaves from stem
Packing in the field	Fill pickle barrel
Packing for delivery	15-20 large heads in a large green box (1¾ bushel) or 25-30 smaller heads in large green box
Storage	In cooler at 32° F packed with ice when available

Broccoli Raab

Yield	½ bunch per row foot at 7200 bunches to the acre
Value	\$2.00 per bunch at \$14,400 per acre
Standards	Harvesting: 40-50 bunches per hour per person depending on quality of the crop @ approximately 160 hrs per person in cutting plus approximately 100 hours per acre to load and unload boxes from and to washing area. When harvested loose; 75 - 100 lb per hour @ approximately 100 hrs per acre
	Washing: Including cleaning bins and double dunk, 20 bins per hour per person
Tools needed	Knives and twistie's if making bunched and regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ Greens 12-18 inches tall with small broccoli heads for mature harvest. Greens 8-10 inches tall for young tender leaves. Leaves are dark green without any sign of yellowing or necrosis. Stems should be pale green on the inside without any sign of a white fibrous core.

Harvest Procedures

- ◆ Broccoli Raab is harvested in kneeled position. Once the crop gets tall some people cut while standing upright.
- ◆ Broccoli Raab is harvested in the same box it is distributed in.
- ◆ If Broccoli Rabe is tender with no white core, hold enough stems for a bunch around the bottom of the plants in one hand and cut with one motion with the other hand. To check cutting height look at the cut stem in your hand to see if there is a solid white core in the stem. If so, cut a little bit higher on the plant.
- ◆ If the plants are more mature cut one stem at a time like cut flowers until you have a large handful.
- ◆ If packing loose leaves, place all stems in the same direction.
- ◆ If making bunches wrap twistie around the stems and hold the twistie in place. Spin the bunch to tighten the twistie. If the ends of the stems are uneven trim them. Place 16 bunches in a box.
- ◆ When packing bunches in a box put 4 bunches in a layer and pack leaves to stems so they fit in tightly for stacking of boxes.

Washing Procedures

- ◆ Wash off box with a hose and dunk into the 1st set of washing tubs. Leave in the tub for about 30 seconds.
- ◆ Then drain for a few seconds and place into the 2nd set of tubs with the iced water. Leave in iced water while you wash off the next box and dunk it into the 1st washing tub.
- ◆ Then remove the first box of broccoli rabe from the iced water and put in second box.
- ◆ Repeat until all boxes are washed.

Cleaning in the field	remove dead and yellow leaves
Packing in the field	16 bunches per regular 1½ bushel box OR 12 lbs of loose leaves
Packing for delivery	16 bunches per regular 1½ bushel box OR 12 lbs of loose leaves
Storage	At 32° – 41° F, 95 –100% humidity. Pack with ice in closed containers for storage longer than a few days.

Brussels Sprouts

Yield	¼ marketable stalk per row foot at 3560 stalks to the acre
Value	\$2.50 per stalk at \$7,000 per acre
Standards	60 stalks per hour per person @ approximately 65-100 hrs per acre, (includes cleaning in the field)
Tools needed	Hedge trimmers or machete, large green boxes (1¾ bushel)

Ready to Harvest Indicators and Quality

- ◆ Sprouts are firm, solid, and round without any sign of Alternaria on the center leaves of the sprouts. Some of the outer leaves are allowed to have some black spots as they can easily be removed before cooking.
- ◆ Usually Brussels Sprouts are harvested after the 1st frost to increase the sweet flavor of the sprouts



Harvest and Cleaning Procedures

- ◆ One person snaps the leaves off the stalks and removes the diseased sprouts at the bottom of the stalk. This person also snaps the top of the stalk off.
- ◆ A second person cuts the stalk with the pruning scissor so that no diseased sprouts are left on the stalk.
- ◆ When the cutter catches up with the person snapping off the leaves he/she then counts the stalks into a regular green box at 10 to 12 stalks to a box.
- ◆ Brussels sprouts are not washed. If box is dirty carefully wash off bottom of box.

Cleaning in the field	Remove leaves and diseased sprouts from stalk
Packing in the field	10-12 stalks to a large green box (1¾ bushel)
Packing for delivery	10-12 stalks to a large green box (1¾ bushel)
Storage	At 32° – 41° F, 95 -100% humidity but needs good air circulation, don't pack in closed containers for long-term storage.

Cabbage

(Green, Red, Savoy, Arrowhead, & Mini)

Yield	Green and red: ¾ head to the row foot at 10,800 heads to the acre
	Arrowhead and mini: 0.6 heads per row foot at 13,000 heads to the acre
Value	\$0.35 per lbs at \$11,340 per acre
Standards	Harvesting: 200 heads per hour per person depending on quality of the crop and size of cabbage @ approximately 60 hrs per acre plus hauling from the field @ approximately 100 hrs per acre in small boxes and about 20 hrs per acre in 20 bushel bins
Tools needed	Knives (make sure they are very sharp) regular 1½ bushel boxes or 20 bushel bulk bins

Ready to Harvest Indicators and Quality

- ◆ Firm heads, the top of the head must be hard and solid. Firmness is more an indicator than size. A good spraying program should avoid any presence of cabbage worms, or damage by other insects at this point. Cabbage infected with Alternaria or black rot will not store well.

Harvest Procedures

- ◆ Cabbage is harvested in standing up and bending over position.
- ◆ Cut heads with a few wrapper leaves to protect the head during transportation. Use cabbage knives that are very sharp and only used for this purpose.
- ◆ Slightly push plant to one side and with smooth motion cut the cabbage high enough to remove the damaged leaves but allow for a few healthy wrapper leaves to remain. Cut should be straight across.
- ◆ If harvesting for one delivery count into regular green boxes.
- ◆ If harvesting for bulk storage place in 20 bushel bulk bin
- ◆ If cut properly, which means at the right height, no additional cleaning needs to be done. Pull off any damaged leaves. Cleaning cabbage in the field greatly reduces harvest efficiency.

Cleaning Procedures

- ◆ Cabbage is not washed. If cabbage is coming out of storage it usually needs to be re-trimmed.
- ◆ Use very sharp knives. Hold a head of cabbage in one hand against your body. With your knife hand brace your thumb against the stem and carefully pull the knife towards your thumb. Cut just above the damaged outer leaves. If you are not comfortable with this method place clean cardboard or a cutting board on the table and place the cabbage on the table to trim. Make sure you cut is straight across.
- ◆ Peel the leaves from the bottom of the plant instead from the top. When you cut at the correct height, the leaves will come off without much effort.

Cleaning in the field	Remove damaged leaves
Packing in the field	10-15 Arrowhead or 6-8 Red in a regular green box OR bulk bin for storage
Packing for delivery	10-15 Arrowhead, 6-8 Red in a regular 1½ bushel box Storage: 4-6 large heads in small box, 6-8 medium heads in regular 1½ bushel box, 10-15 small heads in a large box
Storage	At 32° – 41° F, 95 -100% humidity but needs good air circulation, don't pack in closed containers for long-term storage.

Carrots, bunching

Yield	0.4 bunch per row foot at 14,400 bunches to the acre.
Value	\$2.00 per bunch at \$28,800 per acre
Standards	Harvesting: 60 bunches per hour per person depending on quality of the crop @ approximately 240 hrs per person in harvesting plus loading and unloading boxes from and to washing area
	Washing: 80-100 bunches per hour
Tools needed	Tractor with bed lifter. Fork, twisties, and regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ Healthy, green tops, and carrots 5-6 inches long (depending on variety), but always wait until they are sweet. Carrots are straight without forks.

Harvest Procedure

Carrots are usually dug up with a bed lifter (see procedure for carrots for storage), but if conditions do not allow for the use, here are the procedures if a digging fork is needed:

- ◆ Place fork near carrots but not close enough to cut them. Two people dig up the carrots while the rest of the crew pulls the carrots out of the ground and bunches them.
- ◆ Pull out enough carrots for one bunch with each pull. Clean off any brown leaves.
- ◆ Carrots are bunched in kneeled position. Put 5-10 carrots in each bunch (depending on variety) but make sure all bunches are similar in size. Make sure tops of carrots are even with each other and wrap twistie around the stems just above the carrots. Then twist the bunch to tighten the twistie. It is important to have neat and tight bunch for washing and distribution. If the bunches are loose the carrots will break off during washing.
- ◆ When there are quite a few inches made count 15 bunches into a box, carrot to carrot.



Washing Procedures

- ◆ Use the bunch washer to wash the carrots. Two people are needed for this job. They should switch tasks every 5 boxes are so. Soak the bunches in the white tub. One person places 2 or 4 bunches at a time on the table. The second person grabs 2 or 4 bunches at a time (depending on how dirty the roots are) and places the root ends into the bunch washer. That person then places the cleaned bunches into the second wash tub. The first person rinses out the box and places 15 bunches into the box (5 bunches to a layer).
- ◆ When five boxes are re-packed the first person brings them into the barn and puts the boxes into the cold water tank. The carrots soak in the



cold water until the next 5 boxes are cleaned. The carrots go into the cooler after they have soaked in the cold water tub.

- ◆ Repeat until all carrots are washed and cooled.

Cleaning in the field	remove dead and yellow leaves
Packing in the field	15 bunches per regular 1½ bushel box carrots on top of carrots
Packing for delivery	15 bunches per regular 1½ bushel box carrots on top of leaves to top for stacking of bins
Storage	At 32° – 41° F, 95 –100% humidity. Pack with ice in closed containers for storage longer than a few days.

Carrots, storage

Yield	1.2 lbs per row foot at 26,000 lbs per acre
Value	\$0.80 per lbs at \$17,500 per acre (includes storage and sorting losses)
Standards	Harvesting: 250- 300 lbs per hour per person depending on quality of the crop. Three people can fill up a bulk bin in 1 to 1 ½ hours @ approximately 100-120 hrs per acre.
	Washing: 300 lbs per person per hour
	Bagging: 100 of 2 lbs bags per person per hour.
Tools needed	Tractor with bed lifter. Green ½ bushel buckets and regular green boxes OR 20 bushel bulk bin Tractor with three point hitch forklift

Ready to Harvest Indicators and Quality

- ◆ Anytime after October 1
- ◆ Carrots are full size, straight without forks or eating damage due to carrot fly.
- ◆ The tops are not as healthy looking as when bunched, which does not really matter at this point.

Harvest Procedures

- ◆ Undercut carrots with tractor and bedlifter.
- ◆ Make sure the blade is set at an angle to lift the carrots and is let down deep enough to avoid cutting the carrots.
- ◆ After lifting, grab a bunch of carrots and place them in your lap to remove tops. Place bucket in front of you so you don't have to twist your body to put them in a bucket. Wearing gloves helps to prevent blisters on your hands.
- ◆ Only take straight carrots with no more than two prongs. Stunted, diseased, forked, and split carrots are left in the field. Small carrots do not store well so discard those or distribute them immediately to members.
- ◆ When carrots will be delivered to members in a few days, empty the buckets into green bins on the truck.
- ◆ If harvesting for bulk and storage, empty buckets into 20 bushel bulk bin.
- ◆ When all the buckets are full, drive the tractor with a 20 bushel bulk bin down the driving lane and carefully dump the carrots into the 20 bushel bin. The buckets are laid out over the full length of the bed so the entire crop from one bed is dumped in the 20 bushel bin at one time.

- ◆ Leave the buckets at the same place to be filled up with carrots from the next bed. Nobody has to walk to the nearest 20 bushel bulk bin; the 20 bushel bin is being driven to the buckets.

Washing Procedures

- ◆ Do not wash until ready to deliver. Then put through barrel washer.
- ◆ This washer works best if filled up with approx. 300 lbs of carrots.
- ◆ Hose the carrots before entering the washer, so any dirt on the carrots is soft.
- ◆ Sorting is done on the receiving end. Barrel washer should have the sorting table at the end.
- ◆ Sort out the carrots with large, soft, and brown spots. Sort carrots by size into separate bins if needed.

Cleaning in the field	Remove tops, discard forked or diseased carrots
Packing in the field	45 lbs per regular green box or 900 lbs per bulk bin
Packing for delivery	45 lbs per regular green box, 20 bags per regular box, or 12 bags to a small box
Storage	At 32° – 41° F, 95 -100% humidity. Pack in closed containers or bags for long-term storage.



Cauliflower (white and Green)

Yield	½ marketable head per row foot at 4800 heads to the acre
Value	\$3.00 per head at \$16,000 per acre
Standards	Harvesting: 40 heads per hour per person depending on quality of the crop @ approximately 120 hrs per acre plus lugging boxes out of field to packing barn
Tools needed	Knives, rubber bands, large green boxes (1¾ bushel)

Ready to Harvest Indicators

- ◆ Firm, white heads without any presence of worms. When harvested too late, heads become loose and turn yellow.
- ◆ One week before harvesting the heads need to be kept out of direct sun light. This is done by folding several large leaves over the small white head or by tying the leaves with a large rubber band. If rubber bands are used choose three different colors that are used on three different harvesting days. Tying is done at the same time as harvesting. Many varieties no longer require this step as they are “self-blanching”.



Harvest and Cleaning Procedures

- ◆ Cauliflower is harvested in standing up and bending over position.
- ◆ Cut stem just under the head, leaving some leaves attached.
- ◆ Cut off tops of wrapper leaves surrounding head. Do this so there is a complete circle of leaves surrounding the head. They will protect the outside of the head from bruising and provide a nice appearance. Any bruises turn in to brown spots in less than six hours.
- ◆ Place 6 heads on the first layer in the box face up. Place a layer of cauliflower leaves or cardboard between the two layers. Place the next layer six heads of cauliflower on top of the leaves face up.

Cleaning in the field	Cut off tops of wrapper leaves
Packing in the field	10-12 heads in a large green box (1¾ bushel)
Packing for delivery	10-12 heads in a large green box (1¾ bushel)
Storage	At 32° – 41° F, 95 -100% humidity. Pack in closed containers or plastic bags for storage longer than 3 days.

Celeriac

Yield	2/3 piece (@1 lbs each) per row foot at 14,000 lbs to the acre
Value	\$2.00 per lbs at \$28,000 per acre
Standards	Harvesting: 100 lbs per hour per person or in other words, a crew of three fills up a 20 bushel bin of 800 lbs in 2½ hours @ approximately 135 hrs per acre.
	Washing: 350 lbs per person per hour
Tools needed	Knives and ¾ bushel green buckets and bulk bins

Ready to Harvest Indicators and Quality

- ◆ Roots 3-6 inches in circumference. Usually late in the fall.

Harvest Procedures

- ◆ One crew cuts the celeriac out of the ground. Cut below the surface just enough to remove most of the soil & tangled roots, but not too high or the bulb will be damaged. If this is too difficult first go through with the bed lifter to lift the celeriac out of the ground.
- ◆ The rest of the crew rips off the tops and puts the roots in buckets.
- ◆ If harvesting for one delivery empty buckets into green bins on the truck.
- ◆ If harvesting in bulk, empty buckets into a bulk bin. When the buckets are full, drive the tractor with a 20 bushel bulk bin down the driving lane and carefully dump the celeriac into the 20 bushel bin. The buckets are laid out over the full length of the bed so the entire crop from one bed is dumped in the 20 bushel bin at one time. Leave the buckets at the same place to be used for the next bed of celeriac

Washing Procedures

- ◆ Do not wash until ready to deliver. Then put through barrel washer.
- ◆ This washer works best if filled up with approx. 300 lbs of product.
- ◆ Hose the celeriac before entering the washer, so any dirt on the celeriac is soft.
- ◆ Sorting is done on the receiving end. Barrel washer should have the sorting table at the end.
- ◆ Sort celeriac by size (15 large, 20 medium) into regular green box.

Cleaning in the field	remove dead and yellow leaves
Packing in the field	35 lbs per regular green box or 800 lbs per bulk bin
Packing for delivery	15 large, 20 medium, or 30 small in a regular 1½ bushel box
Storage	At 32° – 41°F, 95 -100% humidity. Pack in closed containers or bags for long-term storage

Chard

Yield	1 bunch per row foot at 21,600 bunches to the acre. (higher yields are recorded from multiple cuttings but quality is much lower)
Value	\$0.80 per bunch at \$17,280 per acre
Standards	Harvesting: 60 - 100 bunches per hour per person depending on quality of the crop @ approximately 210-250 hrs per acre (half the labor is needed when harvesting loose)
	Washing: 20 bins per hour per person
Tools needed	Orthomec harvester or knives, regular green boxes and twisties.

Ready to Harvest Indicators and Quality

- ◆ Plants 15-18 inches tall, bottom leaves are large enough to make a bunch.
- ◆ Chard has good color, free from yellowing leaves or old stems with eating damage from leaf-miners.

Harvest Procedures

- ◆ Chard is harvested in a kneeled position.
- ◆ Hold onto all the leaves you will put in the bunch before cutting close to the ground.
- ◆ Inspect bunch for dead or diseased leaves and discard of them before placing a twistie around the bunch.
- ◆ Hold the twistie and spin the chard.
- ◆ If leaves are not bunched place all the stems in the same direction in the box.
- ◆ Trim back the plant to 2-3 inch stems for re-growth

Washing Procedures

- ◆ If clean, dunk bin with product in well water to clean, and then dunk again in ice water to cool.
- ◆ Leave the bin in ice water for at least one minute to cool down.



Packing in the field	16 bunches or 12 lbs per regular 1½ bushel box
Packing for delivery	16 bunches or 12 lbs per regular 1½ bushel box
Storage	At 32 –41F, 95 -100% humidity. Pack with ice in closed containers or bags for storage longer than a day.

Cilantro

Yield	0.1 Lbs per row foot at 3250 lbs per acre
Value	\$7.00 per lbs at \$22.750 per acre
Standards	Harvesting: 3 – 4 bins per hour per person depending on quality of the crop. Orthomec Harvester does not do well with cilantro @ approximately 120 hrs per acre plus lugging boxes out of field to packing barn
	Washing: Double dunking and cleaning bins, 15 bins per hour
Tools needed	Orthomec Harvester or Knives, regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ 4-5 inches tall, nice green leaves without any signs of yellowing.

Harvest Procedures

- ◆ Cilantro is harvested in kneeled position.
- ◆ Cilantro is harvested in the same bin it is distributed in.
- ◆ Cut Cilantro as low to the ground as possible. Keep hands and knife free of dirt.
- ◆ One hand does the cutting while the other hand holds the leaf end of the product. Shake to remove yellow leaves and stems.
- ◆ Then the cilantro is placed in the box. For easier distribution place all the stems in the same direction.



Washing Procedures

- ◆ Wash off box with a hose and dunk into the 1st set of washing tubs. Leave in the tub for about 30 seconds.
- ◆ Then drain for a few seconds and place into the 2nd set of tubs with the ice water. Leave in ice water while you wash off the next box and dunk it into the 1st washing tub.
- ◆ Then remove the first box of cilantro from the ice water and put in second box.
- ◆ Repeat until all boxes are washed.

Cleaning in the field	remove dead and yellow leaves
Packing in the field	Loosely in regular per regular 1½ bushel box
Packing for delivery	Distribute by site in small black box or tomato tray
Storage	At 32° – 41°F, 95 -100% humidity. Pack in closed containers or bags for storage longer than a day.

Collards

Yield	0.7 bunches per row foot at 10,000 bunches per acre (higher yields are recorded when multiple pickings occur from each plant)
Value	\$1.00 per bunch at \$10,000 per acre
Standards	Harvesting: 40-60 bunches per hour per person depending on quality of the crop. @ approximately 200 hrs per acre plus lugging boxes out of field to packing barn
Tools needed	Large green boxes and twisties if making bunches

Ready to Harvest Indicators

- ◆ Leaves 15-18 inches tall, bottom leaves are large enough to make a bunch out of 5 - 6 leaves.

Harvest Procedures

- ◆ Collards are harvested while kneeling.
- ◆ Grab a bunch of the biggest leaves near the stem of the plant and snap off the leaves.
- ◆ Do not use the really dark green leaves. Leave the smaller leaves at the top of the plant and remove any dead or yellow leaves on the bottom.
- ◆ If making bunches snap off 5-6 leaves, twist the twistie around the stems and twist the bunch to tighten the twisty or use a rubber band.
- ◆ Put 15 bunches in a large green box. If harvesting loose place 90 leaves in a large green bin.



Cleaning Procedures

- ◆ If the collards are clean do not dunk, just spray off the bins. If dirty, dunk bin with product in well water to clean, and then dunk again in ice water to cool. Leave the bin in ice water for at least one minute to cool down.

Cleaning in the field	remove dead and yellow leaves
Packing in the field	16 bunches or 80 loose leaves
Packing for delivery	16 bunches or 80 loose leaves
Storage	At 32 –41F, 95 -100% humidity. Pack with ice in closed containers or bags for storage longer than a day

Corn

Yield	0.75 marketable ears per row foot at 10,500 ears per acre (about 200 bags)
Value	\$5.00 per dozen / \$4,000 per acre
Standards	Harvesting: 8-10 bins (400-500 ears) per hour per person depending on quality of the crop @ approximately 25 hrs per acre plus transporting boxes out of field to packing barn
Tools needed	Large green boxes (1½ bushel) and harvest conveyor

Ready to Harvest Indicators and Quality

- ◆ Ears should be firm, and silk sticking out of the ears is brown and dead. When husks are pulled back, all kernels should be plump.
- ◆ Do not harvest over mature ears, as sugars will be converted to starch.
- ◆ Do not harvest ears with worm damage. To check for corn earworm damage: European Corn Borer (ECB) can be felt when pressing the ear in the palm of your hand. Presence of ECB is noticed by a hollow feeling underneath the leaves where there is ECB damage. Corn Ear Worm (CEW) is usually at the tip of the ear and is easier to spot.



Harvest Procedures

- ◆ Take two rows and pull your pickle barrel in the middle behind you or place the ears on the conveyor.
- ◆ Grab the ear, and pull down and out to pull ear off stalk. Remove excess stem at that time, or do it when transferring the corn into the bins. Stem removal is only done to save space in box and has no cosmetic value.
- ◆ Count 52 ears to a barrel when picked. No counting should have to be done afterwards.
- ◆ If using the harvest conveyor, place the ears on the conveyor as you pick them. The people on the wagon count the corn into boxes. Count 52 ears into a large green box or 42 ears in a regular green box. For 52 ears pick up 4 ears at a time and count to 13. For 42 ears pick up 4 ears at a time and count to 10 then add 2 extra ears.

Cleaning in the field	Remove extra stem
Packing in the field	52 ears in a large green box (1½ bushel)
Packing for delivery	52 ears in a large green box (1½ bushel) or 42 in a regular 1½ bushel box
Storage	At 32 –41F, 95 -100% humidity. Pack with ice in closed containers or bags for storage longer than a day

Cucumber

Yield	7 cucumbers per row foot at 50,000 cucumbers per acre
Value	\$0.40 per cucumber at \$20,000 per acre
Standards	Harvesting: 8-12 ½bushel red buckets per hour per person depending on quality of the crop @ approximately 200 hrs per acre plus lugging buckets out of field to packing barn
	Washing: When needed, 350-500 lbs per person per hour
Tools needed	½ bushel red buckets and/or ⅝ bushel buckets

Ready to Harvest Indicators

- ◆ 4 - 6 inches long and firm, dark green, straight and smooth. Skin is free from scab or other blemishes.

Harvest Procedures

- ◆ Cucumbers are harvested in standing up and bending over position.
- ◆ Make sure you harvest the newest plantings first to prevent the spread of disease.
- ◆ One person harvests each side of a cucumber bed.
- ◆ Go down row and pull all 4-5 inch long fruits off the vine without breaking the skin off the cucumber, and place in bucket.
- ◆ When the bucket is full place it in harvest lane for pick up with flatbed
- ◆ Cucumbers are not washed as wheel tracks are mulched with straw.



Packing in the field	Fill buckets
Packing for delivery	40-60 cucumbers per small box
Storage	At 46 –54F, 95 -100% humidity. Pack in closed containers for storage during the week. Sort through frequently

Dill

Yield	0.07 lbs per row foot at 2500 lbs to the acre
Value	\$7.00 per lbs at \$17,500 per acre
Standards	Harvesting: 3 – 4 bins per hour per person depending on quality of the crop @ approximately 100 hrs per acre plus lugging boxes out of field to packing barn
	Washing: 12-15 bins per person per hour
Tools needed	Orthomec harvester and Knives and regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ 7-10 inches tall, dark green. Harvest without weeds and before plant bolts.

Harvest Procedures

- ◆ Dill is harvested in kneeled position.
- ◆ Dill is harvested in the same bin it is distributed in. Hold the dill in one hand and cut with the other. Pull out dead or yellow stems. Place in the bin. For easier distribution place all the stems in the same direction
- ◆ Leave behind 1-2 inches of uncut material

Washing Procedures

- ◆ Dunk whole bin into the 1st and 2nd tubs. Leave the bin in the 2nd tub for about 30 seconds

Cleaning in the field	remove dead and yellow leaves
Packing in the field	Loosely in regular green box
Packing for delivery	Distribute by site in a small black box or tomato tray
Storage	At 32 –41F, 95 -100% humidity. Pack in closed containers or bags for storage longer than a day



Eggplant

Yield	1.75 lbs to the row foot at 25,200 lbs to the acre
Value	\$1.00 per lbs at \$25,200 per acre
Standards	Harvesting: 5– 7 buckets (20 lbs per bucket) per hour per acre depending on quality of the crop@ approximately 200 hrs per person in harvesting plus loading and unloading buckets to packing area
	Washing: Eggplant is not washed but carefully sorted and counted
Tools needed	Scissors and ⅝ bushel green or red ½ bushel buckets

Ready to Harvest Indicators and Quality

- ◆ Fruits 4-5 inches long, filled out, firm and free from blemishes.

Harvest Procedures

- ◆ Eggplant is harvested in standing up and bending over position.
- ◆ Each person harvests one bed at a time (one row per bed). Mark the spot where you stop harvesting, so you can begin there the next time you harvest.
- ◆ Cut fruit off from plant with scissors leaving a small stem on the fruit. Leave about a ¼ inch stem on the eggplant.
- ◆ Wheeltracks in Eggplant are mulched with straw which makes cleaning unnecessary.



Packing in the field	Green or red buckets
Packing for delivery	Count into regular 1½ bushel boxes, count depends on variety
Storage	At 56 -54F, 90 -95% humidity. No long term storage, sort through frequently.

Fennel

Yield	1 bulb per row foot at 14,000 bulbs per acre
Value	\$1.50 per lbs at \$21,000 per acre
Standards	Harvesting: 50 bulbs per person per hour @ approximately 300 hrs per acre in harvesting plus loading and unloading boxes from and to washing area
	Washing: 150 bulbs per hour
Tools needed	Sharp knives and old large green boxes (1¾ bushel)

Ready to Harvest Indicators and Quality

- ◆ Harvest when fennel has filled out to a bulb that weighs about ½lb.

Harvest Procedures

- ◆ Fennel is harvested in a kneeling position
- ◆ Plant is cut at the root, hold the knife in a level position so the stem being cut is nice and smooth at the bottom. If the immediate outside leaves are blemished cut slightly higher so those are easily removed.
- ◆ Bulbs brought back to the barn are free from blemishes or soft spots, and only need some slight washing by spraying off the bottom part of the bulb.
- ◆ Extra leaves are cut off in the field by a second person at the length of the bin. Same person packs and loads on the truck



Packing in the field	Regular 1½ bushel bins, 15 bulbs per bin
Packing for delivery	Same bins, 15 bulbs per bin
Storage	At 32°F, 90 -95% humidity.

Garlic and Scapes

Yield	0.2 lbs dried garlic per row foot at 4000 lbs to the acre. 20,000 pieces of garlic scapes to the acre from hardneck varieties
Value	\$6.00 per lbs at \$16,000 per acre for the garlic and \$4,000 for the scapes
Standards	Harvesting: 800 pieces garlic scape and 35 lbs garlic per person per hour. This includes lifting the garlic with bedlifter, removing the tops, and picking them into boxes @ approximately 150 hrs per acre in harvesting plus loading and unloading boxes from and to drying area (at least another 75 hrs).
	Cleaning: 40 - 50 lbs to the hour
Tools needed	Scapes: Buckets and pickle barrels. Garlic serrated knives and regular 1½ bushel bins or old large green boxes (1¾ bushel) Tractor with bedlifter

Ready to Harvest Indicators and Quality

- ◆ Scapes: Scape is curled about 6 inches long with a small bulb on the end.
- ◆ Garlic: First two leaves are starting to die back. Garlic is cured so stem is hard and dry before delivery. All cloves are filled without any presence of mold.



Harvest Procedures

- ◆ To harvest the scapes, wait until they are longer than 6 inches and snap them off the stem just above the main stalk. Mark where you finish so you know where to start the next day.
- ◆ Pull garlic out of the ground with the help of a bedlifter .
- ◆ Cut off the roots with a sharp serrated knife, ½ inch below the bottom of the bulb or twist off roots with hands.
- ◆ We cure the garlic in an old greenhouse. We covered the greenhouse with 90% shade cloth to protect garlic from sunscald. Garlic is laid flat on greenhouse benches to allow for good aeration. Fans (on at all times) allow for good airflow and ventilation.

Cleaning Procedures

- ◆ Garlic can be washed straight after harvest, but we choose not to.
- ◆ When the leaves crumble off and the necks are sufficiently dried up, excess stem is cut off and the garlic is moved into the barn (and not in the cooler due to high moisture levels).

Cleaning in the field	Cut off roots
Packing in the field	Fill boxes
Packing for delivery	Count into small black boxes
Storage	Store garlic ideally at 32 –41F, 65 –70% humidity

Joi Choi,

Yield	0.6 head to the row foot at 13,000 heads to the acre
Value	\$0.50 per lbs at \$13,000 per acre
Standards	Harvesting: 125 – 175 heads per hour per person depending on quality of the crop @ approximately 100 hrs per acre in harvesting plus loading and unloading boxes from and to washing area
	Washing: 175 heads per person per hour
Tools needed	Knives. large green boxes (1¼ bushel)

Ready to Harvest Indicators and Quality

- ◆ Heads are 8 -12 inches tall and are 2 – 3 lbs each free from damaged or yellow leaves

Harvest and Cleaning Procedures

- ◆ Slide knife under head and cut off where root meets stem. Be careful to leave head intact.
- ◆ When cut properly and straight, the bottom of the head is nice and smooth.
- ◆ If the lower leaves are damaged or yellow, cut just above the lower leaves to leave them on the ground. Re-trim if your first cut did not leave behind a nice smooth surface on the bottom.
- ◆ It is important to cut at the correct place, so all the excess leaves fall off. Stripping off leaves after cutting is not correct. Cut a second time if leaves need to be removed.
- ◆ One person cuts the heads and another person counts and packs the Joi Choi.

Washing Procedures

- ◆ Dump gently into the 1st washing tubs. Rinse off the bottoms with a hose if necessary.
- ◆ Repack and dunk in ice water for while you wash the 2nd box.
- ◆ Then take the 1st box out of the ice water and put in the 2nd box.
- ◆ Repeat until all the boxes are washed.

Cleaning in the field	remove dead and yellow leaves
Packing in the field	12 heads per large green box (1¼ bushel)
Packing for delivery	12 heads per large green box (1¼ bushel)
Storage	At 32 –41F, 95 -100% humidity. Pack in closed containers or bags for storage longer than 5 days

Kale

Yield	1 bunch per row foot at 15,400 bunches to the acre
Value	\$.60 per bunch at \$9,240 per acre
Standards	Harvesting: 60 – 100 bunches per hour per person depending on quality of the crop @ approximately 200 hrs per acre in harvesting plus loading and unloading boxes from and to washing area
	Washing: Kale is not washed
Tools needed	Knives. large green boxes (1¾ bushel)

Ready to Harvest Indicators and Quality

- ◆ Plants 15-18 inches tall, bottom leaves are dark green and large enough to make a bunch out of 5 - 6 leaves.

Harvest Procedures

- ◆ Grab a bunch of the biggest leaves near the stem of the plant and snap off the leaves.
- ◆ Leave the smaller leaves at the top of the plant and any dead or yellow leaves on the bottom.
- ◆ If you are not making bunches put 60 leaves in each box.
- ◆ If you are making bunches take 5-6 leaves of the curly kale or a large handful of the Toscano Kale.
- ◆ Place the twistie around the stems and then twist the bunch to tighten the twisty or use rubber bands.
- ◆ Kale is not always washed but can be dunked in iced water to remove field heat.



Cleaning in the field	remove dead and yellow leaves
Packing in the field	12 -16 bunches OR 60 loose leaves per large green box (1¾ bushel)
Packing for delivery	12 -16 bunches OR 60 loose leaves per large green box (1¾ bushel)
Storage	At 32 –41F, 95 -100% humidity. Pack with ice in closed containers or bags for storage longer than a day

Kale, Flowering

Yield	0.7 head to the row foot at 10,000 heads to the acre
Value	\$1.00 per head at \$10,000 per acre
Standards	Harvesting: 8 bins per hour per person @ approximately 160 hrs per acre in harvesting plus loading and unloading boxes from and to washing area
	Washing: when part of a mix, 12 bins per person per hour
Tools needed	Knives. regular 1½ bushel box

Ready to Harvest Indicators and Quality

- ◆ Flowering Kale is harvested for braising mix and are therefore never delivered as full size heads.
- ◆ Mature heads 10 inches across and bright purple. The best color is after the first frost.
- ◆ Outer leaves are usually somewhat diseased which are removed during cutting. Heads are free from worms and other insects.

Harvest Procedures

- ◆ Push head to the side and cut off head leaving behind dead and diseased leaves. Cut high enough to leave damaged leaves on the stalk
- ◆ Then turn the head upside down in the bin and cut around the stem in a circle. This cuts off the leaves and the stem remains.
- ◆ Discard the stem.

Washing Procedures

- ◆ Flowering kale is usually mixes with other greens in a braising mix.
- ◆ Braising greens are washed twice; once in the first set of tubs followed by the dunking in the iced water in the second set of tubs. By going through the two tubs of cold water the greens stay fresher longer and are very clean.
- ◆ If insects are a problem dump leaves into washing tubs and let them soak for 5-10 minutes and then repack and dunk bin into second washing tub.

Cleaning in the field	Leave yellowed leaves in the field
Packing in the field	10 lbs per regular 1½ bushel bins
Packing for delivery	Usually part of a mix packed at 12 lbs per regular 1½ bushel box
Storage	At 32 –41F, 95 -100% humidity. Pack with ice in closed containers or bags for storage longer than a day

Leeks

Yield	1 large piece per row foot at 14,400 pieces per acre (small pieces are wasted) Or ½ bunch per row foot at 9,000 bunches per acre
Value	\$1.50 per piece at \$21,600 per acre \$2.25 per bunch at \$20,000 per acre
Standards	With a crew of three people a minimum of 150 pieces per hour @ 288 hrs per acre or 25 bunches per person @ approximately 360 hrs per acre in harvesting plus loading and unloading boxes from and to washing area.
	Washing: Depending on where the roots are cut, but when roots are cut off, a minimum of 100 bunches per person per hour.
Tools needed	Knives, Harvesting Fork, regular 1½ bushel bins and large green boxes for a cutting surface, or tractor with bedlifter

Ready to Harvest Indicators and Quality

- ◆ Leeks are about 1 inch in diameter with tall dark green leaves free from blemishes and diseases.

Harvest and Cleaning Procedures

- ◆ The first person forks the leeks out of the ground.
- ◆ The second person pulls the leeks and lays them out in rows with the roots facing the same direction.
- ◆ The third person cuts the roots off, at the place where the roots meet the stem. Do not cut into the plant.
- ◆ The fourth person cleans off any old, diseased or damaged leaves by peeling it from the bottom.
- ◆ The fifth person trims off the tops by cutting across the leaves at the same height. Do the trimming on the large green boxes and trim the leaves at the same length as the bin.
- ◆ If bunching leeks put 2-4 leeks per bunch making bunches uniform in size. Then place into a box.

Washing Procedures

- ◆ Dump leeks into the 1st washing tubs and spray off root ends with a hose. They don't need to be double dunked

Cleaning in the field	Cut off roots and remove outer leaves
Packing in the field	20 leeks per regular 1½ bushel bins or 10-15 bunches
Packing for delivery	20 leeks per regular 1½ bushel bins or 10-15 bunches
Storage	At 32 –41F, 95 -100% humidity. Pack with ice in bins for storage longer than a few days.

Lettuce, full size

Yield	1 marketable head per row foot at 21,600 heads to the acre. This number drops down under heavy pressure from thrips and white fly causing virus infections during August.
Value	\$0.80 per head at \$17,280 per acre
Standards	Harvesting: Large (1 ¾ bushel) green bin with 16-24 heads per box@ approximately 100 hrs per acre for cutting plus approximately 60 hrs for packing in boxes. Add additional time for loading and unloading boxes from and to washing area.
	Washing: 10 – 12 bins per person per hour, depending on variety, and quality.
Tools needed	Knives and pickle barrels or large (1 ¾ bushel) green bins

Ready to Harvest Indicators and Quality

- ◆ Heads firm, weighing anywhere from ½ lbs (Boston to ¾ lbs (Green-leaf, Romaine)

Harvest Procedures

- ◆ Lettuce is harvested in kneeling position. Two persons are kneeling on each side of the bed and place the bin in between on top of the bed. A third person follows and packs the heads into boxes. When the pickings are slim a pickle barrel is a good tool to be dragged by a single person through the field.
- ◆ Height of Cutting: Cut high enough to remove dead and damaged outer leaves while keeping the head intact. Like cabbage the harvest efficiency is much higher when the cutting is done at the right location. Cleaning after cutting is unnecessary when skill is developed in the cutting procedure. One tip is to stay close to the place where the cut is made. You can accomplish this by working on your knees, so you can easily bend over to see where the knife is entering the plant. As a procedure we always bring a few extra in to allow for any heads that might get damaged during transportation or washing, usually 5%.
- ◆ Cleaning in the field: None if harvested properly, but avoid any cleaning at the Packing house.

Washing Procedures

- ◆ Washing Procedures: Dump heads into the first washing tub and make sure to remove dirt from the cut ends either with gloves or with a brush. Shake out any excess water. Make sure the lettuce is in the water for a short amount of time to avoid getting water logged. Stack lettuce upside down to let the water drain while sitting in the cooler. If heads are clean in the field only the bottom of the box is washed and heads are put straight in the cooler.
- ◆ Packing for CSA: 12 heads per regular (1 1/3 bushel) green bin. When packed in several layers be sure to pack so that the cut ends face each other and the leaf ends face each other. The liquid from the cut ends can turn the leaves brown.
- ◆ Packing for Wholesale: 24 heads per large lettuce box

Cleaning in the field	Leave dead yellow leaves in the field
Packing in the field	12 heads per regular 1⅓ bushel bins or 16-18 heads per large green box (1¾ bushel)
Packing for delivery	12 heads per regular 1⅓ bushel bins or 16-18 heads per large green box (1¾ bushel)
Storage	At 32 –41F, 95 -100% humidity. Pack in closed containers for storage longer than a few days.

Lettuce, Salad Mix

Yield	1 lbs per bed foot at 7200 lbs to the acre
Value	\$3.00 per lbs at \$21.600 per acre
Standards	Harvesting: 4-5 bins per person per hour@ approximately 150 hrs per acre in harvesting plus loading and unloading boxes from and to washing area. Machine harvest up to 35-50 bins per hour @15- 25 hrs per acre (for three people) as success greatly depends on conditions.
	Washing: 8-12 bins per person per hour.
Tools needed	Orthomec harvester or Knives. Regular 1½ bushel bins

Ready to Harvest Indicators and Quality

- ◆ Leaves are 6 -8 inches tall, healthy, free from yellowing, necrosis or other blemish. .

Harvest Procedures

- ◆ Salad mix is harvested in kneeled position.
- ◆ Two people harvest into the same bin, one on either side of the bed. This way each bin contains a mix of all the lettuces in the bed. The bin sits on the middle of the bed with the harvesters in kneeled position in the wheel tracks.
- ◆ Hold a small bunch of lettuce with one hand and cut with the other in one smooth motion. Pull out any dead or yellow leaves. Place leaves in the bin which is at all times placed close to the harvested area.
- ◆ Cut 1- 2 inches from the bottom of the plant. Cut high enough to avoid taking out the growing point. Lettuce has good re-growth capacities in spring and fall, if weeds are controlled and plants remain healthy.

Washing Procedures

- ◆ Rinse off outside of box. If lettuce is clean dunk the whole box in the first tub. Otherwise dump loosely into the first washing tub. Combine with other salad ingredients and mix. Wash inside of box.
- ◆ Then remove salad greens from water and repack and dunk box into second tub with iced water. Do not leave the box in the 2nd tub for more than 15 seconds. Leaves tend to get waterlogged after a few minutes, which makes them deteriorate faster.
- ◆ By going through the two tubs of cold water the salad greens stay fresher longer, and are very clean.
- ◆ Salad mix is not spun dry as the water keeps the mix cool at the sites (which are usually at outside temperatures. Members are instructed to wash the salad-mix one more time when they bring it home and to pack it away after spinning it dry in a salad spinner.

Cleaning in the field	Leave yellowed leaves in the field
Packing in the field	12 lbs per regular 1½ bushel bins
Packing for delivery	12 lbs per regular 1½ bushel bins
Storage	At 32 –41F, 95 -100% humidity. Pack in closed containers for storage longer than a few days.

Mei Ching Choi, as Braising greens

Yield	0.5 lbs per row foot at 10,000 lbs to the acre.
Value	\$1.50 per lbs at \$15,000 per acre
Standards	Harvesting: 7-9 bins per person per hour @ approximately 100 hrs per acre not including transport and hauling out of field.
	Washing: 15-20 bins per person per hour
Tools needed	Knives. regular 1½ bushel bins

Ready to Harvest Indicators and Quality

- ◆ 5-6 inches tall, small “heads” formed, light green leaves without signs of yellowing. Absolutely no worms or eating damage in the mix.

Harvest Procedures

- ◆ Mei ching choy is harvested in kneeled position.
- ◆ Hold the head in one hand and cut the head low enough to break it up. Remove any dead or yellow leaves and place in bin.
- ◆ Cut just above where all the stems are connected so that you have loose leaves but high enough that you don’t cut the growing point.



Washing Procedures

- ◆ Dump box into the first washing tub, then repack and dunk box into second tub with ice water. Do not leave greens for longer than 15 seconds in water. Leaves tend to get waterlogged after a few minutes, which makes them deteriorate faster.

Cleaning in the field	Leave yellowed leaves in the field
Packing in the field	12 lbs per regular 1½ bushel bins
Packing for delivery	12 lbs per regular 1½ bushel bins
Storage	At 32 –41F, 95 -100% humidity. Pack in closed containers for storage longer than a few days

Mei Ching Choi, full size

Yield	.75 heads to the row foot at 16,000 heads per acre
Value	\$1.00 per head at \$16,000 per acre
Standards	Harvesting: 12 bins per hour @ approximately 120 hrs per acre not including transport
	Washing: 12-15 bins per hour
Tools needed	Knives. regular 1½ bushel bins

Ready to Harvest Indicators and Quality

- ◆ 5-6 inches tall, small “heads” formed, light green leaves without signs of yellowing. Absolutely no worms or eating damage in the mix.

Harvest Procedure

- ◆ Gently push the plant to one side and slice with the knife so that the head stays together. You want a smooth surface at the cut point; do not leave a stem attached.
- ◆ Cut at the correct place, so that you have a smooth bottom surface and all the excess leaves fall off. Stripping off leaves after cutting should not be done. Cut a second time if there are leaves that need to be removed.
- ◆ One person cuts the heads and another person packs and counts the heads.

Washing Procedures

- ◆ Dump gently into the 1st washing tubs. Rinse off the bottoms with a hose if necessary.
- ◆ Repack and dunk in ice water for while you wash the 2nd box.
- ◆ Then take the 1st box out of the ice water and put in the 2nd box.
- ◆ Repeat until all the boxes are washed.
- ◆

Cleaning in the field	Leave yellowed leaves in the field
Packing in the field	12 heads per regular 1½ bushel bins
Packing for delivery	12 heads per regular 1½ bushel bins
Storage	At 32 –41F, 95 -100% humidity. Pack in closed containers for storage longer than a few days

Melon, Cantaloupe

Yield	1 melon per row foot at 7200 melons per acre
Value	\$2.50 per melon at \$18,000 per acre
Standards	Harvesting: 75-100 melons per hour per person. It takes a crew of five people about 45 minutes to an hour to harvest and sort 350 melons between leaving the barnyard and unloading in the barn. (approximately 100 hrs per acre)
	Washing: not necessary when mulched is used in between plastic. Sorting should be done in the field to save time in the barn
Tools needed	large green boxes (1¾ bushel)

Ready to Harvest Indicators and Quality

- ◆ Cantaloupes are ready when they have a full yellow color on the outside. When cut open, flesh is sweet and juicy.

Harvest Procedures

- ◆ 1 or 2 people stand on harvest wagon and the others each take a row of melons.
- ◆ After a picker harvests a melon, he or she tosses the melon to one of the people on the truck. Make sure you have eye contact with the catcher before you toss the melon underhanded.
- ◆ Move the harvest wagon down the harvest lane as you pick.



Washing Procedures

Cleaning in the field	Brush off any soil or straw mulch
Packing in the field	sort by size, anywhere from 8 - 12 melons per large (1 ¾ bushel) green box
Packing for delivery	sort by size, anywhere from 8 - 12 melons per large (1 ¾ bushel) green box
Storage	At 37° – 45° F, 95% humidity, with the exception of Honeydew melons at 50 –54F.

Onions, green

Yield	1 bunches per foot at 20,000 bunches per acre
Value	\$1.00 per bunch at \$20,000 per acre
Standards	Harvesting: 40-60 bunches per person per hour. A crew of six can harvest about 300 bunches in a little over an hour, including loading it on the truck. (approximately 450 hrs per acre)
	Washing: 80-100 bunches per person per hour
Tools needed	large green box (1¾ bushel), twisties and knives

Ready to Harvest Indicators and Quality

- ◆ Onions have sized up between 3 and 4 inches. Onions are white without any dead leaves. The leaves are not crushed or damaged and have no signs of thrips.

Harvest and Cleaning Procedures

- ◆ The first person pulls onions out by grabbing them as low as possible at the stem to avoid crushing the green stems. Place the onions on the top of the bed all facing the same way.
- ◆ The second person cleans off the outer leaves around the bulb which results in a clean white bulb.
- ◆ The third person bunches two to four onions together with twisties.
- ◆ The fifth person cuts off the excess length off the leaves to allow the bunch to fit lengthwise in the box.
- ◆ The last person picks up the finished bunches, counts, and places them in the box.
- ◆ Onions do not like to be washed as it affects their storage life. Remove most of the dirt in the field. Bunched fresh onions look much nicer when clean. Spray off the onions with hose but do not dump into washing tub.



Packing in the field	15 bunches in a regular 1¾ bushel box
Packing for delivery	15 bunches in a regular 1¾ bushel box
Storage	32 – 41F, 95 -100% humidity. Pack in closed containers for storage longer than a week.

Onions, storage

Yield	1.5 lbs per row foot at 32,000 lbs per acre
Value	\$1.00 per lbs at \$32,000 per acre
Standards	Harvesting: 175 lbs per person per hour. This includes pulling the onions, removing the tops, and picking them into boxes. (@approximately 200 hrs per acre)
	Curing, cleaning and sorting: 250 lbs per person per hour.
Tools needed	⅝ bushel green buckets or regular 1½ bushel boxes and knives

Ready to Harvest Indicators and Quality

- ◆ Onion tops are starting to die back. Onions taken out of the field are healthy with no signs of botrytis or neck rot.

Harvest Procedures

- ◆ Pull onions out of the ground. Clean off some of the yellow and rotten leaf parts, but take care not to remove too many of the outer layers.
- ◆ Cut off the tops with a sharp knife, 2-4 inches above the crown.
- ◆ You can also cut the tops off first then pull them out of the ground.
- ◆ Fill buckets with the trimmed onions and pick up with wagon.
- ◆ When the crop is harvested for longer term storage, bring the onions in the greenhouse for curing. Cover the greenhouse with 80% shade cloth to protect onions from sunscald.
- ◆ Remove onions as soon as the necks are sufficiently dried up (you can no longer roll any stems between your fingers and the stem tissue feels like paper).
- ◆ The leaves will easily crumble off at this point and after a rough cleaning the onions are moved into the barn (and not in the cooler due to high moisture levels). The onions are packed into 20 bushel bins. They can also be brought to Yonder Farms cooler to be stored at low humidity at 32° F.



Packing in the field	Green buckets
Packing for delivery	Pack in regular 1½ bushel box, 40 lbs to a box OR by count
Storage	At 32 –41F, 65 –70% humidity

Parsley

Yield	¼ lbs per foot at 5400 lbs per acre (for two cuttings)
Value	Loose \$2.50 per lbs at \$13,500 per acre or \$1.00 per bunch at \$21,600 per acre
Standards	Harvesting: Depending on conditions and if bunching is necessary, 4 loose boxes per hour person (@approximately 150-200 hrs per acre) ; 60 bunches per person @ approximately 360 hrs per acre.
	Washing: 12 boxes per hour person
Tools needed	Knives, regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ Plants 5-6 inches tall and bushy, dark green free of yellow or dead leaves.

Harvest and Cleaning Procedures

- ◆ Parsley is harvested in kneeled position.
- ◆ The hand that holds the knife takes the parsley by the leaf end from the other hand. Shake parsley vigorously to remove any yellow leaves or stems from previous cuttings.
- ◆ For easier distribution place all the stems in the same direction in the box.
- ◆ If the stems are cut high of the ground make sure you re-cut it again, so only 2-3 inches remain on the plant. This is to avoid cutting dead stems at next harvest. After harvest the parsley plants will need to look evenly cut to accommodate even re-growth.

Washing Procedures

- ◆ Dunk box into both washing tubs. Wash parsley and other herbs last after you have washed the other greens. Do not remove parsley out of boxes but rather move the parsley in the water to rinse while sitting in the box.
- ◆ By going through the two tubs of cold water the parsley stays fresh longer and is very clean. Do not leave parsley for longer than 15 seconds in water. Leaves tend to get waterlogged after a few minutes, which make them deteriorate faster.

Packing in the field	Green box
Packing for delivery	In a black box or tomato tray to accommodate smaller quantities
Storage	At 32 –41F, 95 -100% humidity. Pack in closed containers for storage longer than a few days.

Parsnip

Yield	0.83 lbs per row foot at 18,000 lbs per acre.
Value	\$0.80 per lbs at \$14,400 per acre
Standards	Harvesting: 175 lbs per person per hour or five people can harvest and fill up a bulk-bin in about an hour @ approximately 100 hrs per acre.
	Washing: 300 lbs per person per hour
Tools needed	⅝ bushel buckets, bulk bins, tractor with bedlifter, tractor with forklift

Ready to Harvest Indicators and Quality

- ◆ Root 6 -12 inches long in October.
- ◆ Roots are white and straight without any defects.

Harvest Procedures

- ◆ Undercut parsnips with the bed lifter,
- ◆ Then pull out and twist off tops and put in buckets.
- ◆ Only take straight parsnips with no more than two prongs.
- ◆ Stunted, diseased, forked, and split parsnips are left in the field.
- ◆ Small parsnips do not store well. Distribute those immediately.
- ◆ If harvesting for one day's share empty buckets into green boxes on the truck.
- ◆ If harvesting in bulk, drive the tractor with a bulk bin down the harvest lane and carefully dump the parsnips into the bin. The buckets are laid out over the full length of the bed so the entire crop from one bed is dumped in the bin at one time. Leave the buckets at the same place to be used for the next bed.

Washing and Sorting Procedures

- ◆ Do not wash until ready to deliver. Then put through barrel washer.
- ◆ This washer works best if filled up with approx. 300 lbs of parsnips.
- ◆ Hose the parsnips before entering the washer, so any dirt on the parsnips is soft.
- ◆ Sorting is done on the receiving end. Barrel washer should have the sorting table at the end. Sort out parsnips with large soft spots. Sort parsnips by size into regular boxes if needed.

Packing in the field	800 lbs per bulk bin.
Packing for delivery	40 lbs per regular 1½ bushel box or twenty 2 lbs bags per regular 1½ bushel box
Storage	At 32 –41F, 95 -100% humidity. Pack in closed containers or bags for long-term storage.

Peas (Sugarsnap, Snowpeas)

Yield	0.12 pint per row foot at 2600 pints to the acre for bush types. 0.75 pint per row foot at 5400 pints to the acre for trellised peas Snow-peas yield approximately 30% less than sugarsnaps.
Value	\$3.00 per pint at \$7,800 per acre for bush types \$3.00 per pint at \$16,200 per acre for trellised peas
Standards	Harvesting: 15 lbs per person per hour @ approximately 175 hrs for bush type OR 20 lbs per person per hour trellised type @ approximately 270 hrs per acre
Tools needed	½ bushel green buckets

Ready to Harvest Indicators and Quality

- ◆ Peas are plump and have filled out due to swelling of peas inside the pod.
- ◆ Do not harvest diseased, damaged, over mature or immature pods.

Harvest Procedures

- ◆ If peas are trellised only harvest the mature peas into the bucket. If the plants are not trellised and most of the peas are mature, pull out the whole plant and pull off the peas. Double the buckets to prevent peas from falling out the holes.
- ◆ This can be done standing up or kneeling down. Some people sit on a bucket while cleaning the vines. This might not be as efficient but pea harvest might become strenuous after a few hours.



Washing Procedures

- ◆ Peas don't need to be washed but if needed rinse quickly with cold water to remove field heat. If harvested on a hot day peas can be soaked in the cold water tub to remove the field heat.

Packing in the field	Every bucket weighs about 20 lbs filled with peas.
Packing for delivery	Weighed by site into regular green boxes or packed into pint containers with nets, 15 pints per small box.
Storage	At 32 –42F, 95 –98% humidity. Cover in closed containers or bags if stored for a few days,

Peppers, Green and Red

Yield	2½ lbs per row foot at 36,000 lbs to the acre.
Value	\$1.00 per lbs at \$36,000 per acre
Standards	Harvesting: 10 buckets or 150 lbs per hour @ approximately 240 hrs per acre
Tools needed	⅝ bushel green or ½ bushel red buckets

Ready to Harvest Indicators and Quality

- ◆ When peppers are firm and large. When the peppers cannot be easily squeezed between the fingers it is a sign of being ready. Yield of peppers is not measured only in size but also in the thickness of the walls. For Carmen peppers only harvest the red peppers.
- ◆ Only peppers that are free of blemishes are taken out of the field. The rest are picked and discarded in the wheel tracks.

Harvest Procedures

- ◆ Count out the number of buckets needed to harvest.
- ◆ One bucket of green peppers yields approx 35 peppers or 15 lbs. One bucket of Carmen peppers yields 60 peppers. If you need 750 green peppers (or 320 lbs) you need to lay out 21 buckets.
- ◆ Move full buckets to the harvest lane as you fill them. When all the buckets are full pick up with tractor or truck.
- ◆ Two people harvest from the same bed, each taking one side of the row. Watch for rot, which might on the outside look like a small blemish but is usually more substantial on the inside.
- ◆ Mark where you stopped harvesting so you can start there the next day.

Washing Procedures

- ◆ Peppers are generally not washed and stored in a dry location.
- ◆ In the afternoon peppers are sorted by color and size and counted in the barn.

Packing in the field	Harvest in buckets and fill up in regular (1 1/3 bushel) green boxes, either by count or volume.
Packing for delivery	By count or volume in regular 1½ bushel boxes. If given out by count, 50-60 pieces per box.
Storage	At 45 – 65F, 90 –95% humidity. The barn is a good environment.

Potatoes

Yield	1.3 lbs per row foot at 18,750 lbs per acre
Value	\$0.85 per lbs at \$12,750 per acre (yield includes storage losses)
Standards	Harvesting: 300-400 lbs per person per hour or 10-16 buckets @ approximately 50 - 65hrs per acre.
	Washing and sorting: 500 lbs per person per hour.
Tools needed	½ bushel green buckets, digging forks, tractor with potato digger, tractor with forklift, 20 bu. bulk-bins

Ready to Harvest Indicators and Quality

- ◆ For early harvest: potatoes have sized up to make a harvest worthwhile (August).
- ◆ Harvest for storage: the vines are starting to die back and the potatoes start forming a firm skin that doesn't get easily damaged by the harvester (Middle to late September, into October). Daytime air temperatures should have dropped to around 60°F.

Harvest Procedures

- ◆ If harvesting for new potatoes dig them with a fork. Fill the buckets and then empty the buckets into green boxes on the truck.
- ◆ For bulk harvest: Place about 30 buckets on the harvester. One person drives the tractor, 3-4 people sort out the good potatoes on the machine and place them on the outside chains. One or two people change the buckets on the back of the harvester. Bring the full buckets to the harvest lane. One person drives the tractor with a bulk bin down the harvest lane and carefully dumps the potatoes into the bin.
- ◆ **Keep each type of potato in separate bins**



Washing Procedures

- ◆ We usually do not wash new potatoes as it removes too much skin.
- ◆ Potatoes do not like water so if they are washed they need to be distributed within a week. They are washed with the conveyor washer.
- ◆ Potatoes are sorted for quality (not size)
- ◆ Put two fans blowing at high speed towards the pallets with washed potatoes for drying.

Cleaning in the field	Only pick up potatoes that are blemish free, which means no cuts or bruises and no rot
Packing in the field	In buckets being transferred to a bulk bin.
Packing for delivery	By volume or weight, 50 lbs (or 25 quarts) per regular 1½ bushel box.
Storage	At 38 –40F, 90 –95% humidity. Potatoes need to be cured at 50 – 60F and the temperatures should gradually be brought down.

Pumpkin

Yield	½ pumpkin per row foot at 3,600 pumpkins per acre
Value	\$2.50 per pumpkin at \$9,000 per acre
Standards	Harvesting: Including picking off the vine and filling up bulk-bin, 800 lbs bin per person per hour @ approximately 18-20 hrs per acre.
Tools needed	Tractor with forklift, 20 bushel bins, pruning scissors or serrated knives

Ready to Harvest Indicators and Quality

- ◆ Pumpkins have a full color. Try to harvest pumpkins before the stem turns brown. Some years this means you need to bring it in earlier than desired.
- ◆ Leave any blemished or discolored pumpkins in the field.

Harvest Procedures

- ◆ The harvest crew goes down the rows and pulls the pumpkins off the vines. (Take care not to pull the stem off, use a clipper if needed). If cutting, cut the stem so that it 5-6 inches long.
- ◆ Then they are laid down the length of the bed (out of the vines so they are easy to see), smaller pumpkins like Baby Bear can be placed directly in buckets.
- ◆ When there is a good amount of one variety harvested it is time to pick up the pumpkins.
- ◆ One person rides in a bulk bin and another person hands them the pumpkins until the bin is full enough for both people to bend and fill.
- ◆ Each variety of pumpkin should have its own bin.



Packing in the field	In 20 bushel bins
Packing for delivery	Large green boxes
Storage	At 50 degrees and 50-70% humidity. Storage life depends on variety anywhere from 8-16 weeks.

Radishes

Yield	0.3 bunches per row foot at 10,800 bunches per acre
Value	\$0.75 per bunch at \$8,100 per acre
Standards	Harvesting: 60-80 bunches per person hour @ approximately 180 hrs per acre.
	Washing: 150 bunches per person per hour.
Tools needed	Rubber bands and regular 1½ bushel box

Ready to Harvest Indicators and Quality

- ◆ When radishes are about ¾ to an inch in diameter.
- ◆ Radishes are round, have good color, free of blemishes and cracks.

Harvest Procedures

- ◆ One person harvests several rows of radishes, working on their knees.
- ◆ Depending on size, one bunch contains approx. 5 –7 radishes to serve one share or 7 – 10 for wholesaling.
- ◆ Only radishes that are free of blemishes and without splits are taken.
- ◆ Hold the radish bunch with one hand and put the rubber band over the radish end of the bunch two times.
- ◆ Make sure all radishes will stay in the bunch but not so tight that it breaks the stems.
- ◆ No counting is done while bunching. Place 5 bunches in a pile. When there are quite a few piles on the ground, someone picks them up and counts them into small green boxes. 20-25 bunches per box.

Washing Procedures

- ◆ Use the bunch washer to wash the radishes. Two people are needed for this job. They should switch tasks every 5 boxes are so. Soak the bunches in the white tub. One person places 2 or 4 bunches at a time on the table. The second person grabs 2 or 4 bunches at a time (depending on how dirty the roots are) and places the root ends into the bunch washer. That person then places the cleaned bunches into the second wash tub. The first person rinses out the box and places 25 bunches into the box (5 bunches to a layer).
- ◆ When five boxes are re-packed the first person brings them into the barn and puts the boxes into the cold water tank. The radishes soak in the cold water until the next 5 boxes are cleaned. The beets go into the cooler after they have soaked in the cold water tub.
- ◆ Repeat until all radishes are washed and cooled.

Cleaning in the field	Yellow leaves are discarded, or pulled out of the bunch.
Packing in the field	20-25 bunches to a regular 1½ bushel box.
Packing for delivery	20-25 bunches to a regular 1½ bushel box.

Rutabaga

Yield	2.55 lbs per row foot at 36,720 lbs to the acre
Value	\$0.35 per lbs at \$12,850 per acre
Standards	Harvesting: Depends on size, but 400 lbs per hour is not unusual. When rutabagas are large expect to harvest more than 400 lbs @ approximately 80-100 hrs per acre.
	Washing: 350-400 lbs per hour per person (includes cleaning boxes, and weighing). or in other words, two people wash 1000 lbs in 1 ½ hour
Tools needed	Tractor with forklift, 20 bushel bulk bins and sharp knives

Ready to Harvest Indicators and Quality

- ◆ Seasonal, before the grounds gets frozen or before the tubers get too big for consumption. Rutabagas should not weigh more than 3 lbs.
- ◆ Rutabaga isn't a pretty looking crop to begin with but only tubers that are relatively round and do not weigh more than 3 lbs are taken out of the field. Larger ones can be fed to farm animals.

Harvest Procedures

- ◆ Pull rutabaga out of ground, trim off the root then cut the stem about an inch above the tuber and leave them in a windrow or put in a bucket.
- ◆ When enough is harvested to fill a few bins, pick up the product and place in bulk bin.

Washing Procedures

- ◆ Wash in barrel washer or conveyor washer

Cleaning in the field	Dirt is rubbed or cut off the bottom part of the tuber
Packing in the field	1000 lbs per bulk bin
Packing for delivery	45 lbs per regular 1½ bushel box
Storage	At 32° – 41° F, 95 -100% humidity. Pack in closed containers or bags for long-term storage.

Scallions

Yield	1 bunch per row foot at 21,600 bunches per acre
Value	\$0.60 per bunch at \$12,960 per acre
Standards	Harvesting: 50 bunches per hour @ approximately 300-450 hrs per acre
	Washing: 100 bunches per hour
Tools needed	Rubber bands, regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ When scallions are about pencil size in diameter. One plant (consisting of several scallions) should be big enough to make one bunch. The bunch should be a small handful of 5-7 large scallions.
- ◆ Scallions have dark green foliage free from thrips damage. Roots are pure white.

Harvest Procedures

- ◆ Scallions are already planted in bunches in the field.
- ◆ Cut or pull the scallions out of the ground, break the roots apart to remove most of the dirt, and put a rubber band around the bunch two times.
- ◆ Usually one plant or 5-6 scallions per bunch.
- ◆ Bunches are stacked in piles of ten.
- ◆ When there are quite a few piles on the ground someone picks them up and counts them in boxes. Usually 40-50 bunches per regular green box.

Washing Procedures

- ◆ Place scallions on greenhouse bench, all ends facing the same direction.
- ◆ Use the power washer to clean one side of the bunch. Flip the bunches over and wash the other side. Wash the box.
- ◆ Count 40 - 50 bunches into the washed box. This job can be done by one or two people.

Cleaning in the field	Yellow leaves are trimmed off. Scallions are cut to the length of the box if needed.
Packing in the field	40-50 bunches to a regular 1½ bushel box.
Packing for delivery	40-50 bunches to a regular 1½ bushel box.
Storage	At 32 –42F, 95 –98% humidity. Cover in closed containers or bags if stored for a few days.

Sorrel

Yield	0.35 lbs per row foot at 7,560 lbs per acre (one cutting)
Value	\$2.00 per lbs at \$15,120 per acre
Standards	Harvesting: 6-8 bins per hour per person @ approximately 75- 100 hrs per acre
	Washing: 12 –15 bins per hour per person.
Tools needed	Knives, regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ When leaves are 4 –6 inches tall
- ◆ Leaves are light green and only a slight flower stem is showing in the middle of the plant.
- ◆ Sorrel leaves might have holes which is acceptable.

Harvest Procedures

- ◆ Sorrel is harvested in the same bin it is distributed in.
- ◆ Cut sorrel as close to the ground as you can. If stems are long cut the product again and leave the excess stems in the wheel track.
- ◆ Hold a small bunch of leaves at the top of the plant with one hand and cut with one smooth motion with the other hand.
- ◆ The excess yellow leaves and stems from previous cutting can this way easily discarded of by shaking it vigorously.
- ◆ Then the sorrel is placed in the box with all the stems in the same direction.

Washing Procedures

- ◆ Dunk box into both washing tubs unless greens are very dirty, then dump into the first washing tub, repack and dunk bin into second tub with ice water.
- ◆ By going through the two tubs of cold water the greens stay fresher longer and are very clean.
- ◆ Do not leave greens for longer than 15 seconds in water. Leaves tend to get waterlogged after a few minutes, which make them deteriorate faster.

Cleaning in the field	Stems or yellow leaves are picked out of the box before a new layer is put on. For easier distribution place all the stems in the same direction.
Packing in the field	15 lbs per regular 1½ bushel box
Packing for delivery	15 lbs per regular 1½ bushel box
Storage	At 32 –42F, 95 –98% humidity. Cover in closed containers or bags if stored for a few days.

Spinach

Yield	0.14 lbs per row foot at 5,400 lbs per acre
Value	\$3.00 per lbs at \$16.200 per acre
Standards	Harvesting: 5 bins per hour @ approximately 100 hrs per acre (depending on health of crop)
	Washing: 8-10 bins per hour
Tools needed	Orthomec Harvester or Knives, regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ When spinach is approx 3 –4 inches tall.
- ◆ Spinach needs to be dark green and free from any white mold or yellowing due to N deficiency.

Harvest Procedures

- ◆ Spinach is harvested in the same box it is distributed in. Two people harvest into the same box, one in either wheel track. Move the box as you harvest.
- ◆ Spinach is harvest keeling down
- ◆ Hold a small bunch of spinach at the top of the leaves in one hand. Cut with one smooth motion with the knife with the other hand.
- ◆ Shake out any yellowed leaves or stems.
- ◆ Then the Spinach is placed in the box.

Washing Procedures

- ◆ Dunk box into both washing tubs unless greens are very dirty, then dump into the first washing tub, repack and dunk bin into second tub with ice water.
- ◆ By going through the two tubs of cold water the greens stay fresher longer and are very clean.
- ◆ Do not leave greens for longer than 15 seconds in water. Leaves tend to get waterlogged after a few minutes, which make them deteriorate faster.

Cleaning in the field	Stems or yellow leaves are removed
Packing in the field	12 lbs per regular 1½ bushel box
Packing for delivery	12 lbs per regular 1½ bushel box
Storage	At 32 –42F, 95 –98% humidity. Cover in closed containers or bags if stored for a few days.

Strawberries

Yield	¾ pint per row foot at 10,800 pints per acre (in a dry year)
Value	\$2.50 per pint at \$27,000 per acre (in a dry year)
Standards	Harvesting: 15 Quarts or 25 pints per person per hour @ approximately 400- 450 hrs per acre
Tools needed	Black boxes with pint baskets & netting. Bowls to pick in are optional

Ready to Harvest Indicators and Quality

- ◆ Berries are picked when they are light red and firm.
- ◆ Ripe berries are discarded as they do not hold up until time of delivery.
- ◆ Berries are free from blemishes or eating damage. Minor bulging due to tarnished plant bug is acceptable.

Harvest Procedures

- ◆ Each person takes one row of strawberries, picking into the bowl or directly into pint baskets.
- ◆ When the bowl is filled pour the berries into the pint containers in the small black box.
- ◆ Fill the pint containers until they have a rounded top then place net over the top.
- ◆ Make sure to keep the harvest crew in one section of the field at a time.
- ◆ Mark where you stopped so you can start there the next day.
- ◆



Packing in the field	pints in small black boxes
Packing for delivery	15 pints per small black box or 8 quarts per small black box
Storage	Store in cooler overnight. If delivering the same day as harvest do not put in cooler. Long term: at 32 degrees at 90% humidity for 5-7days

**Squash Summer
(includes Zucchini)**

Yield	4.33 lbs per row foot at 31,200 lbs per acre
Value	\$1.00 per lbs at \$31,200 per acre
Standards	Harvesting: 5-6 buckets per hour or 120 lbs @ approximately 200-300 hrs per acre (not including picking up buckets and transport).
Tools needed	Pocket or paring Knives, green buckets

Ready to Harvest Indicators and Quality

- ◆ When squash is 4-5 inches long and a good thickness. If it is patty pan squash it should be the size of a doorknob.
- ◆ Fruit is firm from stem to tip. Soft or pointed tips (with Zucchini) indicate rot and should be discarded.
- ◆ Plants infected with larvae from squash bugs need to be abandoned.

Harvest Procedures

- ◆ One person walks down each side of the plant. Each person carries a bucket.
- ◆ Zucchini is cut, summer squash can be cut or twisted & patty pan is twisted off.
- ◆ Cut or twist off the stem right above the fruit and place carefully in the bucket.
- ◆ When the bucket is full carefully put it next to the harvest lane.
- ◆ If the vines give you a rash, cut the toes off a long pair of socks to make a long glove to protect your arm.
- ◆ When all of the squash and zucchini are harvested pick up buckets with the harvest truck.
- ◆ Count into boxes in the barn



Packing in the field	fill bucket
Packing for delivery	Usually 40-60 pieces per small black box.
Storage	Store in barn. For 1-2 weeks keep at 41-50 degrees at 95% humidity

Squash, Winter

Yield	3¼ lbs per row foot at 23,400 lbs per acre
Value	\$0.60 per lbs at \$12,000 per acre (yield includes storage losses)
Standards	Harvesting: Including picking off the vine and filling up bulk-bin, 600 lbs per person per hour @ approximately 40 hrs per acre (not including transport)
	Washing: 600 lbs per person per hour
Tools needed	¾ bushel green buckets, tractor with forklift, 20 bushel bins

Ready to Harvest Indicators and Quality

- ◆ Squash have a full color. Green Acorn develops an orange side. Kabocha should be harvest slightly on the green side as they continue to mature after harvest.
- ◆ Squash are mature, free of blemishes and black rot infestations (concentric circles on butternut)

Harvest Procedures

- ◆ The harvest crew goes down the rows and pulls the squash off the vines and wipes off the biodegradable plastic that may be stuck to the squash. Take the stems off of the acorn squash and butternut squash types or cut stems very short. If you remove the stems completely leave in windrows in the field for one to days to cure.
- ◆ Each variety of squash is put in a windrow down the length of the bed (out of the vines so they are easy to see) OR can be placed directly in buckets.
- ◆ When there is a good amount of one variety harvested it is time to pick up the squash.
- ◆ One person rides in a bulk bin and another person hands them the squash until the bin is full enough for both people to bend and fill. Or carefully empty the buckets into the bulk bin.
- ◆ Each variety of squash should have its own bin.
- ◆ Butternut and buttercup squash needs to be cured in the greenhouse at 85 degrees for 7-10 days to be sweet tasting. Cover the greenhouse with 80% shade cloth. Other varieties do not need to be cured.

Washing Procedures

- ◆ Wash squash in the conveyor washer just before delivery.
- ◆ Squash is sorted for quality and size
- ◆ Put two fans blowing at high speed towards the pallets with washed squash for drying.
- ◆ Sweet dumpling, Delicata squash, Buttercup and Kabocha should be distributed first as they don't keep very long. Keep butternut for the last deliveries.

Packing for delivery

Delicata 30 or 40 to a regular 1½ bushel box
Butternut 15 or 25 to a regular 1½ bushel box
Acorn 30 or 40 to a regular 1½ bushel box
Mini Spaghetti 15 or 30 to a regular 1½ bushel box
Sweet Dumpling 45 or 60 to a regular 1½ bushel box
Buttercup 15 to a regular 1½ bushel box

Sweet Potatoes

Yield	1.2 lbs per row foot at 17,300 lbs per acre
Value	\$1.00 per lbs at \$15,000 per acre (yield includes storage losses)
Standards	Harvesting: 200 - 250 lbs per hour per person @ approximately 100 hrs per acre (not including transport)
Tools needed	Buckets, bulk-bins, tractor with potato digger, tractor with forklift

Ready to Harvest Indicators and Quality

- ◆ Sweet potatoes need to be harvested before the soil temperature goes below 55°F. The vines may have to be mowed before dug with a root digger.
- ◆ Tubers are filled out (no sausage shaped tubers are harvested), and free from mouse damage. Minor damage can be cut away with a knife as the latex will form a new skin where the tuber has been cut



Harvest Procedures

- ◆ First mow the vines.
- ◆ For bulk harvest: Place about 30 buckets on the harvester. One person drives the tractor, 3-4 people sort out the good potatoes on the machine and place them on the outside chains. One or two people change the buckets on the back of the harvester. Bring the full buckets to the harvest lane. One person drives the tractor with a bulk bin down the harvest lane and carefully dumps the potatoes into the bin.
- ◆ Sweet potatoes are easily bruised so they need to be handled gently.
- ◆ Sweet potatoes need to be cured in the greenhouse for ten days at 85° F. Cover the greenhouse with 80% shade cloth. Cover up the bins with tarps that can breathe (absolutely no plastic) to protect against sunscald.

Washing Procedures

Cleaning in the field	Remove large chunks of dirt
Packing for delivery	2-3 lbs in a paper bag. 7- 8 bags per black box. 15 bags to small green box
Storage	55° F at 80%humidity.

Tatsoi

Yield	0.3 lbs per row foot at 10,800 lbs per acre
Value	\$2.50 per lbs at \$27,000 per acre
Standards	Harvesting: Harvesting: 5 boxes per hour @ approximately 140 hrs per acre
	Washing: Washing: 8-10 boxes per hour
Tools needed	Orthomec harvester or Knives and regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ When Tatsoi is approx 4 - 6 inches tall.
- ◆ Tatsoi should be dark green, free from holes and absent of yellow leaves.

Harvest Procedures

- ◆ Tatsoi is harvested in a kneeled position.
- ◆ Tatsoi is harvested in the same box it is distributed in.
- ◆ One hand holds a small bunch of Tatsoi by the top of the leaves. The other hand cuts with knife in a smooth motion
- ◆ The excess yellow leaves and stems from previous cutting can this way easily discarded by shaking it vigorously.
- ◆ Then the Tatsoi is placed in the box.
- ◆ Tatsoi can also be harvested as a head just as we harvest bok choi.

Washing Procedures

- ◆ Dunk box into both washing tubs unless greens are very dirty, then dump into the first washing tub, repack and dunk bin into second tub with ice water.
- ◆ By going through the two tubs of cold water the greens stay fresher longer and are very clean.
- ◆ Do not leave greens for longer than 15 seconds in water.
- ◆ Leaves tend to get waterlogged after a few minutes, which makes them deteriorate faster.

Cleaning in the field	Stems or yellow leaves are removed
Packing in the field	10-12 heads or 12 lbs per regular 1½ bushel box
Packing for delivery	10- 12 heads or 12 lbs per regular 1½ bushel box
Storage	At 32 –42F, 95 –98% humidity. Cover in closed containers or bags if stored for a few days.

Tomatoes

Yield	<p>Polbig: 6 lbs per row foot at 43,200 lbs per acre Juliet's: 5.4 pints per row foot at 38,800 pints per acre Heirlooms: 2.8 lbs per row foot at 20,160 lbs per acre Beefsteak: 8.3 lbs per row foot at 60,000 lbs per acre Plum Tomatoes: 5 lbs per row foot at 36,000 lbs per acre</p>
Value	<p>Polbig: \$1.00 per lbs at \$ 43,200 per acre Juliet's: \$1.50 per pint at 58,200 per acre Heirlooms: \$1.50 per lbs at 30,240 per acre Beefsteak: \$.60 per Lbs at \$36,000 per acre Plum tomatoes: \$0.60 per lbs at 21,600 per acre</p>
Standards	<p>Harvesting: Polbig in Quart baskets: 30 -40 quarts (60-80lbs) per person per hour, including sorting, and netting @ approximately 500 hrs per acre. Juliet in pint baskets: 30 – 40 pints per hour, including sorting, and netting @ approximately 800 hrs per acre. Heirloom: 80 -100 lbs per hour, including sorting @ approximately 225 hrs/A Beefsteak: 200 lbs per hour, including sorting @ approximately 300 hrs/A Plum: 200 lbs per person per hour, minimal sorting in the field @ approximately 110 hrs per acre.</p>
Tools needed	<p>Buckets (Polbig, beefsteak, Juliet's, and plums) Tomato Trays (Heirloom varieties)</p>

Ready to Harvest Indicators and Quality

- ◆ When tomatoes are a pinkish red and still firm. Very mature tomatoes like the heirloom tend to be soft. Mountain Fresh is a firmer tomato and can be harvested relatively mature also.
- ◆ All tomatoes have good color, are free from cracking, relatively firm, free from insect damage, early signs of other defects.

Harvest Procedures

- ◆ Each person takes one side of a tomato row.
- ◆ Pick tomatoes into buckets or tomato trays.
- ◆ Remove the green stems so that the tomatoes are not punctured. Do not remove the stems from the heirloom tomatoes.
- ◆ Do not harvest tomatoes with soft spots or bruises.
- ◆ Heirloom and some beefsteak varieties are very soft and easy to damage. They must be harvested into one layer tomato trays placing each tomato upside down in the tray. If they are place right



side up the bottoms will bruise and break open. Heirlooms are best harvested the day they will be distributed.

- ◆ Mark where you stopped harvesting so you can continue the next day.
- ◆ Beefsteaks are harvested in green buckets or trays and sorted in the barn.

Sorting Procedures

- ◆ Put Polbigs or other small beefsteak tomatoes into quart baskets or paper tomato bags. Quarts should have rounded top and a net. 8 quarts per black box. If there is a glut of tomatoes distribute them in 3 lbs. fruit bags. 8 fruit bags to a regular green box.
- ◆ Put Juliet plum tomatoes into pint baskets. Fill to rounded top and put on net. 15 pints per black box.
- ◆ Sort heirlooms and beefsteak by size into the one layer tomato trays. Heirlooms and large beefsteak are given out by number.
- ◆ Plum tomatoes are distributed by count or in quarts.



Cleaning in the field	Wipe of any dirt & remove green tops off of all the tomatoes but heirlooms
Packing for delivery	Polbigs or other small beefsteak in Quarts or 3 lbs fruit bag Juliet’s in pints Golden Rave tomatoes in pints or quarts Heirloom and large Beefsteak in one layer tomato trays Plum tomatoes by count or in quarts.
Storage	Red tomatoes can be stored in cooler but we never do, as condensation afterwards make them deteriorate rapidly. Ideal is 55° F at 80%humidity. Next best is in the barn (75° F at 80%humidity)

Turnips

Yield	1/2 bunch per foot at 10,800 bunches to the acre
Value	\$1.00 per bunch at \$10,800 per acre
Standards	Harvesting: 30-50 bunches per hour per person depending on quality of the leaves @ approximately 270 hrs per acre
	Washing: 100 bunches per hour.
Tools needed	twisties, regular 1½ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ Turnips 2- 3 inches in width with healthy tops
- ◆ Turnips are white without cracks or eating damage by root maggot. Leaves are light to dark green with no yellowing or necrosis or aphids.

Harvest Procedures

- ◆ Select the larger (at least the size of a quarter) turnips out of rows, clean off the dead leaves, and put 4-6 turnips per bunch. Hold the twistie tightly next to the stems and twist the bunch. Make sure to bunch tight enough to keep the turnips together during washing.
- ◆ All bunches should be uniform in size. Bunches are left in the wheel-track, to be picked up and boxed periodically to avoid over-harvesting. Pack the turnips, root to root to keep the leaves clean.
- ◆ Don't bunch and count at the same time as this can cause mistakes in counting.

Washing Procedures

- ◆ Use the bunch washer to wash the turnips. Two people are needed for this job. They should switch tasks every 5 boxes or so. Soak the bunches in the white tub. One person places 2 or 4 bunches at a time on the table. The second person grabs 2 or 4 bunches at a time (depending on how dirty the roots are) and places the root ends into the bunch washer. That person then places the cleaned bunches into the second wash tub. The first person rinses out the box and places 15 bunches into the box (5 bunches to a layer).
- ◆ When five boxes are re-packed the first person brings them into the barn and puts the boxes into the cold water tank. The turnips soak in the cold water until the next 5 boxes are cleaned. The turnips go into the cooler after they have soaked in the cold water tub.
- ◆ Repeat until all turnips are washed and cooled.

Cleaning in the field	Remove dead and yellow leaves from the bunch
Packing in the field	15 bunches per regular (1½ bushel) green box. Pack roots at just one side of the box so greens do not get muddy.
Packing for delivery	15 bunches per regular 1½ bushel box, pack in rows of five. Pack tightly, root to leaf
Storage	At 32° – 41° F, 95 -100% humidity. Pack with ice in closed containers for storage longer than a few days.

Watermelon

Yield	0.8 melon per row foot at 5760 melons per acre
Value	\$2.25 per melon at \$12,960 per acre
Standards	Harvesting: 50 - 75 melons per hour per person depending on quality of the crop @ approximately 80- 100 hrs per acre.
	Washing: not necessary when mulched is used in between plastic.
Tools needed	Large green 1¾ bushel boxes

Ready to Harvest Indicators and Quality

- ◆ Melons are ready when at least two out three symptoms occur.
 1. Melons have a yellow coloration on the side not exposed to the sun
 2. Melons sound hollow
 3. Tendril closest to the melon is shriveled up

Harvest Procedures

- ◆ 1 or 2 people stand on harvest wagon and the others each take a row of melons.
- ◆ After a picker harvests a melon, he or she tosses the melon to one of the people on the truck. Make sure you have eye contact with the catcher before you toss the melon underhanded.
- ◆ Move the harvest wagon down the harvest lane as you pick.

Washing Procedures

Cleaning in the field	Brush off any soil or straw mulch
Packing in the field	sort by size, any where from 6 - 8 melons per large (1 ¾ bushel) green box
Packing for delivery	sort by size, any where from 6 - 8 melons per large (1 ¾ bushel) green box
Storage	At 37° – 45° F, 95% humidity, with the exception of Honeydew melons at 50 –54F.