

Plan Ahead for Vegetable Harvest Efficiency

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With most vegetable crops, a large portion of the production cost is associated with getting the produce out of the field and ready for market. Planning ahead to make your harvest and handling operations more efficient is a good way to enhance profitability.

Jean-Paul Courtens and Jody Bolluyt of Roxbury Farm in Kinderhook, New York, have developed an excellent set of systems to do just that. Their 225-acre farm includes 30 acres dedicated to vegetable, herb, and melon production, and 40 acres that are in soil building cover crops. Fields are taken out of vegetable production every two to three seasons and are planted in cover crops. This rotation allows the soil to rest and regenerate. They are committed to growing a wide variety of crops to supply their 1,000 or so Community Supported Agriculture members who pick up their shares at locations in Columbia County, Manhattan, the Capital Region, or Westchester County. They have provided the following information on harvesting efficiency.

The Challenge of Diversification. Diversified farms are at danger of losing valuable time transitioning from crop to crop as each one has slightly different needs. There are greater demands on the crew to have a diverse set of skills for harvesting each different crop. While we will never be as efficient as farms that grow only a few different crops, over the years we have worked out systems that allow us to make the best use of our time. We hope our systems can help farmers who are increasing their crop diversity continue to maintain their harvest efficiency.

Field Layout. All of our fields are divided into 50 foot sections (eight 6-foot beds) with a 12 foot wide grass driving lane in between. This allows us to access the field in all weather conditions without creating compaction in the crop production areas while we also never have to carry a harvest crate more than 25 feet. Carrying produce long distances is hard on the body and increases the time it takes to harvest.



Twelve-foot wide grass walkways between 50-foot wide fields allow access in all weather conditions without creating compaction and also mean that harvest containers don't have to be carried more than 25 feet to get them out of the field.

Crop Rotation. This is also planned according to harvesting. We plant the crops that are harvested at the same time in the same field or section. For instance we plant all of the leafy greens together: head lettuce, kales, leaf lettuce, broccoli raab or all of our bunching roots together: radishes, baby beets, baby carrots, salad turnips. That way we don't have to drive all over the farm to get the harvest. We lose the most time by switching tasks, so if the crew can just stand up and walk a few steps to the next crop our harvest time is decreased.

By grouping different families together in the same section we have to make sure we have a wide crop rotation. We still want to make sure we do not follow too closely with crops of the same family. A wide variety of cover crops are mixed into our rotation. We try to have half of our vegetable acreage in cover crops each season. The grasses and legumes break up the disease cycle and weed cycle in our vegetable fields (although we do have to be careful, some legume cover crops host the same diseases as our vegetable crops). Keeping careful records of our crop planting is important to make sure we don't follow too closely with the same family in the same bed.

This field of red clover will be rotated with vegetable crops to provide nitrogen and to maintain soil health. Note the 12 foot wide grass alleys are visible on either side of the clover field early in the spring.



Pest Control. Another way to increase harvest efficiency is to have healthy, weed and pest-free crops. We use compost and a composted dried chicken manure product as a side dress for fertility. Another reason we include many legumes in our crop rotation is to increase our soil fertility without additional expensive inputs. Bed forming and stale seed bedding are important tools to create weed-free soil for our vegetable crops, especially for the direct seeded crops. We form raised beds two to three weeks before we plant a crop. Then we stale seed bed three to four times before we seed or plant the crop. Pest control options for the organic grower have also improved. We use floating row cover, scouting, beneficial insects, Entrust (spinosad), and Dipel (B.t.) for pest control.

Communication and Standards. Once the crops are ready to harvest we make sure to have a system for clear communication and clear expectations with the harvest crew. We created a harvest manual that has a sheet for each crop we grow. You can find the harvest manual on our website at http://www.roxburyfarm.com/pdf_documents/harvest_manual.pdf.

The crop sheets describe how to identify when a crop is ready to harvest, the harvesting technique, the tools needed, how to pack in the field, washing and storing techniques, and how to pack in the barn. We also train the crew on each crop but the harvest manual provides them a written description and reference if they forget something. The manual states the standards for how many boxes, heads, etc. we expect an average harvester to harvest in an hour. This gives the crew an idea of how long something should take and if it is taking much longer we can work on techniques to increase the efficiency.

Peppers, Green and Red

Yield 2 ½ 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

Tools needed Green or 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.
- ◆ 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

- ◆ Lay out the number of buckets needed to harvest.
- ◆ One bucket of peppers yields approx 35 peppers or 15 lbs. If you need 750 peppers (or 320 lbs) you need to lay out 21 buckets.
- ◆ Lay them the same distance apart from each as it takes to fill up one bucket. When all buckets are filled they are moved to the harvest lane and picked up by the truck.
- ◆ Two people harvest from the same bed, each taking one 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.

This excerpt from the Roxbury Farm Harvest Manual provides an example of the kind of information that the crew has on hand to aid them in being as efficient as possible.

Harvest Schedule. We create a clear harvest schedule and keep to it each day. All of our harvesting is done by 1:00 pm each day. We don't want to harvest crops in the afternoon sun and heat. The crew has a written harvest list so that they can easily move from one crop to another. They know how many boxes or buckets to take to the field and what tools they will need. This reduces trips back to the barn. The list states how many bunches, pounds, or heads to put in each box. We have a same number in each box so that we can easily keep track of how many more bunches to make.

Harvest Management. Two people manage the harvesting. This reduces tension among the crew when there is confusion, they can go to the harvest managers with questions. The harvest managers also make sure the crops in the boxes are up to standards. Below standard crops in the boxes reduces the washing and packing efficiency in the barn.

The different tasks are divided up among the crew members and they keep to these tasks each day. For instance we have a crew that harvests the sweet corn each day and at the same time another crew is harvesting the tomatoes and peppers. That way everyone becomes comfortable in a job and knows the routine.

Containers and Handling. We grow a large amount of root crops so that we can continue to deliver crops until mid-December. There is a different system for these crops. We harvest all of our storage crops into 20 lbs buckets. We don't want to spend a whole day lifting heavy boxes. We lay out the number of buckets we will need for the whole bed so that time is not spent walking around for buckets. When one bucket is full the next bucket is right there. The full buckets are moved to the driving lane. We then empty the buckets into 20 bushel bulk bins carried by a forklift on a tractor. This system is used for all of our storage crops from winter squash to sweet potatoes.



These vegetables at Kinderhook Farm are harvested directly into plastic buckets. The harvesting manual tells workers that the standard is to harvest 10 buckets or 150 lbs of peppers per hour.

Washing and Sorting. We have a large well-lit barn for our sorting and washing. While we do a lot of sorting the field, the final sorting and packing are done on tables under the lights in the barn. The harvest manual also describes how we wash and pack all of our crops. The washing of the cut greens is the same for all of the greens. The number of peppers, squash, cucumbers, etc counted into a box is the same every day. We wash all of the bunched roots the same way. This keeps the washing and sorting moving efficiently in the barn.

While we grow many different crops, we work on creating systems that allow us to treat similar crops in the same way so that it seems that we only grow a few different crops. Emphasizing clear communication and having clear standards helps the crew to be as efficient as possible.