Jen Lindsey

introduction to organic vegetables

Where Do I Put My Crops? Planning a Crop Rotation from the Start

I like to do my initial crop plan in the winter. Planning takes time. It may be a part of farming that many of us avoid. But I find that having a good plan laid out in an easy-to-read map makes it possible to quickly do what needs to be done during the season, know what my contingency plans are, and avoid the major problems with pests, weeds, and fertility that are more common with haphazard plantings.

The steps below are a summary of two great publications, *Crop Rotations on Organic Farms* and chapter 7 from *Sustainable Vegetable Production from Start Up to Market. Growing for Market* also has a number of articles on crop planning steps, techniques, and software; see P. Dawling, ed., "How to Plan Crop Rotations," and J. Volk, ed., "Mapping Crops on a Spreadsheet." Take some time with these publications and then use the following steps when you sit down to make your crop rotation plan.

1. Write down your goals. Describe what are you trying to achieve with your rotation. (See Table 1 for a list of common goals identified by experienced farmers.)
2. Prioritize your goals. Which goals are most important for your farm?
3. List crops you plan to grow and how much you plan to grow.
4. Create rotational groups. Group crops by family, planting arrangement, nutrient needs, timing, or other important qualities. (See Tables 2 and 3.)
5. Check for excessive acreage of one crop family.
6. Make a map of your farm or garden. Make sure the map is drawn to scale. It helps to download a real map of your farm with soil types from a web soil survey that you can overlay field drawings onto (see the NRCS Web Soil Survey at **websoilsurvey .nrcs.usda.gov/app/HomePage.htm.**). They have a function where you can measure field sizes on their map.
7. Divide your farm or garden into equal-size rotational units. It is much easier to plan your rotation in terms of fields of the same size or uniform strips within fields. For example, divide the farm into 2-acre fields or into beds 300 feet long by 5 feet wide. The size of the units will depend on the size of your farm and what you can "get your head around." The size of your rotational units typically matches the smallest area planted to a single crop or rotational group.

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8. Define the land area (rotational units) needed for each grouping of crops. For example, you may devote several units to a certain crop, like pumpkins, and only one unit to other crops, like carrots.
9. Identify conditions on your farm that will affect which crops are grown where on the farm. Few farms or even gardens have uniform conditions in each part of the farm. Some fields may be wet. Some fields may dry out and warm up earlier in the spring, making them good fields for early planting. Some fields may have problems with diseases or pests. Note these conditions on your farm map.
10. Make multiple copies of your farm map.
11. Using copies of the farm map, compare possible rotations. Keep the following in mind:
    a. Timing of field operations and equipment required for different rotational units
    b. Inclusion of cover crops and their effect on subsequent crops
    c. Disease history and how long the rotation must be between crops/groups to avoid/ameliorate disease
    d. Inclusion of fallow periods, rotation between weed-prone and competitive crops, and rotation between crops grown in different seasons for weed management
    e. Rotation in time and space of susceptible crops to keep insect pests from returning to crops the next year or moving from crop to crop in the field
12. Alternatively, use a field conditions/field futures worktable or a fields table with a time axis. (For detailed worktables, see Mohler and Johnson, eds., *Crop Rotation on Organic Farms.* See Table 4 for "field table with a time axis" blank forms.)

TABLE 1. COMMON GOALS FOR CROP ROTATION.

1.	Conserve and build organic matter
2.	Add nitrogen
3.	Control diseases
4.	Reduce labor
5.	Reduce weed pressure
6.	Minimize off farm inputs
7.	Increase profits
8.	Capture solar energy
9.	Have a diverse product line
10.	Economic stability
11.	Control insects

Source: Mohler and Johnson, *Crop Rotation on Organic Farms* (2009).

TABLE 2. CROP FEATURES THAT MAY BE THE BASIS FOR ROTATION GROUPS.

Crop Feature	Examples
Botanical family	Crucifers, cucurbits, nightshades
Harvested anatomical structure	Roots, leaves, fruits, grains
Planting arrangement	Multiple rows on raised beds, narrow single rows, wide row spacing
Cultivation practices	Hilled crops, wheel-hoed crops, mulched crops
Timing of planting and harvest	Early, mid-, late season; multiple
Nutrient demand	Heavy, medium, light
Cultural practices	Drip irrigation, overhead, row cover
Pest complex	Fenced for deer, sprayed for Colorado potato beetle, etc.

Source: Grubinger, *Sustainable Vegetable Production from Start Up to Market* (1999), Table 7.1

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ADDITIONAL RESOURCES

Coleman, E. *The New Organic Grower.* White River Junction, Vt.: Chelsea Green, 1995.

Jeavons, J. *How to Grow More Vegetables Than You Ever Thought Possible on Less Land Than You Can Imagine.* 7th ed. Willits, Calif.: Ecology Action, 2006.

Kroeck, S. *Soil Resiliency and Health: Crop Rotation and Cover Cropping on the Organic Farm.* Stevenson, Conn.: Northeast Organic Farming Association, 2004.

TABLE 3. EXAMPLE CROP GROUPING.

Group	Family	Crop	Planting Date	Weeks in Field	N Needs (lb/A)	Rows/4-foot bed (5-foot center)	Cultural Practices	Weed Competition	Seedbed Required
1	Beet	Beets	Early spring	7–9	130	3	cult.	mod.	fine
	Beet	Spinach	Early spring	4–6	130	3	cult.	mod.	fine
	Beet	Swiss chard	Early spring	7–8	90	3	cult.	mod.	fine
	Carrot	Carrots	Early spring	10–12	90	4	cult.	low	fine
2	Crucifer	Broccoli	Early spring	7–9	130	2	cult.	mod.	med.
	Crucifer	Cabbage	Early spring	10–12	130	2	cult.	mod.	med.
	Crucifer	Cauliflower	Early spring	10–12	130	2	cult.	mod.	med.
	Crucifer	Collards	Early spring	10–12	130	2	cult.	mod.	med.
	Crucifer	Kale	Early spring	7–9	130	2	cult.	mod.	med.
	Crucifer	Pac choi/tat soi, etc.	Early spring	7–9	45	4	cult.	low	fine
	Crucifer	Radishes	Early spring	4–6	45	4	cult.	low	med.
	Crucifer	Turnips	Early spring	4–6	45	4	cult.	mod.	fine
	Legume	Peas	Early spring	7–9	0	2	cult.	low	med.
	Lettuce	Lettuce	Early spring	4–6	45	4	cult.	mod.	med.
	Lily	Green onions	Early spring	4–6	45	4	cult.	low	fine
4	Cucurbit	Cantaloupes	Summer	10–12	90	1	plastic	high	med.
	Cucurbit	Cucumbers	Late spring	7–9	90	1	plastic	mod.	med.
	Cucurbit	Summer squash	Late spring	7–9	90	1	plastic	high	med.
5	Cucurbit	Winter squash	Fall	10–12	90	1	straw	high	coarse
6	Cucurbit	Watermelons	Summer	10–12	45	1	plastic	high	med.
7	Grass	Sweet corn	Summer	10–12	130	2	cult.	high	med.
8	Legume	Snap beans	Late spring	7–9	0	2	cult.	mod.	med.
	Legume	Southern peas	Summer	7–9	0	2	cult.	mod.	med.
9	Mallow	Okra	Summer	10–12	90	1	plastic	low	fine
	Nightshade	Bell peppers	Summer	7–9	90	2	plastic	mod.	med.
	Nightshade	Eggplant	Summer	10–12	90	2	plastic	mod.	med.
	Nightshade	Tomatoes	Summer	7–9	130	1	plastic	mod.	med.

Note: Planting date, weeks in field, fertility, row spacing, cultural practices, ability to compete with weeds, and seedbed required are all factors you might consider when deciding how to divide up crop groups. The number of groups and which factors are most important will vary from farm to farm.

TABLE 4. FIELD MAP WITH A TIME AXIS.

Field Name	Block Number	March				April				May					June				July					August				September				October					November				December				January					February			
		6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26

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