

# Four Season Organic Vegetable Planning and Production for Profit

## For the Health of It!

Decision making with the KISS principle – Keep it Simple and Sensible.

Identify the questions and the answers.

1. What to grow? Provide for diversity and profit! Know your market!
2. How much to grow? Depends on total space, space/plants and people to feed!
3. When to grow it? Identify the season, crop time, successions, and season extension!
4. Where to grow it? Select the site, the spacing, the grouping and the rotation!
5. How to grow? Provide soil, water, training, and crop protection!
6. How to harvest, process, protect, store? Select containers, temperature, and humidity!
7. How to display and market? Both a first and a last question, back to what to grow!

### 1. WHAT to plant?

- Chart of 50 vegetables; cool and warm season; leaves, roots, flowers, fruits, seeds
- How many would a first time, small scale (1-10 acre) market farmer plant?
- What would you grow if you were starting with just 5 to 10 vegetables?
- What is the relative proportion of each? What percent of each for the *product mix*?
- When planning for profit, the crop value (\$/lb), the number of other growers (ease of production), and the price sensitivity influence crop selection.

### 2. HOW MUCH to plant?

- What is the size of the cultivated space available?
- How much is needed for the intended market? Usually in pounds or bunches.
- Over what period of time? 20-24 week season? Or 48 week season?
- How much space is needed per plant and what is the yield per plant or per unit area?
- Is the crop a one time harvest or a repeat harvest plant?
- When planning for profit, the crop value (\$/lb), the number of other growers (ease of production), and the price sensitivity influence how much to plant.

### 3. WHEN to plant?

- What is the marketing strategy? To harvest as many weeks of the year as possible?
- Will you use transplants, frost fabric protection and cold frames to extend the season?
- Will you use succession or multiple plantings to extend the season?
- How to use warm season and cool season vegetables to extend the season?

### 4. WHERE to plant?

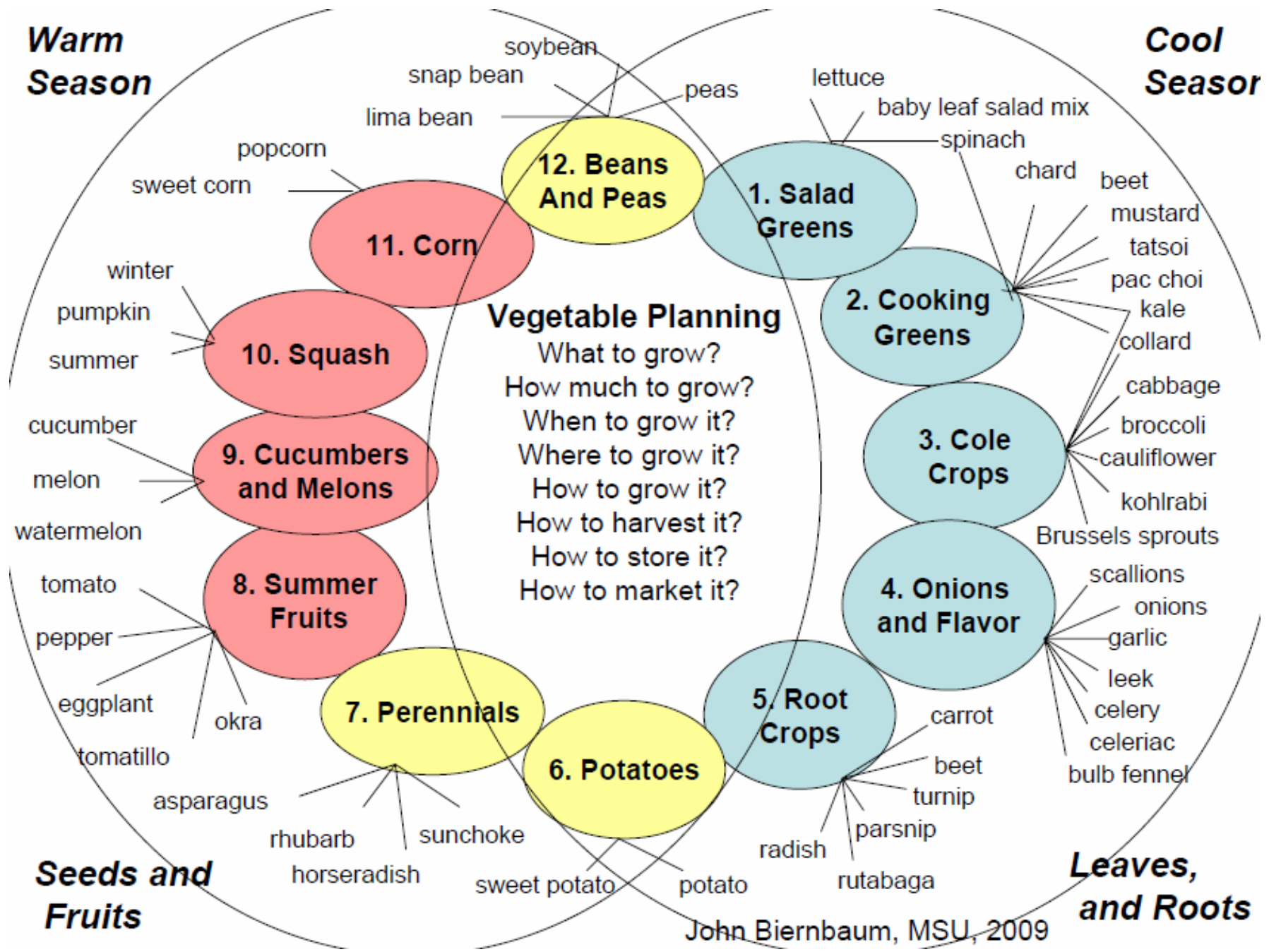
- What is the site soil type, drainage, light, access to water, wind, slope, etc.?
- What is the size of the plant - spread and height (shadows)?
- What plants can be placed side by side or near each other?
- What was in that space previously that might influence the next crop?
- What pests and disease that impact similar crops are important to consider?

5. HOW to plant and grow? Consider multiple components when planning!

6. HOW to harvest, process, store, protect? Maintain quality with timing and good process!

7. HOW to market? The market often influences what to grow so is part of planning!

Planning is one part of developing a successful program for productivity and profitability.



John Biernbaum, MSU, 2009

## 1. What to grow?

What is your marketing goal?

- Smaller scale farm or market garden - Farm Stand, Farmer's Market, CSA, Institution
- Commercial Farm - Wholesale to broker or processor or retail outlet
- Less or more crops?
  - Diversity is a risk management strategy as is direct marketing;
  - Specific market?
  - *Planning for productivity or profit?*

Are you making the shift from field crops to vegetables? Or gardening for personal use to farming for profit? Crop selection decisions are guided by the market and the potential for income. Do you have space for sweet corn and pumpkins or does the space need to become space for more profitable items like lettuce or tomatoes? Will you focus on fresh market sales or will you be able to store produce for out of season sales? If you grow crops like potatoes, onions or winter squash for storage and out of season sales, will you be able to get the price you need when larger producers are selling at lower prices?

What about the emphasis on local and organic? This is often a producer driven decision based on personal values. When it comes to considering profitability, a next important piece is whether the market values local and organic and is the consumer willing and able to pay the true cost of production and marketing?

A chart and list of 50 common vegetables provides a good starting point. A good goal is to get to know the crops so you can make good decisions about what to grow. There are many pieces of information that the market gardener can use to make informed decisions.

Botanical and Taxonomic Information (classification)

- Latin name (genus and species) and plant family? (Important for rotations.)
- Geographic origin? (Important to understand climate or soil influences.)
- Warm season or cool season? (Important for scheduling and for refrigeration.)
- What is the life cycle? For example, annual, biennial, perennial.
- Variations, types, and cultivars (few or many?) Cultivar selection is important.

Horticultural Information

- How is the plant propagated? Seeds, division, cuttings.
- How long is the growing time? Days to harvest from seed packet or catalog.
- How much space is needed? Height, spread, trellised, deep soil for tubers.
- What are the growing conditions?
  - Light: full sun, partial sun, shade
  - Temperature: hot, warm, cool, cold
  - Moisture: dry, moderate, wet
  - Soil: sand, loam, clay, organic/muck; acidic, neutral, basic
  - Fertility: poor/low fertility, moderate, rich/fertile
  - Pests and diseases and plant protection.
- What is the yield? (How Much to Plant?) (See Section 2 below.)
  - How many plants per unit area? Spacing varies.
  - How many harvestable pounds per unit area?
  - How many plants or how much area per person for a meal or a year?
- When is the correct time and how long to harvest? (See Section 3 below.)
  - When to grow it? Relative to frosts; with protection; in a hoop house?

- Are multiple harvests possible? Are succession plantings needed?
- Where to grow it? (See Section 4 below.)
- How to grow it? (See Section 5 below.)
- How to store it after harvesting and how to market it? (See Section 6 below)

#### Economic (profitability) and Marketing Information

- Enterprise budgets are a good place to start.
- Profitability in terms of dollars per unit area and time - \$/sqftwk (square foot week)
  - Example of tomato and lettuce.

To compare crops that require a large difference in space and production times and that sell for a range in values (\$/lb), the gross income can be standardized per square foot required and weeks of production.

| Crop         | Spacing   | sq ft | weeks to produce | sqftwks | yield (lbs) | \$/lb sale price | \$ total income | \$/sqftwk income |
|--------------|-----------|-------|------------------|---------|-------------|------------------|-----------------|------------------|
| Lettuce Head | 10" x 10" | 0.7   | 5                | 3.5     | .75         | \$2              | \$1.50          | \$0.43           |
| Tomato       | 1.5' x 4' | 6     | 20               | 120     | 20          | \$3              | \$60            | \$0.50           |
| Potato       | 12" x 4'  | 4     | 15               | 60      | 1           | \$1              | \$1.00          | \$0.02           |
| Potato       | 12" x 12" | 1     | 15               | 15      | 1           | \$1              | \$1.00          | \$0.07           |

Profit equals Income minus costs. Identifying costs is a bit more complicated.

- How much labor or handling is required?
- How much equipment is necessary?
- What is the availability and cost of labor?
- How perishable is the crop and is refrigeration required?
- How much competition is there in the market place that might lower the price?
- How much demand is there that might raise the price?
- How much income is possible per unit of time invested?
  - Arnolds – target of minimum dollars per hour of harvesting labor.
- What mix of crops is necessary to meet the market requirements?
- Wholesale/indirect or retail/direct sales?

Direct Markets – farm stand, farmers markets, community supported agriculture (CSA), farm to school, hospitals, restaurants, retirement communities, prisons, etc.

Wholesale – Retail grocery stores or specialty stores like Whole Foods.

Getting to know a crop has many components that can be learned gradually, over time and with experience. While there are many crops to grow, and diversity of crop production is an important strategy to manage and minimize risk, a good recommendation is to start with focus on a few crops and learn them well before moving to the next new crop.

## 2. How much to grow?

- Total space available – these definitions are relative to perspective and scale.
  - Really small – less than 100' x 100' or 10,000 square feet (< 0.25 acre)
  - Small – 1 (200' x 200' to 5 acres (200' x 1000'))
  - Medium- from 5 to 50 acres
  - Large – greater than 50 acres
- How many people with how much time (labor) are available?
- How much food needed? In pounds or number of people to feed.
- How much income needed? Or a target level of sales in dollars.

- Yield per unit area
- \$ per pound or unit of sale
- Yield per plant or yield per 100' row or yield per sq ft
- plants per person or row feet per person or sq ft per person
- \$ value per pound range – minimum to maximum
- \$ value per pound average for calculations

Crop Mix Example: What crops do you intend to grow and what percent of the space do you plan to use for each? These decisions will also depend on what you want to market and when you want to market it, but crop mix is a first step. What you will grow for personal home use vs a farm stand vs CSA vs restaurant sales will be different. The crop mix allows the calculation of how much of the space will be planted to each crop (estimates of number of square feet or beds).

Example Fall Crop Selection and Mix - Lets start with a crop mix of four categories of crops:

- 25% Root crops: carrots, beets, turnips, radishes, green onions
- 25% Head crops: lettuce (multiple types), Chinese (napa) cabbage, pac choi, tatsoi
- 25% Leafy greens: spinach, chard, kale, collards, komatsuna
- 25% Baby leaf salad greens (BLSG): lettuce (multiple types), spinach, mizuna, kale, beets, chard, Tokyo Bekana cabbage, arugula, tatsoi, pac choi, claytonia, mache, etc

### Developing a Crop Mix Plan for Ten Beds

| Crop           | Percent | Beds | Plant Date | Location |
|----------------|---------|------|------------|----------|
| Lettuce        | 10      | 1    |            |          |
| Salad Mix      | 10      | 1    |            |          |
| Bunching Onion | 10      | 1    |            |          |
| Chard          | 5       | 0.5  |            |          |
| Spinach        | 5       | 0.5  |            |          |
| Carrots        | 5       | 0.5  |            |          |
| Turnip/radish  | 5       | 0.5  |            |          |
| Tomato         | 20      | 2    |            |          |
| Pepper         | 10      | 1    |            |          |
| Cucumber       | 10      | 1    |            |          |
| Snap beans     | 10      | 1    |            |          |
| Total          | 100     | 10   |            |          |

### 3. When to grow it?

- Min Days to Harvest (catalog value)
- Max Days to Harvest? (Under cooler conditions.)
- Field Season-Unprotected
- Field Season-Protected
- Hoophouse / coldframe season
- Spring crop – start \_\_\_ days (weeks) before last spring frost
- Fall crop – start \_\_\_ days (weeks) before first fall frost.

## **Seasonal, Succession and Season Extension**

*Seasonal* production and diet refers to eating warm season vegetables like fresh tomatoes in the summer rather than all year long and perhaps cool season vegetables like cabbage or kale in the winter. Many Americans are used to having the same produce available throughout the year. While it may not be a good use of energy to have fresh tomatoes all winter long, there are methods to extend the season. A producer can decide what strategies will be used to extend the season. Eating seasonally with a willingness to accept the vegetables that are locally available is currently a new idea for many people, but one that has value.

*Succession* planting is a strategy to have a particular crop over a longer period of time. One component of marketing for profit is to have a crop to sell over a longer period of time.

Extending the harvest can be done several ways.

- Plant crops that provide multiple harvests; for example leafy greens where mature leaves can be harvested each week or fruiting plants like tomatoes and summer squash that continue to produce fruit for several weeks.
- Plant multiple varieties with different days to harvest at the same time. This can be done for sweet corn, potatoes, tomatoes, cabbage and other crops.
- Make plantings of the same variety at time intervals. Will work for baby leaf salad mix, head lettuce, radishes, turnips, and other crops. The time between planting will not necessarily determine the time between harvests. In the spring, with temperature increasing, the time between planting can get longer to achieve a weekly harvest. In the fall, with temperature and light decreasing, the time between planting gets shorter.
- Start enough transplants at one time to make several weekly plantings. Will work for lettuce and some Asian greens.

**Season Extension** can be done many different ways.

- Plant in a protected spot or where a sandy soil warms earlier in the season.
- Modify the soil with raised beds or plastic mulch to warm the soil.
- Select crops and varieties that allow earlier production.
- Use transplants grown in heated areas with lights so young plants are set out.
- Use quick hoops and protective coverings to limit the effect of frost in the spring or fall.
- Use cold frames to protect young plants.
- Use a high tunnel for season extension for warm season crops or winter harvesting of cool season crops.

## **High Tunnels**

- Warm season crops like tomatoes, peppers, eggplants, summer squash, and cucumbers can be planted 4 to 6 weeks earlier than normally planted outside with harvests 4 to 6 weeks earlier.
- Cool season crops like salad greens, leafy cooking greens and root vegetables are planted starting in August and continuing through September for winter harvest. Crops can also be planted starting in early February.
- The key to extended summer and winter harvest are to:
  - Plant the right crops
  - At the right time
  - Rely on crops that provide multiple harvests
  - Manage the high tunnel and interior crop covers to protect the crop by creating a cloud or igloo effect.

### Example of Field Planting Schedule for Climate Zone 5 (Michigan)

| No. | Common Name                      | Jan | Feb | Mar | Apr | May | Jun  | Jul  | Aug  | Sep  | Oct | Nov | Dec |
|-----|----------------------------------|-----|-----|-----|-----|-----|------|------|------|------|-----|-----|-----|
| 1   | <a href="#">Asparagus</a>        |     |     |     | H   | H   | H    |      |      |      |     |     |     |
| 2   | <a href="#">Baby leaf salad</a>  |     |     |     | DS  | DS  | DS   |      | DS   | DS   |     |     |     |
| 3   | <a href="#">Green beans</a>      |     |     |     |     | DS  | DS/H | DS/H | DS/H | DS/H | H   |     |     |
| 4   | <a href="#">Soybean</a>          |     |     |     |     | DS  |      |      |      | H    | H   |     |     |
| 5   | <a href="#">Beets</a>            |     |     |     | DS  | DS  | H    | DS   |      | H    | H   |     |     |
| 6   | <a href="#">Broccoli</a>         |     |     | TS  |     | P   | H/TS | P    |      | H    | H   |     |     |
| 7   | <a href="#">Brussels sprouts</a> |     |     |     |     | TS  | P    |      |      | H    | H   |     |     |
| 8   | <a href="#">Cabbage</a>          |     |     | TS  |     | P   | H/TS | P    |      | H    | H   |     |     |
| 9   | <a href="#">Chinese cabbage</a>  |     |     | TS  |     | P   | H/TS | P    |      | H    | H   |     |     |
| 10  | <a href="#">Carrot</a>           |     |     |     | DS  |     | H    | H/DS |      | H    | H   | H   |     |
| 11  | <a href="#">Cauliflower</a>      |     |     | TS  |     | P   | H/TS | P    |      | H    | H   |     |     |
| 12  | <a href="#">Celeriac</a>         |     |     | TS  |     | P   |      |      |      | H    | H   |     |     |
| 13  | <a href="#">Celery</a>           |     |     | TS  |     | P   | H    | H    |      |      |     |     |     |
| 14  | <a href="#">Chard</a>            |     |     | TS  |     | P   | H/TS | P    |      | H    | H   |     |     |
| 15  | <a href="#">Collards</a>         |     |     | TS  |     | P   | H/TS | P    |      | H    | H   |     |     |
| 16  | <a href="#">Popcorn</a>          |     |     |     |     |     | DS   |      |      |      |     |     |     |
| 17  | <a href="#">Sweet corn</a>       |     |     |     |     |     | DS   |      |      |      |     |     |     |
| 18  | <a href="#">Cucumber</a>         |     |     |     | TS  |     | P    | H    | H    | H    |     |     |     |
| 19  | <a href="#">Eggplant</a>         |     |     | TS  |     |     | P    |      | H    | H    | H   |     |     |
| 20  | <a href="#">Florence fennel</a>  |     |     | TS  |     | P   | H/TS | P    |      | H    | H   |     |     |
| 21  | <a href="#">Garlic</a>           |     |     |     |     |     |      | H    |      |      | P   |     |     |
| 22  | <a href="#">Horseradish</a>      |     |     | H   | H   |     |      |      |      |      | H   | H   |     |
| 23  | <a href="#">Kale</a>             |     |     | TS  |     | P   | H/TS | P    |      | H    | H   |     |     |
| 24  | <a href="#">Kohlrabi</a>         |     |     | TS  |     | P   | H/TS | P    |      | H    | H   |     |     |
| 25  | <a href="#">Leek</a>             |     | TS  |     | P   |     |      |      |      | H    | H   | H   | H   |
| 26  | <a href="#">Lettuce</a>          |     |     | TS  |     | P   | H    |      | TS   | P    | H   |     |     |
| 27  | <a href="#">Melon</a>            |     |     |     | TS  |     | P    |      | H    | H    |     |     |     |
| 28  | <a href="#">Mustard greens</a>   |     |     | TS  |     | P   | H    | H    |      |      |     |     |     |
| 29  | <a href="#">Okra</a>             |     |     | TS  |     |     | P    | H    | H    | H    |     |     |     |
| 30  | <a href="#">Scallions</a>        |     |     |     | DS  | DS  |      |      | DS   |      |     |     |     |
| 31  | <a href="#">Onion</a>            |     | TS  |     | P   |     |      | H    | H    |      |     |     |     |
| 32  | <a href="#">Pak choi</a>         |     |     | TS  |     | P   | H    | H    |      |      |     |     |     |
| 33  | <a href="#">Parsnip</a>          |     |     | H   | H   |     | DS   |      |      |      |     |     |     |
| 34  | <a href="#">Pea</a>              |     |     |     | DS  | H   | H    |      |      |      |     |     |     |
| 35  | <a href="#">Bell pepper</a>      |     |     | TS  |     |     | P    |      | H    | H    | H   |     |     |
| 36  | <a href="#">Potato</a>           |     |     | P   | P   |     |      |      | H    | H    |     |     |     |
| 37  | <a href="#">Sweet Potato</a>     |     |     |     | BED |     | P    |      |      | H    |     |     |     |
| 38  | <a href="#">Pumpkin</a>          |     |     |     | TS  |     | P    |      |      | H    | H   |     |     |
| 39  | <a href="#">Radish</a>           |     |     |     | DS  | H   | H    |      |      | DS   | H   |     |     |
| 40  | <a href="#">Rhubarb</a>          |     |     |     |     | H   | H    |      |      |      |     |     |     |
| 41  | <a href="#">Rutabaga</a>         |     |     |     |     | DS  |      |      |      |      |     |     |     |
| 42  | <a href="#">Spinach</a>          |     |     |     | DS  | H   | H    |      |      |      |     |     |     |
| 43  | <a href="#">Summer squash</a>    |     |     |     |     | TS  | P    | H    | H    | H    |     |     |     |
| 44  | <a href="#">Winter squash</a>    |     |     |     |     | TS  | P    |      |      | H    | H   |     |     |
| 45  | <a href="#">Sunchoke</a>         |     |     | H   | H   |     |      |      |      |      |     | H   | H   |
| 46  | <a href="#">Tatsoi</a>           |     |     | TS  |     | P   | H    | H    |      |      |     |     |     |
| 47  | <a href="#">Tomato</a>           |     |     | TS  |     |     | P    |      | H    | H    | H   |     |     |
| 48  | <a href="#">Tomatillo</a>        |     |     |     | TS  |     | P    |      |      |      |     |     |     |
| 49  | <a href="#">Turnip</a>           |     |     |     |     | DS  |      | H    | DS   |      | H   |     |     |
| 50  | <a href="#">Watermelon</a>       |     |     |     | TS  |     | P    |      | H    | H    |     |     |     |

DS= DIRECT SOW, TS=TRANSPLANT SOW, P=PLANT TRANSPLANTS TO FIELD, H=HARVEST

#### 4. Where to grow it? (Site, Spacing, Rotation)

Site Location (soil, sun, access to water; then slope, protection from wind and frost)

- In Row (inches)
- Between Row (inches)
- Mature Height – Trellis or train?
- Space Average (sq in or sq ft)
- Space Minimum (sq in or sq ft)- fertile, irrigated conditions – plants may need less space
- Space Maximum (sq in or sq ft)- poor soil, non irrigated – may need more space

#### Spacing

Vegetable Transplant Spacing Assumptions and Guidelines for the MSU SOF CSA

| Spacing Code | Plants per bed ** | square inches per plant | square feet per plant | spacing          | Rows per bed | Plants per row | Beds per 128 cell plug tray | Beds per CSA**** distribution |
|--------------|-------------------|-------------------------|-----------------------|------------------|--------------|----------------|-----------------------------|-------------------------------|
| 1            | 120               | 24                      | 0.17                  | 5" x 5"          | 4            | 30             | 1                           | 1                             |
| 2            | 60                | 48                      | 0.33                  | 7" x 7"          | 5            | 12             | 2                           | 1                             |
| 3            | 30                | 96                      | 0.67                  | 10" x 10"        | 3            | 10             | 4                           | 2                             |
| 4            | 20                | 144                     | 1.00                  | 12" x 12"        | 2            | 10             | 6                           | 3                             |
| 5            | 16                | 180                     | 1.25                  | 13.5"x13.5"      | 2            | 8              | 7                           | 4                             |
| 6            | 12                | 240                     | 1.67                  | 15" x 15"        | 2            | 6              | 10                          | 5                             |
| 7            | 4                 | 720                     | 5.00                  | 2.5' x 2'        | 1            | 4              | NA                          | NA                            |
| 8            | 2                 | 1440                    | 10.00                 | 2.5' x 4'        | 1            | 2              | NA                          | NA                            |
| 9            | trellis           | 120 to 360              | 0.8 to 2.5            | 2.5' x 4" to 12" | 1            | 24 to 8        | NA                          | NA                            |

\*\*Our bed size = (30"x96") = 2888 square inches or 20 square feet

\*\*\*\* Our CSA membership is approximately 55 and we plan for some extra

These are not intended as ideal spacing for all situations but useful for starting and comparing.

#### Code Crops

- 1 scallions (multiples)
- 2 kohlrabi, mei qing choi
- 3 Chinese cabbage, komatsuna, lettuce, pac choi, parsley, radichio, tatsoi
- 4 celery, bulb fennel, basil, potatoes (depends on variety)
- 5 chard, collards, kale, potatoes (depends on variety)
- 6 broccoli, califlower (not usually done in the PSGH)
- 7 eggplant, peppers; (field spacing is more like code 5 or 6).
- 8 tomatoes, summer squash and large plants
- 9 trellis: peas (4" in row), pole beans (6" in row), or cucumbers (12" in row).

#### Rotation

One of the key reasons for not growing crops in the same place each year has to do with the development of microorganisms that help decompose plant material. At the end of a crop, there are leaves and roots that need to be decomposed. Microorganisms develop to help the process. If the same plants are decomposed in the same spot, the microorganism population may get so efficient that even healthy plants still in production



will get decomposed. The best way to avoid this is to not plant the same crop in the same space time after time.

Rotation- What crops are good to follow? – crop does better in soil used to grow a certain crop.  
 Rotation- What crops not good to follow? – crop does not do as well in soil used to grow a crop.  
 Example Location and Rotation: For the first year of planting, placement is not dependent on the previous crop. But in later years, the categories need to change location. The basic idea of a rotation is to not plant the same crop or closely related crops in the same place over time. For example, tomatoes, peppers and eggplants are closely related; cabbage, broccoli and cauliflower are closely related.

|        | Season 1 | Season 2 | Season 3 | Season 4 |  |
|--------|----------|----------|----------|----------|--|
| Bed 1: | root     | BLSG     | leaf     | head     |  |
| Bed 2: | head     | root     | BLSG     | leaf     |  |
| Bed 3: | leaf     | head     | root     | BLSG     |  |
| Bed 4: | BLSG     | leaf     | head     | root     |  |

Rotation - How to group crops as part of the planning process? There are several options.

- Just plant everything in chronological order – group by time of planting.
- Group by time of harvest?
  - Clean up field so can be replanted.
- Group by similar amounts of space used?
- Group by production times – short or long?
- Group by fertility need, or moisture requirement?
- Group by ease of cultivation or weed management?

Is there a problem if too many crops that are closely related are in the same area? For example, with all the Brassicas or cole crops in one area, the cabbage looper can stay in one place. If all the tomato, pepper and eggplants are together, a pest like hornworm might do more damage. Should you spread them out and mix them with other crops? An alternative view is that if the crops are together, if a pest management strategy needs to be applied, it is easier to do to one larger group than several smaller groups. What is possible for a small plot (less than 100 square feet) may not be possible for a large plot.

#### Vegetable Rotation of the MSU Student Organic Farm

| Crop Group     | Summer Fruit                      | Early Crops                            | Corn                      | Potato                        | Squash/Melon (vines) | Late(Fall) Crops  | Green Cover                 |
|----------------|-----------------------------------|--|---------------------------|-------------------------------|----------------------|-------------------|-----------------------------|
| Rotation Order | 1                                 | 2                                      | 3                         | 4                             | 5                    | 6                 | 7                           |
| Half A         | Tomato, Pepper, Eggplant          | Garlic(fall), Onions                   | Sweet Corn, Pop           | Potato                        | Winter squash        | Fall brassicas    | oats vetch or sorgxsudan;   |
| Half B         | Cucumber, Summer squash, pumpkins | Spring Brassicas<br>Root crops<br>Peas | Corn, Flint Corn, Soybean | Leek<br>Celery<br>Green beans | Melons               | Fall root crops   | (rye vetch roll for mulch?) |
| Other          | Mulch                             | Buckwheat<br>Late Vetch                | Under sown clover         | Fall Rye                      | Fall Rye             | SprSum cover crop | Compost?                    |

Crop Scheduling Plan for 10 beds.

| Week/Date | 52 | 1                                  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16               | 17 | 18          | 19 | 20 | 21                                | 22 | 23 | 23 | 24 | 25 |
|-----------|----|------------------------------------|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|------------------|----|-------------|----|----|-----------------------------------|----|----|----|----|----|
| Bed       |    | J-1                                | J-2 | J-3 | J-4 | F-1 | F-2 | F-3 | F-4 | M1 | M2 | M3 | M4 | MA | A1 | A2 | A3               | A4 | M1          | M2 | M3 | M4                                | J1 | J2 | J3 | J4 | JJ |
| 1.        |    | winter killed fall planted oats    |     |     |     |     |     |     |     |    |    |    |    |    |    |    | leafy greens - > |    |             |    |    |                                   |    |    |    |    |    |
| 2.        |    |                                    |     |     |     |     |     |     |     |    |    |    |    |    |    |    |                  |    |             |    |    |                                   |    |    |    |    |    |
| 3.        |    | winter rye green manure cover crop |     |     |     |     |     |     |     |    |    |    |    |    |    |    |                  |    | Till in rye |    |    | Tomato                            |    |    |    |    |    |
| 4.        |    |                                    |     |     |     |     |     |     |     |    |    |    |    |    |    |    |                  |    |             |    |    |                                   |    |    |    |    |    |
| 5.        |    | winter rye green manure cover crop |     |     |     |     |     |     |     |    |    |    |    |    |    |    |                  |    | till rye    |    |    | buckwheat green manure cover crop |    |    |    |    |    |
| 6.        |    |                                    |     |     |     |     |     |     |     |    |    |    |    |    |    |    |                  |    |             |    |    |                                   |    |    |    |    |    |
| 7.        |    |                                    |     |     |     |     |     |     |     |    |    |    |    |    |    |    |                  |    |             |    |    |                                   |    |    |    |    |    |
| 8.        |    |                                    |     |     |     |     |     |     |     |    |    |    |    |    |    |    |                  |    |             |    |    |                                   |    |    |    |    |    |
| 9.        |    |                                    |     |     |     |     |     |     |     |    |    |    |    |    |    |    |                  |    |             |    |    |                                   |    |    |    |    |    |
| 10.       |    |                                    |     |     |     |     |     |     |     |    |    |    |    |    |    |    |                  |    |             |    |    |                                   |    |    |    |    |    |

| Week/Date | 25   | 26 | 27 | 28 | 29 | 30                      | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
|-----------|--|----|----|----|----|-------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bed       | JJ   | J1 | J2 | J3 | J4 | A1                      | A2 | A3 | A4 | S1 | S2 | S3 | S4 | SO | O1 | O2 | O3 | O4 | N1 | N2 | N3 | N4 | ND | D1 | D2 | D3 | D4 |
| 1.        | leafy greens   |    |    |    |    | green manure cover crop |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 2.        |  |    |    |    |    |                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 3.        | tomatoes, peppers, etc   |    |    |    |    |                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 4.        |  |    |    |    |    |                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 5.        | fall cabbage, broccoli, cauliflower, brussle sprouts, carrots, beets, turnips, etc |    |    |    |    |                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 6.        |  |    |    |    |    |                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 7.        |  |    |    |    |    |                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 8.        |  |    |    |    |    |                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 9.        |  |    |    |    |    |                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 10.       |  |    |    |    |    |                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

## 5. How to grow it? Plan ahead for success! Too many details to include here.

- Seed purchasing and storage (longevity and cost)
- Direct seeding (spacing and timing information)
- Transplant scheduling and production (A separate course,)
- Transplanting (spacing and timing information)
- Season extension – multiple options to consider.
- Soil fertility and health; soil organic matter (A major component and a separate course.)
  - Cover crops or green manures
  - Compost (A separate course.)
  - Mulching
- Cultivation – ground cover management
- Irrigation
- Pollination: for some crops setting fruit.
- Crop Protection: pest and disease prevention – start with healthy soil and plants.

## Some Sources of Organic Seeds, Cuttings and Plants:

- Johnny's Selected Seeds, 207-437-4395, [www.johnnyseeds.com](http://www.johnnyseeds.com)
- Richter's Herbs, 905-640-6677, [www.richters.com](http://www.richters.com)
- Cook's Garden, 800-457-9703, [www.cooksgarden.com](http://www.cooksgarden.com)
- High Mowing Seeds 802-472-6174 [www.highmowingseeds.com](http://www.highmowingseeds.com)
- Territorial Seed Company, 800-626-0866 [www.territorialseed.com](http://www.territorialseed.com)
- Fedco Seeds, PO Box 520, Waterville, ME 04703 [www.fedcoseeds.com](http://www.fedcoseeds.com)
- Seeds of Change, 1-888,762-7333, [www.seedschange.com](http://www.seedschange.com)
- Baker Creek 417-924-8917 [www.rareseeds.com](http://www.rareseeds.com)
- Seed Savers Exchange 563-382-5990 [www.seedsavers.org](http://www.seedsavers.org)
- Bountiful Gardens 417-924-8917 [www.bountifulgardens.org](http://www.bountifulgardens.org)
- Harris Seeds 800-544-7938 [www.growers.harriseseeds.com](http://www.growers.harriseseeds.com)

ATTRA Organic Seed Suppliers Search: [http://attra.ncat.org/attra-pub/organic\\_seed/](http://attra.ncat.org/attra-pub/organic_seed/)

## 6. How to harvest, process, and store to maintain quality?

How do we maintain the quality, freshness and flavor in the garden or market garden through harvesting, processing, storage and marketing? A good place to start is to understand the requirements prior to planting. Does it make sense to plant more than can be successfully harvested, washed, stored and maintained for marketing? Fruit such as tomato, peppers, eggplant, cucumbers and squash are easier to handle and maintain after harvest than leafy greens like lettuce, salad mix and cooking greens. Potatoes, winter squash, and onions are not as quickly perishable, but need to be matured and handled properly for long term storage.

Here are a few important factors:

- Harvest at the proper state of development.
- Temperature – keep the produce cool (50-55F) or cold (35-40F). There is an important difference. Harvest when it is cool (in the morning) and keep it cool either in an insulated container or refrigerated. Cold water can be used to cool the produce.
- Water – produce is 85 to 95% water and a key to maintaining quality is to prevent water loss and wilting. Harvest it when it is well watered and turgid, which is usually when it is cool and not losing water (in the morning). Water used to cool produce can help but too much water can lead to problems.

- Food safety – with people getting sick from contaminated spinach, peppers or peanut butter, the market gardener is compelled to understand potential sources of contamination and how to protect your produce. Planning starts with clean hands, harvest tools, harvest and storage containers, and clean water for rinsing and cooling.
- For storage crops like potatoes, onions and winter squash, temperature and sometimes drying treatments are important for long term storage.
- Storage containers can make a big difference so consider options before investing.

**7. HOW to market?** (The market often influences what to grow so can't be left to the end.) How to market brings you back to the question of "What to Grow?" These two questions need to be asked continuously as you grow in experience.

Displaying vegetables at a farm stand or farmers market without refrigeration on a hot summer day can quickly reduce quality. Providing shade is usually a first step. A canopy will also protect from rain. Maintaining moisture with application of water may be an option, but often is not practical with a large flow of traffic. Plastic storage containers can maintain moisture but the question is how much to display vs how much to protect. Large displays attract attention, but require large amounts of produce that is not being protected. Displaying some fraction of the produce and replacing regularly with additional produce from containers or coolers.

Plastic bags are usually necessary to protect the produce after sale. Food grade plastic bags are required.

## **Summary**

Good planning and scheduling choices for productivity and profitability are made based on considering a range of information that takes time and experience to learn. Think about the big picture and then start collecting lots of pieces (mental pictures) to assemble into a whole.