

Crop Planning

Goals in Planning – Time management is my major reason for doing extensive crop planning. The more I can organize during the winter, the smoother things go during the season. Another important piece is good data collection. We all want to continually improve our production. But if we don't know what we did last year, it is hard to access what worked and what did not work. Of course there are plenty of farmers who are able to hold the important information in their heads. But when you are getting started it is often helpful to have a few things to go by namely: **the seed order, bed preparation schedule, greenhouse seeding sheet, direct seeding and transplanting schedules, a harvest record sheet and a detailed map.**

Why Spreadsheets –“I want to be a farmer because I don't like to sit in front of a computer,” you say. Well, everything we are going to talk about today can be done with a piece (or 10) of graph paper and a calculator. John Jeavons book “How to Grow More Vegetables,” [1] does a nice job of putting a lot of relevant information on a few pieces of paper in graph form. This is a handy reference. But what it does not do is allow you to reformat the information according to what data you really want to see, or easily update it year to year. Josh Volk frequent contributor to “Growing for Market” says if you were going to do something similar on paper you would put each row of the spreadsheet on an index card. There would be an index card with each planting on it and all the corresponding yield, planting, seeding and ordering information. You could then arrange the index cards by planting date, by crop, by variety or by seed company order form. But it would take some time considering that you would have hundreds of index cards [2]. With the computer you can just sort the rows depending on what you are interested in looking at.

The Process – The process outlined here is adapted from a process shared by Josh Volk from Slow Hand Farm, frequent contributor to Growing for Market. When one of the farmers I work with asked what he does differently than they do, Josh responded, “Probably not much.” This outline just gives those of us not familiar with forming spreadsheets and crop plans some handy steps and formats to use. The key here is we will form something Josh calls a “crop master” or master spreadsheet with all the information about our crops. From there we can create the seeding, transplanting and greenhouse charts and easily update them when we get new information.

Step 1 - Collecting the Data – What data is available and where to find it will of course depend a little bit on where you are and what sort of operation you have. But there are a few likely places to look. The Cooperative Extension offices have a lot of information about growing crops in their production guides, but to get more specific information one of the best places to look is often the seed catalogs. They usually put very specific information about everything from the number of seeds per ounce to plant spacing. Knott's Handbook for Vegetable Growers [3] is a good all around source for vegetable information such as germination temperatures, plant spacing, scheduling successive plantings and more. I like John Jeavons' book as well, though his plant spacing are designed for intensive raised bed systems that don't work in my field. Everyone's brain works differently which makes it hard for us to use each other's spreadsheets. I have included a sample here and there is another nice example available online from Roxbury

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Farm. For me it makes the most sense to gather all the data in the first part of my spreadsheet. Then I can work to process it into the other information I need. I love sitting down with my seed catalogs and thumbing through them to decide what I want to grow this year. The first 21 columns in my spreadsheet are all the data I think I might want about each crop. Everything from crop and variety names to plant spacing, seeds per ounce, and ordering information. This may seem a little overwhelming at first. But the nice thing is you won't ever have to do as much work again. You will probably grow many of the same crops and varieties next year and you will have all the data right there.

Step 2 – Calculating Yield Needed – Whether you plan to grow for a market or for a CSA it is important to try to grow an appropriate amount for that market outlet. In the case of a CSA this can be more than a little nerve wracking because you have pretty well guaranteed a certain number of people produce every week and they are hoping they don't just get swiss chard every week. Yield calculations are never going to be perfect. But every year you will be able to get closer if you have a starting point. There are a few ways to do this but this is a feasible option.

For a CSA the data you will need is the # of CSA shares, the quantity you will give each shareholder in a given week, the unit, the number of weeks you expect a specific crop succession to produce, the # of varieties if you plan to plant more than one thing and give people a mix of say tomatoes, and whether the crop received multiple harvests or not..

Crop yield per planting you need = (# CSA shares) x (quantity/ share) x number of weeks

Step 3 – Bed/Row Feet per Planting – Next we want to know how much to grow to get that yield. I calculate this in bed feet. But if you are not in a bed system it works the same to calculate in row feet.

- a. **Row feet per planting** = target crop yield ÷ crop yield per 100 ft row ÷ 100 ft
- b. **Bed feet per planting** = row feet/planting ÷ # rows/bed

Step 4 & 5 – Timing Direct Seeding & Transplanting – To figure out when to plant each of these crops I work backwards from the target date I want to harvest. It may make more sense to you to work forward from the target seeding/transplanting dates to find the harvest date. If you work back from the target harvest date you will probably have to adjust for what is reasonable in your area in terms of frost free dates etc.

- a. **Seeding date** = target harvest date – days to maturity
- b. **Transplant date** = seeding date + days to transplant

Step 6 – Harvest Dates – You will need columns for seeding/transplanting date, days to maturity, weeks to maturity, and weeks of production.

- a. Estimated 1st harvest date = seeding/transplanting date + days to maturity
- b. Estimated last harvest date = 1st harvest date + weeks of production x 7

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Step 7 – Additional Transplanting Information – It is nice to gather here the information you will need when you are in the greenhouse – ie how many plants, the tray size and number of plants.

Step 8 – Seed Ordering Information – For this section you will probably want to make columns for the company, the number of seeds, the oz you need, seeds/ oz, minimum germination, cost and unit code.

Step 9 – Field Prep/ Cultivation - Field prep timing always depends on the weather, but it is nice to have target dates set for when you will want to do your field work. This is especially important when you have a cover crop to work in. Based on your experience of how long it takes for that cover crop to break down after you plow it in and if you plan to make beds you may want to have columns for 1st tillage, 2nd tillage, bed preparation, 1st cultivation and 2nd cultivation. I find it really important to have those 1st and 2nd cultivation dates on my calendar. With a hundred plantings to manage it is easy for me to forget to do that first cultivation when the weeds are tiny and then they get out of control.

Creating To Do Lists from the Plans – Now comes the fun part. It almost feels like magic. Once you have the data together you can easily pull from that data onto other spreadsheets to make to do lists. It is good to also add extra blank columns next to the tasks to record when things were actually done. It is good to make sure the sheet can be printed out on a single sheet of letter sized paper. That way you can keep a copy of everything handy in the greenhouse where it is easy to reach and volunteers or employees know where to find it. For example when a planting crew goes to the field they will have a clipboard that has the crop, variety, how many trays, the spacing and any other notes. These sheets can be sorted by date and field so all the plantings for that week are grouped together and all the plantings for a field are next to each other. That saves a lot of running back and forth to the greenhouse. The blank spaces make it easy for a crew to keep records and you to be able to understand them later.

- a. Open a new worksheet
- b. Name the worksheet
- c. Fill in the column names for the information you want for the sheet – ie for the greenhouse seeding chart: crop, variety, seeding date, days in greenhouse, traysize, trays.
- d. Create a sample formula line. This line will correspond with the cell above your data in the master sheet. You will not want to touch this line when you reformat reorder your data. For example to capture crop press = then go to the master sheet and click the box at the top of the crop line. Press enter.
- e. Drag down these formulas. Now you have all the data from the master sheet for these relevant topics.

- f. Reorder the data. You can reorder the data here by date or crop or field according to what is most helpful.

Again which sheets you choose to make is up to you, but these are a few common ones:

- a. Greenhouse seeding chart
- b. Direct Seeding Chart
- c. Transplanting Chart
- d. Field Prep/ Cultivation
- e. Seed Order

Creating the Map – This is the one piece that is very difficult to link directly to your crop master. You pretty much need to work back and forth from your planting schedule to figure out where everything will go in the field. There are just too many factors for excel to take into consideration – from example, field A is wet, crops B and C should be close together, last year crop C was in bed 14.

One tip, instead of creating your map in space it can be helpful to think about it in time. When I have just a map of the field it is hard to know when a planting is supposed to come out and another one go in. This can be especially important when you want to fit in as many cover crops as possible.

Additional Tips for Using Excel – The following is a cheat sheet of spreadsheet features that Josh Volk commonly uses when he works with spreadsheets. It is important to keep in mind that these will work just fine in open office as well as excel.

Cell Address - the column letter followed by the row number (e.g. F35)

relative cell address - when you put a cell address in a formula it defaults to a relative cell address, meaning relative to the cell the formula is in. The cell address in the formula will change if you move the formula to another cell.

absolute cell address - you can make the column, or row, or both absolute (meaning they won't change if you move the formula to another cell). This is done by putting a \$ in front of the letter, or number, or both (e.g. \$F35, F\$35, or \$F\$35 - meaning three different things)

Referencing - this lets you reference cells in other sheets, even other workbooks. This works just like other cell addresses. Be aware that if you move cells in the referenced sheet (by sorting or any other method) the cell will still be referenced but the information that was in it will not.

Formulas I use in crop planning

=+/*() - pay attention to where your parenthesis are in the formula, it makes a big difference sometimes.

+ - - adding or subtracting a number to a date is equivalent to adding or subtracting

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days. Very useful.

sum() - this adds up all of the cells in a range. Ranges of cells start with the top left cell address, are separated by a colon (or sometimes double periods), and end with the bottom right cell address (e.g. A1:C55, or A1..C55)

count() - This counts the number of cells in a range that have a number in them

countA() - This counts the number of cells in a range that have anything in them

If() - I used to use more if statements but they take up a lot of space and aren't really so useful in the end. Basically they will do one thing if a cell matches the criteria you're looking for, or something else if it doesn't.

Nesting formulas - I use a lot of formulas inside of formulas. You can nest a lot of formulas but usually it's easier to use multiple steps, showing each intermediate step in another column. This is much easier to edit in the future and to understand when you forget how the formula works.

1. Jeavons, J., *How to Grow More Vegetables: Than You Ever Thought Possible on Less Land Than You Can Imagine*.
2. Volk, J., *Tips of Using Spreadsheets for Crop Planning*, in *Growing for Market*. 2010, Fairplains Publications Inc.
3. D.N., M. and G.J. Hochmuth, *Knott's Handbook for Vegetable Growers*. Vol. 5. 2007, Hoboken, NJ: John Wiley and Sons, Inc.

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