CHAPTER 1

Year-Round Production

Food production requires planning, and the steps of a good planning process are cyclical, with information from each stage suggesting changes at other stages. Before the cycle even starts, it is important to be clear about the goals of your farming. Here at Twin Oaks Community, the goal of our garden crew is to increase our self-sufficiency and reduce dependence on the cash economy. We aim to provide a diverse year-round supply of tasty, fresh organic vegetables and fruit for our intentional community and also to grow enough to process for out-of-season use. The increasing interest in buying local food and eating organic is creating a need for a dependable supply of local, sustainably grown winter vegetables as well as summer ones. Before you wail with exhaustion at the thought of more work and no rest, let me emphasize that all farmers need time to rest, and this needs to be incorporated into the farm's schedule. It might take the form of a complete shutdown of the farm's interaction with the public or a slowdown that allows all the workers to take turns vacationing. Give careful consideration to what you can do to extend the season without overworking yourself, your crew, or your soil. If you decide to provide produce during the winter, you'll find the pace is naturally slower: few weeds germinate, and established crops need less attention. It's not a second hectic summer.

I've identified 16 factors that help us to keep good food on the table year-round:

1. Planning: During the winter we spend a few hours each week working on some aspect of planning the coming year's work. This helps us make best use of our land, money, people, climate, and crops. We also do some planning mid-year for August–December, for the hoophouse and for the intensive raised bed area where we grow many different crops in quick rotation. If the situation changes, we can always change the plan. Having a map and a schedule helps us make the best use of the growing season and minimizes the need for last-minute, middle-of-the-field, brain-frying calculations in August. We create a field manual, with all

the most important maps, schedules, and crop specifications inside plastic sheet protectors. We keep the manual in our tool shed.

2. Research and information: One of the most important farm implements is the brain! Gathering (and retaining) information helps avoid silly mistakes in the field. Books, websites, seed catalogs, conferences, and field trips to other farms can feed the farmer's mind and spirit and lead to better crops. A good filing system, in both paper and electronic formats, keeps the information accessible.

3. Caring for the soil: Compost, cover crops and organic mulches such as spoiled hay or old sawdust all improve the soil. Getting an annual or biennial soil test and amending with any needed lime, gypsum, or other minerals will help increase yields. A good multiyear rotation schedule for the main crops will also help get the most from your soil, by varying what is drawn from it each year.

4. Maximizing plant health: Keeping plants growing well, by preventing and controlling pests, diseases, and weeds, leads to a longer productive crop life and a longer-running food supply. It's vital!

5. Gearing up: Having appropriate, functioning machinery and tools, as well as an ample irrigation system, ensures that productivity is not limited by your equipment. Implements need to fit the scale of the farming and the number of people available to do the work. We're growing on 3.5 acres (1.4 hectares). The equipment we have is workable, although not ideal. We use a John Deere tractor for disking, compost spreading, bushhogging, and potato furrowing, hilling, and harvesting; an 11 hp BCS walking tractor (with rototiller, rotary plow, and mower); many scuffle hoes; an Earth-Way manual push seeder; some drip irrigation; seven Rain Bird overhead rotary sprinklers; seven wheelbarrows; six Garden Way carts, and many stacks of plastic 5-gallon buckets. We also have lots of helpers.

6. Storage: We store potatoes in a root cellar; sweet potatoes, winter squash, pumpkins, garlic, and onions in a basement; carrots, beets, turnips, rutabagas, celeriac, and kohlrabi in a walk-in cooler; and peanuts in the pantry. Meeting the different storage requirements of various crops helps maximize their season of availability.

7. Transplants: Using transplants often makes multiple crops possible in a bed in one season because it reduces the length of time each crop needs to be in the bed. It also extends the season in the spring by allowing plants started inside in milder conditions to be set out as soon as the weather is mild enough, giving them a head start over direct sown crops. And it means overwintered cover crops can be left growing later (for example, until clovers, vetches, or peas flower), for improved soil nutrients.

8. Season extension: The supply of a crop can often be extended at both ends of its normal growing season. Usually an extension of 2 or 6 weeks in fall takes only a little extra vigilance

and a modest investment in rowcover or shadecloth. Naturally, the further you try to extend the season of a crop beyond what is normal for your climate, the more energy it takes and the less financially worthwhile it becomes. We have recently discovered the wonders of biodegradable plastic mulch—it warms the spring soil and brings melons to maturity 3 or 4 weeks earlier.

9. Overwintering crops: Kale, collards, spinach, leeks, and parsnips can all survive outdoors without rowcover in our climate (USDA Winter Hardiness Zone 7a). We can harvest small amounts throughout the winter, and when spring arrives, the plants perk up and give us big harvests sooner than the new spring-sown crops. Arugula, mâche (corn salad), and some other small greens are very winter-hardy too.

10. Protected growing: A hoophouse (high tunnel) is a very good investment for winter crops as their rate of growth is much faster inside, and the quality of the crops, especially leafy greens, is superb. Even though we had expected good results from a hoophouse, we are still amazed, twenty years after building it, at just how incredibly productive it is. Also, working in winter inside a hoophouse is much more pleasant than dealing with frozen rowcover and hoops outdoors. Greenhouses and coldframes also offer opportunities for cold-weather crops.

11. Succession cropping: We plant outdoor crops here in central Virginia every month. Admittedly the only ones we plant in December and January are multiplier onions (potato onions). We grow 9 plantings of carrots, 6 or 7 plantings of sweet corn, and 5 or 6 each of cucumbers, summer squash, zucchini, edamame, and bush beans. We do almost 50 plantings of lettuce! Southern peas and lima beans get 2 plantings. All this means that as one planting is passing its peak, a younger one starts to be productive. Some crops grow here in spring and again in the fall, so we make the most of both seasons. Examples include broccoli, cabbage, spinach, kale, collards, turnips, beets, potatoes, and many Asian greens. I recommend recording dates of sowing, first harvest, and last harvest for each planting. You can use this information to determine the best sequence of planting dates for keeping up a continuous supply.

12. Interplanting and undersowing: Sowing or transplanting one crop (or cover crop) while another is still growing is a way of increasing the productivity of the land. Sometimes it enables a cover crop to get established in a timely way that would not be possible if we waited for the food crop to be finished first. We interplant peas in the center of spinach beds in March and plant lettuce on either side of peanuts in April. We undersow our last sweet corn planting with oats and soybeans, which then become the winter cover. We undersow our fall brassicas with clovers in August to form a green fallow crop for the following year.

13. Food processing: We have a food processing crew who pickle, can, freeze, and dry whatever produce we don't need to eat right away. They also make sauerkraut and jam. We make use of a solar food dryer and an electric dehydrator.

Figure 1.1. Protecting plants with a hoophouse or rowcover can extend the season. Credit: Kathryn Simmons.

Processed (or value-added) foods effectively lengthen the season of local food availability, without requiring out-of-season growing.

14. Crop review: During the main growing season, we don't do a lot of paperwork. We record planting dates, noting the harvest start and finish dates for our succession crops. We label each crop in the field with a row tag. When the crop is finished, we pull up the labels and consign them to one of two plastic jars in the shed: "Successes" or "Dismal Failures." On a rainy day in fall, we transfer the information to the notes column on our planting schedule. At the beginning of the winter, we take time to discuss and write up what worked and what didn't, so that we learn from the experience and can do better next year. This is an example of those triangular cycles recommended in personal growth literature and management workshops, which rotate through three stages: "Plan–Execute–Review" or "Learn–Do–Reflect."

15. Choice of crops and varieties: Every year we try to introduce a new crop or two, on a small scale, to see if we can add it to our portfolio. Sometimes we can successfully grow a crop that is said not to thrive in our climate. Rhubarb works, but Brussels sprouts really don't. We like to find the varieties of each crop that do best for our conditions. We read catalog descriptions carefully and try varieties that offer the flavor, productivity, and disease resistance we need. Later we check how the new varieties do compared with our old varieties. We use heirloom varieties if they do well and hybrids if they are what works best for us. We don't use treated seeds or GMOs because of the wide damage we believe they do.

16. Lots of help: Last but by no means least, we arrange our work so that unskilled visitors and new community members can join in and be useful. It is sociable work, combining productivity with integration into the team.

CHAPTER 2

Create Your Crop Plan and Field Manual

No one has the same farm as you do! This chapter will give an overview of our annual planning process. It will help you create a customized Field Manual to consult when anything is unclear during the hot days of the busy season. The details follow in the next few chapters.

Planning is circular, just like farming itself. For new farmers, this can be daunting, but each year it becomes easier as you are only tweaking the plan you used last year. It is possible to start at various places in the cycle.

Before I tell you about our planning steps, I have a few words to say about plans. Some people seem fatalistic about plans: "Oh, plans never work out!" or "I hate to be controlled by a plan." However, most market growers can see the value in planning, even if we have days when our plans unravel. A plan is just a plan! If a better idea comes along, or the situation changes, then you can change your plan. In agriculture, many things are outside our control. Having a good set of plans actually streamlines making changes and seeing how this will affect other parts of the farming year. A Notes column at the side of every spreadsheet or map gives space to write in any alternative idea you already have, anything different that you end up doing and whether to make this a permanent change in future years or not.

Here I'll list the main planning steps of the sequence I use and describe those that don't have their own chapter. Then I'll list the contents of my Field Manual.

Start with your farming mission

What is your long-term vision? Why are you choosing farming? Will the farm need to supply all your income? Will it be a service? Do you plan to provide good food for people who cannot pay full price? Are you planning to raise a family? Are you intending to be a demonstration of a better way of life?

If the growing season is already underway,

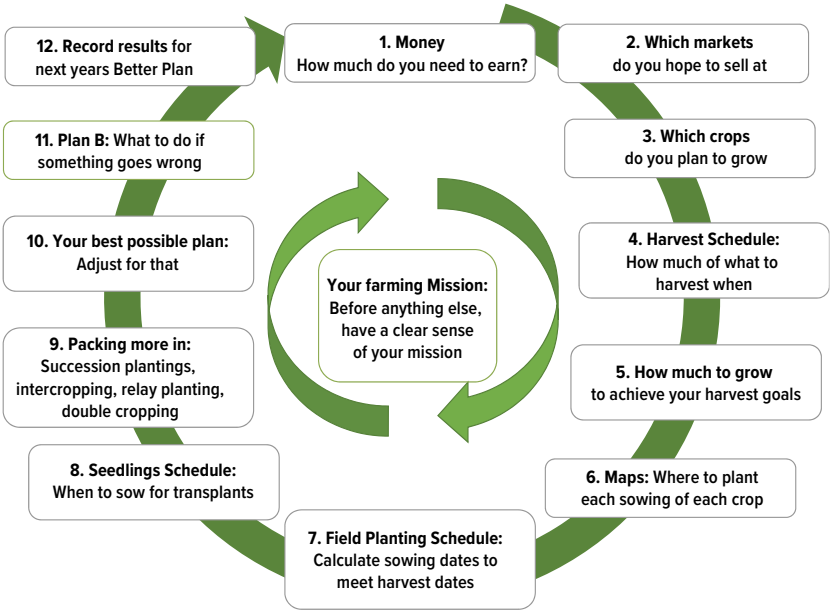

Figure 2.1. Crop Planning Cycle.

start wherever you are in the sequence and consider your vision and mission as soon as you can make time!

Step 1: How much money do you need to earn?

Figure out how much money you need to support your household, your farm, and your future. Then decide how to achieve this, given the resources you have, including land, climate, markets, and labor. This will involve some jumping ahead to think about crops and quantities. Every year after your first, revisit this question. You may only need to tweak your plans, but if you need a major rethink, it's best to know before you start planting.

For us, this step includes auditing and budgeting both money and labor. It doesn't rely on the other tasks in the sequence, but we need to prepare our money budget request and then, once budgets are set, cut our cloth to make best use of the funds we get. Other farms may have different timelines, but at some point, it's necessary to look at the money, sort out any errors, contemplate the financial well-being of the farm and decide if anything needs to be done differently. This is a point at which we see if we can afford to buy more tools or supplies. (It's good to have a reward for tackling accounting, I always think.) At the end of one year, we had just the right amount for a Valley Oak wheel hoe, and what a boon it has been!

Planning the labor budget and recruiting help for the season are also independent of the other steps—figuring out how much labor we need, when we will need it and then finding workers, whether interns, apprentices, full-time or casual labor. We have a spreadsheet for

planning this too, slowly increasing the number of hours per week and the number of workers per day from January. We try to pace ourselves to ensure we get enough people when the harvesting takes a long time and when we have lots of transplanting. We steel our hearts against the many people who want to help in April but will have gone indoors by July. Obviously, the issues are different depending on whether you are paying for this labor or it is voluntary. Even if it's free, you still need to organize everyone and find them tools.

Step 2: Which markets will you sell at?

New growers are often advised to start with a farmers market rather than a CSA (Community Supported Agriculture, where members pay a subscription and receive a regular supply of produce based on what the farm has available) the first year as you can sell a more erratic supply of crops at market. But if you have experience from apprenticing on another farm, a commitment to careful planning, and you need that upfront beginning-of-season cash, you may decide to start with a CSA. If you have an off-the-farm job, this can tide you over until your financial footing is more secure. Also consider restaurants, schools and other institutions, wholesalers, and/or farm stands. Often a flexible combination works best. Revisit this step every year and give careful thought to changes.

Step 3: Deciding which crops to grow

If you grew crops last year, I hope you had a Crop Review process to make use of the information from as many workers as possible. This will make the coming year even better. See chapter 3, Crop Review. If this is your first year, consult nearby growers, study market booths, read the crop chapters in this book, and make a rough plan.

Step 4: How much to harvest when: harvest and food-processing schedules

These are lists of which crops to expect when. When I revise these calendars, I change the date to one halfway between what we had in print and what happened last year. This way we can gradually zero in on the likeliest date without lots of wild pendulum swings to dates based on variable weather. I have the same list sorted by date and alphabetical by crop. I also make a version that shows when crops are abundant enough for our food-processing crews to start canning and freezing. Unless you, too, live in the kind of intentional community I live in, you might plan not to have surpluses unless you have CSA sharers who want to can. An idea of when to expect lots of paste tomatoes can be very helpful in ensuring that people are available to process them and not on vacation.

Step 5: How much to grow

Most growers plant a bit extra in case, but you don't want to waste your resources growing too much of the wrong thing. See chapter 7, How Much to Grow.

Step 6: Maps

If you haven't already, make a rough map of your growing space before you go any further.

Table 2.1. Harvest Calendar by Crop

Starting Date	Crop	End Date	Harvest Frequency	Storage for Out-of-Season Use
Oct 20	Arugula, fall/winter	Apr 15	As needed	Not stored. Pesto is possible
Apr 5	Asparagus	Jun 6	Daily	Freezer
Jul 10	Beans, asparagus	Oct 15	3 × week	End with frost
May 20	Beans, bush	Oct 15	3 × week	Freezer. Die with first hard frost
Jun 10	Beans, fava	Jun 10	One harvest	Not stored
Aug 15	Beans, lima	Oct 15	2 or 3 × week	Not stored
Sep 20	Beet greens, fall	Nov 15	3 × week	Freezer
May 1	Beet greens, spring	Jun 30	3 × week	Freezer

Dates are weather dependent. Quantities may be small and erratic at both ends of the season for that crop. Check against Garden Task List, Hoophouse Log.

Table 2.2 Harvest Calendar by Starting Date

Starting Date	Crop	End Date	Harvest Frequency	Storage for Out-of-Season Use
Jan 1	Lettuce	Endless	Daily as needed	n/a
Jan 1	Turnips, winter hoophouse	Feb 28	As available	For fresh eating
Mar 10	Garlic scallions	Apr 20	3 × week	Freezer
Apr 5	Asparagus	Jun 6	Daily	Freezer
Apr 5	Senposai, spring	May 20	Daily as needed	n/a
Apr 10	Rhubarb	Jun 6	2 × week	Freezer
Apr 15	Radishes, salad spring	May 30	3 × week	For fresh eating. Preceded by hoophouse radishes
May 1	Beet greens, spring	Jun 30	3 × week	Freezer

Dates are weather dependent. Quantities may be small and erratic at both ends of the season for that crop. Check end of list for crops that carry over throughout the winter.

If you have the time, the best option is to make detailed field map layouts each year before you place your seed orders. We prioritize getting our seed orders in early, so if necessary, we postpone our detailed maps. Making accurate maps after your seed order has the disadvantages that the space available for that crop might not be exactly as hoped, ideas sometimes change, and the seed bought won't exactly match the need! But it will be close. We use photocopied hand-drawn maps. Some growers make maps using a spreadsheet or online aerial photography.

We plan the main garden layout following a 10-year rotation, and noting changes suggested by the Crop Review. Then we fit in the smaller succession crops (see chapter 4, Crop Rotations; chapter 7, How Much to Grow; and

Table 2.3. Field Planting Schedule

Transplant or Sow	Actual Transplant or Sow	Vegetable	Variety	Row ft	Pl/100 ft	Inrow space	Space between rows	Location	Transplants	Success?	Notes
Jan 25		Potato Onions	Small ones	200	220	5		1E	528		Harvest ~6/13
Jan 25		Shallots	Ambition	90	220	5		0E	238		Plant bulbs
Feb 1		Fava Beans	Windsor	90	*		16	16W	*		2 × 45'–90'. 228 g = 16'. Last date 3/14 * Direct sown, no transplants
Feb 10		Spinach, spring	Acadia	900	200	6		2E 14W	2160		If not enough t/pl for 2/21, direct sow now
Feb 14		Carrots #1	Danvers	450			8	20W	0		5 rows/bed Germ ~day 15–28
Feb 21		Spinach, spring	Acadia	1800	200	6		11W 12W	4320		T/pl from hphs, or 5 speedlings/bed
Feb 28		Carrots #2	Danvers	450	*			22E	*		5 rows/bed. Germ ~day 15–28. Spread future carrot sowing dates out if delayed. * Direct sown crops are not counted.
Mar 1		Onions	Ailsa Craig 110d	60	300	4		25E	216		Bed A
Mar 1		Onions	Australian Brown 100d	30	300	4		25E	108		Bed A
Mar 6		Turnips, spring	White Egg Turnip 45d	90				3W	0		comp with purp top
Mar 7		Senposai	Senposai	270	67	18	12	12E	217		1 bed, 3 rows

chapter 12, Succession Planting). We also revise the Raised Bed Planning Chart and plan the raised bed crops for Feb–June (see chapter 4, Crop Rotations).

Step 7: Sowing dates: field planting schedule

Most of the major steps in our planning process have their own chapter, but the outdoor (field) planting schedule doesn't, despite being an important spreadsheet and the one containing the most information. It's a list by date of what we intend to plant outside, how much, what spacing, and where, assembled from information from the seed order as well as our field maps. It has an open column to write in when we actually plant, a Notes column (of course) and a "Success?" column to fill out during the harvest season, all to inform the next Crop Review. We include each variety, its row length, and row spacing, and, for transplants, how many plants will be needed to achieve the stated in-row spacing (including 20% extra, so that we can select the sturdiest plants). We have a "Location" column listing the bed number or plot, so we get the right thing in the right place nearly all of the time. If we make changes, intentionally or accidentally, we cross out the planned information and write in what actually happened. If we think our change is an improvement to keep for next year's plan, we circle the new information; otherwise, we consider it a one-time anomaly. We keep this plan on a clipboard in the shed, and at the end of each shift, we enter on it the details of crops we've planted.

Step 8: Seedlings schedule

If you are growing your own transplants (starts) you will need a schedule for that. See chapter 6, Scheduling Transplants.

Step 9: Packing more in

If space is at a premium, you will want to make best use of every bit! Consider succession plantings, intercropping, relay planting, and follow-on or double cropping (see chapter 4, Crop Rotations; chapter 8, Crop Spacing; and chapter 12, Succession Planting). Skip this step if the season is advancing faster than your planning!

Step 10: Adjust to make your best possible plan

Before finalizing your plans for the growing season, look at the whole set of plans and see if something can be improved. Can you fit a short–term cover crop in a summer gap after one food crop, before the next gets planted? Would the work be easier if the summer squash and cucumbers were side by side each time? If possible, get two or three other growers to look over your maps and schedules. You could return the favor! When you make a change, follow through and update all the other charts, tables, and spreadsheets as needed.

Step 11: Plan B: what to do if something goes wrong

This step is independent of the others, good for a rainy day. I have written more about this in my second book, *The Year-Round Hoophouse*, and

the ideas apply equally (if sometimes differently in detail) to outdoor growing. The basic idea is to have a written list of useful people to contact and first steps to take when something goes very wrong. It's hard to think clearly when disaster strikes, and usual resources such as electricity, internet, and clean water supply may have gone.

Step 12: Record results for next year's better plan

This is the last task of our winter planning. I like to do a kind of housecleaning, so that once things get busy, I can find what I need more easily, instead of having important bits of information on tiny scraps of paper or lost in a sea of outdated trivia. Once the backlog is filed, I can indulge in new research on crops I hope to improve in the coming year.

This step includes taking time to walk the farm regularly throughout the year, taking notes and photos, and recording what is working well and what isn't, along with your thoughts on why that is. An annual Crop Review (see chapter 3, Crop Review) is the best way I know to be sure this happens.

Revise the Seed Inventory Spreadsheet. Do the physical inventory of seeds leftover at the end of the year, to determine what you need to buy (see chapter 5, Seed Storage, Inventory, and Orders). Prepare the Seed Order Spreadsheet and place your seed orders (see chapter 5 again).

Finish up any other planning tasks. Revise the Hoophouse Planting Schedule and maps. (For those with hoophouses, there is more in chapter 16, Growing Vegetables Year-Round in a Hoophouse.) Revise the planning schedule, file notes, prune old files, and discard junk.

Gather your plans

Once we have completed each step in our winter planning process, we print out a good copy of each final spreadsheet, map, or list and decorate it with a sticker. This whimsical feature lets us easily tell this year's spreadsheet from another and the final corrected versions from earlier drafts. One year, we had a beetle theme, another newts and lizards. Well worth the dollar it costs for a sheet of stickers! The order in which we do these steps means that the information we need is gradually transferred along the chain, and we don't need to keep going back to consult the many different notes made during the previous year. Usually for each planning stage, we list at the top of the sheet which other charts, spreadsheets, or maps are needed to compile the new one. At the bottom of the sheet, we list places to post or file copies and which following planning stages to take that information on to.

At this point, we usually write an annual report for the community—what worked, what didn't, and changes we plan for next year. You might want to write up a similar report for your CSA subscribers, market customers, and/or farmworkers.

Different styles of planning

Each farm will have its own style of planning. Some farmers prefer hardback notebooks or loose-leaf binders of worksheets. We use mostly

spreadsheets, with our "Colored Spots Plan" for raised bed planning being our most obvious exception (see chapter 4, Crop Rotations). During the year, we work off the printed sheets; we don't often go back to the computer. All our important sheets are in our Field Manual.

The main value for us in using spreadsheets is that the program will do calculations for us, after we provide the basic information one time. We enter how many cabbages we want, the in-row spacing and row length, and out pops the projected number of rows. We can quickly switch to a different number to make a whole number of rows. Then we can enter the harvest date and the days to maturity, and out pops the transplant date and the sowing date, along with the number of starts and the number of flats to sow, allowing a percentage extra.

The second advantage of using spreadsheets is the ability to quickly sift out selected parts of the information and rearrange it to give us, say, a list with just the 46 lettuce sowings in date order, or a list of just the crops planted in the East Garden, or the seed orders sorted by supplier, to use for entering online.

Some farms are so well-organized and generous that they post their plans on their website. Jean-Paul Courtens of Roxbury Agriculture Institute at Philia Farm, connected with Roxbury Farm, a 1,000-share CSA farm on 300 acres in Kinderhook, New York, has posted an impressive array of information. See the Appendix of Resources for links to their Harvest Manual and Crop Production Manual. Excel spreadsheets developed by Joel Gruver are available free on the Growing Small Farms website of North Carolina State University. If you would rather use worksheets, a valuable resource is the ATTRA publication *Organic Market Farm Documentation Forms*, by H. Born.

It is possible to put every piece of information about every crop on one giant spreadsheet, then select the columns you want and hide the rest. These separate groupings of different types of information become the various schedules and lists needed for seedling production, field planting, harvesting, etc. This is how we started out, but we soon found that our farm has relatively minor tweaks each year, and it was easier for us to deal with smaller spreadsheets and just update each one. Careful proofreading is easier for us than manipulating giant spreadsheets.

Using a web-based vegetable farm crop planning system offers easier access to information for less time spent inputting. Someone else runs the software. Some free ones (such as AgriXP) are available, and many paid ones (such as Tend, AgSquared, and VeggieCropper) offer a free trial of about two weeks. But if your internet service is poor, don't try it. We're one technological step back, so we rely on spreadsheets.

My dedication to winter planning came from the time I found myself standing in the full sun in the middle of the field with a tape measure, notebook, and pencil, trying to calculate how many rows of sweet corn I could fit in and how long to make them. My brain wasn't functioning at its best, and I was under pressure to get seeds in the ground. There had to be a saner way—ah, do the planning in winter! We enjoy taking life slower in the winter,

Table 2.4. Crop Planting Quantities

Crop	2015	2016	2017	2018	2019	2020
Beans, bush (all double rows)	34 hphs + 180 + 215 + 180 + 192 +215 + 180 = 1,196	34 hphs + 180 + 180 + 180 + 180 + 146	46 hphs + 900 (5 sowings)	49 hphs + 720 (4 sowings)	5 beds + 0 hphs = 900	8 beds = 720
Beets	4 beds spr 5 × 90 × 4; 3 beds fall 5 × 90 × 3 = 3,150	4 beds spr 5 × 90 × 4; 3 beds fall 5 × 90 × 3 = 3,150	4 beds spr 5 × 90 × 4; 3 beds fall 5 × 90 × 3 = 3,150	3 beds fall only 1,350	4 spr 3 + fall + hphs = 3240	4 spr 3 fall = 3,150
Broccoli	1,880 spr + 2,385 fall = 4,265	1,800 spr + 2385 fall = 4,120	1,590 spring only	1,590 spr + 600 fall = 2,190	1,540 spr, fall failure = 2,235	0
Cabbage	180 + 600 spr; 1,325 + 180 fall = 2,285	180 + 600 spr 1,470 fall = 2,249	710 spring only	710 spr + 180 fall = 890	180 + 360 spr + 720 fall = 1,260	2 spr + 2 fall = 720
Carrots	Spr + smr 8 × 5 × 90 = 3,600; fall 5 × 5 × 180 = 4,500 Total = 8,100	4 beds spr = 1,800. 0 smr; fall 4 × 5 × 200 + 1 × 5 × 90 = 4,450 Tot = 6,160	4 beds spr = 1,800 0 smr fall 1 bed + main = 4425 = 6,225 Tot	3 beds spr + 0 smr + 1 fall + main = 5,775	4 spr + 1 fall + 3,750 main = 6,000	4 spring + 1 fall + 3,500 = 5,750
Chard/ leaf beet	112 hphs + less than 180	124 hphs + 140	124 hphs + 180	180	484	304
Collards	270 + 270	270 + 270 + 60	270	270 spr + 270 fall = 540	270 spr + 270 fall = 540	270 spr + 270 fall = 540
Corn	7,020	7,502	5,148	3 plots	6 plots = 7,060	6 plots = 7,155

Check: Crop Review, Field Planting Plan, Raised Bed Plan, Veg Finder, Succession Crops Planning Sheet
Note: hphs = hoophouse, dbl = double, spr = spring and smr = summer.

so we do one or two planning steps each week (with a 2-week break for holidays). If you prefer a complete break during the winter, you could devise a more compressed planning schedule, perhaps a whole week before the end of the year and another in early spring.

Make your own field manual

As our planning got more detailed, I started to need to keep the information close by, in a relatively weatherproof and portable package. You might keep yours on your phone. My solution is clear plastic sheet protectors—pockets you can slip a sheet or two of paper in and file in a ring binder. I prefer not to have the binder, just three metal rings. This way, I can open the manual at any page and fold it round to single page size, keeping the manual with whichever page I need to look at on the top until the current task is dealt with. The plastic keeps the pages fairly clean and dry, so I can take it out to the field and set it down on the ground

with no worries. You can include whatever is useful to you and also customize the manual to make crew versions, shed clipboard versions, customer versions, and website versions.

My Field Manual consists of about forty sheet protectors. The spreadsheets, maps, charts, and lists from our planning are included as well as other useful pages, such as:

- Garden Calendar (Monthly Task List). Creating this is a semi-independent task and a refreshing change from all the spreadsheets. It's a month-by-month list of the tasks, taking a half to a whole page for each month. This calendar gives new workers an accessible overview of what we hope to accomplish each month and reminds us of tasks we might otherwise forget. It includes not just the seeding and transplanting jobs but also prompts us to weed the strawberries, sort through the potatoes 2 weeks after harvest, look out for Mexican bean beetles, divide the rhubarb, and so on. It includes a section that I find particularly useful, on climate information, latitude, and daylight length. We make sure when we revise it to include things we plan to do differently this year, to prevent autopilot taking over.
- Ten-Year Crop Rotation Pinwheel (see chapter 4, Crop Rotations).
- Crop Planting Quantities Chart. This is another planning step that can be fitted in between other main steps in the chain. It's independent and is used for long-term planning/musing. It's simply a chart of how much of each crop we plant each year. We have about twenty years of data collected. The chart helps us see if we are unconsciously drifting towards more or less of certain crops when we adjust our plans to fit available space. It's also useful to look at how we did things in "olden days"—different plant or row spacings, etc.—and helps us be more intentional about what we do now.
- Tables of Soil Temperatures for vegetable seed germination and Days to Emergence at different temperatures (for sowing and flame-weeding decisions).
- Virginia Extension Vegetable Planting Guide.
- Sunrise and Sunset Timetable.
- Phenology Log.
- Plastic Card Calendar (free from an insurance company).
- Lettuce List and Lettuce Log. This is a crop where sowing and transplanting dates need to be quite precise if you want a continuous supply. It took me several years of fine-tuning to get an almost year-round supply without huge gluts. See chapter 38, Lettuce All Year Round.
- Onion Planting Plan and Log. This is a crop we must pay close attention to. We trialed different varieties, so the planning is complicated and the recordkeeping important. We track what's where and monitor growth a few times during the season, then record the harvest of each variety separately to compare yields. Later we compare the keeping qualities. Any

crop you are focusing on improving may warrant its own plan and recording sheet.
- Sweet Potato Slip Growing Plan and Worksheet (see chapter 58, Sweet Potatoes).
- Fall Brassica Spreadsheet. Planting dates for fall crops can be exacting because the cooling weather slows down the plant growth, and a day or two difference in sowing date can make a week or two difference in harvest date. With a crop like broccoli, this can make the difference between 4 weeks of harvest and 6, where the extra 50% of time means more than 50% extra yield because it takes place during warmer weather. We may plant six to eight broccoli varieties with varying days to maturity, four to eight types of cabbage, up to eight types of Asian greens, two kohlrabies, one variety of kale, and one of collards. All this means lots of seedlings to track.
- Farmscaping Worksheet and Suggestions.
- Winter Cover Crops Maps.
- Cover Crops Information and Chart (see chapters 19 and 20, Cover Crops).
- Map of the Blueberry Patches and Grape Rows and Monthly Care List and Logs.

If you find yourself often seeking a particular table, diagram or list, then that piece of paper has earned a place in your Field Manual.

Crop Review

We have developed a tradition of having a Crop Review Meeting in November when each growing season slows down. The growing season never really ends here in central Virginia, just slows for a couple of months. We encourage all the crew to attend by counting it as work hours, talking it up as interesting and providing snacks halfway through. Our goal is to review how the season went while we can still remember it and get the information in writing so we can use it in making our plans for the next season.

The format

Our basic format is to go alphabetically down a list of crops, using a spreadsheet we've prepared in advance. Anyone who remembers anything notable about that crop speaks up, and someone takes notes on a laptop. We usually time it so that, while we talk, we have seed garlic to separate into cloves for planting the next day. We allow 5 hours (all afternoon) with a break in the middle. We grow a lot of different crops and have a lot of different plantings; a farm that specializes in fewer crops would not need as much time. Naturally this is also a time for mutual congratulation and appreciation, reliving the highlights, and a few hilarious or rueful diversions when we recall the more disastrous events of the year. Among comments like "harder to pick," "not enough water," "Five blahs" (Red Sun tomato), and "don't remember," we have "Walla Walla: the big unkeeper," and "Zucchini Spineless Beauty: Fruitless! Pointless!" And then our silly mistakes: Broccoli Green Comet: "One row lost to sweet potatoes," and Acorn Squash: "Gap filling resows hoed off by accident, let's not do that again."

Preparation

Like most farming activities, the success of the Crop Review is partly related to the quality of the preparations. In the weeks just before the Crop Review, we gather up all the miscellaneous scraps of information we can find about our plantings. Some of these are in my pocket

Table 3.1. Garden Crop Review Worksheet

Vegetable	Row feet	General comments	This year's varieties	Last year's varieties	Comments on varieties
Beans – bush	180		Bush Blue Lake	*Bush Blue Lake*	
	675		Provider	*Provider*	
	133		Burpee's Stringless Greenpod		
	90		Burpee's Tender Pod	*Strike*	
	48		Jade	*Jade*	
Beans – asparagus	76		Purple Pod	*Purple Pod*	
Beans – favas	74		Windsor	*Windsor*	
Beans – edamame	480		Envy 75d	*Envy 75d*	
			Envy 75d		
			Envy 75d		
			Envy 75d		
			Envy 75d		
			Envy 75d		
Beans – limas	180		Jackson Bush	*Jackson Bush*	

notebooks, some on the backs of seed packets, and some in more organized places like the Planting Schedule and the Seed Order. We also file our row labels (cut from venetian blinds) after the crop is finished in two plastic tubs, one for "Successes" and the other marked "Dismal Failures." If the crop wasn't very successful, we write a few words about why on the label before putting it in the Dismal Failures tub. It doesn't have to be a total disaster to qualify. We take each tub, sort the labels by month, then by date, and record the success or otherwise. We use a column on our Planting Schedule for this. It helps to consolidate the information in just a few places. I copy down any comments written on the label about the problem we encountered, bang the dirt off the labels and collect them together for cleaning and reuse on a rainy day.

We also post a paper on the community bulletin board asking the cooks and diners to write down any comments they have about what went well and any requests for more/less/different produce. It's equivalent to asking CSA members in a newsletter or bag-note to send in their opinions. This input is taken to the meeting.

The next task is to prepare the spreadsheet for the Crop Review. This takes 2–3 hours. We work from last year's Crop Review and Seed Order. We copy last year's Crop Review to a new worksheet and empty the comments columns. We have a "General Comments" column for each vegetable and one for "Comments on Varieties." Referring to the Seed Order for the past year, we enter the row length and the variety names for each crop. We keep the previous year's information and reduce its prominence

Figure 3.1. Popping garlic cloves in preparation for planting makes an ideal task to do at the Crop Review meeting. Credit: Southern Exposure Seed Exchange.

by reducing the point size and putting it in italics (it can be useful for comparisons). We also refer to any supplementary seed orders made during the year that were not recorded in the main spring Seed Order.

I tidy up the spreadsheet, print out a copy, then sit down in a comfortable chair and proofread. I might add details such as where and when that crop was planted or divide the row length up between the spring and fall plantings. Then I print out enough good copies for us to look at while we talk.

The next important task is to line up the snack-makers! While we recognize the power of caffeine and sugar to keep us alert, we also cater for those avoiding these. Our rule is that we have to get past Lettuce in the alphabet before we break out the snacks. It keeps us focused and prevents us from talking for too long about the crops early in the alphabet.

The Crop Review meeting

This meeting replaces the outdoor work shift for the afternoon, providing a welcome change from the routine. Participation is not compulsory, and many of the paracrew members who are less involved in the organizing and planning don't take part. We expect the main crew people to make a high priority of being there.

The facilitator keeps us on task and watches the time. Some people can concentrate better if they have hand work, and usually there is

someone who can focus best if they are typing the notes, so they get that job. We bring all the crop records we have, plus the seed orders and the planting schedules (outdoor, seed starting, and hoophouse).

In reviewing each crop, we consider yield, quality, flavor, ease of harvesting, pests and diseases, and the effects of weather. We also take into account the space use and timing in terms of a continuous supply of that crop or a good flow of produce in general as well as the crop's popularity with our diners and cooks.

We write in any new crops we're interested in trying at the end of the spreadsheet. We reward ourselves by allowing a 30' × 4' (9 × 1.2 m) bed space for an experimental crop or variety for each person participating in the planning process.

After the Crop Review meeting, we use the information to plan improvements and to fine-tune how we do things. We try really hard not to make the same mistake two years running! We file a copy and keep copies to work from when planning the crop layout for next year, composing the Seed Order and making up the planting schedule. We also write up an Annual Report or "Informant" for the community.

The Crop Review starts us on a sequence of planning tasks that we do in the winter, with the information from each step going on to the next stage.