Value Chain Cluster Initiative
Food Business Development From Field to Fork

DEVELOPING & IMPLEMENTING YOUR PRODUCTION PLAN

The examples and tools provided in this handout were generated for the "Production Planning for Profitable Four Season Gardening" Workshops conducted by VC2 in collaboration with partner organizations. Key resources used include Brookfield Farms, Johnny's Selected Seeds, and WVU Extension. For more information, contact Mary Oldham, Value Chain Cluster Initiative (VC2) at maryoldham@vc2.org or 304-692-1044

STEP 1. DETERMINE WHAT YOUR CUSTOMERS WANT & WHAT YOU'LL GROW

Any planning we undertake should be based on trying to improve our CONSISTENCY and FILL OUR CUSTOMERS' NEEDS. The crops we choose to grow should be selected with intention based on which crops our customers want, when they want them, and how much volume they're likely to buy.

STEP 2. DEVELOP YOUR CROP SCHEDULE

Figure out when you will plant your crops and develop a schedule. You can fill out the CROP SCHEDULE example worksheet using the instructions, examples, and CROP INFO sheet.

STEP 3. DEVELOP YOUR CROP PLAN

Figure out how much you need to plant to meet projected demand for your products. You can fill out the example crop plan worksheet, using the CROP INFO sheet & the information from your CROP SCHEDULE worksheet.

STEP 4. COMPILE YOUR MASTER PLAN & GREENHOUSE SCHEDULE

1. HAVE A MASTER LIST OR CALENDAR: Keep a master list of all the dates and quantities to plant of your different crops. You can make a long list or write this directly on your calendar.

2. ENSURE YOU'LL HAVE PLANTS OR SEEDS READY BY THE DATES ON YOUR CROP SCHEDULE: If you are planning to start the plants from seed instead of buying transplants, you will need to develop a greenhouse schedule to have your transplants ready on time. If you don't want to start transplants, you may be able to develop a relationship with a nursery to have them provide you with transplants by the dates you need to put plants out in the field.

STEP 5. PLAN YOUR FIELDS FOR YOUR PLANTINGS

Plan out a field map to determine where you will put your different crops on your farm.

STEP 6. TRY YOUR PLAN, TRACK RESULTS, AND START PLANNING AGAIN!

Plant according to your crop plan and track your results so you can adjust next year!

STEP 2: DEVELOPING YOUR CROP SCHEDULE

A consistent supply of product builds buyer loyalty! That's why scheduling is so important. We need to consider many factors when scheduling our crops, including crop information and our capacity to use season extension techniques. A hugely important factor that should influence our crop schedule is OUR MARKETING PLANS! We need to plan to have product when we need to sell it. Therefore, this crop scheduling exercise requires us to flip back and forth between thinking about when we need to plant things for target harvest dates and when we can expect to harvest things based on the dates when we actually can plant things! It's a bit of a puzzle!

Directions for using the Crop Scheduling Worksheet

SECTION 1. Fill out the information for the crop you select in the CROP INFORMATION section. You can use the "CROP INFO SHEET" for reference or other resources you may have.

SECTION 2. The first planting date will be first safe date to plant unless otherwise desired. For each successive planting, add the number of days between succession planting to the first planting date to come up with next planting date. For example, if you plant April 1st and you need to plant every 15 days to have a consistent supply, you would add 15 days to April 1st and your 2nd planting would be on April 15.

To calculate the expected harvest date for each planting, add the "Number of days to harvest" that you filled out in SECTION 1: CROP INFORMATION to the planting date. This will give you an idea of when the crop will be ready to harvest. Therefore, this is when you can expect to be ready to sell this crop.

Continue figuring out your successive planting dates and projected harvest dates. You will determine your last planting date based on looking at how the projected harvest dates compare with the "first date that frost will affect your crop" that you figured out in SECTION 1: CROP INFORMATION. You don't want to plant one more time if you will be harvesting it too late!

SECTION 3: This crop scheduling worksheet provides important info that we need for our crop plan. Now you can see how many plantings you're able to do. Write that number in SECTION 3: INFORMATION FOR CROP PLAN. Also, estimate how many weeks you'll be able to have the crop in harvest by using the projected harvest dates, and write this box in this section. You'll need these numbers for the STEP 2: DEVELOPING YOUR CROP PLAN.

Additional Notes:

If you are using season extension techniques…
The example assumes that you are using no season extension techniques. If you are, you may consult additional resources to see when you could plant earlier in the spring and harvest later into the fall, for example. This would affect the numbers you put in your crop information section.

Certain crops may not be able to be planted all season long…
The extent to which you can plant crops all season depends on the type of crop and variety. Consult production information from WVU Extension to know. For example, unless you have heat-resistant varieties, it may not make sense to plant in the summer. So you may have to set up your schedule to leave a gap during the hottest part of the summer.

You may need to adjust standard succession planting intervals…
Intervals between successive plantings are just a standard guideline. However, you may need to adjust your intervals during hot or cold times of the season depending on the crop and changes in maturation.

Your schedule should be tailored to your market plans…
If you're selling to farmers markets, you may want to try to plant lettuce all summer because maybe you'll have an outlet to sell through. However, what if you are trying to sell to the school system and they don't want lettuce until September? Instead of thinking about your schedule based on when you can plant and have product available to harvest, you can start with your target harvest date.

CROP SCHEDULING EXAMPLE 1: GROWING FALL LETTUCE

FIELD CROP SCHEDULING WORKSHEET EXAMPLE		
Fall Lettuce Example		
SECTION 1: CROP INFORMATION		
CROP	Lettuce	**Notes**
Number of Days Between Succession Plantings	14	You may need to adjust intervals depending on the time of the year; crops grow quickly in the heat of summer and slower in spring/fall
First safe frost-free date to plant outside (with no additional season extension)	4/14/2015	
First fall frost date that will affect this crop (with no additional season extension)	10/15/2015	
Number of days to harvest	42	55 day lettuce; number of days from transplant

SECTION 2: PLANTING AND PROJECTED HARVEST SCHEDULE			
Planting Number	**Planting Date**	**Projected Harvest Date**	**Notes**
1	7/7/2015	8/18/2015	end of August - target sales date
2	7/21/2015	9/1/2015	
3	8/4/2015	9/15/2015	
4	8/18/2015	9/29/2015	
5	9/1/2015	10/13/2015	trial planting - cover with row cover
6			
7			
8			
9			
10			

SECTION 3: INFORMATION TO PUT IN YOUR CROP PLAN	
Total Number of Plantings	5
harvest and available for sale	10?

STEP 3: DEVELOPING YOUR CROP PLAN

In developing the crop plan, we're basically going through three steps. First, we're translating our estimated demand into how many row feet, beds, and acres we need to plant. Second, we're determining how many plants that means we need to plant. That helps us determine seed orders and how many transplants we need to acquire. But we aren't going to plant all of that at once, right? So, third, we're determining how many plants we're going to plant each time we do a successive planting. *Our goal is to have consistent quantities, consistently throughout the season.*

Before we look at an example, here's a description of what each of the columns in the crop plan worksheet mean. The colors are there to let you know that it's not as overwhelming as it looks! The blue boxes indicate information we get from the CROP INFO sheet. The green boxes indicate numbers we'll pull from the CROP SCHEDULE worksheet we already did. The yellow boxes indicate numbers that the worksheet will guide us to calculate based on numbers we already have. The orange box is the only box that we really have to think hard about – estimate our buyer's weekly demand. If you are estimating this for farmers markets, you may need to guess a little. If you are working with a wholesale buyer like a school, they may be able to tell you what they need and you can determine how much you'll grow for them.

How you get the numbers in the crop plan, what they mean, and why they matter

	What does this mean?	Where do I get this info?
CROP	You must choose the crops you will plant.	YOU DECIDE
UNIT	The size of the unit of your product.	CROP INFO SHEET
YIELD / ROW FT	How much of the crop you can expect to harvest per linear foot.	CROP INFO SHEET (or your own data if that is more reliable for you)
Weekly Demand	*How many units of this crop you want to have available for sale on a weekly basis. This should be based on what your buyers want!*	*YOU ESTIMATE*
# Weeks Available	*How long you'll have this crop in harvest.*	*PLANTING SCHEDULE WORKSHEET*
Total Demand (Yield Needed)	*How much you'll plan to harvest over the whole season.*	*CALCULATE (column 4 x column 5)*
ROW FT NEED	*How many linear row feet you'll have to plant in order to reach your goals.**	*CALCULATE (column 6 / column 3)**
TOTAL ROW NEED	*How many rows of this crop you'll need to plant over course of season. Examples are based on rows 350 feet long*	*CALCULATE (column 7 / row length)*
ROWS PER BED	How many rows are typically in a bed of the width you are using. The examples are based on a bed 6 feet wide.	CROP INFO SHEET
TOTAL BEDS NEED	*How many beds you'll have of this crop over course of season. This figure can help you plan how you'll arrange different beds in your fields and allocate space correctly.*	*CALCULATE (column 8/ column 9)*
TOTAL ACRES IN PROD	*How many acres of this crop you'll have over the course of the season. This figure can also bed valuable because it can help you plan your fields out and make sure you have enough space prepared for your crops.*	*CALCULATE (column 10 / beds per acre)*
Spacing (inches)	How closely the crop is spaced in the rows.	CROP INFO SHEET
Plants/seed Per Foot	How many plants you plant per foot.	CROP INFO SHEET
Plants Needed	*How many plants you'll need over the course of season. (A failure rate of 20% is incorporated into the calculation to cover potential losses). **	*CALCULATE (column 7 x column 13) x 1.2**
Number of plantings	*How many plantings you will do if you want to have consistent and extended harvests.*	*PLANTING SCHEDULE WORKSHEET*
Row feet per planting	*How many row feet you'll have to plant each time you plant. (More meaningful for direct seeded crops).*	*CALCULATE (column 7 / column 15)*
Plants per planting	*How many plants you would plant each time you would plant. (Easier for transplanted crops).*	*CALCULATE (column 14 / column 15)*

*The next page shows an example for two different crops – one transplanted and one traditionally direct seeded. How you factor in crop loss can be different in each case. For a transplanted crop, in column 14, we also multiply the number of plants needed by 1.20 to make sure we plant 20% more seedlings than we need. In this way we can give ourselves room for some loss between seeding and transplanting out the plants in the field.

Note: For direct seeded crops like spinach or carrots, you would want to multiply column 7 by the additional 1.20 (to add in your 20% error here) instead of in column 14. In this way, you are assuming that you will have up to 20% loss and have planted extra row feet accordingly. Then column 14 would tell you about how much seed you would need.

If you want to create more room for error for yourself, you could also estimate weekly demand (column 4) a little higher than you think. However you decide to do it, it's a good idea to overestimate and plan for some crop loss.

CROP PLAN EXAMPLE

Here's an example of a crop plan that can give you the calculations and numbers you might need. There are two examples to show how you might factor in some seedling loss for a transplanted crop vs. a direct seeded crop.

	ROW LENGTH:			BED WIDTH:		BEDS PER ACRE [43560 square feet / (row length X bed width)]											
	350			6		20.7											
OVERALL STEPS	1. TRANSLATE DEMAND INFORMATION INTO AREA (ROW FEET,BEDS, ACRES)										2. FIGURE OUT HOW MANY PLANTS OR SEEDS NEED TO PLANT			3. FIGURE OUT HOW MANY PLANTS OR ROW FEET PER PLANTING		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CROP	UNIT	YIELD per ROW FT	Weekly Demand	# Weeks Available	Total Demand (Yield Needed)	ROW FT NEED	TOTAL ROW NEED	ROWS PER BED	TOTAL BEDS NEED	TOTAL ACRES IN PROD	Spacing (inches)	Plants Per Foot	Plants Needed	Number of plantings	Row feet per planting	Plants per planting
Where do I get this info?	*CROP INFO SHEET*	*CROP INFO SHEET*	*ESTIMATE!*	*PLANTING SCHEDULE WORKSHEET*	*CALCULATE*	*CALCULATE*	*CALCULATE*	*CROP INFO SHEET*	*CALCULATE*	*CALCULATE*	*CROP INFO SHEET*	*CROP INFO SHEET*	*CALCULATE*	*PLANTING SCHEDULE WORKSHEET*	*CALCULATE*	*CALCULATE*
Calculation Instructions					*COLUMN 4 X COLUMN 5*	*COLUMN 6 / COLUMN 3 **	*COLUMN 7 / ROW LENGTH*		*COLUMN 8 / COLUMN 9*	*COLUMN 10 / BEDS PER ACRE*			*(COLUMN 7 X COLUMN 13)**		*COLUMN 7 / COLUMN 15*	*COLUMN 14 / COLUMN 15*
EXAMPLE																
example calculations for a transplanted					20 X 10	200 / 0.29	690/ 350		2.0/5.0	0.4/20.7			[690 x 1] X 1.20		690/5	828/5
Lettuce	lbs	0.29	20	10	200	690	2.0	5.0	0.4	0.019	12	1	828	5	138	166
example calculations for a direct-seeded crop					15 x 6	[90/0.25] x 1.20	432/ 350		1.2/5.0	0.2/20.7			(432 x 10)		432/3	4320/3
Spinach	lbs	0.25	15	6	90	432	1.2	5.0	0.2	0.012	1.2	10	4320	3	144	1440

STEP 4. COMPILE YOUR MASTER PLAN & GREENHOUSE SCHEDULE

Now that you've figured out when you want to plant your crops and how much to plant, you can compile that information into a comprehensive or master plan that lists all of your dates and quantities. You can do this in a list or table format. You may also decide to write the dates on the calendar.

One important thing that you need to think about is whether you are direct seeding or transplanting your crops. Make sure you know whether the "days to maturity (or harvest)" numbers you are using to develop your crop schedules and plans are based on from when you seed the crop directly or if the number is from when it is transplanted.

If you are transplanting crops you will need to make sure you have the transplants ready by the dates you plan to plant them out in the ground. So that means you either have to start them from seed yourself or make sure your local nursery will have them ready for you. If you are starting the plants from seed to use as transplants, you'll need to make sure you know which date to seed them.

Here's an example of what a master crop schedule could look like with your greenhouse dates included as well. You could also put the dates on a calendar, or find a different system that works for you.

EXAMPLE COMPREHENSIVE MASTER CROP PRODUCTION SCHEDULE

FIELD PLANTING DATE	**CROP**	**PLANTING NUMBER**	**DS or TP?**	**ROW FT NEED**	**SEEDS/PLANTS NEEDED**	**AVERAGE DAYS IN FLATS**	**GREENHOUSE SEEDING DATE**	**Notes**
from your crop schedule				*from your crop plan*	*your crop plan*	*crop info sheet or reference info*	*CALCULATION (field planting date - average days in flats)*	
7/7/2015	Lettuce	1	TP	138	166	28	6/9/2015	
7/21/2015	Lettuce	2	TP	138	166	28	6/23/2015	
7/30/2015	Spinach	1	DS	144	about 1440 sd			
8/4/2015	Lettuce	3	TP	138	166	28	7/7/2015	
8/7/2015	Spinach	2	DS	144	about 1440 sd			
8/18/2015	Lettuce	4	TP	138	166	28	7/21/2015	
9/1/2015	Lettuce	5	TP	138	166	28	8/4/2015	

REFERENCE SHEETS

CROP INFO REFERENCE SHEET (Compiled info. from seed catalogs & Brookfield Farms)

		If you have data from your farm, use it instead.	This is the spacing that these calculations are based on.	Number of plants planted per row foot; indicates spacing.(0.67 means that is spaced at 18 inches. 1 means at 12 inches, etc.)		Need this number to back-calculate from field planting to greenhouse seeding during Step 4.
CROP	**UNIT**	**YIELD PER ROW FEET**	**PLANT/ SEED SPACING (inches)**	**PLANTS PER ROW FOOT**	**ROWS PER BED**	**AVERAGE # WEEKS BETWEEN SEEDING IN FLATS AND TRANSPLANT**
BEAN, SNAP	lbs.	1.14	2.00	6.00	2	2
BEET	lbs.	0.50	1.00	12.00	4	
BROCCOLI	lbs.	0.34	18.00	0.67	2	4
CABBAGE	lbs.	1.40	12.00	1.00	2	4
CABBAGE, CHINESE	lbs.	1.78	12.00	1.00	1	4
CARROT	lbs.	0.75	0.40	30.00	2	
CAULIFLOWER	lbs.	0.40	18.00	0.67	2	
CUCUMBER	lbs.	2.29	12.00	1.00	1	3 to 4
EGGPLANT	lbs.	2.14	18.00	0.67	1	8
KALE	lbs.	0.86	18.00	0.67	2	4
LETTUCE (romaine)	lbs.	0.29	12.00	1.00	5	4
PEPPER, SWEET	lbs.	1.07	18.00	0.67	2	8
POTATO, SWEET	lbs.	0.85	18.00	0.67	2	
RADISH	lbs.	0.29	1.33	9.00	5	
SCALLION	bu.	1.00	1.00	12.00	5	
SPINACH	lbs.	0.25	0.86	14.00	5	
SQUASH, SUMMER	lbs.	3.71	36.00	0.33	1	3 to 4
SQUASH, WINTER	lbs.	1.14	36.00	0.33	1	4
TOMATO, CHERRY	lbs.	2.40	18.00	0.67	1	6
TOMATO, SLICER	lbs.	3.20	18.00	0.67	1	6

Different Example of Production Plan

	Plant in ground Date	Seed date	Crop	Variety	Days to germination	Days to maturity	DS/ TP / Containe	Days to TP	Hard off period	Hard off date	TP date	First Harvest Date	Plant in Tunnel Date
		0-Jan	bachelor's button							0-Jan	0-Jan	0-Jan	
Herbs		0-Jan	Lemongrass	(F)			Container			0-Jan	0-Jan	0-Jan	
Misch		0-Jan	LUFFA	<ORDER?>						0-Jan	0-Jan	0-Jan	
Onion		0-Jan	onion	(other)long bunching	7	60				0-Jan	0-Jan	7-Mar	
Peanut		0-Jan	peanut	(SE) Carwiles VA						0-Jan	0-Jan	0-Jan	
Peanut		0-Jan	peanut	(SE) Talbert's small red						0-Jan	0-Jan	0-Jan	########
Peanut		0-Jan	peanut	(SE) Tennesse Red valencia						0-Jan	0-Jan	0-Jan	########
Herbs	20-Jan	20-Jan	Oregano	ORDER	10	80	Container			20-Jan	20-Jan	20-Apr	
Greens	24-Mar	17-Feb	Kale	(TB) Vates Scotch Blue	7	55	TP	35	7	17-Mar	24-Mar	20-Apr	
Brassica	14-Apr	17-Feb	Broccoli	(F) Fiesta Broccoli	10	65		56	7	7-Apr	14-Apr	3-May	
Onion	1-Apr	18-Feb	Onion	(F) Copra	7	104		42		1-Apr	1-Apr	9-Jun	
	10-May	22-Feb	sweet william		10	110	tp	77	5	5-May	10-May	22-Jun	
Greens	12-Mar	26-Feb	Lettuce	(TB) Salad Bowl Red	7	46	tp	14	2	10-Mar	12-Mar	20-Apr	
Brassica	14-Apr	3-Mar	Cabbage	(TB) mamoth red	8	85	TP	42		14-Apr	14-Apr	4-Jun	
Carrot	11-Mar	11-Mar	carrott	(TB) Scarlet Nantes	8	65	DS			11-Mar	11-Mar	23-May	28-Jan
Beet	11-Mar	11-Mar	Beet	(TB) Detroit Red	8	50	DS			11-Mar	11-Mar	8-May	28-Jan
Beet	11-Mar	11-Mar	Beet	(TB) Cylindra	8	54	TP			11-Mar	11-Mar	12-May	28-Jan
Carrot	11-Mar	11-Mar	carrott	(TB) Little Finger	8	57	DS			11-Mar	11-Mar	15-May	
Pea	12-Mar	12-Mar	pea	(mixed)micro pea greens	5	58	DS			12-Mar	12-Mar	14-May	
Pea	12-Mar	12-Mar	Pea	(f) Opal Gold Snap	5	58	DS			12-Mar	12-Mar	14-May	
Pea	12-Mar	12-Mar	peas	(F) sugarsnap	5	52	DS			12-Mar	12-Mar	8-May	
Onion	13-Mar	13-Mar	Onion	Yellow onion sets	8	85	DS			13-Mar	13-Mar	14-Jun	
Onion	13-Mar	13-Mar	Onion	Red onion sets	8	85	DS			13-Mar	13-Mar	14-Jun	
Herbs	13-May	14-Mar	Basil	(S)Lemon	7	68	TP	60	7	6-May	13-May	28-May	
	10-May	15-Mar	strawflower		7	80	tp	56	4	6-May	10-May	10-Jun	
tomatoes	10-May	15-Mar	tomato	(F) Amish Paste	7	85		56	7	3-May	10-May	15-Jun	
tomatoes	10-May	15-Mar	Tomato	(F) Black Prince <ORDER>	7	72		56	7	3-May	10-May	2-Jun	
tomatoes	10-May	15-Mar	Tomato	(F)Heirloom Mix	7	75		56	7	3-May	10-May	5-Jun	

GREAT RESOURCES FOR IMPROVING PRODUCTION PLANNING ON YOUR FARM

Four season production techniques, variety selection, scheduling/planning assistance:

WVU Extension Info provided by Lewis Jett, WVU Extension Commercial Horticulture Specialist

Lewis Jett himself: Lewis.Jett@wvu.mail.edu

Eliot Coleman's books: Four Season Growing and Winter Harvest Handbook

Johnny's Seed Catalogs and Helpful tools in growers section on website: http://www.johnnyseeds.com/

Rodale Institute – has good resources

Crop Planning pre-fab and editable spreadsheets:

Crop Planning Excel Spreadsheets for CSA from Brookfield Farms. Comprehensive greenhouse and field scheduling tools, seed order templates, field mapping templates, historical crop and yield information. Overall great planning tool that you can modify for your own use and farm. Available for $25 on their website and comes with technical assistance from the farmers themselves. Highly worth the small fee. http://www.brookfieldfarm.org/

Succession Planning Tool from Johnny's Seeds: http://www.johnnyseeds.com/

Software Packages Available:

Agsquared: http://www.agsquared.com/

Useful if you have good internet connection, don't like spreadsheets, and are good at updating records. Especially useful if you are interested in visualizing your plantings in the field because it has a good mapping component.

Mother Earth News Garden Planner: http://www.motherearthnews.com/garden-planner/vegetable-garden-planner.aspx#axzz3B2Udly8m

Also good for visualizing field mapping component.