

MATCHING PROFITABLE PRODUCTION WITH LABOR NEEDS

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One problem on vegetable farms is when your crops do not generate enough income at season margins to retain quality, stable employees. Some growers plant crops they almost invariably know will lose money just to provide hours of work at certain times of season. How can you match profitable crops with labor needs?

The first step is to know your costs of each crop produced. A production budget can tell you the cost of producing each crop as well as help you determine how much labor is used for each crop. Let's use sweet corn sold at a retail market as an example. Table 1 shows the costs broken into variable and overhead costs. The variable cost section also provides information on dates, and cost of labor.

Table 1. New Jersey Production Schedule for one acre of Early Sweet Corn – IPM – Retail Sales.*

Operation	Date	Labor	Materials	Fuel & Lube	Repairs	Total
<u>VARIABLE COSTS</u>						
Set up Irrigation Eq.	March					\$ 225.00
Soil test	March	\$ 5.08	\$ 1.00			\$ 6.08
Apply lime	April 1	\$ 10.15	\$ 19.00	\$1.80	\$0.90	\$ 31.85
Plow	April 1	\$ 20.30		\$3.60	\$1.80	\$ 25.70
Disk	April 1	\$ 15.23		\$2.70	\$1.35	\$ 19.28
Apply Pre-Plant Herb.	April 1	\$ 14.50	\$ 19.19	\$1.80	\$0.90	\$ 36.39
Apply Pre-Plant Fert.	April 1	\$ 10.15	\$ 84.00	\$1.80	\$0.90	\$ 96.85
Plant	April 15	\$ 10.15	\$ 60.75	\$1.80	\$0.90	\$ 73.60
Apply Fertilizer	April 15	\$ 10.15	\$ 80.00	\$1.80	\$0.90	\$ 92.85
Apply insecticide	April 15	\$ 14.50	\$ 24.23	\$1.80	\$0.90	\$ 41.43
IPM Scouting	June-July					\$ 21.00
Apply Herbicide Early	June	\$ 14.50	\$ 3.19	\$1.80	\$0.90	\$ 20.39
Disk	May	\$ 15.23		\$2.70	\$1.35	\$ 19.28
Apply insecticide	June	\$ 29.00	\$ 11.24	\$3.60	\$1.80	\$ 45.64
Apply insecticide	July	\$ 14.50	\$ 5.62	\$1.80	\$0.90	\$ 22.83
Harvest & Grade	July 1-20	\$160.00	\$260.00			\$ 420.00
Selling Charge 10.00%						\$ 660.00
<u>INTEREST ON OPERATING CAPITAL</u>						\$ 44.31
<u>TOTAL VARIABLE COSTS</u>						<u>\$1,091.25</u>
<u>FIXED COSTS</u>						
Farm Stand						\$ 50.00
Tractors						\$ 13.00
Implements						\$ 10.00
Land Charge						\$ 100.00
<u>TOTAL FIXED COSTS</u>						<u>\$ 173.00</u>
<u>TOTAL FIXED AND VARIABLE COSTS</u>						<u>\$2,074.25</u>
<u>MANAGEMENT FEES</u>		7.00%				<u>\$ 138.20</u>
<u>TOTAL COSTS</u>						<u>\$2,212.44</u>

SALES Sweet Corn 400 crates @ 16.50/bag
NET RETURNS

\$6,600.00
\$4,387.56

*Developed by Dr. Robin G. Brumfield, Specialist in Farm Management, Raymond Samulis, County Agricultural Agent, Kristian Holmstrom, Program Associate, Vegetable IPM, Joseph Ingerson-Mahar, Vegetable IPM Coordinator

Planning and Scheduling for Labor Needs

Gantt Charts can help you work out the order in which tasks need to be carried out; and, allow you to identify the resources needed to grow and sell a crop, along with the times when these resources will be needed. When production is under way, Gantt Charts help you to monitor whether the crop is on schedule. If it is not, they help you to pinpoint the remedial action necessary to put it back on schedule. I have modified Gantt Charts for vegetable growers and have incorporated information on costs and labor needs so you can match profitable production with labor needs.

How to Use the Tool:

To plan a project using a Gantt Chart, follow these steps:

1. List all activities in the plan.

The first step is to list all of the tasks that need to be completed to produce and sell your crop. For each task, show the earliest start date, how many hours of labor it will take, the type of labor (Operator, Regular, or Seasonal), and the cost for each task.

Table 2 shows the task list taken from the budget for producing sweet corn using IPM for the retail market in Table 1.

Table 2. Modified Gantt Chart Example: Growing sweet corn using IPM for the retail market.

Task	Description	Date	Hours	Type*	Cost
1	Set up Irrigation Equipment	March	0.5	O	
2	Test Soil	March	0.5	R	\$5.08
3	Apply lime	April 1	1	R	\$10.15
4	Plow	April 1	2	R	\$20.30
5	Disk	April 1	1.5	R	\$15.23
6	Apply Pre-Plant Herbicide	April 1	1	O	\$14.50
7	Apply Pre-Plant Fertilizer	April 1	1	R	\$10.15
8	Plant	April 15	1	R	\$10.15
9	Apply Fertilizer	April 15	1	R	\$10.15
10	Apply Insecticide	April 15	1	O	\$14.50
11	Disk	May	1.5	R	\$15.23
12	Apply Post-Emergent Herbicide	Early June	1	O	\$14.50
13	IPM Scouting	June-July	1.5	O	\$21.00

14	Apply insectide	June	2	O	\$29.00
15	Apply insectide	July	1	O	\$14.50
16	Harvest & Grade	July 1-20	20	S	\$160.00
	Total		37.5		\$364.44

*O = Operator Labor @\$14.50/hour, R = Regular Labor @\$10.15/hour and S = Seasonal Labor @ \$8.00/hour.

2. Make a chart for the year and schedule the labor activities.

Next, draw up a Gantt Chart. Plot each task on yearly calendar, showing it starting on the earliest possible date. Indicate the hours of labor required for each task. Take the information from Table 2 and use it to schedule actions. Schedule them in such a way that sequential actions are carried out in the required sequence. A scheduled version of the sweet corn budget is shown in Table 3.

Table 3. Gantt Chart Example. Sweet Corn – IPM – Retail showing hours of labor required by type for each month.*

Task	Month											
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
1			0.5	O	Set up Irrigation Equipment							
2			0.5	R	Test Soil							
3				1	R	Apply Lime						
4				2	R	Plow						
5				1.5	R	Disk						
6				1	O	Apply Pre-Plant Herbicide						
7				1	R	Apply Pre-Plant Fertilizer						
8				1	R	Plant						
9				1	R	Apply Fertilizer						
10				1	O	Apply Insecticide						
11					1.5	R	Disk					
12						1	O	Apply Post-Emergent Herbicide				
13						1.5		O	IPM Scouting			
14						2	O	Apply Insecticide				
15							1	O	Apply Insecticide			
16							20	S	Harvest and Grade			
Total			1	9.5	1.5	4.5	21					
Total O			0.5	2		4.5	1					
Total R			0.5	7.5	1.5							

Total							20					
S												

*O = Operator Labor @\$14.50/hour, R = Regular Labor @\$10.15/hour and S = Seasonal Labor @ \$8.00/hour.

By drawing this Gantt Chart, you can see that:

- Labor is only required March through July.
- If all goes according to schedule, you need:
 - 20 hours of seasonal labor all in July.
 - 8 hours of operator labor starting in March.
 - 9.5 hours of regular labor starting in March.

3. Make a chart each of your other crops and other farm activities for the year and schedule the labor activities as above.

Pay particular attention to which crops look the most profitable and also, what crops or activities can extend that labor to slack months.

4. Make a master Gantt chart

You may want to start by writing down how many workers you think are needed. Then, how many weeks, and finally how many hours of that labor will you have? Next, what crops do you intend to grow? Make a budget and a Gantt chart for each one.

How do the labor needs of the crops you intend to grow match the hours of labor you expect to have? This will allow you to look at the big picture to see how much labor you anticipate needing in each month. Can you modify work schedules or crops and other activities to utilize available labor in slack months? For example, can workers be trained for multiple tasks so that the regular labor crew who fertilize in April can work in a farm stand in July?

Key points:

The starting point is to develop a budget for each crop. Gantt charts are useful tools for planning and scheduling crops. They help you to assess how long a crop will take to grow and sell and determine the resources needed, When a crop is being grown, Gantt charts are useful for monitoring the labor you are actually using. If you include a budgeting component, you can see how you actually did compared to the projection. This can be essential to successfully and profitably manage labor. The Rutgers Greenhouse Cost Accounting Program now includes outdoor crops. Contact me at Brumfield@aesop.rutgers.edu for more information.