Extension Education Methods

Veggie Compass: A Spreadsheet-based Tool to Calculate Cost of Production for Diversified Organic Vegetable Farmers

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SUMMARY. Organic sales continue to increase in the United States, particularly in the category of fruits and vegetables. Many organic vegetable producers are highly diversified in both crop production and marketing strategies, selling many different crops through several different market channels. With this level of operational complexity, determination of cost of production and calculation of breakeven prices for each crop in each market channels is extremely challenging. A spreadsheet-based tool called Veggie Compass was created to assist growers in tracking their operational costs and determining crop-specific and market-specific costs of production, breakeven prices, and gross profits. The spreadsheet uses farm-specific data regarding expenses, sales, and labor inputs in its calculations. A farmer can define the crops grown and markets sold to tailor the information specifically for their operations. Continued development in collaboration with farmers will improve the program and allow growers to perform analyses that enable them to set prices that more accurately reflect their respective operational costs.

Sales of organic food products in the United States continue to grow, reaching \$3.2 billion and totaling 4% of total food sales [Organic Trade Association (OTA), 2011; U.S. Department of Agriculture (USDA), 2008]. Fruits and vegetables are the largest component of these sales, comprising about 38% to 40% of total organic food sales and 12% of total U.S. fruit and vegetable sales (OTA, 2011).

Organic vegetable farmers in the upper midwestern United States and elsewhere face growing pressure to remain cost competitive and become more profitable. Greater availability of organic vegetables at discount grocery stores can exert downward pressure

on prices of organic produce in other markets, influencing consumer purchasing decisions as price remains among the most important factors in consumer food purchases (Lusk and Briggeman, 2009; Thilmany, 2006). Brown and Miller's review of research addressing farmers' market and community-supported agriculture (CSA) economics finds substantial evidence that CSA farmers, who are mostly organic, do not earn an adequate income (Brown and Miller, 2008). Similarly, a national survey of CSA farmers in 2001 found that less than half of CSA farmers were satisfied with their compensation from the farm and their ability to cover operating costs (Lass et al., 2003). Tegtmeier

and Duffy's (2005) study of upper-midwestern-U.S. CSA farmers and Ostrom's (2007) study of CSA farmers in Minnesota and Wisconsin illustrated the continuation of these trends.

Some of these same studies indicate that many organic vegetable farmers poorly understand their costs and thus inappropriately price their produce. Ostrom (2007) notes that Minnesota and Wisconsin CSA farmers set share prices based on their competitors' prices at market, not based on the prices needed to cover their costs of production. Lizio and Lass (2005) found that CSAs in the northeastern United States behave similarly, setting share prices by the market. Tegtmeier and Duffy (2005) found that many CSAs established share prices to cover their operating costs, but not to cover their own labor.

Organic vegetable growers at farmers' markets face similar challenges in determining appropriate prices for their produce. Surveys of vendors at farmers markets find low average annual sales in terms of dollars (<\$12,000 per year), indicating that for most vendors, farmers markets merely supplement household income and are not viable as a full-time profession (Payne, 2002; Ragland and Tropp, 2009; Varner and Otto, 2008). The determination of the cost of production for organic vegetables grown in the upper midwestern United States is further complicated by the highly diversified nature of both crop choices and markets by most organic vegetable operations in the region (Hendrickson, 2005).

For the production of organic vegetables to expand to meet increased demand while maintaining profitable farm incomes, many CSA and farmers market vegetable growers must better understand their costs on both a per-crop and per-market basis. Growers can then compare the price they need to recover all their costs (both fixed and variable) for a crop in a specific market and the current or typical prices for the same crop in that market. If there is a positive gap (i.e., the market price exceeds the price needed to recover all their costs), they can set their price at the typical level for that crop and earn a positive profit in that market. Indeed, if the gap is large for them, they can even be strategic and set a lower price to capture market share. On the other hand, if the gap is negative, the grower

may still choose to sell at the typical price and lose on that crop in the short-term, for example, to bring customers to their stand, to keep CSA customers, or to recover their variable costs and some of their fixed costs for that crop. The key to profitably pursue such strategies is for the grower to have accurate cost information.

Historically, enterprise budgets have been a cornerstone of farm financial planning. These budgets allow farmers to conduct breakeven analyses and estimate production costs (Dillon, 1993). However, these values have two major weaknesses when applied to diversified vegetable operations: 1) the budgets address individual crops and do not address costs applied to the overall farm operation that impact several crops (Brumfield, 2008; Chase, 2009); and 2) the figures presented in these budgets, if available, represent averages from farms and do not account for the specifics of scale, technology, inputs, and management of particular farms (Christensen et al., 1994). The heterogeneity in size, scope, and strategies for both production and marketing among diversified organic vegetable farms in the upper midwestern United States necessitates a more holistic approach to determining cost-of-production and setting prices.

Several financial management resources are available to organic vegetable producers. The Organic Farmer's Business Handbook (Wiswall, 2009), a popular book among organic farmers, provides worksheets to assist farmers with the determination of their costs of production. Iowa State University (Chase, 2011) has developed enterprise budgets for small-scale

vegetable farmers, providing spreadsheet templates for a number of crops including asparagus (*Asparagus officinalis*), basil (*Ocimum basilicum*), carrot (*Daucus carota*), cherry tomato (*Solanum lycopersicum*), green bean (*Phaseolus vulgaris*), and sweetpotato (*Ipomoea batatas*). Additionally, the Midwest Organic and Sustainable Education Service (MOSES) published a book entitled Fearless Farm Finances: Farm Financial Management Demystified (Blanchard et al., 2012), which discusses the concepts of farm financial management, such as the establishment of data collection systems, design of a bookkeeping programs, and explanations of standard financial statements. However, Veggie Compass differs from these other resources in that it provides a spreadsheet-based program for data organization and analysis per specific crop and market channel, as well as providing resources to collect farm-specific data necessary for the analyses.

History of Veggie Compass Program

In an effort to address the aforementioned needs related to farm financial analysis and cost-of-production determination, the Veggie Compass project was initiated in 2007. The project began with a Wisconsin organic farmer who approached the University of Wisconsin's Center for Integrated Agricultural Systems (CIAS), asking for a partnership in the development of a whole farm cost accounting spreadsheet for diversified vegetable growers as he could not find an existing program that adequately met the needs of such farmers. At the onset of the project, to ensure that this new tool would be useful and relevant to organic diversified vegetable producers in the upper midwestern United States, the team recruited a panel of ten organic vegetable farmers to better understand the necessary components for a readily implementable cost analysis and whole farm planning tool. Beyond ease of use, common themes emerged, such as the

ability to interface with existing farm accounting programs and the need to be sufficiently flexible to allow growers to enter farm-specific data values.

As a result of these recommendations, the Veggie Compass spreadsheet was developed to facilitate the analysis of farm records. Using farmer-provided cost, sales, and labor data, the spreadsheet calculates the cost of production for each crop, the profitability of each crop, the profitability of each market channel (e.g., CSA, farmer's market, wholesale, retail), and the profitability of each crop within each market channel. With this detailed cost of production information, farmers can more accurately set prices based on cost of production. Once a user has 1 year of data to use as a baseline, the tool can also be used to predict the outcome of future farm scenarios based on changes in crop types, volumes, or markets.

In 2011, the Veggie Compass team commenced another critical partnership for the continuation of its development and outreach with the Southern Sustainable Agriculture Working Group (SSAWG). In collaboration with the Wisconsin organic farmer partner and a new farmer partner from Virginia, SSAWG initiated a series of farmer profitability trainings using the Veggie Compass system. In this process, based on farmer feedback, the SSAWG team members modified the spreadsheets, adding features and text to create a more robust system that is more easily understood from the farmer perspective.

Veggie Compass was developed using Excel 2007 spreadsheet software (Microsoft, Redmond, WA). Six worksheets are linked together, carrying data values throughout the overall spreadsheet and performing various analyses. Users enter their data in the first three input worksheets, each marked by individual tabs at the bottom of the spreadsheet. Information is then generated in the last three output worksheets with calculations based on formulas embedded within the spreadsheet, providing the user with profit

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Units

To convert U.S. to SI, multiply by	U.S. unit	SI unit	To convert SI to U.S., multiply by
0.4047	acre(s)	ha	2.4711
0.3048	ft	m	3.2808
0.0929	ft ²	m ²	10.7639
0.4536	lb	kg	2.2046

and loss figures and breakeven prices for specific crops in specific market channels.

Program description

When the file is opened, Input Sheet One is viewed. At the bottom of the page, there are clickable tabs labeled “Step 1: Expenses Input,” “Step 2: Sales Input,” “Step 3: Production Input,” “Cost of Production,” “Sales Output,” and “Profit and Loss (P & L) by Market Channel.” The Veggie Compass spreadsheet requires the user to input farm data in the first three tabs (steps one through three). On Sheet One (Fig. 1), growers enter farm expenses. Sheet Two (Fig. 2) requires users to enter all sales information for their farming operation. On Sheet Three (Fig. 3), growers enter seed cost, number of transplants, field areas, and production (field growing and harvest/packing) labor hours for each crop.

Throughout the sheets, formulas have been embedded into cells that calculate values based on a farm’s specific data. These formulas are password protected and cannot be changed by the user. The spreadsheet uses information from the three input sheets to calculate each crop’s cost per unit for production through harvest and packing, breakeven prices, gross margins,

unit net profit, and crop net profit by market channel, presenting these values on the spreadsheet’s three output sheets. Growers can use this information to identify crop profitability in each market channel to which they sell. Thus, farmers can adjust their selection of crops grown, the quantity of crop grown, the market channels through which they sell, and prices charged for each crop sold in each market channel.

Several pieces of data are necessary to generate the detailed calculations provided by Veggie Compass. These include total farm expenses (both fixed/overhead and variable costs); farm sales by crop and by market channel; quantity of each crop sold in each market channel; seed cost of each crop; number of transplants grown in the greenhouse for each crop; field growing area of each crop and total area; hours devoted to field production for each crop; hours devoted to harvesting and packing for each crop; hours worked in the greenhouse; “not crop-specific” hours spent in field growing and harvesting/packing; crop-specific costs for field production (e.g., trellising for tomato); and crop-specific costs for harvest and packing [e.g., twist ties for bunching onion (*Allium fistulosum*)]. Farmers should be able to obtain these

values from farm business accounting programs, crop sales, Schedule F or comparable tax documents, farm planning/planting records, and payroll/labor records.

Entering farm data

Input Sheet One is based on the same farm expenses categories as used by the Internal Revenue Service (IRS) Schedule F tax form. These categories include labor expenses (including wages and employee benefits); repair and maintenance of machines, trucks, buildings, and equipment; fuel; general production supply expenses (soil amendments, seeds and plants, pest management, and custom hire costs); additional supply costs for the greenhouse, packing shed, and other uses; purchase of equipment and tools; equipment rental; freight; storage and warehousing; sales and marketing costs; operating expenses, such as property tax, professional development, rent, business insurance, and cost of organic certification; and utility costs. Equipment depreciation is also included as a farm expense, with the user choosing the depreciation amount (and thus the calculation method). For example, the grower may simply use depreciation claimed for taxes or straight-line depreciation calculated as part of a farm accounting system. The

	A	B	C	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Veggie Compass - Whole Farm Profit Management Step 1: Expense Input Page Use this sheet like you would a schedule F tax form. Enter the amount spent on each expense in the Total Cost column. But then allocate that cost to the appropriate farm activities. For example, under wages, the total cost for Clerical & Office labor may be \$15,000 but that should be distributed over General Mgmt. & Admin, CSA, Farmer's Market, Wholesale, Restaurant, Resale as appropriate. All greenhouse, field growing and harvest & pack labor should be recorded in the Pink Production Labor column. Be sure and allocate repair and maintenance of buildings and equipment over the various farm activities as necessary. You may not need all the rows or columns to track expenses on your farm, so use the level of detail that best fits your operation.																
2																	
3	Expenses	Total Costs \$	General Mgmt. & Admin.	Seed	Green house	Field Growing	Harvest & Packing	Production Labor	CSA	Farmer's Market	Wholesale	Stand	Resale	Check			
4	Labor Expense:																
5	Wages:																
6	Clerical & Office													0			
7	Management (owner/other)													0			
8	Machine Shop													0			
9	Production Labor													0			
10	Distribution Labor													0			
11	Work Exchange Labor													0			
12	Worker Bonuses/Gifts													0			
13	Employee Benefits:																
14	Food													0			
15	Employee Housing													0			
16	Visa h2A expense													0			
17	Health & other Personal Ins.													0			
18	Retirement Plan													0			
19	Other													0			
20	Payroll Taxes																
21	FICA - Social Security													0			
22	Worker's Comp													0			
23	FUTA - Fed Unemp													0			
24	SUTA - State Unemp													0			
25	Insurance:																
26	Crop													0			
27	Auto													0			
28	Farm													0			
29	Other Insurance													0			
30	Car & Truck Expense:																
31	Car													0			
32	Market Truck													0			
33	Delivery Truck													0			
34	General Farm Truck													0			

Fig. 1. Screen capture of Input Sheet One of the Veggie Compass cost of production tool for diversified vegetable producers. Farmers enter their overall farm business expenses, similar to the Internal Revenue Service (IRS) Schedule F tax form; community-supported agriculture (CSA), Temporary Agricultural Worker Visa (Visa h2A), Federal Unemployment Tax Act (FUTA), State Unemployment Tax Act (SUTA).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	
1	Veggie Compass - Whole Farm Profit Management			Step 2: Sales Input Page													Step 2: Sales Input Page			
1) From outside records, enter in the cream colored box to the far right the total income for each of the line items in red font (only the red font items- the others will be automatically calculated once you enter crop sales data). 2) Enter your crops and the unit of measure used for each. Some crops may be tracked in different units, so you will need to enter them separately such as bulk sprinrch, bunched sprinrch and bagged sprinrch. 3) Enter the sales dollars received for each crop in each market channel. Total crop sales for each market channel will appear at the bottom of the page and in the cream colored income box to the far right. 4) Enter the number of units sold of each crop in each market channel. The average unit price will automatically be calculated. NOTE: To ensure total CSA sales recorded in column G matches the amount collected for CSA shares/baskets (and entered in cell S6), an adjusted sales function has been added for this market channel (column D). Except for the CSA market channel, total sales for all other market channels will be autofilled in the creamed colored box to the far right, where total income will be calculated automatically.																				
2																				
3	Crop	Unit of Measure Lbs, bunch, head, etc	CSA				Farmer's Market			Wholesale			Stand			Total Crop Sales				
4			Sales (\$)	Adjusted Sales	Units Sold	Average Unit Price	Sales (\$)	Units Sold	Average Unit Price	Sales (\$)	Units Sold	Average Unit Price	Sales (\$)	Units Sold	Average Unit Price	Sales (\$)	Units Sold			
5			\$0		0			0			0			0			\$0	-	Income	Total
6			\$0		0			0			0			0			\$0	-	CSA*	
7			\$0		0			0			0			0			\$0	-	Farmer's Market	\$
8			\$0		0			0			0			0			\$0	-	Wholesale	\$
9			\$0		0			0			0			0			\$0	-	Stand	\$
10			\$0		0			0			0			0			\$0	-	Buy/Resell *	
11			\$0		0			0			0			0			\$0	-	Total Sales	\$
12			\$0		0			0			0			0			\$0	-	USDA Program Payments *	
13			\$0		0			0			0			0			\$0	-	Patronage Dividends*	
14			\$0		0			0			0			0			\$0	-	Interest Income *	
15			\$0		0			0			0			0			\$0	-	Other Income *	
16			\$0		0			0			0			0			\$0	-	Total Income	\$
17			\$0		0			0			0			0			\$0	-		
18			\$0		0			0			0			0			\$0	-	* Insert amount from outside records	
19			\$0		0			0			0			0			\$0	-		
20			\$0		0			0			0			0			\$0	-		
21			\$0		0			0			0			0			\$0	-		
22			\$0		0			0			0			0			\$0	-		
23			\$0		0			0			0			0			\$0	-		
24			\$0		0			0			0			0			\$0	-		
25			\$0		0			0			0			0			\$0	-		
26			\$0		0			0			0			0			\$0	-		
27			\$0		0			0			0			0			\$0	-		
28			\$0		0			0			0			0			\$0	-		
29			\$0		0			0			0			0			\$0	-		
30			\$0		0			0			0			0			\$0	-		
31			\$0		0			0			0			0			\$0	-		
32			\$0		0			0			0			0			\$0	-		
33			\$0		0			0			0			0			\$0	-		
34			\$0		0			0			0			0			\$0	-		
35			\$0		0			0			0			0			\$0	-		
36			\$0		0			0			0			0			\$0	-		
37			\$0		0			0			0			0			\$0	-		
38			\$0		0			0			0			0			\$0	-		
39			\$0		0			0			0			0			\$0	-		
40			\$0		0			0			0			0			\$0	-		
41			\$0		0			0			0			0			\$0	-		
42			\$0		0			0			0			0			\$0	-		
43			\$0		0			0			0			0			\$0	-		
44			\$0		0			0			0			0			\$0	-		
45			\$0		0			0			0			0			\$0	-		
46			\$0		0			0			0			0			\$0	-		
47			\$0		0			0			0			0			\$0	-		
48	TOTAL CROP SALES		CSA	CSA Adjusted			Farmer's Market			Wholesale			Stand			Total Farm Crop Sales				
49			\$0	\$0			\$0			\$0			\$0			\$0				
50																				
51																				
52																				
53																				
54																				
55																				

Veggie Compass tool requires the user to distribute expenses over the various activities (greenhouse, field production, harvest and packing) of the farm business as appropriate. On row three, the farmer must establish names for the various market channels (e.g., restaurant, wholesale, farm stand, retail) used by their operation. The CSA and resale channels are locked, however, due to unique formulas associated with the specific attributes of these market channels. On the final row of the sheet, summaries of both total farm expenses and labor costs for each activity and sales category are provided.

various strategies of pricing the values of each CSA box, with each individual item priced at market price or as relative percentage of the total cost of a share.

among others. In addition to entering labor records, the grower is required to enter the area of each crop planted in acres, row feet, or square feet. Total greenhouse hours and labor hours devoted to field production and harvest and packing tasks not specific to a crop (e.g., primary tillage, sanitation of pack house) are distributed among the crops as a proportion of the total area grown.

Step 3: Production Input Page										
Enter the seed cost and number of plants raised in the greenhouse for each crop. Specify the area planted to each crop, such as acres, row feet or square feet. The same unit must be used for each crop. Then enter the labor hours Field Growing and Harvest & Packing for each crop. If there are Field Growing and/or Harvest & Packing supplies specific to certain crops, enter those values here. From labor records, enter the total Greenhouse labor hours, and the Not Crop Specific (NCS) hours for Field Growing and Harvest & Packing in the blue boxes to the right. The value in the bright yellow box is a calculation of your true labor costs per hour.										
Seed & Greenhouse		Area Planted Pick a Unit:		Field Growing		Harvest & Packing		Actual Labor Cost per Hour		0
Crop	Unit of Measure	Seed Cost (\$)	# of Plants in Greenhouse	Sq Feet	Total Labor hrs by crop	Crop Specific Field Costs - nonlabor (\$)	Total Labor hrs - Harvest & Packing	Crop Specific Harvest & Packing Costs - nonlabor (\$)		
5	0.0									
6	0.0									
7	0.0									
8	0.0									
9	0.0									
10	0.0									
11	0.0									
12	0.0									
13	0.0									
14	0.0									
15	0.0									
16	0.0									
17	0.0									
18	0.0									
19	0.0									
20	0.0									
21	0.0									
22	0.0									
23	0.0									
24	0.0									
25	0.0									
26	0.0									

Total Hrs worked in Greenhouse *
 Total Non-Crop Specific Hrs spent Field Growing *
 Total Non-Crop Specific Hrs spent Harvest & Packing *
 * Insert amount from outside records

Acres
 Row Feet
 Sq Feet

Veggie Compass STEP 1 Expenses Input STEP 2 Sales Input STEP 3 Production Input Cost of Production by Crop Sales Output P & L By Market Cha

Fig. 3. Screen capture of Input Sheet Three of the Veggie Compass cost of production tool for diversified vegetable producers. Farmers enter their crop-specific data detailing the crop-specific labor requirements needed for the field growing, harvest and packing on their farm, as well as labor hours spent on general tasks; 1 lb = 0.4536 kg; 1 ft² = 0.0929 m²; 1 acre = 0.4047 ha; 1 ft = 0.3048 m.

efforts are time-consuming and expensive and often do not generate benefits that exceed the costs; most users are satisfied with a simple method for allocating labor that reasonably approximates the actual labor allocations.

Input Sheet Three provides a key calculation carried through many of the formulas in the spreadsheet—the true production labor costs per hour for the overall farm operation. This value is based on the labor hours entered into Input Sheet Two and the labor expenses entered into Input Sheet One. Thus, this value does not reflect an hourly pay rate, but the overall labor expense for all farm employees, including wages, payroll taxes, and employee benefits.

Calculating costs of production

Output Sheet One (“Cost of Production by Crop”) (Fig. 4) contains calculations for cost of production, detailing the cost to produce each crop through field production and harvest and packing. Protected formulas specific to individual cells use farmer-entered data from the three input sheets to complete the required calculations. In the first three data columns, crops grown, seed costs,

and number of plants produced in the greenhouse are carried over from the Input Sheet Three. A crop’s share of greenhouse expenses is calculated from that crop’s relative proportion of the total transplants produced in the greenhouse. Crop-specific field areas and labor costs for both field growing and harvest/packing are brought over from the Input Sheet Three, with non-crop-specific labor and remaining nonspecific field expenses allocated by field area, and non-crop-specific harvest/packing expenses calculated based on the crop’s proportion of time reported for harvest/packing of as compared with the total. Crop-specific labor costs for field growing are calculated by multiplying actual labor costs per hour (as calculated on Input Sheet Three) and multiplying by field growing crop-specific labor hours. Non-crop-specific labor hours, as allocated by field area, are calculated by multiplying non-crop-specific hours spent field growing (as entered in Input Sheet Three) multiplied by actual labor cost per hour, and multiplying that total by the proportion of field production space devoted to that crop. Allocating non-crop-specific labor hours by field area is a simple

approximation that is easy to implement in the spreadsheet and meets most growers’ needs. However, the approximation is subject to error, such as if the crop requires extra tillage or extra passes to end a cover crop.

Total crop cost up to harvest is provided by summing that crop’s seed cost, that crop’s share of the greenhouse cost, and that crop’s share of the total field growing costs. This cost is valuable as information regarding crop expenses before the labor investment in harvesting the crop. There may be times, depending on market prices in a given production season, that a farmer may choose not to harvest a crop if the costs of harvest are more than the price the farmer would receive by selling the crop. Crop-specific nonlabor costs (e.g., bags for packing, twist ties, etc.) are carried over from Input Sheet Three. The crops share of total harvest and pack costs are calculated by summing crop-specific costs and the non-crop-specific costs as allocated by the proportion of crop.

The last two columns in the Cost of Production sheet calculate the total cost of producing each crop (summing seed and greenhouse costs of each crop, the crop’s share of total field growing costs, and the crop’s share of

Fig. 4. Screen capture of Output Sheet One of the Veggie Compass cost of production tool for diversified vegetable producers. The spreadsheet summarizes values of the crop-specific field growing and harvest/packing labor cost and the total cost to produce each crop per unit; 1 ft² = 0.0929 m².

Output Sheet Two (Fig. 5) calculates the crop cost of production, crop gross margin, unit breakeven price, unit net profit, and crop net profit for each crop within each market channel. Because each market channel has unique expenses associated with it, the unit cost of producing a crop for one market channel can differ from the cost for another market channel. Thus, the crop cost of production is calculated based on the units sold of each crop within each market channel. Sales data, number of units sold, and unit average price for each market channel are carried over from Input Sheet Two. Unit cost of production and total crop cost of production values are carried over from the calculations provided by the Cost of Production sheet. However, these values do not yet include the overhead costs of general management and administration, as well as market channel expenses. Crop gross profit for each market channel is calculated by subtracting

Output Sheet Three (“Profit and Loss” sheet) (Fig. 6) summarizes the sales and costs of the whole farm business and its overall profitability. The percent of total sales in each market channel is calculated to demonstrate the contribution of each market channel to the total farm sales. The crop costs of production for each market channel, as totaled on the sales output sheet, are automatically brought over to Output Sheet Three. Production

The net profit for each market channel is also calculated on this sheet. The total of the unique market channel expenses and the general management and administration are deducted from the gross profit to

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Veggie Compass - Whole Farm Profit Management		Sales Output										Sales Output							
2																				
3	Crop	Unit of Measure Lbs, bunch, head, etc	CSA										Farmer's Market							
4			Sales (\$)	# of Units	Unit Average Price	Unit Cost of Production	Crop Cost of Production	Crop Gross Profit (%)	Unit Break Even Price	Unit Net Profit	Crop Net Profit	Sales (\$)	# of Units	Unit Average Price	Unit Cost of Production	Crop Cost of Production	Crop Gross Profit (%)	Unit Break Even Price	Unit Net Profit	Crop Net Profit
5	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
6	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
7	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
8	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
9	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
10	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
11	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
12	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
13	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
14	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
15	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
16	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
17	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
18	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
19	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
20	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
21	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
22	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
23	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
24	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
25	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
26	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
27	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
28	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
29	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
30	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
31	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
32	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
33	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
34	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
35	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
36	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
37	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
38	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
39	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
40	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
41	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
42	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
43	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
44	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
45	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
46	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
47	U	U \$0	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0	\$0.00	0	0	\$0	\$0.00	\$0	\$0.00	\$0	\$0.00	
48	CSA		Sum CSA Crops Cost of Production				CSA Crops Gross Profit		CSA Crops Net Profit			Farmer's Market		Sum FM Crops Cost of Production		FM Crops Gross Profit		FM Crops Net Profit		
49	\$0.00		\$0.00				\$0		\$0.00			\$0.00		\$0		\$0		\$0.00		

Fig. 5. Screen capture of Output Sheet Two of the Veggie Compass cost of production tool for diversified vegetable producers. The spreadsheet summarized the sales, units sold, average unit price, unit cost of production, crop gross profit, unit breakeven price, unit net profit, and crop net profit for each crop in each market channel; CSA = community-supported agriculture, 1 lb = 0.4536 kg.

Veggie Compass - Whole Farm Profit Management		Farm Profit & Loss by Market Channel						
		CSA	Farmer's Market	Wholesale	Stand	Total From On-Farm Production	Buy-Resell	Grand Total
5	Sales - by Market Channel	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6	Market Channel sales as % of Total sales	\$0	\$0	\$0	\$0	0.00%	\$0	\$0
8	All Production Expenses	\$0	\$0	\$0	\$0	\$0	\$0	\$0
9	Production Expense as % of Mkt Chan sales	\$0	\$0	\$0	\$0	\$0	\$0	\$0
11	Gross Profit	\$0	\$0	\$0	\$0	\$0	\$0	\$0
12	Gross Profit as a % of Mkt Channel sales	\$0	\$0	\$0	\$0	\$0	\$0	\$0
14	Market Channel Expenses	\$0	\$0	\$0	\$0	\$0	\$0	\$0
15	General Mgmt. & Admin. Expenses Allocated to Market Channel	\$0	\$0	\$0	\$0	\$0	\$0	\$0
17	Total Market Channel plus General Mgmt & Admin Expenses	\$0	\$0	\$0	\$0	\$0	\$0	\$0
18	Total MC & GM Exp as % of Mkt Chan sales	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20	NET PROFIT	\$0	\$0	\$0	\$0	\$0	\$0	\$0
21	Net Profit as % of Mkt Channel Sales	\$0	\$0	\$0	\$0	\$0	\$0	0%
22	Net Profit as % of Total Net Profit	\$0	\$0	\$0	\$0	\$0	\$0	0%
24	Non Operating Income							
25	USDA Program Payments							\$0
26	Patronage Dividends							\$0
27	Interest Income							\$0
28	Other Income							\$0
29	Taxable Income							\$0

Fig. 6. Screen capture of Output Sheet Three of the Veggie Compass cost of production tool for diversified vegetable producers. Based on farm-specific data entered into Input Sheets One through Three, the spreadsheet calculates and summarizes sales, production expenses, gross profit, net profit, and taxable income per market channel; CSA = community-supported agriculture.

reveal the net profit. The net profit provides the dollar value of the profit or loss for each market. The percentage of sales that is net profit is provided to reveal the profitability of each market channel. The percentage of total net profit for each market channel is calculated to show the contribution of each market to the farm's total net profit. Nonoperating income, as entered into the Sales Input sheet, is automatically brought over to the profit and loss sheet. Finally, taxable income is calculated by adding total farm net profit and the nonoperating income.

Farmer feedback: Program use and validation

Since 2008, the Veggie Compass program has been trialed using actual annual farm expenses and labor data from five organic diversified vegetable farms in the upper midwestern United States. These farms represented the average size and scope of the certified organic vegetable farms in the region. The project team met with each of the participating farmers to assist with the entry of information into the spreadsheet, gathering information as to where further clarity was needed with respect to spreadsheet use. In addition, the project team consulted with the farmers as to the validity of the calculations provided by the spreadsheet and the applicability of the numbers to future farm business and management decisions.

Beyond outreach efforts in the upper midwestern United States, the Veggie Compass tool has been integrated into farm-management and cost-of-production workshops in other areas of the United States, particularly in the southeastern U.S. SSAWG, with funding from a USDA Risk Management Education grant, held four "Growing Farm Profits" workshops in 2012 to 2013 that were attended by 236 producers. Growers attended this workshop anticipating integrating the labor and harvest collection worksheets and the Excel-based spreadsheet into their farm-management operations during the following season. Comments submitted on postworkshop surveys distributed six months following the workshop included the following:

"The workshop has had a great impact on how I think about my

farming operation. We are [now] tracking costs in each enterprise and thinking more about profit margins. [We are] trying to use this information to make better decisions about what to grow and what to sell. [We] started a new enterprise this year based on our estimates that it could be more profitable than other things we have been raising."

"I have changed my method of keeping records. I started looking at the things I needed to record from a different perspective- not just cost of seed, but literally from start to finish of each of our products. To include labor, time, water, etc. in order to see if we are breaking even or making a profit and how much of one... Your course made me look at things from a different point of view. I felt smarter and more informed of what I need to improve my farm."

"I'm not a farmer, but an educator. Part of my work consists of providing outreach, training and technical assistance to small farmers and ranchers in Texas. The CD and the ideas behind Veggie Compass and Growing Farm Profits are very powerful. Probably the stronger element of Veggie Compass is the profit analysis by marketing channels... I have been talking to farmers about Veggie Compass and other similar spreadsheets to highlight all of the elements they should consider to keep records on. It is an eye opener for them."

Future program development

The Veggie Compass program continues to evolve. The project team has thus far validated the program with three farmers located in the upper midwestern United States. This consisted of a full-day session of consulting with the farmers, confirming correct data entry, and discussing program output. Thus far, the greatest variation in the data occurs with the calculation of labor hours per crop and activity, which, according to farmer input, can vary up to 25% from timesheet values. However, farmers have confirmed that the data has allowed them to undertake informed changes in their marketing and production strategies. During the 2014 vegetable production season in Wisconsin, the project team will collaborate with a coalition of CSA farmers to further test methods to allow for accurate collection of crop-specific labor data, the most significant hurdle to

the widespread implementation of this program. Alternative strategies of collection, such as focusing collection on key activities throughout the growing season, grouping crops with similar production characteristics, and creating benchmark values applicable to farms of different sizes and levels of mechanization will be explored.

Although originally designed for organic producers in the upper midwestern United States, this tool can be used by diversified vegetable producers across the United States. The spreadsheet is available online (CIAS, 2013) and is free to download, along with an accompanying user manual and data collection forms. CIAS maintains the spreadsheet and the website, ensuring updates occur as necessary.

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