



## SCENARIO 2A (3 MONTH) – ORG. SPINACH OR LETTUCE

This scenario considers planting a cover crop and maintaining it over a two-month period in the spring or summer before terminating it and prepping the ground for the next commercial crop. The total lost opportunity of commercial production is represented by certified organic (COG) spinach or leaf lettuce and would occur over a three-month period. The distinction between this scenario and Scenario 3 is the COG certification.

### FOREGONE REVENUE ASSUMPTIONS

The primary cost to the grower of cover cropping is the foregone revenue from spinach or lettuce, as shown in the table below.

### Per-Acre Net Returns of Foregone Crops – Scenario 2a

	<u>COG Spinach</u>	<u>COG Leaf Lettuce</u>
Yield	5,000 - 7,200 lbs	700 - 740 boxes
Price	\$1.55 - \$2.22 / lb	\$11.50 - \$18.70 / box
Gross Returns	<b>\$11,400 - \$14,300</b>	<b>\$12,000 - \$16,400</b>
Seeding	\$1,980	\$165
Fertility	\$630	\$855
Labor (non-harvest, \$16.10 / hr)	\$721	\$871
Harvest	\$1,160 - \$1,380	\$5,150 - \$5,640
Water (Spin: 8 ac-in, Let: 17 ac-in)	\$160	\$370
Other Operating Costs	\$870	\$740
<b>Total Operating Costs</b>	<b>\$5,520 - \$5,730</b>	<b>\$8,140 - \$8,660</b>
Land Rent	\$1,000 - \$1,700	\$1,000 - \$1,700
Other Cash Overhead	\$144	\$500
<b>Total Cash Overhead</b>	<b>\$1,200 - \$1,600</b>	<b>\$1,600 - \$1,930</b>
<b>Non-Cash Overhead</b>	<b>\$218</b>	<b>\$130</b>
<b>Total Costs</b>	<b>\$7,050 - \$7,450</b>	<b>\$9,970 - \$10,600</b>
<b>Net Returns by Crop</b>	<b>\$4,260 - \$6,950</b>	<b>\$1,960 - \$5,830</b>
<b>Total Annual Foregone Revenue</b>	<b>\$3,500 - \$5,900</b>	

Based on these cost and return estimates, in planting a cover crop instead of spinach or lettuce commercial crops, **growers would most likely be foregoing \$4,700 per acre** with a potential range (80 percent chance) of foregoing \$3,500 and \$5,900 during the three month period. The range aims to represent the diversity of net returns experienced by growers in the Pajaro Valley, while the most likely value is the estimated most common value experienced across the valley.

### COVER CROP COSTS

Another private cost that growers would face in following this scenario would be costs to establish, maintain and incorporate in the cover crop during the three-month period in the spring or summer. These activities would most likely cost \$245 per acre with a potential range (80 percent chance) of between \$130 and \$375 per acre.

### TOTAL COSTS TO GROWER

Combining the cover crop cost with the foregone revenue costs, total costs to the grower are most likely \$4,950 with the range between \$3,800 and \$6,200 per acre over the three-month period. Note that the most likely value is approximately the sum of the most likely cover crop cost and the most likely foregone revenue cost, but that the range is not the sum of the lowest and highest values, as it is unlikely that any individual grower in a given year would experience together the lowest (or highest) foregone revenue *and* the lowest (or highest) cover cropping costs.

### POTENTIAL YIELD IMPROVEMENTS – PRIVATE BENEFITS

Literature suggests that cover cropping can influence the yields of subsequent crops by affecting: pest and disease pressure, short-term nitrogen availability (especially for nitrogen fixing crops), long



term soil texture and fertility (especially for crops with high carbon-nitrogen ratios), soil loss, and other factors. Studies suggest that the potential short-term adverse yield impact of cover cropping may be up to a 19 percent yield reduction, from cover crops with a high carbon-nitrogen ratio taking an extended period of time to break down in the soil. Literature also suggests the longer term impact of cover cropping is a yield increase, potentially up to nearly 90 percent (Burket, 1997) (Ngouajio, 2003). However, there is uncertainty what the specific yield benefits would be in the Pajaro Valley under current management practices. As such, we cap the positive impact of cover cropping at the maximum yields that UCCE publications suggest are attainable (high-end of their yield sensitivity tables). This is up to a 10 percent increase for spinach and 50 percent increase for lettuce. The financial model suggests the net impact of these increased yields would most likely be \$1,200 per acre (25 percent increase) that could partially offset the costs to the grower.

### WATER SAVINGS & RELATIVE COSTS PER UNIT

Water use for the crops, based on UCCE publications (Tourte L. a., 2015) (Tourte, Sample Costs to Produce Organic Leaf Lettuce, 2009), as well as discussions with growers (Dennis Lebow, 2016) and PVWMA, is estimated at 8.8 inches for spinach and 17 inches for leaf lettuce. While the cover crop is not expected to use water in the most likely situation for this scenario, it is modeled to use up to four inches at most. In total this scenario would likely save 12 inches of water, or one acre foot. Based on the total costs presented above, this scenario would be equivalent to a **most likely water value savings of \$4,610 per acre-foot**, with a range of \$3,500 to \$5,700 per acre-foot. Of the four scenarios found to likely result in water savings, this scenario ranks as the most expensive per unit of water that would be conserved. Like Scenario 3, the relative

short term duration of this scenario would also cause potential difficulties in experiencing additional benefits from the program being implemented. However, in the event that a cover crop program is implemented, organic producers should not be excluded as this group of growers has other incentives for cover cropping and fallowing, and this concept is likely to fit into a long term management plan for certified organic production.

### SUMMARY PER ACRE COSTS AND BENEFITS

Value Type	Foregone Crop Revenue	Cover Crop Cost	Total Cost	Water Savings (AF)	Value per AF
Range (80% Chance)	\$3,500 - \$5,900	\$130 - \$375	\$3,800 - \$6,200	0.7 – 1.1	\$3,500 - \$5,700
Most Likely	\$4,700	\$245	\$4,950	1.1	\$4,610

### REFERENCES

- Burket, J. Z. (1997). Winter Cover Crops and Nitrogen Management in Sweet Corn and Broccoli Rotations. *HortScience* 32, no. 4, 664-668.
- Dennis Lebow, Dick Peixoto, Mara Miller, Jason Morgan, Arturo Diaz, Paul Furot, and Dean Sakae (2016, April). Farm Managers in Pajaro Valley. (T. Greenwalt, Interviewer)
- Ngouajio, M. M. (2003). Effect of Cover Crop and Mangement System on Weed Populations in Lettuce. *Crop Protection*, 57-64.
- Tourte, L. a. (2015). *Sample Costs to Produce and Harvest Organic Spinach*. University of California Cooperative Extension.
- Tourte, L. R. (2009). *Sample Costs to Produce Organic Leaf Lettuce*. University of California Cooperative Extension.

