



SCENARIO 3 (FULL YEAR) – BROCCOLI / LEAF LETTUCE

This scenario considers planting a cover crop and maintaining it over an eight-month period before terminating it and prepping the ground for the next commercial crop. The total lost opportunity of commercial production is represented by a rotation including broccoli and leaf lettuce over a one-year period.

FOREGONE CROP REVENUE

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

Per-Acre Net Returns of Foregone Crops – Scenario 3

	Broccoli	Leaf Lettuce
Yield	750-820 boxes	600 - 900 cartons
Price	\$7.60 - \$12.00 / box	\$12.15 - \$17.14 / carton
Gross Returns	\$6,840-\$8,670	\$9,960 - \$12,990
Seeding / Transplant	\$550	\$265
Fertility	\$230	\$387
Labor (non-harvest, \$16.10 / hr)	\$1,400-\$1,600	\$588
Harvest (labor & mat.)	\$2,220-\$2,320	\$5,200 - \$6,400
Water (broc: 20 ac-in, let: 15 ac-in)	\$435	\$305
Other Operating Costs	\$794	\$1,776
Total Operating Costs	\$5,850-\$6,020	\$8,200 - \$9,400
Land Rent by Crop Period	\$1,000 - \$1,700	\$1,000 - \$1,700
Other Cash Overhead	\$370	\$435
Total Cash Overhead	\$1,460 - \$1,800	\$1,400 - \$2,100
Non-Cash Overhead	\$174	\$324
Total Costs	\$7,560-\$7,940	\$10,200 - \$11,400
Net Returns by Crop	(\$500)-\$1,250	(\$400) - \$1,700
Total Annual Foregone Revenue	(\$310) - \$2,370	

Based on these cost and return estimates, in planting a cover crop instead of broccoli and lettuce commercial crops, **growers would most likely be foregoing \$1,000 per acre.** While the model indicates

possible loss of income from operations, this is expected to occur infrequently; the potential range (80 percent chance) of foregone revenue in this scenario is between (\$310) and \$2,370.

COVER CROP COSTS

Growers would also incur costs to establish, maintain and incorporate the cover crop during the eight-month period. Growers could either establish one cover crop and let it go to seed, or incorporate the first cover crop before it goes to seed and establish a second cover crop. These activities would most likely cost \$300 per acre with a potential range (80 percent chance) of between \$166 and \$465 per acre.

TOTAL COSTS TO GROWER

Combining the cover crop cost with the foregone revenue costs, total costs to the grower are most likely \$1,300 per acre with the range between \$(10) and \$2,370 per acre per year. 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 cycles and disease pressure, short-term nitrogen availability (especially for nitrogen-fixing cover 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 16 percent yield increase for broccoli, and up to a 35 percent increase in yield for lettuce. This suggests that the long-term impact of cover cropping may be an increase of approximately \$240 in profit per acre per year that could partially offset the costs to the grower.

WATER SAVINGS & RELATIVE COSTS PER UNIT

Water use for the crops, based on UCCE publications (Surendra, 2012) (Smith, 2009) , as well as discussions with growers (Lebow, 2016) and PVWMA, is estimated at 20 acre inches while leaf lettuce is an additional 15 acre inches for a total of 35 acre inches per year. 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 eight inches at most. In total, this scenario would likely save just under 34 acre-inches of water per acre, or 2.8 acre feet. Based on the total costs presented above, this scenario would be equivalent to a **most likely water value savings of \$465 per acre-foot**, with a range of \$(7) to \$957 per acre-foot. In addition, the duration of this scenario would likely ensure that benefits from the program are additional, and fallowing would not have been practiced without this program.

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)	\$(310) - \$2,370	\$166 - \$465	\$(10) - \$2,670	2.5 – 3.0	\$(7) - \$957
Most Likely	\$1,000	\$300	\$1,300	2.8	\$465

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 Faurot, 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.
- Smith, R. a. (2009). *Sample Costs to Produce Romaine Hearts Leaf Lettuce*. University of California Cooperative Extension.
- Surendra, D. a. (2012). *Sample Costs and Returns to Produce Broccoli*. University of California Cooperative Extension .