Economic Consideration of Alternatives to Fumigation and Second Year Strawberries

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Cost of Steam as an Alternative to Fumigation

Factors Impacting the Cost of Steam

- Machine cost
  - Machine manufacturer's cost
  - Repair costs
  - Hours of life
  - Acres treated per year
- Operating costs
  - Gallons per treated acre and cost per gallon
  - Labor hours and cost per hour
  - Transportation of the steam machine

Hours for Steam Application at Varying Field Sizes and Buffer Widths

Field Size/ Buffer Width	5 Acres		10 Acres		20 Acres		40 Acres	
	Buffer *	Hours	Buffer	Hours	Buffer	Hours	Buffer	Hours
25 ft	.3	2.1	.4	3.0	.5	4.3	.8	6.1
50 ft	.5	4.3	.8	6.1	1.1	8.6	1.5	12.1
100 ft	1.1	8.6	1.5	12.1	2.1	17.1	3.0	24.2
200 ft	2.1	17.1	3.0	24.2	4.3	34.3	6.1	48.5
300 ft	3.2	25.7	4.5	36.4	6.4	51.4	9.1	72.7

* Size of buffer zone in acres.

Steam Applicator Cost Estimate

		Annual Cost	Cost per Acre		
			3 acres	7 acres	10 acres
Machine cost	$208,000	$35,600			
Annual repair cost	$4,200	$4,200			
Years of life	7 years				
Acres per year	280				
Hours of life	15,680 hours				
Total Machine Cost		$39,800			
Cost per Acre			$142	$142	$142
Transportation	$600		$200	$86	$60
Total Cost per Acre			$342	$230	$202

Steam Operating Costs

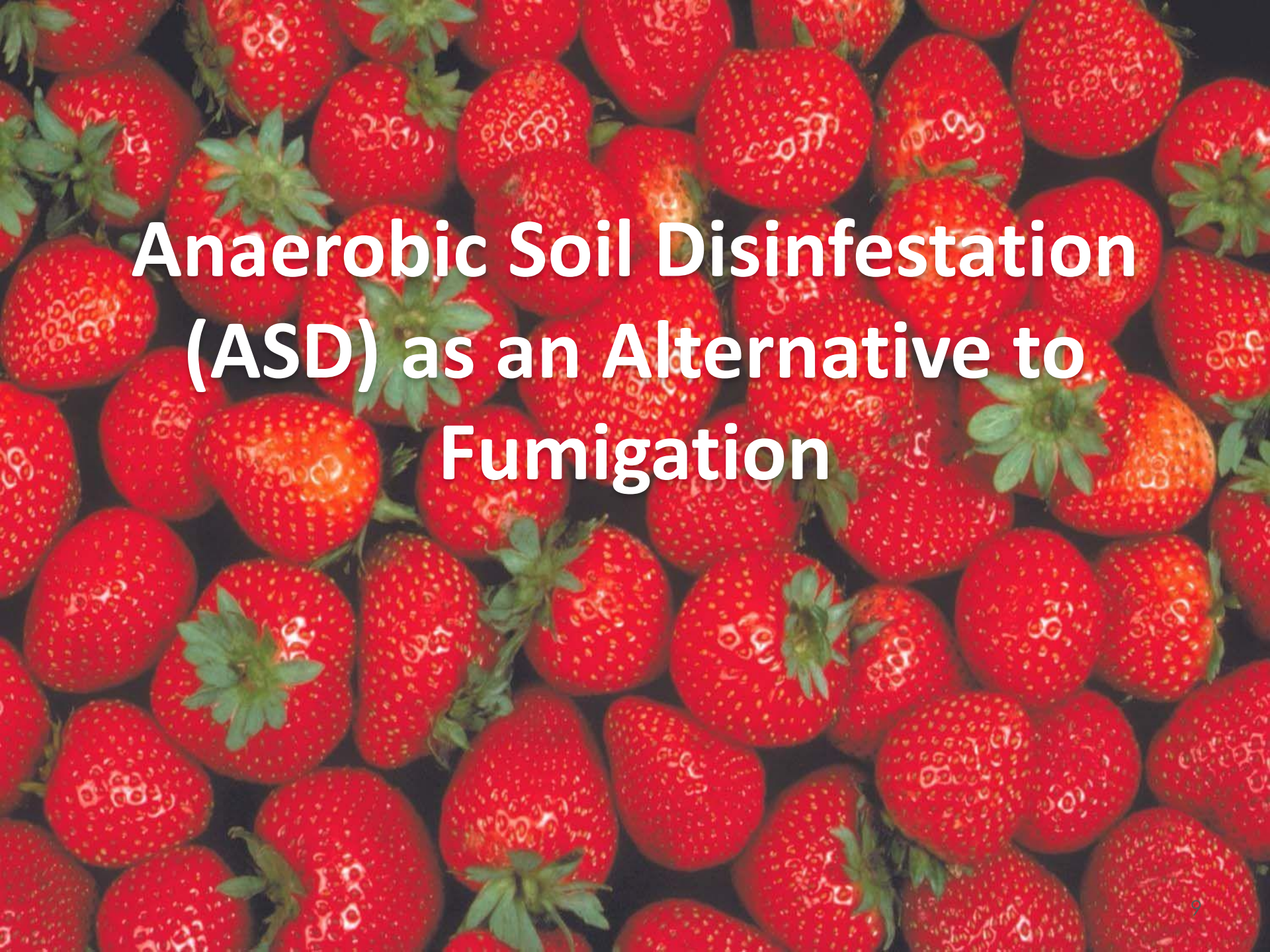
	Units/acre	$/Unit	$/Acre
Fuel	1,561 gallons	$2.61	$4,074
Labor	8 hours	$14.52	$211
Total			$4,285

Steam Cost per Acre Treated

	Cost per Acre		
	3 acres	7 acres	10 acres
Cost per Acre	$142	$142	$142
Transportation	$200	$86	$60
Machine Cost per Acre	**$342**	**$230**	**$202**
Fuel	$4,074	$4,074	$4,074
Labor	$211	$211	$211
Total operating cost	**$4,285**	**$4,285**	**$4,285**
Total cost per acre	**$4,627**	**$4,515**	**$4,487**

Revenue, Costs, and Net Returns per Acre Using Steam vs. Fumigation

	Steam Higher Yield	Steam Same Yield	Fumigation Non TIF Tarp	Fumigation TIF
Gross Revenue	$33,589	$30,653	$30,653	$30,653
Total Costs	$30,526	$30,526	$27,708	$28,008
Net Returns	$3,063	$127	$2,645	$2,945


Anaerobic Soil Disinfestation (ASD) as an Alternative to Fumigation

Santa Maria 2012 Trial

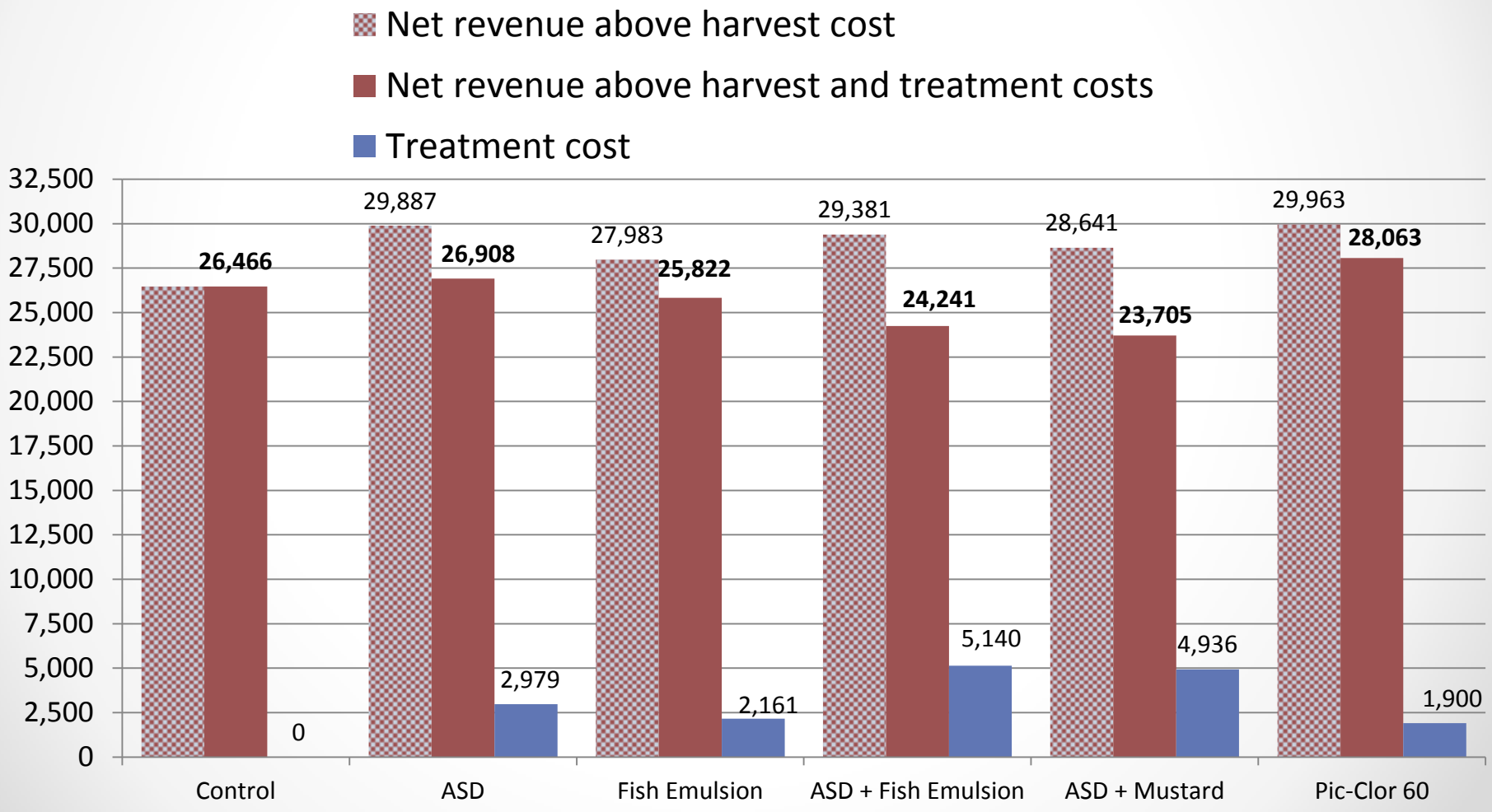
Treatment	Materials per Acre	ASD Water (AI/A)
Control		
ASD	Rice bran - 9 tons	3 acre inches
Fish Emulsion	True 4-0-2, 411 gallons	
ASD + Fish Emulsion	Rice bran – 9 tons True 4-0-2, 411 gallons	
ASD + Mustard	Rice bran – 7.5 tons Mustard cake – 1.5 ton	3 acre inches
Pic-Clor 60	300 pounds broadcast	

Santa Maria -Treatment Costs per Acre

	Rice bran	Mustard or Fish emulsion	Shipping	Water	Install drip*	Fumigate	Total
ASD	$2,565		$360	$54			$2,976
Fish Emulsion		$1,829			$332		$2,161
ASD+Fish Emulsion	$2,565	$1,829	$360	$54	$332		$5,140
ASD+ Mustard	$2,138	$2,400	$345	$54			$4,936
Pic-Clor						$1,900	$1,900

*Installation of extra drip lines for fish emulsion plots. Original lines were clogged and had be replaced.

Santa Maria 2012
Partial Costs and Net Returns
($ per Acre)



Santa Maria Results

- All treatment yields were higher than the control.
- ***ASD had equivalent yields to Pic-Clor.***
- Adding mustard seed meal or fish emulsion to ASD decreased yields.
- Pic-Clor 60 showed the highest net returns above harvest and treatment costs followed by ASD with rice bran only and then fish emulsion only.


Economic Consideration for
Second Year Strawberries

Sample Costs to Produce Strawberries and Sample Costs to Produce Second Year Strawberries – Santa Cruz and Monterey

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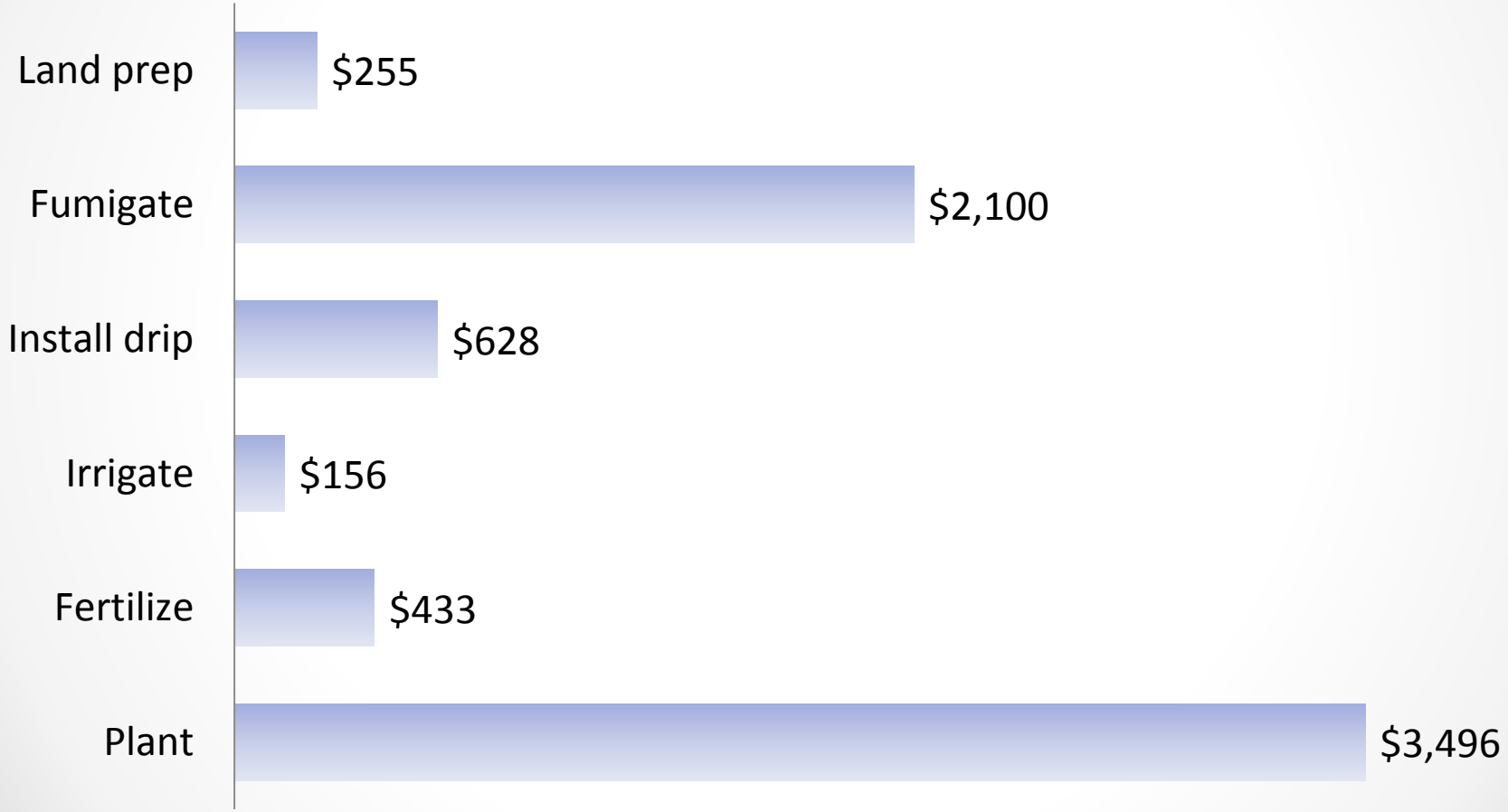
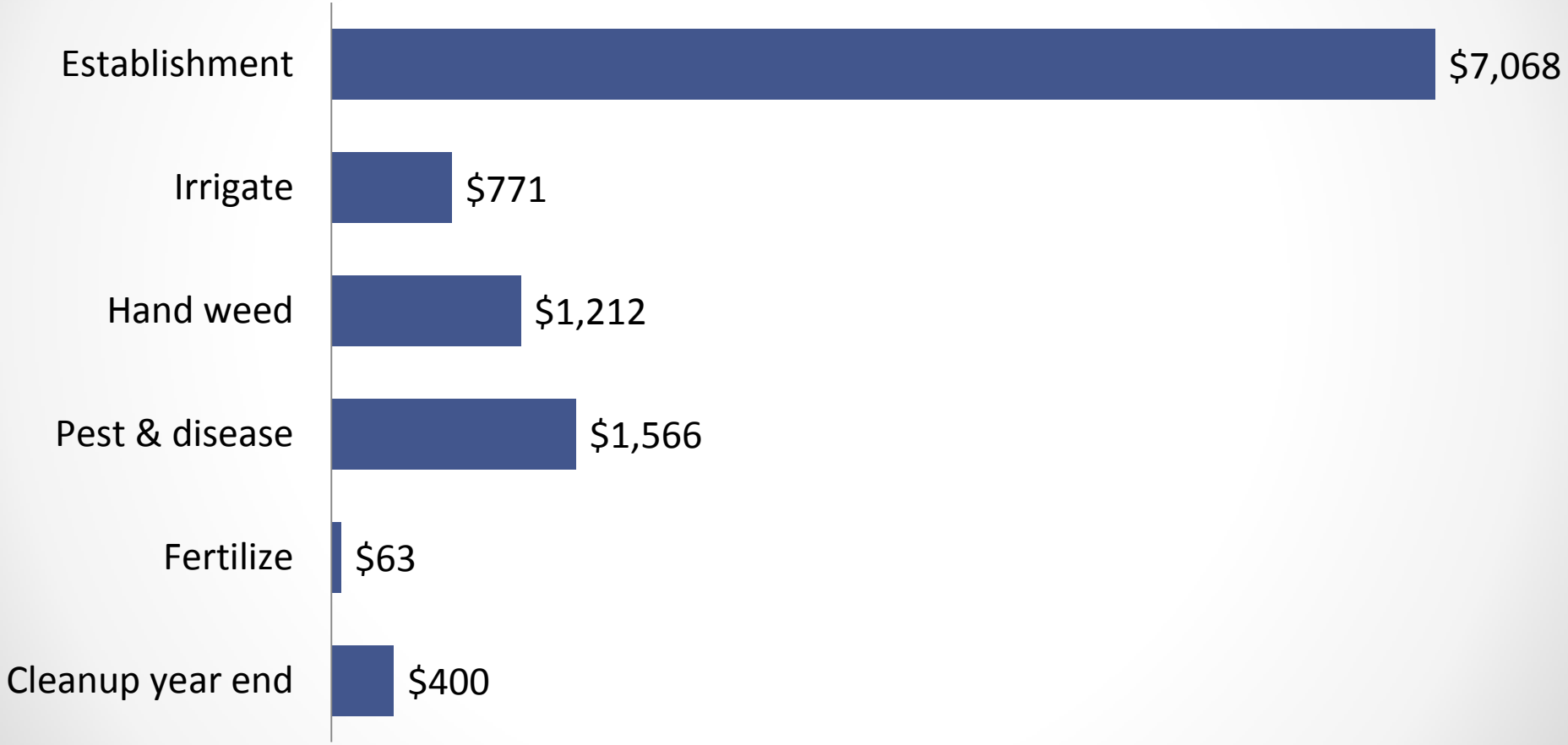
First Year Establishment Assumptions

- 50 acres of rented land, 43 are strawberries
- Land prep – disc 8X, chisel 4X, subsoil 3X
- 48 inch wide beds, 12 inches high, 2 rows per bed
- 21,780 plants per acre
- Broadcast fumigation
- Plastic mulch is laid on the bed prior to planting
- Planting requires 20 or more man hours per acre
- Fertilization preplant – slow release fertilizer drilled into beds
- Fertilization post plant – March – Sept. through drip
- Irrigation planting: sprinkler preplant and establishment

First Year Costs Through Planting
$7,068 per Acre



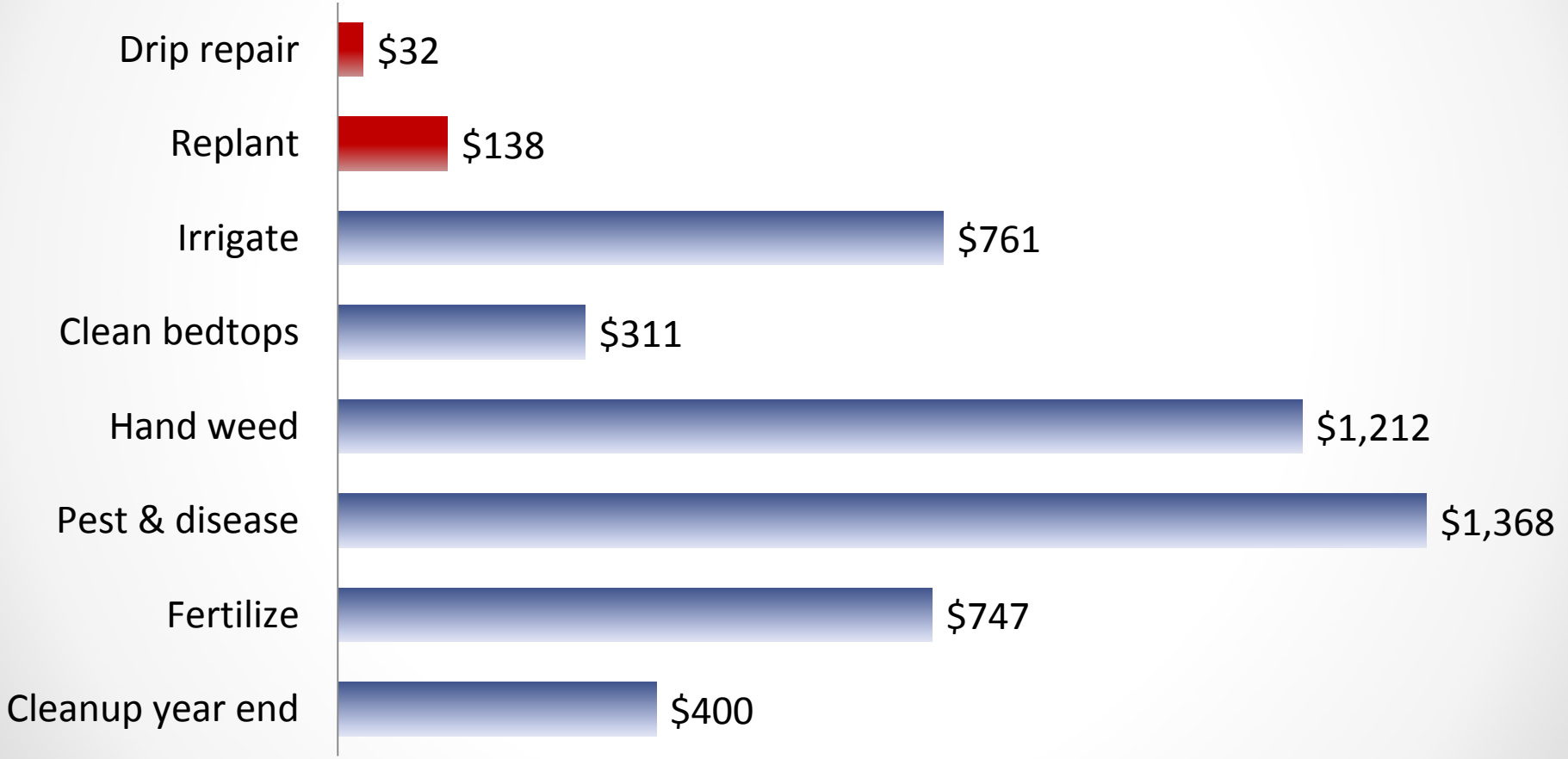
First Year Production
$11,080 per Acre



- Establishment = costs through planting

Second Year Production

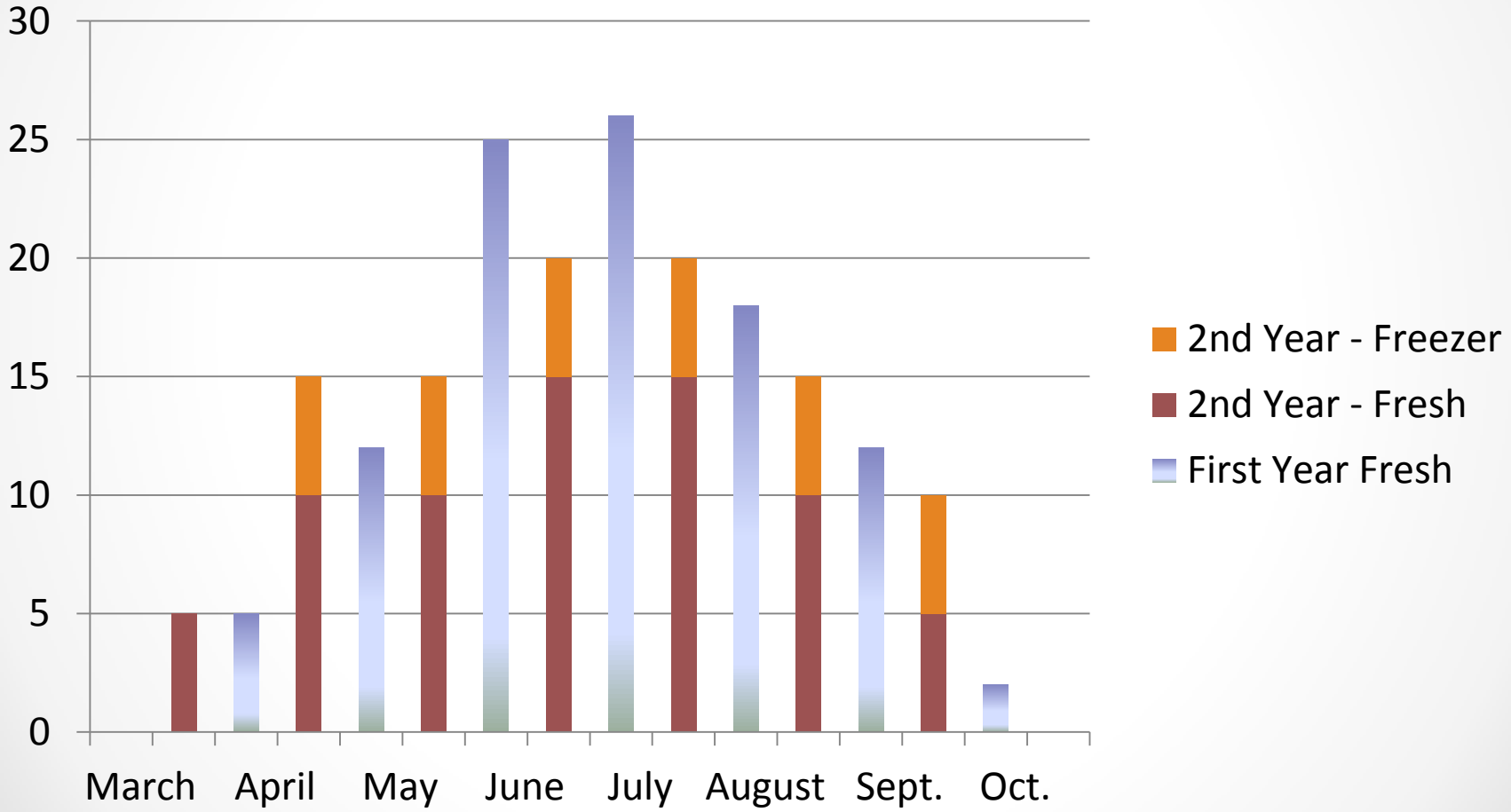
$4,969 per Acre



Comparison of First and Second Year Production Costs per Acre

	First Year	Second Year
Establishment/Replant	$7,068	$138
Drip repair		32
Clean bedtops		311
Hand weed	1,212	1,212
Pest and disease control	1,566	1,368
Fertilize	63	747
Irrigate	761	771
Cleanup year end	400	400
TOTAL	$11,080	$4,969

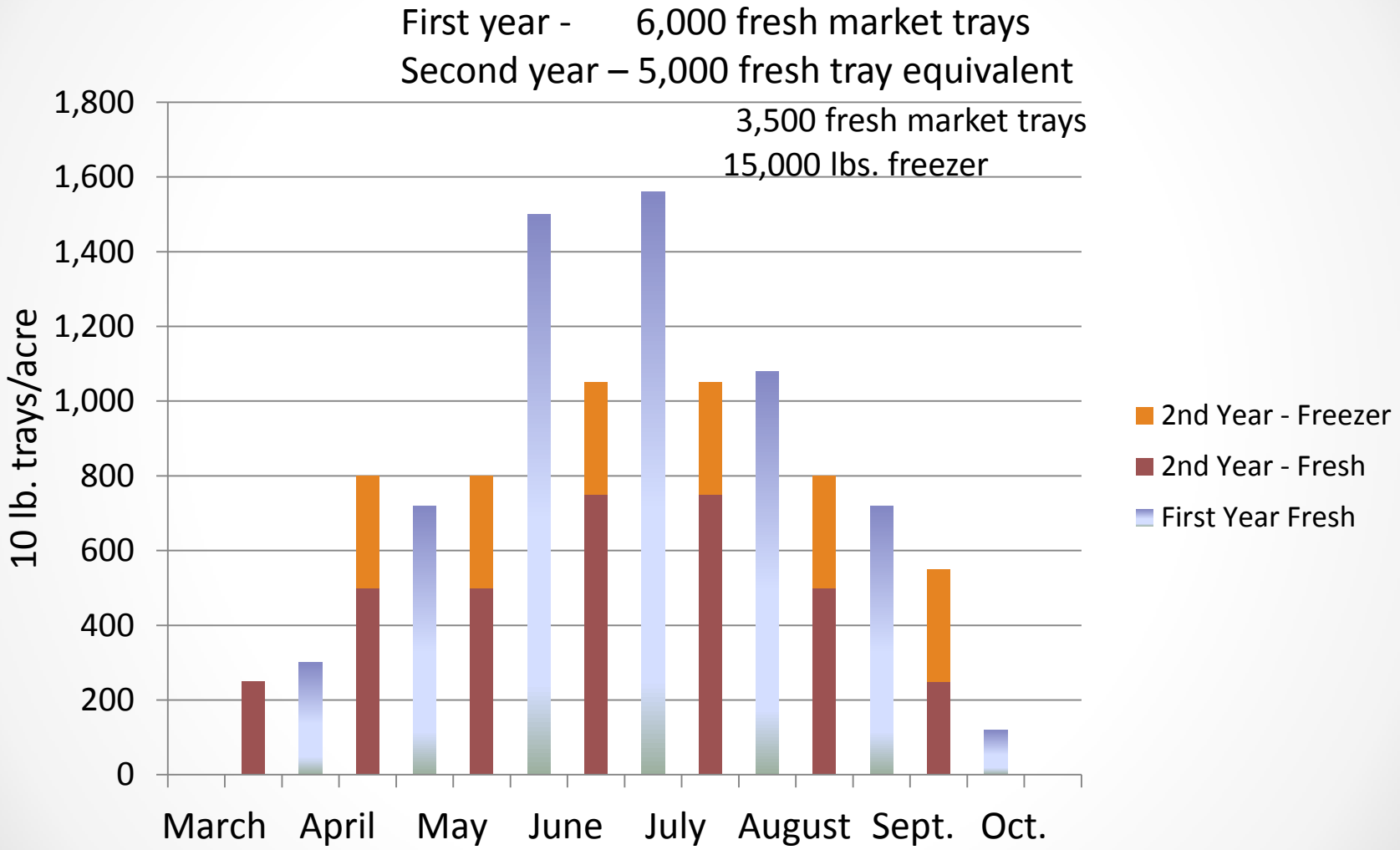
Percent of Crop Harvested by Month



Yield per Acre

	First Year	Second Year	Difference
Fresh market trays	6,000 trays	3,500 trays	2,500 trays
Freezer pounds		15,000 pounds	
Freezer tray equivalent		1,500 trays	
Total tray equivalent	6,000 trays	5,000 trays	1,000 trays

Trays Harvested by Month



Comparison of First and Second Year Revenue per Acre

	First Year	Second Year	Difference
Fresh market trays	6,000 trays	3,500 trays	2,500 trays
Freezer pounds	0	15,000 pounds	
Fresh market price	$8.30 /tray	$8.00*/tray	$.30/tray
Freezer price	NA	$.32/pound	NA
Fresh revenue	$49,800	$28,000	$21,800
Freezer revenue	$0	$4,800	-$4,800
Total Revenue	$49,800	$32,800	$17,000

* The second year price is lower because late season berries for the second year can be smaller and in some cases the quality may decline.

Comparison of First and Second Year Revenue per Acre

	First Year	Second Year	Difference
Total Revenue	$49,800	$32,800	$17,000
Production cost	$11,080	$4,969	$6,111
Net Revenue	$38,720	$27,831	$10,889

When do second year berries make sense?

- Available funds for production are limited.
- Available funds can be used for a better purpose.
- Disease and pest pressures in the first year are **not** high.
- Market outlets are not compromised.
- Buyers do not demand highest quality fruit.
- The price premium for quality is relatively low, possibly in a year when overall production is down.

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