

S. J. Valley

**COST ANALYSIS FOR GRANNY SMITH APPLES - Trellised  
1986**

Since Granny Smith is relatively new to California and apples are generally new to the central valley, this cost study is based on many assumptions. Therefore, actual costs may vary considerably based on yield, selection of spray materials, training/trellis method, size and amount of equipment, irrigation method, land, terrain and other practices. The cultural methods listed are intended to promote productivity and produce fruit mainly for the fresh market. The following assumptions were used in this study:

**ASSUMPTIONS**

1. Pre-Plant Investment - Land purchased at \$3000/acre plus new machinery, irrigation systems, well, trellis (if used), and buildings. Property taxes are 1% per year. Trees are planted in 80 acre blocks with 75 acres producing. (5 acres for drive-rows and turning and loading areas.)
2. Planting - 340 trees/acre, 8' x 16'. Tree replacement at 10 trees/acre 2nd yr; 6 trees/acre 3rd yr; and 3 trees/acre the 4th yr.

3. Irrigation - An overhead aprinkler system is used. Water is pumped from a 800 ft well, and is applied according to the following schedule:

YEAR	ACRE INCHES/ACRE
1st	30 inches
2nd	40 inches
3rd	50 inches
4th	60 inches
Mature	60 inches

4. Fertilizer - Fertilizer is applied in the following amounts:

YEAR	MATERIAL/TREE	MATERIAL/ACRE
1st	1/4 lbs actual N	85 lbs actual N
2 +	1/2 lbs actual N	170 lbs actual N *

\* If vigorous growth and/or bitter pit are a problem you should reduce the amount of nitrogen applied.

5. Herbicide - Strip application is made annually after the first year's growth. Hand hoeing is done around the tree base the first year only.
6. Cover Crop - A natural cover is used, established the second year. Mow 6 times.

7. Insect and Disease Control -  
 PESTICIDE APPLICATION FOR GRANNY SMITH APPLES

YEAR	PEST AND APPLICATIONS	MATERIAL COST
1	1. Aphid	\$12
2	1. Mildew	5
	Aphid	12
	Total	17
3	1. Dormant	22
	2. Mildew/Scab	17
	3. Fireblight	5
	4. Mildew/Scab	17
	Codling Moth	12
	5. Codling Moth	12
	6. Miticide	12
	Codling Moth	12
	7. Codling Moth	12
	Total	121
4+	1. Dormant	22
	2. Scab/Mildew	17
	3. Fireblight	5
	4. Fireblight	5
	5. Codling Moth	12
	Scab/Mildew	17
	6. Codling Moth	12
	7. Codling Moth	12
	Miticide	12
	8. Codling Moth	12
	Total	126

Application Costs @ \$10 each

8. Pruning, Training, Suckering and Thinning : Fruit and Flower Removal - Flowers and fruits are removed by hand the first two years to encourage vigorous growth.

For the mature orchard, 30 hrs/acre of hand thinning is required, plus three hours of supervision.

Labor hours include pruning for all years and tying for trellised apples.

YEAR	THINNING, PRUNING, SUCKERING AND TRAINING HRS/ACRE
1	10 hrs skilled labor + 3 hrs unskilled
2	30 hrs skilled labor + 2 hrs unskilled
3	40 hrs skilled labor
4	50 hrs unskilled + 5 hrs supervisory labor

9. Pollination - 2 hives per acre starting in the third year, at \$20/hive

10. Gopher Control - \$20/acre, which includes \$1/acre for bait, \$7/acre for machine, and \$2/acre for labor to run gopher machine and \$10/acre in labor for trapping.

11. Yields - The assumed gross yields per training method are:

YEAR	TRELLIS TONS/ACRE	FREE-STANDING TONS/ACRE
3	5	3
4	9	6
5	12	9
6	15	12
7	18	16
8	20	20

The yields in the third and fourth years are included in the establishment study as a credit to offset the costs incurred that year. The income from the apples is subtracted from the costs to calculate total costs.

12. Packout - From limited experience, it appears that because of sun damage as well as other factors, not all fruit will be packable. While actual packouts may depend on management, training system, location of orchard, etc., a typical packout might be 60% (40% of fruit going to processing).

13. Packing, Processing and Marketing - Costs are not included in this study.

14. Interest - Interest rates are assumed to be 12.5%/year. Interest is also charged on the annual operating costs for six months of each year and on accumulated costs from previous years in the establishment study.

In the production study interest is charged on the cost of establishing the orchard to reflect the income foregone by keeping capital tied up in the orchard.

15. Depreciation - Straight line depreciation is used with no salvage value.

16. Labor Rates - Tractor and supervisory labor is \$7.50/hr. Field labor is \$5.75/hr. These include Unemployment Insurance 3.5%; Social Security 6.7%; Disability and Workmen's Compensation 7.4%.

**Trellised Granny Smith Apples  
Establishment Costs  
1986**

Costs are for an orchard planted with 340 trees per acre, 8' by 16'.  
An overhead sprinkler system is used.

Skilled labor                      \$7.50  
Field Labor                        \$5.75

	-----Costs Per Acre-----			
YEAR	1st	2nd	3rd	4th
YIELD: tons per acre	---	---	5	9

**PLANTING COSTS:**

Land Preparation- subsoil & disc	150				
Fumigation: \$300/acre+\$20 app fe	320				
Layout	25				
Trees: 340 @ \$4.50 (+10 2nd yr +6 3rd yr, +3 4th yr all @\$5.50)	1530	55	33	17	
Tree protectors, \$.07 each	24	1			

Planting: 340 @ \$1.00/tree (+10, 2nd yr; + 6, 3rd yr; +3, 4th yr all @ \$1.50)	340	15	9	5	
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**CULTURAL COSTS:**

Training and pruning	92	237	300	325	
Ties - \$.01 each, 10 per tree	34	34	34	34	
Gopher Control	20	20	20	20	
Cultivation (6x)	45	45			
Mow (6x)			39	39	
Hand Hoe: \$0.09/tree	31				
Irrigation:					
1 hr labor per 6 acre set	1	1	1	1	
\$19.20/acre (standby)	19	19	19	19	
\$10.27/acre inch (power)	308	411	514	616	
Pollination			40	40	
Herbicide and application	46	46	33	33	
Fertilizer @ \$.32/lb	34	61	61	61	
Insect and disease control mater	12	17	121	126	
Application cost, \$10/spray	10	10	70	80	
Trellis repair	10	10	10	10	
Misc. labor and power,	15	15	15	15	

<b>TOTAL CULTURAL COSTS</b>	<b>\$3,066</b>	<b>\$996</b>	<b>\$1,319</b>	<b>\$1,441</b>	
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**HARVESTING COSTS:**

Picking (\$31/ton)			155	279
Bin rental (\$7/ton)			35	63
Bin liners (\$.50/ton)			3	5
Move bins in & out of orchard (\$2.70/ton)			14	24
Haul (\$11/ton)			55	99
Fork Lift rental 1 month			13	13
Forklift operation (5 tons per hour)			8	14

<b>TOTAL HARVESTING COSTS</b>			<b>\$282</b>	<b>\$497</b>
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YEAR	1st	2nd	3rd	4th
<b>OVERHEAD COSTS:</b>				
County taxes	94	94	94	94
Office and Business Costs	245	80	128	155
<b>TOTAL OVERHEAD COSTS</b>	<b>\$339</b>	<b>\$173</b>	<b>\$222</b>	<b>\$249</b>
<b>TOTAL CASH COSTS</b>	<b>\$3,405</b>	<b>\$1,170</b>	<b>\$1,823</b>	<b>\$2,186</b>
<b>ACCUMULATED CASH COSTS</b>	<b>\$3,405</b>	<b>\$4,575</b>	<b>\$6,398</b>	<b>\$8,584</b>
<b>DEPRECIATION:</b>				
Buildings, equipment, trellis & irrigation system	\$384	\$384	\$384	\$384
<b>INTEREST ON INVESTMENT @ 12.5%:</b>				
Buildings, equipment, trellis & irrigation system	394	394	394	394
Land \$3000	375	375	375	375
Interest on accum. cash cost	426	572	800	1073
<b>TOTAL INTEREST ON INVESTMENT</b>	<b>\$1,195</b>	<b>\$1,341</b>	<b>\$1,569</b>	<b>\$1,842</b>
<b>TOTAL COST FOR THE YEAR</b>	<b>\$4,984</b>	<b>\$2,895</b>	<b>\$3,776</b>	<b>\$4,412</b>
<b>REVENUE FROM PRODUCTION (\$300/TON)</b>			<b>\$1,500</b>	<b>\$2,700</b>
<b>NET COST FOR THE YEAR</b>	<b>\$4,984</b>	<b>\$2,895</b>	<b>\$2,276</b>	<b>\$1,712</b>
<b>NET PROFIT FOR THE YEAR</b>			<b>\$0</b>	<b>\$0</b>
<b>ACCUMULATED NET COST</b>	<b>\$4,984</b>	<b>\$7,878</b>	<b>\$10,154</b>	<b>\$11,866</b>

**SAMPLE COSTS TO PRODUCE TRELLISED GRANNY SMITH APPLES**  
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Costs are on a per acre basis for an 80 acre orchard with 75 producing acres  
340 trees per acre, sprinkler irrigation

Labor rates: \$7.50 /hr. tractor and supervisory labor  
\$5.75 /hr. field labor  
Yield: 20 tons per acre

Operation	Labor Hours Per Acre	Labor	Cash and Labor Costs per Acre			Total Cost
			Fuel & Repairs	Materials Kind and Quantity	Cost	
<b>Pre-harvest Costs:</b>						
Pruning, suckering	55	325.00		50 hrs. field, 5 hrs. sup. labor		325.00
Fertilizer	.5	3.75	3.20	170 lbs/acre @ \$.32/lb	54.40	61.35
Hand Thinning	33	212.25				212.25
Insect & disease cntrl				Materials - 8 sprays	126.00	126.00
Application cost				\$10/spray		80.00
Irrigation	.17	1.28		60 acre inches	635.40	636.68
Pollination				2 hives	40.00	40.00
Weed control				Materials and Applic.	33.00	33.00
Gopher control		12.00	7.00	Bait	1.00	20.00
Mow (6x)	3	22.50	16.68			39.18
Trellis repair						10.00
Misc.	1	7.50	7.00			14.50
Interest on operating capital @ 12.5% for 6 months						99.87
<b>TOTAL CULTURAL COSTS</b>		<b>\$92.67</b>	<b>\$584.28</b>	<b>\$33.88</b>	<b>\$889.80</b>	<b>\$1,697.83</b>
<b>Harvest costs:</b>						
Picking				\$31.00 per ton		620.00
Bin rental				7.00 per ton		140.00
Bin liners				.50 per ton		10.00
Move bins in & out of orchard				\$2.70 per ton		54.00
Haul				\$11.00 per ton		220.00
Forklift rental - 1 month				\$13 per acre per month		13.00
Forklift operation labor				5 tons per hour		30.00
<b>TOTAL HARVEST COSTS</b>						<b>\$1,087.00</b>
<b>Cash overhead:</b>						
Office and business costs						222.79
County Taxes						93.07
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>\$315.86</b>
<b>TOTAL CASH COSTS</b>						<b>\$3,100.69</b>
<b>TOTAL CASH COST PER TON 20 tons/acre</b>						<b>\$155.03</b>
<b>Investment</b>						
	New Cost Per Acre		Annual Cost	Depreciation	Interest @ 12.5%	
Equipment & buildings	1493.98		143.33		93.37	236.70
Irrigation & well system	2813.33		140.67		175.83	316.50
Trellis (20 years)	2000.00		100.00		125.00	225.00
Trees (25 years)	11866.00		474.64		741.63	1216.27
Land	3000.00				375.00	375.00
<b>TOTAL INVESTMENT COSTS</b>		<b>\$21,173.31</b>	<b>\$858.64</b>	<b>\$1,510.83</b>		<b>\$2,369.47</b>
<b>TOTAL COSTS PER ACRE</b>						<b>\$5,470.15</b>

TRELLISED GRANNY SMITH APPLES  
1986

EQUIPMENT AND BUILDING LIST

ITEM	ORIGINAL COST	ANNUAL USE (ACRES)	COST PER ACRE	LIFE (YEARS)	OVERHEAD DEPRECIATION	INTEREST AT 12.5%	REPAIR COST PER HOUR	FUEL PER HOUR	REPAIR & FUEL COST PER HOUR
<b>Tractors:</b>									
50 HP 4WD	\$24,500	75	\$327	10	\$33	\$20	\$2	\$3	\$6
25HP 2WD	10,500	75	140.00	10	14.00	8.75	1.05	\$1.63	\$3
Scraper	1,000	75	13.33	10	1.33	.83	.48		.48
Sprayer - 500 gal. pull-type	35,000	75	466.67	10	46.67	29.17	5.60	\$8.00	\$14
Disc, 8' offset	3,500	75	46.67	15	3.11	2.92	1.68		1.68
Weed Sprayer- pull type	1,500	75	20.00	10	2.00	1.25	.24		\$0
Mower	5,200	75	69.33	12	5.78	4.33	1.25		\$1
2 Forklift attachments	2,000	75	26.67	10	2.67	1.67			
20 6' Ladders	1,120	75	14.93	5	2.99	.93			
Gopher Machine	978	75	13.04	15	.87	.82			
Trellises	150,000	75	2000.00	20	100.00	125.00			
Overhead Sprinkler	135,000	75	1800.00	20	90.00	112.50			
Pump 125 HP	40,000	75	533.33	20	26.67	33.33			
Well- 800 ft deep	30,000	75	400.00	20	20.00	25.00			
Booster Pump- 50 HP	6,000	75	80.00	20	4.00	5.00			
Buildings	18,000	75	240.00	30	8.00	15.00			
Miscellaneous (pruning shears, picking bags, and shop tools)	8,750	75	116.67	5	23.33	7.29			
<b>TOTAL COST</b>	<b>\$473,048</b>		<b>\$6,307.31</b>		<b>\$384.08</b>	<b>\$394.21</b>			