

COST ANALYSIS FOR GRANNY SMITH APPLES - TRELLISED
Santa Cruz County - 1986

Since Granny Smith is relatively new to California and apples are generally new to Santa Cruz county, this cost study is based on many assumptions. The cost study is based on full size Granny Smith trees, although many growers are now planting dwarf varieties due to less expensive input requirements and other reasons. Therefore, actual costs may vary considerably based on type of tree, 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 study includes three tables 1) "Establishment Costs", 2) "Production Costs" and 3) "Equipment and Building List." 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 sprinkler 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	TIME	PEST	MATERIAL	COST	
1-2	Green Tip	1.San Jose Scale Mites Aphids	Lorsban 4E, 1 pt/ac	\$5.38	
			Supreme/Superior Oil, 4 gal/ac	11.80	
		2.Scab	Cyprex 65W, 1 lb/ac	7.30	
	Pink Bud	3.Scab Mildew	Cyprex 65W, 2 lb/ac	14.60	
			Karathane, 16 oz/ac	3.80	
	Rains	4.Scab	Cyprex 65W, 3 lb/ac Karathane, 16 oz/ac	21.90 <u>3.80</u>	
	TOTAL			\$68.58	
	3+	Green Tip	1.San Jose Scale Mites Aphids Pandemus	Lorsban 4E, 1 pt/ac	\$5.38
				Superior/Supreme Oil, 6 gal/ac	17.70
			2.Scab	Cyprex 65W, 1 lb/ac	7.30
Pink Bud		3.Scab Mildew	Cyprex 65W, 1 lb/ac	7.30	
			Karathane, 16 oz/ac	3.80	
Rains		4.Scab Infection	Cyprex 65W, 3 lb/ac Karathane, 16 oz/ac	21.90 3.80	
April		5.Thinning	Sevin, 6 lb/ac	16.50	
		6.Codling Moth	Guthion 50W, 1 lb/ac	8.20	
Summer		7.Orange Tortrix Apple Pandemus	Lorsban 50W, 6 lb/ac	<u>28.40</u>	
TOTAL				\$120.28	

Application Costs @ \$10 per application, custom

8. Pruning, Training, Suckering and Thinning : - 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	PRUNING, TRAINING, SUCKERING AND THINNING 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. 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%.
15. Fuel and Repairs - Hourly costs for each piece of equipment are given in the "Equipment and Buildings List" at the back of this study. These values were used to calculate the "Production Costs" and "Establishment Costs" tables.
16. Investment Costs - Investment costs are included in both the establishment and production cost studies.

ESTABLISHMENT COST

Depreciation - Straight line depreciation with no salvage value is calculated for buildings, equipment, trellises, and the irrigation system. The full inventory used is listed in detail in the "Equipment and Buildings List" at the back of this study.

Interest on Investment - Interest rates are assumed to be 12.5% per year. Interest on buildings, equipment, trellises and the irrigation system is listed item by item in the "Equipment and Buildings List" at the back of this study. Interest is charged on land. Interest is also charged on the "Accumulated Cash Costs" calculated in the study. This is interest on accumulated operating costs. It assumes principal is not paid on operating costs until the orchard comes into production.

PRODUCTION COSTS

Depreciation and Interest - Annual costs per acre for equipment, and buildings, the irrigation system and trellises are listed in detail in the "Equipment and Buildings List" at the back of this study.

The cost per acre for the trees is taken from the "Accumulated Net Cost" calculated in the "Establishment Costs" section of this study. Interest is charged on the cost of establishing the orchard to reflect the income foregone by keeping capital tied up in the orchard. It also is a rough estimate of average annual interest payments on a long term establishment loan. Depreciation is calculated as straight line with no salvage value.

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Trellised Granny Smith Apples
Establishment Costs
Santa Cruz County - 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 fee	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
Pest Control materials	69	69	120	120
Application cost, \$10/spray	40	40	70	70
Trellis repair	10	10	10	10
Misc. labor and power,	15	15	15	15

TOTAL CULTURAL COSTS	\$3,153	\$1,078	\$1,319	\$1,425
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HARVESTING COSTS:

Picking (\$31/ton)		155	279
Bin rental (\$9/ton)		45	81
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

TOTAL HARVESTING COSTS		\$292	\$515
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YEAR	1st	2nd	3rd	4th
OVERHEAD COSTS:				
County taxes	94	94	94	94
Office and Business Costs	252	86	129	155
TOTAL OVERHEAD COSTS	\$346	\$180	\$223	\$249
TOTAL CASH COSTS	\$3,498	\$1,258	\$1,833	\$2,189
ACCUMULATED CASH COSTS	\$3,498	\$4,756	\$6,589	\$8,778
DEPRECIATION:				
Buildings, equipment, trellis & irrigation system	\$384	\$384	\$384	\$384
INTEREST ON INVESTMENT @ 12.5%:				
Buildings, equipment, trellis & irrigation system	394	394	394	394
Land \$3000	375	375	375	375
Interest on accum. cash cost	437	595	824	1097
TOTAL INTEREST ON INVESTMENT	\$1,206	\$1,364	\$1,593	\$1,866
TOTAL COST FOR THE YEAR	\$5,089	\$3,006	\$3,810	\$4,439
REVENUE FROM PRODUCTION (\$300/TON)			\$1,500	\$2,700
NET COST FOR THE YEAR	\$5,089	\$3,006	\$2,310	\$1,739
NET PROFIT FOR THE YEAR			\$0	\$0
ACCUMULATED NET COST	\$5,089	\$8,094	\$10,404	\$12,143

SAMPLE COSTS TO PRODUCE TRELLISED GRANNY SMITH APPLES
Santa Cruz County - 1986

Costs are on a per acre basis for an 80 acre orchard with 75 producing acres
340 trees per acre, sprinkler irrigation

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

Operation	Labor Hours /Acre	Labor	Cash and Labor Costs per Acre			Total Cost	Your Cost
			Fuel & Repairs	-----Materials----- Kind and Quantity	Cost		
Pre-harvest Costs:							
Prune & sucker	55	\$325.00		50 hrs. field, 5 hrs. sup.		\$325.00	
Fertilizer	.5	3.75	\$3.20	170 lbs/acre @ \$.32/lb	\$54.40	61.35	
Hand Thinning	33	212.25				212.25	
Pest control Application				Materials - 7 sprays \$10/spray- custom	120.28	120.28	
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	
Wellis repair						10.00	
Misc.	1	7.50	7.00			14.50	
Interest on operating capital @ 12.5% for 6 months						98.89	
TOTAL CULTURAL COSTS		\$584.28	\$33.88		\$884.08	\$1,681.12	
Harvest costs:							
Picking				\$31.00 per ton		620.00	
Bin rental				\$9.00 per ton		180.00	
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				\$13.33 per acre per month		13.00	
Forklift operation labor				5 tons per hour		30.00	
TOTAL HARVEST COSTS						\$1,127.00	
Cash overhead:							
Office and business costs						224.65	
County Taxes						93.07	
TOTAL CASH OVERHEAD COSTS						\$317.72	
TOTAL CASH COSTS						\$3,125.85	
TOTAL CASH COST PER TON 20 tons/acre						\$156.29	

Investment	New Cost Per Acre	Annual Cost		
		Depreciation	Interest @ 12.5%	
Equipment & buildings	1493.98	143.33	93.37	236.70
Irrigation & well	2813.33	140.67	175.83	316.50
Trellis (20 years)	2000.00	100.00	125.00	225.00
Trees (25 years)	12143.00	485.72	758.94	1244.66
Land	3000.00		375.00	375.00
TOTAL INVESTMENT COSTS \$21,450.31		\$269.72	\$1,528.14	\$2,397.86
TOTAL COSTS PER ACRE				\$5,523.71
TOTAL COST PER TON: 20 tons/acre				\$276.19

TRELLISSED GRANNY SMITH APPLES

1986

EQUIPMENT AND BUILDING LIST

ITEM	ORIGINAL COST	ANNUAL USE (ACRES)	COST PER ACRE	LIFE (YEARS)	OVERHEAD DEPREC-IATION	INTEREST AT 12.5%	REPAIR COST PER HOUR	FUEL PER HOUR	REPAIR & FUEL COST PER HOUR
Tractors:									
50 HP 4WD	\$24,500	75	\$326.67	10	\$32.67	\$20.42	\$2.45	\$3.25	\$5.70
25HP 2WD	10,500	75.00	140.00	10	14.00	8.75	1.05	1.63	2.68
Scraper	1,000	75.00	13.33	10	1.33	.83	.48		.48
Sprayer - 500 gal. pull-type	35,000	75.00	466.67	10	46.67	29.17	5.60	8.00	13.60
Disc, 8' offset	3,500	75.00	46.67	15	3.11	2.92	1.68		1.68
Weed Sprayer- pull type	1,500	75.00	20.00	10	2.00	1.25	.24		.24
Mower	5,200	75.00	69.33	12	5.78	4.33	1.25		1.25
2 Forklift attachments	2,000	75.00	26.67	10	2.67	1.67			
20 6' Ladders	1,120	75.00	14.93	5	2.99	.93			
Gopher Machine	978	75.00	13.04	15	.87	.82			
Trellises	150,000	75.00	2000.00	20	100.00	125.00			
Overhead Sprinkler	135,000	75.00	1800.00	20	90.00	112.50			
Pump 125 HP	40,000	75.00	533.33	20	26.67	33.33			
Well- 800 ft deep	30,000	75.00	400.00	20	20.00	25.00			
Booster Pump- 50 HP	6,000	75.00	80.00	20	4.00	5.00			
Buildings	18,000	75.00	240.00	30	8.00	15.00			
Miscellaneous (pruning shears, picking bags, and shop tools)	8,750	75.00	116.67	5	23.33	7.29			
TOTAL COST	\$473,048		\$6,307.31		\$384.08	\$394.21			