
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2007

**SAMPLE COSTS TO
ESTABLISH AND PRODUCE
PROTEA**



SOUTH COAST

San Diego County

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SOUTH COAST – San Diego County 2007

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Acknowledgements. Thank you to the participating growers, industry representatives, and businesses associated with the protea industry for their cooperation and contributions to this study.

INTRODUCTION

Sample costs to establish and produce protea in the South Coast Region - San Diego County - are presented in this study. The study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. The practices described are based on production procedures considered typical for this crop and area, and will not apply to every farm. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, "Your Cost", is provided to enter your actual costs on Tables 3 and 4.

The hypothetical farm operation, production practices, overhead, and calculations are described under assumptions. For additional information or explanation of calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or the UC Cooperative Extension office in your county.

Sample Cost of Production Studies for many commodities can be downloaded at <http://coststudies.ucdavis.edu>, requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-4424 or obtained from the local county UC Cooperative Extension office. Some archived studies are also available on the website.

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ASSUMPTIONS

The following assumptions refer to Tables 1 to 9 and pertain to sample costs to establish and produce protea in the South Coast Region - San Diego County. The cultural practices described and materials used are considered typical for protea production in the region. The costs, practices, and materials will not be applicable to all situations every production year. Cultural practices, materials, and protea production costs vary by grower and region, and differences can be significant. The practices and inputs used in the cost study serve as a guide only. For production and other information on protea go to <http://www.californiaprotea.com>. *The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products or cultural practices.*

Farm. This study assumes a hillside farm operation size of 20 contiguous acres owned and operated by the grower. The plantings will most likely be on slopes greater than 15% angle. Protea is planted on 10 acres, other crops are on eight acres and, roads or open space and buildings are on the remaining two acres.

Establishment Operating Inputs (Tables 1 & 2)

Land Preparation. This study assumes that in August and/or September, a custom operator clears the land, providing operations that leave the ground ready for planting. The cost is included in the first year.

Plant Establishment. In December, the grower rents an auger for drilling the holes, which takes two men at eight hours per day to dig 600 holes. In January, the holes are irrigated prior to planting. This is followed by a crew that cleans out the hole and plants the protea at two minutes per hole. Two to 5% of the plants are replanted each year. The plants are expected to have a 15 year life, bloom in the third year, produce a commercial crop in the fourth year and reach production maturity in the sixth year. Plant spacing depends on the species or variety planted and ranges from 4 foot x 4 foot to 10 foot x 10 foot. For this study the protea species is planted on 6 foot x 6 foot triangle spacing (average of suggested spacing for six species), 1,392 plants per acre $[(43560/(6 \times 6)) + 15\%]$.

Plants. No specific variety or genera is used in this study. The plants are purchased from the nursery in one gallon pots. Common names are not standard over many countries, so botanical names are used in most cases. In California, three genera of South African *Proteaceae*: *Protea*, *Leucadendron* and *Leucospermum* and the Australian genus *Banksia* may be planted. Although plant sizes differ and require different spacing's, most growers will have some of each to extend the blooming or market period.

Fertilization. Nitrogen fertilizer as soluble ammonium sulfate beginning in the second year is injected through the drip irrigation system. One-half is applied in the spring (April) and one-half in the fall (September). The amount of material and N applied each year is shown in Table A.

Year	Ammonium Sulfate		Water
	lbs.	lbs. N	acre inch
1	0	0.00	3.00
2	25	5.25	6.00
3	50	10.50	6.00
4	100	21.00	12.00
5	200	42.00	15.00
6	300	63.00	18.00

Irrigation. The field is laid out and the drip irrigation system installed prior to planting. The field is irrigated in January prior to planting. Beginning in the second year, the field is irrigated one time per week in the spring and winter, and two times per week during the summer. The amount of water applied each year is shown in Table A.

Prune. Pruning is necessary for flower development. Pruning in the first three years consist of pinching out or cutting the terminals. The plants are pruned monthly, each time taking about one-minute per plant. Beginning In the fourth year, the plants are pruned in late February/early March and October at three minutes per plant each time, increasing to four minutes per plant in the fifth year and five minutes per plant thereafter.

Pest Management. Pesticides and rates are listed in the *UC IPM Pest Management Guidelines, Floriculture*. For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at <http://ipm.ucdavis.edu>.

Weeds. Beginning in the first year, the field is sprayed in December with Ronstar and again in the spring (April) with Roundup. The grower uses a backpack sprayer to apply the herbicides. The field is hand weeded using a weed whacker three times – February, May, August.

Diseases. Beginning in the third year, Botrytis (gray mold) appears on the leaves and flowers during the cool spring. Subdue is applied as a preventative in April using a backpack sprayer and Heritage fungicide is applied in June. Phytopthera (*Phytopthera Cinnamoni*) is a soil borne fungi that can cause sudden death. Subdue fungicide is applied through the irrigation water as a preventative in January and June beginning in the first year.

Insects and mollusk. Ants can be a problem and are treated with Lorsban or Amdro in May beginning in the third year. Also, mealybugs are treated with Malathion or Orthene three times – once each in April, May and June. Snails do not damage the protea, but can hide in the foliage, causing rejection of the product. Snails are controlled, beginning in the third year, with metaldehyde bait placed around the plants.

Harvest. Many plants will produce a few flowers in the third year, with commercial crop production beginning in the third or fourth year and reaching production maturity in the sixth or seventh year. In this study, it is assumed that flowers are produced and sold in the third year. Typically, a protea planting consist of several protea species which do not bloom at the same time, but bloom at various overlapping intervals. Stem production is year round with most species producing stems from September to June. The flowers or stems are harvested by hand. See Harvest under Production Operating Inputs for harvest procedures and returns. Yields assumed in this study are shown in Table B.

Table B. Average Plant Flower Yields by Year & Species

Species	Year							
	2	3	4	5	6	7	8	TOTAL
	(Flowers per plant)							
Proteas	0	3	7	11	18	18	18	74
Leucospermoms	0	2	7	17	27	37	37	127
Leucadendrons (bunches)	0	1	4	6	8	8	8	36
Banksias	0	2	6	12	22	30	30	102
Average All Species	0	2	6	11	17	20	20	75

Production Operating Inputs (Tables 3 – 9)

Prune. Pruning is necessary for flower development. Some growers may incorporate the pruning with the picking or harvesting of the flowers. In this study, pruning is considered a separate operation that is done in late February/early March and October, each time taking about five minutes per plant.

Replants. Approximately 2 to 5% of the plants are replanted each year and may extend the life of the planting. In this study, 2% are replanted each year.

Irrigation. The field is irrigated through the drip irrigation system one time per week in the spring (February through June) and winter (October through December), and two times per week during the summer (July through September). A total of 18 acre inches is applied.

Fertilization. Nitrogen fertilizer as soluble ammonium sulfate is injected through the drip irrigation system for a total of 300 pounds of ammonium sulfate fertilizer or 63 pounds of Nitrogen (N) per acre. One-half is applied in the spring (April) and one-half in the fall (September).

Pest Management. Pesticides and rates are listed in the *UC IPM Pest Management Guidelines, Floriculture*. For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at <http://ipm.ucdavis.edu>. Pesticide applications, timing, and materials vary according to pest pressure. The pesticide program in this report is considered typical, but practices vary considerably within the region. Inputs cited in this report may be effective but their effectiveness depends upon agronomic and environmental conditions. For information on current regulations and pesticide use permits, contact the local county Agricultural Commissioner's office.

Weeds. The field is sprayed in December with Ronstar and again in the spring (April) with Roundup. The grower uses a backpack sprayer to apply the herbicides. The field is hand weeded using a weed whacker three times – February, May, August. It takes approximately 8 man-hours each time to weed an acre.

Diseases. Botrytis (gray mold) appears on the leaves and flowers during the cool spring. Subdue is applied as a preventative in April using a backpack sprayer. Heritage is applied in June. Phytophthora (*Phytophthora Cinnamoni*) is a soil borne fungi that can cause sudden death. Subdue fungicide is applied through the irrigation water as a preventative in January and June.

Insects and mollusk. Ants can be a problem and are treated with Lorsban or Amdro in May. Mealybugs are treated with Malathion or Orthene three times – once each in April, May and June. Snails, so not damage the protea, but can hide in the foliage, causing rejection of the product. Snails are controlled with metaldehyde bait placed around the plants.

Vertebrates. Gophers and squirrels are a problem and the squirrels are baited once per month during the year; whereas, the gophers are trapped. Labor cost is estimated at six hours per acre for the season.

Harvest. Typically, a protea planting consist of several protea species which do not bloom at the same time, but bloom at various overlapping intervals. Stem/flower production is year round with most species producing stems from September to June. Flowers are cut all year in this study. The flowers or stems are cut by hand, placed in water buckets and carried to the edge of the field. It is assumed that one person can harvest 100 stems per hour. For this study we are assuming two to three pickers, depending upon the number of flowers producing and that the field is harvested twice a week. Typically, the crew will pick in the mornings and move on to other duties after the pick is completed. Some growers may contract harvesting crews that come in and cut everything that is ready and then move to other growers.

Table C. Protea sp.
Flower Yields by
Year

Year	plant	acre
1	0	0
2	0	0
3	3	4,176
4	7	9,744
5	11	15,312
6	18	25,056

Haul. Growers use an ATV or pickup to haul the flowers to the cooling shed. In this study, the grower uses an ATV with a trailer to haul the picked flowers. Some growers will put the crop on a truck/pickup and take it directly to market to avoid cooling costs. Hauling costs in the study are based on 400 stems per load.

Yields. Yields for protea vary depending on genus and species and range from 8 to 30 flowers per plant per year (*So You Want to Grow Protea* booklet). Averaging over only the protea species gives a yield of 18 flowers per plant per year or approximately an average of 25,000 flowers per acre per year over the remaining life of the planting. The yields in the study are rounded to whole numbers for the income calculations. See Table C for protea yields by year.

Returns. For this study based on current grower input, their average seasonal returns less 30% for packing, shipping and marketing costs taken by wholesalers is rounded to \$1.20 per stem (flower) providing an estimated gross return of \$30,000 per producing acre. Prices vary by genus and species from \$0.42 to \$1.93 per stem. Average for the Protea species is \$1.18 per stem. See Table D.

Species	\$/stem
P. cynaroides (King)	1.93
P. nerifloia (Mink)	0.56
P. May Day	1.05
Leucospermum sp.	0.42
Banksia sp.	1.23
Leucadendron sp.	*1.93
Average	1.18

*\$/bunch (10 stems)

Cooling Costs/Packing/Marketing. Cooling costs vary by cooler and grower volume. Growers are responsible for these costs. The estimated cost is 30% of the selling price, but is not shown in the study. For flexibility a grower may own a cooler, but is usually not feasible on a ten acre planting.

Pickup/ATV: The pickup is used by the grower for personal and miscellaneous business operations. It can also be used to haul picked flowers to the cooler or market. The ATV is used with or without the ATV trailer and is used to transport workers and small equipment to the field. It is also used during harvest with a trailer to transport the picked flowers to the cooler and is shown as an operation – Haul under harvest. Times and costs are estimated and not taken from any specific data.

Labor, Equipment and Interest

Labor. Labor rates of \$16.22 per hour for machine operators and \$11.99 for general labor includes payroll overhead of 41%. The basic hourly wages are \$11.50 for machine operators and \$8.50 for general labor. The overhead includes the employers’ share of federal and California state payroll taxes, workers’ compensation insurance for flowers (code 0035), and a percentage for other possible benefits. Workers’ compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2007 (personal email from California Department of Insurance, May 18, 2007, unreferenced). Labor for operations involving machinery are 20% higher than the operation time given in Table 3 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for delivery of diesel and gasoline are \$2.90 and \$2.80 per gallon, respectively. Fuel costs are derived from American Automobile Association (AAA) and Energy Information Administration 2006 monthly data. The cost includes a 2% local sales tax on diesel fuel and 8% sales tax on gasoline. Both also include federal and state excise tax. The fuel, lube, and repair cost per acre for each operation in Table 3 is determined by multiplying the total hourly operating cost for each piece of equipment used (no equipment used in this study) for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

Interest on Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 10% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using

a negative interest charge. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of January 2007.

Risk. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks that affect the profitability and economic viability. The risks associated with producing and marketing protea should not be minimized.

Cash Overhead

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. Employee benefits, insurance, and payroll taxes are included in labor costs and not in overhead (see Labor).

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by two on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.714% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$437 for the entire farm.

Office Expense. Office and business expenses are estimated at \$550 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, utilities, and miscellaneous expenses.

Sanitation Services. Sanitation services provide a single toilet with washing equipment and cost the farm \$1,740 annually. The cost includes delivery and 12 months of weekly service for the single toilet. Sanitation facilities required will vary by state regulations and crew size. Cal/OSHA Safety Order 3457 requires employers to provide one hand-washing facility for each 20 employees or fraction thereof and if more than five laborers are employed separate toilets for each sex are required. The employer must also keep records of toilet servicing for two years.

Supervisor/Management Salaries. Wages for management are not included as a cash cost. Returns above total costs are considered a return to management and risk.

Non-Cash Overhead

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is $((\text{Purchase Price} - \text{Salvage Value}) \times (\text{Capital Recovery Factor})) + (\text{Salvage Value} \times \text{Interest Rate})$.

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 7.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

Interest Rate. An interest rate of 7.25% is used to calculate capital recovery. The rate will vary depending upon size of loan and other lending agency conditions, but is a suggested rate by a farm lending agency in January 2007.

Irrigation System/Water Meters. Water is delivered from the district which is run through a flow meter purchased by the grower. The one-inch meter costs \$300. A cost of \$12,500 per farm is charged to the grower. The cost pays for the right or option to use as much water volume as can be delivered to the farm by a one-inch diameter pipe. The grower also installs a filter system, irrigation laterals and drip lines.

Buildings. It is assumed that the farm has some storage or shop buildings. The price of the building as suggested by participating growers may be or include a cooler for storing the flowers.

Land. The value of the land as estimated by the growers in the area is \$20,000 per acre. Crop land for floricultural crops in the region may range from \$9,000 to \$90,000 per acre. Land is slightly higher if a one or two inch water meter is in place. The land is in San Diego county and located on a hillside with a greater than 20% slope.

Establishment Costs. Costs to establish the protea planting are used to determine capital recovery expenses, depreciation, and interest on investment for the production years. Establishment cost is the sum of the costs for land preparation, planting, cash overhead and production expenses for growing the flowers through the first year that protea are harvested minus any returns from production. The Total Accumulated Net Cash Cost on Table 1, in the third year represents the establishment cost. For this study the cost is \$26,915 per acre or \$269,150 for the 10-acre planting. The life of the planting is 15 years and the establishment cost is spread over the remaining 12 production years.

Shop/Field Tools/Equipment. This includes various equipment used in the production of protea. Tools and equipment such as pruning tools, backpacks, weed eaters/weed whackers, hoes, shovels, and small wrenches are included here. The cost is estimated and not taken from any specific data.

Equipment. Farm equipment is generally purchased new or used. The equipment in this study is assumed to be purchased new. Annual ownership costs for equipment and other investments are shown in Table 7. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

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For information concerning the above mentioned University of California publications contact UC DANR Communications Services (1-800-994-8849) or your local county Cooperative Extension office.

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Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH PROTEA
 SOUTH COAST - San Diego County 2007

	Cost Per Acre						
	Year:	1st	2nd	3rd	4th	5th	6th
Tons Per Acre:				3,500	9,000	15,000	25,000
Planting Costs:							
Land Clearing & Preparation	1,300						
Plant: Auger Holes	450						
Irrigate: Presoak holes	56						
Plant: Protea (labor & plants)	8,940						
Replant: (labor & plants)		180	174	174	174	174	174
TOTAL PLANTING COSTS	10,746	180	174	174	174	174	174
Cultural Costs:							
Disease: Phytophthora (Subdue) through drip line	220	220	220	220	220	220	220
Rodent: Squirrel (bait)/Gopher (trap)	137	137	137	137	137	137	137
Prune: Hand Yrs 1-3, 12X	3,309	3,309	3,309	2,782	2,782	2,782	2,782
Weed: Spray (Roundup)	18	18	18	18	18	18	18
Irrigate: (water & labor)	165	328	342	666	828	995	
Weed: Hand (Weedwhacker)	288	288	288	288	288	288	288
Weed: Spray (Ronstar)	197	197	197	197	197	197	197
Fertilize: through drip (21-0-0)		4	7	14	29	43	
Mollusk: Snails (bait)			293	293	293	293	293
Insect: Mealybug (Malathion)			21	21	21	21	21
Disease: Botrytis (Subdue)			225	225	225	225	225
Disease: Botrytis (Heritage)			92	92	92	92	92
Insect: Ants (Amdro)			13	13	13	13	13
ATV + Trailer	36	36	36	36	36	36	36
Pickup	16	16	16	16	16	16	16
TOTAL CULTURAL COSTS	4,386	4,553	5,214	5,018	5,195	5,376	
Harvest Costs:							
Pick/Cut Flowers			420	1,091	1,787	2,998	
Haul from field to cooler or market			150	383	637	1,063	
TOTAL HARVEST COSTS			570	1,474	2,424	4,061	
Interest On Operating Capital @ 10.00%	1,372	267	349	389	447	550	
TOTAL OPERATING COSTS/ACRE	16,504	5,000	6,307	7,055	8,240	10,160	
Cash Overhead Costs:							
Office Expense	550	550	550	550	550	550	550
Liability Insurance	24	24	24	24	24	24	24
Sanitation Costs (Toilets)	174	174	174	174	174	174	174
Property Taxes	260	260	261	261	261	261	261
Property Insurance	27	27	27	27	27	27	121
Investment Repairs	66	66	66	66	66	66	66
TOTAL CASH OVERHEAD COSTS	1,101	1,101	1,102	1,102	1,102	1,196	
TOTAL CASH COSTS/ACRE	17,605	6,101	7,409	8,157	9,342	11,356	
INCOME/ACRE FROM PRODUCTION			4,200	10,800	18,000	30,000	
NET CASH COSTS/ACRE FOR THE YEAR	17,605	6,101	3,209				
PROFIT/ACRE ABOVE CASH COSTS				2,643	8,658	18,644	
ACCUMULATED NET CASH COSTS/ACRE	17,605	23,706	26,915	24,272	18,257	5,628	

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Table 1. continued

	Cost Per Acre						
	Year:	1st	2nd	3rd	4th	5th	6th
	Tons Per Acre:			3,500	9,000	15,000	25,000
Non Cash Overhead (Capital Recovery):							
Water Meter		2	2	2	2	2	2
Irrigation System (filters)		10	10	10	10	10	10
Irrigation System (drip)		167	167	167	167	167	167
Buildings		115	115	115	115	115	115
Land		1,611	1,611	1,611	1,611	1,611	1,611
Water Meter Fee		77	77	77	77	77	77
Hand/Field Tools		24	24	24	24	24	24
Equipment		546	546	554	555	555	556
TOTAL INTEREST ON INVESTMENT		2,552	2,552	2,560	2,561	2,561	2,562
TOTAL COST/ACRE FOR THE YEAR		20,157	8,653	9,969	10,718	11,903	13,918
INCOME/ACRE FROM PRODUCTION				4,200	10,800	18,000	30,000
TOTAL NET COST/ACRE FOR THE YEAR		20,157	8,653	5,769			
NET PROFIT/ACRE ABOVE TOTAL COST					82	6,097	16,082
TOTAL ACCUMULATED NET COST/ACRE		20,157	28,810	34,579	34,497	28,400	12,318

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Table 2. MATERIALS AND CUSTOM WORK COSTS PER ACRE - ESTABLISHMENT YEARS
SOUTH COAST - San Diego County 2007

	Unit	\$/Unit	Year 1		Year 2		Year 3		Year 4		Year 5			
			Total Per Acre											
			units	\$	units	\$	units	\$	units	\$	units	\$		
OPERATING COSTS														
Custom:														
Land Preparation	acre	1,300.00	1.00	1,300										
Fertilizer:														
21-0-0	lb	0.14			25.00	4	50.00	7	100.00	14	200.00	29		
Fungicide:														
Subdue Maxx	floz	5.03	43.56	219	43.56	219	87.06	438	87.06	438	87.06	438		
Heritage	oz	24.62					3.50	86	3.50	86	3.50	86		
Insecticide:														
Metaldehyde 3.5G	lb	1.62					142.50	231	142.50	231	142.50	231		
Malathion 5	pint	4.27					0.75	3	0.75	3	0.75	3		
Amdro Pro Fire Ant Bait	lb	8.65					1.00	9	1.00	9	1.00	9		
Herbicide:														
Roundup Pro	pint	6.24	2.00	12	2.00	12	2.00	12	2.00	12	2.00	12		
Ronstar WSP	pint	38.20	5.00	191	5.00	191	5.00	191	5.00	191	5.00	191		
Rodenticide:														
Wilco Squirrel Bait	lb	5.40	12.00	65	12.00	65	12.00	65	12.00	65	12.00	65		
Water:														
Water:	acin	54.17	4.00	217	6.00	325	5.94	322	11.93	646	14.92	808		
Plants:														
Protea (gallon pots)	each	6.00	1,392.00	8,352	28.00	168	28.00	168	28.00	168	28.00	168		
Labor (general)	hrs	11.99	396.92	4,759	311.33	3,733	365.34	4,380	393.02	4,712	468.06	5,612		
Fuel - Gas	gal	2.80	0.75	2	0.75	2	3.88	11	8.77	25	14.10	39		
Fuel - Diesel	gal	2.90	2.08	6	2.08	6	2.08	6	2.08	6	2.08	6		
Lube				1		1		3		5		7		
Machinery repair				6		6		25		55		88		
Interest				1,373		267		349		389		447		
TOTAL OPERATING COSTS				16,503		4,999		6,307		7,056		8,239		

Yr 6 +, See Table 3

UC COOPERATIVE EXTENSION
Table 3. COSTS PER ACRE TO PRODUCE PROTEA
 SOUTH COAST - San Diego County 2007

Operation	Operation	Cash and Labor Cost per acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent			
Cultural:								
Plant: Replant 2%	0.50	6	0	168	0	174		
Disease: Phytophthora (Subdue) applied through drip	0.06	1	0	219	0	220		
Rodent: Squirrel (bait)/Gopher (trap)	6.00	72	0	65	0	137		
Mollusk: Snails (Metaldehyde)	5.20	62	0	231	0	293		
Irrigate: Water & Labor	1.68	20	0	975	0	994		
Weed: Hand with Weedwhacker	24.00	288	0	0	0	288		
Prune: Hand 2X	232.00	2,782	0	0	0	2,782		
Insect: Mealy bug (Malathion)	1.50	18	0	3	0	21		
Weed: (Roundup)	0.50	6	0	12	0	18		
Fertilize: (Ammonium Sulfate) applied through drip	0.00	0	0	43	0	43		
Disease: Botrytis (Subdue)	0.50	6	0	219	0	225		
Insect: Ants (Amdro)	0.40	5	0	9	0	13		
Disease: Botrytis (Heritage)	0.50	6	0	86		92		
Weed: (Ronstar)	0.50	6	0	191	0	197		
ATV & Trailer	2.00	29	6	0	0	35		
Pickup	0.50	7	8	0	0	16		
TOTAL CULTURAL COSTS/ACRE	275.84	3,313	15	2,220	0	5,549		
Harvest								
Pick Flowers	250.00	2,998				2,998		
Haul to Cooler and/or Market	59.40	855	208	0	0	1,063		
TOTAL HARVEST COSTS/ACRE	309.40	3,852	208	0	0	4,061		
Interest on operating capital @ 10.00%						550		
TOTAL OPERATING COSTS/ACRE		7,166	223	2,220	0	10,159		
CASH OVERHEAD:								
Office Expense						550		
Sanitation Service						174		
Liability Insurance						24		
Property Taxes						396		
Property Insurance						121		
Investment Repairs						66		
TOTAL CASH OVERHEAD COSTS						1,331		
TOTAL CASH COSTS/ACRE						11,491		
NON-CASH OVERHEAD:								
Investment		Per producing Acre		-- Annual Cost --		Capital Recovery		
Water Meter		17		2		2		
Irrigation System: Filters		100		10		10		
Irrigation System: Drip Lines		1,500		167		167		
Buildings		1,389		115		115		
Land		22,222		1,611		1,611		
Water Meter Fee		694		77		77		
Establishment (Protea)		26,915		3,434		3,434		
Hand/Field Tools		167		24		24		
Equipment		3,231		556		556		
TOTAL NON-CASH OVERHEAD COSTS		56,235		5,995		5,995		
TOTAL COSTS/ACRE						17,486		

UC COOPERATIVE EXTENSION
Table 4. COSTS AND RETURNS PER ACRE to PRODUCE PROTEA
 SOUTH COAST - San Diego County 2007

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Protea: flowers and/or bunches	25,000.00	each	1.20	30,000	
OPERATING COSTS					
Plants:					
Protea	28.00	each	6.00	168	
Fungicide:					
Subdue Maxx	87.06	floz	5.03	438	
Heritage	3.50	oz	24.62	86	
Rodenticide:					
Wilco Gopher Bait	12.00	lb	5.40	65	
Insecticide:					
Metaldehyde 3.5G (snails)	142.50	lb	1.62	231	
Malathion 5	0.75	pint	4.27	3	
Amdro Pro Fire Ant Bait	1.00	lb	8.65	9	
Irrigation:					
Water	18.00	acin	54.17	975	
Herbicide:					
Roundup Pro	2.00	pint	6.24	12	
Ronstar WSP	5.00	lb	38.20	191	
Fertilizer:					
Ammonium Sulfate (21-0-0)	300.00	lb	0.14	43	
Labor (non-machine)	597.62	hrs	11.99	7,165	
Fuel - Gas	23.03	gal	2.80	64	
Fuel - Diesel	2.08	gal	2.90	6	
Lube				11	
Machinery repair				142	
Interest on operating capital @ 10.00%				550	
TOTAL OPERATING COSTS/ACRE				10,160	
NET RETURNS ABOVE OPERATING COSTS				19,840	
CASH OVERHEAD COSTS:					
Office Expense				550	
Sanitation Service				174	
Liability Insurance				24	
Property Taxes				396	
Property Insurance				121	
Investment Repairs				66	
TOTAL CASH OVERHEAD COSTS/ACRE				1,331	
TOTAL CASH COSTS/ACRE				11,491	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Water Meter				2	
Irrigation System: Filters				10	
Irrigation System: Drip Lines				167	
Buildings				115	
Land				1,611	
Water Meter Fee				77	
Establishment (Protea)				3,434	
Shop/Field Tools				24	
Equipment				556	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				5,995	
TOTAL COSTS/ACRE				17,486	
NET RETURNS ABOVE TOTAL COSTS				12,514	

UC COOPERATIVE EXTENSION
Table 5. MONTHLY CASH PER ACRE to PRODUCE PROTEA
 SOUTH COAST - San Diego County 2007

Beginning JAN 07	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 07	07	07	07	07	07	07	07	07	07	07	07	07	
Cultural:													
Plant: Replant 2%	174												174
Disease: Phytophthora (Subdue) applied through drip	110					110							220
Rodent: Squirrel (bait)/Gopher (trap)	11	11	11	11	11	11	11	11	11	11	11	11	137
Mollusk: Snails (Metaldehyde)		17	17	58	58	58	17	17	17	17	17		293
Irrigate: Water & Labor		71	71	71	71	71	142	142	142	71	71	71	995
Weed: Hand with Weedwhacker		96			96			96					288
Prune: Hand 2X		1,391								1,391			2,782
Insect: Mealy bug (Malathion)				7	7	7							21
Weed: (Roundup)				18									18
Fertilize: (Ammonium Sulfate) applied through drip				21					21				43
Disease: Botrytis (Subdue)				225									225
Insect: Ants (Amdro)					13								13
Disease: Botrytis (Heritage)						92						197	289
Weed: (Ronstar)													0
ATV & Trailer	3	3	3	3	3	3	3	3	3	3	3	3	35
Pickup	1	1	1	1	1	1	1	1	1	1	1	1	16
TOTAL CULTURAL COSTS	300	1,591	104	417	262	354	174	270	196	1,495	104	284	5,549
Harvest:													
Pick Flowers	312	312	288	288	288	192	132	156	192	216	312	312	2,998
Haul to Cooler and/or Market	112	112	101	101	101	67	45	56	67	78	112	112	1,063
TOTAL HARVEST COSTS	424	424	389	389	389	259	177	212	259	294	424	424	4,061
Interest on operating capital @ 10.00%	6	23	27	34	39	44	47	51	55	70	74	80	550
TOTAL OPERATING COSTS/ACRE	729	2,037	519	839	689	657	398	533	509	1,859	602	788	10,159
OVERHEAD:													
Office Expense	46	46	46	46	46	46	46	46	46	46	46	46	550
Sanitation Service	15	15	15	15	15	15	15	15	15	15	15	15	174
Liability Insurance		24											24
Property Taxes				198								198	395
Property Insurance	61						61						121
Investment Repairs	6	6	6	6	6	6	6	6	6	6	6	6	66
TOTAL CASH OVERHEAD COSTS	126	90	66	263	66	66	126	66	66	66	66	263	1,331
TOTAL CASH COSTS/ACRE	856	2,127	585	1,103	755	723	524	599	575	1,925	668	1,051	11,490

UC COOPERATIVE EXTENSION
Table 6. RANGING ANALYSIS
 SOUTH COAST - San Diego County 2007

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE PROTEA

	YIELD (flowers/acre)						
	17,500	20,000	22,500	25,000	27,500	30,000	32,500
OPERATING COSTS:							
Cultural Cost	5,549	5,549	5,549	5,549	5,549	5,549	5,549
Harvest (cut flowers)	2,098	2,398	2,698	2,998	3,297	3,597	3,897
Haul to Cooler/Market	744	851	957	1,063	1,169	1,276	1,382
Interest on operating capital @ 10.00%	482	504	527	550	573	596	618
TOTAL OPERATING COSTS/ACRE	8,873	9,302	9,731	10,160	10,588	11,018	11,446
Total Operating Costs/flower	0.51	0.47	0.43	0.41	0.39	0.37	0.35
CASH OVERHEAD COSTS/ACRE	1,331	1,331	1,331	1,331	1,331	1,331	1,331
TOTAL CASH COSTS/ACRE	10,204	10,633	11,062	11,491	11,919	12,349	12,777
Total Cash Costs/flower	0.58	0.53	0.49	0.46	0.43	0.41	0.39
NON-CASH OVERHEAD COSTS/ACRE	5,993	5,994	5,995	5,995	5,996	5,996	5,997
TOTAL COSTS/ACRE	16,197	16,627	17,057	17,486	17,915	18,345	18,774
Total Costs/flower	0.93	0.83	0.76	0.70	0.65	0.61	0.58

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE	YIELD (flowers/acre)						
	17,500	20,000	22,500	25,000	27,500	30,000	32,500
\$/flower							
0.60	1,627	2,698	3,769	4,840	5,912	6,982	8,054
0.80	5,127	6,698	8,269	9,840	11,412	12,982	14,554
1.00	8,627	10,698	12,769	14,840	16,912	18,982	21,054
1.20	12,127	14,698	17,269	19,840	22,412	24,982	27,554
1.40	15,627	18,698	21,769	24,840	27,912	30,982	34,054
1.60	19,127	22,698	26,269	29,840	33,412	36,982	40,554
1.80	22,627	26,698	30,769	34,840	38,912	42,982	47,054

NET RETURN PER ACRE ABOVE CASH COST

PRICE	YIELD (flowers/acre)						
	17,500	20,000	22,500	25,000	27,500	30,000	32,500
\$/flower							
0.60	296	1,367	2,438	3,509	4,581	5,651	6,723
0.80	3,796	5,367	6,938	8,509	10,081	11,651	13,223
1.00	7,296	9,367	11,438	13,509	15,581	17,651	19,723
1.20	10,796	13,367	15,938	18,509	21,081	23,651	26,223
1.40	14,296	17,367	20,438	23,509	26,581	29,651	32,723
1.60	17,796	21,367	24,938	28,509	32,081	35,651	39,223
1.80	21,296	25,367	29,438	33,509	37,581	41,651	45,723

NET RETURNS PER ACRE ABOVE TOTAL COST

PRICE	YIELD (flowers/acre)						
	17,500	20,000	22,500	25,000	27,500	30,000	32,500
\$/flower							
0.60	-5,697	-4,627	-3,557	-2,486	-1,415	-345	726
0.80	-2,197	-627	943	2,514	4,085	5,655	7,226
1.00	1,303	3,373	5,443	7,514	9,585	11,655	13,726
1.20	4,803	7,373	9,943	12,514	15,085	17,655	20,226
1.40	8,303	11,373	14,443	17,514	20,585	23,655	26,726
1.60	11,803	15,373	18,943	22,514	26,085	29,655	33,226
1.80	15,303	19,373	23,443	27,514	31,585	35,655	39,726

UC COOPERATIVE EXTENSION
Table 7. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT,
 SOUTH COAST - San Diego County 2007

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
07	All Terrain Vehicle (ATV)	10,000	5	4,482	1,680	51	72	1,803
07	Trailer for ATV	1,500	3	624	381	7	11	399
07	Pickup 1/2 ton	25,000	5	11,204	4,200	127	181	4,507
	TOTAL	36,500		16,310	6,260	185	264	6,709

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
Buildings (may include cooler)	25,000	30		2,065	88	125	500	2,778
Protea Establishment (10 acres)	269,150	12		34,339	942	1,346	0	36,627
Field/Shop Tools	3,000	10		432	0	0	60	492
Irrigation: Filters (10 acres)	1,000	20		96	4	5	20	125
Irrigation: Drip System (10 acres)	15,000	15		1,673	53	75	300	2,101
Land (20 acres)	400,000	30	400,000	29,000	0	4,000	0	33,000
Water Meter 1-inch (18 acres)	300	20		29	1	2	60	92
Water Meter Fee (Farm)	12,500	15		1,394	0	0	0	1,394
TOTAL INVESTMENT	725,950		400,000	69,028	1,088	5,553	940	76,609

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm		Price/ Unit	Total Cost
	Units/ Farm	Unit		
Liability Insurance	18	acre	24.28	437
Office Expense	18	acre	550.00	9,900
Sanitation Facilities	10	acre	174.00	1,740

UC COOPERATIVE EXTENSION
Table 8. HOURLY EQUIPMENT COSTS
 SOUTH COAST - San Diego County 2007

Yr	Description	COSTS PER HOUR							Total Costs/Hr.
		Actual Hours Used	Cash Overhead			Operating			
			Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
07	All Terrain Vehicle (ATV)	615	2.73	0.08	0.12	1.91	1.21	4.22	7.15
07	Trailer for ATV	595	0.64	0.01	0.02	0.39	0.00	0.39	1.06
07	Pickup 1/2 ton	6	699.93	21.12	30.17	3.08	13.90	16.98	768.20

UC COOPERATIVE EXTENSION

Table 9. OPERATIONS & MATERIALS - PRODUCTION YEAR FOR PRODUCING PROTEA

SOUTH COAST - San Diego County 2007

MONTH	OPERATION	TRACTOR	IMPLEMENT	LABOR HRS/acre	MATERIAL	RATE/AC	UNIT
Jan	Plant: Replant 2% of flowers			0.50			
Jan	Disease: Phytophthora (through drip 3 ft strip)		Backpack Sprayer	0.03	Subdue	21.78	floz
June			Backpack Sprayer	0.03	Subdue	21.78	floz
Jan	Rodent: Squirrel (bait) /Gopher (trap)			0.50	Squirrel Bait	1.00	lb
Feb				0.50	Squirrel Bait	1.00	lb
Mar				0.50	Squirrel Bait	1.00	lb
Apr				0.50	Squirrel Bait	1.00	lb
May				0.50	Squirrel Bait	1.00	lb
June				0.50	Squirrel Bait	1.00	lb
July				0.50	Squirrel Bait	1.00	lb
Aug				0.50	Squirrel Bait	1.00	lb
Sept				0.50	Squirrel Bait	1.00	lb
Oct				0.50	Squirrel Bait	1.00	lb
Nov				0.50	Squirrel Bait	1.00	lb
Dec				0.50	Squirrel Bait	1.00	lb
Feb	Mollusk: Snails		Hand Spread	0.40	Metaldehyde	7.50	lb
Mar			Hand Spread	0.40	Metaldehyde	7.50	lb
Apr			Hand Spread	0.80	Metaldehyde	30.00	lb
May			Hand Spread	0.80	Metaldehyde	30.00	lb
June			Hand Spread	0.80	Metaldehyde	30.00	lb
July			Hand Spread	0.40	Metaldehyde	7.50	lb
Aug			Hand Spread	0.40	Metaldehyde	7.50	lb
Sept			Hand Spread	0.40	Metaldehyde	7.50	lb
Oct			Hand Spread	0.40	Metaldehyde	7.50	lb
Nov			Hand Spread	0.40	Metaldehyde	7.50	lb
Feb	Irrigate			0.12	Water	1.29	acin
Mar				0.12	Water	1.29	acin
Apr				0.12	Water	1.29	acin
May				0.12	Water	1.29	acin
June				0.12	Water	1.29	acin
July				0.24	Water	2.56	acin
Aug				0.24	Water	2.56	acin
Sept				0.24	Water	2.56	acin
Oct				0.12	Water	1.29	acin
Nov				0.12	Water	1.29	acin
Dec				0.12	Water	1.29	acin
Feb	Weed: Hand		Weedwhacker	8.00			
May			Weedwhacker	8.00			
Aug			Weedwhacker	8.00			
Feb	Prune: Hand			116.00			
Oct				116.00			
Apr	Insect: Mealybug		Backpack Sprayer	0.50	Malathion	0.25	pt
May			Backpack Sprayer	0.50	Malathion	0.25	pt
June			Backpack Sprayer	0.50	Malathion	0.25	pt
Apr	Weed: Herbicide		Backpack Sprayer	0.50	Roundup	2.00	pt
Dec			Backpack Sprayer	0.50	Ronstar	5.00	lb

UC COOPERATIVE EXTENSION
Table 9. Continued
 SOUTH COAST - San Diego County 2007

MONTH	OPERATION	TRACTOR	IMPLEMENT	LABOR	MATERIAL	
				HRS/acre	RATE/AC	UNIT
Apr	Fertilize: through drip				21-0-0	150.00 lb
Sept					21-0-0	150.00 lb
Apr	Disease: Botrytis		Backpack Sprayer	0.50	Subdue	43.50 floz
June			Backpack Sprayer	0.50	Heritage	3.50 oz
May	Insect: Ants		Backpack Sprayer	0.40	Amdro	1.00 lb
Jan	Harvest			26.00		
Feb				26.00		
Mar				24.00		
Apr				24.00		
May				24.00		
Jun				16.00		
Jul				11.00		
Aug				13.00		
Sep				16.00		
Oct				18.00		
Nov				26.00		
Dec				26.00		
Jan	Haul	ATV	Trailer			
Feb		ATV	Trailer			
Mar		ATV	Trailer			
Apr		ATV	Trailer			
May		ATV	Trailer			
Jun		ATV	Trailer			
Jul		ATV	Trailer			
Aug		ATV	Trailer			
Sep		ATV	Trailer			
Oct		ATV	Trailer			
Nov		ATV	Trailer			
Dec		ATV	Trailer			