AN ANALYSIS OF THE ECONOMIC FEASABILITY OF A PISTACHIO PROCESSING FACILITY

by

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ABSTRACT

The economic feasibility of adding a pistachio roasting facility to the current operations of Tularosa Pistachio Groves (TG) was examined. A facility that roasts and processes 200,000 pounds of pistachio nuts was found to be the most economically viable for the available product grown by (TG) and other small growers in this area. This size facility optimizes the production capacity of the equipment needed for a small grower/processor and fully utilizes a fulltime skilled labor pool needed for the operation. Lower production levels utilize the same equipment on an intermittent schedule. Although operating costs are less when processing fewer pistachio nuts, the negative cash flows during the early period of the project are significant and make the lower production levels less financially viable. The primary reason the lower production quantities are less attractive is because the initial capital investment produced lower cash incomes in the early years of operation. Additional cash is needed for the operation costs, and principal and interest payments. Achieving maximum production to utilize the capacity of the facility sooner makes the project more financially feasible.

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CHAPTER 1: INTRODUCTION

1.1 Problem – Product Grown Exceeds Availability of Processed Product

Tularosa Groves (TG) operation includes machine harvesting, hulling, float tank operation, drying, pin sorting, sizing, hand sorting and packaging. The roasting operation is performed under contract by another firm. This arrangement initially worked well; however, the amount that can be roasted by this processor is limited due to their expanding market, and the limited capabilities of the equipment. Currently, TG orchard production exceeds the amount that can be roasted for us by the current contractual arrangement with the other firm TG sales of a roasted product is limited because of the limited capacity of the firm that performs the roasting. No improvements in this arrangement are foreseen.

In order to increase the quantity available for sales, a roasting operation is needed. This addition would make TG operation less reliant on others, and will enable sales of a roasted product to increase dramatically. The roasting capability would require an initial capital outlay in the form of an additional building, roasting equipment and other associated equipment such as conveying, handling and mixing items. With these additions and the added operational costs, more labor, management and expendables would be required. The sales potentially can increase; however the unknown is if this is a financially sound endeavor. The problem to be addressed is if the roasting pistachio operation is a profitable investment for the TG operation and is the investment and operation of the facility feasible as a value added project.

1.2 The Objective

The objective of this thesis is to evaluate the profitability and feasibility of purchasing and operating a pistachio roasting operation as a value added activity for the TG operation. The thesis determines the costs associated with the investment in buildings and equipment, and operating costs associated for targeted sales numbers each year for a 15 year period. The analysis considers fulltime processing labor, administrative support, a salaried manager position, utility cost estimates, packaging costs, insurance, marketing costs, and other incidental costs associated with this operation. Depreciation of the capital investments and the tax effect on the total farm operation is included in the analysis. A spreadsheet model is used to project cash flows for a 15 year period. Three scenarios are analyzed. Scenario 1 analyzes a processing operation that processes and sells only the product grown by TG throughout the life of the project. Scenario 2 analyzes an operation that processes and sells 90,000 pounds of product after the third year of operation. Scenario 3 analyzes an operation that processes and sells 200,000 pounds of product beginning in the year 6. This amount represents the annual plant capacity. With this model, the analysis will determine if the investment will be profitable and if the operation will generate the required cash to meet the periodic debt requirements associated with this operation.

1.3 History of the nut and the industry in the United States

The pistachio nut, known from antiquity in Asia Minor, the islands in the Mediterranean and the Middle East countries as a luxury food has become an established crop in the United States, primarily in California. Other areas such as New Mexico, Arizona and west

Texas have small localized areas under cultivation. The nut is consumed in the same manner as it was in ancient times, that being a dried, roasted, food that has a split shell easily opened by hand. Currently, over 80 % of the pistachios consumed are eaten in this manner. The industry focuses virtually all activity in promoting the nut as a food product consumed in this manner. Rootstock planted, cultivars chosen, orchard layout, plant nutrition, tree maintenance and processing activities consider optimizing the product that will provide the best in shell pistachio nut.

The ultimate product sought is the naturally split nut that is easily opened by hand, with no shell stains, uniform in size and 25 to 30 nuts weighing one ounce. The pistachio nut is grown on a tree. The tree is deciduous, dioecious (male and female flowers on separate trees), drought resistant and very tolerant to hot and dry weather conditions. The tree can tolerate low temperatures but is sensitive to spring frosts which can kill the flower and damage new growth. The tree does not tolerate high humidity during the growing season. The tree must be dormant for at least 1000 hours each year at a temperature below 45 degrees but cannot sustain long periods of extreme cold. This 1000 hour period is the rest period. Nut production is drastically reduced if the rest period is curtailed. Because of these unique climatic conditions, the growing area in the United States is limited to geographical regions around Kern county California and the high desert areas of Arizona, New Mexico and west Texas. (Ferguson, Pistachio Production, 1995)

The industry initially started in the early 1900’s in California. Early industry activity was focused on developing cultivars, both male and female, that were conducive to California. After several years of research, the best cultivars were determined to be the nut producing

"Kerman" and the pollinator "Peters". Research also was conducted on rootstock varieties and orchard layout. Today, the industry primarily consists of these cultivars grafted to a variety of rootstocks developed for specific geographical and climatic conditions. (Ferguson, Pistachio Production, 1995)

1.4 The Orchard and Plantings

Orchards are planned considering pollination in the spring and harvest activities in the fall. The initial activity is the planting of rootstock. Rootstocks are utilized because of their generic faster root development and provide a means to control the male and female tree layout of the cultivar in the orchard that promotes uniform pollination. A tree spacing of 18 to 20 feet on center is used. This spacing will yield approximately 120 to 140 trees per acre. The year following planting, the rootstock is grafted with the appropriate cultivar. A ratio of one Peters to 12 Kerman is the most common ratio used. Planting of the Kerman cultivar would yield a random male to female layout and the most desirable pollinator, Peters could not be obtained. Once the graft has taken, orchard activity for the next 3 to 4 years consists of irrigating, fertilizing, weed control, tree training and pruning.

Nuts appear the fourth year after grafting. Initial yields are about 50 pounds per acre and achieve an average yield of 2000 pounds per acre when fully mature about the 12^{th} year after grafting. The Kerman cultivar is very susceptible to alternate year bearing tendencies. The yields can vary year to year on a mature tree from a low of 1500 pounds per acre to highs approaching 2500 pounds per acre.

1.5 The Crop and Harvest

During March, the male and female fruit buds begin to swell. The flowering begins in mid April. The female flower is apetalous (no petals) and has no nectar to attract bees. The pollen produced by the male flower on a separate tree is spread by wind. Each female bud contains 100 to 300 minute flowers on a rachis (similar to the stem on a grape cluster). At pollination time, the bud and rachis measures about 1 to 1 ½ inches long.

Figure 1.1: Female Pistachio Flower

Throughout April and May, the rachis and the pistachio nut grow to its full size.

Figure 1.2: Pistachio Nuts on Rachis

Botanically, pistachio nuts are drupes and consist of three parts; an exocarp, a mesocarp and an endocarp. The exocarp is a soft fleshy hull, the mesocarp is the hard shell and the endocarp is the nutmeat. After attaining full size, the mesocarp hardens into the hard shell. This occurs during June. The nutmeat begins growing in July and fully fills the hard shell by mid August. Throughout August and early September, the nut ripens and the radial suture around the hard shell begins to split, the exocarp (hull) degrades and the individual nut begins to separate from the rachis. (Ferguson, Pistachio Production, 1995)

Figure 1.3: Ripened Pistachio Nuts

Harvesting begins when most of the nuts have ripened. Generally a 20 day window exists for optimum harvest. Prior to this time frame, nuts are immature and after the window, the exocarp degrades to a state that staining of the hard shell occurs and the occurrence of

alftoxins increases. If alftoxin level exceeds the regulated maximum level, the product cannot be sold to the consumer. Harvesting is mechanically performed using a pair of machines; one that shakes the tree and the other that captures the nuts.

Figure 1.4: Harvesting Machines

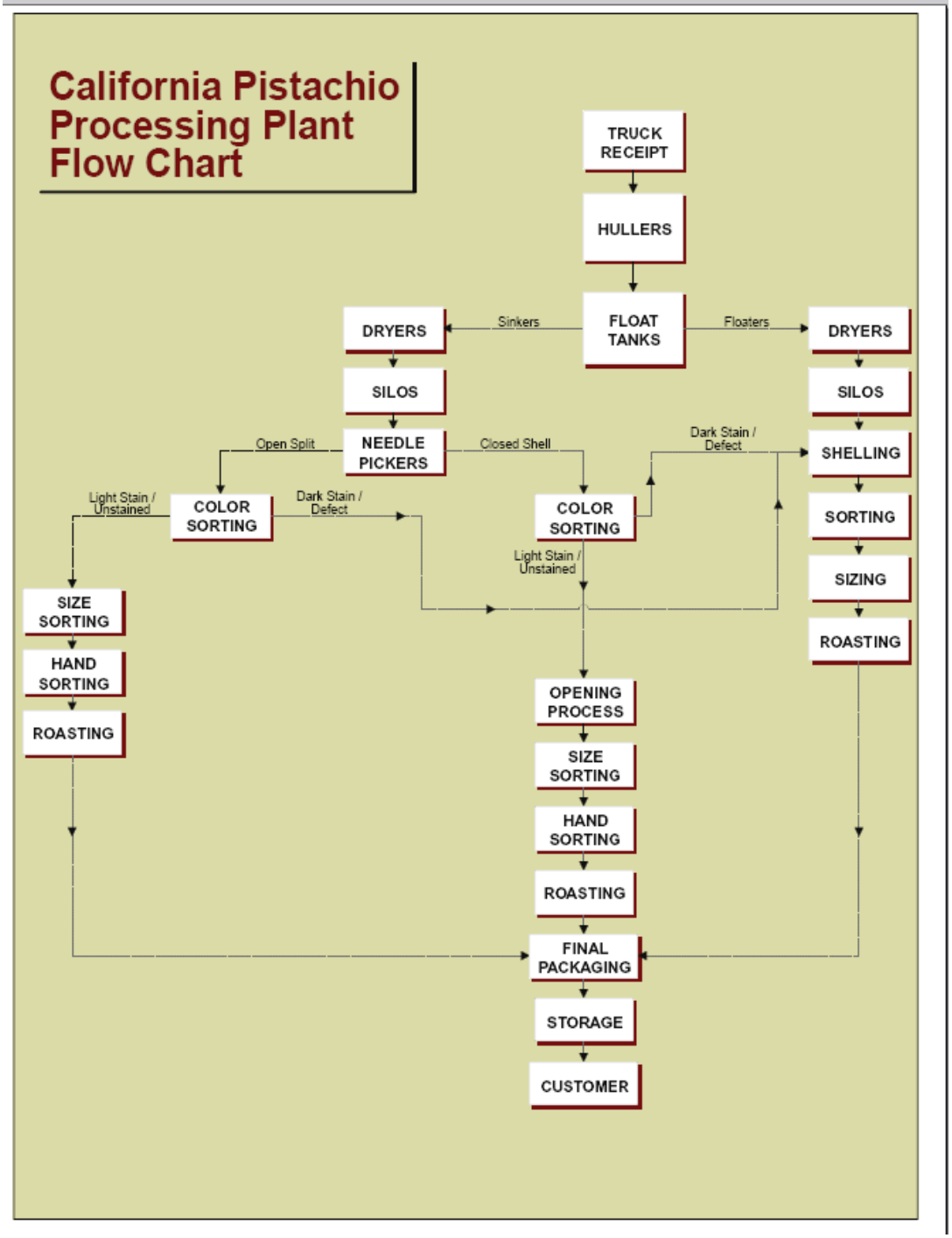
On a good day, without major mechanical breakdowns, 400 to500 trees can be harvested (shaken). This represents about 6,000 to 8,000 pounds of nuts; dried weight.

1.6 Processing

The primary use of the pistachio nut is as an in-shell snack food. This is due to the ease of opening the nut without a cracking tool. This accounts for 80 % of the pistachio utilization. The non-split nuts are used primarily as added ingredients with other food products such as packaged snack mixes, ice cream and condiments. Although a market exists for non-split nuts, the sorting process is complex and time consuming. The salable product consists of

whole kernels for snack mixes and broken kernels for ingredients for other foods. Figure 1.5 illustrates the processing steps.

Figure 1.5: California Pistachio Processing Plant Flow Chart



(Victoria Island, California Pistachio Processing Plant Flow Chart,)

Immediately after harvesting, the hullers remove the exocarp from the hard shell. This process step must be performed within 24 hours of harvesting to prevent shell staining and mold occurrence. The process is an abrasive wet process that includes initial washing of the nut. The nut is then conveyed to a float tank in which the good nut, sinker, settles to the bottom of the tank and is segregated from the floaters which are conveyed to a separate containment area. Floaters generally comprise 10% to 15% by volume of the harvested nut. Both sinkers and floaters are then dried at about 150 degrees until the nut moisture content is about 5% to 6%. Hulling, floating and drying operations are performed simultaneously with the harvest operation, since the nuts are perishable at this stage of processing. The dried nuts are then stored in a refrigerated environment.

The sinkers contain the product that is used as a snack food in its original grown state. The floaters are used in a shelled state as additives with other food products. The needle pickers separate the split nuts from the closed nuts. In this processing stage, the nuts transgress through a rotating tube 3 to 4 feet in diameter. The inside of the tube is lined with small needles that catch the split opening of the shell. Non-split nuts transgress through the bottom of the rotating tube and are combined with the floater nuts. Color sorting accomplished by either a hand or machine operation. This step eliminates unsightly and shell stained nuts. The industry has established a per cent stained criteria in the voluntary grade criteria. The electronic machines have sensitivity settings for the separation process and hand sorting tables have speed adjustments. The food quality of a stained versus non-stained nut are the same; however the appearance impacts the value.

The sorted nuts are then sized based on the number of nuts per ounce. Generally, three size batches are sought. Another hand sorting operation is performed, and then the split nuts are roasted. The roasting is performed in either a batch oven or a low speed rotating oven. The roasting operation is performed at a temperature of 250 degrees for approximately 20 minutes. The nuts are then packaged and ready to sell.

The floaters and un-split nuts that have been dried are further processed by breaking the shell and separating the nutmeat. The nutmeat is sorted by size and then roasted. The nutmeat is used as a snack food or as an added ingredient for other food products.

CHAPTER 2: METHODS

2.1 Theory

The value added process activities for Tularosa Groves will require a capital investment in additional equipment, fulltime labor resources and additional operating inputs. As with most capital investments, the initial investment is greater than the immediate cash returns. The initial outlay is recouped over time. The ability to recoup this initial investment will determine the profitability of the project. Several evaluation techniques are available to determine profitability. Some notable techniques are internal rate of return, net present value, payback period, hurdle rate, sensitivity analysis, and book rate of return. All utilize some sort of analysis involving time, costs, income, and cash flows. To determine profitability, the anticipated cash flows of the value added project will be analyzed (Brealey and Myers, 2003).

In addition to the investment being profitable in the long run, the periodic financial commitments such as payrolls, loan payments, taxes, etc. must be paid. The investment must be feasible throughout the life of the project. Cash flows are used to determine feasibility of the investment. Cash flows in this analysis will determine if deficits occur and provide information to determine if appropriate remedies are available to mitigate cash deficits.

To determine if this value added project is a good venture for our current farm operation, both the profitability and the financial feasibility will be analyzed. In order for this project to be undertaken, both the profitability and feasibility must be considered.

The profitability and feasibility result from the cash flow analysis are dependent on the accuracy of the input data utilized. Managers and analyst use the best available sources to predict the future, however, the data used is still an estimate and subject to factors beyond the realm of historical facts and theoretical results provided by analytical equations. Risk and uncertainty are involved. The risk in cash flow projections can involve both costs and income and an uncertain future. Consumer purchasing can change over time and the costs of goods purchased are subject to other market factors. Confidence factors are vital to the decision process used from the results of the analysis (Brealey and Myers, 2003).

2.2 Methods

To determine the profitability of the project, a capital budget for fifteen years was developed. The budget considered income generated, operating costs, labor costs, packaging costs, tax effect, depreciation, salvage value, loan costs, rent, and initial project cash outlays for equipment down payments. The net annual cash positions were determined. A discounted cash flow method was used to determine the net present value of the investment.

Of all the profitability measuring methods available, a discounted cash flow model is the most utilized. A survey of 392 Chief Financial Officers (CFO) revealed that 75% of the firms responding use present value techniques and the capital asset pricing mode (CAPM) for evaluating new investments. The survey was conducted on large and small firms. Larger firms tended to use present value models more so than smaller firms. CFO's with business degrees, primarily MBA's, utilized these procedures more than those without out the degrees. Smaller firms and less financially stable firms tend to use less accurate

payback procedures. The reasoning stated was a need to regain initial investments quicker, unfamiliarity of more accurate procedures that considers the risk involved, and the size of the firm and absence of other projects that produce a profit and enable pooling of risk and analyzing the overall effect on the firm. The firms using net present value techniques considered firm risk rather than specific project risk. The CAPM is used to establish the return rate for all investments analyzed by net present value techniques. The Internal Rate of Return (IRR) and the Net Present Value (NPV) procedures were used with equal frequency (75%) (Graham and Harvey, 1999).

The theory that involves discounted cash flow is that a dollar today is worth more than a dollar in the future. The longer the period of time to the receipt of the dollar, the more that dollar is discounted. Using discounted cash flows, the dollars received over time are converted to present day dollars. The amount of the discount is based on a rate of return that is expected from other investments for the firm.

The NPV and the IRR are similar in that future cash flows are discounted and compared to present day expenditure. The NPV uses the firm's rate of return, discounts the cash flow, and subtracts the initial capital outlay for the investment from the discounted cash flow. If a positive number results from the comparison, the investment is worthwhile. The IRR is similar in process as the NPV. The difference is that the IRR determines the discount rate or rate of return that has a NPV equal to zero (Brealey and Myers, 2003).

The results of the capital budgeting analysis are a net after tax net cash position for each year of operation for a project life of 15 years. The results provide a NPV for the project

and a cash position for each year of operation. The equations (1) through (5) provide a description of the procedures used to calculate the NPV. The loan down payments represent the initial cash outlay for the project (equation 5). The principal payments represent the remaining capital outlay over the life of the project rather than one large initial investment (equation 4). The cash income before taxes are represented by the revenues generated and the expenses incurred for each year of operation. Salvage value is assumed to be 20% of the original equipment purchase price. Because all equipment was depreciated after year 8, the salvage value is taxable as ordinary income. This salvage value is treated as depreciation recapture and is accounted for in the last year of operation of the project in the cash income for that year. Tax expenses are determined based on the cash income before taxes less depreciation and loss carryover. Losses in the previous year are used to reduce the income in the current year. Loss carryover is applicable if the project is a corporation. This project will be formed as a corporation separate from the farming operation. Principal payments reduce the cash income; however, these payments do not reduce taxes as do direct operating expenses. The rate of return is a reduction of the desired rate of return for the project considering the average tax rate for the life of the project. Net cash position which is calculated as described in equation (6) is also used to examine annual cash flows.

$$CIBT_k = R_k - OC_k - I_k \quad (1)$$

$$TI_k = CBT_k - D_k + DR_{15} \quad (2)$$

$$T_k = TI_k \times TR_k \quad (3)$$

$$NCIAT_k = CIBT_k - T_k - P_k \quad (4)$$

$$NPV = \sum_{k=1}^{N} NCIAT_k * (1+i)^{-k} - DP_0 \qquad (5)$$

$$NCP_k = CIBT_k - T_k - P_K \qquad (6)$$

$CIBT_k$ = Cash income before taxes year k

K = 1 to N periods (15 years)

R_k = Revenue in year k

OC_k = Operating costs in year k

I_k = Interest payments in year k

TI_k = Taxable income in year k

D_k = Depreciation in year k

DR_{15} = Depreciation recapture in year 15

T_k = Taxes in year k

TR_k = Federal and state tax rate in year k

$NCIAT_k$ = Net cash income after taxes

P_k = Principal loan payments in year k

NPV = Net present value

i = Discount rate

DP_o = Loan down payment at beginning of investment

NCP_k = Net cash position in year k

CHAPTER 3: MODEL AND DATA DESCRIPTION

3.1 Spreadsheet Description

Utilizing the previously described equations, Excel spreadsheets were developed using the relevant items that comprise sales, costs, tax rates, depreciation, down payments, principal payments, and interest payments that relate to the proposed project. A project life of 15 years is used which represents the economic technological life. At this time, TG production would be approaching full production as described in scenarios 1 and 2 and the plant would be producing a maximum equipment capacity as described in scenario 3. A decision to sell, augment the operation or modernize the technology would be made at the 15 year time.

Table 3.1 reports the building and equipment costs details. This includes the cost of the equipment required and the cost of a building needed to support the proposed operation. A rental rate for the applicable portion of the building is used because the proposed building would house other TG operations not directly associated with nut processing. From the cost data for equipment needed, down payment amounts, annual loan interest, principal amounts, salvage value and annual equipment depreciation annual costs are estimated for use in the cash flow for determining the net present value.

Table 3.2, provides details on labor requirements and costs associated with the processing operation. The basis for the production rates are the proposed equipment manufacturers daily production capacities and output rates. Crew sizes and labor costs are estimated using local wage rates. A labor cost for processing 10,000 pounds of packaged product is estimated. This amount represents a continuous week’s production. Smaller amounts

increase disruption and crew inefficiencies due to start up processes, cleanup activities and machine setup calibrations.

Table 3.3 provides a summary of the costs of packaging materials, packing materials, flavorings, and historical prices paid to growers for raw pistachio nuts. The data depicting historical pistachio prices was included in order to determine if price trends could exist and if out year prices could be predicted. No trends were depicted and the prices appear random in nature.

Table 3.4 summarizes the projected sales quantity and revenue for the fifteen year life of the project. A fifteen year period was chosen because this is the projected time all the current stock of planted trees will achieve full (mature) production as shown in Scenarios 1 and 2 and the processing equipment purchased will need to be replaced due to physical aging, increased maintenance of the equipment and anticipated new technological advancements.

Table 3.5 reports the projected sales, package weights, units sold, and product prices for each product category. Sales are categorized into Retail, Corporate Holiday, and Wholesale sales. Within each category, the sales are further categorized by the type of flavoring and the package size. The percentage of flavored product and package size is based on historical sales data. The amount of flavored product and package size by category is required to determine packaging costs and usage amounts. The unit price within each category by package size is from the current TG pricing structure.

The percentage of category sales is a function of marketing effort undertaken. The most predictable and easiest to control is the wholesale category. This can be accomplished by increasing the use of snack food jobbers, seasonal contracts, and contracts with chain and national outlets. This effort will yield fixed contracts to fulfill in the future. In addition, product deliveries will occur throughout the year. The Wholesale category is more controllable than other categories and annual goals can be set. Marketing activities for the other categories can be changed based on the wholesale quantities anticipated each year. An average price per pound is determined based on total sales divided by pounds sold.

Table 3.6 shows the projected packaging and labor use by year. A labor usage factor is determined. This factor is used to determine when a fulltime processing crew will be needed and equipment capacities are maximized.

Table 3.7 summarizes the state and federal tax expenses and average tax rate for the life of the project. The tax rate utilizes the Federal IRS tax schedule for a corporation. New Mexico state tax rates and the allowable three year period for corporate loss carry over is sed for calculating the tax expense each year. A loss carryover is applicable if the processing entity is a corporation. From the tax amount calculated each year and the taxable income applicable for that year, a tax percent is calculated. This rate is averaged over the fifteen year life of the project and utilized in discounting the desired rate of return in the NPV calculation. An after tax rate of return was used since the NPV is based on after tax income.

Table 3.8 reports the results of the annual income and expense estimates and the NPV analysis. The income portion of the sheet utilizes increasing amounts of finished product sold culminating in the third year of the project at 90,000 pounds when the production level of the nut processing process facility reaches normal annual capacity. The income generated is based on the quantity sold and the distribution of sales by category provided in Table 3.5. Sales revenues can be re-estimated in the model by changing the quantity available to sell and adjusting the category of sales as a percentage.

The expense portion includes all costs associated with the processing activity. Annual percentage increases were applied to account for personnel cost increases and increasing maintenance on aging equipment. Table 3.9 lists the expense items and source for each item of cost.

The NPV is estimated in Table 3.8. Income before taxes is calculated by subtracting operating expenses including interest expense from the total income generated from product sales. The taxable income is determined by subtracting depreciation from the income before taxes plus any depreciation recaptured as ordinary income in year 15. The tax expense is based on this estimate amount if a loss carry over from the previous year is not applicable. If the loss carryover provision is utilized, the taxable income is further reduced by the loss incurred during the previous year.

Net cash income is calculated as cash income before taxes minus taxes minus principal payments. This calculation is made with and without the loss carryover provision. These results for each year are used in the NPV calculation. The NPV calculation utilizes a before

tax discount rate of 15%. This rate determination is not based on precise empirical data but a judgmental consideration of three factors; the cost of borrowing money, a moderate personal investment strategy, and the risk involved in the production of an agricultural commodity. The cost of borrowing money is currently 8.5%. A moderate return expected on other investment options corresponding to my personal attributes is be about 12%. The price paid for the raw nut product is based on market prices that can fluctuate for unpredictable reasons adding risk to expenses anticipated. Based on these factors, a 15% discount rate is utilized. This considers the combination of borrowing rate of capital, price risk, and an amount that could be reasonably expected from a long term investment involving personal investment strategies on commercially available investment options. This 15% rate is adjusted to an after tax discount rate in order to determine a net after tax cash income.

The NPV is calculated under two scenarios. This includes a before tax rate of return and an after tax rate of return.

3.2 Model Variability and Flexibility

The model utilizes the best available input information based on historical data, estimates and available factual data. The initial model analysis (scenario 1) assumes that only the product grown by TG would be available for processing and sales. The model can input any amount of product up to the processing capacity of the equipment. Additional raw product can be purchased from other growers or imported from other states. The amount to be processed for sales can exceed the amount grown in a particular year. In essence, the plant can operate at full production the first year of operation. The advantage of selling

only TG product is the cost (price) of the raw product is paid to the growing operation of TG and not another grower. Essentially the nut cost is transferred to another family owned operation.

The model can evaluate numerous scenarios by changing critical variables such as the amount of raw product, percentages of each sales category, and high versus low cost equipment purchases. The model can be used to perform sensitivity analysis by changing critical variables and examining the impacts on cash flows and NPV.

The model can also be used with @Risk to generate distribution of the cash flows and NPV by incorporating random number generations (probability distributions) of critical uncertain variables. This analysis utilizes random number inputs for the wholesale sales category and the price paid for raw nuts. The wholesale category uses a truncated triangular probability distribution for the percentage of total sales that are at the wholesale price. The reasoning for this type of distribution is that the percentage is more controllable than random. The minimum, most likely and maximum percentage expected is 25%, 60%, and 70% respectively. The raw nut price is a truncated normal distribution since the historical prices do not predict a trend and human factors (demand) set the price. The raw nut prices are truncated at $1.00 and $2.20 with a mean of $1.22 and standard deviation of $.29. The risk analysis is used to examine the cumulative distribution of annual cash flow and the NPV.

A “static” analysis of the NPV is also performed without the use of probability distribution with one of the uncertain variables held at a constant value while varying the other

uncertain variable over a selected range. This is done by holding the raw nut price at a constant amount and varying the percentage of wholesale sales amounts. Another analysis is conducted by holding the wholesale sales percentage constant and varying the raw nut price. Two of the analysis scenarios were used in the sensitivity analysis. The resulting NPV is the record for each respective price level. Therefore, four sets of NPV values derived in the sensitivity analysis are reported. The change in NPV dollar amount is also compared.

Table 3.1: Investment Cost, Loan Characteristics, and Depreciation of Processing Equipment and Building.

5000 SF Metal Building	Cost	Amort Period	Int Rate	Square FT	Cost / SF
Structure	24000			4000	3
Slab	17500			5000	3
Building Erection	12000			4000	3
Plumbing	5000				
Interior Electrical	5000				
Electrical service	1000				
Commercial Kitchen	8000				
HVAC	3000				
Cold Room	10000				
Natural Gas Service	1000				
10% Contingency	8650				
Total Cost	**95150**	10	8.50%		
Amortorized Cost per Year / Rent	($14,501.59)				

Sorting Equipment (not purchased)	
Color sorter	0
Total Cost	0
Downpayment	0
Loan Amount	$0.00
Loan Payment per Year	$0.00

Roasting Equipment	
Mixing Vat	10000
Roaster Oven	59000
Cooling Bin	8250
Conveyance Items	12000
Installation	5000
Factory Rep - Calibration	$5,000
Total Cost	$99,250
Downpayment 20%	$19,850
Loan Amount	$79,400
Loan Payment per Year	$15,512

Loan Information and Salvage					Salvage
Item	Rate	Nper	LOAN	Total Cost	Value %
Roasting Equipment	8.50%	7	$79,400	99250	20.00%
Packaging Equipment	8.50%	5	$12,000	15000	20.00%
Misc Equipment	8.50%	5	$15,200	19000	20.00%

Roasting Equipment							
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7
Payment	$15,512	$15,512	$15,512	$15,512	$15,512	$15,512	$15,512
Interest	$6,749	$6,004	$5,196	$4,319	$3,368	$2,335	$1,215
Principal	$8,763	$9,508	$10,316	$11,193	$12,145	$13,177	$14,297
Principal Balance	$70,637	$61,128	$50,812	$39,619	$27,474	$14,297	($0)

TABLE 3.1: INVESTMENT COST, LOAN CHARACTERISTICS, AND DEPRECIATION OF PROCESSING EQUIPMENT AND BUILDING. (cont'd)

Packaging Equipment	
Bagging Machine w / scale	$7,000
Conveying Auger	$6,000
Unit Scale	$2,000
Total Cost	$15,000
Downpayment	$3,000
Loan Amount	$12,000
Loan Payment per Year	$3,045

Sorting and Miscellaneous Equipment	
Sorting Table	$5,000
Pallet Scale	$2,000
Forklift	$6,000
Bins	$3,000
Mixing Barrels	$1,000
Counters and Carts	$2,000
Total Cost	$19,000
Downpayment	$3,800
Loan Amount	$15,200
Loan Payment per Year	$3,857

Packaging Equipment					
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Payment	$3,045	$3,045	$3,045	$3,045	$3,045
Interest	$1,020	$848	$661	$458	$239
Principal	$2,025	$2,197	$2,384	$2,587	$2,807
Principal Balance	$9,975	$7,777	$5,393	$2,807	($0)

Sorting and Miscellaneous Equipment					
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Payment	$3,857	$3,857	$3,857	$3,857	$3,857
Interest	$1,292	$1,074	$837	$581	$302
Principal	$2,565	$2,783	$3,020	$3,277	$3,555
Principal Balance	$12,635	$9,851	$6,832	$3,555	($0)

Total Interest Paid per Year	$9,061	$7,926	$6,694	$5,358	$3,908	$2,335	$1,215

Depreciation - MACRS 7 yr SL and Depreciation Recapture											
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 15 Book	YR 15	Depreciation
Percentage	7.13%	14.29%	14.29%	14.29%	14.29%	14.29%	14.29%	7.13%	Book Value	Salvage Value	Recapture
Roasting Equipment	$7,077	$14,183	$14,183	$14,183	$14,183	$14,183	$14,183	$7,077	$0	$19,850	$19,850
Packaging Equipment	$1,070	$2,144	$2,144	$2,144	$2,144	$2,144	$2,144	$1,070	$0	$3,000	$3,000
Sorting and Misc Equipment	$1,355	$2,715	$2,715	$2,715	$2,715	$2,715	$2,715	$1,355	$0	$3,800	$3,800
Total Depreciation per year	$9,501	$19,041	$19,041	$19,041	$19,041	$19,041	$19,041	$9,501	$0	$26,650	$26,650

Table 3.2: Labor Requirements and Costs

Manpower								
Operation	Machine Rate per Day	Crew Size	Set up - hrs	Cleanup - hrs	Pounds/Day	Man hours/day	Man hours/ Pound	Mandays/10000 Pounds
Sorting	2000	2	1	1	1500	16	0.010666667	13
Roasting	2500	2			1875	16	0.008533333	11
Bagging	2500	2			1875	16	0.008533333	11
Mailing/Shipping		1	0	0		8		
Admin/Quality Check		1	0	0		8		
Max Ann plant Cap 150dys	300000						Total =	35

Labor Analysis and Rates		
Hourly Rate	$9.00	$12.00
SS	$0.69	$0.92
Medical Insurance	$0.75	$0.75
401K	$0.27	$0.36
Bonus	$0.45	$0.60
Vacation, Holiday	$0.62	$0.83
Total Gross Hourly Rate	$11.78	$15.46
Total Gross Weekly Rate	$471.26	$618.35
Total Gross Annual Labor	$23,563.15	$30,917.54

Labor Usage						
Pounds	Mandays	Crew Days	Work Weeks	Weeks plus Contingency	Utilization / Year	Labor Cost / Year
10000	34.7	17.3	3.5	5.2	0.1	$5,666

Table 3.3: Raw Nut and Packaging Costs

Consumable Costs	
	Cost/unit
Product Items	
Raw Nuts	$1.33
Mylar Pouches	0.41
Cloth Sacks - each	0.71
Boxes	0.1
Packing Material	0.02
Flavorings	0.03

=RiskNormal(A40, A39,RiskTruncate(A37, A38))

=RiskNormal(1.22, 0.29,RiskTruncate(1, 2.2))

Pistachio Prices*	
Year	Price/#
1995	$1.09
1996	$1.16
1997	$1.13
1998	$1.03
1999	$1.33
2000	$1.01
2001	$1.01
2002	$1.10
2003	$1.22
2004	$1.34
2005	$2.03

*** Source USDA/California Pistachio Commission, March 2006**

Pistachio Price Distribution	
(Normal Truncated)	
$1.00	<< Minimum Price
$2.20	<<Maximum Price
$0.29	<<Standard Deviation
$1.22	<<Mean
$1.33	<<Price Distribution

Table 3.4: Projected Sales Quantity and Revenue.

Worksheet - Income, Packages, Sales, Distribution, etc.															
Year #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Pounds Sold (X1000)	50	70	90	90	90	90	90	90	90	90	90	90	90	90	90
Income from Sales	259640	363495	467351	467351	467351	467351	467351	467351	467351	467351	467351	467351	467351	467351	467351
Average per Pound return	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19	$5.19
Retail Sales $															
One pound Pouches - Salted	53667	75133	96600	96600	96600	96600	96600	96600	96600	96600	96600	96600	96600	96600	96600
One pound Pouches - Flavored	23000	32200	41400	41400	41400	41400	41400	41400	41400	41400	41400	41400	41400	41400	41400
2 1/2 pound - Salted	42933	60107	77280	77280	77280	77280	77280	77280	77280	77280	77280	77280	77280	77280	77280
2 1/2 pound - Flavored	7283	10197	13110	13110	13110	13110	13110	13110	13110	13110	13110	13110	13110	13110	13110
5 pound salted	5750	8050	10350	10350	10350	10350	10350	10350	10350	10350	10350	10350	10350	10350	10350
Retail Total $	132633	185687	238740	238740	238740	238740	238740	238740	238740	238740	238740	238740	238740	238740	238740
Retail Pounds Sold															
One pound Pouches - Salted	7667	10733	13800	13800	13800	13800	13800	13800	13800	13800	13800	13800	13800	13800	13800
One pound Pouches - Flavored	2875	4025	5175	5175	5175	5175	5175	5175	5175	5175	5175	5175	5175	5175	5175
2 1/2 pound - Salted	6708	9392	12075	12075	12075	12075	12075	12075	12075	12075	12075	12075	12075	12075	12075
2 1/2 pound - Flavored	958	1342	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725
5 pound salted	958	1342	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725
Retail Total Pounds	19167	26833	34500	34500	34500	34500	34500	34500	34500	34500	34500	34500	34500	34500	34500
Corporate Holiday Sales $															
One pound Pouches - Salted	2625	3675	4725	4725	4725	4725	4725	4725	4725	4725	4725	4725	4725	4725	4725
One pound Pouches - Flavored	5750	8050	10350	10350	10350	10350	10350	10350	10350	10350	10350	10350	10350	10350	10350
2 1/2 pound - Salted	12000	16800	21600	21600	21600	21600	21600	21600	21600	21600	21600	21600	21600	21600	21600
2 1/2 pound - Flavored	4200	5880	7560	7560	7560	7560	7560	7560	7560	7560	7560	7560	7560	7560	7560
5 pound salted	1100	1540	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
Corporate Total $	25675	35945	46215	46215	46215	46215	46215	46215	46215	46215	46215	46215	46215	46215	46215
Corporate Holiday Sales #'s															
One pound Pouches - Salted	500	700	900	900	900	900	900	900	900	900	900	900	900	900	900
One pound Pouches - Flavored	1000	1400	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
2 1/2 pound - Salted	2500	3500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
2 1/2 pound - Flavored	750	1050	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350
5 pound salted	250	350	450	450	450	450	450	450	450	450	450	450	450	450	450
Corporate Total #'s	5000	7000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000
Wholesale $															
One pound Pouches - Salted	48438	67813	87188	87188	87188	87188	87188	87188	87188	87188	87188	87188	87188	87188	87188
One pound Pouches - Flavored	18406	25769	33131	33131	33131	33131	33131	33131	33131	33131	33131	33131	33131	33131	33131
2 1/2 pound - Salted	23896	33454	43013	43013	43013	43013	43013	43013	43013	43013	43013	43013	43013	43013	43013
2 1/2 pound - Flavored	5942	8318	10695	10695	10695	10695	10695	10695	10695	10695	10695	10695	10695	10695	10695
5 pound salted	4650	6510	8370	8370	8370	8370	8370	8370	8370	8370	8370	8370	8370	8370	8370
Wholesale Total $	101331	141864	182396	182396	182396	182396	182396	182396	182396	182396	182396	182396	182396	182396	182396
Wholesale #'s															
One pound Pouches - Salted	12917	18083	23250	23250	23250	23250	23250	23250	23250	23250	23250	23250	23250	23250	23250
One pound Pouches - Flavored	3875	5425	6975	6975	6975	6975	6975	6975	6975	6975	6975	6975	6975	6975	6975
2 1/2 pound - Salted	6458	9042	11625	11625	11625	11625	11625	11625	11625	11625	11625	11625	11625	11625	11625
2 1/2 pound - Flavored	1292	1808	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325
5 pound salted	1292	1808	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325
Wholesale Total #'s	25833	36167	46500	46500	46500	46500	46500	46500	46500	46500	46500	46500	46500	46500	46500
Total $	259640	363495	467351	467351	467351	467351	467351	467351	467351	467351	467351	467351	467351	467351	467351
Total #'s	50000	70000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000

Table 3.5: Distribution of Sales, Package Weights, Units Sold and Product Prices.

Sale Distribution, Cost, Pkg Size' etc.	% of Total Sales	% Retail Sales	% Total Sales	Pkg Wgt #'s	Pkg Qty	Total #'s	Pkg Price	Per # Price
Retail Sales	**0.3833**							
One pound Pouches - Salted		40%	15.3%	1.0	7667	7667	$7.00	$7.00
One pound Pouches - Flavored		15%	5.8%	1.0	2875	2875	$8.00	$8.00
2 1/2 pound - Salted		35%	13.4%	2.5	2683	6708	$16.00	$6.40
2 1/2 pound - Flavored		5%	1.9%	2.5	383	958	$19.00	$7.60
5 pound salted		5%	1.9%	5.0	192	958	$30.00	$6.00
TOTAL		100%	38.3%					
Corporate Holiday Sales	**0.1**							
One pound Pouches - Salted		10%	1.0%	1.0	500	500	$5.25	$5.25
One pound Pouches - Flavored		20%	2.0%	1.0	1000	1000	$5.75	$5.75
2 1/2 pound - Salted		50%	5.0%	2.5	1000	2500	$12.00	$4.80
2 1/2 pound - Flavored		15%	1.5%	2.5	300	750	$14.00	$5.60
5 pound salted		5%	0.5%	5.0	50	250	$22.00	$4.40
TOTAL		100%	10.0%					
Wholesale	**0.52**							
One pound Pouches - Salted		50%	25.8%	1.0	12917	12917	$3.75	$3.75
One pound Pouches - Flavored		15%	7.8%	1.0	3875	3875	$4.75	$4.75
2 1/2 pound - Salted		25%	12.9%	2.5	2583	6458	$9.25	$3.70
2 1/2 pound - Flavored		5%	2.6%	2.5	517	1292	$11.50	$4.60
5 pound salted		5%	2.6%	5.0	258	1292	$18.00	$3.60
TOTAL		100%	51.7%					

Wholesale Distribution	
(Triangular Distribution)	
Minimum>	25.0%
Most Likely>	60.0%
Maximum>	70.0%
Wholesale % of Sales>	**See cell B74**
=RiskTriang(M70, M71, M72)	
=RiskTriang(0.25, 0.6, 0.7)	

Table 3.6: Projected Packaging and Labor Use, and Cost.															
Year #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
One # Mylar Pouch Salt	21083	29517	37950	37950	37950	37950	37950	37950	37950	37950	37950	37950	37950	37950	37950
One # Mylar Pouch Flavor	7750	10850	13950	13950	13950	13950	13950	13950	13950	13950	13950	13950	13950	13950	13950
2 1/2 # Salted Sack	6266.7	8773.3	11280	11280	11280	11280	11280	11280	11280	11280	11280	11280	11280	11280	11280
2 1/2 # Flavored Sack	1200	1680	2160	2160	2160	2160	2160	2160	2160	2160	2160	2160	2160	2160	2160
5 # Salted Sack	500	700	900	900	900	900	900	900	900	900	900	900	900	900	900
Mylar Pouch Cost	11,822	16,550	21,279	21,279	21,279	21,279	21,279	21,279	21,279	21,279	21,279	21,279	21,279	21,279	21,279
Cloth Sack Cost	5,656	7,919	10,181	10,181	10,181	10,181	10,181	10,181	10,181	10,181	10,181	10,181	10,181	10,181	10,181
Total Pkg Cost	17,478	24,469	31,460	31,460	31,460	31,460	31,460	31,460	31,460	31,460	31,460	31,460	31,460	31,460	31,460

Labor Allocation / Yr	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Cost	28330	39662	50994	50994	50994	50994	50994	50994	50994	50994	50994	50994	50994	50994	50994
Usage - % Crew	0.5	0.7	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

Cost/lb (Excludes Downpayment)	$4.73	$4.17	$3.87	$3.89	$3.91	$3.86	$3.89	$3.74	$3.77	$3.79	$3.82	$3.85	$3.88	$3.91	$3.95

Table 3.7: Estimated Taxes

Tax Table - Corporate per IRS					
Income Range $	Minimum Amount	Plus percent	Over Minimum	State	Total
0 - 50000	$0	15.00%	$0	4.90%	19.90%
50000- 75000	$9,950	25.00%	$50,000	4.90%	29.90%
75000 - 100000	$17,425	34.00%	$75,000	4.90%	38.90%
100000 - 335000	$27,400	39.00%	$100,000	4.90%	43.90%

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Income Before Tax		$36,513	$85,778	$135,075	$134,379	$133,726	$133,125	$131,995	$130,884	$128,476	$125,985	$123,407	$120,740	$117,979	$115,122	$112,165
Taxable Income		$27,012	$66,737	$116,033	$115,337	$114,685	$114,083	$112,954	$121,383	$128,476	$125,985	$123,407	$120,740	$117,979	$115,122	$138,815
TAX		$5,375	$14,954	$34,439	$34,133	$33,847	$33,583	$33,087	$36,787	$39,901	$38,807	$37,676	$36,505	$35,293	$34,039	$44,440
Average Tax Rate		19.90%	22.41%	29.68%	29.59%	29.51%	29.44%	29.29%	30.31%	31.06%	30.80%	30.53%	30.23%	29.91%	29.57%	32.01%
Average Over 15 Years	28.95%															

Taxable Income with Loss Carry Over		$27,012	$66,737	$116,033	$115,337	$114,685	$114,083	$112,954	$121,383	$128,476	$125,985	$123,407	$120,740	$117,979	$115,122	$138,815
TAX		$0	$14,954	$34,439	$34,133	$33,847	$33,583	$33,087	$36,787	$39,901	$38,807	$37,676	$36,505	$35,293	$34,039	$44,440
Average Tax Rate		0.00%	22.41%	29.68%	29.59%	29.51%	29.44%	29.29%	30.31%	31.06%	30.80%	30.53%	30.23%	29.91%	29.57%	32.01%
Average Over 15 Years	27.62%															

Table 3.8: Net Present Value Analysis - Value Added Pistachio Processing.

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Pounds Sold		50000	70000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	
Income																	
Retail Sales		$132,633	$185,687	$238,740	$238,740	$238,740	$238,740	$238,740	$238,740	$238,740	$238,740	$238,740	$238,740	$238,740	$238,740	$238,740	
Corporate Holiday		$25,675	$35,945	$46,215	$46,215	$46,215	$46,215	$46,215	$46,215	$46,215	$46,215	$46,215	$46,215	$46,215	$46,215	$46,215	
Wholesale		$101,331	$141,864	$182,396	$182,396	$182,396	$182,396	$182,396	$182,396	$182,396	$182,396	$182,396	$182,396	$182,396	$182,396	$182,396	<<random Variables
Total		$259,640	$363,495	$467,351	$467,351	$467,351	$467,351	$467,351	$467,351	$467,351	$467,351	$467,351	$467,351	$467,351	$467,351	$467,351	
Expenses																	
Raw Nuts Purchased		$66,687	$93,362	$120,036	$120,036	$120,036	$120,036	$120,036	$120,036	$120,036	$120,036	$120,036	$120,036	$120,036	$120,036	$120,036	<<random Variables
Process Building Rent		$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	$14,502	
Processing Labor		$28,330	$39,662	$50,994	$50,994	$50,994	$50,994	$50,994	$50,994	$50,994	$50,994	$50,994	$50,994	$50,994	$50,994	$50,994	
Equipment Repairs / Maintenance		$2,000	$2,100	$2,205	$2,315	$2,431	$2,553	$2,680	$2,814	$2,955	$3,103	$3,258	$3,421	$3,592	$3,771	$3,960	
Packaging Costs		$17,478	$24,469	$31,460	$31,460	$31,460	$31,460	$31,460	$31,460	$31,460	$31,460	$31,460	$31,460	$31,460	$31,460	$31,460	
Shipping Consumables		$3,895	$5,452	$7,010	$7,010	$7,010	$7,010	$7,010	$7,010	$7,010	$7,010	$7,010	$7,010	$7,010	$7,010	$7,010	
Utilities		$6,000	$6,300	$6,615	$6,946	$7,293	$7,658	$8,041	$8,443	$8,865	$9,308	$9,773	$10,262	$10,775	$11,314	$11,880	
Insurance		$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	
Marketing		$5,193	$7,270	$9,347	$9,347	$9,347	$9,347	$9,347	$9,347	$9,347	$9,347	$9,347	$9,347	$9,347	$9,347	$9,347	
Travel/Miscellaneous		$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	
Salary' Manager		$50,000	$51,500	$53,045	$54,636	$56,275	$57,964	$59,703	$61,494	$63,339	$65,239	$67,196	$69,212	$71,288	$73,427	$75,629	
Sales Commission		$12,982	$18,175	$23,368	$23,368	$23,368	$23,368	$23,368	$23,368	$23,368	$23,368	$23,368	$23,368	$23,368	$23,368	$23,368	
Total		$214,066	$269,791	$325,582	$327,615	$329,717	$331,891	$334,141	$336,468	$338,875	$341,366	$343,944	$346,612	$349,372	$352,229	$355,186	
All Loan Interest		$9,061	$7,926	$6,694	$5,358	$3,908	$2,335	$1,215	$0	$0	$0	$0	$0	$0	$0	$0	
Cash Income Before Taxes		$36,513	$85,778	$135,075	$134,379	$133,726	$133,125	$131,995	$130,884	$128,476	$125,985	$123,407	$120,740	$117,979	$115,122	$112,165	
Depreciation		$9,501	$19,041	$19,041	$19,041	$19,041	$19,041	$19,041	$9,501	$0	$0	$0	$0	$0	$0	$0	
Depreciation Recapture																$26,650	
Taxable Income		$27,012	$66,737	$116,033	$115,337	$114,685	$114,083	$112,954	$121,383	$128,476	$125,985	$123,407	$120,740	$117,979	$115,122	$138,815	
Taxes w/o Loss Carryover		$5,375	$14,954	$34,439	$34,133	$33,847	$33,583	$33,087	$36,787	$39,901	$38,807	$37,676	$36,505	$35,293	$34,039	$44,440	
Loan Downpayments	$26,650																
Principal Payments		$13,354	$14,489	$15,720	$17,057	$18,506	$13,177	$14,297	$0	$0	$0	$0	$0	$0	$0	$0	
Net Cash Income w/o Loss Carry Over		$17,784	$56,335	$84,916	$83,189	$81,373	$86,365	$84,612	$94,097	$88,575	$87,177	$85,731	$84,235	$82,686	$81,084	$67,725	
Taxable Income with Loss Carry Over		$27,012	$66,737	$116,033	$115,337	$114,685	$114,083	$112,954	$121,383	$128,476	$125,985	$123,407	$120,740	$117,979	$115,122	$138,815	
Taxes with Loss Carry Over		$0	$14,954	$34,439	$34,133	$33,847	$33,583	$33,087	$36,787	$39,901	$38,807	$37,676	$36,505	$35,293	$34,039	$44,440	
Net Cash Income With Loss Carry Over		$23,159	$56,335	$84,916	$83,189	$81,373	$86,365	$84,612	$94,097	$88,575	$87,177	$85,731	$84,235	$82,686	$81,084	$67,725	
Net Cash Position w/o Loss Carryover		$17,784	$56,335	$84,916	$83,189	$81,373	$86,365	$84,612	$94,097	$88,575	$87,177	$85,731	$84,235	$82,686	$81,084	$67,725	
Net Cash Position with Loss Carryover		$23,159	$56,335	$84,916	$83,189	$81,373	$86,365	$84,612	$94,097	$88,575	$87,177	$85,731	$84,235	$82,686	$81,084	$67,725	

NPV Net Cash Income w/o Loss Carry Over >>	$510,188	10.66%	AfterTaxReturnRate*
NPV Net Cash Income with Loss Carryover >>	$508,436	10.86%	AfterTaxReturnRate*
NPV Net Cash Income w/o Loss Carry Over >>	$389,293	15.00%	BeforeTaxReturnRate
NPV Net Cash Income with Loss Carryover >>	$393,967	15.00%	BeforeTaxReturnRate

*After Tax Rates Based on Average Tax Rate over 15 Years

Taxes based on individual entity so all $ not taxed at a particular marginal rate.

Table 3.9: Expense Items

Item	Source	Increase/Year
Raw Nuts Purchased	Table 3.3	
Process Building Rent	Table 3.1	
Processing Labor	Table 3.2	
Equipment Maintenance/repair	Estimate	5%
Packaging Costs	Table 3.3	
Shipping Consumables	1.5 % Sales	
Utilities	Estimate	5%
Insurance	Estimate	
Marketing	2 % Sales	
Miscellaneous/Travel	Estimate	
Salary – manager	Estimate	3 %
Sales Commission	5 % Sales	
Loan Interest	Table 3.1	
Depreciation	Table 3.1	
Depreciation Recapture	Table 3.1	
Taxes	Table 3.7	
Loan Down payments	Table 3.1	
Principal Payments	Table 3.1	

CHAPTER 4: MODEL RESULTS

4.1 Static Model Results

Three scenarios are examined. The results of three scenarios are shown in Table 4.1. The three scenarios represent operational conditions based on amounts of product processed and sold. Scenario 1 analyzes a processing operation that processes and sells only the product grown by TG throughout the life of the project. Scenario 2 analyzes an operation that processes and sells 90,000 pounds of product after the third year of operation. And Scenario 3 analyzes an operation that processes and sells 200,000 pounds of product beginning in the year 6. This amount represents the annual plant capacity. The amount in each sales category and the cost of the raw nuts purchased are the same in all three analyses.

Scenario 1 represents a totally self contained operation with sales and processing totally dependent on the amount of raw nuts grown by TG. The income from the operation increases annually as the production from TG increases as trees mature. This scenario (Table 4.1, Scenario 1) is used to determine if the plant investment is worthwhile when the plant is being utilized at considerably less than the rated capacity.

Scenario 2 represents an operation with sales and processing equal to the mature orchard production beginning in year 3 of the analysis (90,000 pounds). This scenario would require the purchase of raw nuts from other sources during the initial years of operation. This scenario (Table 4.1, Scenario 2) operates at less than rated capacity and can be used to further determine if the investment in an oversized plant is worthwhile.

Scenario 3 has sales and processing matching plant capacity beginning in year 6. This scenario analyzes a condition that exceeds the current and future production of raw nuts grown by TG. The scenario represents an operation that goes beyond a home grown self contained entity and could represent an operating unit that could be regionalized or formed into a cooperative. This scenario (Table 4.1, Scenario 3) is a business venture that could be sold to an entity solely concerned with food processing.

In each of the three analyses, the wholesale sales percentage is 60% of the total sales and the cost of the raw nuts purchased is $2.00 per pound. These input factors are the most logical based on the quantity processed especially later in the life of the project and represent a best estimate of the price growers are expected to be paid over the 15 year period.

Scenario 1

The least complex would be processing quantities matching the amount grown by TG. This operation would utilize existing labor and management for both processing and farming operations. The advantage of this operation would be a smaller work force and a simpler management structure. . The total farming and processing activities can be managed by one person. The disadvantages are the financial outcomes of the processing entity. See Table 4.1 Scenario 1. The result for the NPV analysis is a negative $22,472 for the project. The initial cash positions are negative for five years. In addition, the operation will be undergoing constant change and shifting of employee work roles during the project life and

the processing capability will be utilized at less than 50 % capacity which is 200,000 pounds per year.

Scenario 2

The second analysis, shown at Table 4.1 Scenario 2, assumes the processing amounts are equal to 90,000 pounds per year beginning in year 3. The advantages of this operation are improved annual cash income in the initial years of operation and a positive NPV value of $122,391 for the project. The cash flow for the initial year of operation is a negative $21,635 and increases to a maximum positive amount of $42,145. The primary disadvantage is the processing capability is less than 50 % of full capacity even in years 3 through 15. An under-utilization of full time personnel could occur periodically during any year and off farm raw nut purchases will be needed until year 10 of operation since TG nut production will not achieve 90,000 pounds until then.

Scenario 3

The third analysis, shown at Table 4.1 Scenario 3, assumes the processing facility operates at 200,000 pounds beginning the 6^{th} year of the project life. The advantages are increased annual cash flows and a positive NPV. The cash flow in year 1 is a negative $21,635. Cash flows increase starting in year 2 at a positive $14,208 to a maximum of $147,948 in year 8. The NPV is a positive $669,332. The primary disadvantage is the large quantity of raw nuts that must be procured and purchased.

Summary

The analysis of a facility that processes the amount grown each year (Scenario 1) has a negative NPV with accompanying negative cash flows for the first 5 years. An annualized NPV is a negative $3,477. If the annual cash flow is increased each year by this amount, the NPV would be positive. This annual amount relates to increasing annual sales by about 1000 pounds. Under this analysis, the equipment capacity of 200,000 pounds per year is never achieved which means the facility is underutilized and the equipment purchased should be downsized in capability and investment amounts. Scenario 1 is close to be financially viable; however, the facility investment is too large considering the NPV result and processing level relative to capacity.

The second analysis (Scenario 2) utilizes 90,000 pounds as the amount processed and sold beginning in year 3. The NPV is positive but there is a negative cash flow during the first year of operation. The annualized NPV is a positive $18,162. The cash flow peaks at $42,145 midway in the project life, and then gradually decreased due to labor and management annual expense amounts which are indexed by a percentage each year. The equipment is still underutilized and could be downsized.

The third analysis (Scenario 3) result has the largest positive NPV and the largest single annual positive cash flow of $147,948 in the 8th year. Cash flows gradually decreased to $121,577 the last year.

Based on the NPV and the cash returned each year, the most logical project production goal is to maximize the quantity processed to fully utilize the equipment processing capacity.

4.2 Sensitivity Analysis

In the capital budgeting process, the results are dependent on the inputs and the accuracy of these inputs. Although degrees of efforts are made in the accuracy of the inputs, uncertainty and risk is involved. Numerous items were inputted in the model using the most reliable information reasonably available. Quotes were obtained, costs were determined and market information obtained. These inputs are uncontrollable by an individual or a small firm. The market determines the costs of such items.

The quantity of sales and the cost of raw nuts are difficult to predict with certainty. These items are dependent on consumer demand. Because of this, these two uncertain variables were used in sensitivity analysis. The results are reported in Table 4.2 In both scenario 1 and scenario 3 shown in Table 4.2, a 5 percentage point change in wholesale sales has a larger dollar impact on the NPV than a $.10 change in raw nut cost.

4.3 Analysis of NPV Cumulative Distributions Using @Risk

The purpose of using probability distributions to represent wholesale sales percentage and raw nut prices is to estimate the cumulative probability distribution of annual cash flows and the NPV. With this result, risk or variability can be examined.

Cumulative distributions of annual net cash income were generated for each year using Scenario 2. A cumulative distribution for the NPV was also generated using Scenario 2 (Table 4.3).

The cash flow distribution values for Scenario 2 were all positive with the exception of the first two years of operation. During the first year of operation, the probability of a cash

flow being negative is less than 10 percent. During the second year of operation, the probability of a negative cash flow is less than 5 %. At the 50 % cumulative probability, the first year of operation cash flow is $18,106. The second year cash flow at this cumulative probability is $56,730. Subsequent year cash flows at this cumulative probability are greater than $80,000 except for the last year of operation when depreciation recapture and the tax effect on the representative amount reduces the amount to $68,132.

4.4 Sensitivity Analysis Using @Risk

The sensitivity tornado graph option in @Risk was used to examine the impact of the two uncertain variables on the NPV results. The wholesale percentage has a -.761 relationship with the NPV and the raw nut price has a -.632 relationship with the NPV. This means that an increase in the wholesale sales percentage more negatively affects the NPV than an increase in the price paid for raw nuts. These coefficients result from estimating the linear relationship between the change in the uncertain variables and the change in the NPV.

Table 4.1: Analysis for Three Capacity Scenarios.

Processing Production Equals Grown Product – Scenario 1

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
#'s Sold (1000)	45	50	55	60	65	70	75	80	85	90	90	90	90	90	90
Net Cash Income	-$29,663	-$23,535	-$17,471	-$11,476	-$5,550	$6,940	$11,345	$29,284	$31,895	$36,330	$34,266	$32,129	$29,918	$27,629	$19,139
NPV >>	($22,472)	13.00%	AfterTaxReturnRate*			Annualized NPV>>		($3,477)							
Raw Nut Cost / #	$2.00														
Wholesale %	60%														

Processing Production Equals Orchard capacity in 3 years –Scenario 2

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
#'s Sold (1000)	50	70	90	90	90	90	90	90	90	90	90	90	90	90	90
Net Cash Income	$21,635	$7,777	$31,680	$29,787	$27,814	$32,662	$30,637	$42,145	$38,326	$36,330	$34,266	$32,129	$29,918	$27,629	$19,139
NPV >>	$122,391	12.20%	AfterTaxReturnRate*			Annualized NPV>>		$18,162							
Raw Nut Cost / #	$2.00														
Wholesale %	60%														

Processing Production Equals Equipment Capacity in 6 Years -Scenario 3

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
#'s Sold (1000)	50	75	125	150	175	200	200	200	200	200	200	200	200	200	200
Net Cash Income	-$21,635	$14,208	$71,040	$92,002	$112,705	$140,216	$138,463	$147,948	$142,426	$141,029	$139,583	$138,086	$136,538	$134,935	$121,577
NPV >>	$669,332	10.25%	AfterTaxReturnRate*			Annualized NPV>>		$89,275							
Raw Nut Cost / #	$2.00														
Wholesale %	60%														

NPV is based on Net Cash Income w/o Loss Carry Over

Table 4.2: Sensitivity Analysis to Raw Nut Cost and Wholesale Percentage.

Processing Production Equals Orchard capacity in 3 years															
Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
#'s Sold (1000)	50	70	90	90	90	90	90	90	90	90	90	90	90	90	90
Net Cash Income	-$11,635	$18,991	$45,758	$43,934	$42,027	$46,934	$45,023	$55,688	$51,159	$49,413	$47,606	$45,736	$43,801	$41,798	$31,650
NPV >>	$212,394	12.05%	AfterTaxReturnRate*												
Raw Nut Cost / #	$1.80														
Wholesale %	60%														

Raw Nut Cost=$1.80	
WS %	NPV
40%	$451,181
45%	$394,257
50%	$336,344
55%	$272,936
60%	$212,394
65%	$150,549
70%	$86,239

Wholesale % = 60%	
Nut $	NPV
$1.60	$303,918
$1.70	$256,375
$1.80	$212,394
$1.90	$167,600
$2.00	$122,391
$2.10	$75,008
$2.20	$29,103

Processing Production Equals Equipment Capacity in 6 Years															
Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
#'s Sold (1000)	50	75	125	150	175	200	200	200	200	200	200	200	200	200	200
Net Cash Income	-$11,635	$26,223	$85,235	#######	$132,340	$162,656	$160,903	$170,388	$164,866	$163,469	$162,023	$160,526	$158,978	$157,375	$144,017
NPV >>	$818,050	10.06%	AfterTaxReturnRate*												
Raw Nut Cost / #	$1.80														
Wholesale %	60%														

Raw Nut Cost=$1.80	
WS %	NPV
40%	$1,241,552
45%	$1,139,092
50%	$1,036,490
55%	$920,233
60%	$818,050
65%	$715,728
70%	$612,947

Wholesale % = 60%	
Nut $	NPV
$1.60	$980,475
$1.70	$892,236
$1.80	$818,050
$1.90	$743,769
$2.00	$669,332
$2.10	$594,659
$2.20	$510,888

Table 4.3 Simulation Results Summary Statistics Scenario 2

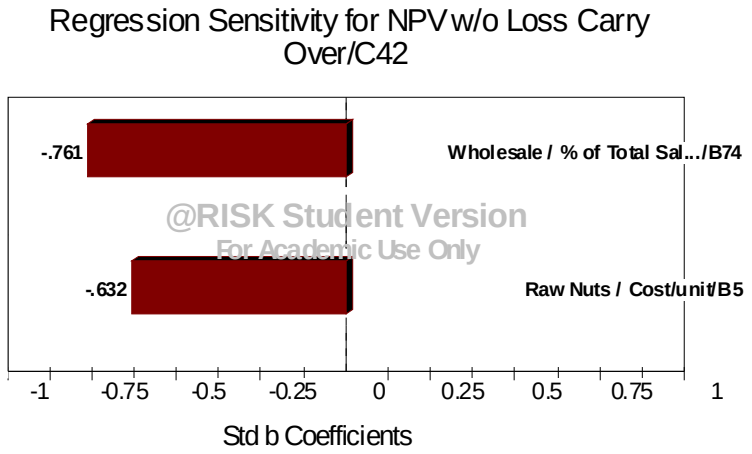
	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Annual Production	50000	70000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	
	Net Cash	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Cash**	**Net Present**
	Income	**Income**	**Income**	**Income**	**Income**	**Income**	**Income**	**Income**	**Income**	**Income**	**Income**	**Income**	**Income**	**Income**	**Income**	**Value**
Minimum	-$35,620	-$11,002	$11,516	$9,622	$7,650	$12,497	$10,473	$21,981	$18,161	$16,166	$14,101	$11,965	$9,754	$7,465	-$207	($7,489)
Maximum	$55,113	$97,970	$135,673	$133,946	$132,130	$137,122	$135,369	$144,854	$139,332	$137,934	$136,488	$134,992	$133,443	$131,841	$118,482	$913,338
Mean	$17,600	$55,341	$84,516	$82,773	$80,942	$85,919	$84,136	$93,801	$88,386	$86,956	$85,469	$83,928	$82,327	$80,662	$67,629	$508,306
Standard Deviation	$13,996	$16,811	$18,310	$18,336	$18,362	$18,386	$18,433	$18,127	$17,932	$17,994	$18,066	$18,147	$18,240	$18,345	$17,741	$143,258
CV	0.795	0.304	0.217	0.222	0.227	0.214	0.219	0.193	0.203	0.207	0.211	0.216	0.222	0.227	0.262	0.282
5.0%	-$6,254	$25,025	$52,548	$50,723	$48,816	$53,724	$51,812	$62,477	$57,901	$56,203	$54,396	$52,526	$50,591	$48,588	$37,568	$259,719
10.0%	$29	$33,152	$61,589	$59,828	$57,960	$62,868	$60,956	$71,038	$65,871	$64,349	$62,774	$61,144	$59,457	$57,712	$45,538	$326,600
15.0%	$3,002	$37,314	$65,671	$63,910	$62,061	$67,023	$65,213	$75,120	$69,953	$68,431	$66,856	$65,226	$63,539	$61,794	$49,090	$357,936
20.0%	$6,002	$41,515	$69,791	$68,030	$66,181	$71,143	$69,333	$79,240	$73,723	$72,551	$70,976	$69,346	$67,659	$65,914	$52,873	$389,416
25.0%	$8,835	$45,371	$73,681	$71,919	$70,071	$75,033	$73,223	$82,815	$77,294	$75,896	$74,450	$72,954	$71,549	$69,803	$56,444	$418,949
30.0%	$11,008	$48,033	$76,374	$74,709	$73,054	$78,016	$76,206	$85,555	$80,033	$78,636	$77,189	$75,693	$74,144	$72,734	$59,183	$441,297
35.0%	$13,214	$50,736	$79,155	$77,428	$75,612	$80,604	$78,851	$88,336	$82,814	$81,417	$79,970	$78,474	$76,925	$75,323	$61,964	$463,677
40.0%	$15,012	$52,939	$81,421	$79,694	$77,879	$82,871	$81,117	$90,602	$85,080	$83,683	$82,237	$80,740	$79,192	$77,589	$64,231	$481,990
45.0%	$16,594	$54,878	$83,416	$81,690	$79,874	$84,866	$83,112	$92,597	$87,076	$85,678	$84,232	$82,736	$81,187	$79,584	$66,226	$498,096
50.0%	$18,106	$56,730	$85,323	$83,596	$81,780	$86,772	$85,018	$94,503	$88,982	$87,584	$86,138	$84,642	$83,093	$81,490	$68,132	$513,469
55.0%	$19,257	$58,140	$86,774	$85,047	$83,231	$88,223	$86,469	$95,954	$90,433	$89,035	$87,589	$86,093	$84,544	$82,941	$69,583	$525,162
60.0%	$20,496	$59,658	$88,335	$86,609	$84,793	$89,785	$88,031	$97,516	$91,995	$90,597	$89,151	$87,655	$86,106	$84,503	$71,145	$537,741
65.0%	$22,717	$62,347	$91,135	$89,408	$87,593	$92,585	$90,831	$100,316	$94,794	$93,397	$91,951	$90,454	$88,906	$87,303	$73,945	$560,262
70.0%	$24,384	$64,127	$93,237	$91,510	$89,694	$94,686	$92,933	$102,418	$96,896	$95,499	$94,052	$92,556	$91,007	$89,405	$76,046	$577,073
75.0%	$26,750	$66,654	$96,219	$94,492	$92,677	$97,669	$95,915	$105,400	$99,878	$98,481	$97,035	$95,538	$93,990	$92,387	$79,029	$600,904
80.0%	$29,344	$69,424	$99,490	$97,763	$95,947	$100,939	$99,186	$108,671	$103,149	$101,752	$100,306	$98,809	$97,261	$95,658	$82,300	$627,014
85.0%	$32,555	$72,853	$103,537	$101,811	$99,995	$104,987	$103,233	$112,718	$107,197	$105,799	$104,353	$102,857	$101,308	$99,705	$86,347	$659,289
90.0%	$36,169	$76,713	$108,094	$106,367	$104,551	$109,543	$107,789	$117,274	$111,753	$110,355	$108,909	$107,413	$105,864	$104,261	$90,903	$695,580
95.0%	$40,538	$81,410	$114,382	$112,655	$110,839	$115,831	$114,078	$123,563	$118,041	$116,644	$115,198	$113,701	$112,153	$110,550	$97,192	$745,338

Income values are net cash income without loss carryover

Net present value is based on net cash income without loss carryover.

Simulation based on random wholesale sales percentage and raw nut prices.

Figure 4.1 Relative Sensitivity Importance of Random Variables on Net Present Value



CHAPTER 5: SUMMARY AND CONCLUSION

The thesis analyzed a roasting processing facility with three production capacity scenarios. Scenario 1 represents a totally self contained operation with sales and processing totally dependent on the amount of raw nuts grown by TG. Scenario 2 analyzes an operation that processes and sells 90,000 pounds of product after the third year of operation. Scenario 3 analyzes an operation that processes and sells 200,000 pounds of product in year 6 of operation. A project life of fifteen years is used in the analyses. Net cash positions and NPV are determined for the three scenarios. A @Risk analysis is performed on Scenario 2. Sensitivity analysis is performed on the input random variables for the percentage of Wholesale sales and the price paid for the raw nut product.

From the analyses used, the most financially viable from a cash flow, NPV, risk and sensitivity to random and controlled input variables is Scenario 3. Scenario 3 analyzes an operation that processes and sells 200,000 pounds of product beginning in the year 6. Scenario 3 results have the highest NPV ($669,332) and the highest net cash income per year. In addition to be financially the most feasible, the equipment utilized is fully utilized. This scenario requires that over 50 % of the product processed and sold each year must be purchased from other growers since this total annual quantity exceeds the annual growing capacity of TG. This is doable since numerous growers have raw nuts available in the area however; refrigerated storage capacities may have to be larger compared to the other scenarios storage capacities. Local growers generally sell their product on the tree to avoid

having to store the product. The maximum capacity of 200,000 pounds is achieved in year 6. This gradual increase to this maximum allows for a learning curve in sales marketing, establishing contractual relations with local growers, and developing efficiencies in the processing operation.

The sensitivity analysis shows that the Wholesale sales percentage affects the outcomes more than the price paid for the raw nut product. The minimum NPV in the @Risk analysis is a minus $7,489 and a maximum NPV of $913,338. The initial year of operation cash flow has a 10 % chance of the outcome being less than $29.

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