# Projected Expenses

The CCA Cherimoya Handbook

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# Introduction

**by Claude Sweet, Editor**
**High Value Crop Newsletter**
**7488 Comet View Court**
**San Diego, CA 92120-2004**
**Email sweetent@cox.net**
**Voice 619 286-1534**
**Fax 619 286-9255**

The Cherimoya Handbook provides guideposts for the reader to prepare a comprehensive feasibility study using their own assumptions that are relevant to specific properties.

Developing an economic analysis for a new crop requires gathering a lot of information which is inserted into a financial document known as a Revenue and Expense Statement

**Accountants make sure columns and rows of figures are properly totaled.**

Horticultural experts must provide raw information that is factually accurate and completely represents the true nature of the information incorporated into the financial report.

Projecting long range expenses and revenues is not an exact science. There are many different approaches to how this can be accomplished.

**Consult Objective Sources**

Universities, state, and federal departments of agriculture, private companies, and nonprofit institutions contribute basic and applied agricultural research. They are responsible for the economic importance of agriculture to America's gross national product.

Crop research is exchanged between the staff of universities and agricultural agencies of different nations. Formal international organizations have been formed to facilitate the communication of specific crop information.

Research performed at public institutions is usually financed by tax funds and is provided to all interested parties via publication in accredited journals. Researchers are usually reluctant to disseminate preliminary finds of their research.

The peer review process required to publish in professional journals can delay the dissemination of the information. The presentation of research may also be delayed to present the paper at professional meetings and conferences.

Private researchers who attend conferences may do so as observers rather than as participants. Employers may restrain their scientists from publishing research which is considered proprietary and could provide competitors with a scientific "windfall".

**Research Depends On Grants**

Members of the academic community must attract public and private funding to support their research.

**Grower organizations may help to fund specific research objectives related to their crops.**

**Crop yields are generally stated as estimates of the gross harvest weight in pounds at the roadside.**

**A more realistic yield figure is the net weight of the crop graded by size and quality determined by the market demand and/or grading standards. There may be an addition reduction in weight due to moisture loss.**

**The net plantable acres represents the actual number of acres available in each slope category with deductions taken for the land used for roads, fences, and buildings.**

**A slope index is calculated by determining creating a data base representing comparable land prices for equivalent small parcels in the area with similar slopes. The index is used to calculate the adjusted value for each plantable acre of a designated slope.**

# Establishing Objective Criteria

**The Evaluation Process**

Each grower who considers planting a new crop must establish criteria to apply to the opportunities that are being considered.

The same criteria should be applied when searching for developed sites, raw land for development, or for land that is owed and under consideration for development or converting from an existing crop to another crop.

**Most people have difficulty comparing opportunities.**

Gathering information is not a simple process when there is a lack of historical data and objective research to consult. The investigator is forced to develop a list of survey questions and interview persons who are acknowledged to have the most informed opinions.

Constructing a valid set of survey questions is difficult and requires the assistance of someone who has an understanding of the subject matter and has experience designing test questions.

A scale to rate specific elements must be established that defines the range between very favorable and unfavorable extremes.

A Lickart Scale is a measurement tool used to compare opinions about specific statements in a survey. For example, a scale of zero to five would use zero to indicate a person strongly disagrees and five would represent the strong agreement with the statement.

**Divergence From Optimum**

Soil and water pH can be tested and the result is a numerical measurement. The tolerance of a specific plant can also be measured and its performance can be determined for optimum growth and yield. Decreases in growth and yield result as the pH value becomes more acid or alkaline.

**Information Sources**

Research conducted by researchers at Agricultural Experiment Stations, Cooperative Extension, and/or USDA personnel appear in publications published by the respective institution or in journals of various professional societies.

Cooperative Extension personnel provide an important bridge between the academic researcher and the grower. The Extension Service has the responsibility to apply basic research in a practical, meaningful way to solve specific crop problems.

Trade publications provide an excellent vehicle to communicate current information on topical issues with growers. Extension agents will frequently contribute articles to trade journals. Not all articles that appear in trade publications may be unbiased. Professional journalists, private consultants, and industry representatives also contribute articles which may not equally present different points of view.

Generally, trade publications will report market volume and prices. They provide a forum for readers to discuss industry problems. Peer reviewed scientific magazines are less likely to publish opinions expressed by their readers. Monthly trade publications are able to quickly respond to breaking news stories.

**Grower Associations**

An excellent source of information is a group of farmers who are actively involved in growing the same crop.

Attend a meeting and, if possible, obtain back issues of their newsletter. There are also special interest newsletters that are concerned with organic production and marketing, small farming, and other related topics. Most of these newsletters are published by membership organizations.

Trade publications are another source of information. Product reviews are useful, but may not be completely objective.

**Using Your Computer**

Computers provide growers and agricultural researchers with a means of accessing a world wide database through the Internet and the World Wide Web. Information is collected and entered into the United States Department of Agriculture's information network.

**Contact people around the world using a local phone call to connect to Internet.**

Individuals who have a computer equipped with a modem can access the network of electronic databases. Agricola, CAB Abstracts, The Agrochemicals Handbook, and Food Science & Technology Abstracts are part of over 36 different databases that are might be consulted.

Searching for key words in titles provides the user with the number of articles in the database. Combining keywords narrows the number of entries until the list of titles is reduced to a manageable size. The list can be downloaded to the computer and printed out after disconnecting from the database.

The list of references doesn't provide the actual text of the article. There are services that provide photocopies of articles for a fee. Information can be FAXed or mailed. If speed is not a requirement, the authors can be contacted directly for reprints.

# Identifying The Perfect Growing Site

## Land Resources

The production considerations apply equally to the selection of a site to grow all crops. However, marketing considerations are a variable factor in site selection.

Each planting site must be evaluated to determine its ability to produce specific crops using ideal conditions as the standard. Deviations from the optimum should be regarded as increasing the risk to the grower.

The following factors apply to all production sites:

**I. Size and shape of the parcels being farmed.**
- A. Is the farm an economic unit?
- B. Are the individual parcels contiguous?
- C. Are the access roads paved?

**II. Description of land and soil.**
- A. Topography and elevation.
- B. Soil profile characteristics
  1. Soil type
  2. Depth
  3. pH
  4. Drainage and moisture holding abilities
  5 Erosion potential
  6. Presence of noxious weeds reducing crop yields
  7. Presence of soil born diseases causing economic damage to the crop
- C. Presence of established insect pests causing economic damage to the crop

**III. Climatic considerations.**
- A. Mean monthly temperatures
- B. Monthly heat units
- C. Hours of winter chilling
- D. Weekly rainfall records
- E. Prevailing wind patterns
- F. Cloud cover
- G. Fog
- H. Smog
- I. Average number of frost free days
- J. Average date of last spring frost
- K. Average date of first fall frost
- L. Lowest recorded winter temperature*
- M. Highest recorded summer temperature*

*include duration if available.

**IV. Ground water irrigation sources.**
- A. Quality
- B. Quantity
- C. Energy sources
- D. Pumping expenses
- E. Type of aquifer
- F. Alternative water sources
  1. Streams
  2. Lakes
  3. Reservoirs
  4. State or federal water distribution systems
  5. Municipal water districts

The following factors vary according to the site location:

**I. Direct marketing considerations**
- A. Roadside stand
  1. Distance (in miles) from urban population center.
  2. Distance (in time) from urban population center.
  3. Accessibility via paved (all weather) roads
  4. Parking facilities
  5. Traffic flow created by other area attractions
  6. Related site attractions
- B. Certified farmers market
  1. Distance to urban population center measured in miles.
  2. Distance to urban population center measured in time.
  3. Accessibility via paved (all weather) roads
  4. Parking facilities
  5. Traffic flow created by other area attractions
  6. Related on site attractions

**II. Brokering crop**
- A. Distance to urban population center measured in miles.
- B. Distance to urban population center measured in time.
- C. Accessibility via paved (all weather) roads
- D. Unloading facilities
- E. Availability of trucking to
  1. Rail transportation
  2. Air transportation
  3. Cargo (boat) shipping terminal

**III. Processing**
- A. Distance to processing facility measured in miles.
- B. Distance to processing facility measured in time.
- C. Accessibility via paved (all weather) roads
- D. Unloading facilities
- E. Availability of trucking to processing facility

# Land — A Production Input

**Land Is A Limited Resource**

A farmer's land is an asset which can increase or decline in value according to its agronomic ability to produce a crop.

Land serves as collateral to secure loans for farm improvements, expansion of planted acreage, acquisition of equipment, or construction and remodeling farm structures.

**The sales price of farm land should never exceed a crop's ability to return a profit on the investment.**

Foreign investors, willing to pay prices above those justified by the land's ability to produce income combined with an increase in speculators desiring to obtain farm land for residential or commercial purposes has made it difficult for farmers to acquire new land for expansion.

**Foreign Policy Affects Farming**

Farmers in the 1970's expanded their acreage to take advantage in the rapid expansion of farm exports stimulated by the weak US dollar. Interests rates to borrow money were less than the appreciation of land values.

In the early 1980's, a strong US dollar resulted in the decline of many farm exports. Producers of these crops had not developed alternative domestic markets to compensate for the loss of foreign sales.

Farm managers, whose favorable ratio of assets to debts provided an economic cushion, were able to survive lower farm prices by postponing capital improvements and reducing their operating expenses.

Reduced farm revenues, increasing interest rates, and declining land appreciation combined to cause economic disaster to farmers who had highly leveraged their operations.

**Tax shelters funnel money into farming and their presence can adversely affect small farmers who derive their sole income from farming.**

**Soil Is A Production Input**

A soil's productivity is adversely affected by infectious diseases, erosion, increased levels of specific soil salts, changes in pH levels, accumulation of pesticides and herbicides, reduced organic content, and reduction in drainage.

Management practices can influence the soil's ability to produce a crop. Fire, flood, disease, accumulated chemical, and erosion are elements which can, to various degrees, be controlled by farming practices.

The topography of a site can influence production costs. Level land provides more opportunities to use mechanical equipment and the lowest pumping costs.

Rolling or hillside sites are more expensive to operate. There is additional labor required to accomplish the same tasks performed on level land. More engineering and equipment resources are necessary to irrigate sites with uneven topography.

The steeper the slope the greater the need to engineer and construct access roads. Mechanical harvesting equipment that functions on level land is usually not suitable for sloping sites.

There may be site problems associated with: soil drainage, depth of profile and/or pH. These factors should be corrected prior to the establishment of permanent crops. Expensive modifications will impact the economic viability of individual crops.

**Develop Land In Phases**

Developing a project in stages reduces the tremendous cash requirements of a project. Although this approach produces higher per acre management costs, it also allows subsequent plantings to benefit from the experience obtained in establishing and providing cultural care to existing plantings.

Most of the land suitable for cherimoya production in California involves hillside property. The depth of hillside soil is shallow compared to the flat bottom land.

The organic content of hillside soils is generally low. Combined with a shallow soil profile, the moisture retention levels are minimal. Interruption of irrigation to high side plantings can quickly produce tree stress, especially when high temperatures, low humidity, and windy conditions exist.

When no cloud cover exists, cold air flows down hill to the valleys and the hillsides are frost free. When the jet stream dips into Southern California, it brings Arctic air currents that will affect the hill tops and leave the valleys warmer.

Large property should be divided into small parcels that can be classified according to the steepness of the hillside slope. This will simplify the design of grove roads and irrigation lines.

| **Slope** Description | **Parcel** Description |
|---|---|
| **Flat** | **A** |
| **2.5-5%** | **B** |
| **6-10%** | **C** |
| **11-15%** | **D** |
| **16-20%** | **E** |
| **21-25%** | **F** |
| **26-30%** | **G** |
| **31-35%** | **H** |
| **>36%** | **I** |

# Choosing An Affordable Site

**Fair Market Value**

What is a fair market price for land suitable to grow cherimoyas? The number of parcels meeting climate, soil, and water requirements for commercially growing cherimoya are limited in California and must compete with housing developers.

**Affordable flat land parcels on which to plant cherimoya are extremely rare.**

A home site with a prime location and a 360° view in California attracts a higher sales price than can be justified by any legal agricultural crop.

Most listings that are affordable are large parcels and usually include hillsides or various slopes. A larger parcel of land will have a lower per acre price than land that has been subdivided into small lots suitable for obtaining a building permit.

Rural areas without sewers and municipal water service will have specific requirements as to lot size, soil percolation for the leach line of a septic system, and the minimum water quality for potable water.

View sites are usually located on the highest elevation of a hillside parcel and require substantial planning to design road access to the building site with a gentle grade and without sharp switch backs.

Farm land values are influenced by the factors necessary to achieve optimum production of the most valuable class of agricultural crops that can be grown on the property.

The availability of suitable land that is on the market, the general vitality of the economy, and long term interest rates establish a property's fair market value.

**Subdivision Potential**

A large land parcel should be divided into smaller parcels to simplify the construction of access roads and the installation of water mains and other utilities.

Plan to avoid removing mature trees to widen roads and relocate utilities to allow subdivision of the parcel at some unspecified future time.

The extra expense to survey the site and develop a subdivision plan for the property is minimal. It is not necessary to immediately file subdivision plans.

The property owner might consider developing a home site and obtaining a building permit to construct a home in order to obtain attractive long term financing to purchase the property and construct the home.

Lending institutions are rather reluctant to loan fund to develop cherimoya orchards on raw land, especially if the owner lacks experience of being a successful commercial cherimoya producer.

**Adjusting Land Values**

Portions of large parcels may be unusable. Acreage classified as unplantable is not divided into the total acquisition expense. To determine agricultural land prices, the value of any home sites, access roads, and easements for utilities should be deducted from the gross price paid for the land.

**The examples below illustrate the influence of topograhical features on small blocks of land acquired as part of a larger parcel. *Grading soil for road construction in parcels F - I has a negative effect on lower plantable blocks.**

| Total | Parcel | Roads, etc. | Unplantable | plantable |
|---|---|---|---|---|
| **7.00** | A | **2.00** | **0.00** | 5 |
| **12.00** | B | **1.00** | **0.00** | 11 |
| **17.00** | C | **1.00** | **0.00** | 16 |
| **22.00** | D | **1.00** | **0.00** | 21 |
| **13.00** | E | **1.00** | **1.00** | 11 |
| **16.00** | F | **1.00** | **15.00** | -1.5* |
| **8.00** | G | **2.00** | **10.00** | -1.25* |
| **4.00** | H | **1.00** | **3.00** | -1.00* |
| **1.00** | I | **0.25** | **0.75** | -.25* |

Total acreage 100: 10 acres roads, 30 acres unplantable, and 60 acres plantable.

**A 100 acre parcel costing $250,000 ($2,500/acre) is adjusted to achieve the value for the 60 plantable acres ($4,167/acre) by considering slope steepness.**

**Land to construct roads, build fences, develop water resources, and erect farm related buildings is deducted from the plantable acreage to achieve an adjusted per acre value for each acre by its slope.**

| Land Value Factor | Adjusted Cost /Acre | Extended Cost /Acre | Slope Description |
|---|---|---|---|
| **1.6** | $6,667 | $46,667 | Flat |
| **1.35** | $5,625 | $67,500 | <5% |
| **1.1** | $4,583 | $77,917 | 6-10% |
| **.8** | $3,333 | $73,333 | 11-15% |
| **.6** | $2,500 | $32,500 | 16-20% |
| **.3** | $1,250 | $20,000 | 21-25% |
| **.2** | $833 | $6,667 | 26-30% |
| **0** | $0 | $0 | 31-35% |
| **0** | $0 | $0 | >36% |

Total Value* $324,583

***if acquired as separate parcels**

# Establishing Market Prices

**Market Prices**

In a free market system, the seller establishes the price for fresh produce when the supply does not exceed the demand. When the supply exceeds the demand the buyers force sellers to adjust their prices downward in an effort to stimulate sales. Eventually an equilibrium between supply and demand is achieved.

**Over production may allow buyers to offer less than it costs to produce the crop.**

The relationship of prices constantly changes as the volume difference between supply and demand changes. The larger the difference, the greater the response in market prices. For example: a 1% difference in volume will produce a very small change in prices. However, a 20% difference in volume will result in a drastic change in market prices.

**Quality Standards**

Grading standards haven't been established; however, market prices can be expected to vary by grades, sizes, and varieties which are in over and under supply.

Obviously, temporary market swings occur because of special promotions to increase the volume being moved at the retail level. Efforts to speculate in commodities can artificially affect market prices.

Cherimoya is a perishable fruit that can't be held in long term cold storage. Hot weather conditions can accelerate fruit ripening and increase supplies. Rain can delay or prevent entry into the grove to harvest fruit and reduce supplies. Both situations temporarily affect prices.

**Defining Marketing Terms**

1. The ***Estimated Market Potential*** includes the volume of fresh and processed product being marketed — normal wholesale distribution plus roadside stands, Certified Farmers Markets, and direct mail. The choice of year is arbitrary.
2. The ***Rate of Market Expansion*** is an estimate of the market potential. An industry public relations campaign and/or brand name advertising can result in expanding sales volume by creating new market demand and/or acquiring market share from competing soft fruits.
3. The ***Volume Delivered*** can sometimes be gathered from reporting wholesale terminal markets. Rough estimates can be calculated using the industry information of bearing acreage and per acre yields prorated for orchard maturity.
4. The ***% Of Change In Volume Delivered*** reflects increases from: new acreage reaching bearing age, higher yields as orchards mature, less environmental damage from frost, wind, drought, insect, and/or disease.
5. The ***Price Differential*** is the actual supply being offered against the demand from willing buyer. A change in market price that is needed to achieve a balance is the Price Differential.
6. The ***Change In Price*** reflects the size of any supply/demand imbalance relative to the total volume being marketed.
7. The ***Inflation Rate*** has a direct bearing on establishing the base asking price. Once harvest begins, the cost of production inputs and harvest expenses are balanced against the potential loss if the fruit is not sold. Growers attempt to raise their asking price for their crops to offset inflation.
8. The ***Wholesale Price Per Lb.*** reflects the equilibrium between supply and demand for that year. All subsequent prices are projected based on supply and demand values affecting the wholesale value of the commodity.

**In the long term growers who are not profitable will cease doing business and supply will be reduced.**

At some point an equilibrium will be achieved that returns a margin of profit that is attractive to growers and thus encouraging growers to remain in business.

**Price variations**

Prices quoted at wholesale terminal markets (i.e. Los Angeles) are often used by small growers to market their fruit on consignment. Collectively their actions can result in supplies exceeding market demand, thus forcing prices down artificially.

It is extremely important for growers to establish a list of satisfied buyers who can be serviced directly at a confirmed price.

Prices for different sizes and quality of fruit can be expected. Growers should develop buyer recognition of high quality for their label. If fruit quality consistently is variable, growers should grade their fruit as No. 1, No. 2, and processing quality fruit. Different labels should be used to market No. 1 and No. 2 fruit.

At the present time no buyers have expressed interest in buying cherimoyas to create a value added processed product.

# Analyzing Cherimoya's Potential

**Investigating Opportunities**

Analyzing new crop opportunities to sell fresh produce to consumers and processors requires a standard methodology.

**Do supplies of cherimoya create market demand or does demand stimulate growers to create a supply?**

The American consumer is not a homogenized entity, but rather reflects a diverse group of ethnic, age, income, education, religious, geographic, and cultural groups.

Marketing can be specifically targeted to any one or combination of these groups. Any product or item which has wide appeal or generic usage is termed a "mainstream" demand.

Corporate marketing strategy is developed from historical and current consumer demands. There is usually a pattern or trend which can be identified and is used to formulate long term commitments of corporate resources.

In theory, it is possible to gather enough information to identify/design a product that will fulfill a future, and sometime an unperceived consumer demand.

Demand is defined as sales terms (price and payment) and conditions (quality and quantity) which cause the consumer to purchase the product or service. The response of the consumer to price and quality is triggered by their individual responses to fixed or variable needs/uses for the item.

Industry sales volume of cherimoya will vary according to marketing strategies using pricing differentials.

Complex responses can be expected from individual consumer groups to grading or quality differences. Growers may market competing labels that represent different grading standards.

**Demand criteria for exported cherimoya will be different than domestic consumer demand.**

Competition for the consumer dollar is very competitive in basic consumer and luxury products. Advertising plays an important part in establishing brand identity. Supplies of produce with major brand labels are not appearing in local produce departments.

Packaging and product image frequently attempt to emphasize differences between products, especially where the basic functional use is met by all the products.

The reason that a manufacturer chooses to incorporate an input into their produce may be an attempt to gain an advertising advantage rather than a function of reducing costs or improving quality.

**The Decision Matrix**

The ***Production/Processing/Manufacturing*** **(P/P/M) Decision Matrix** gathers information using a standardized systems approach. The use of a numerical risk assessment allows the user to compare the benefits and risks between a variety of similar and dissimilar commodities.

The decision matrix is composed of three major systems:

1. Production
2. Processing
3. Manufacturing.

Each system is divided into sub-systems.

An objective and standardized methodology allows the preparer to compare the economic returns between dissimilar traditional and specialty crops.

Developing a successful commercial planting of a new crop requires the individual elements of the system matrix being in place and operating without major constraints.

Each system has its own supply and demand relationships that establish the value for inputs (goods or services) used within the system.

The products produced by the Processing and/or Manufacturing Systems are dependent on the supply and demand conditions of the Production System.

The profitability of each individual element will vary depending on specific demand elastic or inelastic functions and the level of efficiency within the businesses supplying the input.

The **P/P/M *Decision Matrix*** has been developed as a tool to point out potential areas that can restrict or prevent the orderly flow of a crop from the producer to the retail consumer.

Performing the analysis provides opportunities for solutions to be devised to reduce the risk potential and provide a profit opportunity to the solution provider.

The matrix can be used to compare generic opportunities between crops and/or optimum development for a specific site. The objective of the decision matrix is to determine the most profitable and least risky system or subsystem to concentrate capital.

The preparer should positively answer three questions:

1. **Is it economically feasible?** A feasibility study, including a 10 year marketing analysis and Revenue and Expense projection, should be prepared for each crop. Normal agricultural risks are assumed.
2. **Is it physically possible?** Do any conditions exist which may constrain or preclude a subsystem or system from contributing to the success of the system?
3. **Is it institutionally permissible?** Do any laws or regulations exist which could conflict with, limit or prevent the enterprise from functioning as described in the feasibility study?

**Numerical Evaluation**

The following numerical rating scale is applied to each of the various individual inputs of the P/P/M *Decision Matrix* :-

1. **No Constraints Exists.** Optimum results should occur. Odds are 100 out of 100.
2. **Slightly Constraining Conditions Exist.** Success of venture is not in jeopardy; however, action must be taken to achieve optimum results. Odds 60> out of 100.
3. **Serious Constraints Exist**. Technological solutions exist to eliminate or reduce all identified constraints to acceptable levels.

• Immediate action is required to eliminate or reduce all identified constraints to acceptable levels.

• The project is not likely to succeed as proposed. Odds: <40 out of 100.

4. **Extremely Serious Constraints Exist**. Solutions do not presently exist to eliminate or reduce all identified constraints to acceptable levels.

• Solutions could be devised if enough time, money and expertise were concentrated on the problems.

• The project is a "long shot" as proposed. Odds are <1 out of 10,000.

5. **Major Constraints Exist**. A major technological break through is considered necessary to provide solutions to all identified constraints.

• In the foreseeable future, it is unlikely that solutions can be devised to eliminate or reduce all identified constraints to acceptable levels.

• The project can not succeed as proposed. The odds are 1 out of 1,000,000.

Changing technology can alter the response given to specific sub-systems. New laws and more strident regulations are now being enforced by the EPA.

**Provide Solutions**

Identifying existing or potential problems provides the opportunity to devise remedies to avoid or modify individual constraining factors.

The formulation and implementation of remedies usually requires more financial support, expertise, and time to accomplish the projections identify in the feasibility study.

**One serious constraint or the accumulative effect of several less constraining factors can result in a project's failure.**

Potential constraints may not be directly related to the proposed project. Consumer trends,

**Producers are expected to grow and market cherimoya fruit as a fresh produce item for the foreseeable future. It is unlikely they will receive revenue from sales to processors or manufacturers of value added products.**

**P/P/M Decision Matrix**

**PRODUCTION SYSTEM**

| Inputs | INSTITUTIONALLY PERMISSIBLE | ECONOMICALLY POSSIBLE | PHYSICALLY POSSIBLE |
|---|---|---|---|
| Land resources | | | |
| Production technology & information | | | |
| Communications infrastructure | | | |
| Market institutions & intelligence | | | |
| Transportation & storage of inputs | | | |
| Financing | | | |
| Farm Mechanization & energy | | | |
| Seed & other propagation supplies | | | |
| Fertilizer and other materials | | | |
| Government services | | | |
| Pest, disease. weed control materials | | | |
| Managerial ability/risk taking | | | |

not as yet identified, can affect future market demand for the raw crop or value added product.

Marketing assumptions that appear valid at the pre-planting planning phase can change significantly by the time the first commercial harvest is achieved.

Promoters of projects will take a very opportunistic view to present their project in the most favorable terms. Investors should perform their own due diligence studies.

A conservative view would require emergency cash reserves while an optimistic stance would depend on revenues from early production to complete the development of the project.

The identification, introduction, and development of every new crop can be traced through a series of stages.

The steps in this process vary according to the interests of the initiating party. Producers will have very specific questions concerning the production elements necessary to grow the crop.

A demand for processing and manufacturing rarely exists until after a strong consumer demand for the fresh product has been developed. Ultimately, both processing and manufacturing must become elements of the revenue equation of every crop.

Exactly what volume of the crop will be sold at a given price is extremely difficult to project. Both consumer demand and processing problems can occur.

In spite of consumer demand, a market for processed avocado products has only recently developed due to difficulties in solving quality related problem in processing the fruit.

In the orange juice industry, the production of frozen orange juice has become a major source of revenue for growers and the volume fresh juicing fruit sold is now a relatively small part of total orange juice sales.

**P/P/M Decision Matrix**

**Processing System**

| Inputs | Physically Possible | Economically Possible | Institutionally Permissible |
|---|---|---|---|
| Dependable supply of farm product | | | |
| Storage technology | | | |
| Transportation & storage of commodity | | | |
| Processing technology | | | |
| Transportation & storage of processed products | | | |
| Market institutions & Intelligence | | | |
| Market Education & Promotion | | | |
| Communication Infrastructure | | | |
| Mechanization & Energy Inputs | | | |
| Government Services/enforcement of grades and standards | | | |
| Managerial ability/risk taking | | | |
| Financing | | | |

**P/P/M Decision Matrix**

**Manufacturing System**

| Inputs | Physically Possible | Economically Possible | Institutionally Permissible |
|---|---|---|---|
| Dependable supply of Processed Product | | | |
| Storage technology | | | |
| Transportation & storage of commodity | | | |
| Mechanization & Energy Inputs | | | |
| Market Develoment & Research | | | |
| Communications Infrastructure | | | |
| Market Institutions & Intelligence | | | |
| Transportation & Product Storage | | | |
| Government Services | | | |
| Managerial ability/risk taking | | | |
| Financing | | | |

**Retail Consumer**

# The Commercialization of Cherimoya

**A Brief History**

Cherimoya has been planted as a door yard tree and in small home orchards in coastal areas in California from San Diego to Santa Barbara since the late 1800's. Reports of early efforts to select superior varieties occurred in UC Extension publications and Yearbooks of the California rare Fruit Growers.

The first sustained successful commercial attempt to grow and market cherimoya is credited to the Brown family in Carpinteria who began their efforts in the late 1970's in Carpenteria, CA.

The successfully marketing of cherimoya by the browns stimulated other growers to plant small commercial orchards.

An important step in becoming a recognized speciality crop was the formation of the California Cherimoya Association in 1985. The total acreage in California is less than 200 acres.

Marketing is performed by individual growers or through private produce brokers. Unlike the avocado industry, no cooperative marketing organization has been formed by growers.

**Introducing A New Crop**

The National Science Foundation funded a study of avocado, soybean, and kiwifruit, recent commercial introduced new crops in the United States, The report concluded that the domestication of new plant material follows a specific series of stages:

**Stage 1 — Exploration:**

A. Plant Identification
B. Collection
C. Description
D. Botanical Nomenclature
E. Folk Lore and Cultural Usage of Wild/Cultivated Species

**Stage 2 — Production Parameters**

A. Establish Trial Plantings to develop cultural management techniques and harvest small quantities of the crop for research into potential uses.
B. Selection of superior plants from seedling populations
   1. Propagate name varieties
   2. Obtain yield data
C. Institute a plant breeding program

**Stage 3 — Generic Feasibility Study:**

A. Establish Small Scale Experimental Plantings
B. Utilize limited crop production to supply sample materials for evaluation by manufacturers

**Stage 4 — Decision and Investment:**

A. Establish Small Scale Commercial Plantings
B. Design, construct, and operate a small scale processing facility to provide small quantities of processed product to potential manufacturers

**Stage 5 — Manufacturer's Product Evaluation**

A. Research, design, and construct prototype of new items
B. Produce a limited quantity of the new item
C. Test Market and Evaluation of sales
D. Decision to expand or cancel production of new item

**Selling New Cultivars/Species**

New crops provide opportunities for universities, farmers, and nursery/seedsmen who identify, select, propagate, and introduce superior varieties. The U.S. Plant Variety Protection Act of 1970 allows a patent to be issued for a period of 17 years. A plant patent can be renewed once.

During the period the plant material is under patent protection, the licensee is eligible to recover development and marketing expenses, plus earn a profit by charging a license fee or royalty on each plant propagated by any individual.

Upon completion of the second patent the public obtains free propagation rights to the material. Such plant material is said to be in the "public domain".

The law states that protection will be extended to a "novel variety" if it has the following qualifications:

**1. Distinctness** —The variety must differ from all known varieties by one or more identifiable morphological (i.e. shape or color), physiological (i.e. disease resistance), or other characteristics (i.e. storage or cooking qualities).

**2. Uniformity** —Any variations in the variety must be describable, predictable, and commercially acceptable.

**3. Stability** —The variety, when sexually reproduced, must remain unchanged in its essential and distinctive characteristics to a degree expected of similarly developed varieties.

Growers must insure that they do not freely distribute their new varieties prior to applying for patent protection. Filing in foreign countries should not precede filing in the United States by a period of one year.

**For more information contact:**
**Plant Variety Protection Office,**
**Grain Division**
**Consumer & Marketing**
**Service, U.S.D.A.**
**6505 Belcrest Rd.**
**Beltsville, MD 20782.**

# Defining Financial Concepts

**Financial Projections**

Revenue and expense studies should not represent the optimum yields that can be achieved if the growing season is ideal, and no production problems are encountered.

Site and crop management practices are variable inputs which can impact yields in a negative or positive manner.

The best yield data is gathered from historical evidence. Yields based on individual tree performance lead to overly optimistic projections that can not be sustained as the project matures.

**Be wary of studies that achieve low per acre costs by "economy of scale".**

Economic studies should not be based on an "economy of scale" to achieve the lowest per acre cost per unit. The data must reflect careful research of the production risks. An acceptable level of risk taking is an individual decision; however, few economic studies effectively describe potential risks.

Large commercial plantings should not be undertaken until smaller pilot plantings have been successfully operated for several years.

The size of any farming operation is determined by the annual spendable income desired by the owner/operator and the capital resources available to plant and provide cultural care until a positive cash flow can be generated.

**Small farming enterprises may lack the financial resources to reduce per acre expenses to the lowest theoretical level.**

Personal management objectives may influence decisions to farm specific crops with techniques not utilized by larger enterprises.

Increasing the size of the farming enterprise can reach a level of diminishing returns. There is a typical "average" size farming enterprise for specific crops.

Individual farm size is determined by the value of the crop per acre and the level of income necessary to reward the expertise necessary for its production.

Thus, the size of an average strawberry farm is much smaller than the average grain farm, but the potential net income to the owner/investor may be similar.

**A "Revenue and Expense Statement" is a collection of educated guesses and verifiable facts.**

Both the accountant and the reader must be able to understand how the figures were developed. Yields that are used must be reflective of actual production experiences.

A comprehensive report should contain the necessary supporting footnotes or other references to provide a full and complete explanation of the concepts and related charts/tables.

It is important to provide the prices at which inputs, such as water and fertilizer, are being computed. Specifications for each item should be clearly indicated (i.e. the ratio of NPK and the exact minor nutrients). Include a detailed appendix with tables, charts and references.

Tables should include details concerning establishment costs and pre-production expenses for the non-bearing and productive years of the orchard. Tables should include information about the **"Total Capital Requirements"** of the project.

A comprehensive financial analysis projects the **"breakeven point"** when the orchard is generating enough income to cover annual expenses. The length of time necessary to repay the invested capital is dependent upon the accuracy of data used to prepare the "**Profit and Loss Statement"**.

A tax treatment of the data requires a separate legal opinion to determine if certain deductions can be taken.

**Predicting Yields**

Increasing the per acre plant density will result in greater amounts of marketable fruit prior to the plants becoming crowded. Ultimately the per acre bearing surface is adversely affected with declining yields and reduced size and quality of the harvested fruit.

Eventually, the yields will stabilize and then begin to decline as the tree passes from peak producing years to "middle" age and finally requires replacement when the economic returns fall below a specified level. Disease, insect, and weather conditions can affect the industry's total performance and the harvests of individual growers.

**Yields of younger trees rapidly increase for a few years and slow as the trees reach maturity.**

Not all of the harvested crop will be salable. The percentage of unmarketable fruit is generally higher in a planting just entering its bearing years and decreases as the plantings mature.

No mechanical harvesting

equipment exists nor seems likely to be developed.

**Cherimoya fruit must be hand harvested, even crops destine for processing.**

The harvest pattern will be similar to the hand pollination of the crop. A tree that is hand pollinated weekly over a twelve week period should exhibit fruit that matures in stages. Strip picking a cherimoya grove is not considered practical because of lack of uniform maturity.

It is not advisable that new crops be planted at an "economy of scale" level until a learning curve has been achieved through small trial plantings.

Production expenses, on a per acre basis, are higher in the smaller plantings where the total capital at risk is substantially reduced, but assets are not used at their full potential.

Specialty crop growers frequently lack the perspective which can be gained by examining historical yields and marketing data. What happens when an accountant is asked to prepare a *"Revenue and Expense Analysis"* for a new crop and no published economic model is available?

Cost analysis data must be collected from realistic field evaluations which have been replicated to substantiate the reliability of the information.

After determining an industry's average yield statistics prepared for a crop, it is then possible to develop a *"Revenue and Expense Analysis"* for the specific production site.

**Individual specimen plants can't be used to project yields for commercial plantings.**

An individual plant should not be used to develop a production model for commercial plantings even when planting hybrid seed or using a clonal rootstock to overcome any variation caused by a seedling rootstock.

Many factors influence the size and rate of plant growth. Raw inputs, such as sunlight, water and nutrients, must be available for the plant to manufacture sugars, starches, and carbohydrates.

Each plant requires a minimum amount of raw inputs to support vegetative growth and mature commercial quantities of quality fruit. The quantities available to each individual plant will vary depending on the density (plants per acre) and the canopy (total leaf surface acre exposed to direct sunlight).

**Growers eager to obtain early production risk stunting the tree's growth if hand pollination is carried to an excess.**

Over cropping will reduce the fruit and restrict the tree producing fruiting wood for the next season's crop. Long term yields may also be affected.

Increasing plant density results in higher per acre yields in

Yields should be based upon expected tree growth and cultural practices designed to maximize the per acre bearing surface. Expressing yields as a factor of a mature harvest makes it easy to change assumptions.

| Tree Age | % yield* |
|---|---|
| 13 Yrs | **100.00%** |
| 12 Yrs | **95.00%** |
| 11 Yrs | **90.00%** |
| 10 Yrs | **85.00%** |
| 9 Yrs | **70.00%** |
| 8 Yrs | **55.00%** |
| 7 Yrs | **40.00%** |
| 6 Yrs | **20.00%** |
| 5 Yrs | **10.00%** |
| 4 Yrs | **5.00%** |
| 3 Yrs | **2.50%** |
| 2 Yrs | **0.00%** |
| 1 Yrs | **0.00%** |

***Mature Production = 100%**

young plantings helps to generate an early positive cash flow, but at some future point over crowding limits yields and plant size must be controlled by pruning or reducing the plant density.

**There is an optimum balance between a plant's vegetative growth and the size of the crop which it can support.**

Some fruit may be produced by cherimoya trees in the 2nd and 3rd leaf after planting. The first commercial harvest should occur in the 4th leaf.

The actual amount of fruit harvested per tree may be quite small; however, the total harvested may allow a grower to have sufficient quantity to market commercially prior to the 4th leaf.

**Harvesting costs decline on a per unit basis as the crop volume increases.**

Selective harvesting is required because of the differences in fruit maturity. A grower who carefully tracks the dates of hand pollination and fruit set by blocks can predict the amount of fruit which will mature weekly.

The amount actually harvested is determine by the ability to store the fruit on the tree and the market demand. Harvest expenses will vary according to the volume of fruit harvested.

A careful analysis must be performed to determine if the extra expense of selective harvesting can be justified in crops which can be harvested with a single pass through the field.

**Gross sales price less packing, cold storage, and marketing expenses equals the net returned to grower.**

For real estate tax purposes, planted acreage will be assessed at the fourth leaf, when the trees

are considered to have their first commercial harvest. The deduction of capitalized planting expenses are also taken starting in the fourth leaf even though prior fruit harvests may have occurred.

The "first commercial harvest" used to qualify for specific tax deductions can differ from actual horticultural practices.

Increases in production rarely follow a straight line. The vegetative growth of tree crops may double or triple the plant's leaf surface area for the first few years after establishment.

The growth rate declines in proportion to the increase of growing terminals. A mature plant stabilizes its annual growth unless pruning stimulates a more vigorous response.

The time required to achieve a canopy of vegetation that reduces growth because of shading within the grove depends on the original plant density.

**Doubling the plant density will not result in doubling the per acre production of a mature planting.**

The deciduous nature of the cherimoya tree makes it possible to restrain size by dormant pruning with a minimum loss of fruiting wood. A grower should have a specific tree training concept in mind when determining plant spacing, that allows pruning to control plant size in high density plantings.

"Stumping" or removing trees as a solution to over crowding results in per acre yields being `reduced until new fruiting wood is produced.

Plantings eventually will enter into a period of stable (mature) production which will continue until a natural decline in production occurs because of age or when the plants are affected by disease and/or insect problems.

Plants have both an economic and a physical life. The physical life is referred to as the **"useful life"** for tax purposes since that will determine the depreciation schedule of the plant.

**A tree's physical life can continue long after exceeding its economic life.**

The **"useful life"** for a commercial cherimoya tree has not been established. The pioneering cherimoya grower may find the physical condition of the rootstock is otherwise vigorous, but the per tree revenue is not at an acceptable commercial level.

Top working an inferior cultivar to a higher yielding clone with superior flavor, taste, and/or storage qualities reduces the time for the tree to return to full bearing status.

When the tree's root system is suffering from diseases, it is necessary to replant with a superior rootstock. Growers usually will fumigate the soil so that the new tree has an opportunity to become establish prior to the soil becoming re-infected.

**Existing Infrastructure**

A small cherimoya grower will require the services of an existing business that grades, packs, stores, markets, and arranges transportation of shipments of fresh produce.

In recent years there has been an increase in the number of organizations that specialize in handling and marketing subtropical and tropical produce that is considered ethnic and/or exotic.

A more costly alternative is the construction and operating an on-site packing house/cold storage facility and staffing a marketing operation.

The price of produce sold to processors will depend on a willing buyer, cost to produce the product, margin of profit, retail demand, and the volume of product that can be moved at the retail price.

Actual transportation costs will depend on the distance, perishability of the crop, ability to mechanize the handling, and the necessity to maintain a specific temperature.

**Cherimoya fruit begins to lose weight immediately after being harvested.**

Weight loss increases as the temperature rises, relative humidity falls, and the volume of air moving over the produce increases. The total weight loss increases as the length of exposure time lengthens.

Growers who do not weigh their produce prior to being transported to a packing house are not aware of how much the transportation in an uncovered truck has actually cost them in lost revenue.

An on-site cooler and transportation by a refrigerated truck will insure the delivery of cherimoya with the minimum amount of **"shrink"** and reduction of quality.

**Processing Revenues**

Crops grown exclusively for processing have different concerns than if the primary purpose is fresh fruit production. The grading process determines that a portion of the packout should be diverted to processing to avoid depressing the price per tray of fresh fruit sales.

The development of a market for processed products is a much more complicated issue that requires the investment of resources to produce new products and promote a market demand when one probably does not exist.

# Classifying Expenses

**Classifying Expenses**

There are two basic types of project expenses: those that must be capitalized and those that can be deducted in the same year. Regardless of how expenses are classified, their still is the need to raise the funds to pay for the expenses.

It is the tax preparer who must be concerned with depreciating assets and capitalizing specific expenses. Owner operator/investors can receive tax deductions for business related losses.

Declaring the losses depends on the type of ownership of the business venture (i.e. Limited partnership, Sub-chapter S Corporation, General Partnership, or Sole Proprietorship, including two spouses).

Anyone with an active role of management can take losses against ordinary income; however, an investor with a passive role in management must have passive income in-order to write off the losses. Losses can be carried forward and backward within restrictions.

**Federal and State Tax laws may differ. A tax liability may exist on a state return when no liability exists on the federal return.**

This handbook doesn't attempt to provide the comprehensive advice necessary to setup an investment vehicle to raise capital to plant a commercial cherimoya orchard. An attorney who specializes in creating agricultural tax sheltered investments should be consulted if you require such assistance.

Owning or leasing equipment, structures, and even trees have been suggested as methods of reducing the hard cash necessary to operate an agricultural enterprise.

Such methods of creative financing might be acceptable when large properties are being developed and parcels are being sold to different buyers as investments.

It seems that the key to controlling expenses is having expert management and access to a packing/cold storage facility that will insure the delivery of high quality fruit to market.

Economies of scale suggest that a major planting of cherimoya would have the resources and staying power to solve the identified and unidentified problems that will surely emerge.

The Hawaiian macadamia industry had a major land developer who did plant and sell parcel to limited partnership and provided them with a turnkey operation that included grove management, picking, processing, and marketing. Its success suggests that this approach can be very successful in planting other minor crops.

Care should be taken to avoid the situation used in the hillsides in Rancho California in Riverside county. Even the steepest raw land was bulldozed and ripped.

Twenty acre parcels of land were sold, sight unseen, to Mid-Westerners for a fee per planted acre. Land was planted that was so steep that workers were lowered from the hilltops with ropes.

Irrigation systems were not designed to provide adequate water when the trees reached maturity. This required buyers to replace mains and sub-mains in the 5th or 6th year.

Such steep hillside plantings proved to have major harvesting problems and expenses.

**Amortized Expenses**

Typical expenses to establish the infrastructure of a cherimoya orchard requiring capitalization include the following categories:

**Nursery Trees**

***Planting*** *— materials (tree stakes, mulches, etc.) and labor*

***Indirect Water Development Costs*** *(wells, pumps, water storage tanks/lake, etc.)*

***Direct Water Delivery System*** *— drippers, laterals, etc.*

***Land Clearing —*** *by hand or using mechanical equipment*

***Ripping/Soil Preparation***

***Terracing***

***Road Construction —*** *grading*

***Culverts*** *— materials and installation labor*

***All Weather Roads —*** *paving materials and labor*

***Fencing —*** *fence materials, gates, troughs, and construction labor*

***Windbreak Development —*** *windbreak plants, planting labor, and irrigation system*

***Wind Machine/Frost Control***

***Tractor***

***Tractor Implements***

***Misc. Equipment (capitalized)***

***Pickup Truck***

***Housing (Manager)***

***Housing (Labor)***

***Office Space***

***Spray Equipment***

***Fruit Hauling Wagon***

***Packing Facility***

***Grading/Sizing Equipment***

***Cold storage Facility***

Planting a property in stages may allow the infrastructure to be scheduled in increments that spread the cash requirements over an extended period of time.

**Salaries**

Management of the farming enterprise should be based on the expertise of the manager, responsibilities, and a need to attract and maintain a qualified individual in a position who is responsible for the both daily activities and planning for long range goals.

**Wages must reflect a decision to obtain and retain qualified salaried and hourly employees.**

Costs to plant and maintain any crop will vary according to the slope of the parcel(s). Most financial proposals don't incorporate the additional costs of farming on slopes.

When flat land is used as the base for an economic analysis, either a "slope" or "productivity" index should be used to reflect the additional time/energy required to perform planting and other cultural tasks on different degrees of hillside slopes.

In the example below, the price to plant a tree increases as the number of trees planted per hour drops due to factors related to the steeper slopes.

The index provides a simple way to adjust all establishment and cultural costs that relate to labor and energy.

**Hidden Costs**

The potential for accidents increases as the hillside slope increases. Tree density may also be related to the slope's steepness.

Accident prevention must be a high priority for the grower. Training programs should be in place to educate employees in the proper way to operate equipment, lift heavy objects, and handle various chemicals.

Safe working conditions will translate into reduced insurance costs.

**Tree Planting Costs**

Base number trees/hour 6 Base planting cost/tree $1.27

**Labor Productivity Index**

| Parcel | base No. Trees/Hr. | Productivity Index | Trees/Hour Per Worker | Cost/Hr. | Cost/tree | Adjusted Cost/tree |
|---|---|---|---|---|---|---|
| A | **6** | **1.00** | 6.00 | $7.61 | $1.27 | $7.61 |
| B | **6** | **1.00** | 6.00 | $7.61 | $1.27 | $7.61 |
| C | **6** | **0.95** | 5.72 | $7.61 | $1.33 | $7.99 |
| D | **6** | **0.91** | 5.45 | $7.61 | $1.40 | $8.38 |
| E | **6** | **0.85** | 5.07 | $7.61 | $1.50 | $9.01 |
| F | **6** | **0.72** | 4.29 | $7.61 | $1.77 | $10.65 |
| G | **6** | **0.63** | 3.75 | $7.61 | $2.03 | $12.18 |
| H | **6** | **0.56** | 3.33 | $7.61 | $2.29 | $13.72 |
| I | **6** | **0.50** | 3.00 | $7.61 | $2.54 | $15.23 |

***Fringe Benefits calculated as a percentage of hourly wage paid to workers**

| | base year | 1st year | 2nd year | 3rd year | 4th year | 5th year |
|---|---|---|---|---|---|---|
| Social Security Tax | **7.80%** | **7.80%** | **7.80%** | **7.80%** | **7.80%** | **7.80%** |
| Unemployment Insurance | **6.40%** | **6.40%** | **6.40%** | **6.40%** | **6.40%** | **6.40%** |
| Disability/accident Insurance | **4.00%** | **4.00%** | **4.00%** | **4.00%** | **4.00%** | **4.00%** |
| Health Insurance | **5.00%** | **5.00%** | **5.00%** | **5.00%** | **5.00%** | **5.00%** |
| Fringe benefits* | 23% | 23% | 23% | 23% | 23% | 23% |
| Fringe benefits totaling | $1.39 | $1.43 | $1.48 | $1.52 | $1.57 | $1.61 |
| | **$6.00** | $6.00 | $6.18 | $6.37 | $6.56 | $6.75 |
| Inflation rate | **0.00%** | **3.00%** | **3.00%** | **3.00%** | **3.00%** | **3.00%** |
| Increased benefits from inflation | $0.00 | $0.18 | $0.19 | $0.19 | $0.20 | $0.20 |
| Hourly wage paid to workers | $6.00 | $6.18 | $6.37 | $6.56 | $6.75 | $6.96 |
| Fringe benefits — business cost | $1.39 | $1.43 | $1.48 | $1.52 | $1.57 | $1.61 |
| Hourly wage — Total cost to the business | $7.39 | $7.61 | $7.84 | $8.08 | $8.32 | $8.57 |

**Calculating Hand Pollination Costs**

Growers may wish to consider both the size of the fruit at maturity and total yields per acre. The price per pound may vary according to fruit count per container. An eight fruit may actually be preferred by retail consumers.

There are additional costs associated with smaller fruit. More flowers must be pollinated and more fruit must be harvested to achieve the same total yields per acre.

The amount of pollen and the pollen source can affect fruit size when used in conjunction with a target yield that will allow individual fruit to mature at a specific number of ounces.

Cherimnoya fruit is usually priced by the pound. A fruit weighing a pound will give many consumers "check out counter price shock." An eight ounce piece of fruit would stimulate more sales than larger fruit — a pound or pound and half fruit.

| % of flowers hand pollinated | Base Yr. | Yr. 1 | Yr. 2 | Yr. 3 | Yr. 4 | Yr. 5 |
|---|---|---|---|---|---|---|
| to mature a fullterm fruit* | 26.77% | 22.75% | 21.38% | 31.23% | 34.61% | 37.17% |
| | Base Yr. | Yr. 1 | Yr. 2 | Yr. 3 | Yr. 4 | Yr. 5 |
| Ave. Oz/Fruit | 8 | 8 | 8 | 8 | 8 | 8 |
| | Base Yr. | Yr. 1 | Yr. 2 | Yr. 3 | Yr. 4 | Yr. 5 |
| Number Of Minutes To Pollinate An Individual Flower* | 0.50 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |

*Hand pollination is not recommended on 1 and 2 year old trees since it diverts energy the tree requires for vegetative growth and can stunt the tree's long term production.

**Tracking Fruit From Pollination To Harvest**

As the trees increase in size, there will be a cooler, more humid microclimate formed under the tree's canopy which should favor a higher degree of natural and hand pollination.

There are many reasons that may prevent a pollinated flower from resulting in a marketable fruit. Some can be expected and should be used to anticipate how many additional flowers should be pollinated in order to achieve a target level of production per tree.

On occasion there will be temperatures that are warmer or colder than normal that will cause crop damage, especially when combined with low humidity and high winds.

| | | Base Yr. | Yr. 1 | Yr. 2 | Yr. 3 | Yr. 4 | Yr. 5 |
|---|---|---|---|---|---|---|---|
| | | **4** | **4** | **4** | **4** | **3** | **3** |
| % of hand pollinated flowers that set fruit | | **66%** | **66%** | **68%** | **70%** | **72%** | **74%** |
| | loss | 3 | 3 | 3 | 3 | 2 | 2 |
| % of fruit aborting after 8 weeks | | **40%** | **40%** | **38%** | **34%** | **30%** | **28%** |
| | loss | 1.06 | 1.06 | 1.03 | 0.87 | 0.70 | 0.62 |
| | total | 1.58 | 1.58 | 1.69 | 1.69 | 1.64 | 1.60 |
| % of fruit that is misshaped | | **30%** | **30%** | **30%** | **30%** | **29%** | **28%** |
| | loss | 0.48 | 0.48 | 0.51 | 0.51 | 0.48 | 0.45 |
| | total | 1.11 | 1.11 | 1.18 | 1.18 | 1.16 | 1.15 |
| % of fruit that is damaged from normal causes | | **8%** | **8%** | **8%** | **8%** | **8%** | **8%** |
| | loss | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| | total | 1.07 | 1.07 | 1.14 | 1.14 | 1.12 | 1.12 |
| % of fruit that is damaged from unusual causes | | **0%** | **15%** | **25%** | **0%** | **0%** | **0%** |
| | loss | 0.00 | 0.16 | 0.29 | 0.00 | 0.00 | 0.00 |
| | total | 1.07 | 0.91 | 0.86 | 1.14 | 1.12 | 1.12 |

# A Cash Flow Analysis

**The Development Analysis**

Many tax shelter promoters provide lower per acre development and cultural costs by dividing expensive items among the largest possible number of acres.

This concept is a sound management tool only if the data demonstrated a historical track record of success. Commercial cherimoya plantings in California have been undertaken since the early 1990's.

However, uncertainties still remain concerning variety selections, tree spacing, yields, tree training systems, and other establishment and cultural care programs.

The financial analysis becomes more complicated when orchard blocks are planted in different years, but the use of computers makes it possible to analyze multiple options quickly.

Developing property in stages provides an opportunity to reduce the agricultural risk exposure by making mistakes on a small scale. Corrective solutions can be made and implemented in subsequent plantings, thus reducing risk exposure in each additional planting stage.

**Defining Cash Flow**

Every business must maintain a positive checking account balance to pay its bills. An accounts receivable provides an indication of funds that should be forthcoming; however, collection of these funds often slows when the economy is soft. In some cases the accounts become uncollectable.

**Investors become unhappy when asked to contribute unexpected funds.**

A major source of difficulties for many businesses is the overly optimistic projections of revenues which are used to make payments on loans and provide operating capital.

When a project is not sufficiently capitalized, the only recourse is to ask investors for additional funds to make up the deficit to pay bills when project income doesn't meet projections.

**Regulating Cash Flow**

Planting a total of sixty acres in the first year would require a substantial amount of money up front as establishment costs.

Planting in stages delays the expenditure of major improve-

**Example of a Topographical Classification of a potential hillside cherimoya project.**

| Parcel | Total Gross Acres | Less *Unplantable Acres | Total Usable Acres | Less Roads, Fences, Etc. | Total Plantable Acres | Total Planted Acres |
|---|---|---|---|---|---|---|
| A | 7.00 | 0.00 | 7.00 | 2.00 | 5 | 5 |
| B | 11.00 | 0.00 | 11.00 | 1.00 | 10 | 10 |
| C | 16.00 | 0.00 | 16.00 | 1.00 | 15 | 15 |
| D | 21.00 | 0.00 | 21.00 | 1.00 | 20 | 20 |
| E | 12.00 | 1.00 | 11.00 | 1.00 | 10 | 10 |
| F | 16.00 | 15.00 | 1.00 | 1.00 | 0 | 0 |
| G | 12.00 | 10.00 | 2.00 | 2.00 | 0 | 0 |
| H | 4.00 | 3.00 | 1.00 | 1.00 | 0 | 0 |
| I | 1.00 | 0.75 | 0.25 | 0.25 | 0 | 0 |
| Total | 100.00 | 29.75 | 70.25 | 10.25 | 60 | 60 |

**Example of planting a hillside cherimoya project in stages.**

| Total Acres | Trees/A | Planted Parcel | year 1 Acres Planted | year 2 Acres Planted | year 3 Acres Planted | year 4 Acres Planted | year 5 Acres Planted | year 6 Acres Planted | year 7 Acres Planted |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 290 | A | 2 | 3 | 0 | 0 | 0 | 0 | 0 |
| 10 | 290 | B | 3 | 2 | 5 | 0 | 0 | 0 | 0 |
| 15 | 276 | C | 0 | 0 | 5 | 5 | 5 | 0 | 0 |
| 20 | 247 | D | 0 | 0 | 0 | 5 | 5 | 5 | 5 |
| 10 | 232 | E | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| 0 | 217 | F | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 185 | G | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 174 | H | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 145 | I | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Acres planted/year | | 5 | 5 | 10 | 10 | 10 | 10 | 10 |
| 60 | Total acres planted. | | | | | | | | |

ments like installing irrigation mains and pumping capacity until actually required for planting.

**When weather is hot, dry, and windy, trees quickly become stressed when irrigation is interrupted.**

**Developing Wells**

It may be cheaper to drill and equip a single well that will meet the entire irrigation demand for sixty acres of mature cherimoyas. Drilling two or more wells will result in a higher total cost, but there is a real advantage in multiple wells when a pump repair is necessary,

Installing a submersible pump and motor reduces installation costs, but the trade-off is higher maintenance expenses for the life of the project. Pulling and replacing a motor and pump that is set at 300 feet in the well can require several days during which time the trees are stressed from missed irrigations.

A turbine motor at the well head (pump submerged) is more expensive initially, but a damaged motor can be pulled and replaced in hours if the parts are available.

A small grower may not be able afford to purchase a spare pump and motor. They must depend on a local supplier to inventory and/or order the needed parts.

A large grower should consider stocking key replacement parts as an insurance policy. Growers should also plan a regular off season maintenance program of pulling pumps and reconditioning motors.

**Management decisions should be based on horticultural principles, not because of tax implications.**

**Fencing**

Fencing property is not always a priority when establishing a new planting. A fence to keep out animal pests may not be an urgent necessity if the site is in an area of developed agricultural properties.

A site that is surrounded by native brush is very likely to experience problems with animals chewing surface irrigation lines for water, burying in the ground and eating tree roots, and/or damaging fruit.

Two footed critters can steal fruit from orchards with ease if fencing is not installed. Even when fencing is installed, remote sites without the presence of 24 hour employees can still be subject to theft.

Installing fencing in stages is more expensive because the total perimeter of individual parcels is much greater than the total perimeter of the combined parcels.

**Roads**

The entire property should be surveyed and a comprehensive plan developed for the construction of roads that will maximize the access to each planted parcel and potential home site(s) that would be possible if the property would be subdivided.

**Brake-Even Point**

Accountants will frequently refer to a point in a business where the revenues equal the expenses. This doesn't mean that the business is showing a profit because various tax deductions usually continue to produce a loss.

What occurs is that the investor(s)/owner(s) no longer must contribute funds for the business to operate.

**Return On Investment**

A cost of using start-up capital should be calculated based on what could have been earned without risk in a tax free guaranteed investment.

The profit returned to investor should reflect both the earning on the start-up capital and the risk of the business investment.

A tax free return of 4% may equal an 8% return that is taxed, depending on the investors rate of federal and state tax payments.

A return on invested capital of 20 to 25% would not be unreasonable considering that there are more uncertainties and unknowns concerning the production and marketing of cherimoya compared to avocados which are a more established commercial crop.

The period of time to achieve a return on invested capital is delayed in all tree crops. Growers use various techniques to maximize the per acre yields of their orchards and reduce the nonproductive period.

Increasing the per acre tree density is one of the most commonly used method to increase yields. Topworking an older grove to higher yielding cultivars is also a common practice.

**Scheduling Revenues**

Being able to deliver fruit when other growers are not producing will generate increased grower returns.

Paving a dirt grove road can allow a grower to reenter a grove after heavy rains and pick fruit when other growers may still be repairing road damage.

Cherimoya growers may be able to affect the harvest date of their crops by inducing tree dormancy to produce off-season production.

Varieties can be developed to extend the harvest season of cherimoyas. There is as much as six weeks difference in time the same varieties of cherimoya planted in Carpinteria and in San Diego will go dormant. Climatic conditions are the likely cause since avocado varieties demonstrate a similar difference in harvesting dates.

# Projecting Project Revenues

**Maximizing Project Revenues**

Revenue is derived from sales to domestic and export markets. Only the highest quality fruit will be acceptable for export. The net price received by growers can vary between fruit sold to export and domestic buyers.

A grower gradually gains experience to predict the number of flowers that must be pollinated to compensate for poorly shaped fruit and or failure to achieve a pollinated fruit that the tree will retain until maturity.

Ordinary problems a grower can expect include: weak pollen viability and low humidity that affects the receptive period of a flower in its female phase.

Unusual problems may also be experienced that cause fruit to abort or become damaged, and thus be unsalable. Extreme summer heat combined with low humidity and windy weather can stress a tree to the extent that defoliation occurs. Fruit exposed to prolong direct sun will suffer damage to the thin skin. If the interior tissue of the fruit is damaged, the fruit is unsalable.

Growers report that a degree of natural pollination occurs when the weather conditions are ideal. Malformed/oddly shaped fruit is not uniformly pollinated.

Any fruit that exhibits a deformity should be removed and not allowed to mature since the tree's food resources would otherwise go into increasing the size of remaining "full figured" fruit.

**Calculating Yields**

The volume of bearing surface can be measured and calculations made to project tree size from initial planting through reaching maturity. Using a ratio between the volume of bearing surface and its ability to mature a pound of marketable fruit can be used to estimate the gross harvest weight per acre obtainable for a grove of any age trees.

Total pounds per acre projections must be converted into net weights of the crop graded by size and quality. The actual value of the crop will vary according to market demand establishing price differences for size and fruit quality.

**Voluntary Grading Standards**

Although mandatory grading standards do not exist in the cherimoya industry, growers who establish high standards for their label, can expect to earn a premium for their pack.

At the present time only No. 1 and No. 2 grades are marketed as fresh fruit. Any fruit that doesn't meet that standard has no alternative market, i.e. processing into juice, puree, jam, wine, fruit leather, etc. Eventually a processing market for the fruit must be developed to convert this otherwise wasted fruit into an income producing entity.

**Preserving Fruit Quality**

The packout percentage of an orchard's No. 1, No. 2, and processing quality cherimoya fruit will change as the trees achieve maturity. Fruit that is sunburned declines as the tree's canopy increases.

Fruit that is located in the interior of the canopy is provided a few degrees of protection from frost damage as the canopy traps radiating ground heat. A larger leaf canopy also provides protection from hail damage.

Growers can reduce fruit damage by restricting their efforts of hand pollination to flowers that will be protected by foliage from hot, dry, windy conditions that frequently occur in the late summer and early fall.

Preserve fruit quality by reducing bruising in harvesting and transporting the fruit from the field to the packing house.

Care must be taken to train and supervise workers in the proper way to select, harvest, and transport the fruit. For example, fruit should never be "dumped" into a bin from a picking sack. Bins should never be placed in a location to absorb radiant heat from the sun.

Fruit quality is preserved by quickly reducing the core temperature of the fruit to its optimum level as quickly as possible.

Fruit should be harvested in the morning when it is at the lowest possible core temperature. Harvesting should be discontinued when temperature exceed optimum conditions.

After harvest care must include efforts to minimize delays in transportation to a facility to precooled the fruit and store it at a precise temperature and humidity to preserve quality.

Transportation of fruit to any off farm packing facility must be in an enclosed, cooled van to avoid moisture loss, lowered fruit quality, and reduce post-harvest spoilage during storage.

The risk to the grower extends beyond the grove and packing house. The handling the fruit receives after leaving the packing facility and its storage at the retail sales site can affect the fruit's shelf life on display at produce counter.

It is essential to educate retail produce clerks on proper handling and storage procedures. But failure to remove distressed fruit from display shelf is the primary cause of consumer dissatisfaction.

# Projecting Project Expenses

**Reducing Expenses**

Paying workers by a "piece rate" rather than by the hour sacrifices fruit quality in an attempt to lower harvesting costs. This approach is counter productive as it will result in a lower net return to the grower.

The largest expense of producing cherimoyas is hand pollination and harvesting tasks. Tree size and shape is an important consideration in containing these expenses.

A tree's structural form is affected by multiple factors:

- single leader, vase
- trained in a hedgerow or as stand alone tree
- the height and width of scaffolding branches
- terrain—flat or sloped
- access by mechanical equipment to transport fruit bins or lift workers to perform activities without the use of a ladder
- harvested from ground or requiring a ladder

**Maintaining A Trained Work Force**

Cherimoya workers must be properly trained to perform specific tasks such as hand pollination and harvesting. Both tasks will be performed over a period of months.

Management should attempt to schedule its works to use workers with special skills exclusively to perform these task rather than under utilize these workers in performing jobs that can be accomplished by using temporary workers.

**Hiring illegal workers is a foolish way to temporarily reduce employee expenses.**

Many project proforma statements under estimate employee expenses because a flat rate is used in their projections. Each 30b description should include the minimum qualifications required. The cost of each job should include a range of hourly wages that assumes worker longevity.

A trained employee expects a regular program of performance based salary increases and a package of fringe benefits—paid holidays, paid vacation, medical insurance, retirement plan, and even an annual bonus when the farm's earnings exceed specific bench marks.

**Purchasing Verses Leasing**

Major expenses generally are incurred in the year that they are acquired, but income tax rules may require that their cost is spread over an extend period of years. This artificially reduces the allowable expense deductions, but does nothing to solve the cash flow problems of financing the items.

Some cash flow problems can be solved by leasing or renting rather than purchasing major items. The pros and cons of such arrangements should be discussed with your financial advisor.

**Phased Property Development**

Developing every plantable acre in a single year may reduce the per acre management and maintenance costs from the start. In crops where the risks are completely understood and based upon years of historical data, it may make economic sense to undertake large scale plantings.

A crop like cherimoya still has many elements of uncertainty that suggest caution should be the major watch word. Planting a property in stages allows portions of the infrastructure to be scheduled in increments. If the length of time being considered is four or six years, it is possible to make changes to new planting based on experience gained from initial plantings.

It is difficulty for many financial money managers to incur higher management and cultural expenses because they have only developed five acres the first year rather than sixty acres. If any errors occur in a series of small plantings, the extra management fees incurred is small compared the money saved by not making the mistakes on a grand scale.

A phased development policy spreads the cash requirements over an extended period of time. Ideally the project should begin to generate a small revenue stream prior to undertaking plantings in the fourth through sixth years.

The extra management funds required in a phased property development plan should be considered "on the job" training that can't be obtained from any other source for less money.

**Management Decisions**

Many CEO's are making business decisions based on recommendations an accountant makes because of tax implications. Wrong!

Every decision of an agricultural enterprise should be based on sound horticultural principals and practices that are tempered by funding constraints.

Under no circumstances should short term profit motives (greed) substitute for long term policies that protect and preserve the land.

Compromising worker safety and health to obtain higher profits oncreases the possibil;ity of criminal procacusion and civial ligation.

# Revenue and Expense Statement

| | Base Yr. | Yr. 1 | Yr. 2 | Yr. 3 | Yr. 4 | Yr. 5 | Yr. 6 | Yr. 7 | Yr. 8 | Yr. 9 | Yr. 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Estimated Market Demand (lbs.) | **224,000** | 224,000 | 248,640 | 248,640 | 273,504 | 330,940 | 400,437 | 484,529 | 537,827 | 596,988 | 650,717 |
| Projected rate of market expansion | | **1.00%** | **0.00%** | **0.00%** | **1.00%** | **1.00%** | **1.00%** | **1.00%** | **1.00%** | **1.00%** | **1.00%** |
| Total market expansion | | 11.00% | 0.00% | 10.00% | 21.00% | 21.00% | 21.00% | 11.00% | 11.00% | 9.00% | 7.00% |
| Volumn of market expansion | | 24,640 | 0 | 24,864 | 57,436 | 69,497 | 84,092 | 53,298 | 59,161 | 53,729 | 45,550 |
| Expanded Market (Demand) | | 248,640 | 248,640 | 273,504 | 330,940 | 400,437 | 484,529 | 537,827 | 596,988 | 650,717 | 696,267 |
| Shipments (Supply — line 121) | 225,342 | 306,978 | 370,791 | 437,480 | 511,979 | 589,113 | 667,679 | 748,519 | 824,293 | 902,155 | 984,384 |
| Current demand (lbs.) | | -58,338 | -122,151 | -163,976 | -181,040 | -188,675 | -183,150 | -210,692 | -227,305 | -251,438 | -288,117 |
| % change in vol. delivered from previous yr. | | 36.23% | 20.79% | 17.99% | 17.03% | 15.07% | 13.34% | 12.11% | 10.12% | 9.45% | 9.11% |
| change in vol. delivered from previous yr. | | 81,636 | 63,813 | 66,689 | 74,500 | 77,133 | 78,566 | 80,840 | 75,774 | 77,862 | 82,229 |
| Shipments (Supply — line 121) | | 306,978 | 370,791 | 437,480 | 511,979 | 589,113 | 667,679 | 748,519 | 824,293 | 902,155 | 984,384 |
| Annual Supply surplus (Lbs.) | | 58,338 | 122,151 | 163,976 | 181,040 | 188,675 | 183,150 | 210,692 | 227,305 | 251,438 | 288,117 |
| Length of Marketing Season in wks | **28** | **28** | **28** | **28** | **28** | **28** | **28** | **28** | **28** | **28** | **28** |
| Seasonal Market Adjustments in wks | **0** | **1** | **-1** | **3** | **2** | **-1** | **0** | **1** | **2** | **3** | **4** |
| Adjusted Marketing Season in wks | 28 | 29 | 27 | 31 | 30 | 27 | 28 | 29 | 30 | 31 | 32 |
| Weekly Supply surplus (Lbs.) | | 2,084 | 4,363 | 5,856 | 6,466 | 6,738 | 6,541 | 7,525 | 8,118 | 8,980 | 10,290 |
| Weekly Supply surplus (Trays) | | 208 | 436 | 586 | 647 | 674 | 654 | 752 | 812 | 898 | 1,029 |
| Difference prior yr's/current yr. supply | | 81,636 | 63,813 | 66,689 | 74,500 | 77,133 | 78,566 | 80,840 | 75,774 | 77,862 | 82,229 |
| Initial Asking Price | **$2.50** | $2.50 | $1.70 | $3.10 | $2.45 | $1.70 | $0.70 | $0.50 | $0.40 | $0.35 | $0.45 |
| Inflation rate | 0.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% |
| Initial asking price | | $2.58 | $1.75 | $3.19 | $2.52 | $1.75 | $0.72 | $0.52 | $0.41 | $0.36 | $0.46 |
| Price adjustment | **$0.00** | **($0.80)** | **$1.40** | **($0.65)** | **($0.75)** | **($1.00)** | **($0.20)** | **($0.10)** | **($0.05)** | **$0.10** | **$0.25** |
| Adjusted price | $2.50 | $1.70 | $3.10 | $2.45 | $1.70 | $0.70 | $0.50 | $0.40 | $0.35 | $0.45 | $0.70 |

# Projected Yields

| Tree Age | 5,950 Base Yr. | 5,950 Yr. 1 | 2,678 Yr. 2 | 4,046 Yr. 3 | 4,653 Yr. 4 | 5,058 Yr. 5 | 5,058 Yr. 6 | 5,058 Yr. 7 | 5,058 Yr. 8 | 5,058 Yr. 9 | 5,058 Yr. 10 | 5,058 Yr. 11 | 5,058 Yr. 12 | 5,058 Yr. 13 | % of Mature Yield | Lbs./ Tree |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 > | 16 | 34 | 54 | 76 | 96 | 116 | 136 | 154 | 170 | 184 | 196 | 206 | 211 | 216 | 100.00% | 5,058 |
| 12 | 18 | 20 | 22 | 20 | 20 | 20 | 18 | 16 | 14 | 12 | 10 | 5 | 5 | 5 | 95.00% | 4,805 |
| 11 | 20 | 22 | 20 | 20 | 20 | 18 | 16 | 14 | 12 | 10 | 5 | 5 | 5 | 5 | 90.00% | 4,552 |
| 10 | 22 | 20 | 20 | 20 | 18 | 16 | 14 | 12 | 10 | 5 | 5 | 5 | 5 | 5 | 85.00% | 4,299 |
| 9 | 20 | 20 | 20 | 18 | 16 | 14 | 12 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 70.00% | 3,540 |
| 8 | 20 | 20 | 18 | 16 | 14 | 12 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 55.00% | 2,782 |
| 7 | 20 | 18 | 16 | 14 | 12 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 40.00% | 2,023 |
| 6 | 18 | 16 | 14 | 12 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 20.00% | 1,012 |
| 5 | 16 | 14 | 12 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 10.00% | 506 |
| 4 | 14 | 12 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5.00% | 253 |
| 3 | 12 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 2.50% | 126 |
| 2 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0.00% | 0 |
| 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0.00% | 0 |
| total | 211 | 216 | 221 | 226 | 231 | 236 | 241 | 246 | 251 | 256 | 261 | 266 | 271 | 276 | | |