

PDS A-B11-141

Consultancy Report  
*Feasibility Study for Pineapple Processing Cannery for Chapare Zone,  
Bolivia*

***Bolivia: Managed Rural Capital Resources Activity  
Contract Number: 511-0617-3-10117***

Prepared by:  
***Charles J. Bauman***

Prepared for:  
Agricultural Cooperative Development International  
50 F Street, NW, Suite 900  
Washington, DC 20001  
Phone: 202/638-4661  
Fax: 202/626-8726

April 4, 1993

DRAFT COPY DRAFT COPY

FEASIBILITY STUDY for  
PINEAPPLE PROCESSING CANNERY

for

CHAPARE ZONE, BOLIVIA

By

Charles J. Bauman

Requested by

AgroCapital

Cochabamba, Bolivia

Draft Date: April 4, 1993

FEASIBILITY STUDY for  
PINEAPPLE PROCESSING CANNERY

for

CHAPARE ZONE, BOLIVIA

By

Charles J. Bauman

**INTRODUCTION**

Pineapple has been targeted by various government groups as a crop with potential for expansion. As part of AgroCapital's interest in developing the agro sector of Bolivia's economy, they are engaged in providing loans and technical assistance to small independent pineapple farmers.

In addition, AgroCapital has been approached by an Argentine company with an expressed interest to build a cannery in the Chapare Zone for the purpose of processing pineapple. The Argentine company intends to export the canned pineapple and juice concentrate from the proposed cannery to Argentina and Chile. They believe that they can market 150,000 cases of 24/2½ (24 cans of 30 ounce or 850 grams) of slices, chunks, tidbits and crushed processed pineapple.

Given that AgroCapital's investment in the small pineapple farmers and the interest shown by the Argentine company, AgroCapital has arranged for this feasibility study as a guide for planning the best use of their time and resources.

**STUDY METHOD**

Even though pineapples have been grown for many years in Bolivia, with several attempts at processing pineapples for local consumption, there is little existing knowledge to make proper projections of what might be achievable. Therefore, the foundation of this study must be based on statistics of other countries growing and canning pineapples. In today's world of economics and trade, there are no longer isolated or protected markets. Anyone investing in an agroindustrial venture such as a cannery to process pineapple must be aware of the world market for processed (canned) pineapple.

The study will cover the following:

1. World Production of Canned Pineapples
2. World Exports and Imports
3. World Costs of Production
4. Sales Values in Principal Markets
5. Conditions Required for Successful Cannery Operations
  - 5.1 A Secure Supply of Raw Materials at World Competitive Prices
  - 5.2 Availability of a Trainable Labor Force at World Competitive Wages.
  - 5.3 Access to Suitable Markets.
  - 5.4 Reasonable Costs of Financing
  - 5.5 No Unreasonable Government Restrictions or Requirements
6. Investigations and Reporting of Existing Conditions
7. Extrapolation of Costs for Bolivia by Best Estimate of Expected Achievements
8. A Summary and Recommendations for AgroCapital
9. List of Tables, Graphs and References

## **1. WORLD PRODUCTION OF CANNED PINEAPPLES**

The statistics for the production of canned (processed) pineapple are given in two forms: (1.) Metric Tons which account for the net weight of the product in the various can sizes, including the packing medium (juice and syrup). (2.) In terms of 20 ounce cans 24 to a case, referred to as 24/2T case. This can size is also known as 567 or 570 gram size. Most of the world's consumption is in the 24/2T size. Some markets and areas still have a preference for the 2½ can size (30 ounces, 850 grams), which is the case in Bolivia. The USDA uses a factor of 71.1 cases of 24/2T per Metric Ton in their statistics and 48.99 cases of 24/2½ per Metric Ton.

The preference for this study will be to express most of the statistics in term of 24/2T cases, because this is the standard for most of the world's major producers. Where it is desirable to think or express the cases in 24/2½ size, the number of 24/2T cases must be divided by 1.5 (or if the reader prefers multiply by 0.67). Many of the tables and graphs will be duplicated in both sizes. However, the cost data is extracted from industry standardization on 24/2T so that when these values are converted to 24/2½, they must be factored by more rules than just multiplying 24/2T costs by 1.5 to get 24/2½ costs. Examples are: 24/2½ recovery is lower so that fruit

costs increase greater than the 1.5 factor, and base weight of tin plate in the cans make the cans more expensive than the 1.5 factor.

These are some of the most important statistics to know about World Production of Canned Pineapples:

- World production in 1992 was 74.2 Million Cases of 24/2T size. It is expected that production will reach 76.7 million cases in 1993, based on normal weather.
- World production is geographically very concentrated. It is expected for 1993 that Thailand will account for 49% of the world's production. When the Thailand and the Philippine productions are added together, they will account for 72% of the world's expected production for 1993.
- World production has risen from 51.9 Million cases in 1972 to the level of 74.2 million cases in 1992. An annual compound growth rate of 2% (two percent).

See these Tables, Graphs and Reference for more details of World Production of Canned Pineapples:

Thailand's Production by Can Size (Table) EXHIBIT "A"

Thailand's Production by Can Size (graph) EXHIBIT "B"

World Production by Geographical Area (Table) EXHIBIT "C"

World Production Canned Pineapple in Metric Tons (Graph) EXHIBIT "D"

World Production Canned Pineapple in 24/2T Cases (Graph) EXHIBIT "E"

Reprints of the USDA's HORTICULTURAL PRODUCTS REVIEW for July 1992, pages 41 to 52 "Canned Pineapple and Pineapple Juice Situation in Selected World Markets". (Reference) REFERENCE "A"

## **2. WORLD EXPORTS AND IMPORTS**

At least 85% of the World's production of processed canned pineapple is exported by the producing country and being imported by another country.

The import value of the 63.7 million cases of 24/2T had a value in excess of \$700 million dollars. Canned pineapple is a very important foreign exchange earner to many countries. When the value of the pineapple juice and concentrate are added to the solid pack value, the import value of pineapple trade is in excess of 1 Billion Dollars.

It is expected that exports and imports will continue to grow as production grows and prices remain stable. Europe and Asia are growing faster than the US market. It is believed that the Latin American markets have not yet been properly approached. The high import duty structure of many of the Latin American countries provided a barrier to entry into many of these countries; however, many of these barriers are now falling and the producing countries are now

looking to sell more product to Latin America.

	1990	1991	1992	1993
USA	25.4	23.9	26.2	26.1
EUROPE	26.8	27.8	28.0	28.6
ASIA	7.5	9.7	10.4	11.3
OTHER MARKETS	9.0	8.9	9.0	9.0
TOTAL	68.7	70.3	73.6	75.0
% USA/EUROPE	76.0 %	73.5 %	73.6 %	72.9 %

As is evident from the above Table, the USA and Europe are the principal consumers of canned pineapple. However, their percentage of the total is beginning to decrease and the trend is expected to continue.

See these Tables and Graphs for more details of World Exports and Imports of Canned Pineapples:

- World Production by Geographical Area (Table) EXHIBIT "C"
- World Production Canned Pineapple in 24/2T Cases (Graph) EXHIBIT "E"
- World Exports of Canned Pineapple in 24/2T Cases (Graph) EXHIBIT "F"

### **3. WORLD COSTS OF PRODUCTION**

Production costs, of course, vary from country to country and from company to company. However, since canned pineapple is a freely traded commodity market shares of producers tend to gain their fair shares only by acceptable quality and acceptable price.

Although much effort has been made to develop labor saving equipment for the growing and the processing of pineapples, it remains very labor intensive. This has forced some countries to cease being areas where pineapples are canned. A good example of this are Hawaii and Taiwan. Hawaii was once the world's largest producer of canned pineapple and had more than 8 major canneries. Today there is only one cannery that will operate in 1993.

At the present moment, the most competitive producing country with the lowest cost is Thailand. However, their quality is not as good as Philippine quality. Although some Thai producers offer lower prices than the Philippines and other countries, they do not always win on price alone; many buyers will pay more for what they believe is a higher quality.

Nevertheless, Thailand is the country with the most production and is very aggressive in the market place. In addition, the government of Thailand has been very supportive of its producers by advancing pre-export financing. So, looking at Thai costs of production is the best introduction to what must be achieved by a company that is going to invest in a cannery.

One of the most important items in the final cost of a case of pineapple is the cost of raw fruit. In that cost there are three things to consider: (1.) The cost of the fruit in terms of cost per fruit or cost per ton. (2.) A supply sufficient to have the cannery operate at its design capacity so that overhead and other non-variable costs are kept in line. (3.) Quality and condition of the fruit, which determines recovery.

There are three ways that canneries obtain their raw fruit: (1.) Vertical integration, where the cannery grows its own fruit. (2.) Buy from independent growers. (3.) A combination of some production on their own and the purchases from independent growers. Thailand is almost 100% small (1 to 20 Hectares) independent growers. This has been a great strength for the Thailand canners, because it has spread the agricultural risk. The following table is a history of the cost of a Short Ton (2000 pounds) delivered to the cannery without the crowns.

YR.	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
89	60	46	48	48	46	43	40	39	38	42	82	64
90	79	61	61	56	49	50	51	52	52	49	82	64
91	95	96	99	103	103	108	117	121	121	117	126	112
92	108	88	71	68	61	53	55	55	82	110	108	111
93	111	92	68	65	69	68	66	66	68	77	76	94

The canners will avoid purchasing, as much as possible, during the high cost months which are normally August to November. The canneries tend to repair their canneries during this high cost period unless they are short of product for their markets and customers.

After the cost, supply and quality of raw fruit, the next most important factor is a good supply of trainable workers at daily wage rates competitive with other countries competing for canned pineapple export markets. In this regard, Thailand has one of the lowest rates. Most Thai canners obtain suitable workers for handling, trimming, can filling and moving of product within the cannery for about \$4.00/Day (Four US Dollars/Day).

After fruit and labor costs, material inputs such as cans, labels, sugar, citric acid, kraft cases, etc. at reasonable costs. Thailand has been able to maintain very reasonable costs for these inputs.

After fruit, labor and material costs, the next most important factor is transport and roads to the port areas for overseas (export) shipments. Again, Thailand has good roads and their ports,

though congested, are adequate for canned pineapple.

All of the above factors have given Thailand a cost structure that requires anyone wishing to compete for canned pineapple trade on the world market must be sure to be able meet these costs per case, or have a unique market situation different from free market forces.

	\$	X's	\$
	CASE	BY	CASE
	24/2T	for 2.5	24/2.5
FRUIT COSTS	3.59	1.50	5.39
CANS	2.14	1.60	3.42
CARTONS	0.29	1.58	0.46
LABELS	0.21	1.50	0.32
SUB-TOTAL PKG	2.64	N/A	4.20
FACTORY LABOR	0.31	1.50	0.47
UTILITIES	0.12	1.50	0.18
SUGAR/ACID	0.23	1.50	0.35
WHSE/LOADING	0.31	1.50	0.47
SUB-TOTAL	0.97	N/A	1.46
COSTS BEFORE G&A	7.20	N/A	11.04

The above costs are the average variable cost that a Thailand producer has for 24/2T case and 24/2½ case. These costs are before the manufacturer's general overhead, sales expense, marketing, interest and taxes. This cost plus ocean freight is the price that a producer, long on inventory and in need of cash, might offer to Latin American markets. In summary, the markets of Argentina and Chile could import CIF to their port cities as low as \$11.04 + freight @ \$3.00 + markup @ \$1.50 for a total of \$15.54/case of 24/2½ for unbranded product. If internationally

branded product was desired, it might be obtained for \$17.54/case to \$18.54/case under the same conditions.

#### **4. SALES VALUES IN PRINCIPAL MARKETS**

The sales value of canned pineapple has several division or categories which make great differences in the pricing:

1. Consumer Branded Product
2. Consumer Private Label
3. Consumer Unbranded Product
4. Branded Industrial Product
5. Unbranded Industrial Product

A Consumer Branded Product is one which the consumer recognizes as a brand name product and is familiar with the quality. To have a branded product requires advertising and a customer service program that will act on the suggestions or complaints of the customer. They will also offer services to the customer as to how to use the product, etc. Normally, recognizable branded pineapple will sell at a premium to Private Label and Unbranded product. This premium varies, but to unbranded product, it will sell at a 25% premium in the supermarkets of the US and Europe.

When a chain store, or large supermarket, contracts with a canner to put a his store label on the product, this is known as Private Labeling. Supposedly the chain store will stand behind the product for the suggestions or complaints of the consumer. Usually, the chain store or super market prices this product between the Nationally Branded Product and Unbranded Product.

Unbranded Product usually has a label unknown to the consumer. The customer who buys unbranded product does so on price alone without consideration of knowing the company which produces the product. In the US, the market for Consumer Branded Product has a market share greater than 55%. In addition, Private Label Product has at least a 20% share of market. This leaves Unbranded Product having a share of market of less than 25%. The US market tends to be brand conscience. The opposite is true in the European market: they tend to be price oriented, although this is changing and the consumers are becoming more quality-conscious and slowly tending to Consumer Branded Product.

Branded Industrial Product is product sold to food manufacturers who use the processed pineapple in a food product produced by them: cookies, ice cream, yogurt, etc. The manufacture pays a higher price because he expects a better quality and expects that the Nationally Branded

Manufacturer will stand behind the product.

Unbranded Industrial Product is for the remanufacturer who buys on price alone and is willing to accept that the quality might vary from order to order.

Any pineapple canning operation established in Bolivia would fall into the category of unbranded product.

See the following Table and Graph for wholesale pricing of Branded Products to various markets:

Value of a Branded Case of 24/2T of Pineapple (Table) EXHIBIT "G"

Value of a Branded Case of 24/2½ of Pineapple (Graph) EXHIBIT "H"

## **5. CONDITIONS REQUIRED FOR SUCCESSFUL CANNERY OPERATIONS**

### 5.1 A Secure Supply of Raw Material at World Competitive Prices

It is not possible to over-emphasize the importance of a secure supply of fruit in quantity equal to the planned cannery capacity. Without the supply in quantity and quality, the cannery or project has no hope of being successful. However, a secure supply of good quality that is uncompetitive in terms of free world market trade can be equally disastrous. Therefore, the number one requirement for any investor in a pineapple cannery is: **there must be a secure supply equal to the cannery's capacity of suitable quality and reasonable price before the project proceeds.**

### 5.2 Availability of a Trainable Labor Force at World Competitive Wages.

It is not sufficient to have low-cost labor. The potential labor must be trainable to follow procedures that will insure that the product can be produced safely and sanitarly. Therefore, if the first requirement of raw material availability is passed then: **there must be a good supply of trainable labor at world-competitive wages.**

### 5.3 Access to Suitable Markets

Access to suitable markets means that the targeted markets are available both by suitable transportation and favorable duties and tariffs.

#### 5.4 Reasonable Costs of Financing

A pineapple canning facility is capital intensive especially when the canning season is short, 100 days or less. Inventories of finished goods must be carried for minimum of 6 months. Inventories of packaging materials also must be carried 3 months in advance of canning. These factors often require that a dollar (US\$1) of assets be employed for every dollar of sales, especially in the early start-up years of a new canning venture. Even long establish large canners will have fifty cents (US\$0.50) of assets employed for every US dollar of sales. With this type of capital required, interest rates for financing must be reasonable.

#### 5.5 No Unreasonable Government Restrictions or Requirements

Assuming that the venture has as its goal to be competitive in the free market of canned pineapple, any government restriction or requirement that other competitors do not incur can make the venture non-competitive.

### **6. INVESTIGATIONS AND REPORTING OF EXISTING BOLIVIAN CONDITIONS**

#### 6.1 Availability of suitable quantity and quality of pineapples

The interest of the Argentine investor is reported to 150,000 cases of 24/2½. This translates at 11.7 case/Metric Ton to 12,821 Metric Tons of pineapples. At **current** average yield of 20 Metric Tons/Year per hectare in production (plant crop 45mt + ratoon crop 30mt in three years @ 80% recovery), it would require that 641 hectares be dedicated totally to the proposed venture. If proposals of the AgroCapital technical advisors are successful, this number could be one-half that amount.

At the present time, there may be 600 or more hectares in the Chapare Zone, but not all of the plantings are smooth cayenne. At the present time, all of the yield is dedicated to the fresh markets. Normally, a canner can never compete for fruit against the fresh fruit price. See the table above that gives the Thai price for fruit by months. During the months of August, September, October and November, canners will not operate their canneries because natural production of fruit is low, and the fresh market price becomes high. So, canning is normally suspended during periods of high fruit costs.

My best guess is that, until smooth cayenne plantings in the Chapare exceed 1500 to 2000 hectares and the fresh market amply supplied, will there be a sufficient supply to operate a 150,000 case 24/2½ venture.

In addition to the limited number of planted hectares, there seem to be several major disease problems that are just now being addressed. Much more programmed technical assistance will be required before the Chapare Zone achieves the needed 1500 to 2000 hectares.

## 6.2 Cost of the Fruit

There is little hard data on what is the cost of fruit. There seems to be some agreement that a 2 Kg fruit will cost US \$0.30/fruit. This would translate to \$150/Metric Ton and would not be competitive with world prices for pineapples for canning. An AgroCapital model using planting densities of 44,000 per hectare, calculates that total cost for a three- year cycle would be \$16,007 per hectare. At these densities, with the fertilization program, disease control, etc., we might expect 80 metric tons for the plant crop and 60 metric tons for the ratoon crop. This would yield a cost per metric ton of \$114.33 if all holds according to plan. The next three-year cycle would not have \$6,000 cost for planting materials, so, that succeeding cycles would cost about \$12,000 for the cycle. With yield at 140 metric tons/cycle costs would be reduced to \$85.71 per metric ton. A value of \$85.00 per metric ton would approach being competitive for the canner. A warning: these are assumptions of costs and yields not yet achieved.

## 6.3 Available Supply of Trainable Labor at World Competitive Wages

There appears to be an ample supply of labor. Also, there is a need to create jobs for the growing population. Most of the studies in the hands of AgroCapital indicate that \$4.00/day will be the wage rate for an agroindustrial enterprise operation.

Finding first-line foremen and supervisors may be more difficult. This problem must be taken into account in estimating the start up costs.

## 6.4 Cans, Cases and Other Cannery Supplies

Cans and cases will be more expensive since there is only one supplier. Lower costs might be obtained by importing from Argentina on a duty-free basis, since the product is for export. However, it must be realized that all inputs during early years of operations will be higher than other countries with experienced pineapple canneries.

## 6.5 Reasonable Costs of Financing

At the present time there does not appear to be a program by the Bolivian government that would offer export financing. Such a program could go a long way towards making a cannery operation viable. Next to the availability of low cost fruit supply, the cost of financing is the most important incentive for attracting an investor to build a cannery.

## 6.6 No Unreasonable Government Restrictions or Requirements

Brief investigations to date have not uncovered any laws, rules, or requirements that would place an undue burden on the investor establishing a cannery. However, this is an item that in later investigations that needs close scrutiny.

## 6.7 Availability of Market Statistics of Volumes and Prices

This study considers that the two targeted export markets for the production of canned pineapple (plus the juice and concentrate) are Argentina and Chile. The amount of research is limited to: (1.) The statements of the Argentine investor who believes he can market 150,000 cases of 24/2½. and (2.) A study "Estudios de Mercados Chile y Argentina" by Carana Corporation, La Paz, Bolivia and dated November 15 - 30, 1992.

In the study mentioned above, the size of the Argentine market for imported canned pineapple was not specifically given. However, the study did conclude that Bolivian product FOB Santa Cruz @ \$16.30 for 24/2½ case would have market potential in the Argentine market. The Chilean import statistics for the first 8 months of 1992 were that 2.8 million net kilos of canned pineapple were imported for a US dollar value of 2.8 million dollars. This translates to a CIF value of one dollar/kg or \$20.40/case of 24/2½. The yearly Chilean import volume of 24/2½ can be estimated from those values to be 200,000 cases.

## 6.8 Existing Bolivian Pineapple Canneries

There are several small canneries that process a variety of canned vegetables that include in their production very small amounts (1000 cases or less) of canned pineapple. In addition, there are two companies that have plants dedicated to canning pineapples.

The first company is Productos Natural, Santa Cruz. This is very small plant that can handle 5,000 pines/day (10 metric ton). The equipment is all homemade (very low tech) and of questionable sanitary design and use. There are many places that the fruit comes into contact with bare iron and steel. We saw many swollen cans from the last packing season, which is a good indication of poor canning

procedures. In addition, all cans showed signs of rusting. The owner maintains that he is able to produce 5,000 cases per season if he can get the fruit. He has a work force of 32 to 37 workers to operate the cannery. Therefore, his labor costs are at least \$100/day for the 100 cases/day or \$1.00/case. The owner said that fruit cost him \$0.30/fruit or \$150.00/metric ton or \$15.00/case. Local cans and case cost \$7.20/case. Other costs for labels, citric acid, utilities, etc. add at least another \$1.50. This adds up to a total cost of \$24.70. It is difficult to understand how this operation can make money when the market study above believes that FOB Santa Cruz can expect \$16.30/case for sales to the Argentine market. Perhaps he pays far less for the fruit than the \$0.30/fruit that he claims.

The second company is Industrias LAS, Santa Cruz. This appears to be a properly designed plant. Its one drawback is that it can only economically process size 2½ fruit through its ginaca. It has a small high temperature concentrator. It is estimated that if it could obtain an average of 40 metric tons per day a 100 day season (peaking to 60 to 80 tons on some days of double shifts) it could produce 40,000 cases/year. The General Manager indicated to me that because of high fruit costs ( about \$150/metric ton), his costs were more than \$20/case. It is reported that, without the building, the pineapple equipment has a value of \$500,000. My own estimate that is this figure is close to the right number. The equipment was furnished by an Argentine company under the name of CONDOR. The LAS operation is the minimum level of cannery that an investor should attempt to produce canned pineapple for an export market.

## **7. EXTRAPOLATION of COSTS FOR BOLIVIA BY BEST ESTIMATE OF EXPECTED FUTURE ACHIEVEMENTS**

Assuming that an agroindustrial venture is secure in its ability to market 150,000 cases of 24/2½ cases of canned pineapple, and that a supply of fruit would be available, a facility to produce such a quantity would cost about \$2,000,000. This assumes fruit supply of 100 days, and working 2 shifts when the supply peaks. If it were desirable to stage the construction over 4 years to match the supply of excess fruit from the fresh market the initial investment would be \$1,000,000 and then about \$350,000 for each of the 3 expansions.

Using Thai production costs factored for Bolivian conditions, it is possible to make a rough estimate of Bolivian per case costs. These assumptions include: (1.) cans and cases imported from Argentina duty free for re-export. (2.) Ability to train the work force.

	\$	X's	\$	BOLIVIAN COSTS		
				@\$85/MT	@\$100/MT	@\$125/MT
				80% EFF	80% EFF	80% EFF
CASE	BY	CASE	=11.7 CS	=11.7 CS	=11.7 CS	
24/2T	for 2.5	24/2.5	24/2.5	24/2.5	24/2.5	
FRUIT COSTS	3.59	1.50	5.39	7.26	8.55	10.68
CANS	2.14	1.60	3.42	4.80	4.80	4.80
CARTONS	0.29	1.58	0.46	0.64	0.64	0.64
LABELS	0.21	1.50	0.32	0.47	0.47	0.47
SUB-TOTAL PKG	2.64	N/A	4.20	5.91	5.91	5.91
FACTORY LABOR	0.31	1.50	0.47	1.00	1.00	1.00
UTILITIES	0.12	1.50	0.18	0.27	0.27	0.27
SUGAR/ACID	0.23	1.50	0.35	0.52	0.52	0.52
WHSE/LOADING	0.31	1.50	0.47	0.70	0.70	0.70
SUB-TOTAL	0.97	N/A	1.46	2.49	2.49	2.49
COSTS BEFORE G&A	7.20	N/A	11.04	15.66	16.95	19.08
FREIGHT TO IMPORTING COUNTRIES ARG/CHILE			3.00	1.50	1.50	1.50
TOTAL CIF COSTS BEFORE G&A, PROFIT, TAXES			14.04	17.16	18.45	20.58

If the cost of fruit can be reduced to \$85/metric ton, then perhaps a pineapple cannery in the Chapare Zone can become feasible. Juice and concentrate earnings normally contribute \$2.00/case of 24/2½. Therefore, a project of 150,000 cases would have a juice and concentrate operating earnings of \$300,000, which should be able to cover the G&A and interest costs on inventory. Before there would be a return on the capital investment of \$2,000,000, efficiencies would have to increase beyond the 80% assumed. If Bolivian canned pineapple were given a duty preference, then duty savings could be added to the expected net sales value of a case. In summary, the margins would be minimal so that this is not a project to undertake without thorough study and planning.

## 8. A SUMMARY AND RECOMMENDATIONS FOR AGROCAPITAL

### 8.1 Executive Summary

It is premature for AgroCapital to consider any investment or participation in a pineapple cannery at this time. The growing of cayenne pineapple must reach a more mature stage of agricultural development before a pineapple cannery would be feasible. It is not in the tradition of canners to be purchasing raw fruits and vegetables in competition with the fresh fruit and vegetable market. Since AgroCapital is committed to loans to small pineapple growers, it is recommended that they concentrate their time and resources on this area until such time that it appears that the fresh market is saturated. When that happens, a cannery will be welcomed as a stabilizer to the fresh market.

### 8.2 Recommendations

I recommend to AgroCapital that they involve themselves in the farm to market mechanisms of pineapples. Especially those being grown by the farmers to whom they have extended loans. These farmers not only need technical assistance for the growing of pineapple, but they need a stable market price if they are to repay their loans.

Consider a program to export fresh pineapples under the fresh banana export program. However, before that can be done a program to evaluate the holding qualities of the Bolivian smooth cayenne pineapple needs to be made. The ideal temperature to hold pineapples is 47 degrees F (8 degrees C) while bananas is 57 degrees F (13 to 14 degrees C). If necessity pineapples can be shipped with bananas with some loss of days that the pineapples can be held. Therefore, in the coming fresh pineapple season, some experiments should be made to see if Bolivian pineapple treated with wax and fungicides, packed in boxes similar to banana boxes, cooled with bananas, and transported with the bananas (at 57 degrees F) to export markets arrive in good condition. The scale of the number of boxes does not need to be large: a pallet per container load would be sufficient. However, careful observations of the condition of the fruit on arrival, and the shelf-life after arrival need to be recorded. At least one pine from every box needs to be cut open and inspected for internal brown spot.

In addition to investigations of exporting fresh pineapples, there could be export potential for fresh-cut chilled product. In the coming fresh pineapple season, an investigation could be made. It would require that a small refrigerator with a good separate freezer compartment and temperature controls be totally dedicated to the experiment. The equipment and materials, without fruit costs, would be about \$5,000. In addition, there would be the cost of technical assistance. Where

*Bolivia doesn't  
have refrigerated  
trucks ?!*

*?*

labor costs are low, the operating margins for ready-to-eat chilled pineapple can be attractive. One thousand kgs/week is the minimum sales size at which the operation could employ a dedicated refrigerated truck, making weekly round-trips to Argentina. Could the Buenos Aires market absorb 1000kgs/week (4,000 packages of 250 grams of chunks)? If the trials, tests and market studies during the 93-94 fresh fruit season are positive, then operations could be a reality for the 94-95 season. CIF sales Buenos Aires would be about \$48,000/season of 12 weeks at 1000kgs/week. An operating margin before interest and taxes of \$20,000 could be expected. The investment required would be \$50,000 to \$60,000. The **caution** is that chilled products never can be without the proper refrigeration. If the market can be developed and expanded, this could be a more attractive pineapple type business for Bolivia than the canning of pineapples, especially on a two-to-four-year horizon.

Another item that might be considered would be frozen chunks, if the fresh cut chunks could not be handled by the Buenos Aires market due to lack of proper refrigeration.

## **9. LIST OF TABLES, GRAPHS AND REFERENCE**

- Thailand's Production by Can Size (Table) EXHIBIT "A"
- Thailand's Production by Can Size (Graph) EXHIBIT "B"
- World Production by Geographical Area (Table) EXHIBIT "C"
- World Production Canned Pineapple in Metric Tons (Graph) EXHIBIT "D"
- World Production Canned Pineapple in 24/2T Cases (Graph) EXHIBIT "E"
- Reprints of the USDA's HORTICULTURAL PRODUCTS REVIEW for July 1992, pages 41 to 52 "Canned Pineapple and Pineapple Juice Situation in Selected World Markets". (Reference) REFERENCE "A"
- World Exports of Canned Pineapple in 24/2T Cases (Graph) EXHIBIT "F"
- Value of a Branded Case of 24/2T of Pineapple (Table) EXHIBIT "G"
- Net Sales/EBIT for Branded 24/2T Cases (Graph) EXHIBIT "H"

---

*AgroCapital*  
*20 Ton/Hour Pineapple Processing Cannery*  
*Chapare Zone, Bolivia*

---

## **INTRODUCTION**

This report is intended as a supplement to:

"The Feasibility Study for Pineapple Processing Cannery for Chapare Zone, Bolivia".

It is intended that this supplement will provide an order-of-magnitude estimate of what the cost of a pineapple processing cannery will be. The writer is very familiar with what pineapple processing canneries cost and, later in this report, will go through a line by line estimate comparing it to a recently constructed cannery of 40 tons/hour.

The minimum size cannery which the writer thinks appropriate to consider is 20 tons/hour. The reasons why this is the minimum size to be considered are:

1. Canned pineapple is an internationally traded export commodity, with cost of the finished product being one of the critical factors to being able to market the product. The second critical factor is quality of the product. Both of these factors require some minimum scale of operation for the plant to be cost and quality effective. That minimum size is 20 tons/hour.
2. Canned pineapple requires establishing and keeping customers. Any output below 500,000 cases of 24/2T would limit the venture's ability to have proper sales and marketing arrangements.

## **ASSUMPTIONS**

The following are the assumptions being made:

1. The initial output of the cannery should have standardized production of 500,000 cases of 24/2T solid pack (slices, chunks, tid-bits and crushed). Not all of the production would be in the 2T can size. It should have the ability to also can 1F, 2½ and 6/10's. In addition to the 500,000 cases of solid pack, it should be able to capture all of the juice. The juice would be concentrated to 6° degree brix.
2. The economic price for pineapples for canning will occur during a 14-week period each year. It took the Thailand pineapple industry more than 10 years to stretch their canning season beyond the 14-week period. It is not rational to

expect that Bolivia could achieve year-round production quicker than what other areas achieved.

3. Economic pricing of pineapples means that local and export demand for fresh has been exceeded and there is sufficient surplus to assure running the cannery at design capacity.
4. 25,000 tons of fruit (2000 pounds) would be required to produce 500,000 standardized cases of 24/2T solid pack.
5. A 14-week season with six working days/week (allowing one day/week for clean-up and maintenance) will provide 84 working days.
6. Production capacity in pineapple canneries is determined by how fast the pineapples can be peeled. The most efficient way to peel is with a Honomach ginaca. Each ginaca can peel +/- 7 tons of fruit per hour. With a 2 or three-shift operation, with time off for washing down, work breaks, etc., each ginaca in a well-run cannery can achieve 140 tons per day. With 25,000 tons to be processed, 1 ginaca would require 179 days and 2 ginacas would require 89 days. It would be marginal to use only 2 ginacas, especially because fruit diameter is going to vary in the first 10 or more years of operations. It is going to take many years before the farmers find the correct field planting densities. Therefore, the cannery should be designed for three ginacas. This would rate the cannery capacity at 20 tons/hour and all other equipment would be geared to this rate.
7. At a ginaca feed-rate of 20 ton/hour and desired yield of 20 cases/ton, we must design for 400 case/hour or 9,600 cans/hour or 160 cans/minute.
8. At feed-rate of 20 tons/hour, the expected yield-rate of single strength juice to the evaporator would be 30 gallons/minute.

### **ESTIMATED COST**

The estimated cost is intended to provide an order of magnitude for planning purposes. I believe that the estimating methods used allow me to advise that the minimum figure you could use would be \$3,400,000 and the maximum cost would be \$4,000,000. Making a cost estimate of a project without having spent at least three percent of the proposed costs on detailed engineering plans, is not the best way. However, with my detailed knowledge of a cannery that was recently constructed in an area with similar labor costs and skills, I was able to price off the 118 line items of a plant with twice the capacity, and scale down to the proposed plant of 20 tons/hour. Each line item was adjusted to the needs of the conditions existing in Chapare. The detailed estimate is attached.

In the report "The Feasibility Study for Pineapple Processing Cannery for Chapare Zone, Bolivia", under section 7., I suggested that a cannery with a capacity of 225,000 cases/year of 24-2T could be built for \$2,000,000, using Argentine equipment similar to the Industrias LAS

plant at Santa Cruz. Upon review, I believe any entry into the export market with a production of less than 500,000 cases/year of 24-2T would be unprofitable.

### **RECOMMENDATION**

Considerations for building a cannery can only be considered if the following criteria are met:

1. That there is a supply of fruit in excess of 2,500 metric tons per week for a period exceeding 14 consecutive weeks.
2. That the minimum target production would be 500,000 cases of 24-2T.
3. That the price of fruit is below \$75.00/metric ton.
4. That the financial analysis uses \$4,000,000 as the cost to build the cannery, and estimates that working capital for inventory of production is 75 percent of the out-of-pocket costs for one year's production.
5. That Bolivia obtains the most favorable tariff and duty treatment with its neighbors.

If these criteria are met, a cannery project has good prospects of making a return on the investment required, and would add greatly to Bolivia's agribusiness infrastructure.

Charles J. Bauman  
Los Angeles, California

June 8, 1993

**COST ESTIMATE**  
**PINEAPPLE PROCESSING CANNERY**  
**CHAPARE ZONE - BOLIVIA**

**SUMMARY**

	<b>40 TON/HR</b>	<b>20 TON/HR</b>
	\$000's	\$000's
<b>A. FRUIT RECEIVING &amp; GINACAS</b>	<b>584</b>	<b>423</b>
<b>B. PREPARATION LINES</b>	<b>484</b>	<b>151</b>
<b>C. PROCESSING</b>	<b>736</b>	<b>307</b>
<b>D. JUICE PLANT &amp; EVAPORATOR</b>	<b>1,958</b>	<b>694</b>
<b>E. JUICE CONCENTRATE STORAGE AND ASEPTIC PACKING</b>	<b>1,202</b>	<b>149</b>
<b>F. Q. A. EQUIPMENT</b>	<b>58</b>	<b>45</b>
<b>G. WAREHOUSE</b>	<b>185</b>	<b>55</b>
<b>H. CAN PLANT</b>	<b>185</b>	<b>0</b>
<b>I. ENGINEERING</b>	<b>1,539</b>	<b>629</b>
<b>J. BUILDINGS &amp; OTHER</b>	<b>4,894</b>	<b>965</b>
<b>GRAND TOTAL</b>	<b>\$11,800</b>	<b>\$3,418</b>

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**A. FRUIT RECEIVING & GINACAS**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

ITEM	DESCRIPTION	*	\$ 000	DESCRIPTION	*	\$ 000
1	HYSTER 7.5 TON	T	20	HYSTER to move bins	U	30
2	MECHANICAL DUMPER	N	25	Mechanical Dumper local mfg	N	25
3	PINEAPPLE RECEIVING	N	12	Pineapple Receiving	N	6
4	FRUIT WASHER	N	15	Fruit Washer	N	7
5	GRADER SIZER	T	30	Grader Sizer local mfg	N	20
6	ACCUMULATOR (2)	N	100	Accumulator local mfg	N	40
7	DISTRIBUTION CONVEYOR	T	50	Distribution Conveyor local mfg	N	20
8	GINACAS(6)	T	120	Ginacas (3)	N	210
9	BLOWER	N	16	Blower	N	10
10	WASTE CONVEYOR	N	15	Waste Conveyor local mfg	N	10
11	SUMP PUMP	N	3	Sump Pump	N	2
12	DSM SCREEN	N	20	DSM Screen	N	6
13	DUMP TRUCK(1)	N	35	Dump Truck none contact	C	0
14	LYE PEELER	N	60	Lye Peeler nor needed	D	0
15	CONVEYORS	N	15	Conveyors	N	7
16	MAIN RECEIVING CONVEYOR	T	18	Main Receiving Conveyors	N	10
17	SCALE	N	30	Scale	N	20
SUBTOTAL			\$584	\$423		

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT

N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES

U = USED EQUIPMENT

C = DO BY OUTSIDE CONTRACTOR

D = NOT NEEDED FOR THIS OPERATION

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**B. PREPARATION**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

ITEM	DESCRIPTION	*	\$ 000
1	TRIMMING PCKNG TABLES (6)	N	150
2	SLICERS (6)	T	30
3	HAND GUNS (24)	N	24
4	TFC/TFS SLICER (6)	T	160
5	BANANA LINE	N	2
6	HAND TRUCKS (10)	N	2
7	VENTILATION	N	93
8	PANS & TRAYS	N	10
9	LOCKER ROOM	N	13
SUBTOTAL			<b>\$484</b>

DESCRIPTION	*	\$ 000
Trimming & Packing Tables (3)	N	60
Slicers	N	50
Hand Guns (10)	N	10
TFC/TFS Slicers	D	0
Banana Line	D	0
Hand Trucks (5)	N	1
Ventilation (2)	N	20
Pans & Trays	N	5
Locker Room	N	5
SUBTOTAL		<b>\$151</b>

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT

N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES

U = USED EQUIPMENT

C = DO BY OUTSIDE CONTRACTOR

D = NOT NEEDED FOR THIS OPERATION

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**C. PROCESSING**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

ITEM	DESCRIPTION	*	\$ 000	DESCRIPTION	*	\$ 000	
1	CAN DELIVERY SYSTEM	N	16	Can Delivery System - Manual	D	0	
2	DEPALLETIZER	T	40	Depalletizer	D	0	
3	CHUNCK FILLING LINE	N	30	Chunk Filling Line	N	10	
4	5 BOWL FILLER	N	60	Bowl Fillers - Do manually	D	0	
5	CONVEYOR	N	8	Conveyor	N	5	
6	SYRUPER	N	240	Syruper	U	80	
7	SEAMER	T	40	Seamer	U	50	
8	ELEVATOR	N	12	Elevator	N	6	
9	COOKER COOLER (300CPM)	T	200	Cooker Cooler (160cpm)	N	100	
10	DRYER BLOWER	T	16	Dryer Blower	N	8	
11	DUD DETECTOR	N	22	Dud Detector	N	20	
12	PALLETIZER	N	10	Palletizer - Do manually	D	0	
13	VACUUM PUMP	N	18	Vacuum Pump	N	12	
14	SUGAR MELTING SYSTEM	T	10	Sugar Melting System	N	6	
15	CUT BACK TANK SYSTEM	T	10	Cut Back Tank System	N	6	
16	HEATER & STEAM VALVE	T	4	Heater & Steam Valve	N	4	
SUBTOTAL			\$736	SUBTOTAL			\$307

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT

N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES

U = USED EQUIPMENT

C = DO BY OUTSIDE CONTRACTOR

D = NOT NEEDED FOR THIS OPERATION

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**D. JUICE PLANT & EVAPORATOR**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

ITEM	DESCRIPTION	•	\$ 000	DESCRIPTION	•	\$ 000
1	JUICE CONVEYOR	N	20	Juice Conveyor	N	16
2	CORE CONVEYOR	N	10	Core Conveyor	N	5
3	ELEVATOR	N	10	Elevator	N	5
4	INSPECTION TABLE	N	4	Inspection Tables	N	2
5	BROWN PRESS	T	10	Brown Press	U	4
6	JUICE PRESSES	U	300	Juice presses	U	125
7	RAW JUICE TANK & PUMP	T	8	Raw Juice Tank & Pump	N	4
8	HEATER (H & L)	T	4	Heater (H & L)	N	6
9	CONTROLLER SYSTEM	T	4	Controller System	N	5
10	TWP CENTRIFUGES	U	160	Two Centrifuges	U	60
11	SSJ TANK & PUMP	T	4	SSJ Tank & Pump	N	5
12	WASTE CONVEYORS	N	8	Waste Conveyors	N	4
13	EVAPORATOR FEED TANK	T	4	Evaporator Feed Tank	N	3
14	EVAPORATOR 60 GPM	T	1300	Evaporator 20 GPM	N	400
15	CYCLONE	N	6	Cyclone	N	4
16	PIPING	N	80	Piping	N	35
17	COOLING TOWER	N	25	Cooling Tower	N	10
18	FREE DRAIN PUMP & TANK	T	1	Free Drain Pump & TANK	N	1
	<b>SUBTOTAL</b>		<b>\$1,958</b>			<b>\$694</b>

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT

N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES

U = USED EQUIPMENT

C = DO BY OUTSIDE CONTRACTOR

D = NOT NEEDED FOR THIS OPERATION

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**E. JUICE CONCENTRATE & ASEPTIC**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

ITEM	DESCRIPTION	*	\$ 000
1	REFRIGERATION 50 TR	N	65
2	R 56	N	20
3	TWO BLENDING TANKS	N	20
4	PUMPS	T	5
5	FREEZER STORAGE	N	300
6	ASEPTIC PLANT	N	792
SUBTOTAL			\$1,202

DESCRIPTION	*	\$ 000
Refrigeration 20TR	N	25
R 56	N	8
Two Blending tanks	N	10
Pumps	N	6
Freezer Storage	N	100
Juice presses - not req'd	D	0
SUBTOTAL		\$149

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT  
 N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES  
 U = USED EQUIPMENT  
 C = DO BY OUTSIDE CONTRACTOR  
 D = NOT NEEDED FOR THIS OPERATION

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**F. Q.A. EQUIPMENT**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

ITEM	DESCRIPTION	*	\$ 000
1	REFRACTOMETER	T	1
2	CENTRIFUGE	T	3
3	COLOMETER	T	2
4	BENCH SCALE	N	2
5	REFRIGERATOR/INCUBATOR	T	3
6	GRADUATE SCALE	N	5
7	pH METER	N	4
8	MICROWAVE	N	3
9	MICROSCOPE	T	1
10	EXHAUST	N	4
11	GLASS WARE	N	10
12	OTHERS	N	20
SUBTOTAL			\$58

DESCRIPTION	*	\$ 000
REFRACTOMETER	N	2
CENTRIFUGE	N	5
COLOMETER	N	5
BENCH SCALE	N	2
REFRIGERATOR/INCUBATOR	N	4
GRADUATE SCALE	N	5
pH METER	N	4
MICROWAVE	N	3
MICROSCOPE	N	2
EXHAUST	N	3
GLASS WARE	N	5
OTHERS	N	5
SUBTOTAL		\$45

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT  
 N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES  
 U = USED EQUIPMENT  
 C = DO BY OUTSIDE CONTRACTOR  
 D = NOT NEEDED FOR THIS OPERATION

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**G. WAREHOUSE**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

ITEM	DESCRIPTION	*	\$ 000
1	FORKLIFTS (3)	T	40
2	LABEL & CASE LINE (2)	T	60
3	CASE PALLETIZER	T	5
4	CAN DEPALLETIZER	T	5
5	OTHER PACKAGING EQUIPMENT	T	50
	SUBTOTAL		160

DESCRIPTION	*	\$ 000
FORKLIFTS (3)	U	25
LABEL & CASE LINE (1)	U	25
CASE PALLETIZER	D	0
CAN DEPALLETIZER	D	0
OTHER PACKAGING EQUIPMENT	U	5
		55

**H. CAN PLANT**

1	BODY LINE	T	115
2	END LINE	T	70
	SUBTOTAL		\$185

BUY CANS	D	0
BUY ENDS	D	0
		\$0

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT  
 N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES  
 U = USED EQUIPMENT  
 C = DO BY OUTSIDE CONTRACTOR  
 D = NOT NEEDED FOR THIS OPERATION

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**I. ENGINEERING**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

**POWER PLANT**

ITEM	DESCRIPTION	*	\$ 000	DESCRIPTION	*	\$ 000	
1	PANEL BOARD	N	45	PANEL BOARD	N	30	
2	BOILER (10 TCN)	N	200	BOILER (5 TON)	N	100	
3	AIR COMPRESSOR	N	40	AIR COMPRESSOR	N	20	
4	TRANSORMER	N	40	TRANSORMER	N	20	
5	SWITCH GEAR	N	50	SWITCH GEAR	N	20	
6	STAND BY GENERATOR	N	60	STAND BY GENERATOR	N	30	
SUB TOTAL			\$435	SUB TOTAL			\$220

**WATER PLANT**

1	DEEP WELL (2)	N	150	DEEP WELL (1)	N	60	
2	MAIN pIPE (300 M)	N	30	MAIN pIPE (100 M)	N	10	
3	SAND FILTER	N	50	SAND FILTER	N	25	
4	STORAGE TANK (50,000 GAL.)	N	30	STORAGE TANK (20,000 GAL.)	N	8	
5	STORAGE TANK (20,000 GAL.)	N	8	STORAGE TANK (10,000 GAL.)	N	5	
6	SOFTENER SYSTEM & PUMP	N	70	SOFTENER SYSTEM & PUMP	N	30	
7	MAIN SUPPLY PUMP	N	16	MAIN SUPPLY PUMP	N	6	
8	COOLING SYSTEM	N	60	COOLING SYSTEM	N	30	
9	CLORINATION SYSTEM	N	8	CLORINATION SYSTEM	N	5	
SUBTOTAL			\$422	SUBTOTAL			\$179

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT

N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES

U = USED EQUIPMENT

C = DO BY OUTSIDE CONTRACTOR

D = NOT NEEDED FOR THIS OPERATION

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**I. ENGINEERING**

**PAGE 2 OF 2**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

**POWER LINE**

ITEM	DESCRIPTION		\$ 000	DESCRIPTION		\$ 000
1	HIGH VOLTAGE 1 KM	N	20	HIGH VOLTAGE 1 KM	G	0
2	CONTROL ROOM	N	32	CONTROL ROOM	G	0
3	MAIN SUPPLY LINE	N	60	MAIN SUPPLY LINE	G	0
SUB TOTAL			\$112			
				\$0		

**FIRE SYSTEM**

1	MAINLINE, VALVE, CONROL, ENGINE, PUMP	N	400	MAINLINE, VALVE, CONROL, ENGINE, PUMP	N	150
SUBTOTAL			\$400	\$150		

**WASTE WATER**

1	POND SYSTEM (100,000 W.M)	N	110	POND SYSTEM (100,000 W.M)	N	50
2	EQUIPMENT	N	60	EQUIPMENT	N	30
SUBTOTAL			\$170	\$80		
TOTAL ENGINEERING			\$1,539	\$629		

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT  
 N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES  
 U = USED EQUIPMENT  
 C = DO BY OUTSIDE CONTRACTOR  
 D = NOT NEEDED FOR THIS OPERATION  
 G = GOVERNMENT SUPPLY THIS SERVICE

**COST ESTIMATE FOR PINEAPPLE PROCESSING CANNERY - CHAPARE ZONE - BOLIVIA**

**J. BUILDINGS & OTHER**

**40 TON/HOUR CANNERY**

**20 TON/HOUR CANNERY**

ITEM	DESCRIPTION	*	\$ 000
1	CANNERY & OFFICE 4,000 sm	N	1200
2	WAREHOUSE 4,000 sm	N	800
3	CANTEEN	N	85
4	EMPLOYEE HOUSING	N	300
5	ROADS	N	100
6	DRAINAGE, FENCE, ETC	N	274
7	COMMUNICATION EQUIPMENT	N	25
8	OFFICE FURNITURE AND EQUIP.	N	200
9	VEHICLES, SHOP TOOLS	N	150
10	SITE PREPARATION	N	150
11	DISMANTLE, CRATE, SHIP TRANSFERRED EQUIPMENT	N	810
12	CONTINGENCY		800
	<b>SUBTOTAL</b>		<b>\$4,894</b>

DESCRIPTION	*	\$ 000
CANNERY & OFFICE 2,000 sm	N	400
WAREHOUSE 2,000 sm	N	300
CANTEEN	N	20
EMPLOYEE HOUSING	D	0
ROADS	G	0
DRAINAGE, FENCE, ETC	N	50
COMMUNICATION EQUIPMENT	N	20
OFFICE FURNITURE AND EQUIP.	N	50
VEHICLES, SHOP TOOLS	N	85
SITE PREPARATION	N	40
DISMANTLE, CRATE, SHIP TRANSFERRED EQUIPMENT	D	0
CONTINGENCY	D	0
		<b>\$965</b>

T = TRANSFERED @ BOOK + REPAIRS & FREIGHT  
 N = NEW EQUIPMENT + FREIGHT & MIN. DUTIES  
 U = USED EQUIPMENT  
 C = DO BY OUTSIDE CONTRACTOR  
 D = NOT NEEDED FOR THIS OPERATION