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TECHNO-ECONOMIC FEASIBILITY STUDY FOR A PEANUT SHELLER INDUSTRY

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ABSTRACT

A techno-economic feasibility analysis was conducted for the establishment of a post-harvest handling facility, known as a Peanut Service Station (PSS), as a means of expanding markets for peanut raw materials and products. The PSS was designed as a structure containing facilities for removing aflatoxin contamination in freshly harvested peanuts and for converting the peanuts to higher value materials such as graded raw peanuts, roasted and shelled peanuts, and other peanut forms with the quality required by peanut processors in the Philippines.

A survey of post-harvest handling practices of peanut farmers in Region II and of peanut products in the market was carried out as well as of the trading and handling practices of traders owning peanut warehouses in Metro Manila. These surveys provided primary data for the study. Secondary data were obtained from official government statistics and reports.

The study indicated that to produce good quality raw materials for processors, the PSS should be capable of cleaning, drying, sorting, roasting, grading, storing, and packing freshly harvested peanuts. In order to meet a requirement of 721 metric tons of graded raw peanuts per year of peanut processors in Metro Manila, one PSS should have an input of 1,029 metric tons of freshly harvested nuts coming from about 500 farms, assuming a conservative yield of 1 metric ton and a general landholding of 1 hectare of peanut farm per farmer. The computed project cost is PhP7,750,466.00 of which 32% is for fixed asset requirements and 68% is for the working capital requirements. The projected financial statements show that the project is financially viable with a return on investment (ROI) of 21% and an internal rate of return (IRR) of 18%.

To validate the data used in the preparation of the study, a consultative meeting between the farmers and the industry/processing sector was conducted on March 6, 2001. A total of 20 persons attended the meeting. Involved were a farmer sector representative from Northern Mindanao, nine representatives from the industry, and ten representatives from government agencies. The views and recommendations from the stakeholders on the feasibility and from follow-up activities required to establish a peanut sheller industry in the Philippines were obtained at this meeting.

INTRODUCTION

At a workshop held at the Food Development Center on June 8, 1998, peanut processors indicated that the lack of good quality peanuts in adequate volume was a major constraint in the expansion of markets for peanut products. On the other hand, it was indicated by other sectors that farmers were discouraged from planting peanuts due to lack of profitable markets. An evaluation of the post-harvest handling practices for peanuts indicated that there was inadequate capability among producers of peanuts to convert newly harvested produce into clean, dry, sorted, and graded peanuts, or into the form required by processors. Peanuts produced deteriorated in quality, lost profitable markets, and could not compete with imports. In view of this, a study was made of the techno-economic feasibility of establishing an industry that would convert newly harvested peanuts to graded shelled peanuts in a centrally located facility- which was eventually called a Peanut Service Station.

OBJECTIVES

The objectives of this study were: (1) to determine the technical and economic requirements for a peanut sheller industry in the Philippines which include the determination of (a) the appropriate technology needed by the sheller industry, (b) an appropriate size, location, form of ownership, its organizational structure, and (c) the economic profitability of establishing the industry as conceived; and (2) to compare the potential cost of peanuts produced by the sheller industry with imported peanuts.

METHODS

Determination of the Technical and Economic Requirements for a Peanut Sheller in the Philippines

Determination of <u>Appropriate Technologies</u> Needed by the Sheller Industry

The following activities were undertaken to determine appropriate technologies:

1. A survey of peanut farmers and traders in Region II was conducted to determine the processes involved in peanut production, post-harvest handling practices, and marketing. This also provided an assessment of the stages in the process that contributed to the problem of low supply and poor quality peanuts.

2. Given the data from the survey, the Bureau of Postharvest Research and Extension (BPRE) was consulted to identify the technologies and equipment to be used in the sheller industry. They were asked to provide the specifications, throughputs of the equipment, sources or suppliers, and cost of each technology or equipment.

3. BPRE listed the technologies required per operation from stripping, shelling, to packaging of shelled peanuts. Each technology was identified based on labor and power/fuel requirements, investment costs, and cost per unit of product output. This led to an initial list of appropriate technology per major post-harvest activity.

4. In addition, an internet search was conducted, local traders/processors were personally interviewed, and technical studies/publications on post-harvest technologies for peanuts were consulted for alternative technologies. Comparison indicators used by BPRE were applied to evaluate the most appropriate technologies for the sheller industry.

5. A checklist of quality standards for shelled peanuts (Table 6) as required by processors was obtained from the results of a previous project on High Value Crops, a USAID funded project - the Accelerated Systems Agribusiness Program (ASAP), and from interviews of processors. The equipment identified for the sheller industry was evaluated on the basis of capacity to produce quality products.

6. Finally, the list of technologies identified/obtained was compared using comparison indicators and quality standards identified. They were short listed based on their outputs that meet the comparison indicators and standards.

Determination of the Appropriate Size, Location, and Organizational Structure of the Peanut Sheller Industry

The following activities were carried out to determine the appropriate size of the sheller industry:

1. The information on annual peanut production by region for the last 10 years was gathered from the Bureau of Agricultural Statistics (BAS) data on a ten-year Peanut Supply and Utilization Accounts (1989-1998). This was used to present the available raw material on a regional basis for the sheller industry. The data presented the volume of production, imports, exports, used as seeds, feed, and waste, processed, and net disposable food.

2. To validate this data on the requirement of processors, an interview of monthly demand for shelled peanuts was conducted with five known peanut processors based in Metro Manila.

3. The appropriate size of the sheller industry was then determined by evaluating the volume of available unshelled peanuts or production (supply) per region. The average efficiency or recovery rate per technology/equipment or the capacity (input requirement) of the sheller plant was used to estimate the volume of available shelled peanuts for processors. This means that the volume requirement (demand) of processors can be used as basis to compute the total available market of peanuts for the sheller industry.

The following activities were carried out to determine the appropriate location for the sheller industry:

1. Using data from BAS on peanut production per region and the calculated volume requirement of processors, a shortlist of candidate regions for the proposed sheller plant was made. This was based on the extent to which production per region could meet the volume requirement of processors.

2. A set of criteria was made to evaluate the candidate's location:
   - Accessibility to, and availability of, raw material sources
   - Availability of cheap or moderately priced utilities such as power, water, or fuel
   - Combined cost of transporting raw materials and fuel to the sheller plant site
   - Proximity to distributing outlets or channels
   - Availability of skilled and unskilled labor
   - Climatic conditions
   - Availability of infrastructure, e.g. roads, land and sea ports, communication facilities
   - Peace and order situation prevailing in the area
   - Programs/projects being implemented geared towards increased peanut production in the area

To evaluate the above criteria against the candidate's location, a scoring system was used as follows:

1 – 20% true to the criteria.
2 – 40% true to the criteria.
3 – 60% true to the criteria.
4 – 80% true to the criteria.
5 – 100% true to the criteria.

3. Survey of the candidate's prices of utilities was conducted in the province of Isabela, Cagayan Valley Quirino, Pangasinan, Pampanga, Nueva Ecija and Cagayan de Oro. The basis used in ranking the alternatives were the prevailing prices in Metro Manila.

4. The top three locations that garnered the highest scores were recommended.

The following activities were carried out to determine the appropriate form of ownership and organizational structure to handle the sheller plant:

1. The various forms of ownership, single proprietorship, partnership, corporation and cooperative were compared and analyzed based on the investment requirement of the project. Also evaluated was the comparative ability to generate the funds for the project.

2. The manpower requirement of equipment identified in the specific objective was used as the basis in organizing the Production Section. Listed were the number of people to be hired, their qualifications and the specific duties and responsibilities for each position.

3. The Marketing, Management and Administrative Sections were conceptualized based on the BPRE concept of a Peanut Service Station. The number of positions and qualifications to be hired were identified including the list of their duties and responsibilities.

4. The proposed wage structure was computed based on the prevailing salary rates being offered in the proposed locations as identified under the specific objective. The rates or percentage of other employee benefits e.g. SSS (Social Security Code), Income Tax Rate (BIR Revised Tax Code) and other provisions were based on existing laws prevailing to date.

Determination of Economic Profitability of Establishing the Sheller Industry as Conceived

The following activities were carried out to establish economic profitability:

1. Formulation of cost, price, and market assumptions based on the following:

   1.1 Existing business practices in industry as obtained from interviews of traders and financial institutions:
   - Raw material prices
   - Cost of packaging materials
   - Freight costs
   - Water and power costs
   - Insurance costs
   - Repairs and maintenance costs
   - Fuel and oil consumption and costs
   - Marketing costs
   - Depreciation method and amortization
   - Monthly/annual demand for shelled peanuts

1.2 Government published data, regulations, and/or incentives:

- 1989-1998 selling prices of shelled, unshelled peanuts in both fresh and dry form at farm gate, wholesale, or retail. This data was used as basis in setting the buying and selling prices of peanuts for the project (BAS).
- 1989-1998 Production volumes for peanuts per region, per year, etc. (BAS)
- Peanut supply and utilization accounts, Philippines, 1989-1998 (BAS)
- Philippine suppliers of shelled peanuts, 1998 (Foreign Trade Statistics office, National Statistics office)
- Import policies and procedures (BIS-DTI)
- Tax rates (DOF, Customs and Tariff Code, BIR)
- Registration procedures and fees (Cooperative Development Authority)

Note: Assumptions on cost, price, and market including its source, basis, or reference are presented in Table 15.

2. Estimation of acquisition costs of fixed assets adapted from the BPRE report, except for the cost of the fabricated peanut sheller equipment.

3. Identification of asset requirement

Identification of current asset requirement was divided into three parts: inventory, inventory-related costs, and cash credits.

3.1 Inventory costs include the purchase of raw materials and supplies, and the corresponding freight expenses.

3.2 Inventory-related costs are accounts such as direct and indirect labor with corresponding fringe benefits; heat, light and power; maintenance; and warehousing expenses related to raw materials, materials in process, and finished goods.

3.3 Cash credits were itemized into pre-paid expenses, intangible assets, operating salaries, wages and fringe benefits, engineering costs, operating taxes, office supplies, communication facilities, office utilities, billing costs, transportation costs, expenses for advertisement, borrowing costs, and provision for unforeseen costs.

- Intangible assets were itemized as follows: patents, licenses, reproduction rights, and organization and pre-operating expenses.
- Organization expense was computed using the fees being charged by the Cooperative Development Authority (CDA), estimate cost of issuing shares such as broker's fee, interim interest, initial advertising, personnel recruitment, and training. Pre-paid expense, on the other hand, was computed based on estimates of initial investigations, pre-feasibility studies, research and technical studies, economic and marketing studies, financial and profitability studies, design studies, and consulting/engineering fees.

4. Working capital requirement

The cost of working capital was computed by multiplying the total current asset requirement by an assumed current ratio, which is ideally 2:1 (Garrison and Noreen, 1994).

5. Total project cost

The total project cost was based on the materials, supplies, equipment, physical plant, and manpower needs of the project as estimated in item 1.1 and 1.2. This was computed based on fixed asset acquisition as obtained in item 2, and the working capital requirement from the computed estimate in item 4.

6. Sources of financing

Availability of loan windows were gathered from different financing institutions, Land Bank of the Philippines (LBP), Development Bank of the Philippines (DBP), Philippine National Bank (PNB), government financing institutions (GFIs), e.g. the Quedan Corp., Technology and Livelihood Resource Center (TLRC), Department of Agriculture (DA), and private lending groups. The gathered data include prevailing interest rates, service fees on loans, financing terms and part of the project cost that is normally financed, i.e. fixed asset acquisition or working capital requirement. This could help determine the financing plan and loan amortization schedule for the project.

7. Financial statements

Financial statement shows the financial progress of the project in a pro-forma (projected) statement for the next 10 years. The project was estimated to last for 10 years based on the estimated life span of its equipment. The income statement and the cash-flow statement which were considered to be vital and relevant for the project were prepared as follows:

7.1 The income statement is a computation of the project's total revenues and costs for the fiscal year arriving at a net income or deficit within the period. It follows the "accrual concept" in accounting or it provides the costs involved in the realization of profits recorded within the period of occurrence.

The estimate for the buying price of raw materials (unshelled peanuts) was based on the peanut farmers' perceived profitable price that will encourage them to plant peanuts (FDC Survey). Meanwhile, the rate of annual price increase was based on the computed ten-year average increase in prices of peanuts both at farm gate and wholesale (BAS data).

Other cost assumptions were based on generally accepted management and accounting principles. These cost assumptions are shown in Table 15.

7.2 The cash-flow was prepared to systematically show how much cash was generated by the project and how much was disbursed in a given year without following the accrual concept in accounting. The cash-flow statement was divided into three portions:

- The cash inflow. These are funds obtained from a loan and the contribution of investors plus the funds obtained from operations or sales income. The sales income was obtained by using the figure from the income statement, the "profit-before-income-tax" figure and added non-cash expenses such as depreciation.

- For cash outflow. The costs incurred from the acquisition of fixed assets and the intangible assets. It is then increased by payments on loan amortization, income tax, and other cash disbursements.

- The beginning cash balance for the year was then added to the net cash flow to arrive at the ending cash balance in the balance sheet.

8. Financial analysis

Based on the prepared financial statements, a financial analysis was performed to gauge the project's profitability, liquidity, and cash solvency over a period of ten years.

9. Sensitivity analysis

Sensitivity analysis was conducted to test the viability of the project. The financial condition was subjected to certain adverse conditions. The adverse conditions that are possible to occur which can affect the project were: 1) there will be no increase in selling price or that sales will remain the same for a period of ten years, and 2) the cost of raw materials will increase at 10% annually.

10. Profitability ratios

Profitability ratios were calculated to check the financial viability of the project as follows:

$$\text{Net Profit Margin (NPM)} = \frac{\text{Net income after sales}}{\text{Sales}}$$

$$\text{Operating Profit Margin (OPM)} = \frac{\text{Profit before interest and taxes}}{\text{Sales}}$$

$$\text{Gross Profit Margin (GPM)} = \frac{\text{Gross profit}}{\text{Sales}}$$

$$\text{Return on Investment (ROI)} = \frac{\text{Net income}}{\text{Stock equity}}$$

$$\text{Payback Period (PP)} = \frac{\text{Initial-year cash outflow}}{\text{Succeeding annual net cash flow}}$$

and Internal Rate of Return (IRR) as key decision indicators.

$$\text{IRR} = \frac{Bn - Cn}{(1 + I)^n}$$

Where:
Bn = benefits per year (Cash-flow cash balance ending)
Cn = cost per year (Cash-flow total cash outflow)
I = interest rate (Prevailing bank interest rates) = 12%
n = number of years (10 years)

Comparison of Potential Cost of Peanuts Produced by the Sheller Industry with Imported Peanuts

Cost of Peanuts from the Sheller Industry

The selling price for the produce of the sheller plant was set by first computing the Break-Even Selling Price (BESP). The BESP was computed by dividing the total annual production cost (Total Fixed Cost + Total Variable Cost) by the total volume of shelled peanuts produced per annum. Any selling price set above the BESP will mean that the sheller project is profitable. The selling price to be set will depend on the investor's preference/criteria for a minimum return on investment (ROI) and internal rate of return (IRR). Considering the prevailing interest rate of 12% per annum, the criteria of at least 20% ROI and at least 15% IRR, was considered.

Cost of Imported Peanuts

As practiced by local traders, a PhP1.00/kg mark-up was added to the total landed cost (TLC) of imported peanuts (source: Mr. David Ong, importer & wholesaler of peanuts). Therefore, the price of peanuts from the sheller project should be lower by at least PhP1.00/kg than the imported peanuts. The TLC was computed using the BAS data on peanut supplier accounts where the source country, volume and value in US$ or the peanuts imported by the country were presented. Using the formula provided by the Bureau of Import Services of the Department of Trade and Industry, the TLC was computed as follows:

TLC = CIF + Customs Duties & Charges + 10% VAT

Where: TLC = Total Landed Cost

CIF = Cost, Insurance and Freight (Source: Foreign Trade Statistics data of the National Statistics Office).

VAT = Value Added Tax

Customs Duties and other charges and rates were based from the interview with a custom broker connected with the Bureau of Import Services of the Department of Trade and Industry.

To convert the CIF figure of the Foreign Trade Statistics (FTS) office which is in dollar, the foreign exchange rate in 1998 was used which was at PhP39: $1. While the comparison of competitiveness in peanuts supplied from US and other countries was the data of importation in 1998 and 1999.

RESULTS

Determination of the Technical and Economic Requirements for a Peanut Sheller in the Philippines.

Technologies Needed by the Sheller Industry

1. Survey of Peanut Farmer's Post-harvest Handling Practices and Needs

A survey was conducted to find out why the peanuts produced in the farms have not been reaching the processors or those that reach them are of poor quality. The survey focused on production, post-harvest handling practices, and marketing of peanut. One hundred fifty (150) peanut farmers from the provinces of Cagayan (33%), Isabela (50%) and Quirino (17%) participated in the survey. Following are the results of the survey:

1.1 The Peanut Farm and Production Practices

Table 1 shows the size of farm being cultivated for peanut production. During the wet season, only 43 of the respondents (28.70%) would plant peanut. The yield of peanut is low during this season. "Peanuts grown during the wet season tend to be viny and overly vegetative in growth and excessive moisture during harvest also causes poor quality seeds" (Department of Agriculture, Peanut Agribusiness Investment Profile Series of 1996-1997). The production of farmers during the wet season is below 500 kg/0.5 ha, as reported by 24 of the respondents (56.20%). Farmers produce peanuts during the wet season only for seed and home consumption purposes.

The crop rotation system of planting is being observed by 107 farmer respondents or 71.3% of those interviewed. The usual crop rotation used is corn-peanut-corn (96.0%). Most of the farmers use the BPI Pn 9 (56.70%) variety. The main source of planting materials is the Department of Agriculture (34.7%). Most of the farmers buy seeds at PhP20.00 per kg, while 56 respondents buy their peanut seeds at PhP18.00 per kg.

Lack of financing is not a problem for farmers because 57.3% of the respondents preferred to finance their production needs. Their main problem is the high level of pest and disease infestation, followed by the occurrence of natural calamities like the La Nina or El Nino.

Table 1. The peanut farm and production practices of peanut farmers surveyed in Region II, 1999

Item	Number	% Responding
Area being cultivated (ha.)		
< 0.50	11	7.30
0.50 – 0.75	66	44.00
0.751 – 1.00	48	32.00
1.01 – 1.50	11	7.30
1.51 – 2.00	8	5.30
2.00	6	4.00
When do you plant peanuts?		
Wet season (May – June)	43	28.70
Dry season (Oct. – Nov.)	150	100.00
Cropping system employed		
Mono-cropping	2	1.30
Inter-cropping	41	27.30
Cross-rotation	107	71.30
Types of crops rotated		
Peanuts only	2	1.30
Rice – peanuts	4	2.70
Corn – peanuts	144	96.00
Variety of peanuts often used		
BPI Pn 9	85	56.70
UPL Pn 9	3	2.00
UPL Pn 10	5	3.30
CLS 24	11	7.30
Native	46	30.70
Source of planting materials		
Dept. of Agriculture	52	34.70
Traders	38	25.30
Owned	36	24.00
Neighbor/locality	24	16.00

Table 1. *continued…*

Item	Number	% Responding
Price of seeds bought (PhP/kg)		
11.00	3	2.00
12.00	3	2.00
16.00	6	4.00
17.00	12	8.00
18.00	56	37.30
19.00	0	0.00
20.00	57	38.00
> 21.00	13	8.70
Production volume/cropping season (in kg computed at an average area of 0.50 ha.)		
Wet season		
< 500	24	56.20
500 - 1,000	5	12.50
1,000 - 1,500	14	31.30
Dry season		
< 500	44	29.40
500 - 1,000	0	0.00
1,000 - 1,500	53	35.30
1,501 - 2,000	9	5.90
2,001 - 2500	31	20.60
> 2,500	13	8.80
Main production problem encountered		
Pest and disease infestation	45	30.00
Natural calamities/erratic weather conditions	30	20.00
Lack of planting materials	18	12.00
Lack of postharvest facilities	10	6.70
Unavailability of labor	8	5.30
Low yield	15	10.00
High cost of labor and other inputs	6	4.00
High interest rates of loans (traders mostly)	11	7.30
No answer	7	4.70
Source of financing		
Self-finance	86	57.30
Traders/private lenders	45	30.00
Government loans	8	5.30
No answer	11	7.30

1.2 Harvesting and Post-harvest Handling Practices

The Survey Results. The summary of survey for harvesting and post-harvest handling practices is shown in Table 2. Most of the farmers use the manual harvesting method, while farmers tilling more than 1.0 hectare normally use a harvesting machine. To do manual harvest, 5 to 10 workers are needed and this involves pulling out of peanut plants from the soil, tying of the plants into groups of 15-20 plants, and leaving them in the field with the root portion being exposed. The plants are placed in sacks, transported to the farmer's house, and then stripped. For a 0.5-hectare area, harvesting operations usually last for 6-7 hours from the time plants are pulled out from the soil and tied in bunches.

Table 2. Harvesting and postharvest handling practices of peanut farmers surveyed in Region II, 1999

Item	Number	Percent
Mode of harvesting		
Manual	145	96.70
Mechanical	0	0.00
No Answer	5	3.30
No. of workers employed during harvest		
< 5	11	7.30
82	5 – 10	54.70
11 – 15	8	5.30
16 – 20	25	16.70
>20	24	16.00
Cost of labor (PhP/man-day)		
< or = 50.00	33	22.00
60.00	54	36.00
70.00	13	8.70
80.00	0	0.00
90.00	0	0.00
100.00	46	30.70
150.00	2	1.30
200.00	2	1.30
Cost of animal day (PhP/animal-day)		
100.00	62	41.30
120.00	34	22.70
150.00	17	11.30
200.00	37	24.70
Drying of peanuts (wet season)		
Manual sun drying	114	76.00
Mechanical drying	6	4.00
Aeration	30	20.00
With pods	141	94.00
What is your reason for shelling		
For food	14	9.10
For retail/market demand	3	2.30
For seed	128	87.50
For temporary storage	2	1.10

The drying operation of pods after stripping or threshing during the dry season is purely sun drying. Even if most of the farmers would agree that it is best to have a mechanical dryer, only 4% of them can afford to use a mechanical dryer during the wet season. Most of the farmers would opt to sun dry even during the wet season.

About 87.5% of farmers shelled their peanuts for seeds. The peanuts are stored unshelled for extra protection from humidity or moisture and are shelled only prior to planting. There is a small group that would shell the peanuts before storage (0.10%). This practice according to those surveyed is required to save on space. The group is confident that their storage areas are controlled and conducive to storing peanut seeds.

The BPRE Report on Peanut Farmers Postharvest Handling Practices and Needs (This section is from the BPRE Technical Report, 1999.). The practices are as follows*:*

Harvesting. Peanuts are ready for harvest if the shell is filled with matured whole kernels. The maturity period is 100-110 days depending on the variety and weather conditions.

Peanuts are harvested manually by pulling the plant from the ground. Farmers irrigate the peanut area 2-3 days before harvest to loosen and soften the soil. Side plowing the rows of the peanut plants also enables a faster and easier pulling of the plants from the ground. Two to three plants from soft sandy soils are pulled simultaneously by the harvester using each hand. A one hectare peanut farm will require 20-30 man-days to harvest.

Majority of the farmers utilize hired labor to harvest. They are paid in kind based on the number of cans or cavans harvested, commonly called "hunusan", the laborer receives about 1/8 to 1/3 of the total harvest.

Windrowing. After harvesting, peanut plants, in bundles or in singles, are laid in the field for 1 to 2 days for partial drying to remove the pods and to loosen the sticking soil. During the wet season, the newly uprooted peanut plants are simply air-dried under sheds. Many farmers have stopped windrowing because it is laborious and time consuming.

Stripping. The pods are removed or separated from the plant and placed in bags or sacks for handling and transport. In some areas, harvesting is done manually and includes stripping.

In some cases, farmers sell the peanuts to traders after stripping. They find this practical; harvest is easily turned to cash because peanut traders prefer to buy fresh right at the field when the farmers are stripping. The traders have transport facilities to haul peanuts if the farmers agree to sell their produce.

Drying. The pods are spread on mats or concrete pavements to sun dry. Stirring of the pods is necessary for uniformity of drying. The final moisture content of peanuts is 11-12%-wet basis, and for longer storage, the moisture content is lowered to 8-10%. Sun drying during conditions of fair weather takes 2-3 days to reach the desired level of moisture.

Farmers say that peanuts are dry when the sound of nuts inside the pods is heard if shaken. Alternatively, dryness is determined by pressing the thumb and the index finger to a peanut kernel. Peanuts are considered dry when the seed coat separate easily from the cotyledon when pressure is applied.

In a survey conducted in Gonzaga, Cagayan in 1991, only 7 of the 14 farmers interviewed dry their peanuts after stripping. Dried peanuts obtain better prices, and can be stocked for longer storage and as seeds for the next cropping season.

Storage. The dried peanuts in pods are stored in jute or plastic sacks. Peanuts are recommended to be stored in dry and cool space and can last for 1 year if properly managed. The peanuts are usually stored to wait for better market prices, or for seed purposes.

Farmers and traders traditionally store unshelled peanuts because the shell acts as a protective covering for the seed against mechanical damage and insect infestation. These are then shelled prior to cooking or planting.

Shelling. Shelling is the separation of the peanut kernels from the pod or shells. This is done by cracking the shell to separate the kernels. In manual shelling, the thumb and the forefinger are pressed lateral to the line of the pod joints where the cracking and opening of the peanut is easier and faster.

Shelling of peanut is seldom or rarely practiced in Cagayan, Isabela, or Quirino areas. Only 9% of the respondents practice this because it is laborious, inconvenient, and time consuming. These stocks are reserved for home consumption and seeds, and hand shelling is done using family labor.

Cleaning. The removal of impurities such as dirt, soil, and broken shells is referred here as cleaning. In manual shelling, the "bilao", a shallow circular winnowing tray made of bamboo, is commonly used to winnow the peanut kernels from the impurities. Mechanical blowers, sieves, aspirators, etc. are equipment used for this purpose, but these are usually integrated in peanut shelling machines.

Sorting/Grading. Shelled peanuts are sorted or graded according to number of kernels in a pod, size, form, and even maturity of the kernels. Manual sorting/grading of shelled peanuts is done by inspection and by actual hand picking of undesired kernels such as shriveled and immature kernels. Sorted peanuts command better price.

1.3 Marketing Practices

From Table 3, most of the peanut produce of farmer-respondents in Region II is sold to local traders (82.0%). Only 24 of the peanut farmers (16%) sell their produce to public market. The modes of transporting their produce from the farmer to the trader are by animal-drawn cart (30.0%), by jeepney (24.7%), or by pick up but with a minimum volume requirement of at least 500 bags (22 kg/bag). The most common mode of sale is on a cash basis where 34% sell their unshelled peanuts at PhP16.00 per kg. Majority of the farmers (93%) feel that the price is low and is the main reason why most farmers are shifting to other crops. Another problem is the lack of regular buyers of peanut produce which was identified by 6.7% of the respondents.

The BPRE report states that “majority of the farmers in the area sell the bulk of their crop to ‘viajeros’ because they offer a higher price, immediately available in the area at harvest time, and pick-up arrangements at no cost to the farmer. Payment is paid in cash which vary either in kg or per bag (“bulto”) depending on the volume, existing prices, and quality of the kernels.” Peanuts are marketed in three product forms namely: (1) fresh or newly harvested pods (after stripping), (2) dried peanuts in pods, and (3) shelled peanuts.

Table 3. Market and marketing practices of peanut farmers surveyed in Region II, 1999

Item	Number	% Responding
Market/Outlet of Peanut Produce		
Public market	24	16.00
Traders	123	82.00
Home consumption	3	2.00
Mode of Transporting Peanut Produce to the Market		
Cart	45	30.00
Jeepney	37	24.70
Truck	33	22.00
Tricycle	23	15.30
Pick-up by trader	12	8.00
Mode of Sale		
Cash	140	93.30
Terms	3	2.00
No answer	7	4.70
Selling Price of Peanut Produce (PhP/kg)		
<15.00	9	6.00
15.00	10	6.70
16.00	51	34.70
17.00	27	18.00
18.00	7	4.70
19.00	6	4.00
20.00	12	8.00
>20.00	10	6.70
No answer	18	11.90
Marketing Problems Encountered		
Low price	140	93.30
No regular buyer	10	6.70
Cost of Transporting Produce (PhP)		
<5.00	30	20.00
5.00	36	24.00
6.00	1	0.70
7.00	24	16.00
10.00	26	17.30
Picked up by trader	33	22.00

The peanut postproduction and marketing system is presented in Figure 1.

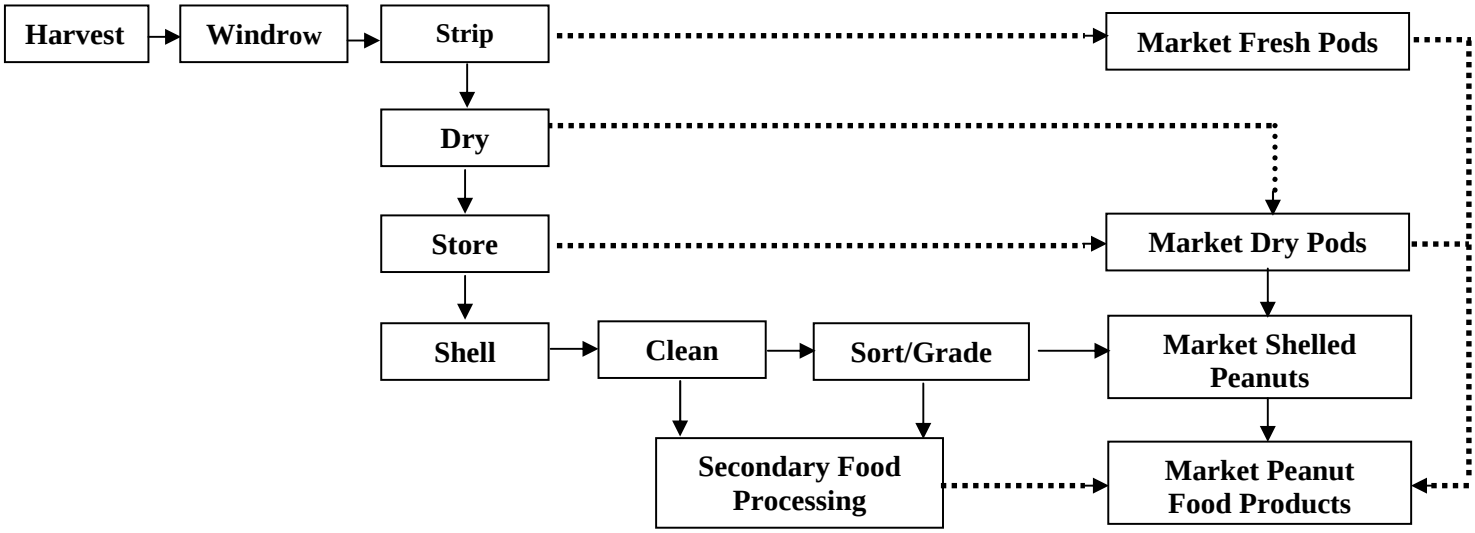

Fig. 1 Peanut postproduction and marketing systems (Source: BPRE,1999).

2. Postharvest Technologies and Equipment

2.1 "Post-harvest Equipment Needs" (BPRE, 1999)

The peanut post-harvest system at the farm level has been traditionally employing manual operations from harvesting to drying. Equipment for stripping and drying has long been developed, but users and adaptors were few or even nil. Small volumes of production (low yields) and traditional method of processing determine the marketing system; selling at the farmers level is in the form of pods, and shelling and sorting operations are done at the large trader or processor's level.

Table 4 presents the peanut post-harvest practices and equipment needs which farmers and local traders can adopt.

2.2 Developed Technologies for Peanuts

The BPRE report limited the identification of mechanized technologies to three major operations of post-harvest activities namely stripping, drying, and shelling.

The evaluation of technologies or post-harvest equipment focused on the net operating cost per unit, capacities, labor, and power requirements. The investment costs were estimated based on the existing price of construction materials and costs of labor in fabricating the equipment. Profitability of investing in these units was not considered in the computation. Only the unit costs per kg were established in the comparison of different facilities.

Table 4. Peanut postharvest practices and equipment needs which can be adopted by farmers and local traders in or near the production area

Operation	Existing practice / Method used	Alternative technology (Locally Developed)
Harvesting	Side plowing and manual pulling of plants	None
Windrowing	Drying of pulled plants/pods at the field	None
Stripping	Manual stripping of pods	Pedal peanut stripper (hold on) Motorized threshers (hold on/throw in)
Final Drying	Sun drying	Flat bed dryers (forced convection type) Rotary drum dryer (conduction type) Pit dryer (natural convection type)
Shelling	Manual cracking of pods & separation of kernels from pods Use of stones or wooden hammer to crack pods	Roller type sheller (ViSCA design) Shellers with shelling bars (UPLB design) Rubber-Tire sheller (KKU design) Drum and concave, motor operated with cleaning mechanisms
Cleaning	Winnowing through use of "bilao"	Blowers and aspirators (fabricated)
Sorting / Grading	Hand picking of undesirable quality kernels in ocular inspection	Classification by density and size through sieves and blowers (fabricated)
Storage	Bag storage	Hermetic sealed storage (plastic covers)
Storage (Seeds)	Bag storage	Sealed storage on metal containers (fabricated or ordinary steel drums)

Source: BPRE, 1999.

Based on available peanut threshers, there were four peanut strippers evaluated, two pedal-driven and two engine-driven. The report recommended the pedal driven Khon Kaen University (KKU) peanut thresher. It has a capacity of 44.0 kg per hr and an operating cost of PhP0.93 per kg and lowest investment cost of PhP7,500.00 per unit.

Three units of mechanical dryers were evaluated, flatbed dryer, the International Research Rice Institute (IRRI) rotary drum dryer, and the Siliman pit dryer. The flatbed dryer was selected despite its high operating cost of PhP5.30 per kg of unshelled peanuts and cost of PhP75, 000.00 per unit, mainly

because of its capacity, which is 1.0 metric ton per hour. Drying is a critical post-harvest activity for peanuts so the capacity of that dryer is an important consideration. The capacity of the IRRI rotary drum dryer is 0.025 metric ton per hr and 0.78 metric ton per hour for the Siliman pit dryer (BPRE, 1999).

In mechanized peanut shellers, seven shellers were evaluated consisting of four designs that were manually operated and three were engine operated. The engine driven KKU peanut sheller was recommended by BPRE because of its high capacity, with 196 kg of unshelled peanuts per hour, and had the lowest per unit operating cost of PhP0.78 per kg.

Since manual stripping, shelling, and drying are still the dominant postharvest operations; no mechanical fees for these operations were imputed in the computation. The KKU and the University of the Philippines (UPLB) pedal type threshers have lower operating costs per kg (PhP0.93 per kg and PhP0.86 per kg, respectively) compared to motor driven strippers. This implies that a large percentage of the operating costs were from fuel and oil of the motor driven strippers.

For mechanical dryers, many types are available for rice and corn but not all of these were tested for peanuts There are three mechanical dryers tested for peanuts by the researchers of the project re: Groundnut Industry (1989) dryer. The flatbed dryer had the highest drying capacity per batch but has the highest unit cost per kg, while the Siliman Pit dryer had the lowest drying cost at PhP2.57 per kg.

The size or volume of the business operation must be considered in selecting the facility so as to maximize the utilization of the chosen equipment. Moreover, the capacity of any equipment to be selected should match the capacity of other equipment that has to be integrated to lower the cost per unit.

2.3 Proposed Manufacturing Process for the Peanut Sheller Industry

The proposed manufacturing processes that the peanut sheller industry will adopt given the constraints in technology are the following:

Receiving. All procured unshelled peanuts will be received in this stage and classified whether for seeds or for commercial use by a procurement team.

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Drying. All unshelled peanuts received by the project will be submitted to the drying section to be dried mechanically or sun-dried. The moisture content of peanut pods must be between 8%-10% before storing or shelling.

Cleaning. At this stage, the soil and other foreign particles that stuck with the pods are dried. It will be easy to clean them with the use of a sieve, large enough to allow the foreign particles to fall and small enough to retain the unshelled peanuts.

Storing/Shelling/Cleaning. The cleaned but unshelled peanuts will either be stored for future shelling operation or will be shelled based on the orders received for the day. The shelling operation will remove the peanut pods from the nuts and the equipment will separate the large nuts from the small nuts.

Sorting and Grading. The sorting process involves the passing of shelled peanuts with skins, through fabricated equipment where it is classified by size and density through sieves and blowers.

The diagram of the process flow for the peanut sheller industry is presented in Figure 2.

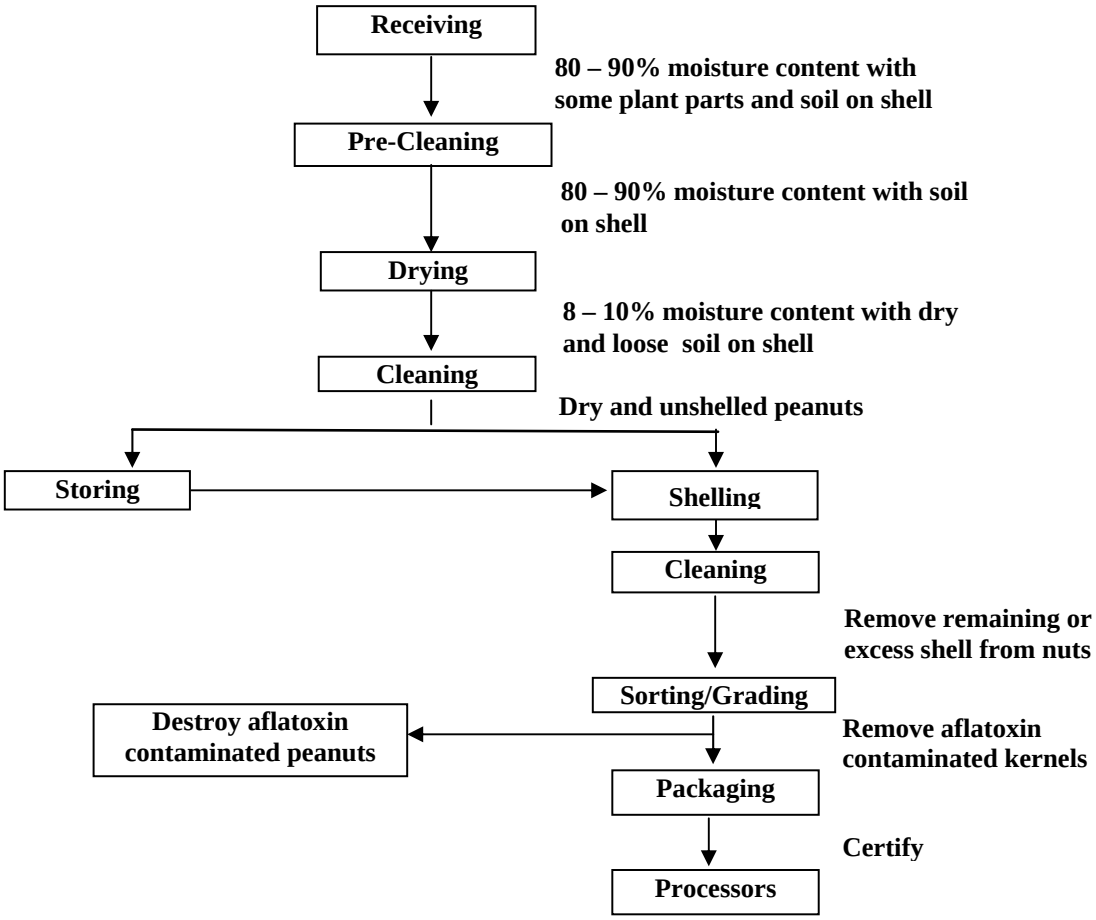

Fig. 2 Proposed process flow of the Peanut Sheller Industry (BPRE, 1999).

The identification of technologies for the peanut sheller industry was based on the process flow, and the postproduction facilities needed. BPRE conceptualized the Peanut Service Station Model (Fig. 3).

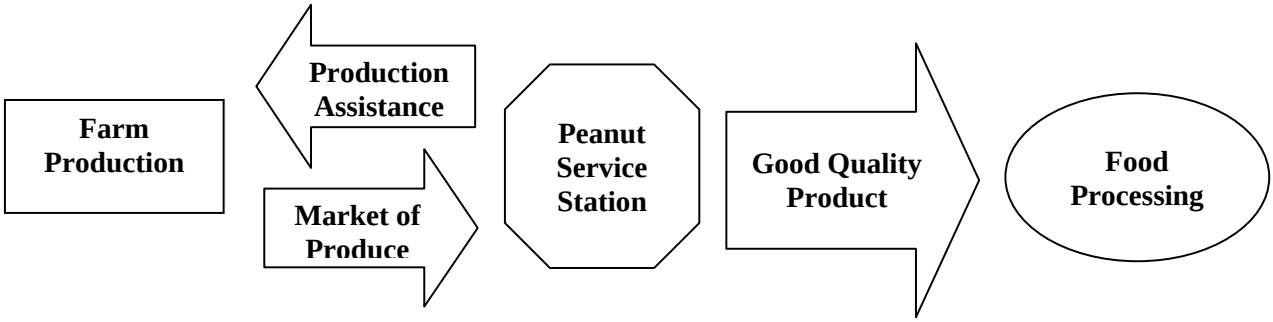

Fig. 3 Conceptual framework of a Peanut Service Station model.

Based on the conceptual framework, BPRE came up with three models of a sheller industry that basically vary only in terms of their plant capacities. According to the BPRE report (BPRE, 1999), the model will be scaled according to the volume of peanut production it intends to procure in a season. Three modules, with the corresponding capacities of the equipment and facilities are presented in Table 5.

Table 5. BPRE modules and recommended equipment for the Peanut Service Station model

Module	Scale	Unit(s)	Facility Requirements
1	30 – 50 tons/season	2	Flatbed Dryers @ 1 ton cap.
(Small)	or	1	Sheller (KKU type)@ 196 kg/hr cap.
	75 – 100 ha/season	1	Light truck @ 80-100 bags cap.
	or	2	Weighing Scales 500 kg max. cap.
	100 tons per year	1	Peanut sorter (fabricated) 0.5 tons/hr cap.
		5	Plastic storage enclosure@ 5tons cap.
			Warehouse with 5,000 bags cap.
			Office space
2	50 – 100 tons/season	4	Flatbed Dryers @ 1 ton cap.
(Medium)	or	2	Sheller (KKU type)@ 196 kg/hr cap.
	150 – 200 ha/season	2	Light truck @ 80-100 bags cap.
	or	2	Weighing Scales 500 kg max. cap.
	200 tons per year	1	Peanut sorter (fabricated) 1 ton/hr cap.
		9	Plastic storage enclosure@ 5tons cap.
			Warehouse with 10,000 bags cap.
			Office space
3	100 – 200 ton/season	6	Flatbed Dryers @ 1 ton cap.
(Large)	or	4	Sheller (KKU type)@ 196 kg/hr cap.
	250 –400 ha/season	2	Light truck @ 80-100 bags cap.
	or	2	Weighing scales 500 kg max. cap.
	400 tons per year	1	Peanut sorter (fabricated) 1 ton/hr cap.
		15	Plastic storage enclosure@ 5tons cap.
			Warehouse with 15,000 bags cap.
			Office space

Source: BPRE,1999.

3. Other Peanut Postharvest Equipment

In Northern Mindanao, there were three private entrepreneurs conducting shelling operations in the region compared to the Cagayan Valley Region which has an average of one private shelling entrepreneur per municipality. The three entrepreneurs in Northern Mindanao have common facilities/equipment in their respective warehouses and are performing almost the same operations, i.e. cleaning, drying, shelling, and packing. The difference between the three entrepreneurs is that only one had the latest fabricated model of sheller equipment (Edison-type Peanut Sheller). The peanut shellers being used by the other two entrepreneurs are of the old type and were not considered in the list of possible technologies for this study.

Cost and performance comparison between the Edison-type Peanut Sheller and other peanut shellers being evaluated by BPRE was done. The KKU sheller has a capacity of 196 kg of unshelled peanuts per hour (input) while the Edison-type has a capacity of 412.5 kg of unshelled peanuts per hour. The cost of units, operation, and maintenance of the equipment are the same.

From the internet, the only supplier of equipment found was LM Carter Manufacturing Co. (LMC) of the United States. The quotation of LMC for a peanut sheller plant with a capacity of 18 metric tons (input) per hour is 4.3 million U.S. dollar or 181.4 million pesos. The quoted price is FOB Donalsonville, Georgia. They proposed a peanut shelling plant layout and the list of equipment required by the sheller plant including shipping charges. However, this option was not considered because of raw material supply limitations or the required input for the proposed sheller plant is so large that local production for its raw material requirement may not be able to supply even 50%.

4. Quality Standards for Shelled Peanuts

In identifying the appropriate technology for the sheller industry project, a set of standards must be met by the combined operation of the technologies or the set of equipment to be used. In 1991, the USAID funded a project called the Accelerated Systems Agribusiness Program (ASAP) and peanut commodity was identified as the priority crop. In this study, a list of quality standards was identified as obtained from their survey of peanut buyers/users (Table 6).

Table 6. Quality standards for shelled peanuts

Characteristics	Quality standards
Sensory	Whole, clean, dried, unblanched nuts with good aroma.
Physico-Chemical:	
Size: Jumbo	40% min. retained on 3/8" screen
1st Class	58% max. retained on 5/16" screen
2nd Class	2% max. retained on ¼" screen
3rd Class	0% through ¼" screen
Moisture	8% maximum
Oil	4.8% minimum
Aflatoxin [1]	15 ppb maximum
Major and Minor Defects	
Total Damage	2.0% maximum
Foreign Matters	0.1% maximum
Splits	3.0% maximum
Shriveled	5.0% maximum
Insects (Dead/Alive)	2.0 pellets

Source: USAID, 1995. Peanut Commodity, Market Opportunity and Cost-Return Study, Accelerated Systems Agribusiness Program

[1] Codex Alimentarius Commission, 1997

5. Appropriate Technologies for the Sheller Industry

In the identification of technologies for the sheller industry project, the equipment for each operation is a separate technology in itself. The identified operations for the sheller industry are drying, cleaning, shelling, sorting/grading, and packaging. The technologies or equipment gathered for a specific operation were evaluated based on labor and power/fuel requirements and investment cost used to compute for the cost per unit of product output. In 1991, BPRE prepared Groundnut Industry study, where equipment were compared to determine the most appropriate technology to produce quality peanuts while the ASAP quality standards were used to screen the equipment available per operation. The list of appropriate technologies for the sheller industry is presented in Table 7.

Table 7. List of appropriate technologies/equipment for the Peanut Service Station

OPERATION	TECHNOLOGY/CAPACITY	LIFE SPAN (YRS.)	ESTIMATED COST PER UNIT (PhP)
Drying	Flatbed dryer with a capacity of 1.0 ton of unshelled peanuts per batch at 18 hours per batch.	5	75,000.00
Shelling	Edison-type peanut sheller with a capacity of 412.5 kg of unshelled peanuts per hour [1].	5	35,000.00
Sorting/ Grading	A fabricated peanut sorter that will classify peanuts by density and size through sieves and blowers.	5	70,000.00
Packaging	50-kg capacity, jute sack.	-	20.00
Storage	Plastic storage enclosure at 200 bags capacity.	3	15,00.00

Source: BPRE, 1999
[1] Southern Frontier Farms, Inc., Cagayan de Oro City.

Size, Location, and Form of Ownership and Organizational Structure for the Peanut Sheller Industry

1. Determination of the Appropriate Size of a Peanut Sheller Industry

The appropriate size of sheller industry was determined from the available raw materials in the region, the volume of demand, and "economies of scale" or the most economic level of production of the project. The economic level of the project is the level of production where the project's fixed costs are covered by the resulting revenue.

1.1 Determination of the Volume of Supply of Raw Materials

Data on total supply of peanuts on the local level was needed in this study. From Table 8, the production volume of peanuts per region was determined using the Bureau of Agricultural Statistics (BAS) data. This helped to determine the size of the project in a given location by identifying the volume of available raw materials.

The average national production of peanuts for a ten-year period (1991-2000) is 30,761.40 metric tons. Ilocos Region is the top peanut-producing region with 34.3% of the country's total production (see Table 8). The lowest peanut-producing region is the Cordillera Administrative Region with an average annual production of 117.50 metric tons or 0.40% of total production. The rest of the regions contribute less than 5% of the total production, except for the Southern Tagalog Region.

It was in 1994 when the total production of the country was at its highest at 36,574 metric tons. However, peanut production had been fluctuating within the 25 thousand levels from 1997 to 2000. This means that there is a potential for present peanut supply of the country to increase to more than 36 thousand metric tons per year or even more, taking into consideration the developed technologies for peanut production.

1.2 Determination of the Total Demand for Shelled Peanuts

The total demand of product is another important consideration in determining the appropriate size of the project. The law of supply and demand is needed to maximize the effectiveness of the project. The total demand was calculated by adding the total peanut production of the country and the total importation made in a given year. In the BAS study on Peanut Supply and Utilization Accounts (Table 9), the average demand for a ten-year period is 72,444.90 metric tons.

The domestic utilization of peanuts based on the BAS study, reveals that peanuts are consumed as food (92.30%), processed (6.93%), used as feeds (0.50%), for the seed requirement of farmers (0.20%), and exported (0.28%). The data on export shows that the country ceased exporting shelled raw peanuts from 1991 to the present.

In 1989, the volume of peanuts consumed as food was 66,225.36 metric tons. This went down in 1991 to 53,416.99 metric tons but again increased to 61,406.86 metric tons in 1993 and 62,843.0 metric tons in 1998. The computed average growth rate for the 10-year period is 0.21%.

The processing sector required a total of 5,030.83 metric tons in 1989; this went down to 4,763.00 metric tons in 1998. The average requirement of processors is 5,071.10 metric tons per year or 422.59 metric tons per month or 14.09 metric tons of shelled peanuts per day in a 30-working day per month.

If the total domestic production is less than the demand or requirement for a commodity, a deficit production situation exists which means that both the domestic production and importation are supplying the country's total consumption or demand for peanuts. Since 1994, the country imported peanuts more than what it produced.

Presented in Table 10 are the 1998 suppliers of imported peanuts in the country. The country's major exporter of peanut is India, supplying 16,482.617 metric tons or 38.04% of the total peanuts imported for the year. Peanuts were sold at an average price of US$0.64/kg. Following close to India is China which provided 10,996.764 metric tons or 25.37%, and third is Vietnam at 10,670.204 metric tons (24.63%). The rest of the suppliers in the list provided less than 4.0% of the total of peanuts imported in 1998.

To validate the 1999 data, five (5) major peanut processors in Metro Manila were interviewed as to their monthly requirement. It was learned that the sample population requires a total of 343 metric tons per month, which translates to an annual requirement of 4,116 metric tons of shelled peanuts (Table 11). Most processors prefer locally produced peanut varieties because of its taste and freshness. Importing of peanuts occurs only when local supply is difficult to obtain.

Table 8. Volume of production by region, Philippines, calendar years 1989 - 1998 (in metric tons)

REGION	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000 (P)	AVE.	% OF TOTAL
Cordillera Autonomous Region	124	123	125	115	88	80	133	130	125	132	117.50	0.4
Ilocos Region	12,081	10,731	10,400	10,440	10,385	10,023	10,244	10,222	10,449	10,577	10,555.2	34.3
Cagayan Valley	9,110	13,005	13,244	15,097	15,399	13,147	4,632	4,318	4,223	3,025	9,520.00	31.0
Central Luzon	1,040	913	1,018	1,100	1,104	1,099	1,249	985	1,025	943	1,047.60	3.4
Southern Tagalog	2,024	2,051	2,056	1,967	1,955	2,081	2,279	2,381	2,478	2,565	2,183.70	7.1
Bicol Region	1,025	1,155	1,147	1,265	1,216	1,122	1,084	1,091	1,134	1,009	1,124.80	3.7
Western Visayas	1,447	1,575	1,507	1,916	1,308	1,223	1,241	1,118	1,108	1,070	1,351.30	4.4
Central Visayas	1,025	1,011	1,055	1,173	1,261	1,283	1,451	1,258	1,268	1,316	1,210.10	3.9
Eastern Visayas	464	493	491	431	419	367	303	365	426	442	420.10	1.4
Western Mindanao	507	507	507	466	467	463	78	466	480	467	440.80	1.4
Northern Mindanao	667	668	674	709	564	553	566	587	582	550	612.00	2.0
Southern Mindanao	479	427	455	465	477	480	517	469	501	551	482.10	1.6
Central Mindanao	597	541	549	604	632	696	729	798	1,080	2,132	835.80	2.7
Caraga Autonomous	218	217	220	224	233	250	202	269	245	265	234.30	0.8
Region of Muslim Mindanao	591	575	581	602	690	622	638	650	667	645	626.10	2.0
Philippines (Total)	**31,398**	**33,993**	**34,030**	**36,574**	**36,200**	**33,493**	**25,346**	**25,107**	**25,791**	**25,689**	**30,761.40**	**100**

Source: Bureau of Agricultural Statistics; 1998
(P) – Preliminary

Table 9. Peanut: Supply and utilization accounts, Philippines, calendar years 1989 – 1998 (in metric tons)

YEAR	Peanut Production	Imports	Gross Supply	Exports	Seeds	Feed & Waste	Processing	Net Food Disposable	Gross Demand
1991	31,398	26,519	57,917	0.00	156.24	289.59	4,054.19	53,416.99	57,917.01
1992	33,993	28,015	62,008	0.00	178.25	310.04	4,340.56	57,179.15	62,008.00
1993	34,030	32,550	66,580	0.00	179.64	332.90	4,660.60	61,406.86	66,580.00
1994	36,574	41,254	77,828	0.00	188.36	389.14	5,447.96	71,802.54	77,828.00
1995	36,200	40,829	77,029	0.00	190.57	385.15	5,392.03	71,061.26	77,029.01
1996	33,493	58,967	92,460	0.00	114.95	462.30	6,472.20	85,410.55	92,460.00
1997	25,836	51,971	77,807	0.00	106.42	389.04	5,446.49	71,865.06	77,807.01
1998	24,718	43,330	68,048	0.00	102.00	340.00	4,763.00	62,843.00	68,048.00
1999	25,791	44,210	70,001	0.00	109.00	350.00	4,900.00	64,642.00	70,001.00
2000 (P)	25,689	49,082	74,771	0.00	107.00	374.00	5,234.00	69,056.00	74,771.00
AVE.	**30,772**	**41,673**	**72,445**	**0.00**	**143.24**	**362.22**	**5,071.10**	**66,868.34**	**72,444.90**
% of Total	**42.48**	**57.52**	**100.00**	**0.00**	**0.20**	**0.50**	**6.93**	**92.30**	**100.00**

Source: Bureau of Agricultural Statistics, 1998
(P) = Preliminary

Table 10. Philippine supplier accounts of shelled peanuts, 1998

COUNTRY	QUANTITY (kg)	VALUE US$ (CIF)	PERCENT SHARE	
			Quantity	Value
India	16,482,617	10,618,709	38.04	39.12
China	10.996,764	7,244,376	25.37	26.69
Vietnam	10,670,204	6,096,640	24.63	22.46
Indonesia	1,592,109	985,147	3.67	3.63
Singapore	1,540,430	916,812	3.56	3.38
Korea	674,636	387,611	1.56	1.41
USA	539,472	323,929	1.25	1.19
Hongkong	346,460	220,516	0.80	0.81
Japan	330,660	216,096	0.76	0.80
New Zealand	47,890	58,457	0.11	0.22
Malaysia	36,000	21,060	0.08	0.08
Myanmar	35,700	21,060	0.08	0.08
United Kingdom	31,000	32,525	0.07	0.12
Australia	5,208	4,535	0.01	0.02
Switzerland	965	776	0.002	0.002
TOTAL	**43,330,205**	**27,142,249**	**100**	**100**

Source: Foreign Trade Statistics, 1998.

Table 11. Peanut requirements of major peanut processors in Metro Manila, 1999

COMPANY NAME/CONTACT PERSON AND ADDRESS	VOLUME REQUIREMENT (metric ton/month)	PRICE (PhP/kg)
Newborn Food Products, Inc. Mr. Ramon T. Pua 2465 Bobock St. Makati City, Philippines	10	37.00
Tobi Marketing, Inc. Mr. Andres C. Y. Go 8526 Juanita De Leon St. Parañaque, Metro Manila	150	35.00
Growers Food Industries, Ent., Inc. Ms. Myrna Fajardo 63 J. Rizal St., Valenzuela Metro Manila	100	41.00
California Manufacturing Co. Inc. Ms. Nora de Leon Km. 18, South Superhighway Parañaque, Metro Manila	80	46.00 -48.00
Marigold Commodities Corp. Mr. Kim Lapuz 131 F. Manalo St. San Juan, Metro Manila	3	Dollar rate $\pm$ PhP2-3. Delivered
TOTAL = 343 metric tons/month		

Note: Conducted the telephone interview last November 1999 at FDC office.

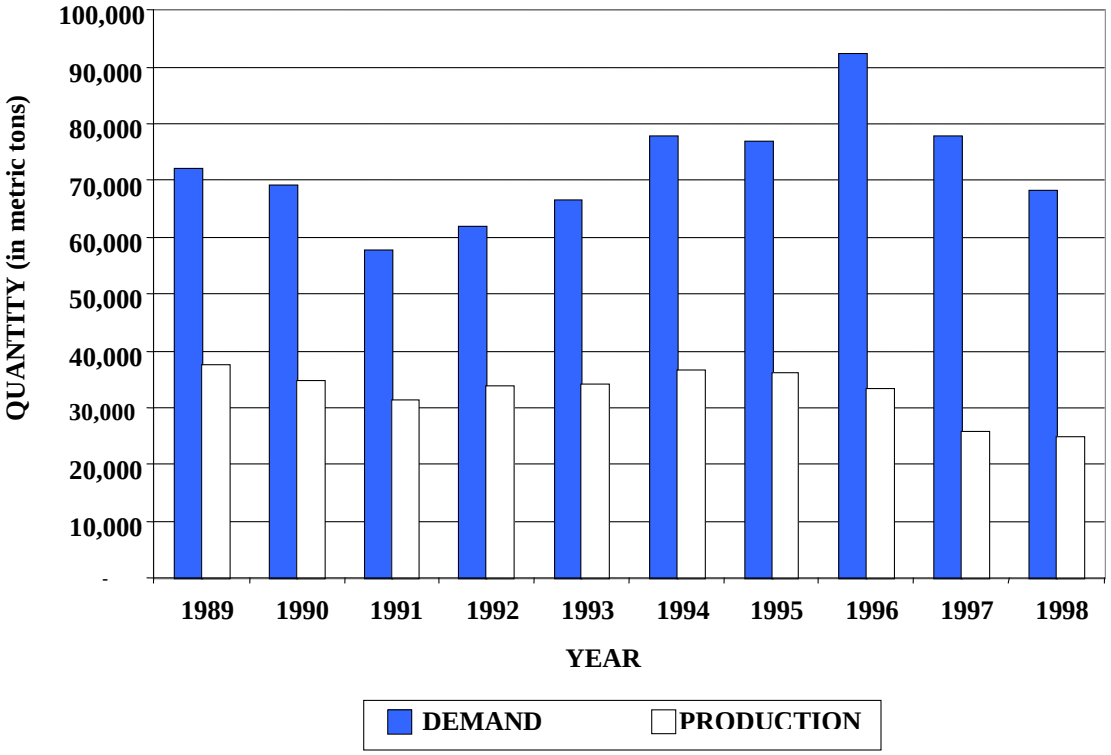

Fig. 4 Peanut production and demand, Philippines (1989-1998).

As a whole, the country's average gross annual demand is 72,293.60 metric tons. The country's total demand for peanuts decreased to 68,284 metric tons in 1998 from 77,807.01 metric tons in 1997. Figure 4 presents the annual production of peanuts versus the total annual demand for the last 10 years.

It is envisioned that local production will improve and remedy the deficit production situation. Production will increase by providing a ready market to the farmer's produce, buying from farmers at acceptable price but equally acceptable to investors. This may also assure a steady source of good quality shelled peanuts, in collaboration with the government's "Gintong Ani" for High Value Commercial Crops Program and the Target Crop Enhancement Program (TCEP) of the Growth with Equity in Mindanao (GEM).

1.3 Appropriate Size for a Peanut Sheller Industry

This peanut sheller industry was conceptualized to cater the requirements of peanut processors. Only the volume being required by the five peanut processors (Table 11) will be considered for this study and the 1999 survey as basis to determine the size of the industry. The annual requirement of the five processors interviewed totals to 4,116 metric tons of shelled peanuts.

Using the identified technology/equipment, the yield or recovery rate of peanuts from a fresh, unshelled form to shelled peanuts is 30%. An ideal size of sheller project will have an annual requirement of 1,188.00 metric tons of field-dried, unshelled peanuts as input, 772.20 metric tons as output, while 4,116 metric tons is the total requirement of the five peanut processors.

From Table 8, there is only one region capable of producing the raw material requirement of the sheller industry based on their 1998-production level. Although, the total volume of peanuts produced will have to go to the project, a lot of micro, small, and medium processors in the region will also compete for the supply of raw materials. This explains why Metro Manila processors are unable to procure enough supply of local peanuts. Considering this situation, the appropriate size of a sheller industry must be small enough to obtain enough raw materials and at the same time provide the requirements of the five major Metro Manila peanut processors.

The BPRE report identified three modules for a sheller project based on varying capacity levels (Table 5). By replacing the sheller unit in module 3 with that of the Edison-type peanut sheller, the project will now have an input capacity of 1,188.00 metric tons per year and an output capacity of 772.20 metric tons. This means that the size or capacity of the plant can be adjusted based on raw material availability, and by increasing or decreasing the number of equipment in the project.

The rated capacity will be based on the capacity of the peanut sheller equipment and the number of units to be employed. The volume of available raw material in a given area will determine the size of the peanut sheller plant. For the proposed size of the peanut sheller plant, it is estimated that at least a total of 372 farmers producing an average of 1.6 metric tons of peanuts for two croppings per year, is required to supply the raw material requirement. To provide for the requirement of the five peanut processors interviewed, six peanut sheller plants will have to be established.

2. Determination of an Appropriate Location for the Sheller Industry

The appropriate location for the sheller project considers the following factors:

a. Accessibility to, and availability of, raw material sources

b. Availability of cheap or moderately priced utilities such as power, water, or fuel

c. Combined cost of transporting raw materials and fuel to the plant site

d. Proximity to distributing outlets or channels

e. Availability of skilled and unskilled labor

f. Climatic conditions

g. Availability of infrastructure, e.g. roads, land and sea ports, communication facilities

h. Peace and order situation prevailing in the area

i. Programs/projects implemented geared towards increased peanut production in the area

In the survey conducted in selected areas/provinces in the country and information articles available about the place, a list of candidate locations was drawn. An evaluation of prospective locations for the Peanut Service Station is shown in Table 12. The ratings with most acceptable points are Pangasinan in Region 1, Cagayan in Region 2, and Bukidnon in Region 10. These locations may not be the best but the advantages outweigh the disadvantages to locate in these areas.

The province of Pangasinan located in the Ilocos Region is the top peanut-producing region in the country in 1998 (BAS). The region produced more than double the volume produced by Cagayan Valley Region. The rate of power or electricity in the province is cheaper by PhP0.02 per kw-hr compared to Metro Manila and a steady supply of power is expected considering the presence of the Sual Power Plant. The rate of water is also cheaper by PhP0.50 per cu.m. than in Metro Manila.

Pangasinan rated high with 34 points, in most of the set criteria but was rated low only in two aspects namely:

a. The site's proximity to distributing outlets or market channels, i.e. Metro Manila, is about 300 km North of Metro Manila.

b. There is no government or private sector led programs/projects geared towards increased peanut production in the area.

Table 12. Evaluation of prospective locations for the Peanut Sheller Industry

REGION/PROVINCE	CRITERIA									
	I	II	III	IV	V	VI	VII	VIII	IX	TOTAL
Bulacan Province	1	1	1	5	3	4	5	5	1	**26**
Bukidnon Province	3	4	3	1	5	3	5	4	5	**33**
Cagayan Province	4	3	4	3	5	4	4	4	3	**34**
Cagayan de Oro	2	4	3	2	4	3	5	4	2	**29**
Isabela Province	4	3	4	3	5	4	3	4	2	**32**
Nueva Ecija Province	1	2	1	5	3	4	4	5	2	**27**
Pampanga Province	2	3	2	4	3	3	3	5	2	**27**
Pangasinan Province	4	4	3	3	4	4	5	4	3	**34**

Second to Pangasinan province is Bukidnon in Northern Mindanao region, where the climatic conditions are classified as Type 4 or that there is an even distribution of rainfall throughout the year. Supposedly, the yield of peanuts should be low considering that the plants receive less solar radiation. But the Growth with Equity in Mindanao (GEM), a USAID funded development project, reported that their peanut cooperatives in the region produce an average of 2.5 tons per hectare. This is almost a ton more than the average yield obtained in Northern Luzon. The province of Bukidnon gathered low ratings on the following aspects:

a. Accessibility to and availability of raw materials. – At present, peanut farmers in the region are concentrating on peanut production for seeds thus, raw materials for the project may be difficult to obtain.

b. The combined cost of transporting raw materials to the plant site. – The price of fuel in the area is PhP1.00 higher than that in Metro Manila.

c. Proximity to distributing outlets or market channels. – The province is located in Mindanao, which is a thousand kilometers from Metro Manila where peanut processing plants are located.

d. Climatic conditions. – Disregarding the reports of the GEM since these are not published research studies, DA Technology Guide to Peanut Production was used as basis where peanut production is low.

On the other hand, the province of Cagayan in the Cagayan Valley region is still a strong contender for the most appropriate location for the sheller project. Having lost its title as the Peanut Capital of the Philippines is just a temporary setback according to DA officials in the region. They claim that

given an available market for the peanut produce, a lot of farmers will plant peanuts. The province scored high on most criteria but got low scores on the following:

a. The availability of cheap/moderately priced utilities. - The prices of fuel and power in the area are high if compared to the rates in Metro Manila.

b. The proximity to distribution outlets/market channels. – The province is located about 450 km North of Metro Manila.

c. Programs/projects geared towards increased peanut production in the area. – Government projects on peanut production is not implemented with vigor. Both government and private organizations encourage corn production.

Despite the handicap, the net benefit to be obtained in locating in these provinces remains great.

3. Determination of an Appropriate Form of Ownership and Organization Structure

3.1 Ownership and Form of Organization.

The ownership of the Peanut Service Station is considered to be best in the form of a cooperative. The project as a pioneering industry will encounter financial obstacles because of very limited funding sources. Despite the high investment requirement of the project, a vision for developing the Philippine Peanut Industry must be possessed by interested investors/entrepreneur. However, this does not preclude that other forms of organization are of lesser importance. Cooperatives are being extended leniency by banks, particularly the Land Bank of the Philippines and other government financing institutions. The peanut farmer, having a stake in the project as owners of the raw material can give the cooperative a better chance of success.

3.2 Organizational Structure

Organizational Chart. Presented in Figure 5 is the proposed organizational chart for the Peanut Service Station project. The organizational structure concept is based on the requirements to run the equipment of the plant. It will require a total of 16 employees or workers and at least 15 contractual workers for the production and procurement operations. The project's organizational plantilla is divided into three sections: Marketing, Production, and Administrative. A Manager, will also be the Marketing Officer, tasked to coordinate, monitor, and manage the other sections.

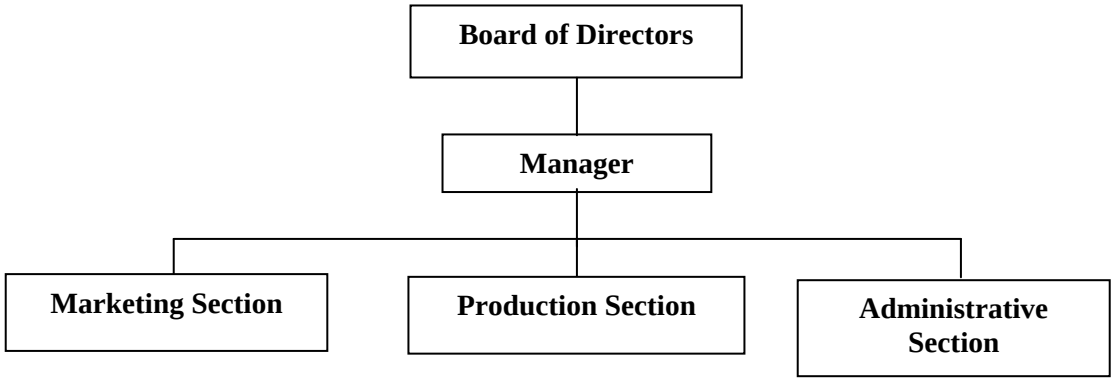

Fig. 5 Proposed organizational structure for the Peanut Service Station.

The Administration section will be manned by four (4) personnel and headed by the Accounting Clerk/Cashier. Five Production Technicians will be tapped or rotated, depending on the enormity of the task as Procurement Officers during the harvest season. The Manager shall be appointed to manage the project and shall be assisted by an Executive Assistant who will also act as Secretary. Other appointees to be hired shall include a Marketing Assistant, Production Technicians, Accounting Clerk/Cashier, Classifier/ Warehouseman, Utility, Driver, Laborer/Helpers, and contractual personnel for production, procurement,, and stripping operations. The list of duties and responsibilities for every position is presented in Table 13.

Table 13. List of positions, requirements, duties and responsibilities for the Peanut Service Station

Position	Requirements, Duties, and Responsibilities
1. Manager	This position requires experience in actual peanut production and trade/marketing. It is preferred that an Agribusiness graduate with a Masters degree in Business Administration will be hired. The person must have at least 5 years of relevant experience and conversant with the equipment design, development, and maintenance, and well versed with Information Technology. The person must be pro-active, a self-starter with the ability to work independently, and work well with a team to encourage teamwork. The Manager shall be responsible in operation, shall monitor production, marketing promotions, administrative functions, and financial status of the project. As Marketing Officer, he/she is responsible for conceptualizing a marketing program/plan for the organization and market awareness for the farmers to produce peanut crops. A compensation of PhP8,000 per month shall be budgeted aside from other benefits as provision of transport, health care, accident insurance, annual bonus, and other incentives as income of the project increases.
2. Executive Assistant/ Secretary	The person for this position occupies a position of trust, tasked to function as an Assistant Manager, or even a Marketing Officer. A proven track record as an Executive Assistant or Private Secretary must be considered, with above average typing skills, accounting background, and must be computer literate. The person will be assigned to undertake the preparation and typing of communications, preparation of reports and quotations, and perform accounting and financial tasks. A secretarial or college graduate related to the field may be considered for the position. A monthly salary of PhP4,500.00 will be budgeted for the position plus benefits, e.g. state insurance and other legislated benefits.
3. Marketing Assistant	The position requires a college graduate in Business Management or Marketing, with at least 4 years of work experience in selling peanut products or other consumer products. The position will be responsible for implementing the marketing and promotion plan conceptualized by the Marketing Officer; and must develop rapport with the project's clients, suppliers, and other benefactors of the project. It must ensure attainment of sales targets, sales promotion, seminars, public relations work, and identify alternative markets for the company. The Marketing Assistant position will have a remuneration package of PhP6, 000.00 and other state legislated benefits.

Table 13. *continued…*

Position	Requirements, Duties, and Responsibilities
4.Accounting Clerk/Cashier	The Accounting Clerk/Cashier shall be responsible for updating and maintaining the ledgers, all financial statements, operating cost reports, and inventory of supplies and assets of the company. He/she shall initiate collection and recording of account, prepare official receipts, invoice billings, and reports for both private and public consumption or such financial reports as required by the Securities and Exchange Commission (SEC) or the Cooperative Development Authority (CDA). The qualified appointee must be an Accounting graduate preferably with post graduate units earned with at least two (2) years of work experience in financial management, accounting or audit work. This position shall be given a salary of PhP3,800.00 monthly plus other state legislated benefits.
5. Production Technicians/ Procurement Officers	The facilities in the peanut center are easy to operate and will not require highly skilled operators. The sheller and dryer operators need only one day training and one week actual hands-on experience to develop the skill. However, the position requires mature and responsible workers who will handle service station operations on drying, cleaning, shelling, sorting, grading, etc. As Procurement Officers, they shall be in-charge of the procurement, renting out of strippers, and at times, stripping and delivery of raw peanuts from project site or Service Station. They must develop good rapport with the farmers to ensure purchase of quality peanuts from the area. The qualification of the position is at least a vocational graduate or a high school graduate with high aptitude in the maintenance of equipment. A commensurate compensation for the two tasks of PhP6,000.00 each per month plus other state legislative benefits shall be offered to qualified candidates.
6. Warehouseman/ Classifier	The Warehouseman/Classifier shall be in-charge in warehousing of raw materials and shelled peanuts, ready for shipment to clients or buyers. He shall maintain cleanliness and orderly arrangement of stocks and supplies in the warehouse. As a Classifier, he/she must have an eye for identifying the different varieties of peanuts and group them in order to achieve evenness in shelling. The qualification of the position is at least a vocational graduate or a high school graduate with high aptitude in peanut. A commensurate compensation of PhP3, 500 per month plus other state legislative benefits shall be offered to the qualified candidate.
7. Driver	The qualified driver must have at least 5 years experience in driving light trucks or heavy equipment. He must be mature, responsible, cooperative, and a team player. It is preferred that the appointee must have extensive knowledge on mechanical works for large type vehicles. A high school graduate with a vocational background in vehicle repair and maintenance shall be considered. He shall be tasked in the delivery of processed peanut products, pick-up of administrative supplies/purchases, and delivery of documents to clients. A compensation of PhP3,500.00 per month will be allocated for this position plus other state-legislated benefits.

Manpower Complement. The Manpower complement for the top post in the organization requires only one Manager and an Executive Assistant/Secretary. Two (2) personnel will be hired for the Marketing Section; seven (7) for the Production Section, including quality control staff and four (4) for the Administrative Section. Contractual personnel, at least 5, will be hired depending on the volume requirement of peanuts during procurement period. They will also be used sparingly in the operations inside the plant like cleaning of peanut pods, hauling peanut sacks from and to storage areas, etc.

Compensation and Wage Schedule. The salary program for this project is considered competitive and above average to ensure hiring of competent, qualified, and efficient personnel. Provincial rates were considered in compensation schedule. They were obtained from Cagayan Valley and Northern Mindanao regions. The following compensation and wage schedule for the organizational plantilla, Marketing, Production, and Administrative Sections (Table 14), are based on the level of responsibility, tasks to be performed vis-à-vis the rate of compensation.

Table 14. Salaries and wage schedule of organizational plantilla

Section/Position	Number	Annual Salary (PhP)	13th Month Pay (PhP)	SSS, Medicare & ECC (PhP)	Annual Cost (PhP)
A. Marketing Section					
Marketing Supervisor	1	72,000	6,000	5,760	83,760
Helper/Driver	1	46,400	3,000	3,712	53,112
TOTAL	**2**				**136,872**
B. Production Section					
Manager/Marketing Officer	1	96,000	8,000	7,680	111,680
Production Technician./ Procurement Officer	5	360,000	30,000	28,800	418,800
Classifier/ Warehouseman	1	54,000	4,500	4,320	62,820
Driver	1	42,000	3,500	3,360	48,860
Utility	1	18,000	1,500	1,440	20,940
Laborers/Operators	15	PhP100/day for 120 days in a year.			180,000
TOTAL	**24**				**843,100**
C. Administrative Section					
Executive Assistant/ Secretary	1	54,000	4,500	4,320	62,820
Accounting Clerk/ Cashier	1	45,600	3,800	3,648	53,048
Utility	1	18,000	1,500	1,440	20,940
Security	3	54,000	4,500	4,320	62,820
TOTAL	**4**				**199,628**

Basis: Cost assumptions presented in Table 15

Economic Profitability of a Peanut Sheller Industry

To determine the economic profitability of the Peanut Service Station, certain assumptions were made to come up with projected statement of operations. These are projection of sales, cost of sales, gross margins, other income or revenue as well as expenses. The projection indicated the profitability of the operation under the assumptions made.

1. Major Assumptions

Relevant assumptions used in marketing, technical, and financial projections are presented in Table 15 below.

Table 15. Assumptions on cost, price, market, and financing aspects

A. Items used to formulate cost assumptions

Name of item	Assumption	Basis/Source/Reference
1. Cost of raw material	PhP18.00/kg	Table 3, Market and marketing practices of peanut farmers surveyed in Region II, 1999.
2. Cost of packaging	PhP20 per 50 kg jute sack with polyethylene plastic	Telephone interview with Ms. Gilda Plata with AR Packaging in November 1999.
3. Freight cost	PhP0.30/kg	Table 3 shows the average pay of farmer is PhP5.00/sack to transport their produce to station. Sack of unshelled peanut would weigh on the average, 20 kg.
4. Direct labor cost and other fringe benefits:		Based on the average of the BPRE quoted rates, the minimum wage law and the rates obtained during interviews with HERCO, a corn/peanut shelling company in Isabela last July 1999. Also interviewed was Ms. Ruby Ang, owner of a shelling company (no company name) in Cagayan de Oro City last March 2000.
a. Annual salaries	PhP661,620.00	
1) 5 production technicians/ procurement officers	PhP594,000.00 PhP360,000.00 or PhP6,000.00/pay/mo	
2) 1 classifier/ warehousemen	PhP54,000.00 or PhP4,500.00/mo	
3) 15 laborers/ operators	PhP180,000.00 (contractual) or PhP100/day for 120 working days/year	
b. 13th Month pay	PhP30,000.00	Provided under Republic Act 6686 as amended under RA 8441.
1) 5 production technicians/ procurement officers	PhP6,000.00/pay/yr	
2) 1 classifier/ warehouseman	PhP4,500.00/yr	
c. SSS, Medicare, Philhealth	PhP33,120.00 computed at 8.0% of annual salary of regular employees	RA 1161, RA 7875.

Table 15. *continued…*

Name of item	Assumption	Basis/Source/Reference
5. Indirect labor and other fringe benefit:		
a. Annual salaries	PhP506,748.00	Based on the average of the BPRE quoted rates, the minimum wage law and the rates obtained during interviews with the HERCO, a corn/peanut shelling company in Isabela last July 1999. Also interviewed were the Chinese owned shelling company (no company name) in Cagayan de Oro City last March 2000.
1) 1 Manager/ Marketing Officer	PhP8,000.00/mo	
2) 1 Marketing Supervisor	PhP6,000.00/mo	
3) 1 Executive Assistant or Secretary	PhP4,500.00/mo	
4) 1Accounting Clerk/cashier	PhP3,800.00/mo	
5) 2 Utility	PhP1,500.00/pay/mo	
6) 1 Driver	PhP3,500.00mo	
7) 1 Helper (marketing)	PhP3,000.00/mo	
8) 3 Security	PhP4,500.00/mo/pay	
b. 13th month pay	PhP36,300.00	RA 8441
c. SSS, Medicare, Philhealth	PhP34,848.00	RA 1161, RA 7871
6. Power utilities	PhP12,290.00/yr	Computed based on the requirements of twelve 40-watt light bulbs in the plant and office, to operate for 8 hours a day for 26 days in a month. The computed average price per kw-hr is PhP5.3953.
7. Water expense	PhP15,400.00/yr	Based on 0.1137 cubic meter per person per day (FDC estimate), consumption was computed at 1,064.232 cu.m. and was rounded to 1,000 cu.m. at the prevailing rate of PhP15.40/cu.m. in Isabela City. The rate was obtained during the interview with PM Lito Co of NFA, Isabela.
8. Fuel and oil	PhP79,428.00/yr	1. Obtained from the BPRE technical report: a. 5 hp gasoline engine at 2 L/hr gasoline for the thresher. b. 2.2 L/hr. kerosene & 2.5 L/hr gasoline for flatbed dryer. c. 5 hp gasoline engine at 2 L/hr gasoline for the sheller. d. Price of gasoline is PhP13.25/L e. Price of kerosene is PhP8.00/L f. Oil is 5% of the cost of fuel. 2. Obtained from interviews with Mr. Raul Paz of BPRE the following information: a. There are two cropping seasons in a year. b. Use of thresher will be for 52 days only at 6 hr/day. c. Use of dryer and sheller will be adjusted to ensure that there will be no idle time for the machines. The sheller equipment will operate for 6 hr/day. d. The dryer capacity is 1000 kg per batch. The dryer will operate for 10 hr per day.

Table 15. *continued…*

Name of item	Assumption	Basis/Source/Reference
9. Repairs and maintenance	PhP34,290.00/yr	The cost of repairs and maintenance can be set at 1.5% of the fixed asset requirement except the cost of the land according to Mr. Emmanuel Avanceña of Southern Frontier Farms, Inc. in Cagayan de Oro City, March 2000.
10. Insurance	Average of 0.3% of fixed assets or PhP10,137.00/yr	Based on the insurance policy obtained from the NFA General Services Division. Percentage of cost varies depending on the type of insurance e.g. fire, theft, lightning, etc and the percentages of the cost of the fixed assets.
11. Transportation	PhP36,000.00	Allocated PhP3,000/month for the transportation expense of procurement officers, personnel on official travel. This is based on the experience of Mr. Avanceña of Southern Frontier Farms interviewed last March 2000.
12. Office supplies	PhP18,000.00	Allocated PhP1,500.00/month as the average expense Southern Frontier Farms spends. Taken during the same interview with Mr. Avanceña last March 2000.
13. Advertisement	PhP127,500.00	Based on Philphos Fertilizer company and what other pesticide companies do during product introduction. Expenses like posters, t-shirt, umbrellas, and sponsorships of Farmers Day and symposium.
14. Permits, license, and realty tax	PhP10,000.00	According to Mr. Arsenio Menor of the Permits and License Division of the Quezon City Hall, December 1999. This estimate varies depending on cities, municipalities, or provinces.

B. Items used to formulate price assumptions

Name of item	Assumption	Basis/source/reference
Price of warehouse with small office	PhP600,000.00	Contained in e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Rate of increase in selling price of shelled peanuts	8.0%	Computed the annual and average rate of increase of shelled peanuts for the past 10 years 1989-1998, data from the Bureau of Agricultural Statistics.
Rate of increase in buying price of unshelled peanuts (raw materials)	5.0%	Computed the annual and average rate of increase of unshelled peanuts for the past 10 years Yearly Average Farm Gate Prices 1989-1998, data from the Bureau of Agricultural Statistics.

Table 15. *continued…*

Name of item	Assumption	Basis/Source/Reference
Price of KKU pedal type peanut stripper/thresher	PhP7,500.00/unit	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Estimated life span of peanut stripper	5 years	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Price of mechanical flat-bed dryer	PhP75,000/unit	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Estimated life span of flat-bed dryer	5 years	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Price plastic enclosure	PhP15,000/200 bags capacity	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Estimated lifespan of plastic enclosure	3 years	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Price of light truck	PhP300,000/unit	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Estimated lifespan of light truck	7 years	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Price of weighing scale	PhP12,000/unit	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Estimated lifespan of weighing scale	7 years	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Price of peanut sorter (fabricated)	PhP70,000/unit	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Estimated lifespan of peanut sorter	5 years	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Estimated lifespan of warehouse with small office	30 years	Contained in the e-mail sent to FDC by Mr. Raul Paz of BPRE in November, 1999.
Price of Edison-type peanut sheller	PhP35,000/unit	Actual fabrication fee paid by Southern Frontier Farms, Inc. Information provided by Mr. Avanceña in March 2000.
Estimated lifespan of Edison-type peanut Sheller	5 years	Estimate provided by Mr. Avanceña of Southern Farms, Inc. in March 2000.
Financing rate	14.0%/annum plus 1.0% service charge	Rate obtained through a telephone interview with Mr. Omar Salvo of Land Bank of the Philippines last January 2000.

Table 15. *continued…*

C. Items used to formulate market assumptions

Name of item	Assumption	Basis/Source/Reference
Volume of demand for shelled peanuts from the Peanut Service Station	343 metric tons/mo or 4116 metric tons/yr	Obtained through the telephone interview with Mr. Ramon Pua of Newborn Foods Corp., Mr. Andres C.Y. Go of Tobi Marketing Corp., Ms. Myrna Fajardo of Growers Food Industries, Enterprises Inc., Ms. Nora de Leon of California Manufacturing Corp., and Mr. Kim Lapus of Marigold Commodities Corp., last December 1999.
Annual peanut service station production capacity	720.72 metric tons	Based on information of Mr. Avanceña of Southern Frontier Farms, Inc. last March 2000, the source of Edison-type peanut sheller design.
Selling price of shelled peanuts produced by the peanut service station	PhP30.00/kg	Formula was obtained from the Bureau of Import Services-Department of Trade and Industry (BIS-DTI), by Mr. Rommel David last January 2000. The data used for computing the landed cost was obtained from the Peanut Sheller Accounts, 1998, BAS. It was based on the price of the lowest computed total landed cost for imported peanuts.
Income tax rate	30% of net income	Based on the Bureau of Internal Revenue income tax return form.

D. Items used to formulate financing assumptions

Name of item	Assumption	Basis/Source/Reference
Capital Contribution Requirement	PhP2,571,406.00	Based on the average requirement of Land Bank of the Philippines requirement for a 70%: 30% loan to equity ratio.
Loan amount	PhP5,700,000.00	Based on the average requirement of Land Bank of the Philippines requirement for a 70%: 30% loan to equity ratio.
Interest on loan	14.0% plus 1.0% service fee	Based on the average interest rate of banks and government financing institution in year 1999.
Financing source	LBP, DBP, GSIS, and SSS	Based on the telephone interviews with the financing institutions for a possible loan window for the Peanut sheller project.

1.1 Production Materials Expense

The production cost of material inputs such as the raw peanuts are assumed to increase in cost by 5.0% from Year 1 to Year 5 and will remain constant up to Year 10 from Year 5 level. The basis for the rate of price increase is the interview with some respondents in FDC survey. The raw material cost will be initially purchased at PhP18.00 per kg and will level off from Year 5 to Year 10 at PhP21.88. The present buying rate in the region is PhP6.00 and has been that way for the past three years (FDC 1999 Survey in Region II). The PhP2.00 premium on the buying rate was established based on the preferred rate as identified by the farmers interviewed. The premium amount is to assure the Peanut Service Station of a steady supply of raw materials. The estimated raw material cost is PhP23,360,625.00 for Year 1.

1.2 Cost of Packaging Materials

The cost of packaging materials is assumed at PhP5.00 per 50-kg jute sack. The rate is based on the canvass made with a supplier in Metro Manila. The Peanut Service Station is envisioned to produce a total of 772,200 kg per year or a total of 15,444.00-50 kg bags of quality, shelled peanuts packed in jute sacks. The total annual cost of packaging material is PhP72,220.00. This will be borne by the farmers.

1.3 Freight Cost

The delivery of raw materials to the peanut processing station and the transport of finished goods to processors are based on the average price a farmer pays for the transport of his produce to market. In Region II, the average pay is PhP5.00 per 25-kg sack. The freight cost of raw material and finished product for the Peanut Service Station is estimated to amount to 15,444 bags or it is PhP0.02 per kg of shelled peanuts.

1.4 Direct and Indirect Labor Expense

Working hours are based on 8 hours a day for 26 working days in a month or 312 working days in a year.

The direct labor cost of production for Peanut Service Station involves salaries and wages and other fringe benefits. See Table 15, number 4 of item A. The total direct labor cost was computed at PhP661,620.00 per year estimated to increase by 5.0% annually until Year 5 and will level off from Year 5 to Year 10. The 5.0% increase is based on the average inflation rate obtained for the year 1999.

The indirect labor costs of production are the expense items on management and on laborers that have no direct influence on the volume of production despite an increase or decrease in their number. The budgeted indirect labor cost is PhP506,748.00 per year (Table 15), assumed to increase at 5.0% per year.

1.5 Expenses for Utilities

Water expense, though not a major production material of the Peanut Service Station is estimated at PhP15,400.00 (Table 15) or PhP0.02 per kg of shelled peanuts. This is readily available from local water suppliers in the area. However, in case of shortage of water supply, water deliveries will be used as an alternative which is expected to be minimal in cost, otherwise, a deep well has to be drilled.

Electric power expense is budgeted based on the power requirement of each machine/equipment plus the computed requirements for illumination, ventilation, and storage of the Peanut Service Station. Electric expense is estimated at PhP12,290.00 per year or PhP0.01 per kg of shelled peanuts (Table 15).

1.6 Fuel and Oil Cost

Fuel and oil expense in operating the processing machines and equipment was assumed at PhP13.25 per liter and a 5-hp.-gasoline engine was assumed to consume 2.0 liters of fuel per hour. The cost of oil was assumed at 5.0% of fuel cost. For kerosene, it was assumed at PhP8.00 per liter and the consumption was at 2.2 liters per hour. Fuel and oil cost was budgeted at PhP79,428.00 per year. All cost and pricing estimates were taken from the BPRE Technical Report.

The cost of fuel and oil for the light truck to transport finished goods to the processors will be under the freight cost.

1.7 Insurance Expense

Fire insurance and theft and damage insurance protection were estimated at an average of 0.3% of cost of fixed assets and will remain the same for the ten-year projection period. Insurance expense is budgeted at PhP10,137.00 per year.

1.8 Repairs and Maintenance Expense

Maintenance and repair cost was estimated at 1.5% of the fixed asset except land or it is budgeted at PhP34,290.00 per year. It is computed at PhP0.05 per kg of shelled peanuts.

1.9 Depreciation Expense

A five-year depreciation period was estimated for the peanut stripper, dryer, sheller, and sorter. A seven-year depreciation period was assumed for the transport vehicle and weighing scale. The depreciation period for warehouse with small office was assumed at 30 years, while office furniture and fixtures were assumed at 15 years (BPRE Technical Report). Older equipment shall be retained for use in operation if serviceable with 10% residual cost on book value.

1.10 Municipal Taxes and Licenses

This expense was estimated at PhP10,000 per year inclusive of fees for municipal license, realty tax, company residence certificate, and others.

1.11 Salaries and Wages

Salaries for employees in all departments except for contractual labor are allocated with 13th month pay and are assumed to increase at 5% per year.

1.12 Office Supplies Expense

The allocated budget for office supplies was estimated at PhP18,000 per annum.

1.13 Laboratory Materials

The costs of laboratory materials are limited to moisture content determination and aflatoxin analysis using the rapid test of high performance liquid chromatography (HPLC).

1.14 Telephone/Communication Expense

The cost of telephone charges and other communication expense was budgeted at PhP1,000.00 per month for a total of PhP24,000.00 per year. The use of cellular phones and two-way VHF communication equipment was discouraged since its limitation is considered more than the advantages that can be attained. However, the purchase of this equipment will be left to the discretion of management.

1.15 Social Security System Contributions and Other Benefits

Expenses for SSS employer's contribution and other benefits due to employees, e.g. PAG-IBIG, retirement fund, health insurance fund, etc. was budgeted at 8.0% of total salaries.

1.16 Other Assumptions

Other assumptions used in marketing, technical, and financial projections are shown in Table 15.

2. Total Production and Project Cost

2.1 Total Production Cost

The total production cost of the Peanut Service Station is presented in Table 16**.** The cost of production for clean, sorted, and graded-shelled peanuts which is the sum of the components of the production cost and the total production cost for the Peanut Service Station is PhP20,606,431.00. The production cost per kg of shelled peanuts is shown in Table 16. The cost of production is PhP20.78 per kg. The annual production of shelled peanuts for one Peanut Service Station, based on an assumed shelling recovery rate of 65%, is 772,200 kg.

2.2 Total Project Cost

The project's total costs or investment requirement are composed of the planned fixed-asset acquisition or the fixed asset requirement and the current asset levels or the working capital requirement. The total investment requirement is the sum of the total fixed asset requirement of PhP2,500,000.00 (Table 17) and the working capital requirement for a 1.5-month initial operation of about PhP2,625,233.00 (Table 18).

The total investment requirement or the total project cost for the Peanut Service Station is PhP7,750,466 (Table 19). To test the financial viability of the project, it will be assumed that about 60% of the total project cost will be financed by the loan. Investor equity will be required to cover for the balance of about 40% the project cost (Table 20).

Table 16. Annual production cost for Peanut Service Station, in pesos (PhP)

Item	Cost in pesos (PhP)	Cost in pesos (PhP) per kg
Raw Materials	18,532,000	18.00
Packaging Materials	288,288	0.40
Freight Cost	205,920	0.29
Direct Labor	661,620	0.92
Indirect Labor	506,748	0.70
Water	15,400	0.02
Electricity	12,290	0.02
Insurance	10,137	0.01
Repairs & Maintenance	34,290	0.05
Depreciation	264,557	0.37
Total	**20,613,678**	**20.78**

Basis: Cost and price assumptions are presented in Table 15.

Table 17. Fixed asset requirements for the Peanut Service Station

Item	Cost (PhP)
Land and improvements	268,500
Warehouse with improvements	1,200,000
Processing machinery and equipment	631,500
Office equipment	60,000
Office furniture and fixture	40,000
Light truck	300,000
Total	**2,500,000**

Source: BPRE, 1999

Table 18. Working capital requirement for Peanut Service Station, in pesos (PhP)

Cost item	Annual requirement, in pesos (PhP) (based on 720,720 kg)	3 – Month requirement (PhP)
Inventories		
Raw materials	18,532,800	4,633,200
Packaging	288,288	72,072
Freight	205,920	51,480
Inventory of related cost		
Direct labor and fringe benefits	661,620	165,405
Indirect labor and fringe benefits	506,748	126,687
Power utilities	5,826	1,457
Water expense	14,000	3,500
Fuel and oil	79,428	19,857
Repairs and maintenance (Bldg. and improvement)	24,630	6,158
Insurance (bldg. & improvement)	8,315	2, 709
Cash credits		
Repairs and maintenance (office bldg. and improvement)	12,000	3,000
Insurance (office bldg. and improvement)	1,000	250
Permits, license and realty taxes	10,000	2,500
Organization and pre-operating Expense	50,000	50,000
Operating salaries and fringe Benefits	243,918	60,980
Office supplies	12,000	3,000
Telephone	24,000	6,000
Power utilities	6,464	1,616
Water utilities	1,400	350
Transportation	36,000	9,000
Advertisement	127,500	31,875
Total working capital	**23,645,834**	**5,250,466**

Source: Price, cost, and market assumptions are presented in Table 15.

Table 19. Summary of total project cost for a Peanut Service Station

Cost item	Cost (PhP)
A. Fixed asset requirement (Table 17)	2,500,000
B. Working capital requirement (Table 18)	5,250,466
Total	**7,750,466**

Table 20. Proposed financing for a Peanut Service Station

Fund source	Amount (PhP)
A. Loan (70%)	5,700,000
B. Investor (30%)	2,050,466
Total	**7,750,466**

Basis: Loan terms currently being offered by the Land Bank of the Philippines.

3. Sources of Financing the Project

3.1 Long Term Bank Loans

Sources of long-term bank loans include Land Bank of the Philippines (LBP), Philippine National Bank (PNB), a joint special lending program between the Government Service Insurance System (GSIS) and the Social Security System (SSS), and the Development Bank of the Philippines (DBP). These banks carry an interest rate of loans ranging from 13% to 15% per year with three to ten years loan maturity. As of August 1999, commercial bank lending rates range from 14% to 17% per year.

3.2 Medium Term Bank Loans

Medium term bank loans are available from traditional sources accessible from government programs through lending institutions such as the GSIS, SSS, DBP, and LBP. These institutions administer lending programs geared toward the government's thrust on food security, such as the Industry Guaranty Lending Program (IGLF), Small and Medium Industry Loan Program (SMILP), "Mani ng Bayan" of the LBP, and Retail Lending Program. These programs are term financing where funds are available for the purchase of fixed assets, with a maturity period of three to seven years. There is other financing window for working capital requirement that carries a maturity period of one year. The rates of interest may be between 1% to 2% lower than the prevailing market rate or it may also be fixed depending on the sharing agreement between the lending institution and the banks.

In securing medium-term loans from these financing institutions, the asset of the project will be used as collateral, preferably the real estate owned by the project. Collateral appraisal and valuation of real estate property ranges from 50% to 75% based on prevailing land market values in the area. Another requirement is a three-year track record but this can be waived since the project is a pioneering industry.

3.3 Other Sources of Funds

Another government sourceof funds is the Manufacturing Productivity Extension for Export Industry Modernization Program (MPE-EIMP) of the Technology and Livelihood Resource Center (TLRC). Interest rates for this funding can range from 12% to 16% with 3 to 10 years loan maturity.

3.4 Outright Equity Infusion

An outright equity infusion from the project's investor(s) is the most ideal for the early establishment of the project. It will minimize the need for loans or the encumbrance of assets to secure a loan aside from the payment of high interest rates. The viability of the project will be enhanced, if the project is financed solely from equity or upon the availability of medium-term soft loans.

4. Combination Loan and Equity Financing

For the purpose of this study, a term loan alternative will be considered to determine the financial capability and viability of the project. The term loan will be used for the purchase of fixed assets while a capital infusion will be used to cover part of the fixed assets and the working capital requirement of the project.

5. Obtain a Soft Loan

A soft loan, which is extended to local projects, is usually available from foreign funding institutions/groups. These loans normally provide for the payment of principal after the grace period of usually one to two years.

Loan Particular

The amount to be borrowed will be PhP3,000,000.00, which will be secured by chattel and real estate property mortgages.

Interest rate is assumed at 14% plus 1% loan management fees, with maturity assumed in 5 years. The loan is based on existing terms being imposed by funding institutions. The project viability can further be enhanced if grace period and other less stringent arrangements are imposed on the loan. The schedule of interest and principal payments of the loans is presented in Table 21.

6. Projected Financial Statements

6.1 Projected Income Statement

The projected income statement (Table 22) provides the computation for projected revenues and projected cost for a ten-year period thereby arriving at the net income or deficit within the period.

The projected gross sales or revenue is presented in Table 23, estimated at PhP21,621,000.00 on the first year based on an assumed shelling recovery rate of 65.0% and selling price of PhP30.00 per kg. The estimated gross sales exclude the added income that can be realized for the shelling services that the station will also offer. The selling price is estimated to increase annually at 8% for the first five years and is assumed to level off from the sixth to the tenth year. This assumption is based on the average rate of increase of prices of shelled peanuts at wholesale (BAS data).

Table 21. Loan amortization schedule for a Peanut Service Station

Inputs		Key figures	
Loan Principal amount	5,700,000	Annual Loan Payments	1,627,231
Annual Interest Rate	15.00%	Monthly Payments	135,603
Loan Period in Years	5	Interest in First Calendar Year	799,634
Base Year of Loan	2000	Interest Over Term of Loan	2,436,156
Base Month of Loan	1	Sum of All Payments	8,136,156

Payments in first 12 months

Year	Month	Month balance	Payments	Principal	Interest	Cumulative Principal	Cumulative Interest	Ending Balance
2000	Jan	5,700,000	135,603	64,353	71,250	64,353	71,250	5,635,647
	Feb	5,635,647	135,603	65,157	70,446	129,510	141,696	5,570,490
	Mar	5,570,490	135,603	65,971	69,631	195,481	211,327	5,504,519
	Apr	5,504,519	135,603	66,796	68,806	262,277	280,133	5,437,723
	May	5,437,723	135,603	67,631	67,972	329,908	348,105	5,370,092
	Jun	5,370,092	135,603	68,476	67,126	398,385	415,231	5,301,615
	Jul	5,301,615	135,603	69,332	66,270	467,717	481,501	5,232,283
	Aug	5,232,283	135,603	70,199	65,404	537,916	546,905	5,162,084
	Sep	5,162,084	135,603	71,077	64,526	608,993	611,431	5,091,007
	Oct	5,091,007	135,603	71,965	63,638	680,958	675,068	5,019,042
	Nov	5,019,042	135,603	72,865	62,738	753,822	737,806	4,946,178
	Dec	4,946,178	135,603	73,775	61,827	827,598	799,634	4,872,402

Yearly schedule of balances and payments

	Year Balance	Payments	Principal	Interest	Cumulative Principal	Cumulative Interest	Ending Balance
2001	4,872,402	1,627,231	960,638	666,593	1,788,236	1,466,227	3,911,764
2002	3,911,764	1,627,231	1,115,065	512,167	2,903,300	1,978,393	2,796,700
2003	2,796,700	1,627,231	1,294,316	332,915	4,197,616	2,311,308	1,502,384
2004	1,502,384	1,627,231	1,502,384	124,848	5,700,000	2,436,156	0

The projected cost of sales for the Model has the value of PhP20,930,298.00 on the first year and PhP25,537,163.00 on the fifth year up to the tenth year. A gross profit of PhP691,302.00 on the first year and an estimated gross profit of at least PhP2,390,268.00 on the fifth to the tenth year, is envisioned to be realized.

The projected operating cost, consisting of the general and administrative cost, is PhP253,918.00 on the first year and PhP335,903.00 on the fifth to the tenth year (see Table 22 for details). The computed net income loss for the Model on the first year is PhP253,575.00 but will have a net income profit from the second year and onwards. The projected net income profit will be at PhP299,638.00 on the second year to PhP2,484,661.00 on the sixth to the tenth year. As presented in Table 22, the computed return on investment (ROI) is 21.0%.

Table 22. Projected income statement for Peanut Service Station, in pesos (PhP)

Cost Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Production (in kg of shelled peanuts)	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720
2. Gross sales	21,621,600	23,351,328	25,217,339	27,246,216	29,412,583	29,412,583	29,412,583	29,412,583	29,412,583	29,412,583
3. Less: Cost of sales										
Raw materials	18,532,800	19,459,440	20,437,560	21,459,864	22,527,648	22,527,648	22,527,648	22,527,648	22,527,648	22,527,648
Packaging materials	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288
Freight cost	205,920	205,920	205,920	205,920	205,920	205,920	205,920	205,920	205,920	205,920
Direct labor	661,620	727,782	800,560	880,616	968,678	968,678	968,678	968,678	968,678	968,678
Indirect labor	506,748	557,423	613,165	674,482	741,930	741,930	741,930	741,930	741,930	741,930
Water expense	15,400	16,170	16,979	17,827	18,719	18,719	18,719	18,719	18,719	18,719
Electricity cost	12,290	12,905	13,550	14,227	14,939	14,939	14,939	14,939	14,939	14,939
Fuel and oil	79,428	79,428	79,428	79,428	79,428	79,428	79,428	79,428	79,428	79,428
Insurance expense	10,137	10,137	10,137	10,137	10,137	10,137	10,137	10,137	10,137	10,137
Repairs & maintenance	34,290	34,290	34,290	34,290	34,290	34,290	34,290	34,290	34,290	34,290
Depreciation	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557
Marketing cost	328,732	328,732	345,075	362,990	382,630	382,630	382,630	382,630	382,630	382,630
Total cost of sales	20,930,298	21,985,071	23,109,509	24,292,626	25,537,163	25,537,164	25,537,164	25,537,164	25,537,164	25,537,164
4. Gross profit/loss	691,302	1,366,257	2,107,830	2,953,590	3,875,420	3,875,219	3,875,219	3,875,219	3,875,219	3,875,219
5. Operating cost:										
Administrative cost	243,918	261,610	281,053	302,420	325,903	325,903	325,903	325,903	325,903	325,903
Amortization of pre-operating cost	10,000	10,000	10,000	10,000	10,000					
Total operating cost	253,918	271,610	291,053	312,420	335,903	325,903	325,903	325,903	325,903	325,903
6. Net operating profit/loss	437,384	1,094,647	1,816,777	2,641,170	3,539,517	3,549,516	3,549,516	3,549,516	3,549,516	3,549,516
7. Interest expense	799,634	666,593	512,167	332,915	124,848	0	0	0	0	0
8. Net income before tax	(362,250)	428,054	1,304,610	2,308,255	3,414,669	3,549,516	3,549,516	3,549,516	3,549,516	3,549,516
9. Income tax (30%)	108,615	128,416	391,383	692,476	1,024,401	3,549,516	3,549,516	3,549,516	3,549,516	3,549,516
10. Net income/loss	**(253,575)**	**299,638**	**913,227**	**1,615,778**	**2,390,268**	**2,484,661**	**2,484,661**	**2,484,661**	**2,484,661**	**2,484,661**

ROI = 21%

Capacity of 720.72 metric tons/yr

Table 23. Projected sale of the Peanut Service Station

Item	Year 1	Year 2	Year 3	Year 4	Year 5 – 10
Input:					
kg of unshelled peanuts	1,029,600	1,029,600	1,029,600	1,029,600	1,029,600
Output: 70%					
Recovery rate:					
kg of shelled peanuts	720,720	720,720	720,720	720,720	720,720
Price per kg (PhP)	30.00	32.40	34.99	37.79	40.81
Rate of increase: 8%					
Sales (PhP**)**	21,621,600	23,351328	25,217,993	27,243,216	29,412,583

Table 24. Annual budgetary requirement for Administration section, in pesos (PhP)

Item	Year 1	Year 2	Year 3	Year 4	Year 5 – 10
Salaries and wages	173,124	190,436	209,480	230,428	253,471
Office supplies	18,000	18,000	18,000	18,000	18,000
Communication	12,000	12,000	12,000	12,000	12,000
Water	3,600	3,969	3,969	4,167	4,376
Electricity	4,000	4,410	4,410	4,631	4,862
Insurance	1,200	1,200	1,200	1,200	1,200
Repairs and maintenance	8,794	8,794	8,794	8,794	8,794
Permits/licenses/taxes	10,000	10,000	10,000	10,000	10,000
Depreciation	13,200	13,200	13,200	13,200	13,200
Total	**243,918**	**261,610**	**281,053**	**302,420**	**325,903**

6.2 Projected Cash-Flow Statement

The cash-flow statement (Table 25) illustrates the cash budget of the project showing cash receipts and cash disbursements. It is used to estimate financing needs or future loans; such that it is sourced at the time the project requires funds and maximizes profitability through efficient cash utilization.

From negative cash receipts for Years 1 and 2, a positive cash receipt is obtained from the third year to the tenth year. The projected cash flow for the Model shows a net cash deficit from the first and second years valued at PhP813,643.00 and PhP392,865.00, respectively. The cash deficit will be covered by the ending cash balances from financing and annual operations, to obtain a positive cash balance on the first year.

Evaluating profitability presented in Tables 22 and Table 25, the project is economically feasible. Most especially in the projected cash flow statement, liquidity of the project is presented on an annual basis to show that there is enough money to finance the operations.

7. Financial Analysis

An analysis on the financial soundness based on the income statements and cash-flow statements of the model reveals that the project is profitable and that economies-of-scale is met. The total production cost is PhP20,613,678.00 per year or P20.79 per kg of quality shelled peanuts, while the operating cost is PhP562,238.00 or PhP0.78 per kg with a selling price of PhP30.00 per kg. The Cash Flow Statement reveals that the project is very liquid or it means that it can easily meet all of its financial obligations within a given year.

7.1 Test of Profitability

Net Profit Margin. The net profit margin ratio is the average income over the years generated by the project against its total sales is 7.3%.

Operating Profit Margin. The computed operating profit margin of 11.45% is more than the 10% profit level (Industry Development Series No. 1, DAP).

Gross Profit Margin. The gross profit margin based on the computation of gross profit margin over sales reveals a profitable percentage of 12.12%.

Return on Investment. The project is computed to provide a return on investment of 21%; this is relatively high compared to interest rates being offered by banks on time deposit interest rate of 7%.

7.2 Test of Capital Investment

The tests of capital investment ratios are financial tools to evaluate the justification for investing in the project.

Internal Rate of Return. Over a 10-year projection period, with an investment of PhP7,750,466.00 (Table 20)**,** the internal rate of return (IRR) for the project is estimated to be at 18%. Compared to time deposit rates of commercial banks in 1999 level of less than 10%, the project is very viable.

Payback Period. The cash payback period for the project is estimated at 5.2 years.

Average Rate of Return. The computed average rate of return that was obtained by dividing the average net income by the average net investment is 0.83%.

7.3 Sensitivity Analysis

Selling Price to Remain Unchanged Despite Cost Changes in Other Items. If the price of shelled, quality peanuts will remain for a ten-year period while production costs increased, the projected return on investment will be -34.0% (Table 26).

Prices of Raw Material Input to Increase by 10.0% Annually. If production cost increase by 10% annually while other factors are retained at present levels, the projected financial position is not feasible with a computed Return on Investment of negative 26% (Table 27). If both **s**ituations will occur, it would be worse at –92% ROI. This shows that the project is sensitive to price changes in its raw material input and sales or selling prices (Table 28).

Table 25. Projected cash-flow statement for Peanut Service Station, in pesos (PhP)

Item	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cash receipts											
Investor contribution	2,491,394										
Loan proceeds	5,700,000										
Net operating profit	-	441,631	1,099,759	1,822,841	2,648,279	3,547,778	3,559,797	3,559,797	3,547,778	3,559,797	3,559,797
Add: Depreciation	-	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557
Total cash receipts	8,191,394	706,188	1,364,316	2,087,398	2,912,836	3,812,335	3,824,354	3,824,354	3,812,335	3,824,354	3,824,354
Cash disbursements											
Debt servicing											
Principal		827,598	960,638	1,115,065	1,294,316	1,502,384	-	-	-	-	-
Interest		799,634	666,593	512,167	332,915	124,848					
Fixed asset acquisition											
Land	268,500										
Building	1,800,000										
Machinery	1,179,000										
Office equipment	60,000										
Office furniture and fixtures	40,000										
Delivery truck	300,000										
Pre-operating expenses	50,000										
Income tax payment	-	(107,401)	129,950	393,202	694,609	1,026,879	1,067,939	1,067,939	1,067,939	1,067,939	1,067,939
Total cash disbursements	3,697,500	1,519,831	1,757,181	2,020,434	2,321,840	2,654,111	1,067,939	1,067,939	1,067,939	1,067,939	1,067,939
Net cash-flow (deficit)	4,493,894	(813,643)	(392,865)	66,964	590,996	1,158,224	2,756,415	2,756,415	2,756,415	2,756,415	2,756,415
Add: Cash-balance beginning	-	4,493,894	3,680,251	3,287,386	3,354,349	3,945,345	5,103,569	7,859,984	10,616,399	13,372,813	16,129,228
Cash balance ending	4,493,894	3,680,251	3,287,386	3,354,349	3,945,345	5,103,569	7,859,984	10,616,399	13,372,813	16,129,228	18,885,643

Internal Rate of Return (IRR) = 18%

Table 26. Projected income statement for Peanut Service Station, in pesos (PhP) - Situation 1: Sales to remain the same for the ten year period

Cost item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Production (in kg of shelled peanut)	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720
Gross sales	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600
Less: Cost of sales										
Raw materials	18,532,800	19,459,440	20,437560	21,459,864	22,572,648	22,527,648	22,527,648	22,527,648	22,527,648	22,527,648
Packaging materials	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288
Freight cost	188,211	197,477	207,258	217,482	228,159	228,159	228,159	228,159	228,159	228,159
Direct labor	664,380	730,818	803,900	884,290	972,719	972,719	972,719	972,719	972,719	972,719
Indirect labor	182,520	200,772	220,849	242,934	267,228	267,228	267,228	267,228	267,228	267,228
Water expense	14,000	14,700	15,435	16,207	17,017	17,017	17,017	17,017	17,017	17,017
Electricity cost	6,464	6,787	7,127	7,483	7,857	7,857	7,857	7,857	7,857	7,857
Insurance expense	9,315	9,315	9,315	9,315	9,315	9,315	9,315	9,315	9,315	9,315
Repairs and maintenance	36,630	36,630	36,630	36,630	36,630	36,630	36,630	36,630	36,630	36,630
Depreciation	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557
Marketing cost	318,820	318,820	318,820	318,820	318,820	318,820	318,820	318,820	318,820	318,820
Total cost of sales	20,505,985	21,537,516	22,635,994	23,790,039	25,002,048	25,002,048	25,002,048	25,002,048	22,002,048	22,002,048
Gross profit/loss	1,115,615	84,084	(1,014,394)	(2,168,439)	(3,380,448)	(3,380,448)	(3,380,448)	(3,380,448)	(3,380,448)	(3,380,448)
Operating cost:										
Administrative cost	243,918	261,610	281,053	302,420	325,903	325,903	325,903	325,903	325,903	325,903
Amort. of pre-operating cost	10,000	10,000	10,000	10,000	10,000					
Total operating cost	253,918	271,610	291,053	312,420	335,903	325,903	325,903	325,903	325,903	325,903
Net operating profit/loss	861,967	(187,526)	(1,305,447)	(2,480,859)	(3,716,351)	(3,706,351)	(3,706,351)	(3,706,351)	(3,706,351)	(3,706,351)
Interest expense	799,364	666,593	512,167	332,915	124,848	0	0	0	0	0
Net income before tax	62,063	(854,119)	(1,817,614)	(2,813,774)	(3,841,199)	(3,706,351)	(3,706,351)	(3,706,351)	(3,706,351)	(3,706,351)
Income tax (30%)	0	0	0	0	0	0	0	0	0	0
Net income/loss	**62,063**	**(854,119)**	**(1,817,614)**	**(2,813,774)**	**(3,841,199)**	**(3,706,351)**	**(3,706,351)**	**(3,706,351)**	**(3,706,351)**	**(3,706,351)**

Return of Investment (ROI) = -34%

Table 27. Projected income statement for Peanut Service Station, in pesos (PhP) - Situation 2: Price of raw material to increase by 10% for the first five years and to remain the same on the 6th year onwards.

Cost item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Production (in kg of shelled peanut)	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720
Gross sales	21,621,600	23,351,328	25,217,339	27,234,726	29,413,504	29,413,504	29,413,504	29,413,504	29,413,504	29,413,504
Less: Cost of sales										
Raw materials	18,532,800	20,386,080	22,424,688	24,667,157	27,133,872	27,133,872	27,133,872	27,133,872	27,133,872	27,133,872
Packaging materials	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288
Freight cost	188,211	206,744	227,130	249,554	274,222	274,222	274,222	274,222	274,222	274,222
Direct labor	664,380	730,818	803,900	884,290	972,719	972,719	972,719	972,719	972,719	972,719
Indirect labor	182,520	200,772	220,849	242,934	267,228	267,228	267,228	267,228	267,228	267,228
Water expense	14,000	14,700	15,435	16,207	17,017	17,017	17,017	17,017	17,017	17,017
Electricity cost	6,464	6,787	7,127	7,483	7,857	7,857	7,857	7,857	7,857	7,857
Insurance expense	9,315	9,315	9,315	9,315	9,315	9,315	9,315	9,315	9,315	9,315
Repairs and maintenance	36,630	36,630	36,630	36,630	36,630	36,630	36,630	36,630	36,630	36,630
Depreciation	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557
Marketing cost	318,820	328,732	345,075	362,990	382,630	382,630	382,630	382,630	382,630	382,630
Total cost of sales	20,505,985	22,473,423	24,642,993	27,029,405	29,654,334	29,654,334	29,654,334	29,654,334	29,654,334	29,654,334
Gross profit/loss	1,115,615	877,905	574,346	205,321	(240,830)	(240,831)	(240,831)	(240,831)	(240,831)	(240,831)
Operating cost:										
Administrative cost	243,918	261,610	281,053	302,420	325,903	325,903	325,903	325,903	325,903	325,903
Amort. of pre-operating cost	10,000	10,000	10,000	10,000	10,000					
Total operating cost	253,918	271,610	291,053	312,420	335,903	325,903	325,903	325,903	325,903	325,903
Net operating profit/loss	861,967	(606,295)	(283,293)	(107,099)	(576,733)	(566,734)	(566,734)	(566,734)	(566,734)	(566,734)
Interest expense	799,364	666,593	512,167	332,915	124,848	0	0	0	0	0
Net income before tax	62,063	(60,298)	(228,874)	(440,014)	(701,581)	(566,734)	(566,734)	(566,734)	(566,734)	(566,734)
Income tax (30%)	18,619	0	0	0	0	0	0	0	0	0
Net income/loss	**43,444**	**(60,298)**	**(228,874)**	**(440,014)**	**(701,581)**	**(566,734)**	**(566,734)**	**(566,734)**	**(566,734)**	**(566,734)**

Return of Investment (ROI) = -26%

Table 28. Projected income statement for Peanut Service Station, in pesos (PhP) - Situation 3: Both situations will occur a 10% increase in a raw material price and no increases in sales.

Cost item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Production (in kg of shelled peanut)	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720	720,720
Gross sales	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600	21,621,600
Less: Cost of sales										
Raw materials	18,532,800	20,386,080	22,424,688	24,667,157	27,133,872	27,133,872	27,133,872	27,133,872	27,133,872	27,133,872
Packaging materials	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288	288,288
Freight cost	188,211	206,744	227,130	249,554	274,222	274,222	274,222	274,222	274,222	274,222
Direct labor	664,380	730,818	803,900	884,290	972,719	972,719	972,719	972,719	972,719	972,719
Indirect labor	182,520	200,772	220,849	242,934	267,228	267,228	267,228	267,228	267,228	267,228
Water expense	14,000	14,700	15,435	16,207	17,017	17,017	17,017	17,017	17,017	17,017
Electricity cost	6,464	6,787	7,127	7,483	7,857	7,857	7,857	7,857	7,857	7,857
Insurance expense	9,315	9,315	9,315	9,315	9,315	9,315	9,315	9,315	9,315	9,315
Repairs and maintenance	36,630	36,630	36,630	36,630	36,630	36,630	36,630	36,630	36,630	36,630
Depreciation	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557	264,557
Marketing cost	318,820	328,732	345,075	362,990	382,630	382,630	382,630	382,630	382,630	382,630
Total cost of sales	20,505,985	22,473,423	24,642,993	27,029,405	29,654,334	29,654,334	29,654,334	29,654,334	29,654,334	29,654,334
Gross profit/loss	1,115,615	(851,823)	(3,021,393)	(5,407,805)	(8,032,734)	(8,032,735)	(8,032,735)	(8,032,735)	(8,032,735)	(8,032,735)
Operating cost:										
Administrative cost	243,918	261,610	281,053	302,420	325,903	325,903	325,903	325,903	325,903	325,903
Amort. of pre-operating cost	10,000	10,000	10,000	10,000	10,000					
Total operating cost	253,918	271,610	291,053	312,420	335,903	325,903	325,903	325,903	325,903	325,903
Net operating profit/loss	861,967	(1,123,433)	3,312,446)	5,720,225)	(8,368,637)	(8,358,638)	(8,358,638)	(8,358,638)	(8,358,638)	(8,358,638)
Interest expense	799,364	666,593	512,167	332,915	124,848	0	0	0	0	0
Net income before tax	62,063	(1,790,026)	(3,824,613)	(6,053,140)	(8,493,485)	(8,358,638)	(8,358,638)	(8,358,638)	(8,358,638)	(8,358,638)
Income tax (30%)	18,619	0	0	0	0	0	0	0	0	0
Net income/loss	**43,444**	**(1,790,026)**	**(3,824,613)**	**(6,053,140)**	**(8,493,485)**	**(8,358,638)**	**(8,358,638)**	**(8,358,638)**	**(8,358,638)**	**(8,358,638)**

Return of Investment (ROI) = -92%

Comparison of Potential Cost of Peanuts Produced by the Sheller Industry, with Imported Peanuts

Break-even selling price for shelled peanuts of the Peanut Service Station

A price lower than the break-even price will make it unprofitable to continue the operations of the station. The computed selling price to break-even is PhP29.39 per kg of shelled peanuts. This price was obtained by dividing the total cost (fix and variable costs) by the volume of production. This is the lowest price that the shelled peanuts from the station can be sold.

Shelled peanut suppliers and their selling prices

Table 29 shows the computed total landed cost (TLC) of shelled peanuts in 1998 by the Philippine Supplier Accounts of Shelled Peanuts (FTS-NSO). Table 30 shows the exporting countries that offered the lowest price (TLC) of shelled peanuts, and these were Korea and Vietnam, both at PhP30.03 (US$0.77) per kg. Vietnam ranked 3rd in terms of the total value of exports to the country amounting to US$6.10 Million (CIF). India was the highest supplier of shelled peanuts in 1998, at 16,482.62 metric tons, valued at US$10.62 Million (CIF) but ranked 7th in terms of TLC. India's peanuts had a TLC of PhP33.54 (US$0.86)/kg of shelled peanuts sold to the Philippines. China supplied 10,996.76 metric tons (or 25.37%), valued at US$7.24 Million (CIF). The Chinese peanuts share the same rank with Japan at 8th place from the cheapest, with a TLC of PhP34.32 (US$0.88)/kg. The U.S. is the 7th biggest supplier of shelled peanuts to the country with 539.47 metric tons valued at US$323,929.00 (CIF). The U.S. peanut is the 4th from the lowest TLC, at US$0.81/kg of shelled peanuts. It can be observed that even if the TLC of India and China are higher by US$0.09 and US$0.11 per kg, respectively, from either Vietnam or Korea (Lowest TLC at US$0.77/kg.), these two countries were able to supply more than 50% of the market share for imported peanuts. According to Mr. David Ong, this can be explained by the fact that China and India were able to supply the buyer's demand of shelled peanuts.

Aside from the top three Philippine suppliers of shelled peanuts, the rest of the suppliers cornered less than 4% of the market share for the country's shelled peanut importation.

Imported vs. Peanut Service Station shelled peanuts.

According to local traders interviewed, the problem with local peanuts is its availability and price. The volume of peanuts is not enough to meet their demand and at the same time, it is priced higher than the imported ones. The price of shelled peanuts produced by the Peanut Service Station should be sold at least PhP1.00 per kg less than the TLC of imported peanuts; traders add a mark-up of PhP1.00/kg to the buying price or TLC. Having computed the break-even selling price of the service station peanuts to be at PhP29.39/kg, selling it at PhP30.00/kg will earn profits for the project.

Table 29. Philippine supplier accounts of shelled peanuts, 1998

Country	Quantity (kg)	Value US$(CIF)	Percent share	
			Quantity	Value
India	16,482,615	10,618,709	38.04	39.12
China	10,996,764	7,244,376	25.37	26.69
Vietnam	10,670,204	6,096,640	24.63	22.46
Indonesia	1,592,109	985,147	3.67	3.63
Singapore	1,540,430	916,812	3.56	3.38
Korea	674,636	387,611	1.56	1.41
USA	539,472	323,929	1.25	1.19
Hongkong	346,460	220,516	0.80	0.81
Japan	330,660	216,096	0.76	0.80
New Zealand	47,890	58,457	0.11	0.22
Malaysia	36,000	21,060	0.08	0.08
Myanmar	35,700	21,060	0.08	0.08
United Kingdom	31,000	32,525	0.07	0.12
Australia	5,208	4,535	0.01	0.02
Switzerland	965	776	0.002	0.002
TOTAL	**43,330,205**	**27,142,249**	**100**	**100**

Source: Foreign Trade Statistics, 1998

Table 30. Philippine suppliers and landed cost of shelled peanuts, 1998

Country	Quantity (kg.)	Value US$(CIF)	Percent share		Price US$/KG. (CIF)	Landed cost	
			Quantity	Value		US$/kg	PhP/kg
India	16,482,617	10,618,709	38.04	39.12	0.64	0.86	33.54
China	10,996,764	7,244,376	25.37	26.69	0.66	0.88	34.32
Vietnam	10,670,204	6,096,640	24.63	22.46	0.57	0.77	30.03
Indonesia	1,592,109	985,147	3.67	3.63	0.62	0.83	32.37
Singapore	1,540,430	916,812	3.56	3.38	0.60	0.80	31.20
Korea	674,636	387,611	1.56	1.41	0.57	0.77	30.03
USA	539,472	323,929	1.25	1.19	0.60	0.81	31.59
Hongkong	346,460	220,516	0.80	0.81	0.64	0.85	33.15
Japan	330,660	216,096	0.76	0.80	0.65	0.88	34.32
New Zealand	47,890	58,457	0.11	0.22	1.22	1.64	63.96
Malaysia	36,000	21,060	0.08	0.08	0.59	0.79	30.81
Myanmar	35,700	21,060	0.08	0.08	0.59	0.79	30.81
United Kingdom	31,000	32,525	0.07	0.12	1.05	1.42	55.38
Australia	5,208	4,535	0.01	0.02	0.87	1.17	45.63
Switzerland	965	776	0.002	0.002	0.80	1.09	42.51
Total	**43,330,205**	**27,142,249**	**100**	**100**	**Ave. 0.63**	**Ave. 0.96**	**Ave. 37.31**

Source: Foreign Trade Statistics, 1998

Table 31. Philippine suppliers and landed cost of shelled peanuts, 1999

Country	Quantity	Value US$(CIF)	Percent Share		Price (CIF) US$/kg	Landed Cost	
			Quantity	Value		US$/kg	PhP/kg
Indonesia	298,931	162,484	0.658%	0.590%	0.54	0.73	29.20
Hongkong	906,471	510,098	1.994%	1.853%	0.56	0.76	30.40
Thailand	365,040	206,280	0.803%	0.749%	0.57	0.76	30.40
New Zealand	69,520	39,586	0.153%	0.144%	0.57	0.76	30.40
Vietnam	4,160,390	2,389,235	9.151%	8.681%	0.57	0.77	30.80
Saudi Arabia	36,000	21,240	0.079%	0.077%	0.59	0.79	31.60
Singapore	995,976	590,330	2.191%	2.145%	0.59	0.80	32.00
Korea	288,000	173,088	0.633%	0.629%	0.60	0.81	32.40
China	28,597,622	17,500,231	62.903%	63.584%	0.61	0.82	32.80
India	9,738,670	5,924,469	21.421%	21.526%	0.61	0.82	32.80
United Kingdom	427	327	0.001%	0.001%	0.77	1.15	46.00
Australia	4,636	4,194	0.010%	0.015%	0.90	1.21	48.40
USA	872	1,091	0.002%	0.004%	1.25	1.68	67.20
Switzerland	236	361	0.001%	0.001%	1.53	2.05	82.00
TOTAL	**45,462,791**	**27,523,014**	**100.000%**	**100.000%**	**Ave. 0.73**	**Ave. 0.99**	**Ave. 39.74**

Source: Foreign Trade Statistics, 1998.

Competitiveness of U.S. peanuts in the Philippines.

1. Philippine supply and demand scenario

The Philippine peanut supply scenario shows that 54.41% of the country's gross demand is supplied by importation. The country's gross demand for 1998 is 72,293.60 metric tons envisioned to increase further considering the programs/projects i.e., the Peanut Collaborative Research Support Program (PCRSP), etc. are geared toward an increase in consumption due to improved quality or lower priced peanut products. Furthermore, the supply gap will further increase because peanut farmers will find it difficult to market their produce at an acceptable price, pushing them to shift to other high value cash crops instead of peanuts.

2. Quality consideration

According to Mr. David Ong, most of the U.S. peanuts being exported in the country are the long or elongated type. This is not the type being demanded by his buyers. They are looking for the "Java" type or the round ones. Another consideration is the distance between the two countries, by the time the U.S. peanuts reach the country, all if not most of it are contaminated with aflatoxin.

3. Price consideration

The TLC of U.S. peanuts ranked 4th from the cheapest at US$0.81/kg; higher by only US$0.01/kg from the 3rd cheapest i.e., Vietnam and Korea, and US$0.02/kg from the second lowest i.e., Malaysia and Myanmar. Considering the technology and the support that the U.S. government extends to their peanut farmers, the U.S. peanuts can compete with the price of other peanut suppliers.

A more recent data, the 1999 Philippine Supplier of Shelled Peanuts shows that the U.S. peanuts were not so appealing for that year (Table 31**)**. The landed cost was computed using the data in Table 30. The price (CIF) of shelled U.S. peanuts ranked second from the highest CIF at US$1.25/kg. Meanwhile, the cheapest supply source of imported, shelled peanuts in terms of CIF is Indonesia at US$0.54/kg and the most expensive is Switzerland at US$1.53/kg.

In terms of landed cost, the TLC of U.S. peanuts ranked 2nd from the most expensive at US$1.68/kg of shelled peanuts. China supplied 62.90% of the total importation of peanuts at 28, 597.62 metric tons, for a TLC of US$0.82/kg, the landed cost of Chinese peanuts costs even lower by US$0.06/kg for 1999 than in 1998.

CONCLUSIONS

Determination of the Technical and Economic Requirements for a Peanut Sheller Industry in the Philippines.

Determination of Appropriate Technology Needed by the Sheller Industry

The 1999 survey on peanut farmer's postharvest handling practices and needs in Region II showed that the farmers do not plant/produce peanuts because there is no market to encourage them. Another is when peanut importation was liberalized in 1987, the entry of cheap imported peanuts reduced the market for locally produced nuts.

The average area of 0.5 to 0.75 hectares that peanut farmers till is too small to produce higher yield. It will be costly to introduce machines in the production and postproduction aspect of the farmers. The yield dictates the selling price of unshelled peanuts, the lower the yield the higher will be their selling price. The survey shows the average yield per hectare of unshelled peanuts in the surveyed area to be 1.125 metric tons, while the average national yield is at 0.78 metric tons per hectare which is way below the average yield per hectare of China or the U.S.

These reasons result in farmers' adoption of traditional postharvest practices and in turn produce low quality peanuts. The introduction of technologies or equipment that will be used in the drying, shelling, sorting/grading, and packaging operations is envisioned to produce quality peanuts. All these major operations must be integrated to form the Peanut Service Station to provide market for peanuts at a stable price.

The equipment recommended for the Peanut Service Station are the following:

1. Flatbed Dryer
2. Edison-type Peanut Sheller
3. Peanut Sorter (fabricated)
4. Plastic Storage Enclosure

Determination of the Appropriate Size, Location and Form of Ownership and Organizational Structure for the Peanut Sheller Industry.

1.1 Determination of the appropriate size of a peanut sheller industry

The recommended appropriate size of the Peanut Service Station is a plant with a capacity of 1,029.60 metric tons of unshelled peanuts as input. The total annual output of the plant is 720.72 metric tons of good quality, sorted, graded and shelled peanuts.

1.2 Determination of the appropriate location for the peanut sheller industry

The appropriate location identified after evaluating at least eight candidate locations for the project is the province of Pangasinan while Cagayan and Bukidnon provinces follow next. The availability of at least 500 hectares of land planting peanuts in a region or province is an important consideration in determining the ideal location for Peanut Service Station.

1.3 Determination of the appropriate form of ownership and organizational structure for the peanut sheller industry

The recommended form of ownership is a cooperative mainly because of its ability to generate easy funding. For the size of the Peanut Service Station, a cooperative is just right, because it is not big enough to incur much overhead and is not too small that quality management is not sacrificed. The organizational

structure is divided into three sections, Marketing Section, Production Section, and Administrative Section.

Determination of Economic Profitability of Establishing the Sheller Industry as Conceived.

The economic/financial study made use of several assumptions to come up with projected financial statements. These assumptions were based on industry practices and secondary data mostly obtained from government institutions.

The computed total investment requirement for a Peanut Service Station is PhP7,750,466.00. The cost of fixed asset requirement is PhP2,500,000.00 and working capital requirement is PhP5,250,466.00. About 75% of the project cost is to be financed through a loan amounting to PhP5,700,000.00 and an equity of PhP2,050,466.00. This is projected to generate a ROI of 21.0% and an IRR of 18.0% based on the criteria earlier set. The project is very attractive in terms of the ability to provide substantial returns to encourage investors. There is sensitiveness to price increases of ten percent but not on the five-percent level if there will be changes in production cost.

The source of financing that will allow for the payment of interest and a grace period of at least one year can be done by providing funds for operations (cash-flow). As presented in its financial statement, the repayment of loan consumes most of the income earned for the first five years, therefore soft loans are needed to maintain financial liquidity.

The operating costs should remain low in order to compete with imported peanuts, which are flooding the local market. Overhead and fixed cost allocations must be minimized while the operation efficiency is maintained at higher level. The Peanut Sheller Industry presents a positive cash flow because of the use of high capacity sheller and a relatively large inflow of cash. The Peanut Service Station project is technically and financially feasible for implementation.

Comparison of Potential Cost of Peanuts Produced by the Sheller Industry, with Imported Peanuts.

Imported Peanuts vs. Peanut Service Station Peanuts

To compete with imported peanuts, the Peanut Service Station must stabilize the price and availability of produced peanuts. In terms of quality, it can be argued that the project's peanuts are of the best quality. It was shown that peanuts must be offered PhP1.00/kg less than the lowest price of imported peanuts. To meet market requirement of peanut produce, six Peanut Service Stations have to be established.

Competitiveness of U.S. Peanuts in the Philippines

The study shows that in 1998, the United States, though 4th in rank can compete with other exporting countries by providing 1.25% of the total volume of shelled peanuts import need of the country. According to Mr. David Ong, a big-time importer and wholesaler of peanuts, U.S. Peanut industry is so developed that their variety/type can adjust to the type of peanuts being required by the local market.

The Peanut Service Station may initially direct 50% of its activities towards importing U.S. peanuts, re-packing them in the plant and retailing it to peanut processors especially during the initial stage of operation. The only condition with this arrangement is that U.S. peanuts should have a landed cost of at least PhP1.00/kg. from the TLC of China, India, or Vietnam. In 1999 data from the Foreign Trade Statistics Office of the National Statistics Office shows that the price (CIF) of U.S. peanuts went up to US$1.25/kg. from US$0.60/kg. in 1998. The price could be the reason why the U.S only supplied 0.872 metric tons in 1999 from a high of 539.472 metric tons in 1998. The computed TLC in 1999 went up by as much as in 107% at US$1.68/kg from the 1998 TLC of US$0.81. Given these conditions, the U.S. peanuts cannot compete with Asian peanut suppliers for the Philippine market.

REFERENCES

BAS. 1998. Peanut Supply and Utilization Accounts, 1989 – 1998 Bureau of Agricultural Standard, Department of Trade and Industry, Philippines.

BPRE. 1999. Peanut Farmers Postharvest Handling Practices and Needs. A technical report for the National Food Authority in support to the study "Techno-Economic Feasibility Study for a Peanut Sheller Industry". 23 pp. Bureau of Postharvest Research and Extension. Muñoz, Nueva Ecija, Philippines.

CODEX Alimentarius Commission. 1997. Standard for processed peanuts. In: General Standard for Contaminants and Toxins in Food. Schedule 1. Maximum level of contaminants and toxins in foods. p. 72. Food and Agriculture Organization of the United Nations and World Health Organization, Rome.

DA. 1997. Peanut Agribusiness Investment Profile Series of 1996 – 1997. Department of Agriculture, Philippines.

FTS. 1998. Philippine Supplier Account of Shelled Peanuts. Foreign Trade Statistics, National Statistics Office, Manila, Philippines.

Garrison R.H. and Noreen E.W. 1994. Managerial Accounting Concepts for Planning, Control, Decision Making. p. 845. 7th ed. Irwin. Burr Ridge, Illinois

USAID. 1995. Peanut: Commodity Profile and Market Opportunities. P.6. Joint project of the Philippine, Department of Agriculture and the United States Agency for International Development.