

Ten Prioritized Projects at National Level

Project No.	Projects	Page No.
G1	Breakfast Cereals (Maize)	123
G2	Fruits/Vegetables Cleaning, Grading and Packaging Unit	136
G3	Savory Potato Products	153
G4	Manufacture of Magnesium Carbonate and Calcium Carbonate	164
G5	Spice Oleo Resins (Chili, Ginger & Cardamom)	175
G6	Digital Animation Studio	187
G7	Fast Moving Consumer Goods(FMCG) Cluster Park	202
G8	Business Process Outsourcing Unit	216
G9	Construction Materials Cluster	229
G10	Integrated Dairy	243

G Ten Potential Projects at National Level

The output of the Investment Opportunity Study, presented in the preceding chapters, has resulted in a comprehensive list of projects for further detailed studies, backed up with recommendation of plans of action. Out of the list, ten prioritized projects have been taken up for preparation of project profiles.

Project profiles have been drawn up in the following format in sufficient detail to attract the prospective investors' interest:

1. Introduction
2. Markets and global competitiveness
3. Proposed business structure
4. Project location and size of project
5. Infrastructure requirements
6. Technology / Manufacturing process
7. Product quality standards
8. Consumption of raw materials, power, water and consumables
9. Project cost, Profitability analysis: breakeven, IRR and NPV
10. Environmental issues
11. Source of Technology / plant and machinery suppliers

Due care has been taken to adopt a cautious approach in the selection of investment parameters, choice of technology, and target markets. The financial analysis is based on the norms and local conditions of Bhutan.

All the ten projects have been found to be viable. **However, before any of these projects is actually taken up for implementation by the investors, it is essential that detailed feasibility studies be commissioned or carried out.** The project profiles may be modified to suit the individual entrepreneurship qualities/capacity, production programme and also to suit the location characteristics, wherever applicable.

Out of the ten prioritized projects, eight are in the manufacturing sector and two are in the services sector. Trade sector projects at national level are listed in the chapter "Projects for Further Detailed Studies", but have not been included in the ten prioritized projects here, as the preliminary attractiveness did not accord ranking in priority.

Two projects namely Fast Moving Consumer Goods and Construction Material Cluster have been drawn up on the cluster based approach. There is a need to explain the rationale behind the cluster approach, which follows the successful pattern established in India and other parts of the world. This envisages the provision of an enabling infrastructure with full coverage for external backward and forward linkages for a group of units manufacturing similar / related products. This infrastructure provides:

1. Complete technology and financial inputs to prospective individual entrepreneurs, for setting up manufacturing units of various listed products /items.
2. 'Flatted factory' space (plant machinery and raw material investment to be made by the individual entrepreneur).
3. Power, water and communication facilities.
4. Common facilities / central laboratory, research & development facility.
5. Central purchasing and central marketing facility (common branding).
6. Central warehousing for raw material and finished goods including bonded warehousing.

The cluster company will buy the entire production of the individual units and market it under a common brand name, recovering its investment from the profit earning on the sales of these branded products.

G.1 Breakfast Cereals (Maize)

G.1.1 Introduction

Maize is an important and widely grown crop in Bhutan. The Dzongkhag-wise production figures are shown in the table below:

Maize Production –Bhutan

S. No.	Region /Dzongkhag	Production (MT)
A. Western Region		
1	Samtse	13647.15
2	Chhukha	6093.74
3	Punakha	566.19
Sub Total		20307.08
B. Central Region		
4	Wangdue Phodrang	347.06
5	Dagana	5447.68
6	Tsirang	5097.84
7	Sarpang	10696.46
8	Zhemgang	4481.01
9	Trongsa	1143.64
Sub Total		27,213.69
C. Eastern Region		
10	Lhuentse	4732.81
11	Mongar	10532.78
12	Pemagatshel	3343.91
13	Samdrup Jongkhar	11590.89
14	Trashigang	11162.86
15	Trashy Yangtse	5204.37
Sub Total		46,567.62
Grand Total		94,088.39

Table G.1.1 Maize Production Bhutan-2005

Health awareness is increasing day-by-day and people are more watchful about their health. The worldwide trend towards good food habits is increasing. Maize has considerable nutritional value and its use for breakfast cereals is well established. Maize flakes are accepted by many as a health food. Dry roasted maize flakes along with a small quantity of sugar are mixed in milk and it becomes a health food especially for growing children. The 'corn flakes and milk' breakfast, popular in the West, is finding increasing favour around the world as a morning meal. The flakes when deep-fried are used extensively for making "chevada" - a popular snack item in India.

In Bhutan, this project is viable as production of maize is wide spread in all the three regions. In some of the districts like Samtse, Sarpang, Mongar, Samdrup Jongkhar and Trashigang, the annual production exceeds 10,000 MT.

G.1.2 Markets and Global Competitiveness Scene

Corn is a staple diet in many countries and has for long been available as corn flakes, a ready-to-eat nutritious breakfast cereal. Corn is high in phosphorus, zinc, fat and carotene. Corn flakes are usually a blend of corn, sugar, malt extract, salt, vitamins, iron and anti-oxidants, which can improve concentration, beat fatigue and prevent anemia.

Though corn flakes are being marketed in by many companies, the major player is, without doubt, Kelloggs at the international level. The big four manufacturers at that level are Kelloggs, General Mills, Post and Quaker Oats. The cereal industry is an oligopoly with four large companies holding 86.4% of the market and a few very small niche companies making up the remaining 13.6% (in 2006).



Figure 1: Corn and Corn flakes

In contrast, the neighboring Indian market has only Kelloggs and Mohan Meakin as the major players who hold market shares of 35% and 8% respectively, while the balance is shared by local brands at the regional level. Kellogg created a lot of awareness about cornflakes in Indian market. Since the U.S. based breakfast cereal giant launched its cornflakes in India some years ago, the market started expanding and the sales of Mohan Meakin corn flakes have doubled. Thus, there is a ready market for new entrants provided that quality, packaging and branding issues are taken care before launching. Corn flakes made in Bhutan can find acceptability in the fast growing Indian market.

Bhutan corn flakes from some of the districts can be uniquely branded as made from organically grown maize and can command a very high premium in western markets.

Apart from local consumption, there will be institutional demand for bulk packaging from hotels and restaurants, which cater to foreign tourists. The same plant can also be expanded to produce other maize products like Chevada and Dalia for the vast Indian market.

The ex-factory price for flakes is considered at Nu. 45/- per kg, which competes quite well in the end market after addition of transportation and distribution costs in India and other countries. For the purpose of assessing the nearest competition, Indian markets prices have been considered. The Kellogg brand sells at Rs. 250/- per kg and the Mohan Making cornflakes sell at Rs.120/- per kg. Thus, the products of this unit will sell well at Rs.100/- per kg in the Indian market.

G.1.3 Proposed Business Structure

It is suggested that these plants are set up in small-scale sector with 600 MT per annum capacity in maize growing Dzongkhags.

The project can also be considered on a cooperative basis, wherein small-scale member manufacturers, produce corn flakes of the same quality and specifications and market them through a common brand name, approaching larger markets through combined marketing. The international market would be easier to access in this way and large volumes could be availed by combining say 10 units, each having production of 600 MT, in various locations. Later on more units can be added into the system.

It is suggested that two separate legal entities are formed. The producing units can be individual small-scale units and the marketing unit can be a cooperative of these units as members. The cooperative entity will invest in brand name, quality standards, food safety issues and establishing marketing network for targeting international markets.

This way the competition from international players in corn flakes market segment can be contained and the volume will be enough to take on international markets.

G.1.4 Project Location and Size of Project

The project does not require any imported raw materials. The location of the project is suggested close to the source of the main raw material – Maize. Thus, projects can be considered in the small-scale sector in each of the following Dzongkhags where maize is available in surplus: Samtse, Sarpang, Mongar, Samdrup Jongkhar and Trashigang. The size of the project is 600 tons per annum operating on a single 8-hour shift basis.

G.1.5 Infrastructure Requirements

Built-up area requirement is 300 sq. meters consisting of production hall, packing and storage area. For each unit having an annual production capacity of 600 MT, about 500 sq. meters land is sufficient.

G.1.6 Technology/ Manufacturing Process

The corn ears are de-husked and the cobs shelled manually by supplier. The grains are first cleaned to remove dirt, dust and bran. Large size maize grains, which generally can be retained by no. 6 mesh screen, are preferred. The process is very simple. Maize nuts are cleaned and graded to remove mud, stones etc. and then soaked in hot water. After drying, these are roasted and then taken to flaker polisher wherein flakes are formed. Flakes are then passed through sieves to remove bran and broken maize. The roasted flakes are inspected, graded and transferred to packing bin to pack in water resistant polythene packages.

During this process of manufacture, the net recovery of flakes is 80%. Of the balance 20%, process loss is 5% and remaining 15% is bran and broken flakes or maize, which is sold to cattle-feed manufacturers.

The process flow chart describing manufacturing flow is given as under:

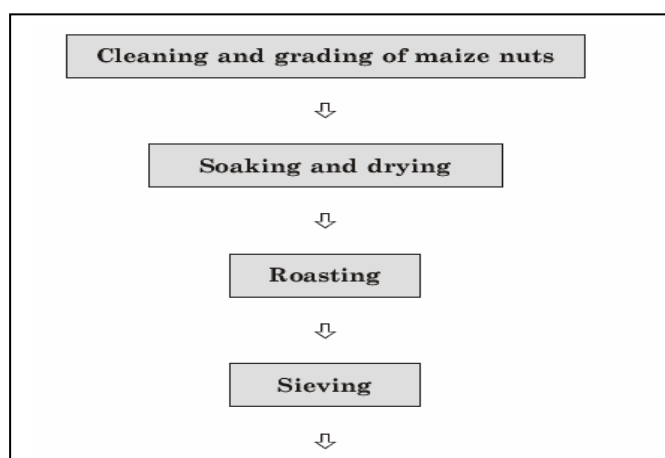


Figure 2 Process Flow Diagram for Corn Flakes

G.1.6.1 Technological Environment

The major players have spent years developing new products through research and development. Technology such as keeping cereal crispy in milk is now available easily thus making it easier for new entrants. Neighboring Indian market is a big market having growth potential would be a good opportunity for the Bhutanese corn flakes.

G.1.7 Product Quality Standards

ISO 9001: 2001 and compliance to HACCP (Hazard Analysis and Critical Control Points) standards are the two international requirements for corn flakes. Exporting to Europe will require additional compliance to Codex Alimentarius Standards for this unit.

G.1.8 Raw Material, Power, Water and Consumables

The only raw material will be good quality maize nuts. The annual requirement of maize nuts even at 100% utilization will be 600 tons for one plant considering 80% yield. The other items required are various packing materials of food grade inside aluminum lined LDPE bags and printed cardboard cartons.

Power requirement shall be 25 HP and hard coke of 18 tons will be required during the year. Water requirement per day will be 1200-1300 liters.

G.1.9 Project Cost/ Total Investment**Summary:**

▪ Plant Capacity	600 MT per year (2 MT per day)
▪ No. of Shifts	One (8 hours per shift) per day
▪ Working Days	300 days per year
▪ D.S.C.R.	3.22
▪ B.E.P.	21.30%
▪ IRR	29.86 %
▪ NPV	Nu.61.47 lacs

COST OF PROJECT

The total cost of the project is estimated at Nu. 93.32 lacs as per the particulars given in the table G.1.2.

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 500 sq. meter (On lease)	
2	Building and Civil Construction	20.00
3	Plant and Machinery	31.96
4	Misc. Fixed Assets	16.17
5	Preliminary Expenses	1.00
6	Pre-operative Expenses	9.49
7	Margin Money for Working Capital	7.89
8	Contingencies 10%	6.81
Total		93.32

Table G.1.2 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	45.22
2	Term Loan from FI's	48.09
Total		93.32

Table G.1.3 Means of Finance

The term loan has been arrived based on the break up of individual investment item and bank's financing pattern as given in table G.1.14.

BUILDING AND CIVIL WORK

About 500 sq. meter of land will be required for this project and built up area required will be 300 sq. meter consisting of production hall, packing and storage etc.

(Nu. in Lacs)

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total
1	Office	20	10	200	600.00	1.20
2	Lab	15	15	225	600.00	1.35
3	Pantry	10	10	100	600.00	0.60
4	Facilities	10	10	100	600.00	0.60
5	Production Hall	50	40	2000	550.00	11.00
6	Packaging and Storage	25	20	500	550.00	2.75
7	Guard Room	10	10	100	500.00	0.50
8	Boundary Wall					2.00
Total						20.00

Table G.1.4 Building and Civil Work

PLANT AND MACHINERY

The cost of plant & machinery is estimated at Nu.31.96 lacs including installation and commissioning. The cost estimates for plant & machinery have been worked out based on the cost figures available from budgetary offers and/or orders placed for similar items in the recent past, duly updated to cover the price escalation in the intervening period. The individual itemized costs are given in table G.1.5.

Freight and insurance have been considered on the assumption that all machineries will be transported by road.

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Roaster	2	3.50	7.00
2	Flakers Polisher	2	2.00	4.00
3	Cutter Machine	2	0.50	1.00
4	Furnace	2	2.50	5.00
5	Sieves	2	0.50	1.00
6	Pouch Packaging Machine (With Nitrogen Filling)	2	2.00	4.00
7	Pouch Sealer	2	2.00	4.00
8	Weighing Machine	2	0.40	0.80
9	Material Handling Equipment		2.25	2.25
10	Installation and Commissioning	1	2.91	2.91
Total				31.96

Table G.1.5 Plant and Machinery

MISC. FIXED ASSETS

Nu.16.17 lacs have been estimated under the heading of MFA. The details of electrical installations for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery and equipment, equipment for water supply, laboratory, workshop, fire fighting equipment, etc. have been provided on a lump sum basis, as per information available with the consultants, for similar assets. The details of miscellaneous fixed assets and their associated costs are shown in table G.1.6 Misc. Fixed Assets.

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Office Equipment	1	2.00	2.00
2	Furniture and Fixture with Interior	1	2.00	2.00
3	Computers with Accessories	1	0.42	0.42
4	Laptop	1	0.55	0.55
5	Fire Fighting Equipment	5	0.05	0.25
6	Car	1	6.00	6.00
7	Loading Three Wheeler	1	1.75	1.75
8	Electrical Installation	-	3.20	3.20
Total				16.17

Table G.1.6 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal and Liaisoning	1.00	1.00
Total			1.00

Table G.1.7 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Expenses incurred prior to commencement of commercial production are covered under this head that total Nu. 9.49 lacs.

Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest and insurance during construction and other miscellaneous expenses. Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing in the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required. Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements and interest during construction have been computed. Other expenses, under this head have been estimated on a block basis, based on information available for similar projects.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	3.07
2	Insurance during Construction Period	0.25% of factory assets	0.17
3	Electricity Charges during Construction Period		1.25
4	Marketing Launch Expenses		1.00
5	Technology Know-how fees		2.00
6	Training Expenses		1.00
7	Traveling Expenses		1.00
Total			9.49

Table G.1.8 Pre-operative Expenses

COST OF RAW MATERIAL

The raw material consumption of the project will be 600 MT per annum and the cost of raw material is Nu.60 lacs.

S. No.	Particulars	Qty. (MT)	Rate per MT (Nu in Lacs)	Total Value (Nu. in Lacs)
1	Maize	600.00	0.10	60.00
2	Spices and added flavors	2.00	1.00	2.00
3	Packaging Material			28.00
Total				90.00

Table G.1.9 Cost of Raw Material

LAND LEASE CHARGES

Required land is 500 sq. meter (5,382 sq. ft.), which has been considered on lease @ Nu. 4.00 per sq. ft. per annum for first three years and @Nu. 6.00 per sq feet for the fourth year and subsequently @3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	0.21
2	2 nd Year	4.00	0.21
3	3 rd Year	4.00	0.21
4	4 th Year	6.00	0.32

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
5	5 th Year	6.20	0.33
6	6 th Year	6.40	0.34
7	7 th Year	6.60	0.35
8	8 th Year	6.80	0.36
9	9 th Year	7.00	0.37
10	10 th Year	7.20	0.38

Table G.1.10 Land Lease Charges

SALES REALISATION

It is assumed that 60% capacity utilization will be achieved during first year of operation, 70% in second year and 80% from on wards.

S. No.	Particulars	Production Per Annum (MT)	Rate Per MT (Nu. in Lacs)	Total Amount Per Annum (Nu. in Lacs)
1	Maize Flakes	480.00	0.45	216.00
2	Bran and Broken Flakes	90.00	0.06	5.40
Total				221.40

Table G.1.11 Sales Realization

	(Nu. in Lacs)
▪ Total sales realization at 100%	221.40
▪ First year 60%	132.84
▪ Second year 70%	154.98
▪ Third year 80%	177.12

SALARY AND WAGES

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The breakdown of manpower and incidence of salaries & wages has been detailed in table G.1.12. Salary & wages will be increased @5% every year.

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
A	Administrative				
1	General Manger	1	18,000	0.18	2.16
2	Purchase Officer	1	8,000	0.08	0.96
3	Sales Officer	1	8,000	0.08	0.96
4	Accountant	1	6,500	0.07	0.78
5	Office Assistant	1	5,000	0.05	0.60
B	Production				
1	Production Manager	1	10,000	0.10	1.20
2	Supervisors	1	7,500	0.08	0.90
3	Skilled Workers	8	6,000	0.48	5.76
4	Semi Skilled Worker	6	4,500	0.27	3.24
Total					16.56

Table G.1.12 Salary and Wages

- Note:
1. Fringe benefits @ 15 % of the salary.
 2. Salary to increase by 5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power & water charges are increased @5% every year. The unit cost of electricity has been considered @ Nu 1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation water tariff of Nu 2.25/ m³ (base rate: Nu. 1.5/ m³ + 50% for sewage charges).

S. No.	Description	Amount per annum (Nu. in Lacs)
1	Power Consumption	3.00
2	Water Consumption	0.25
	Total	3.25

Table G.1.13 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Building & Civil Construction	40%	20.00	8.00	12.00
2	Plant & Machinery	25%	31.96	7.99	23.97
3	Misc. Fixed Assets	25%	16.17	4.04	12.12
4	Preliminary Expenses	100%	1.00	1.00	0.00
5	Pre-operative Expenses	100%	9.49	9.49	0.00
6	Margin Money for Working Capital	100%	7.89	7.89	0.00
7	Contingencies	100%	6.81	6.81	0.00
	Total		93.32	45.22	48.09

Table G.1.14 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

Working capital requirements have been worked out in the following table:

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Material	15 days	25%	3.75	0.94	2.81
2	Receivable	30 days	25%	11.07	2.77	8.30
3	Cash for Expenses	30 days	100%	4.19	4.19	0.00
	Total			19.01	7.89	11.12

Table G.1.15 Working Capital Requirement

ESTIMATED COST OF PRODUCTION AND PROFITABILITY

The profitability projections has been worked out for 10 years, taking 60% capacity utilization during first year of operation, 70% second year and 80% from third year onwards and following assumptions as relevant and applicable have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @13% p.a. on term loan & working capital loan, based on the prevailing bank rates in Bhutan at the time of preparing this profile.
- Insurance charges @0.25% on all assets in first year, then @5% decrease every year.
- Power & water charges are increased @5% every year.
- Administrative expenses have been increased @5% every year.

- Margin money on bank loan has been considered @40% on building, @25% on plant & machinery and @ 25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one year moratorium.
- Preliminary exp. will be written off @10% every year in next 10 years.
- Pre operative exp. will be written off from II year @10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent & interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Installed Capacity (Nu. in Lacs) 100%	221.40	221.40	221.40	221.40	221.40	221.40	221.40	221.40	221.40	221.40
2	Capacity Utilization	60%	70%	80%	80%	80%	80%	80%	80%	80%	80%
3	Actual Sales (Nu. in Lacs)	132.84	154.98	177.12	177.12	177.12	177.12	177.12	177.12	177.12	177.12
4	COST OF PRODUCTION										
4.1	Raw Material Consumed	54.00	63.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00
4.2	Consumables @ 5%	2.70	3.15	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
4.3	Power, Fuel & Water	3.25	3.41	3.58	3.76	3.95	4.15	4.36	4.57	4.80	5.04
4.4	Salary & Wages	16.56	17.39	18.26	19.17	20.13	21.14	22.19	23.30	24.47	25.69
4.5	Fringe Benefits @ 15%	2.48	2.61	2.74	2.88	3.02	3.17	3.33	3.50	3.67	3.85
4.6	Insurance	0.17	0.15	0.14	0.12	0.11	0.10	0.09	0.08	0.07	0.07
4.7	Repair & Maintenance @ 4%	1.93	2.02	2.12	2.23	2.34	2.46	2.58	2.71	2.84	2.99
4.8	Land Lease Rent	0.21	0.21	0.21	0.32	0.33	0.34	0.35	0.36	0.37	0.38
4.9	Other Admn. Exp.	3.00	3.15	3.31	3.47	3.65	3.83	4.02	4.22	4.43	4.65
	Total	84.30	95.10	105.96	107.55	109.13	110.78	112.52	114.34	116.26	118.28
5	Selling & Distribution Expenses @15% on Sales	19.93	23.25	26.57	26.57	26.57	26.57	26.57	26.57	26.57	26.57
6	COST OF SALES	104.23	118.34	132.53	134.12	135.69	137.35	139.09	140.91	142.83	144.84
7	SALES	132.84	154.98	177.12	177.12	177.12	177.12	177.12	177.12	177.12	177.12
8	PROFIT BEFORE INTT. & DEP.	28.61	36.64	44.59	43.00	41.43	39.77	38.03	36.21	34.29	32.28
9	Interest on Term Loan @ 13%	6.25	5.86	5.08	4.30	3.52	2.74	1.96	1.18	0.40	0.00
10	On Working Capital @ 13 %	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
11	Total Interest	7.70	7.31	6.53	5.75	4.97	4.19	3.41	2.63	1.85	1.44
12	Profit Before Depreciation.	20.91	29.33	38.06	37.25	36.46	35.58	34.63	33.58	32.45	30.83
13	DEPRECIATION	7.82	7.82	7.82	7.82	7.82	7.82	5.41	0.60	0.60	0.60
14	Profit After Depreciation	13.10	21.51	30.25	29.43	28.64	27.77	29.21	32.98	31.85	30.23
15	Pre Operative exp. write off	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
16	Preliminary exp. write off	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
17	PROFIT BEFORE TAXATION	13.00	20.46	29.20	28.38	27.59	26.72	28.17	31.93	30.80	29.18
18	Taxation @ 30% of Net Profit	3.90	6.14	8.76	8.52	8.28	8.01	8.45	9.58	9.24	8.75
19	Profit After Taxation	9.10	14.32	20.44	19.87	19.31	18.70	19.72	22.35	21.56	20.43

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
20	Accumulated Profit	9.10	23.42	43.86	63.73	83.04	101.74	121.46	143.81	165.37	185.79
21	PROFIT AFTER TAXATION	9.10	14.32	20.44	19.87	19.31	18.70	19.72	22.35	21.56	20.43
22	Add: Depreciation	7.82	7.82	7.82	7.82	7.82	7.82	5.41	0.60	0.60	0.60
23	Add: Interest on Term Loan	6.25	5.86	5.08	4.30	3.52	2.74	1.96	1.18	0.40	0.00
Total (A)		23.17	28.00	33.34	31.99	30.65	29.26	27.09	24.13	22.56	21.03
24	Interest on Term Loan	6.25	5.86	5.08	4.30	3.52	2.74	1.96	1.18	0.40	0.00
25	Repayment on Term Loan	0	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.09	0.00
Total (B)		6.25	11.86	11.08	10.30	9.52	8.74	7.96	7.18	6.50	0.00
SURPLUS (A) - (B)		16.92	16.14	22.26	21.69	21.13	20.52	19.13	16.95	16.06	21.03
DSCR (A/B)		3.71	2.36	3.01	3.11	3.22	3.35	3.40	3.36	3.47	N.A.
AVERAGE DSCR		3.22									

Table G.1.16 Estimated Cost of Production and Profitability

CALCULATION OF INTEREST ON TERM LOAN (Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	48.09	0	48.09	6.25	6.25
B	2nd year					
	I Qtr	48.09	1.50	46.59	1.54	
	II Qtr	46.59	1.50	45.09	1.49	
	III Qtr	45.09	1.50	43.59	1.44	
	IV Qtr	43.59	1.50	42.09	1.39	5.86
C	3rd year					
	I Qtr	42.09	1.50	40.59	1.34	
	II Qtr	40.59	1.50	39.09	1.29	
	III Qtr	39.09	1.50	37.59	1.25	
	IV Qtr	37.59	1.50	36.09	1.20	5.08
D	4th year					
	I Qtr	36.09	1.50	34.59	1.15	
	II Qtr	34.59	1.50	33.09	1.10	
	III Qtr	33.09	1.50	31.59	1.05	
	IV Qtr	31.59	1.50	30.09	1.00	4.30
E	5th year					
	I Qtr	30.09	1.50	28.59	0.95	
	II Qtr	28.59	1.50	27.09	0.90	
	III Qtr	27.09	1.50	25.59	0.86	
	IV Qtr	25.59	1.50	24.09	0.81	3.52
F	6th year					
	I Qtr	24.09	1.50	22.59	0.76	

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
	II Qtr	22.59	1.50	21.09	0.71	
	III Qtr	21.09	1.50	19.59	0.66	
	IV Qtr	19.59	1.50	18.09	0.61	2.74
G	7th year					
	I Qtr	18.09	1.50	16.59	0.56	
	II Qtr	16.59	1.50	15.09	0.51	
	III Qtr	15.09	1.50	13.59	0.47	
	IV Qtr	13.59	1.50	12.09	0.42	1.96
H	8th year					
	I Qtr	12.09	1.50	10.59	0.37	
	II Qtr	10.59	1.50	9.09	0.32	
	III Qtr	9.09	1.50	7.59	0.27	
	IV Qtr	7.59	1.50	6.09	0.22	1.18
I	9th year					
	I Qtr	6.09	1.50	4.59	0.17	
	II Qtr	4.59	1.50	3.09	0.12	
	III Qtr	3.09	1.50	1.59	0.08	
	IV Qtr	1.59	1.59	0.00	0.03	0.40

Table G.1.17 Calculation of Interest on Term Loan

DEPRECIATION CHART (As Per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 500 sq. meter	0.00	0	0.00	0	0	0	0
2	Building & Civil Construction	20.00	3%	0.60	3%	0.60	3%	0.60
3	Plant & Machinery	31.96	15%	4.79	10%	3.20	0%	0
4	Misc. Fixed Assets	16.17	15%	2.42	10%	1.6166	0%	0
	Total	68.13		7.82		5.41		0.60

Table G.1.18 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1 st Year	2 nd Year	3 rd Year
Variable Cost	103.85	117.98	132.18
Fixed Cost	8.08	7.67	6.88
Break Even Point (B.E.P.)	27.87%	20.74%	15.30%
Average B.E.P.	21.30%		

Table G.1.19 Break Even Point

NPR & RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	9.78%	13.20%	16.48%	16.03%	15.58%	15.08%	15.90%	18.03%	17.39%	16.48%
Return on Investment (RI)	20.12%	31.67%	45.19%	43.93%	42.70%	41.35%	43.59%	49.43%	47.67%	45.17%

Table G.1.20 NPR & RI

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	9.10	14.32	20.44	19.87	19.31	18.70	19.72	22.35	21.56	20.43
1.2	Depreciation	0	7.82	7.82	7.32	7.82	7.82	7.82	5.41	0.60	0.60	0.60
1.3	Interest on term loan & W. C.		7.70	7.31	6.53	5.75	4.97	4.19	3.41	2.63	1.85	1.44
1.4	Preliminary exp. w/off	0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
1.5	Pre operative exp. w/off	0	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
1.6	Net cash inflows	0.00	24.71	30.50	35.83	34.48	33.15	31.76	29.58	26.63	25.05	23.52
2	OUTFLOWS											
2.1	Investment in fixed assets	85.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.2	Investment in working capital	7.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	93.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	93.32	24.71	30.50	35.83	34.48	33.15	31.76	29.58	26.63	25.05	23.52

Table G.1.21 Cash Flow Statement

- Internal Rate of Return (IRR) 29.86%
- Net Present Value (NPV) Nu.61.47 Lacs
- Weighted Average Cost of Capital (WACC) 13%

Project Viability: - Internal Rate of Return of the project is 29.86%, which is much higher than the WACC of 13%. Hence the project is financially viable. The NPV of the project is positive (Nu. 61.47 lacs) at the discount factor of 13% (i.e. the WACC) during the first 10 years of operation considered. This implies that the project generates sufficient funds to cover its cost, including loan repayments and interest payments during the period. This also indicates that the project can continue making profits even after 10 years, and hence the project is financially viable.

G.1.10 Environmental Issues

This unit does not have any pollution generation in the process and the waste, which is maize bran, and broken flakes can be used for animal feed. Suitable application as per the guidelines of the National Environment Commission, Royal Government of Bhutan (NEC) has to be submitted along with detailed project report for environmental clearance before commencement of the project.

G. 1.11 Source of Technology/ Plant Machinery Supplier

The technology and manufacturing process details will be provided by the suppliers of plant machinery. Since the projects falls under small scale category, the Indian plant and machinery manufacturers have been considered as the most suitable for Bhutan. Names and address of the prominent suppliers are given as under:

1. **Flour Tech Engineers (P) Ltd.**
16/5 Mathura Road, Faridabad,
Haryana -121002, India
Phone : +91-129-4043388
Fax : +91-129-2291556
Email: flourtech@rediffmail.com
Website: www.flourtechengineers.com

2. **Duro Overseas Trading House**
343, Mettupalayam Road Coimbatore,
Tamil Nadu, India
641 043
Phone: +91-422-2444453
Fax: +91-422-6584400
E Mail : duro@eth.net

G.2 Fruits/Vegetables Cleaning, Grading and Packaging Unit

G.2.1 Introduction

Bhutan is the source of 'winter vegetables in summer' for the neighboring Indian states. Cabbage, cauliflower, radish, peas, beans, carrot, potatoes, broccoli, fresh chilies etc. are increasingly sold there, capitalizing on Bhutan's seasonal advantage in terms of vegetable production. Bhutan produces those vegetables in summer that can be grown on the Indian sub-continent only in winter.

The farmers have the option to sell produce directly to the traders or through the auction yards operated by the Food Corporation of Bhutan, a state governed trading company. In the auction yards, it is mostly the Indian buyers who purchase for onward sale and distribution to various parts of India.

Bhutanese vegetables are being increasingly demanded because of the taste and freshness, and the conditions under which they are grown. Red potatoes from Bhutan are used predominantly in the manufacture of potato snacks and other potato products.

Although vegetables find a ready market in India, there is little premium gained by the Bhutanese grower, as the products are un-sorted and un-graded. It is the Indian middleman who makes large profits due to higher marketing margins brought about by sorting, grading and packaging operations. The following tables give the summarized national level volumes of vegetables and fruits, which are grown in substantial quantities, (Other vegetables and fruits produced in smaller volumes have not been listed here).

S. No.	Vegetables	Production (MT)
1	Potato	51,452.38
2	Radish	9,462.87
3	Turnip	7,635.23
4	Cabbage	2,726.98
5	Chili	9,125.09
6	Ginger	3,110.34
7	Green leaves	1,755.24

Table G.2.1 Vegetable Production, Bhutan -2005

S. No.	Fruits	Production (MT)
1	Mandarin	42655.17
2	Apple	9662.01
3	Areca nut	2979.00
4	Banana	1514.45

Table G.2.2 Fruit Production, Bhutan -2005

G 2.1.1 Background Note on the Project

For Bhutan, the agricultural and food marketing systems can be said to consist of 4 main sub-systems, viz. production, distribution, consumption and regulatory.

The key players in the chain of activities that connect food and agriculture are the farmers, (or other 'producers' such as dairy farmers), intermediaries, the food processors and the consumers. In practice each see the agricultural food marketing system from a perspective of self-interest and these interests are sometimes in conflict. Illustrative examples of some of the conflicts, which typically arise among the key players are given in table G.2.3.

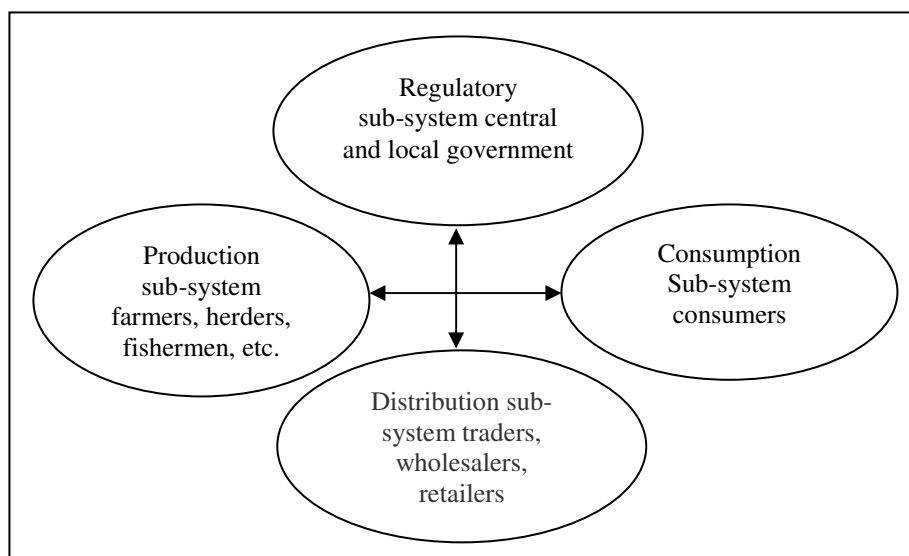


Figure G.2.1 Marketing Sub-System

Conflict of interest in agricultural/food marketing systems

The farmer's interest is focused on getting the best return from the produce which usually equates to maximum price for unlimited quantities. Manufacturers want at least cost, best quality produce from the farmer so that they can sell it at competitive, but profitable prices. Traders and retailers want high quality and reliable supplies from the manufacturers or farmers, at the most competitive prices. Consumers are interested in obtaining high quality products at low prices. Clearly, there are conflicting interests.

Key Players	Interests
Farmers	Maximum price and unlimited quantities
Manufacturers	Low purchase price and high quality
Traders and Retailers	Low purchase price and high quality
Consumers	Low purchase price and high quality

Table G.2.3 Key players and their interest

Marketing system has two distinct dimensions. One of those dimensions is the institution, organization or enterprise which participates in the market and the second is the functions that those participants perform. The functions involved in agricultural and food marketing processes can be classified as being under three sets in marketing system:

- | | |
|---------------------------|------------------------|
| A. Exchange Functions | 1. Buying |
| | 2. Selling |
| | 3. Storage |
| B. Physical Functions | 4. Transportation |
| | 5. Processing |
| C. Facilitating Functions | 6. Standardization |
| | 7. Financing |
| | 8. Risk Bearing |
| | 9. Market Intelligence |

Each of these functions gives additional value to the product and requires inputs for which costs are incurred. As long as the value added to the product is positive, most firms or entrepreneurs will find it profitable to compete to supply the service.

Physical Functions

Storage: An inherent characteristic of horticulture production is that it is seasonal while demand is generally continuous throughout the year. Hence the need for storage arises to allow a smooth, and as far as possible, uninterrupted flow of product into the market.

In agriculture and horticulture, supply often exceeds demand in the immediate post-harvest period. The glut reduces producers' prices and wastage rates can be extremely high. For much of the remainder of the period before the next harvest, the product can be in short supply, with traders and consumers having to pay premium prices to secure whatever scarce supplies are available. The storage function is one of balancing supply and demand.

Both growers and consumers gain from a marketing system that can make produce available when it is needed. A farmer, merchant, co-operative, marketing board or retailer who stores a product provides a service. That service costs money and there are risks in the form of wastage and slumps in market demand and price, so the provider of storage is entitled to a reward in the form of profit.

Transportation: The transport function is chiefly one of making the product available where it is needed, without adding unreasonably to the overall cost of the produce. Adequate performance of this function requires consideration of alternative routes and types of transportation, with a view to achieving timeliness, maintaining produce quality and minimizing transportation costs. Effective transport management is critical to efficient marketing. Whether operating a single vehicle or a fleet of vehicles, transportation has to be carefully managed, including cost monitoring.

Processing: Most horticulture produce in Bhutan is not in a form suitable for direct delivery to the consumer when it is first harvested. Rather it needs to be changed in some way before it can be used. The processing function is sometimes not included in a list of marketing functions because it is essentially a form changing activity. However, it is for this very reason that processing ought to be included as a marketing function. The form changing activity is one that adds value to the product.

Facilitating functions

The facilitating functions include product standardization, financing, risk bearing and market intelligence. Facilitating functions are those activities which enable the exchange process to take place. Marketing, in simple terms, is the act of supplying products to someone in exchange for something perceived to be of equal or greater value, (usually, but not always, a given sum of money). Facilitating functions are not a direct part of either the exchange of title or the physical movement of produce.

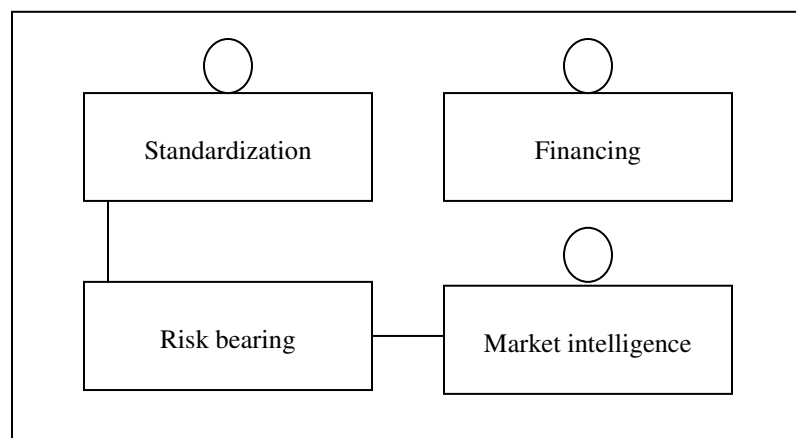


Figure G.2. 2 Facilitating Functions

Standardization: Standardization is concerned with the establishment and maintenance of uniform measurements of produce quality and/or quantity. This function simplifies buying and selling as well as reducing marketing costs by enabling buyers to specify precisely what they want and suppliers to communicate what they are able and willing to supply with respect to both quantity and quality of product. In the absence of standard weights and measures, trade either becomes more expensive to conduct or impossible altogether.

Quality differences in horticulture products arise for several reasons. Quality differences may be due to production methods and/or because of improper plucking in the farm and collecting. Technological innovation can also give rise to quality differences. In addition, a buyer's assessment of a product's quality is often an expression of personal preference. Thus, for example, in some markets a small banana is judged to be in some sense 'better' than a large banana and white maize is 'easier to digest' than yellow maize.

Financing: In this production system there are inevitable lags between investing in the necessary raw materials system (e.g. machinery, cleaning and grading, packaging, flavouring, stocks etc.) and receiving the payment for the sale of produce. During these lag periods some individual or institution must finance the investment. The question of where the funding of the investment is to come from at all points between production and consumption is one that marketing must address.

Thus, based on the national inventory of surplus fruits and vegetables, an integrated horticulture cleaning, grading, packing and marketing unit in Bhutan is proposed.

The objectives of the project is to promote, produce, purchase, process and create storage, research and development, production and marketing facilities to sell fruits and vegetables and to create employment avenues on commercial basis removing the various intermediary tiers presently handling the fruits and vegetables markets:

1. To stimulate the promotion and sale of fresh fruits, vegetables and horticulture products.
2. To improve communication between farmers/growers and consumers to improve quality, freshness and timely availability of the horticulture produce.
3. To develop better and more economical handling of fresh fruits, vegetables and horticulture produce from the farm to the table.
4. To create a logistic managed supply chain system involving storage, preservation, cleaning, grading and packaging of floriculture produce.
5. To educate farmers for improved yields, modern methods of collecting the fruit and vegetables from farm to the marketing centre with minimum loss.
6. To handle small commodities, produced by a large number of small growers, for grading & assembling into economic market lots.

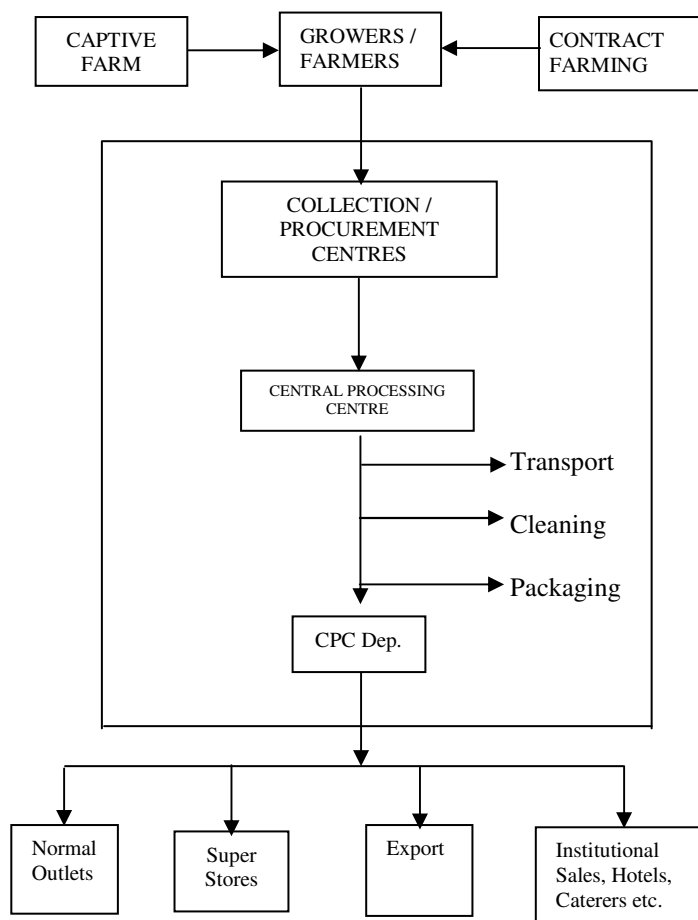


Figure G.2.3 Overview of the project

The overview of the project is shown in Figure G.2.3. It will have area wise collection / procurement centers which will be getting the supplies from farmers directly in the **Central Procurement Center**. In the CPC cleaning, grading, transportations, logistics and packaging is planned. The cleaned, graded and packed fruits and vegetables will be locally marketed through normal outlets, super stores, institutional sales like hotels, restaurants caterers or canteens and also exported to India or Bangladesh.

G.2.2 Markets and Global Competitiveness Scene

Bhutanese fruits and vegetables find ready market in India and Bangladesh, there is little premium attached as the products are unsorted and lack grading aspects. It is the middleman who makes large profits due to higher marketing margins brought about by sorting, grading and packaging.

By preparing the horticulture produce for direct sale to bulk buyers in ready-sorted graded and packaged conditions, this unit will eliminate the middle-man and offer price advantage to the buyers. The further cost savings due to reduction in wastage will be adding to the competitiveness and profitability of this unit. Large retail chains dotting the Indian landscape will prefer graded and packaged off-season produce for direct sale in their counters.

G.2.3 Proposed Business Structure

It is proposed to have this project in the co-operative sector with shareholding among farmers and present distributors, and with state intervention initially in terms of facilitation. There are two principal forms of co-operative organizations proposed for this project at National Level: primary co-operatives and secondary co-operatives.

- **Primary co-operatives**

A primary co-operative is one in which the shareholders are individuals each of whom would be having an equal share in its control. It would be based at the Dzongkhags level for collection, primary storage and supply to the secondary co-operative.

- **Secondary co-operatives**

While a primary co-operative has individual persons as members, a secondary (or national) co-operative is one in which other co-operatives are the members. Apart from this basic difference, the structure and organization of both types follow a very similar pattern. The secondary co-operative will own and operate the project.

- **The control and management of primary co-operatives**

The control structure of co-operatives is proposed to be made up of three tiers as the figure below depicts. The General Meeting of Members makes policy and through this meeting members exercise control. It will be required to hold an Annual General Meeting, thus has the specific responsibilities of receiving and deciding upon an audited statement of account, deciding how any surplus shall be used and distributed, and of electing committees.

- **The management structure of primary co-operatives**

The General Meeting of Members delegates the operational control of the co-operative to a management committee (or board of directors), which controls the works of the co-operative on behalf of the members. One member of this committee is elected chairman or president. A manager (or secretary) is appointed by the management committee as the chief administrative officer of the co-operative. He/she is responsible to the committee for the day-to-day control of the business.

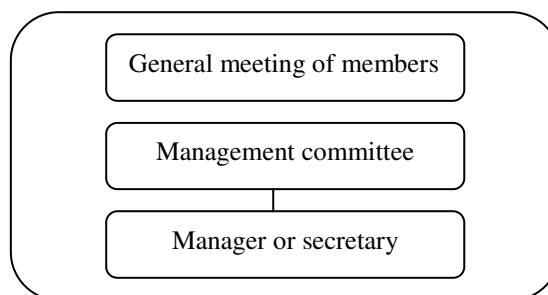


Figure G.2. 4 Structure of Primary Co-operatives

G.2.4 Project Location and Size of Project

It is proposed that Central Processing Centers having storage and processing facilities be planned at Thimphu, Phuentsholing, Gelephu, Samdrup Jongkhar and Collection centers/procurement centers in each region.

G.2.5 Infrastructure Requirements

- **Central Procurement Centre:** The CPC will have computerized logistics network, collection, storage, raw material store. Inventory at different centers will be monitored by computer operations. A detailed MIS will be planned for effective logistics management as success of the project is dependent on it.
- **Field Collection Centers:** The field collection centers will have one room of 15 x 15 sq. ft. with weighing machines and purchase and stock registers. Bin card system will be followed and the ancillary farmers will be given cards, where in the quantity purchased will be entered date wise. The payment system, starting initially on a daily basis, will be established finally on a fortnightly basis and proper records will be maintained for auditing.

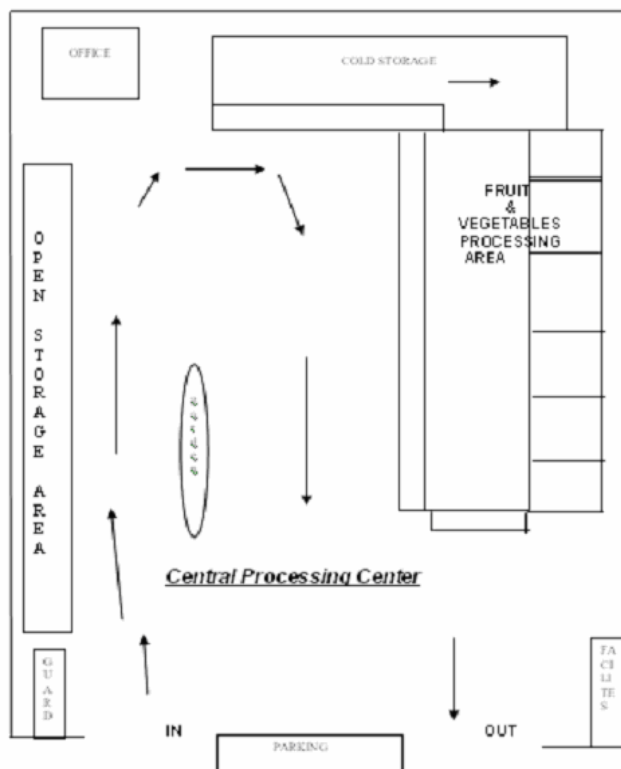


Figure G.2.5 Vegetable Cleaning & Grading Plant Lay out

The cleaning, grading, sorting and handling capacity has been planned as 50 tons per day for the CPC and accordingly the field collection centers will be feeding the CPC. At the collection centers, fresh vegetables will be procured in the previous evening and the vegetables thus, procured will be weighed and transferred to plastic crates with colored cards having information as per format of the card. These crates will then be loaded into the truck and dispatched to CPC where the computer entry will be done on arrival.

By night all the materials thus collected will come to CPC and the work will start in night shift. By morning the fresh vegetables sorted, cleaned and graded will be ready in suitable packs for dispatch to retail stores. Since all the fruits and vegetables will be procured directly from the farmers (all the growers/ farmers will have annual supply contract with the co-operative company) regular collection will not be a problem.

G.2.6 Technology/ Manufacturing Process

Each procurement centre will have one table, one chair and a manual weighing balance. At CPC, following processes will be followed:

1. Sorting
2. Cleaning and grading on machines
3. Graded and weighed vegetables transferred to crates as per grade "A", "B" and "C"
4. Exotic/ Exportable / Organic classified vegetables sorted separately.
5. Computer invoicing and dispatching to retail outlets and bulk order suppliers.

There will be a 100 ton cold storage facility to store the surplus assuming 50 tons per day output capacity for the cleaning and grading facility.

G.2.7 Product Quality Standards

Since this project, involves post harvest technology and supply chain for horticulture produce, there are no product quality standards. However, international quality management system standard ISO 9001: 2000 can be adopted.

G.2.8 Power, Water and Consumables

For this project about 225 KVA connection will be required (including cold storage)- The water requirement for cleaning and washing will be approximately 10,000 liters per day based on the processing capacity of 50 MT per day. The main consumables for this unit are packaging material, ethylene gas and potassium permanganate for which the value has been estimated as 1% of the raw material cost as reflected in table G. 2.18.

G.2.9 Project cost/ Total Investment**Summary:**

▪ Plant Capacity:	50 MT per day (16,000 MT per annum)
▪ No. of Shift:	One (8 hours per shift) per day
▪ Working Days in Year:	320
▪ D.S.C.R. :	2.35
▪ B.E.P. :	39%
▪ IRR :	21.69%
▪ NPV :	Nu. 153.52 lacs

COST OF PROJECT

The total cost of the project is estimated at Nu. 479.52 lacs as per the particulars given in the table G.2.4.

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 6,000 sq. meters (On lease)	
2	Building & Civil Construction	73.21
3	Plant & Machinery	139.43
4	Misc. Fixed Assets	101.45
5	Preliminary Expenses	1.00
6	Pre operative Expenses	34.20
7	Margin Money for Working Capital	98.83
8	Contingencies 10%	31.41
Total		479.52

Table G.2.4 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	254.94
2	Term Loan from FI's	224.58
Total		479.52

Table G.2.5 Means of Finance

The term loan has been arrived based on the break up of individual investment item and bank's financing pattern as given in table G.2.16

BUILDING AND CIVIL WORK

About 6000 sq. meter of land will be required for this project and built up area required will be 1,013 sq. meter consisting of production hall, washing, packing and storage etc.

(Nu. in Lacs)

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total
A	Production Area					
1	Cold Storage Room	70	25	1750	800.00	14.00
2	Main Storage Shed	25	100	2500	550.00	13.75
3	Grading & Packing Section	20	20	400	500.00	2.00

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total
4	Ripening Chamber	14	28	392	650.00	2.55
5	Waxing Chamber	15	15	225	650.00	1.46
6	Curing Chamber	15	15	225	650.00	1.46
7	Washing & Cleaning Room	20	20	400	550.00	2.20
8	Pantry	21	25	525	550.00	2.89
9	Rest Room	20	20	400	550.00	2.20
10	Loading & Unloading Platform	100	10	1000	200.00	2.00
11	Office Block	15	20	300	600.00	1.80
12	Staff Room	39	10	390	550.00	2.15
13	Guard Room	7.7	7.4	55.56	550.00	0.31
14	Facilities	19	5	95	550.00	0.52
15	Show Room, Drive -in- Counter	90	25	2250	550.00	12.38
16	Drive Way and Internal Roads					2.50
17	Boundary wall (lump sum)					5.00
B	Field Collection Centers At 6 different locations (15'*10' each)	15	10	150	450	4.05
Total						73.21

Table G.2.6 Building and Civil Work

PLANT AND MACHINERY

The cost of plant & machinery is estimated at Nu.139.43 lacs including installation and commissioning. The installed production capacity is 50 MT per day. The cost estimates for plant & machinery have been worked out based on the cost figures available from budgetary offers and/or orders placed for similar items in the recent past, duly updated to cover the price escalation in the intervening period. The detailed itemized estimates are given in table G.2.7.

Freight and insurance have been considered on the assumption that all goods are transported by road.

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Chain Pulley Block 1 ton	1	0.20	0.20
2	Motorized Conveyor for bulk Material handling	1	4.50	4.50
3	Hydraulic Pallet Truck 3 ton	2	2.00	4.00
4	Battery operated fork lift 2MT	2	1.00	2.00
5	Box Strapping Machine	2	0.05	0.10
6	Gantry Crane	1	0.50	0.50
7	Traveling Trolley	10	0.04	0.40
8	Electronic Weighing machines (150kKg.)	4	0.42	1.68
9	20 Ton Cold Storage unit for main storage with Insulation and air curtain	1	32.50	32.50
10	Shrink Wrapping Machine	4	0.55	2.20
11	Grading & Sorting table	50	0.04	2.00
12	Inspection tables	5	0.05	0.23
13	Platform type scales (30kg)	4	0.25	1.00

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
14	Platform type scales with printer (15 kg)	40	0.30	12.00
15	Platform type scales (120 kg)	1	0.35	0.35
16	UPS for above Machines	40	0.06	2.40
17	Tray hand wrapping machine	1	0.25	0.25
18	Dryer	1	0.75	0.75
19	Waxing Unit	1	1.80	1.80
20	Washing machine	1	2.50	2.50
21	Packaging machine, Pouch sealing machine	5	0.60	3.00
22	Pre Cooling unit of 50 MT capacity in a batch of 6 hours (one static chamber and two units in conveyors)	1	10.00	10.00
23	Automatic fruit grading and sorting lines (One Ton per Hour)	1	15.00	15.00
24	Vegetable trimming and packaging with shrink wrapping unit	1	15.00	15.00
25	Ethylene Generator 3 nos. (Sure Ripe) Ethy-gen II Concentrate 45 cases	1	5.50	5.50
26	Gastech. Air Sampling Kit Unit 1 no.	1	0.40	0.40
27	Ethylene monitoring tube - 2 box	1	0.32	0.32
28	Carbon di-oxide monitoring unit 2 box	1	0.35	0.35
29	Dryer 1MT per day	3	3.50	10.50
30	Installation, Erection and Commissioning	1	8.00	8.00
Total				139.43

Table G.2.7 Plant and Machinery

MISC. FIXED ASSETS

Nu. 101.45 lacs has been estimated under the heading of MFA. The details of electrical installations for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery & equipment, equipment for water supply, laboratory, workshop, fire fighting equipment, etc have been provided on a lump sum basis as per information available with the consultants for similar assets. The details of miscellaneous fixed assets and their associated costs are been shown in table below:

S. No.	Particulars	Qty. (Nos.)	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Office Equipment	1	3.00	3.00
2	Furniture & Fixture	1	7.50	7.50
3	Miscellaneous Accessories	1	5.00	5.00
4	Vegetable Display Crate	3,000	0.003	9.00
5	Electronic Weigh Bridge	1	3.00	3.00
6	Display Board	20	0.010	0.20
7	Fire Fighting	15	0.05	0.75
8	Computer with Accessories	5	0.50	2.50
9	ERP Software	1	6.00	6.00
10	Water Treatment Plant- 5000 per hours	1	2.50	2.50

S. No.	Particulars	Qty. (Nos.)	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
11	Car	1	8.00	8.00
12	Loading Tempo	6	1.50	9.00
13	Pick-up Van	3	5.50	16.50
14	Truck	3	5.50	16.50
15	Electrical Installation	1	12.00	12.00
Total				101.45

Table G.2.8 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal & Liaisoning	1.00	1.00
Total			1.00

Table G.2.9 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Expenses incurred prior to commencement of commercial production are covered under this head that total Nu. 34.20 lacs.

Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest during construction insurance during construction and other miscellaneous expenses. Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing of in the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required.

Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements, interest during construction has been computed. Other expenses, under this head have been estimated on a block basis, based on information available for similar projects.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	7.82
2	Insurance during Construction Period	0.25% of factory assets	0.78
3	Electricity Charges during Construction Period		1.75
4	Marketing Launch Expenses		4.00
5	Technology Know-how and Consultancy Fees		7.85
6	Training Expenses		5.00
7	Traveling Expenses		7.00
Total			34.20

Table G.2.10 Pre-operative Expenses

COST OF RAW MATERIAL

Based on the processing capacity of 50 MT per day considering 320 days in a year the annual raw material consumption of the project will be 16,000 MT and the cost of the same will be Nu.3,100 lacs, based on the average arrival price of these produce in the selling yards .

S. No.	Particulars	Qty. (MT)	Rate Per Kg (Nu.)	Total Value (Nu. in Lacs)
A	Vegetables			
1	Potato	10,000	12.00	1,200.00
2	Chili Fresh	1,000	40.00	400.00
3	Ginger	1,000	20.00	200.00
4	Others like Radish, Cabbage, turnip etc.	2,000	15.00	300.00
B	Fruits	2,000	50.00	1,000.00
Total				3,100.00

Table G.2.11 Cost of Raw Material

LAND LEASE CHARGES

Required land is 6,000 sq. meter (64,585 sq. ft.), which has been considered on lease @ Nu.4.00 per sq. ft. per annum for first three years and @ Nu 6.00 per sq feet for the fourth year and subsequently @ 3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	2.58
2	2 nd Year	4.00	2.58
3	3 rd Year	4.00	2.58
4	4 th Year	6.00	3.88
5	5 th Year	6.20	4.00
6	6 th Year	6.40	4.13
7	7 th Year	6.60	4.26
8	8 th Year	6.80	4.39
9	9 th Year	7.00	4.52
10	10 th Year	7.20	4.65

Table G.2.12 Land Lease Charges

SALES REALISATION

It is assumed that 60% capacity utilization will be achieved during first year of operation, 70% in the second year and 80% from the third year onwards. The selling price is considered on the basis of the retail prices of these produce in the similar period.

S. No.	Particulars	Production Per Annum (MT)	Rate Per Kg	Total Amount Per Annum (Nu. in Lacs)
A	Vegetables			
1	Potato	9,600	16.00	1,536.00
2	Chili Dry	475	100.00	475.00
3	Ginger	1,000	30.00	300.00
4	Others like Reddish, Cabbage etc.	1,900	24.00	456.00
B	Fruits	1,900	70.00	1,330.00
Total				4,097.00

Table G.2.13 Sales Realization

	(Nu. in Lacs)
▪ Total sales realization at 100%	4,097.00
▪ First year 60%	2,458.20
▪ Second year 70%	2,867.90
▪ Third year 80%	3,277.60

SALARY AND WAGES

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The break down of manpower and incidence of salaries & wages are detailed in the table G 2.14. Salary & wages are increased @ 5% every year.

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
A	Administrative				
1	General Manager	1	25,000	0.25	3.00
2	Manager (Pur. & Marketing)	1	14,000	0.14	1.68
3	Manager (MIS, Logistics)	1	14,000	0.14	1.68
4	Manager (Agri Extension)	1	14,000	0.14	1.68
5	Accountant	1	7,500	0.08	0.90
6	Purchase Executives	1	7,000	0.07	0.84
7	Sales & Export Executives	5	7,000	0.35	4.20
8	Drivers	15	5,000	0.75	9.00
9	Helper	6	3,500	0.21	2.52
10	Security Guards	2	3,500	0.07	0.84
11	Front Line Executives	24	5,000	1.20	14.40
				Sub Total	40.74
B	Production				
1	Production Manager	1	10,000	0.10	1.20
2	Supervisors	5	7,500	0.38	4.50
3	Skilled Workers	15	6,000	0.90	10.80
4	Semi Skilled Worker	30	4,500	1.35	16.20
				Sub Total	32.70
				Grand Total	73.44

Table G.2.14 Salary and Wages

Note: 1. Fringe benefits @ 15 % of the salary.
2. Salary to increase by 5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power & water charges are increased @ 5% every year. The unit cost of electricity has been considered @ Nu.1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation water tariff of Nu.2.25/ m³ (base rate: Nu.1.5/ m³ + 50% for sewage charges).

S. No.	Description	Amount Per Annum (Nu. in Lacs)
1	Power Consumption	3.50
2	Water Consumption	0.50
Total		4.00

Table G.2.15 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Land 6000 sq meters	0%	0.00	0.00	0.00
2	Building & Civil Construction	40%	73.21	29.28	43.93
3	Plant & Machinery	25%	139.43	34.86	104.57
4	Other Misc. & Fixed assets	25%	101.45	25.36	76.09
5	Preliminary Expenses	100%	1.00	1.00	0.00
6	Pre-operative Expenses	100%	34.20	34.20	0.00
7	Margin Money for Working Capital	100%	98.83	98.83	0.00
8	Contingencies	100%	31.41	31.41	0.00
Total			479.52	254.94	224.58

Table G.2.16 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

Working capital requirements have been worked out in the following table:

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Material	15 days	25%	129.17	32.29	96.88
2	Receivable	15 days	25%	102.43	25.61	76.82
3	Cash For Expenses	30 days	100%	40.93	40.93	0.00
Total				272.52	98.83	173.69

Table G.2.17 Working Capital Requirement

ESTIMATED COST OF PRODUCTION & PROFITABILITY

The profitability projections have been worked out for 10 years; at 60% capacity utilization during first year of operation, 70% in second year and 80% from third year onwards and following assumptions and basis as relevant and applicable to Bhutan have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @13% p.a. on term loan & working capital loan.
- Insurance charges @0.25% on all assets in first year, then @5% decrease every year.
- Power & water charges are increased @5% every year.
- Administrative expenses have been increased @5% every year.
- Margin money on bank loan has been considered @40% on building, @25% on plant & machinery and @ 25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one year moratorium
- Preliminary exp. will be written off @10% every year in next 10 years.
- Pre operative exp. will be written off from II year @10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent & interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Installed Capacity 100%	4097.00	4097.00	4097.00	4097.00	4097.00	4097.00	4097.00	4097.00	4097.00	4097.00
2	Capacity Utilization	60%	70%	80%	80%	80%	80%	80%	80%	80%	80%
3	Actual Sales in lacs Nu.	2458.20	2867.90	3277.60	3277.60	3277.60	3277.60	3277.60	3277.60	3277.60	3277.60
4	COST OF PRODUCTION										
4.1	Raw Material Consumed	1860.00	2170.00	2480.00	2480.00	2480.00	2480.00	2480.00	2480.00	2480.00	2480.00
4.2	Consumables @1%	18.60	21.70	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80
4.3	Power, Fuel & Water	4.00	4.20	4.41	4.63	4.86	5.11	5.36	5.63	5.91	6.21
4.4	Salary & Wages	73.44	77.11	80.97	85.02	89.27	93.73	98.42	103.34	108.50	113.93
4.5	Fringe Benefits @15%	11.02	11.57	12.15	12.75	13.39	14.06	14.76	15.50	16.28	17.09
4.6	Insurance	0.78	0.70	0.63	0.57	0.51	0.46	0.41	0.37	0.34	0.30
4.7	Repair & Maintenance @4%	9.64	10.12	10.62	11.15	11.71	12.30	12.91	13.56	14.24	14.95
4.8	Land Lease Rent	2.58	2.58	2.58	3.88	4.00	4.13	4.26	4.39	4.52	4.65
4.9	Other Admn. Exp.	2.40	2.52	2.65	2.78	2.92	3.06	3.22	3.38	3.55	3.72
	Total	1982.45	2300.50	2618.81	2625.57	2631.46	2637.65	2644.14	2650.97	2658.13	2665.65
5	Selling & Distribution Expenses @15% on Sales	368.73	430.19	491.64	491.64	491.64	491.64	491.64	491.64	491.64	491.64
6	COST OF SALES	2351.18	2730.69	3110.45	3117.21	3123.10	3129.29	3135.78	3142.61	3149.77	3157.29
7	SALES	2458.20	2867.90	3277.60	3277.60	3277.60	3277.60	3277.60	3277.60	3277.60	3277.60
8	PROFIT BEFORE INT. & DEP.	107.02	137.21	167.15	160.39	154.50	148.31	141.82	134.99	127.83	120.31
9	Interest on Term Loan @13%	29.20	27.37	23.72	20.07	16.42	12.77	9.12	5.47	1.82	0.00
10	On Working Capital @13 %	22.58	22.58	22.58	22.58	22.58	22.58	22.58	22.58	22.58	22.58
11	Total Interest	51.78	49.95	46.30	42.65	39.00	35.35	31.70	28.05	24.40	22.58
12	Profit Before Depreciation.	55.24	87.26	120.85	117.74	115.50	112.96	110.12	106.95	103.43	97.73
13	DEPRECIATION	38.33	38.33	38.33	38.33	38.33	38.33	26.28	2.20	2.20	2.20
14	Profit After Depreciation	16.91	48.94	82.53	79.41	77.17	74.63	83.83	104.75	101.24	95.54
15	Pre Operative Exp. write off	0.00	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42
16	Preliminary Exp. write off	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
17	PROFIT BEFORE TAXATION	16.81	45.42	79.01	75.89	73.65	71.11	80.31	101.23	97.72	92.02
18	Taxation @30% of Net Profit	5.04	13.62	23.70	22.77	22.09	21.33	24.09	30.37	29.32	27.60
19	Profit After Taxation	11.77	31.79	55.30	53.12	51.55	49.78	56.22	70.86	68.40	64.41
20	Accumulated Profit	11.77	43.56	98.86	151.99	203.54	253.32	309.54	380.40	448.80	513.21
21	PROFIT AFTER TAXATION	11.77	31.79	55.30	53.12	51.55	49.78	56.22	70.86	68.40	64.41
22	Add: Depreciation	38.33	38.33	38.33	38.33	38.33	38.33	26.28	2.20	2.20	2.20
23	Add: Interest on Term Loan	29.20	27.37	23.72	20.07	16.42	12.77	9.12	5.47	1.82	0.00
	Total (A)	79.29	97.49	117.35	111.52	106.30	100.88	91.62	78.52	72.42	66.61
24	Interest on Term Loan	29.20	27.37	23.72	20.07	16.42	12.77	9.12	5.47	1.82	0.00

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
25	Repayment on Term Loan	0	28.08	28.08	28.08	28.08	28.08	28.08	28.08	28.02	0.00
	Total (B)	29.20	55.45	51.80	48.15	44.50	40.85	37.20	33.55	29.84	0.00
	SURPLUS (A) - (B)	50.10	42.04	65.55	63.37	61.80	60.03	54.42	44.98	42.58	66.61
	DSCR (A/B)	2.72	1.76	2.27	2.32	2.39	2.47	2.46	2.34	2.43	N.A.
	AVERAGE DSCR	2.35									

Table G.2.18 Estimated Cost of Production & Profitability

CALCULATION OF INTEREST ON TERM LOAN (Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	224.58	0	224.58	29.20	29.20
B	2nd year					
	I Qtr	224.58	7.02	217.56	7.18	
	II Qtr	217.56	7.02	210.54	6.96	
	III Qtr	210.54	7.02	203.52	6.73	
	IV Qtr	203.52	7.02	196.50	6.50	27.37
C	3rd year					
	I Qtr	196.50	7.02	189.48	6.27	
	II Qtr	189.48	7.02	182.46	6.04	
	III Qtr	182.46	7.02	175.44	5.82	
	IV Qtr	175.44	7.02	168.42	5.59	23.72
D	4th year					
	I Qtr	168.42	7.02	161.40	5.36	
	II Qtr	161.40	7.02	154.38	5.13	
	III Qtr	154.38	7.02	147.36	4.90	
	IV Qtr	147.36	7.02	140.34	4.68	20.07
E	5th year					
	I Qtr	140.34	7.02	133.32	4.45	
	II Qtr	133.32	7.02	126.30	4.22	
	III Qtr	126.30	7.02	119.28	3.99	
	IV Qtr	119.28	7.02	112.26	3.76	16.42
F	6th year					
	I Qtr	112.26	7.02	105.24	3.53	
	II Qtr	105.24	7.02	98.22	3.31	
	III Qtr	98.22	7.02	91.20	3.08	
	IV Qtr	91.20	7.02	84.18	2.85	12.77
G	7th year					
	I Qtr	84.18	7.02	77.16	2.62	
	II Qtr	77.16	7.02	70.14	2.39	
	III Qtr	70.14	7.02	63.12	2.17	
	IV Qtr	63.12	7.02	56.10	1.94	9.12
H	8th year					
	I Qtr	56.10	7.02	49.08	1.71	

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
	II Qtr	49.08	7.02	42.06	1.48	
	III Qtr	42.06	7.02	35.04	1.25	
	IV Qtr	35.04	7.02	28.02	1.02	5.47
I	9th year					
	I Qtr	28.02	7.02	21.00	0.80	
	II Qtr	21.00	7.02	13.98	0.57	
	III Qtr	13.98	7.02	6.96	0.34	
	IV Qtr	6.96	6.96	0.00	0.11	1.82

Table G.2.19 Calculation of Interest on Term Loan

DEPRECIATION CHART (As Per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 6,000 sq. meter	0.00	0	0.00	0	0	0	0
2	Building & Civil Construction	73.21	3%	2.20	3%	2.20	3%	2.20
3	Plant & Machinery	139.43	15%	20.91	10%	13.94	0%	0
4	Misc. Fixed Assets	101.45	15%	15.22	10%	10.145	0%	0
	Total	314.08		38.33		26.28		2.20

Table G.2.20 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1 st Year	2 nd Year	3 rd Year
Variable Cost	2347.82	2727.40	3107.23
Fixed Cost	55.14	53.24	49.52
Break Even Point (B.E.P.)	49.95%	37.89%	29.06%
Average B.E.P.	38.97%		

Table G.2.21 Break Even Point

NPR AND RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	0.68%	1.58%	2.41%	2.32%	2.25%	2.17%	2.45%	3.09%	2.98%	2.81%
Return on Investment (RI)	4.62	12.47	21.69	20.84	20.22	19.53	22.05	27.79	26.83	25.27

Table G.2.22 NPR and RI

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	11.77	31.79	55.30	53.12	51.55	49.77	56.22	70.86	68.40	64.41
1.2	Depreciation	0	38.33	38.33	38.33	38.33	38.33	38.33	26.28	2.20	2.20	2.20
1.3	Interest on term loan & W.C.	0	51.78	49.95	46.30	42.65	39.00	35.35	31.70	28.05	24.40	22.58

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1.4	Preliminary exp. write off	0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
1.5	Pre operative exp. write off	0	0.00	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42
1.6	Net cash inflows	0.00	101.97	123.59	143.45	137.62	132.40	126.98	117.72	104.63	98.52	92.71
2	OUTFLOWS											
2.1	Investment in fixed assets	380.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.2	Investment in working capital	98.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	479.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	- 479.52	101.97	123.59	143.45	137.62	132.40	126.98	117.72	104.63	98.52	92.71

Table G.2.23 Cash Flow Statement

- Internal Rate of Return (IRR) 21.52%
- Net Present Value (NPV) Nu.151.30 Lacs
- Weighted Average Cost of Capital (WACC) 13%

Project Viability: - Internal Rate of Return of the project is 21.52%, which is much higher than the WACC of 13%. Hence the project is financially viable. The NPV of the project is positive (Nu. 151.30 lacs) at the discount factor of 13% (i.e. the WACC) during the first 10 years of operation considered. This implies that the project generates sufficient funds to cover all its cost, including loan repayments and interest payments during the period. This also indicates that the project can continue making profits even after 10 years and hence the project is financially viable.

G.2.10 Environmental Issues (if any)

This project does not use any plant and machinery which generates harmful waste and effluents and thus, does not require any large-scale effluent treatment. The process is semi-automatic and will help in improving environment and hygienic conditions for public in large that use fruits and vegetables in their daily food. The only effluent from the process would be the waste- water which after removal of foreign materials of the fruits and vegetables and cleaning, will be recycled and used again.

Suitable application as per the guidelines of the National Environment Commission of the Royal Government (NEC) has to be submitted along with detailed project report for environmental clearance before commencement of the project.

G. 2.11 Source of Technology/Plant Machinery Supplier

The technology and plant machinery supplier for this project are based in India:

1. **Sifter International**
Industrial Plot No. 83, Sector-6,
Faridabad, Haryana -121006, India
Phone: +91-129-4060039, 2234540
Fax +91-129-2230039
Email : sifter@ndb.vsnl.net.in
Web site: www.sifterindia.com
2. **Osaw Agro Industries Pvt. Ltd.**
P.O. No.5, Agrosaw Complex, Jagadhri Road,
Ambala Cantt, Haryana - 133 001, India.
Phone + 91-171-2699547, 2699167, 2699354
Fax + 91-171-2699018
Email agrosaw@agrosaw.com
Web Site www.agrosaw.com

G.3 Savory Products from Potato

G.3.1 Introduction

Bhutanese potatoes are being increasingly demanded because of the taste and freshness and the conditions under which these are grown. Potatoes from Bhutan are used in the manufacture of potato snacks and other potato products.

Nutritionally potato is considered a good food and in some of the western countries, it is a staple diet. In Bhutan, it is consumed as a vegetable and a snack rather than as a source of calories in the diet. Fried potato wafers are the most established commercial products.

The project envisages manufacture of three types of products - two ready to eat and the third one ready to prepare.

Product I: Potato Chip: Line fried potato chips based on slicing of peeled, pretreated potato and frying it in refined vegetable oil.

Product II: French Fries: - Line fried potato sticks involving cutting the peeled, pretreated potato into uniform sized sticks and frying in refined vegetable oil.

Product III: Potato Flakes Line.

G.3.2 Markets and Global Competitiveness Scene

These products have a ready market today in virtually every location in India, where potato chips and sticks packets are seen in abundance at even wayside stalls. Bhutanese products will find ready markets in Bhutan (in Thimphu, Paro and other tourist locations, where food outlets can serve hot French fries made from the dehydrated potato slices) before moving into India and Bangladesh as well. The table below gives the region wise potato production in the country showing the potential of availability of the raw material:

Bhutan Potato Production

S. No.	Region /Dzongkhag	Production (MT)
A. Western Region		
1	Thimphu	1432.69
2	Paro	7582.05
3	Haa	2236.23
4	Samtse	1078.71
5	Chhukha	4996.11
6	Punakha	672.99
Sub Total		17998.78
B. Central Region		
7	Wangdue Phodrang	8406.37
8	Dagana	1207.55
9	Tsirang	870.73
10	Sarpang	471.79
11	Zhemgang	297.91
12	Trongsa	544.45
13	Bumthang	4523.59
Sub Total		16,322.39

S. No.	Region //Dzongkhag	Production (MT)
C. Eastern Region		
14	Lhuentse	1354.19
15	Mongar	2582.33
16	Pemagatshel	1722.83
17	Samdrup Jongkhar	598.57
18	Trashigang	8224.25
19	Trashi Yangtse	2649.04
Sub Total		17131.21
Grand Total		51,452.38

Table G.3.1 Bhutan Potato Production -2005

Raw material: Potato is grown as a cash crop all over the country and particularly in high altitude areas. Potato, being a seasonal crop, is available in surplus at post-harvest periods.

Currently, potato is grown in almost all the Dzongkhags and the major potato producing Dzongkhags are Trashigang, Wangdue Phodrang, Chhukha, Bumthang, Paro, Mongar, Thimphu, Haa, Punakha, Tsirang, Trongsa, Sarpang, Trashi Yangtse, Pemagatshel and Samdrup Jongkhar. In terms of production, Trashigang, Wangdue Phodrang, Chhukha, Bumthang, Paro and Mongar are more significant.

G.3.3 Proposed Business Structure

This project can be set up in small scale or cottage industry level. It does not require high investment and advance technology. The high value addition offsets the transportation cost for finished products distribution.

G.3.4 Project Location and Size of Project

The project can be located in the Jemina Industrial Estate in Thimphu, but as potato is widely available and easily procured, units can also be located at Gelephu, Samdrup Jongkhar, Trashigang, Wangdue Phodrang, Chhukha, Bumthang, Paro and Mongar.

G.3.5 Technology/ Manufacturing Process

The technology is well established and does not require costly know-how purchase. However, systematic planning of the production set up, to ensure achievement of pre-set quality norms, is essential. During operation, hygienic practices are mandatory for meeting product quality standards.

G.3.6 Infrastructure Requirements

1000 sq. meter of land is required for the project with 595 sq. meter as built up processing area. The power requirement is 30 kwh and water requirement is 4,000 liters per day for the project.

G.3.7 Project Cost/ Total Investment

Summary:

- **Plant Capacity:** MT per annum
 - 1. Potato Chips 480.00
 - 2. French Fries 240.00
 - 3. Potato Flakes 240.00
- **Raw Material Requirement:** 3,000 MT Potato
- **No. of Shift:** One (8 hours per shift) per day
- **No. of Working Days in Year:** 300 days
- **D.S.C.R. :** 2.39
- **B.E.P :** 28.96%
- **IRR :** 23.31%
- **NPV :** Nu.78.05 Lacs

COST OF PROJECT

The total cost of the project is estimated at Nu. 460.64 lacs as per the particulars given in the table G.3.2.

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 1,000 sq. meters (On lease)	
2	Building & Civil Construction	39.10
3	Plant & Machinery	270.00
4	Misc. Fixed Assets	51.75
5	Preliminary Expenses	1.00
6	Pre-operative Expenses	34.31
7	Margin Money for Working Capital	28.40
8	Contingencies 10%	36.09
Total		460.64

Table G.3.2 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	195.87
2	Term Loan from FI's	264.77
Total		460.64

Table G.3.3 Means of Finance

The term loan has been arrived based on the break up of individual investment item and bank's financing pattern as given in table G.3.14.

BUILDING AND CIVIL WORK

About 1000 sq. meter of land will be required for this project and built up area required will be 595 sq. meter consisting of production hall, washing, packing and storage etc.

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total
A	Administrative Building					
1	Office	25	25	625	600.00	3.75
2	Lab	20	15	300	600.00	1.80
3	Pantry	15	10	150	600.00	0.90
4	Facilities	15	10	150	600.00	0.90
B	Production Area					
1	Production Hall	80	50	4,000	550.00	22.00
2	Packaging & Storage	50	20	1,000	550.00	5.50
3	Guard Room	15	10	150	500.00	0.75
4	Boundary Wall					3.50
Total						39.10

Table G.3.4 Building and Civil Work

PLANT AND MACHINERY

The cost of Plant & Machinery is estimated at Nu.270.00 lacs including installation and commissioning. The cost estimates for plant & machinery have been worked out based on the figures available from budgetary offers and/or orders placed for similar items in the recent past, duly updated to cover the price escalation in the intervening period. The itemized costs of three different lines based on the estimates received from leading Indian plant and machinery manufacturer M/s Wintech Taparia is given in table G.35.

Freight and insurance have been considered on the assumption that entire plant will be transported by road.

S. No.	Description	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Automatic Potato Chips Production Line 200 per hour capacity (Complete in all respect on turnkey basis)	1	80.00	80.00
2	Automatic Potato French Fry Production Line 200 per hour capacity	1	70.00	70.00
3	Automatic Potato Flakes Production Line 200 per hour capacity	1	110.00	110.00
4	Installation and Commissioning	0	0.00	10.00
Total				270.00

Table G.3.5 Plant and Machinery

MISC. FIXED ASSETS

Nu. 51.75 lacs has been estimated under the heading of MFA. The details of electrical installations for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery & equipment, equipment for water supply, laboratory, workshop, fire fighting equipment, etc. have been provided on a lump sum basis as per information available with the consultants for similar assets.

The details of miscellaneous fixed assets and their associated costs have already been shown in table below:

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Office Equipment	1	2.50	2.50
2	Furniture & Fixture with Interior	1	2.00	2.00
3	Computers with accessories	3	0.50	1.50
4	Fire Fighting Equipment	10	0.05	0.50
5	Car	1	6.00	6.00
6	Loading Three Wheeler (Bajaj)	1	1.25	1.25
7	Truck	2	5.50	11.00
8	Electrical Installation	1	27.00	27.00
Total				51.75

Table G.3.6 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal & Liaisoning	1.00	1.00
Total			1.00

Table G.3.7 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Expenses incurred prior to commencement of commercial production are covered under this head that total Nu.34.31 lacs. Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest during construction insurance during construction and other miscellaneous expenses.

Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing in the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required.

Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements, interest during construction has been computed. Other expenses, under this head have been estimated on a block basis, based on information available for similar projects.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	17.21
2	Insurance during Construction Period	0.25% of factory assets	0.90
3	Electricity Charges during Construction Period		1.25
4	Marketing Launch Expenses		8.00
5	Technology Know-how fees		5.00
6	Training Expenses		1.00
7	Traveling Expenses		1.00
Total			34.36

Table G.3.8 Pre-operative Expenses

COST OF RAW MATERIAL

S. No.	Items	Qty. (MT)	Rate per MT (Nu in Lacs)	Total Value (Nu. in Lacs)
1	Potato (in MT)	3000.00	0.12	360.00
2	Spices, Salt and Flavors (in MT)	12.00	0.50	6.00
3	Refined Edible Oil (in MT)	105.00	0.50	52.50
4	Packaging Material			30.00
Total				448.50

Table G.3.9 Cost of Raw Material

LAND LEASE CHARGES

Required land is 1,000 sq. meter, which has been considered on lease @ Nu.4.00 per sq. ft. per annum for first three years and @Nu. 6.00 per sq feet for the fourth year and subsequently @ 3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	0.43
2	2 nd Year	4.00	0.43
3	3 rd Year	4.00	0.43
4	4 th Year	6.00	0.64
5	5 th Year	6.20	0.66
6	6 th Year	6.40	0.68
7	7 th Year	6.60	0.70
8	8 th Year	6.80	0.72
9	9 th Year	7.00	0.75
10	10 th Year	7.20	0.77

Table G.3.10 Land Lease Charges

SALES REALISATION

It is assumed that 60% capacity utilization will be achieved during first year of operation, 70% in second year and 80% from third year onwards.

S. No.	Particulars	Production Per Annum (MT)	Rate Per MT (Nu. in Lacs)	Amount Per Annum (Nu. in Lacs)
1	Potato Chips	480.00	0.80	384.00
2	French Fries	240.00	1.00	240.00
3	Potato Flakes	240.00	1.10	264.00
Total				888.00

Table G.3.11 Sales Realization

	(Nu. in Lacs)
▪ Total sales realization at 100%	888.00
▪ First year 60%	532.80
▪ Second year 70%	621.60
▪ Third year 80%	710.40

SALARY AND WAGES

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The break down of manpower and incidence of salaries & wages is detailed in table G.3.12. Salary and wages will be increased @ 5% every year.

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
A	Administrative				
1	General Manager	1	25,000	0.25	3.00
2	Production Manager	1	18,000	0.18	2.16
3	Marketing Manager	0	0	0.00	0.00
4	Purchase Officer	1	8,000	0.08	0.96
5	Sales Officer	3	8,000	0.24	2.88
6	Accountant	1	6,500	0.07	0.78
7	Office Assistant	2	5,000	0.10	1.20
B	Production				
1	Supervisors	3	7,500	0.23	2.70
2	Skilled Workers	10	6,000	0.60	7.20
3	Semi Skilled Worker	12	4,500	0.54	6.48
Total					27.36

Table G.3.12 Salary and Wages

Note: 1. Fringe benefits @ 15 % of the salary.
2. Salary to increase by 5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power and water charges are increased @ 5% every year. The unit cost of electricity has been considered @ Nu. 1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation water tariff of Nu. 2.25/ m³ (base rate: Nu.1.5/ m³ + 50% for sewage charges).

S. No.	Description	Amount Per Annum (Nu. in Lacs)
1	Power Consumption	4.50
2	Gas (Nitrogen) Consumption	4.00
3	Water Consumption	1.00
Total		9.50

Table G.3.13 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Land 1,000 sq meter	0%	0.00	0.00	0.00
2	Building & Civil Construction	40%	39.10	15.64	23.46
3	Plant & Machinery	25%	270.00	67.50	202.50
4	Other Misc. & Fixed assets	25%	51.75	12.94	38.81
5	Preliminary Expenses	100%	1.00	1.00	0.00
6	Pre-operative Expenses	100%	34.36	34.31	0.00
7	Margin Money for Working Capital	100%	28.40	28.40	0.00
8	Contingencies	100%	36.09	36.09	0.00
Total			460.79	195.92	264.77

Table G.3.14 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

Working capital requirements have been worked out in the following table:

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Material	15 days	25%	18.69	4.67	14.02
2	Receivable	30 days	25%	44.40	11.10	33.30
3	Cash for Expenses	30 days	100%	12.63	12.63	0.00
Total				75.72	28.40	47.32

Table G.3.15 Working Capital Requirement

ESTIMATED COST OF PRODUCTION AND PROFITABILITY

The profitability projection have been worked out for 10 years, at 60% capacity utilization during first year and following assumptions and basis as relevant and applicable to Bhutan, have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @13% p.a. on term loan & working capital loan.
- Insurance charges @0.25% on all assets in first year, then @5% decrease every year.
- Power & water charges are increased @5% every year.
- Administrative expenses have been increased @5% every year.
- Margin money on bank loan has been considered @40% on building, @25% on plant & machinery and @25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one-year moratorium.
- Preliminary exp. will be written off @10% every year in next 10 years.
- Pre operative exp. will be written off from II year @10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent & interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Installed Capacity (Nu. in Lacs) 100%	888.00	888.00	888.00	888.00	888.00	888.00	888.00	888.00	888.00	888.00
2	Capacity Utilization	60%	70%	80%	80%	80%	80%	80%	80%	80%	80%
3	Actual Sales Nu. in Lacs	532.80	621.60	710.40	710.40	710.40	710.40	710.40	710.40	710.40	710.40
4	COST OF PRODUCTION										
4.1	Raw Material Consumed	269.10	313.95	358.80	358.80	358.80	358.80	358.80	358.80	358.80	358.80
4.2	Consumables @5%	13.46	15.70	17.94	17.94	17.94	17.94	17.94	17.94	17.94	17.94
4.3	Power, Fuel & Water	9.50	9.98	10.47	11.00	11.55	12.12	12.73	13.37	14.04	14.74
4.4	Salary & Wages	27.36	28.73	30.16	31.67	33.26	34.92	36.67	38.50	40.42	42.44
4.5	Fringe Benefits @15%	4.10	4.31	4.52	4.75	4.99	5.24	5.50	5.77	6.06	6.37
4.6	Insurance	0.90	0.81	0.73	0.66	0.59	0.53	0.48	0.43	0.39	0.35
4.7	Repair & Maintenance @4%	12.87	13.51	14.19	14.90	15.64	16.43	17.25	18.11	19.01	19.97
4.8	Land Lease Rent	0.43	0.43	0.43	0.43	0.43	0.64	0.66	0.68	0.70	0.72
4.9	Other Admn. Exp.	3.00	3.15	3.31	3.47	3.65	3.83	4.02	4.22	4.43	4.65
	Total	340.72	390.56	440.55	443.61	446.84	450.45	454.04	457.82	461.80	465.98
5	Selling & Distribution Expenses @15% on Sales	79.92	93.24	106.56	106.56	106.56	106.56	106.56	106.56	106.56	106.56
6	COST OF SALES	420.64	483.80	547.11	550.17	553.40	557.01	560.60	564.38	568.36	572.54
7	SALES	532.80	621.60	710.40	710.40	710.40	710.40	710.40	710.40	710.40	710.40
8	PROFIT BEFORE INTT. & DEP.	112.16	137.80	163.29	160.23	157.00	153.39	149.80	146.02	142.04	137.86
9	Interest on Term Loan @13%	34.42	32.27	27.97	23.67	19.37	15.07	10.77	6.47	2.17	0.00
10	On working Capital @13 %	6.15	6.15	6.15	6.15	6.15	6.15	6.15	6.15	6.15	6.15
11	Total Interest	40.57	38.42	34.12	29.82	25.52	21.22	16.92	12.62	8.32	6.15
12	Profit Before Depreciation.	71.59	99.38	129.16	130.40	131.48	132.17	132.88	133.40	133.72	131.71
13	DEPRECIATION	49.44	49.44	49.44	49.44	49.44	49.44	33.35	1.17	1.17	1.17
14	Profit After Depreciation	22.16	49.94	79.73	80.97	82.05	82.74	99.53	132.22	132.55	130.53
15	Pre Operative Exp. write off	0.00	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44
16	Preliminary Exp. write off	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
17	PROFIT BEFORE TAXATION	22.06	46.41	76.19	77.43	78.51	79.20	95.99	128.69	129.01	127.00
18	Taxation @ 30% of Net Profit	6.62	13.92	22.86	23.23	23.55	23.76	28.80	38.61	38.70	38.10
19	Profit After Taxation	15.44	32.49	53.34	54.20	54.96	55.44	67.20	90.08	90.31	88.90
20	Accumulated Profit	15.44	47.93	101.26	155.46	210.42	265.86	333.06	423.14	513.45	602.35
21	PROFIT AFTER TAXATION	15.44	32.49	53.34	54.20	54.96	55.44	67.20	90.08	90.31	88.90
22	Add: Depreciation	49.44	49.44	49.44	49.44	49.44	49.44	33.35	1.17	1.17	1.17
23	Add: Interest on Term Loan	34.42	32.27	27.97	23.67	19.37	15.07	10.77	6.47	2.17	0.00
	Total (A)	99.30	114.19	130.74	127.31	113.76	119.95	111.31	97.72	53.65	90.07
24	Interest on Term Loan	34.42	32.27	27.97	23.67	19.37	15.07	10.77	6.47	2.17	0.00
25	Repayment on Term Loan	0	33.08	33.08	33.08	33.08	33.08	33.08	33.08	33.21	0.00
	Total (B)	34.42	65.35	61.05	56.75	52.45	48.15	43.85	39.55	35.38	0.00

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
	SURPLUS (A) - (B)	64.88	48.84	69.69	70.56	71.31	71.80	67.46	58.17	58.27	90.07
	DSCR (A/B)	2.88	1.75	2.14	2.24	2.36	2.49	2.54	2.47	2.60	N.A.
	AVERAGE DSCR	2.39									

Table G.3.16 Estimated Cost of Production & Profitability

CALCULATION OF INTEREST ON TERM LOAN (Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	264.77	0	264.77	34.42	34.42
B	2nd year					
	I Qtr	264.77	8.27	256.50	8.47	
	II Qtr	256.50	8.27	248.23	8.20	
	III Qtr	248.23	8.27	239.96	7.93	
	IV Qtr	239.96	8.27	231.69	7.66	32.27
C	3rd year					
	I Qtr	231.69	8.27	223.42	7.40	
	II Qtr	223.42	8.27	215.158	7.13	
	III Qtr	215.15	8.27	206.88	6.86	
	IV Qtr	206.88	8.27	198.61	6.59	27.97
D	4th year					
	I Qtr	188.61	8.27	90.34	6.32	
	II Qtr	190.34	8.27	182.07	6.05	
	III Qtr	182.07	8.27	173.80	5.78	
	IV Qtr	173.80	8.27	165.53	5.59	23.67
E	5th year					
	I Qtr	165.53	8.27	157.26	5.25	
	II Qtr	157.26	8.27	148.99	4.98	
	III Qtr	148.99	8.27	140.72	4.71	
	IV Qtr	140.72	8.27	132.45	4.44	19.37
F	6th year					
	I Qtr	132.45	8.27	124.18	4.17	
	II Qtr	124.18	8.27	115.91	3.90	
	III Qtr	115.91	8.27	107.64	3.63	
	IV Qtr	107.64	8.27	99.37	3.36	15.07
G	7th year					
	I Qtr	99.37	8.27	91.10	3.10	
	II Qtr	91.10	8.27	82.83	2.83	
	III Qtr	82.83	8.27	74.56	2.56	
	IV Qtr	74.56	8.27	66.29	2.29	10.77
H	8th year					
	I Qtr	66.29	8.27	48.02	2.02	
	II Qtr	58.02	8.27	39.75	1.75	
	III Qtr	49.75	8.27	41.48	1.48	
	IV Qtr	41.48	8.27	33.21	1.21	6.47
I	9th year					
	I Qtr	33.21	8.27	24.94	0.95	
	II Qtr	24.94	8.27	16.67	0.68	
	III Qtr	16.67	8.27	8.40	0.41	
	IV Qtr	8.40	8.40	0.00	0.14	2.17

Table G.3.17 Calculation of Interest on Term Loan

DEPRECIATION CHART (As per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 1000 sq. meter	0.00	0	0.00	0	0	0	0
2	Building & Civil Construction	39.10	3%	1.17	3%	1.17	3%	1.17
3	Plant & Machinery	270.00	15%	40.50	10%	27.00	0%	0
4	Misc. Fixed Assets	51.75	15%	7.76	10%	5.175	0%	0
Total		360.85		49.44		33.35		1.17

Table G.3.18 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1 st Year	2 nd Year	3 rd Year
Variable Cost	419.31	482.56	545.96
Fixed Cost	41.90	39.66	35.28
Break Even Point (B.E.P.)	36.92%	28.52%	21.45%
Average B.E.P.	28.96%		

Table G.3.19 Break Even Point

NPR & RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	4.14%	7.47%	10.73%	10.90%	11.05%	11.15%	13.51%	18.11%	18.16%	17.88%
Return on Investment (RI)	7.88	16.58	27.22	27.67	28.05	28.30	34.30	45.98	46.09	45.37

Table G.3.20 NPR & RI

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	15.44	32.49	53.34	54.20	54.96	55.44	67.20	90.08	90.31	88.90
1.2	Depreciation	0	49.44	49.44	49.44	49.44	49.44	49.44	33.35	1.17	1.17	1.17
1.3	Interest on term loan & W.C.	0	40.57	38.42	34.12	29.82	25.52	21.22	16.92	12.62	8.32	6.15
1.4	Preliminary exp. write off	0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
1.5	Pre- operative exp. write off	0	0.00	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44
1.6	Net cash inflows	0.00	105.55	123.88	140.43	137.00	133.45	129.63	121.00	107.41	103.34	99.76
2	OUTFLOWS											
2.1	Investment in fixed assets	432.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.2	Investment in working capital	28.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	460.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	- 460.69	105.55	123.88	140.43	137.00	133.45	129.63	121.00	107.41	103.34	99.76

Table G.3.21 Cash Flow Statement

▪ Internal Rate of Return (IRR)	23.13%
▪ Net Present Value (NPV)	Nu.175.89 Lacs
▪ Weighted Average Cost of Capital (WACC)	13%

Project Viability: - Internal Rate of Return of the project is 23.13%, which is much higher than the WACC of 13%. Hence the project is financially viable. The NPV shows the present value of the net cash flow, or the project's worth today. The discount rate used here is the WACC. A positive NPV indicates a profitable project (i.e. the project generates sufficient funds to cover its cost, including loan repayments and interest payments).

G.3.9 Environmental Issues

This project does not use any plant and machinery, which generate waste and thus, does not require any effluent treatment. The process of peeling of potato is semi automatic and skin waste generated can be used for animal feed. Suitable environment mitigation measures as per National Environment Commission (NEC), Royal Government of Bhutan guidelines for the construction and operation phases can be adopted.

Application as per the guidelines of NEC has to be submitted along with detailed project report for environmental clearance before commencement of the project.

G. 3.10 Source of Technology/ Plant Machinery Supplier

In India, Wintech Taparia is the leading technology and plant machinery supplier for potato lines and this project has been envisaged on the plant machinery quote obtained from them. However, other companies also manufacture similar lines and their names and address are as given below:

1. **Wintech Taparia Limited**
222, SunRise Tower, 579 M.G. Road,
Indore -452003, Madhay Pradesh, India
Phone : +91-731 – 4065690
Fax :+91-731- 4040696
E mail :sales@wintechtaparia.com
Website: www.wintechtaparia.com
2. **Alisha Machines Pvt. Ltd.**
Alisha Machines, Akraj Ind Compound,
Ghodbunder Vilege Road, Mira, Thane- 401104
Maharashtra, India,
Phone : +91-022-32957746
Fax : +91-0222-8677656
Email : milindparkar@rediffmail.com
Website: www.alishamachines.com
3. **NK Engineering Works (Regd.)**
Nr. Hanuman Mandir Paharganj
New Delhi,NCT of Delhi- 110055, India
Phone: +91-11- 23522232
Fax: +91-11- 23512178
Email: nkengineering@india.com

G.4

Manufacture of Magnesium Carbonate and Calcium Carbonate

G.4.1. Introduction

Magnesium carbonate occurs in nature as magnesite and in another form associated with calcium carbonate in dolomite. The natural product as magnesite is too impure for direct use in industry. The technical grade carbonate is prepared from magnesite or dolomite by calcining the minerals, slaking and carbonation. Pure magnesium carbonate is obtained in the process and when dolomite is used as the raw material, pure calcium carbonate is also precipitated as a byproduct.

G.4.2 Markets and Global Competitiveness Scene

Magnesium carbonate is an odorless, almost tasteless, white powder, sparingly solution in water. Its uses and applications are:

- Manufacture of magnesium salts
- Heat insulation and refractory
- Rubber reinforcing reagent
- Free running table salt
- Use in mineral water as a filtering medium
- In food as an alkali, drying agent, color retention agent, anti-caking agent and carriers

Calcium Carbonate is a white powder (in its pure form) or colorless crystals, odorless and tasteless. Its uses and applications are:

- As a filler in paper, plastics & rubber products
- Extender pigment in paints and enamels
- Manufacture of beauty products and medicines
- Sizing of ropes, textiles, turbines and fabrics

The demand for the technical grade magnesium carbonate is going to increase with the progress in magnesium salt industries, rubber, paper and pigment industries and pharmaceutical industries. The use of precipitated calcium carbonate is bound to increase due to its versatile fields of application like rubber, paper, ink, glass, ceramics and paints industries and plastics and polymer industries based on petrochemical and other process industries in the world.

G.4.3 Proposed Business Structure

This can be taken up by national investors or under FDI.

G.4.4. Project Location and Size of Project

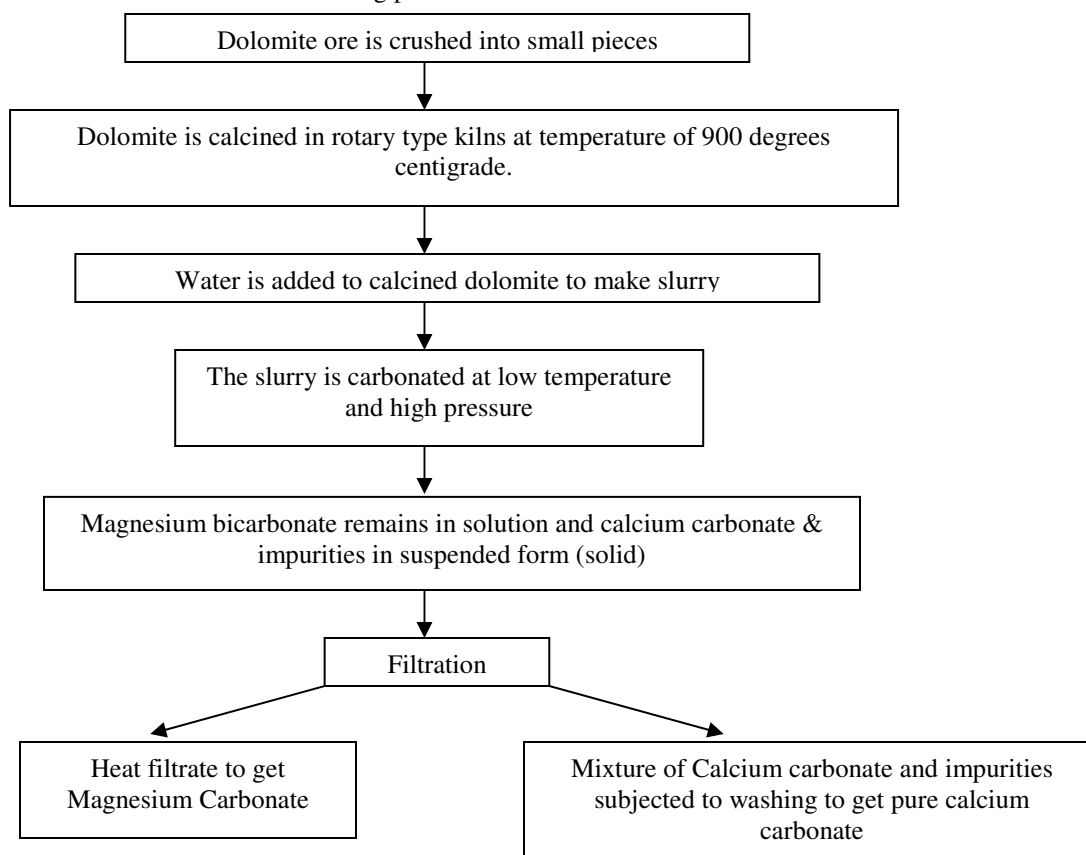
The main raw material, dolomite, is available both in Samtse and Sarpang Dzongkhags. The industrial land space is also earmarked in both the places. The proposed Jigmeling Industrial Estate on Gelephu-Sarpang highway is relatively flat and would require less developmental expenditure than the Dhamdum Industrial Estate in Samtse due to extensive river protection works required there. Thus, Gelephu-Sarpang location has been selected for this project with the expectation that the project implementation might be taken up soon.

G.4.5 Infrastructure Requirements

Land, electricity, ample water and access roads are the basic infrastructure requirements for this project, which are likely to be established by the Ministry of Economic Affairs at Jigmeling Industrial Estate over time. Immediately, rough access roads can be made from any point on the highway and water supply can be arranged by an industry from the nearby hills. BPC has plans to make power available in the industrial estate by 2008-2009.

G.4.6 Technology/Manufacturing Process

The manufacturing process is as follows:



G.4.7 Product Quality Standards

Products for sale in India would confirm to IS specifications. Similarly, for other countries, their standard specifications would be adhered to. ISO 9001:2000 for Quality Management System and ISO 14000 for Environmental Management System would be required.

G.4.8 Raw Material

Dolomite is available in abundance all along the southern foothills of Bhutan. Most of the deposits are approachable by fair weather roads from India and from the nearest road heads by foot-tracks. The largest of the deposits occur from Samtse in the west to Manas river in the east. In the Gelephu-Sarpang area, the nearest deposit would be the Kanamakra-north band, which extends from Thewargaon in the west to Kakulung river in the east (over 20 km extension) and attains a maximum thickness of 2 km in Taklai and Kakulung rivers. Although a substantial quantity out of the 2900 million tons reserve estimated falls in the Manas Game Sanctuary, there is sufficient dolomite available at the Taklai occurrence for the project, which is outside of the restricted area. The Taklai occurrence has analyzed 30.90% CaO, 20.27% MgO 20.27%, SiO₂ 1.07% and R₂O₃ 0.84%. For the manufacturing process adopted, the content of CaO and MgO in dolomite does not matter. The critical factors are the SiO₂ and R₂O₃ content which if above 0.65% and 0.75% respectively would require additional filtration apparatus for their removal.

G.4.9 Project Cost/ Total Investment

Summary:

▪ Rated Plant Capacity	1. Magnesium Carbonate 1,440 MT per annum 2. Calcium Carbonate 1,600 MT per annum
▪ Working days	300 days per annum
▪ No of shifts	One (8 hours per shift) per day
▪ D.S.C.R.	5.54
▪ B.E.P.	12.19%
▪ IRR	15.47%
▪ NPV	Nu. 30.58 Lacs

COST OF PROJECT

The total cost of the project is estimated at Nu.355.27 lacs as per the particulars given in the tables G.4.1.

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 4,000 sq. meters (On lease)	
2	Building & Civil Construction	165.39
3	Plant & Machinery	68.25
4	Misc. Fixed Assets	27.83
5	Preliminary Expenses	1.00
6	Pre-operative Expenses	48.29
7	Margin Money for Working Capital	18.37
8	Contingencies 10%	26.15
Total		355.27

Table G.4.1 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	183.98
2	Term Loan from FI's	171.29
Total		355.27

Table G.4.2 Means of Finance

The term loan has been arrived based on the break up of individual investment item and bank's financing pattern as given in table G.4.13

BUILDING AND CIVIL WORK

About 4,000 sq. meter of land on lease will be required for this project and built up area required will be 2,302 sq. meter consisting of production hall, packing and storage etc.

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total (Nu. in Lacs)
1	Administrative Block	50	65	3250	700.00	22.75
2	Production Processing Space	165	65	10725	600.00	80.44
3	Raw Material	80	65	5200	550.00	28.60
4	Finished Goods Storage	80	70	5600	600.00	33.60
Total						165.39

Table G.4.3 Building and Civil Work

PLANT AND MACHINERY

The cost of Plant & Machinery is estimated at Nu.68.25 lacs including installation and commissioning. The annual installed production capacity is 3,600 MT (6 MT per day). The cost estimates for plant and machinery have been worked out based on the cost figures available from budgetary offers and/or orders placed for similar items in the recent past, duly updated to cover the price escalation in the intervening period. The detailed itemized cost of plant machinery is given in table G.4.4.

Freight and insurance have been considered on the assumption that all goods are transported by road.

S. No.	Particulars	Capacity	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Jaw Crusher unit Cap.	1 Mt/hr.	1	3.50	3.50
2	Rotary Kiln Cap.	1 Mt/hr.	1	4.00	4.00
3	Absorption Column Cap.	1 Mt/hr.	1	2.25	2.25
4	Milk lime make up tank	1 M3	1	0.84	0.84
5	Hydrator Cap. 1	Mt/hr	1	1.80	1.80
6	Compressor for CO ₂ Cap.	50 M3/hr	1	1.50	1.50
7	Saturator Cap.	10 M3	1	1.98	1.98
8	Pressure Filter Cap.	1 Mt/hr.	1	2.50	2.50
9	Boiler Cap.	100 Kg/hr.	1	2.12	2.12
10	Vacuum Filter Cap.	1 Mt/hr.	1	3.50	3.50
11	Dryer Cap.	1 Mt/hr.	1	2.25	2.25
12	Thicker Cap.	1 Mt/hr.	1	0.64	0.64
13	Pump, Piping & Instrumentation		1	2.50	2.50
14	Labs testing Equipment		1	2.60	2.60
15	Bucket Elevator & Conveying System		1	12.50	12.50
16	Material Handling Equipment		1	6.00	6.00
17	Centrifuge Cap.	500 Kgs/hr.	1	2.25	2.25
18	Carbonation unit		1	2.87	2.87
19	Micro Pulverizer Cap.	1 Mt/hr.	1	4.50	4.50
20	Electronic Weighing Scale		1	0.15	0.15
21	Installation, Erection & Commissioning		1	8.00	8.00
Total					68.25

Table G.4.4 Plant and Machinery

MISC. FIXED ASSETS

Nu. 27.83 lacs has been estimated under the heading of MFA. The details of electrical installations for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery & equipment, equipment for water supply, laboratory, workshop, fire fighting equipment, etc. have been provided on a lump sum basis as per information available with the consultants for similar assets.

The details of miscellaneous fixed assets and their associated costs have already been shown in table below:

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Office Equipment	1	3.00	3.00
2	Furniture	1	5.00	5.00
3	Miscellaneous Accessories	1	5.00	5.00
4	Vehicle	1	8.00	8.00
5	Electrical Installation	1	6.83	6.83
Total				27.83

Table G.4.5 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particular	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal & Liaisoning	1.00	1.00
Total			1.00

Table G.4.6 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Expenses incurred prior to commencement of commercial production are covered under this head that total Nu. 47.45 lacs.

Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest during construction insurance during construction and other miscellaneous expenses. Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing of the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required. Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements, interest during construction has been computed.

The import of technical know-how is vital for the project. The technology considered is to be imported from India. Thus, a technical know-how fee of Nu.23 lacs has been considered. For technology absorption and project engineering services, the involvement of Indian consultants has been considered. The cost has been considered as Nu. 3.50 Lacs.

Other expenses, under this head have been estimated on a block basis, based on information available for similar projects.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	11.14
2	Insurance during Construction Period	0.25% of factory assets	0.65
3	Electricity Charges during Construction Period		2.00
4	Marketing Launch Expenses		3.0
5	Technology Know-how fees		23.00
6	Training Expenses		3.50
7	Traveling Expenses		5.00
Total			48.29

Table G.4.7 Pre-operative Expenses

COST OF RAW MATERIAL

The raw material consumption of dolomite is 3,600 MT and coke is 2,160 MT per annum. The cost of raw materials works out to Nu.125.88 lacs as below:

S. No.	Particulars	Qty. (MT)	Rate per MT	Total Value (Nu. in Lacs)
1	Dolomite	3,600.00	250.00	9.00
2	Coke	2,160.00	3,000.00	64.80
3	Transportation Cost	5,760.00	800.00	46.08
4	Packing Material HDPE bags			6.00
Total				125.88

Table G.4.8 Cost of Raw Material

LAND LEASE CHARGES

Required land is 4,000 sq. meter (43,057 sq. ft.), which has been considered on lease @ Nu. 4.00 per sq. ft. per annum for first three years and @ Nu. 6.00 per sq feet for the fourth year and subsequently @3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	1.72
2	2 nd Year	4.00	1.72
3	3 rd Year	4.00	1.72
4	4 th Year	6.00	2.58
5	5 th Year	6.20	2.67
6	6 th Year	6.40	2.76
7	7 th Year	6.60	2.84
8	8 th Year	6.80	2.93
9	9 th Year	7.00	3.01
10	10 th Year	7.20	3.10

Table G.4.9 Land Lease Charges

SALES REALISATION

It is assumed that 60% capacity utilization will be achieved during first year of operation, 70% in second year and 80% from third year onwards.

(Nu. in Lacs)

S. No.	Particulars	Production Per Annum(MT)	Rate Per MT	Total Amount Per Annum
1	Magnesium Carbonate	1,440	0.32	460.80
2	Calcium Carbonate	1,600	0.10	160.00
Total				620.80

Table G.4.10 Sales Realisation

(Nu. in Lacs)

- Total sales realisation at 100% 620.80
- First year 60% 372.70
- Second year 70% 434.56
- Third year 80% 496.64

SALARY AND WAGES

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The break down of manpower and incidence of salaries & wages has been detailed in following table:

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
A	Administrative				
1	Chief Executive Officer	1	40,000.00	0.40	4.80
2	Marketing Manager	1	25,000.00	0.25	3.00
3	Accountant	1	6,000.00	0.06	0.72
4	Computer Operator	1	6,000.00	0.06	0.72
5	Drivers	1	5,000.00	0.05	0.60
6	Peon	2	4,000.00	0.08	0.96
7	Security	2	4,000.00	0.08	0.96
				Sub Total	11.76
B	Production				
1	Production Manager	1	20,000.00	0.20	2.40
2	Supervisors	2	9,000.00	0.18	2.16
3	Skilled Workers	6	7,000.00	0.56	6.72
4	Semi Skilled Worker	10	5,000.00	0.60	7.20
				Sub Total	18.48
				Grand Total	30.24

Table G.4.11 Salary and Wages

- Note:
1. Fringe benefits @ 15 % of the salary.
 2. Salary to increase by 5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power and water charges are increased @ 5% every year. The unit cost of electricity has been considered @ Nu. 1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation's water tariff of Nu 2.25/ m³ (base rate: Nu.1.5/ m³ + 50% for sewage charges).

S. No.	Description	Amount per Annum (Nu. in Lacs)
1	Power Consumption	6.40
2	Water Consumption	1.50
Total		7.90

Table G.4.12 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Land 4,000 sq. meters	0%	0.00		0.00
2	Building & Civil Construction	40%	165.39	66.16	99.23
3	Plant & Machinery	25%	68.25	17.06	51.19
4	Misc. Fixed Assets	25%	27.83	6.96	20.87
5	Preliminary Expenses	100%	1.00	1.00	0.00
6	Pre-operative Expenses	100%	48.29	48.29	0.00
7	Margin Money for Working Capital	100%	18.37	18.37	0.00
8	Contingencies	100%	26.15	26.15	0.00
Total			355.28	183.99	171.29

Table G.4.13 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

Working capital requirements have been worked out in the following table:

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Materials	30 days	25%	5.25	1.31	3.93
2	Consumables @ 5% of Raw Material	30 days	25%	0.26	0.07	0.20
3	Receivable	30 days	25%	31.04	7.76	23.28
4	Cash for Exp.	30 days	100%	9.23	9.23	0.00
Total				45.78	18.37	27.41

Table G.4.14 Working Capital Requirement

ESTIMATED COST OF PRODUCTION AND PROFITABILITY

The profitability projection have been worked out for 10 years, at 60% capacity utilization during first year, 70% second year and 80% from third year onwards and following assumptions and basis as relevant and applicable to Bhutan, have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @13% p.a. on term loan & working capital loan.
- Insurance charges @0.25% on all assets in first year, then @5% decrease every year.
- Power & water charges are increased @5% every year.
- Administrative expenses have been increased @5% every year.
- Margin money on bank loan has been considered @40% on building, @25% on plant & machinery and @25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one-year moratorium.

- Preliminary exp. will be written off @10% every year in next 10 years.
- Pre operative exp. will be written off from II year @10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent & interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Installed Capacity (Nu. in Lacs) 100%	620.80	620.80	620.80	620.80	620.80	620.80	620.80	620.80	620.80	620.80
2	Capacity Utilization	60%	70%	80%	80%	80%	80%	80%	80%	80%	80%
3	Actual Sales Nu. in lacs	372.48	434.56	496.64	496.64	496.64	496.64	496.64	496.64	496.64	496.64
4	COST OF PRODUCTION										
4.1	Raw Material Consumed	75.53	88.12	100.70	100.70	100.70	100.70	100.70	100.70	100.70	100.70
4.2	Consumables @5%	3.78	4.41	5.04	100.70	100.70	100.70	100.70	100.70	100.70	100.70
4.3	Power, Fuel & Water	7.90	8.30	8.71	9.15	9.60	10.08	10.59	11.12	11.67	12.26
4.4	Salary & Wages	30.24	31.75	33.34	35.01	36.76	38.59	40.52	42.55	44.68	46.91
4.5	Fringe Benefits @15%	4.54	4.76	5.00	5.25	5.51	5.79	6.08	6.38	6.70	7.04
4.6	Insurance	0.65	0.59	0.53	0.47	0.43	0.38	0.35	0.31	0.28	0.25
4.7	Repair & Maintenance @4%	3.84	4.04	4.24	4.45	4.67	4.90	5.15	5.41	5.68	5.96
4.8	Land Lease Rent	1.72	1.72	1.72	2.58	2.67	2.76	2.84	2.93	3.01	3.10
4.9	Other Admn. Exp.	6.00	6.30	6.62	6.95	7.29	7.66	8.04	8.44	8.86	9.31
	Total	134.20	149.97	165.89	169.59	172.67	175.91	179.31	182.88	186.63	190.57
5	Selling & Distribution Expenses @15% on Sales	55.87	65.18	74.50	74.50	74.50	74.50	74.50	74.50	74.50	74.50
6	COST OF SALES	190.07	215.16	240.39	244.09	247.17	150.40	253.80	257.37	261.12	265.06
7	SALES	372.48	434.56	496.64	496.64	496.64	496.64	496.64	496.64	496.64	496.64
8	PROFIT BEFORE INTT. & DEP.	182.41	219.40	256.25	252.55	259.47	246.24	242.84	239.27	235.52	231.58
9	Interest on Term Loan @13%	22.27	20.88	18.09	15.31	12.53	9.75	6.97	4.18	1.40	0.00
10	On Working Capital @13 %	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56
11	Total Interest	25.83	24.44	21.66	18.88	16.09	13.31	10.53	7.75	4.96	3.56
12	Profit Before Depreciation.	156.58	194.96	234.60	233.67	233.38	232.92	232.31	231.52	230.55	228.02
13	DEPRECIATION	19.37	19.37	19.37	19.37	19.37	19.37	14.57	4.96	4.96	4.96
14	Profit After Depreciation	137.21	175.59	215.22	214.30	214.00	213.55	214.74	226.56	225.59	223.05
15	Pre Operative Exp. write off	0.00	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83
16	Preliminary Exp. write off	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
17	PROFIT BEFORE TAXATION	137.11	170.66	210.29	209.37	209.08	208.62	212.81	221.63	220.66	218.12
18	Taxation @30% of Net Profit	41.13	51.20	63.09	62.81	62.72	62.59	63.84	66.49	66.20	65.44
19	Profit After Taxation	95.98	119.46	147.21	146.56	146.35	146.04	148.97	155.14	154.46	152.69
20	Accumulated Profit	95.98	215.44	362.64	509.20	655.56	801.59	950.56	1105.70	1260.16	1412.85
21	PROFIT AFTER TAXATION	95.98	119.46	147.21	146.56	146.35	146.04	148.97	155.14	154.46	152.69
22	Add: Depreciation	19.37	19.37	19.37	19.37	19.37	19.37	14.57	4.96	4.96	4.96
23	Add: Interest on Term Loan	22.27	20.88	18.09	15.31	12.53	9.75	6.97	4.18	1.40	0.00
	Total (A)	137.62	159.71	184.66	181.25	188.26	175.16	170.50	164.29	160.83	157.65
24	Interest on Term Loan	22.27	20.88	18.09	15.31	12.53	9.75	6.97	4.18	1.40	0.00
25	Repayment on Term Loan	0	21.40	21.40	21.40	21.40	21.40	21.40	21.40	21.49	0.00
	Total (B)	22.27	42.28	39.49	36.71	33.93	31.15	28.37	25.58	22.89	0.00
	SURPLUS (A) - (B)	115.35	117.43	145.18	144.53	144.33	144.01	142.14	138.70	137.93	157.65
	DSCR (A/B)	6.18	3.78	4.68	4.94	5.25	5.62	6.01	6.42	7.03	N.A.
	AVERAGE DSCR	5.54									

Table G.4.15 Estimated Cost of Production and Profitability

CALCULATION OF INTEREST ON TERM LOAN

(Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	171.29	0	171.29	22.27	22.27
B	2nd year					
	I Qtr	171.29	5.35	165.94	5.48	
	II Qtr	165.94	5.35	160.59	5.31	
	III Qtr	160.59	5.35	155.24	5.13	
	IV Qtr	155.24	5.35	149.89	4.96	20.88
C	3rd year					
	I Qtr	149.89	5.35	144.54	4.78	
	II Qtr	144.54	5.35	139.19	4.61	
	III Qtr	139.19	5.35	133.84	4.44	
	IV Qtr	133.84	5.35	128.49	4.26	18.09
D	4th year					
	I Qtr	128.49	5.35	123.14	4.09	
	II Qtr	123.14	5.35	117.79	3.92	
	III Qtr	117.79	5.35	112.44	3.74	
	IV Qtr	112.44	5.35	107.09	3.57	15.31
E	5th year					
	I Qtr	107.09	5.35	101.74	3.39	
	II Qtr	101.74	5.35	96.39	3.22	
	III Qtr	96.39	5.35	91.04	3.05	
	IV Qtr	91.04	5.35	85.69	2.87	12.53
F	6th year					
	I Qtr	85.69	5.35	80.34	2.70	
	II Qtr	80.34	5.35	74.99	2.52	
	III Qtr	74.99	5.35	69.64	2.35	
	IV Qtr	69.64	5.35	64.29	2.18	9.75
G	7th year					
	I Qtr	64.29	5.35	58.94	2.00	
	II Qtr	58.94	5.35	53.59	1.83	
	III Qtr	53.59	5.35	48.24	1.65	
	IV Qtr	48.24	5.35	42.89	1.48	6.97
H	8th year					
	I Qtr	42.89	5.35	37.54	1.31	
	II Qtr	37.54	5.35	32.19	1.13	
	III Qtr	32.19	5.35	26.84	0.96	
	IV Qtr	26.84	5.35	21.49	0.79	4.18
I	9th year					
	I Qtr	21.49	5.35	16.14	0.61	
	II Qtr	16.14	5.35	10.79	0.44	
	III Qtr	10.79	5.35	5.44	0.26	
	IV Qtr	5.44	5.44	0.00	0.09	1.40

Table G.4.16 Calculation of Interest on Term Loan

DEPRECIATION CHART (As per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 5,000 sq. meter (On lease)	0.00	0	0.00	0	0	0	0
2	Building & Civil Construction	165.39	3%	4.96	3%	4.96	3%	4.96

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
3	Plant & Machinery	68.25	15%	10.24	10%	6.83	0%	0
4	Misc. & Fixed Assets	27.83	15%	4.17	10%	2.7825	0%	0
Total		261.47		19.37		14.57		4.96

Table G.4.17 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1 st Year	2 nd Year	3 rd Year
Variable Cost	187.70	212.85	238.14
Fixed Cost	28.20	26.15	23.91
Break Even Point (B.E.P.)	15.26%	12.06%	9.25%
Average B.E.P.	12.19%		

Table G.4.18 Break Even Point

NPR & RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	36.81%	39.27%	42.34%	42.16%	42.10%	42.01%	42.85%	44.63%	44.43%	43.92%
Return on Investment (RI)	52.17	64.93	80.01	79.66	79.55	79.38	80.97	84.30	83.96	82.99

Table G.4.19 NPR & RI

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	95.98	119.46	147.21	146.56	146.35	146.04	148.97	155.14	154.46	152.69
1.2	Depreciation	0	19.37	19.37	19.37	19.37	19.37	19.37	14.57	4.96	4.96	4.96
1.3	Interest on term loan & W.C.	0	25.83	24.44	21.66	18.88	16.09	13.31	10.53	7.75	4.96	3.56
1.4	Preliminary exp. write off	0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
1.5	Pre-operative exp. write off	0	0.00	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83
1.6	Net cash inflows	0.00	141.28	168.20	193.17	189.74	186.75	183.65	178.99	172.78	169.32	166.14
2	OUTFLOWS											
2.1	Investment in fixed assets	336.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.2	Investment in working capital	18.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	355.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	-355.27	141.28	168.20	193.17	189.74	186.75	183.65	178.99	172.78	169.32	166.14

Table G.4.20 Cash Flow Statement

- Internal Rate of Return (IRR) 15.47%
- Net Present Value (NPV) Nu. 30.58 Lacs
- Weighted Average Cost of Capital (WACC) 13%

Project Viability: - Internal Rate of Return of the project is 15.47%, which is higher than the WACC of 13%. Hence the project is indicated to be financially viable. The NPV shows the present value of the net cash flow, or the project's worth today. The discount rate used here is the WACC. A positive NPV indicates a profitable project (i.e. the project generates sufficient funds to cover its cost, including loan repayments and interest payments).

G.4.11 Environmental Issues

As per the regulations of the National Environment Commission (NEC), Royal Government of Bhutan, this project falls in the list of activities requiring environmental clearance.

The proposed industrial land is relatively flat and used as agricultural land presently. The ecology will not be disturbed by the project as the same level of plantation and vegetation will be maintained by commencing new plantation and green belt development by the project. Mining areas would be located in isolated areas far away from settlements, but plantation in and around the mining area shall be done. The only emission would be smoke from the chimney stack on account of use of coal/coke as fuel and dust from crushers, material handling and transfer points. Adequate stack heights for dispersion of gases and suitable bag filters for dust control will be provided. Sewage treatment plant will be installed and settling ponds provided for any waste water from the plant for the fines/solids to settle and the water to be reused.

G. 4.12 Source of Technology/Plant Machinery Supplier

1. **Beekay Engineering Corporation**
45/47 Industrial Estate, Bhilai, Chhattisgarh –490026, India
Phone: +91-788 - 2282571
Fax: +91-788 2282578
E Mail: bkbhilai@beekaycorp.com
Website: www.beekaycorp.com
2. **Bevcon Wayors Pvt. Ltd.**
Ground Flr., Kavya Apts.
Madhuranagar
Hyderabad, Andhra Pradesh –500038, India
Phone :+91- 40 -23732628
Fax: +91- 40 -23750435
E Mail : info@bevconwayors.com
Website: www.bevconwayors.com
3. **Hi-Tech Enterprises**
J-3/191, 2nd Flr. Rajouri Garden
New Delhi, NCT of Delhi-110027, India
Phone :+91-11- 25432334
Fax :+91-11- 51446805
E Mail :hitech_enterprises@yahoo.com
4. **Surja Engineering Industries**
Howrah Amta Rd. Balitkuri, Kalitala
Howrah, West Bengal- 711113, India
Phone : +91-33- 26531750
Fax: +91-33- 2653175
E Mail :goutam@surjaeng.com
5. **Zemag India Pvt. Ltd.**
AD 49, Sect. 1, Salt Lake
Kolkata, West Bengal- 700064, India
Phone: +91–33- 23598700
Fax : +91 –33- 23598686
Email : jds@cal.vsnl.net.in

G.5

Spice Oleo Resins (Chili, Ginger & Cardamom)

G.5.1 Introduction

Spice oleoresins are the concentrated liquid from the spices that reproduce the character of the respective spice fully. Spice oils are the oils distilled from the spices at the initial stage before they are subjected to solvent extraction. Spice oleoresins are largely used for flavoring of food particularly by large scale food processing and flavoring industries like meat canning, sauces, soft drinks, pharmaceutical preparations, perfumery and soap, tobacco, confectionery and bakery.

Spice oleoresins are also used in fast foods. With increasing fast food outlets in India and other neighboring countries, spice oleoresins will be in great demand, as more and more spicy snacks are being introduced by fast food chains with standardized tastes. Spice oils and oleoresins are especially suited for the manufacturing process of such snacks as these can be conveniently added to the process directly and the standardized taste maintained. Addition of the raw spice itself (ginger, chili, onion etc.) in the processing involves much greater handling and lack of assurance of a standardized taste.

The production of good quality and surplus raw material viz. Chili (9,125 MT), Ginger (3110 MT) and Cardamom (1,163 MT) in the 2005 favours setting up of a project for oleoresins as an attractive investment option.

Cardamom is the third most expensive spice after saffron and vanilla. It is traded internationally in the form of whole fruits and to a lesser extent as seeds. Cardamom oleoresin is used mainly as an alternative to the spice for flavoring a wide range of processed and frozen foods, condiments, gelatins and beverages.

G.5.2 Markets and Global Competitiveness Scene

The processed food and fast food industry is increasing by leaps and bounds, and the global requirement of oleoresin is increasing. There are around 25 plants presently in India exporting their products to Western countries. The demand is increasing and more and more plants are being commissioned for 100% export. The margins are high as the finished product (spice oil) prices ranging between US \$ 18 to \$180 per Kg from equivalent raw material components costing between US \$ 1 to \$15. The principal markets continue to be the USA and Europe where spice imports account for 66% and 60% respectively.

The total export of oleoresins has been growing in the last five years. The largest players in the world market are Brazil (17 % share), India (17%) and the USA (14%). Brazil and India have increased their export whereas the share of the USA is declining.

G.5.3 Proposed Business Structure

This can be taken up by national investors or under FDI with some leading Indian existing manufacturer.

G.5.4 Project Location and Size of Project

Samdrup Jongkhar and Samtse Dzongkhags are proposed on account of the abundant quantities of the raw materials grown in these Dzongkhags.

G.5.5 Infrastructure Requirements

1,200 sq. meter land is needed for the project with 6,400 sq. feet of built up processing area.

G.5.6 Technology/ Manufacturing Process

The technology considered is based on the assumption that all spices and herbs have essential oils and oleoresins, which are intact at lower temperature only. Volatile substances evaporate when ground at higher temperatures. These volatile substances start evaporating at a temperature more than 30 degree centigrade. In Bhutan, temperature remains below this threshold during most of the time of the year and additional environment cooling for the pulverizing process is not required.

Supercritical Fluid Extraction (SCFE) Technology

The process involves cleaning and grinding of spices to desired size and feeding to an extraction chamber in which supercritical CO₂ is then filled. The extraction of spices and herbs takes place at separators in three stages. The plant can handle all types of spices and herbs, thereby making it a multi-purpose unit. The food related applications include aroma recovery of spices, oleoresins, decaffeination, oil recovery etc.

The technology used results in 100 % pure extraction, free of any extraneous chemicals. Separation of oils/oleoresins takes place simultaneously. The extraction takes place at low pressure and temperature to maintain the qualities of the sensitive natural raw materials. The volatile oil is distilled out of the ground spices. The remaining wet powdered spice, now free of volatile components, is dried and subjected to solvent extraction processes to remove the fixed oil and resinous materials. The solvent is later removed from the mass and dried. The extract is mixed with dry spice oil in the required proportion and the product is ready for packing and sale.

It is necessary to prepare the raw material for production of the oleoresin by proper curing, drying and cleaning in sifting machines to remove extraneous matter. The process produces oleoresins of international standards (solvent residues in oleoresins should not be more than 30 PPM.). The process is ideally suitable for small-scale operation. Spice oils are distilled out before subjecting to extraction so that final product can be standardized easily. The spent meal obtained after removal of volatile and fixed oil can be dried and used in animal feed formulation.

G.5.7 Product Quality Standards

Products for export to US markets must conform to FDA standards.

G.5.8 Consumption of Raw Materials, Power and Water

▪ Power	85KW
▪ Water	10 Kl/day
▪ Fuel oil (LDO)	60 L/day

Raw Material	Annual Requirement (MT)
▪ Cardamom	200
▪ Chili:	600
▪ Ginger:	1200

Finished products	Annual Production Capacity (MT)
▪ Cardamom oil	20.00
▪ Chili oil	45.00
▪ Ginger oil	90.00
▪ Manure	750.00

Conversion ratio
(raw material to finish product) :

- Cardamom 10:1
- Chilli 13:1
- Ginger 13:1

G.5.9 Project Cost/ Total Investment

Summary:

▪ No. of Shift	One (8 hours per shift) per day
▪ Working Days in Year	300
▪ D.S.C.R.	3.18
▪ B.E.P.	39.23%
▪ IRR	26.83%
▪ NPV	Nu.168.53 Lac

COST OF PROJECT

The total cost of the project is estimated at Nu. 309.49 lacs as per the particulars given in the table G.5.1

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 1,200 sq. meters (On lease)	
2	Building and Civil Construction	45.90
3	Plant & Machinery	88.25
4	Misc. Fixed Assets	26.10
5	Preliminary Expenses	2.00
6	Pre- operative Expenses	32.77
7	Margin Money for Working Capital	98.45
8	Contingencies 10%	16.02
Total		309.49

Table G.5.1 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	196.19
2	Term Loan from FI's	113.30
Total		309.49

Table G.5.2 Means of Finance

The term loan has been arrived based on the break up of individual investment item and bank's financing pattern as given in table G.5.13.

BUILDING AND CIVIL WORK

About 1,200 sq. meter of land will be required for this project and built up area required will be 6,400 sq. feet consisting of production hall, packing and storage etc.

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total (Nu. in Lacs)
A	Administrative Building Area					
1	Office	20	15	300	600.00	1.80
2	Lab	20	15	300	600.00	1.80
3	Pantry	12	10	120	600.00	0.72
4	Facilities	15	12	180	600.00	1.08
B	Production Area					
1	Production Hall	70	60	4200	700.00	29.40
2	Packaging & Storage	40	30	1200	550.00	6.60
3	Guard Room	10	10	100	500.00	0.50
4	Boundary Wall					4.00
Total						45.90

Table G.5.3 Building and Civil Work

PLANT AND MACHINERY

The cost of Plant & Machinery is estimated at Nu.88.25 lacs including installation and commissioning. The annual installed production capacity is 600 MT (2 MT per day). The cost estimates for plant & machinery have been worked out based on the cost figures available from budgetary offers from the Indian plant machinery suppliers. The itemized list is given in table G.5.4.

Freight and insurance have been considered on the assumption that all goods are transported by road. Freight and insurance have been considered with the assumption that all goods are transported by road.

Goods of imported origin would be handled at the Kolkata port.

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Destoner	1	3.50	3.50
2	Micro Pulverizer	1	9.00	9.00
3	Huller	1	1.25	1.25
4	Steam Distillation Unit	1	4.25	4.25
5	CO ₂ Extractor	1	3.75	3.75
6	Storage Tank	3	1.50	4.50
7	Collection Condensers	3	2.50	7.50
8	Chiller	3	4.50	13.50
9	Siever and Lab Equipment	1	8.00	8.00
10	Air Classier	1	4.00	4.00
11	Hammer Mill	1	9.00	9.00
12	Plate Mill & Oil Water Separator	1	12.00	12.00
13	Material Handling Equipment	1	4.50	4.50
14	Installation and Commissioning	1	3.50	3.50
Total				88.25

Table G.5.4 Plant and Machinery

MISC. FIXED ASSETS

Nu. 26.10 lacs has been estimated under the heading of MFA. The details of electrical installations for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery and equipment, equipment for water supply, laboratory, workshop, fire fighting equipment, etc. have been provided on a lump sum basis as per information available with the consultants for similar assets. The details of miscellaneous fixed assets and their associated costs have already been shown in table below:

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Office Equipment	1	2.50	2.50
2	Furniture & Fixture with interior	1	2.40	2.40
3	Computers with accessories	4	0.42	1.68
4	Laptop	1	0.55	0.55
5	Fire Fighting Equipments	8	0.08	0.64
6	Car	1	6.00	6.00
7	Loading Three Wheeler (Bajaj)	2	1.75	3.50
8	Electrical Installation	1	8.83	8.83
Total				26.10

Table G.5.5 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal & Liaisoning	2.00	2.00
Total			2.00

Table G.5.6 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Expenses incurred prior to commencement of commercial production are covered under this head that total Nu. 32.77 lacs. Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest during construction insurance during construction and other miscellaneous expenses.

Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing in the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required. Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements, interest during construction has been computed.

Other expenses, under this head have been estimated on a block basis, based on information available for similar projects.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	3.87
2	Insurance during Construction Period	0.25% of factory assets	0.40
3	Electricity Charges during Construction Period		1.50
4	Marketing Launch Expenses		10.00
5	Technology Know-how fees		10.00
6	Training Expenses		5.00
7	Traveling Expenses		2.00
Total			32.77

Table G.5.7 Pre-operative Expenses

COST OF RAW MATERIAL

The annual raw material requirement and cost based on the average market price in Bhutan is given in table G.5.8

S. No.	Particulars	Qty. (MT)	Rate per MT (Nu in Lacs)	Total Value (Nu. in Lacs)
1	Cardamom	200	6.00	1,200.00
2	Chilly	600	0.40	240.00
3	Ginger	1,200	0.80	960.00
4	Packaging Material			25.00
Total				2,425.00

Table G.5.8 Cost of Raw Material

LAND LEASE CHARGES

Required land is 1,200 sq. meter (12,917 sq. ft.), which has been considered on lease @ Nu. 4.00 per sq. ft. per annum for first three years and @Nu. 6.00 per sq feet for the fourth year and subsequently @ 3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	0.52
2	2 nd Year	4.00	0.52
3	3 rd Year	4.00	0.52
4	4 th Year	6.00	0.78
5	5 th Year	6.20	0.80
6	6 th Year	6.40	0.83
7	7 th Year	6.60	0.85
8	8 th Year	6.80	0.88
9	9 th Year	7.00	0.90
10	10 th Year	7.20	0.93

Table G.5.9 Land Lease Charges

SALES REALISATION

It is assumed that 60% capacity utilization will be achieved during first year of operation, 70% in second year and 80% from third year onwards. The sales realization based on the 100% plant capacity is given below in table G.5.10. The sales prices considered are based on lowest international prices during the year 2006.

S. No.	Particulars	Production Per Annum (MT)	Rate (\$ US per Kg.)	Rate Per MT (Nu. in Lacs)	Total Amount Per Annum (Nu. in Lacs)
1	Cardamom oil	20.00	177.00	70.80	1416.00
2	Chili oil	45.00	18.00	7.20	324.00
3	Ginger oil	90.00	41.17	16.46	1482.00
4	Manure	750.00		0.004	3.00
Total					3,225.00

Table G.5.10 Sales Realization

	(Nu. in Lacs)
▪ Total sales realization at 100%	3,225.00
▪ First year 60%	1,935.00
▪ Second year 70%	2,257.50
▪ Third year 80%	2,580.00

SALARY AND WAGES

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The break down of manpower and incidence of salaries & wages has been detailed in following table:

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
A	Administrative				
1	General Manger	1	18,000	0.18	2.16
2	Purchase Officer	1	8,000	0.08	0.96
3	Sales Officer	1	8,000	0.08	0.96

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
4	Accountant	1	6,500	0.07	0.78
5	Office Assistant	1	5,000	0.05	0.60
B	Production				
1	Production Manager	1	10,000	0.10	1.20
2	Supervisors	1	7,500	0.08	0.90
3	Skilled Workers	8	6,000	0.48	5.76
4	Semi Skilled Worker	6	4,500	0.27	3.24
Total					16.56

Table G.5.11 Salary and Wages

Note: 1. Fringe benefits @ 15 % of the salary.
2. Salary to be increased by 5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power & water charges are increased @ 5% every year. The unit cost of electricity has been considered @ Nu 1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation water tariff of Nu. 2.25/ m³ (base rate: Nu.1.5/ m³ + 50% for sewage charges).

S No.	Description	Amount Per Annum (Nu. in Lacs)
1	Power Consumption	3.00
2	Water Consumption	1.00
Total		4.00

Table G.5.12 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

Term loan requirement has been arrived based on the normal funding pattern against each cost head of the project as followed by banks.

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Land 1,200 Sq meters	0%	0.00	0.00	0.00
2	Building and Civil Construction	40%	45.90	18.36	27.54
3	Plant & Machinery	25%	88.25	22.06	66.19
4	Misc. & Fixed assets	25%	26.10	6.52	19.57
5	Preliminary Expanses	100%	2.00	2.00	0.00
6	Pre-operative Expanses	100%	32.77	32.77	0.00
78	Margin Money for Working Capital	100%	98.45	98.45	0.00
8	Contingencies	100%	16.02	16.02	0.00
Total			309.49	196.19	113.30

Table G.5.13 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

Working capital requirements have been worked out in the following table:

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Material	15 days	25%	101.04	25.26	75.78
2	Receivable	30 days	25%	161.25	40.31	120.94
3	Cash for Expenses	30 days	100%	32.88	32.88	0.00
Total				295.17	98.45	196.72

Table G.5.14 Working Capital Requirement

ESTIMATED COST OF PRODUCTION AND PROFITABILITY

The profitability projection have been worked out for 10 years, at 60% capacity utilization during first year, 70% second year and 80% from third year onwards and following assumptions and basis as relevant and applicable to Bhutan, have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @13% p.a. on term loan & working capital loan.
- Insurance charges @0.25% on all assets in first year, then @5% decrease every year.
- Power & water charges are increased @5% every year.
- Administrative expenses have been increased @5% every year.
- Margin money on bank loan has been considered @40% on building, @25% on plant & machinery and @ 25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one-year moratorium.
- Preliminary exp. will be written off @10% every year in next 10 years.
- Pre operative exp. will be written off from II year @10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent & interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Installed Capacity (Nu. in Lacs) 100%	3225.00	3225.00	3225.00	3225.00	3225.00	3225.00	3225.00	3225.00	3225.00	3225.00
2	Capacity Utilization	60%	70%	80%	80%	80%	80%	80%	80%	80%	80%
3	Actual Sales Nu. in Lacs	1935.00	2257.50	2580.00	2580.00	2580.00	2580.00	2580.00	2580.00	2580.00	2580.00
4	COST OF PRODUCTION										
4.1	Raw Material Consumed	1455.00	1697.50	1940.00	1940.00	1940.00	1940.00	1940.00	1940.00	1940.00	1940.00
4.2	Consumables @5%	72.75	84.88	97.00	97.00	97.00	97.00	97.00	97.00	97.00	97.00
4.3	Power, Fuel & Water	4.00	4.20	4.41	4.63	4.86	5.11	5.36	5.63	5.91	6.21
4.4	Salary & Wages	16.56	17.39	18.26	19.17	20.13	21.14	22.19	23.30	24.47	25.69
4.5	Fringe Benefits @15%	2.48	2.61	2.74	2.88	3.02	3.17	3.33	3.50	3.67	3.85
4.6	Insurance	0.40	0.36	0.32	0.29	0.26	0.24	0.21	0.19	0.17	0.15
4.7	Repair & Maintenance @4%	4.57	4.80	5.04	5.29	5.56	5.84	6.13	6.44	6.76	7.10
4.8	Land Lease Rent	0.52	0.52	0.52	0.78	0.80	0.83	0.85	0.88	0.90	0.93
4.9	Other Admn. Exp.	3.00	3.15	3.31	3.47	3.65	3.83	4.02	4.22	4.43	4.65
	Total	1559.28	1815.40	2071.60	2073.51	2075.28	2077.14	2079.10	2081.15	2083.31	2085.58
5	Selling & Distribution Expenses @ 15% on Sales	290.25	338.63	387.00	387.00	387.00	387.00	387.00	387.00	387.00	387.00

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
6	COST OF SALES	1849.53	2154.03	2458.60	2460.51	2462.28	2464.14	2466.10	2468.15	2470.31	2472.58
7	SALES	1935.00	2257.50	2580.00	2580.00	2580.00	2580.00	2580.00	2580.00	2580.00	2580.00
8	PROFIT BEFORE INT. & DEP.	85.47	103.47	121.40	119.49	117.72	115.86	113.90	111.85	109.69	107.42
9	Interest on Term Loan @13%	14.73	13.81	11.98	10.14	8.30	6.47	4.63	2.80	0.96	0.00
10	On Working Capital @13 %	25.57	25.57	25.57	25.57	25.57	25.57	25.57	25.57	25.57	25.57
11	Total Interest	40.30	39.38	37.55	35.71	33.88	32.04	30.21	28.37	26.53	25.57
12	Profit Before Dep.	45.16	64.09	83.85	83.78	83.84	83.82	83.70	83.48	83.16	81.84
13	DEPRECIATION	18.53	18.53	18.53	18.53	18.53	18.53	12.81	1.38	1.38	1.38
14	Profit After Depreciation	26.63	45.56	65.33	65.25	65.31	65.29	70.89	82.10	81.78	80.47
15	Pre-Operative exp. write off	0.00	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28
16	Preliminary exp. write off	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
17	PROFIT BEFORE TAXATION	26.43	42.08	61.85	61.77	61.84	61.81	67.41	78.62	78.30	76.99
18	Taxation @ 30% of Net Profit	7.93	12.63	18.55	18.53	18.55	18.54	20.22	23.59	23.49	23.10
19	Profit After Taxation	18.50	29.46	43.29	43.24	43.29	43.27	47.19	55.04	54.81	53.89
20	Accumulated Profit	18.50	47.96	91.26	134.50	177.78	221.05	268.24	323.27	378.09	431.98
21	PROFIT AFTER TAXATION	18.50	29.46	43.29	43.24	43.29	43.27	47.19	55.04	54.81	53.89
22	Add: Depreciation	18.53	18.53	18.53	18.53	18.53	18.53	12.81	1.38	1.38	1.38
23	Add: Interest on Term Loan	14.73	13.81	11.98	10.14	8.30	6.47	4.63	2.80	0.96	0.00
Total (A)		51.76	61.80	73.80	71.91	70.12	68.27	64.63	59.21	57.15	55.27
24	Interest on Term Loan	14.73	13.81	11.98	10.14	8.30	6.47	4.63	2.80	0.96	0.00
25	Repayment on Term Loan	0	14.12	14.12	14.12	14.12	14.12	14.12	14.12	14.46	0.00
Total (B)		14.73	27.93	26.10	24.26	22.42	20.59	18.75	16.92	15.42	0.00
SURPLUS (A) - (B)		37.03	33.87	47.70	47.65	47.69	47.68	45.88	42.29	41.73	55.27
DSCR (A/B)		3.51	2.21	2.83	2.96	3.13	3.32	3.45	3.50	3.71	N.A.
AVERAGE DSCR		3.18									

Table G.5.15 Estimated Cost of Production & Profitability

CALCULATION OF INTEREST ON TERM LOAN

(Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	113.30	0	113.30	14.73	14.73
B	2nd year					
	I Qtr	113.30	3.53	109.77	3.62	
	II Qtr	109.77	3.53	106.24	3.51	
	III Qtr	106.24	3.53	102.71	3.40	
	IV Qtr	102.71	3.53	99.18	3.28	13.81
C	3rd year					
	I Qtr	99.18	3.53	95.65	3.17	
	II Qtr	95.65	3.53	92.12	3.05	

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
	III Qtr	92.12	3.53	88.59	2.94	
	IV Qtr	88.59	3.53	85.06	2.82	11.98
D	4th year					
	I Qtr	85.06	3.53	81.53	2.71	
	II Qtr	81.53	3.53	78.00	2.59	
	III Qtr	78.00	3.53	74.47	2.48	
	IV Qtr	74.47	3.53	70.94	2.36	10.14
E	5th year					
	I Qtr	70.94	3.53	67.41	2.25	
	II Qtr	67.41	3.53	63.88	2.13	
	III Qtr	63.88	3.53	60.35	2.02	
	IV Qtr	60.35	3.53	56.82	1.90	8.30
F	6th year					
	I Qtr	56.82	3.53	53.29	1.79	
	II Qtr	53.29	3.53	49.76	1.67	
	III Qtr	49.76	3.53	46.23	1.56	
	IV Qtr	46.23	3.53	42.70	1.45	6.47
G	7th year					
	I Qtr	42.70	3.53	39.17	1.33	
	II Qtr	39.17	3.53	35.64	1.22	
	III Qtr	35.64	3.53	32.11	1.10	
	IV Qtr	32.11	3.53	28.58	0.99	4.63
H	8th year					
	I Qtr	28.58	3.53	25.05	0.87	
	II Qtr	25.05	3.53	21.52	0.76	
	III Qtr	21.52	3.53	17.99	0.64	
	IV Qtr	17.99	3.53	14.46	0.53	2.80
I	9th year					
	I Qtr	14.46	3.53	10.93	0.41	
	II Qtr	10.93	3.53	7.40	0.30	
	III Qtr	7.40	3.53	3.87	0.18	
	IV Qtr	3.87	3.87	0.00	0.06	0.96

Table G.5.16 Calculation of Interest on Term Loan

DEPRECIATION CHART (As per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 1,200 sq. meter	0.00	0	0.00	0	0	0	0
2	Building & Civil Construction	45.90	3%	1.38	3%	1.38	3%	1.38
3	Plant & Machinery	88.25	15%	13.24	10%	8.83	0%	0
4	Misc. Fixed Assets	26.10	15%	3.91	10%	2.6095	0%	0
Total		160.25		18.53		12.81		1.38

Table G.5.17 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1 st Year	2 nd Year	3 rd Year
Variable Cost	1,848.62	2,153.15	2,457.76
Fixed Cost	41.22	40.26	38.39
Break Even Point (B.E.P.)	47.72%	38.58%	31.40%
Average B.E.P.	39.23%		

Table G.5.18 Break Even Point

NPR & RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	1.37%	1.86%	2.40%	2.39%	2.40%	2.40%	2.61%	3.05%	3.04%	2.98%
Return on Investment (RI)	9.43	15.02	22.07	22.04	22.06	22.05	24.05	28.05	27.94	27.47

Table G.5.19 NPR & RI

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	18.50	29.46	43.29	43.24	43.29	43.27	47.19	55.04	54.81	53.89
1.2	Depreciation	0	18.53	18.53	18.53	18.53	18.53	18.53	12.81	1.38	1.38	1.38
1.3	Interest on term loan & W.C.	0	40.30	39.38	37.55	35.71	33.88	32.04	30.21	28.37	26.53	25.57
1.4	Preliminary exp. write off	0	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1.5	Pre-operative exp. write off	0	0.00	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28
1.6	Net cash inflows	0.00	77.54	90.83	102.85	100.96	99.17	97.32	93.68	88.26	86.20	84.32
2	OUTFLOWS											
2.1	Investment in fixed assets	211.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.2	Investment in working capital	98.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	309.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	- 309.49	77.54	90.85	102.85	100.96	99.17	97.32	93.68	88.26	86.20	84.32

Table G.5.20 Cash Flow Statement

▪ Internal Rate of Return (IRR)	26.83%
▪ Net Present Value (NPV)	Nu. 168.53 lacs
▪ Weighted Average Cost of Capital (WACC)	13%

Project Viability: - Internal Rate of Return of the project is 26.83%, which is much higher than the WACC of 13%. Hence the project is financially viable. The NPV shows the present value of the net cash flow, or the project's worth today. The discount rate used here is the WACC. A positive NPV indicates a profitable project (i.e. the project generates sufficient funds to cover its cost, including loan repayments and interest payments).

G.5.11 Environmental Issues

Enough care to avoid wastage at every point of the process will not only save the cost of product but avoid unnecessary quality deterioration. Environmentally sound technology has been proposed as no chemical is used. The plant is 100% environment-friendly. Suitable environment mitigation measures as per National Environment Commission, RGoB guidelines during the construction and operation phases can be adopted.

Application as per the guidelines of NEC has to be submitted along with detailed project report for environmental clearance before commencement of the project.

G. 5.12 Source of Technology/ Plant Machinery Supplier

For technology, plant & machinery Sifter International in India can be contacted. It designs plant on turnkey basis and has supplied to most of the Indian manufacturers of spice oleoresins besides exporting these plants. The technology can also be sourced from Central Food Research Institute, Mysore (a Government of India food research laboratory).

1. Sifter International

Industrial Plot No. 83, Sector-6, Faridabad
Haryana - 121006, India
Phone: +91-129-4060039, 2234540
Fax : +91-129-2230039
Email : sifter@ndb.vsnl.net.in
Website: www.sifterindia.com

2. Head

Plantation Products, Spices and Flavour Technology,
Central Food Technological Research Institute,
Mysore - 570 013, India
Phone: + 91 - 821 - 2512352
Fax: + 91 - 821 - 2517233
Email : ppsft@cftri.res.in

G.6 Digital Animation Studio

G.6.1 Introduction

The creative arts and music are increasingly becoming a part of the life of Bhutanese youth and the proposed project “Digital Animation Studio” has been suggested keeping these natural inclinations, needs and skills sets of young Bhutanese in mind.

There is good demand for animation in marketing, public messaging and the field has immense potential for Bhutan as outsourcing hub for animation films, documentaries, advertising and feature films.

As humans, we respond to animation. Cells in the brain activate when presented with animated images and respond directly to facial orientation and pose. Understanding human response to faces has been the subject of much investigation by the scientific community over many years.



Figure G.6.1 Face animation being carried out on computer

Tapping into human responses to animation promises to re-shape the human computer experience. For instance, the ability to present talking faces provides a unique opportunity for multimedia providers to create animated characters to deliver messages, provide information about a site, or bring email and chat avatars to life. These opportunities have resulted in a tremendous surge of interest and growth over the past five years.

Following the success of commercial animation program, the digital animation program is all set to shake the film industry, advertisement world, TV serials etc. Animation programs are designed on the basis of strong traditional animation and design skills. Even though extensive use of computer animation software and hardware are used, the traditional roots of animation - drawing and design are also implied.

G.6.2 Markets and Global Competitiveness Scene

In recent years, digital animation has become the key to success for almost all successful Hollywood/Bollywood blockbusters, advertisements, and education films for the masses and it is gaining popularity in many TV serials.

The present animation industry market size is estimated at USD 354 million reflecting a 24% growth over last year, reported by NASSCOM in its Animation and Gaming Report, January 2007. The global animation market is expected to grow at a CAGR of nearly 8 percent over 2006-2010, to reach USD 80 billion by 2010 and the global gaming market is expected to reach USD 42 billion by 2010, growing at a CAGR of nearly 18 percent over 2006-2010.

There are about 300 animation companies, employing nearly 12,000 people, with an additional estimated 3,000 freelancers in the field in India. Exports accounted for over 70% of the revenue in 2006 with the major portion of the work force involved in the outsourcing segment.

Overview: The global animation industry is growing fast and India is a strong contender for outsourcing business. Bhutan can take advantage of attracting Indian FDI in this field. India's main competitors for animation outsourcing are Philippines, Korea and Taiwan. Key segments are film, gaming and non-entertainment or educational areas including medicine and architecture. India offers high quality, low cost animation services.

The major advantage of the proposed project in Bhutan is its independence from all other constraints that impact other projects dependant on road connectivity, raw material availability and other industry infrastructure.

Investment in the entertainment industry has proved over a long period of time to be hugely profitable for such organizations as Disney, Paramount, Universal Studios, MGM/United Artists, and Sony Pictures. In the last few years, technology has made it possible to sell in international marketplace that seems to be practically unlimited. More and more people in more and more countries are able to access, buy, rent, and license more entertainment products than ever before.

The global marketplace, in combination with expanding delivery technology that has never before been available, is making digital entertainment one of the biggest business opportunities in the modern world. With more and more US and Western companies now considering India as one of its destinations to outsource animation work in 3-D (three-dimensional) animation studios, Bhutan can take advantage of its proximity to and special relationship with India for procuring the technology and developing animation industry in the country. Also, Bhutan has the best climate for creative industry and its educated youth are aspiring to be part of creative rather than manual industry. The US-based production houses, which used to earlier outsource most of their animation works to South Asian countries like Taiwan, Korea and the Philippines, are now coming to India. Bhutan can position itself as a serious player in this segment. Thus, there is ample scope for Bhutan to take advantage and dig into this market pie.

The strong English skills of Bhutanese and their creativity and development skills are positive factors for the inflow of projects from the neighboring countries and developed nations.

Indian Animation Industry:

In Asia Pacific, India is an important constituent in animation Industry. This is due to the obvious advantages like large English-speaking base, animation capability with twelve animation studios, presence of a successful entertainment industry, heritage of traditional literature to facilitate content – based partnership and state-of-the-art computer hardware and software platforms along with low production costs.

To meet both the domestic and export demand, some 40-odd Indian companies are making strides into 2D and 3D animation market. More than half-a-dozen Indian entrepreneurs have set up state-of-the-art special effects studios in Bangalore, Chennai, Delhi, Hyderabad, Mumbai and Thiruvananthapuram to compete with players from Korea, Taiwan and the Philippines, who garner a major chunk of global animation business.

Some of the leading Indian animation companies are Pentamedia Graphics, based in Chennai, Jadoo Works in Bangalore, CD India in Chandigarh, UTV Toons in Mumbai, Moving Picture Company in Film City, Noida, Heart Entertainment Ltd. and Color Chips India in Hyderabad.

Another Indian company taking a shot at the animation market is Toonz Animation India. It was set up in 1998 at Thiruvananthapuram, by Bill Dennis, who worked with Disney Feature Animation studio for more than two decades. Toonz won several assignments to produce commercials for Cartoon Network. It will also be producing original programming based on Indian folk tales.

Indian animation studios, which were earlier focusing on minor projects like multimedia presentations, CD-ROM applications, Computer-Based Training (CBT) modules etc. have now started eyeing larger and more lucrative projects such as television ‘mini-series’ and movies. These 3D studios create computer generated (CG) animation using 3D applications like 3D Studio, 3D Max, Maya, Alias etc., which render high quality, life-like animation.

The rich tapestry of Bhutanese culture, society, folklore and commercial competitiveness can be increasingly exploited through digital animation for film, video and television. The influence goes beyond country borders as studios in Hollywood and other parts of world are establishing lucrative creative partnership with Indian animation companies and are looking for further outsourcing in this region. Bhutan could be the next destination for animation industry.

G.6.3 Proposed Business Structure

It is proposed that the unit be a joint venture with any established Indian animation company. It will be an attractive business proposition as the joint venture will work in a peaceful environment and can cater to world markets from Bhutan.

G.6.4 Project Location

A preliminary study conducted for this project reveals that, for reasons of good connectivity, Thimphu will be the ideal location for the Digital Animation Studio.

The working hours have been assumed to be 8, on a 25-day per month operation, at a working efficiency of 70%. It is proposed that in first year of operation, the project achieves 50 % capacity utilization.

G. 6.5 Infrastructure Requirements

5,000 sq. meter land and 31,100 sq feet of constructed area (multi-story) is required for this project. The power requirement is 50 kw. Water is required for consumption by personnel (approximate 1000 liter per day).

G.6.6 Technology/ Manufacturing Process

The digital work begins on paper with two teams of animators creating "objects" for the show. For example, all character poses, walk cycles, head rotations, props and backgrounds are drawn. Almost everything is broken down into what are essentially puppet pieces that can be reassembled on the computer.

For example in an animation studio for cartoons, once drawn, all elements are scanned at 1,200 dpi, catalogued using Portfolio and stored in the studio's animation and digital design archive for easy browsing. All animators and designers can access the files over the studio's network using standard keyword searches. For street scenes, designers can take advantage of the precision of Illustrator to line up buildings, cars and other scene elements before bringing the scene into PhotoShop.

Using real textures brings the show to life for children, as does the depth of the animation. Instead of using two-dimensional characters that move in two dimensions, characters with special animation effects could move in three dimensions -- forward and back and side to side. The result is that the show is more engaging for everyone.

Once animation is completed and approved, it is imported into after effects for rendering and for voice-over synchronization with the characters' lip movements. Then the file is passed off to the studio's post-production department, where final shots are cut into a pre-edited *animatic* -- a preliminary version. Sound tracks and special effects are added and after final editing, the animation is ready for broadcast using the AVR-77 format.

The production of both shows is also noteworthy for how audio is handled. First audio files are edited and then sent as digital files to the sound facility for design, mix and playback to the broadcast master, using a Digital DSP and SSL sound design and mix platforms. Audio therefore remains digital throughout the process.

G.6.7 Quality Control and Standards

The following table lists the various international standards pertaining to animation:

ISO Name	Common Name	ISO Status	Date Last Up Dated
ISO/IEC 19775:2004	X3D Abstract	IS	Nov 2005
ISO/IEC 19775-1:2004/FDAM Am1: 2006	X3D Amendment 1: Additional functionality	FDAM	Apr 2006
ISO/IEC 19775:2004/FDAM Am1: 2006	X3D Architecture and base components with Amendment 1	IS/FDAM	Apr 2006
ISO/IEC CD 19775-1r1:200x	X3D Architecture and base components Revision 1	CD	Jul 2006
ISO/IEC 19776:2005	X3D encodings: XML and Classic VRML	IS	Nov 2005
ISO/IEC FDAM 19776-1:2005/Am1	X3D encodings: XML encoding: Amendment 1	FDAM	July 2006
ISO/IEC FDAM 19776-2:2005/Am1	X3D encodings: Classic VRML encoding: Amendment 1	FDAM	July 2006
ISO/IEC FCD 19776-3	X3D encodings: Binary encoding	FCD	June 2006
ISO/IEC 19777-1:2005	X3D language bindings: ECMAScript	IS	Jun 2006

ISO Name	Common Name	ISO Status	Date Last Up Dated
ISO/IEC 19777-2:2005	X3D language bindings: Java	IS	Jun 2006
ISO/IEC 19774	Humanoid Animation	IS	Jun 2006
ISO/IEC 14772:1997	Virtual Reality Modeling Language (VRML97)	IS	Dec 2003
ISO/IEC14772-1:1997/Amd. 1:2002	VRML97 Amendment 1	IS	Dec 2003

Table G.6.1 Quality Control and Standards

Production Capacity (per day)

For this project, the following production capacities are considered viable:

- Animation Film - 1 per week (50 films per annum)
- Serials (30 min.) - 2 per week (100 serials per annum)
- Others including Advertisement & Special Effects - 6 per week (300 units per annum)

Studio Utilization

It is proposed that during first year, 50% capacity will be utilized, 60% in the second year and this will increase to 70% from third year onwards.

G.6.8 Consumption of Raw Materials, Power and Water

For this project, 50 kw power connections will be required. Water for personal hygiene only will be required as no water is used in the process itself. High-speed broadband and telecommunication facilities are also required.

G.6.9 Project Cost/ Total Investment**Summary:**

▪ Working Days in Year:	300
▪ D.S.C.R.	4.01
▪ B.E.P.	16.45%
▪ IRR	30.25%
▪ NPV	Nu.649.69 lacs

COST OF PROJECT

The total cost of the project is estimated at Nu.935.00 lacs as per the particulars given in the tables G.6.2.

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 5,000 sq. meter (On lease)	
2	Building and Civil Construction	216.70
3	Plant & Machinery	293.64
4	Misc. Fixed Assets	171.86
5	Preliminary Expenses	1.00
6	Pre- operative Expenses	134.81
7	Margin Money for Working Capital	48.77
8	Contingencies 10%	68.22
Total		935.00

Table G.6.2 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	525.68
2	Term Loan from FI's	409.32
Total		935.00

Table G.6.3 Means of Finance

The term loan has been arrived at based on the break up of individual investment items and bank's financing pattern as given in table G.6.14

BUILDING AND CIVIL WORK

About 5,000 sq. meter of land will be required for this project and built up area required will be 31,200 sq. ft. consisting of various labs, studios, dubbing and editing rooms etc. (Nu. in Lacs)

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total
1	Administrative Block	40	50	2000	700.00	14.00
2	Audio Lab	50	30	1500	700.00	10.50
3	Video Lab	50	30	1500	700.00	10.50
4	Computer workstation	60	60	3600	700.00	25.20
5	Editing Room	50	30	1500	700.00	10.50
6	Dubbing, Mixing	50	30	1500	700.00	10.50
7	Studio for shooting	100	150	15000	700.00	105.00
8	Editing room	50	50	2500	700.00	17.50
9	Misc.			2000	650.00	13.00
Total						216.70

Table G.6.4 Building and Civil Work

PLANT AND MACHINERY

The cost of Plant & Machinery is estimated at Nu.293.65 lacs including installation and commissioning. The cost estimates for plant & machinery have been worked out based on the cost figures available from budgetary offers from the various suppliers. The itemized detailed lists of plant & equipment and their landed costs at Thimphu is given in table G.6.5.

Freight and insurance have been considered on the assumption that all goods will be transported by road.

A Studio

S. No.	Description	Model	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Hitachi S 3000 Digital Camera	S 3000	3	6.81	20.43
2	5 " view finder	GM 51P	3	1.10	3.30
3	Lens	A 19 X 8.7 BRM-24	3	1.53	4.59
4	Camera Control Units	RU Z3	3	2.98	8.94
5	Camera Cables	C-502 KAB	3	1.15	3.45
6	Joystick Control Units	RUZ -21A	3	1.53	4.59
7	Camera Tripods	Digital 150	3	0.75	2.25
8	Chroma Key back Drop	Chroma Key	1	2.50	2.50
9	For - A 16 input digital switcher Hanabi	HVS 3000 S	1	22.78	22.78
10	Inscriber character Generator	Inscriber	1	6.50	6.50
11	Intercom System	Clear Com	1	8.95	8.95
12	Waveform Monitor + Vectorscope	TVM 821 DP	1	4.68	4.68
13	Program Monitor	PVM 20 M2E	1	2.98	2.98
14	Preview Monitor	PVM 14 M2E	1	2.13	2.13
15	Source Monitor	PVM 9042	3	2.94	8.82
16	Video Recorders (Digital Betacam)	DVW A 500P	1	35.35	35.35
17	Tally System	Deuro	1	1.25	1.25
18	Audio Yamaha 01V	01 V	1	1.05	1.05
19	Audio Monitoring Speakers	Yamaha MSP-5	1	0.55	0.55

S. No.	Description	Model	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
20	Loudness monitor Meters	Dorrough 40 A2	1	0.35	0.35
21	Production Desk	Deuro	1	0.25	0.25
22	Monitor Mounting Desk	Deuro	1	2.50	2.50
23	Racks for Equipment and VTRs	Deuro	1	1.25	1.25
24	Wiring of the Equipment	Deuro	1	6.82	6.82
25	Installation Charges	Deuro	1	1.10	1.10
26	Audio Monitoring Speakers (Powered)	Yamaha MSP-5	1	1.55	1.55
27	Loudness Monitor Meters	Dorrough 40 A2	1	1.35	1.35
28	Production Desk	Deuro	1	1.25	1.25
29	Monitor Mounting Desk	Deuro	1	2.50	2.50
30	Racks for Equipment and VTRs	Deuro	1	1.25	1.25
31	Wiring of the Equipment	Deuro	1	6.82	6.82
32	Installation Charges	Deuro	1	1.10	1.10
33	Lighting		1	2.50	2.50
34	Lighting		1	2.00	2.00
Total (A)					177.68

Table G.6.5 (A) Plant and Machinery

B Hardware and Software

S. No.	Description	Model	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Computer Workstations	P 4 + standard config.	50	0.35	17.50
2	Computer Desks designed for animation	Deuro	1	0.15	0.15
3	2 D animation drawing desks	Deuro	1	0.14	0.14
4	Digital Pencil test software	Chroma color	1	0.70	0.70
5	Amino Studio License	Amino	1	5.00	5.00
6	Tons Cartoon software	Soft image	1	4.40	4.40
7	Macromedia Flash	Macromedia	1	0.15	0.15
8	Adobe Photoshop	Adobe	1	0.35	0.35
9	Adobe Premiere		1	0.26	0.26
10	Adober After effects		1	0.22	0.22
11	3 D studio Max		1	1.52	1.52
12	Softimage 3D		8	3.60	28.80
13	Maya 3D		8	3.50	28.00
14	Maxon Body paint		1	3.15	3.15
15	Local Area network		1	4.00	4.00
16	Server with central storage		1	3.60	3.60
17	DPS Reality Digital Disk recorders		1	5.75	5.75
18	VHS Recorders	Panasonic	1	0.15	0.15

S. No.	Description	Model	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
19	DVD Players	Samsung / Phillips	1	0.13	0.13
20	CD Archiving workstations	Local	1	1.25	1.25
21	Professional DVD Player+ Recorder	DSR 45	1	3.75	3.75
22	IEEE 1394 Editing system	FCP	1	5.25	5.25
23	Lunch Box Sync	LBS	1	1.74	1.74
Total (B)					115.96
Grand Total					293.65

Table G.6.5 (B) Plant and Machinery

MISC. FIXED ASSETS

Nu. 171.86 lacs has been estimated under the heading of MFA. The details of electrical installations for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery and equipment, equipment for water supply, laboratory, workshop, fire fighting equipment etc. have been provided on a lump sum basis as per information available with the consultants for similar assets.

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Library	-	10.00	10.00
2	Furniture	-	30.00	30.00
3	Set Accessories	-	25.00	25.00
4	Fire Fighting	-	2.50	2.50
5	Miscellaneous Accessories	-	15.00	15.00
6	Vehicle	3	20.00	60.00
7	Electrical Installation	-	29.36	29.36
Total				171.86

Table G.6.6 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal & Liaisoning	1.00	1.00
Total			1.00

Table G.6.7 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Expenses incurred prior to commencement of commercial production are covered under this head that total Nu. 134.81 lacs have been provided under this head.

Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest during construction, insurance during construction and other miscellaneous expenses.

Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing of the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required.

Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements, interest during construction has been computed. Other expenses under this head have been estimated on a block basis, based on information available for similar projects.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	26.60
2	Insurance during Construction Period	0.25% of factory assets	1.71
3	Electricity Charges during Construction Period		2.50
4	Marketing Launch Expenses		20.00
5	Technology Know- how fees		26.00
6	Training Expenses		30.00
7	Traveling Expenses		28.00
Total			134.81

Table G.6.8 Pre-operative Expenses

COST OF RAW MATERIAL

For this project, the raw material is storage media such as compact disks, magnetic tapes etc., which are easily available in Bhutan.

S. No.	Particulars	Qty. (in nos.)	Rate per unit (Nu. in Lacs)	Total Value (Nu. in Lacs)
1	Blank CDs	3000	20.00	0.60
2	USB Drives	30	4000.00	1.20
3	Consumables/Stationery			12.00
Total				13.80

Table G.6.9 Cost of Raw Material

LAND LEASE CHARGES

Required land for the project is 5,000 sq. meter (53,821 sq. ft.), which has been considered on lease @ Nu. 4.00 per sq. ft. per annum for first three years and @Nu.6.00 per sq feet for the fourth year and subsequently @3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	2.15
2	2 nd Year	4.00	2.15
3	3 rd Year	4.00	2.15
4	4 th Year	6.00	3.23
5	5 th Year	6.20	3.34
6	6 th Year	6.40	3.44
7	7 th Year	6.60	3.55
8	8 th Year	6.80	3.66
9	9 th Year	7.00	3.77
10	10 th Year	7.20	3.88

Table G.6.10 Land Lease Charges

SALES REALISATION

It is assumed that 50% capacity utilization will be achieved during first year of operation, 60% in second year and 70% from third year onwards.

(Nu. in Lacs)

S. No.	Particulars	Production Per Annum	Rate Per unit	Total Amount Per Annum
1	Animation Films	50	15.00	750.00
2	Serials (Cartoon 30 minutes)	100	2.00	200.00
3	Others; Advertisements, Multimedia presentations, Games, New Product launch simulations films, Interactive Educations CD's	300	1.50	450.00
Total				1,400.0

Table G.6.11 Sales Realization

(Nu. in Lacs)

- Total sales realization at 100% cap. util. 1,400.00
- First year 50% cap. util. 700.00
- Second year 60% cap. util. 840.00
- Third year 70% cap. util. 980.00

SALARY AND WAGES

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The break down of manpower and incidence of salaries & wages is detailed in following table:

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
A	Administrative				
1	Chief Executive Officer	1	1,00,000.00	1.00	12.00
2	General Manager	1	60,000.00	0.60	7.20
3	Manager Marketing	1	30,000.00	0.30	3.60
4	Marketing Executive	5	15,000.00	0.75	9.00
5	Accountant	2	7,000.00	0.14	1.68
6	Drivers	3	4,500.00	0.13	1.62
7	Office Assistants	2	4,500.00	0.09	1.08
8	Security	3	4,000.00	0.12	1.44
				Sub Total	37.62
B	Developers				
1	Team Leaders	2	30,000	0.60	7.20
2	Story Board Artist	10	25,000	2.50	30.00
3	Lay Out Artists	4	25,000	1.00	12.00
4	Animators	10	25,000	2.50	30.00
5	Editors	4	30,000	1.20	14.40
6	Voice Animators	4	20,000	0.80	9.60
7	Sound Engineer	2	25,000	0.50	6.00
8	Network Engineer	2	20,000	0.40	4.80
				Sub Total	114.00
Total					151.62

Table G.6.12 Salary and Wages

Note:

1. Fringe benefits @15 % of the salary.
2. Salary to increase by @ 5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power & water charges are increased @5% every year. The unit cost of electricity has been considered @ Nu 1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation water tariff of Nu. 2.25/ m³ (base rate: Nu. .5/ m³ + 50% for sewage charges).

S. No.	Description	Amount per Annum (Nu. in Lacs)
1	Power Consumption	4.50
2	Water Consumption	0.25
Total		4.75

Table G.6.13 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Land 5,000 sq. meters (On lease)	0%	0.00		0.00
2	Building & Civil Construction	40%	216.70	86.68	130.02
3	Plant & Machinery	40%	293.64	117.46	176.18
4	Misc. & Fixed assets	40%	171.86	68.75	103.12
5	Preliminary Expenses	100%	1.00	1.00	0.00
6	Pre- operative Expenses	100%	134.81	134.81	0.00
7	Margin Money for Working Capital	100%	48.77	48.77	0.00
8	Contingencies	100%	68.22	68.22	0.00
Total			935.00	525.69	409.32

Table G.6.14 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

Working capital requirements have been worked out in following table:

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Materials	30 days	25%	1.15	0.29	0.86
2	Consumables @5% of Raw Materials	30 days	25%	0.06	0.01	0.04
3	Receivable	30 days	25%	58.33	14.58	43.75
4	Cash for Exp.	30 days	100%	33.88	33.88	0.00
Total				93.42	48.76	44.65

Table G. 6.15 Working Capital Requirement

ESTIMATED COST OF PRODUCTION AND PROFITABILITY

The profitability projection have been worked out for 10 years, at 50% capacity utilization during first year, 60% second year and 70% from third year onwards and the following assumptions and basis as relevant and applicable to Bhutan, have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @13% p.a. on term loan & working capital loan.
- Insurance charges @0.25% on all assets in first year, then @5% decrease every year.
- Power & water charges are increased @5% every year.
- Administrative expenses have been increased @5% every year.

- Margin money on bank loan has been considered @40% on building, @25% on plant & machinery and @ 25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one year moratorium
- Preliminary exp. will be written off @10% every year in next 10 years.
- Pre operative exp. will be written off from II year @10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent & interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Revenue at Installed Capacity (Nu. in Lacs) 100%	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
2	Capacity Utilization	50%	60%	70%	70%	70%	70%	70%	70%	70%	70%
3	Actual Sales Nu. in Lacs	700.00	840.00	980.00	980.00	980.00	980.00	980.00	980.00	980.00	980.00
4	COST OF PRODUCTION										
4.1	Raw Material Consumed	13.80	15.18	16.70	16.70	16.70	16.70	16.70	16.70	16.70	16.70
4.2	Consumables @5%	0.69	0.76	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
4.3	Power, Fuel & Water	4.75	4.99	5.24	5.50	5.77	6.06	6.37	6.68	7.02	7.37
4.4	Salary & Wages	151.62	159.20	167.16	175.52	184.30	193.51	203.19	213.34	224.01	235.21
4.5	Fringe Benefits @15%	22.74	23.88	25.07	26.33	27.64	29.03	30.48	32.00	33.60	35.28
4.6	Insurance	1.71	1.54	1.39	1.25	1.12	1.01	0.91	0.82	0.74	0.66
4.7	Repair & Maintenance @4%	18.62	19.55	20.53	21.56	22.63	23.76	24.95	26.20	27.51	28.89
4.8	Land Lease Rent	2.15	2.15	2.15	3.23	3.34	3.44	3.55	3.66	3.77	3.88
4.9	Other Admn. Exp.	30.00	31.50	33.08	34.73	36.47	38.29	40.20	42.21	44.32	46.54
	Total	246.09	258.75	272.15	285.64	298.80	312.64	327.18	342.45	358.50	375.36
5	Selling & Distribution Expenses @15% on Sales	175.00	210.00	245.00	245.00	245.00	245.00	245.00	245.00	245.00	245.00
6	COST OF SALES	421.09	468.75	517.15	530.64	543.80	557.64	572.18	587.45	603.50	620.36
7	SALES	700.00	840.00	980.00	980.00	980.00	980.00	980.00	980.00	980.00	980.00
8	PROFIT BEFORE INTT. & DEP.	278.91	371.25	462.85	449.36	436.20	422.36	407.82	392.55	376.50	359.64
9	Interest on Term Loan @13%	53.21	49.89	43.24	36.58	29.93	23.28	16.63	9.98	3.33	0.00
10	On Working Capital @13 %	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81
11	Total Interest	59.02	55.69	49.04	42.39	35.74	29.09	22.44	15.79	9.14	5.81
12	Profit Before Depreciation.	219.90	315.56	413.81	406.97	400.46	393.27	385.38	376.76	367.36	353.84
13	DEPRECIATION	76.33	76.33	76.33	76.33	76.33	76.33	53.05	6.50	6.50	6.50
14	Profit After Depreciation	143.57	239.23	337.49	330.64	324.13	316.95	332.33	370.26	360.86	347.33
15	Pre Operative Exp. Write off	0.00	13.48	13.48	13.48	13.48	13.48	13.48	13.48	13.48	13.48
16	Preliminary Exp. Write off	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
17	PROFIT BEFORE TAXATION	143.47	225.65	323.91	317.06	310.55	303.37	318.75	356.68	347.28	333.75
18	Taxation @30% of Net Profit	43.04	67.70	97.17	95.12	93.17	93.01	95.63	107.00	104.18	100.13
19	Profit After Taxation	100.43	157.96	226.73	221.95	217.39	212.36	223.13	249.67	243.10	233.63

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
20	Accumulated Profit	100.43	258.38	485.12	707.06	924.45	1136.8	1359.93	1609.61	1852.70	2086.33
21	PROFIT AFTER TAXATION	100.43	157.96	226.73	221.95	217.39	212.36	223.13	249.67	243.10	233.63
22	Add: Depreciation	76.33	76.33	76.33	76.33	76.33	76.33	53.05	6.50	6.50	6.50
23	Add: Interest on Term Loan	53.21	49.89	43.24	36.58	29.93	23.28	16.63	9.98	3.33	0.00
Total (A)		229.97	284.17	346.30	334.86	323.65	311.97	292.81	266.16	252.93	240.13
24	Interest on Term Loan	53.21	49.89	43.24	36.58	29.93	23.28	16.63	9.98	3.33	0.00
25	Repayment on Term Loan	0	51.16	51.16	51.16	51.16	51.16	51.16	51.16	51.20	0.00
Total (B)		53.21	101.05	94.40	87.74	81.09	74.44	67.79	61.14	54.53	0.00
SURPLUS (A) - (B)		176.76	183.12	251.90	247.11	242.55	237.52	225.02	205.02	198.40	240.15
DSCR (A/B)		4.32	2.81	3.66	3.82	3.99	4.19	4.32	4.35	4.64	N.A.
AVERAGE DSCR		4.01									

Table G.6.16 Estimated Cost of Production and Profitability

CALCULATION OF INTEREST ON TERM LOAN

(Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	409.32	0	409.32	53.21	53.21
B	2nd year					
	I Qtr	409.32	12.79	396.53	13.10	
	II Qtr	396.53	12.79	383.74	12.68	
	III Qtr	383.74	12.79	370.95	12.26	
	IV Qtr	370.95	12.79	358.16	11.85	49.89
C	3rd year					
	I Qtr	358.16	12.79	345.37	11.43	
	II Qtr	345.37	12.79	332.58	11.02	
	III Qtr	332.58	12.79	319.79	10.60	
	IV Qtr	319.79	12.79	307.00	10.19	43.24
D	4th year					
	I Qtr	307.00	12.79	294.21	9.77	
	II Qtr	294.21	12.79	281.42	9.35	
	III Qtr	281.42	12.79	268.63	8.94	
	IV Qtr	268.63	12.79	255.84	8.52	36.58
E	5th year					
	I Qtr	255.84	12.79	243.05	8.11	
	II Qtr	243.05	12.79	230.26	7.69	
	III Qtr	230.26	12.79	217.47	7.28	
	IV Qtr	217.47	12.79	204.68	6.86	29.93
F	6th year					
	I Qtr	204.68	12.79	191.89	6.44	
	II Qtr	191.89	12.79	179.10	6.03	
	III Qtr	179.10	12.79	166.31	5.61	

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
	IV Qtr	166.31	12.79	153.52	5.20	23.28
G	7th year					
	I Qtr	153.52	12.79	140.73	4.78	
	II Qtr	140.73	12.79	127.94	4.37	
	III Qtr	127.94	12.79	115.15	3.95	
	IV Qtr	115.15	12.79	102.36	3.53	16.63
H	8th year					
	I Qtr	102.36	12.79	89.57	3.12	
	II Qtr	89.57	12.79	76.78	2.70	
	III Qtr	76.78	12.79	63.99	2.29	
	IV Qtr	63.99	12.79	51.20	1.87	9.98
I	9th year					
	I Qtr	51.20	12.79	38.41	1.46	
	II Qtr	38.41	12.79	25.62	1.04	
	III Qtr	25.62	12.79	12.83	0.62	
	IV Qtr	12.83	12.83	0.00	0.21	3.33

Table G.6.17 Calculation of Interest on Term Loan

DEPRECIATION CHART (As per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 5,000 sq. meter	0.00	0	0.00	0	0	0	0
2	Building & Civil Construction	216.70	3%	6.50	3%	6.501	3%	6.50
3	Plant & Machinery	293.64	15%	44.05	10%	29.36	0%	0
4	Misc. Fixed Assets	171.86	15%	25.78	10%	17.186	0%	0
Total		682.20		76.33		53.05		6.50

Table G.6.18 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1st Year	2nd Year	3rd Year
Variable Cost	417.22	465.06	513.61
Fixed Cost	62.88	59.38	52.58
Break Even Point (B.E.P.)	22.24%	15.84%	11.27%
Average B.E.P.	16.45%		

Table G.6.19 Break Even Point

NPR & RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	20.50%	26.86%	33.05%	32.35%	31.69	30.96%	32.53%	36.40%	35.44%	34.06%
Return on Investment (RI)	19.10	30.05	43.13	42.22	41.35	40.40	42.45	37.50	46.24	44.44

Table G.6.20 NPR & RI

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	100.43	157.96	226.73	221.95	217.39	212.36	223.13	249.67	243.10	233.63
1.2	Depreciation	0	76.33	76.33	76.33	76.33	76.33	76.33	53.05	6.50	6.50	6.50
1.3	Interest on term loan & W.C.	0	59.02	55.69	49.04	42.39	35.74	29.09	22.44	15.79	9.14	5.81
1.4	Preliminary exp. write off	0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
1.5	Pre-operative exp. write off	0	0.00	13.48	13.48	13.48	13.48	13.48	13.48	13.48	13.48	13.48
1.6	Net cash inflows	0.00	235.87	303.55	365.68	354.24	343.03	331.35	312.20	285.54	272.31	259.51
2	OUTFLOWS											
2.1	Investment in fixed assets	886.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.2	Investment in working capital	48.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	935.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	- 935.00	235.87	303.55	365.68	354.24	343.03	331.33	312.20	285.54	272.31	259.51

Table G.6.21 Cash Flow Statement

- Internal Rate of Return (IRR) 30.25%
- Net Present Value (NPV) Nu. 649.69 Lacs
- Weighted Average Cost of Capital (WACC) 13%

Project Viability: - Internal Rate of Return of the project is 30.25%, which is much higher than the WACC of 13%. Hence the project is financially viable. The NPV shows the present value of the net cash flow, or the project's worth today. The discount rate used here is the WACC. A positive NPV indicates a profitable project (i.e. the project generates sufficient funds to cover its cost, including loan repayments and interest payments).

G.6.10 Environmental Issues

Pollution Control: No special pollution control measures are needed for Digital Animation Studio project. Suitable environmental mitigation measures as per National Environment Commission, RGoB guidelines during the construction and operation phases can be adopted. Application as per the guidelines of NEC has to be submitted along with detailed project report for environmental clearance before commencement of the project.

G. 6.11 Source of Technology/Plant Machinery Supplier

The technology can be procured under either licensing arrangement with leading players in animation or by hiring consultants to design and implement the project. The leading technology providers in India are Toonz animation, Pentamedia and UTV. The following are the suppliers for various items:

1. Softmart Solutions

H-19 A, First Floor, Kalkaji Main Road
New Delhi –110019 India
Phone: +91-11-26446435, 26446436, 26446437, 28898298, 41604788, 26446297
Fax: +91-11-26446175
Email: sales@softmartonline.com, softmart@vsnl.com
Website: www.softmartonline.com

2. Toonboom

7 Laurier Avenue East
Montreal, Quebec, Canada H2T 1E4
Phone: +514- 278-8666
Fax: +514- 278-2666
Email: info@toonboom.com
Website: www.toonboom.com

3. Maya

4999, St. Catherine St. West, Suite 400
Montreal, Quebec, Canada, H3Z 1T3
Phone: 800-343-6292 (US and Canada) or +1-514-369-5706
Fax: 514-369-4200
Email: info@mayahtt.com
Website: www.mayahtt.com

G.7 Fast Moving Consumer Goods(FMCG) Cluster Park

G.7.1 Introduction

FMCG refers to 'Fast Moving Consumer Goods', in which non-durable goods required for daily or frequent use, are covered. Typically, a consumer buys these goods at least once in a month.

The sector covers a wide gamut of daily use products such as detergents, toilet soaps, toothpastes, shampoos, creams, powders, food products, personal hygiene products and hosiery, which can be termed as fast consuming.

Typical characteristics of FMCG products are:

- Individual items are of small value, but all FMCG products put together account for a significant part of the consumer's budget.
- The consumer keeps limited inventory of these products and prefers to purchase them frequently, as and when required. Many of these products are perishable.
- The consumer spends little time on the purchase decision. Rarely does he/she look for technical specifications (in contrast to consumer durable goods like electronics products or industrial goods). Brand loyalties or recommendations of reliable retailers or dealers drive purchase decisions.
- Manufacturing of branded products by third party vendors is quite common. Most of the leading brands don't manufacture their own products, but have a host of small-scale manufacturers/ vendors who produce the products to the required specification and label.

The key features of this product range are high initial launch cost (high marketing and distribution cost) and low capital investment in manufacturing.

G.7.1.1 Low Capital Investment in Manufacturing:

Most product categories in FMCG require relatively minor investment in plant and machinery and other fixed assets. The turnover is typically five to eight times the investment made in a green field project operating at full capacity. This is due to the fact that, the business being marketing driven, players do not integrate backward. Also, the business has low working capital intensity as bulk of sales from manufacturers takes place on a cash basis.

G.7.1.2 High Initial Launch Cost:

Nonetheless, there is a large front-ended investment made in new products including cost of product development, market research, test marketing and most importantly the product launch. To create awareness and develop franchisees for a new brand requires enormous initial expenditure on launch advertisements, free samples and product promotions. Launch costs are as high as 50-100% of revenue in the first year and these costs progressively reduce as the brand matures and gains consumer acceptance, thereby raising the turnover.

For established brands, advertisement expenditure varies from 5-12% depending on the categories. It is common to give occasional push by re-launches, which involves repositioning of brands with sizable marketing support.

In Bhutan, there is no national brand in FMCG sector. Although groups like Tashi Commercial Corporation have experience in distribution of wide array of FMCG products from India in Bhutanese market, the manufacturing arena has not been explored in right earnest. There is a good possibility of cluster approach in which small units manufacturing different types of product range are set up in one place and produce range of products under a common brand.

The quality standards, marketing, supply chain, distribution network and other logistics issues are handled by an umbrella organization in which these units have shareholding. The day-to-day management is handled by professional experienced managers from FMCG sector. The individual units produce similar range of items for common brand and supply to the umbrella company, which in turn manage the national or international marketing by setting up distribution and supply chain logistics network.

G.7.2 Markets and Global Competitiveness Scene

Major global consumer product companies (such as Unilever, P&G, Colgate, Nestle and Heinz) have a lion's share of the global market. These companies have been established for a very long time and possess a clutch of strong brands with proprietary technology.

Most of these companies are cash rich and well managed. Their brands generate strong cash flows and allow them to reinvest in strengthening the brand equity further, with continued promotions/ advertisements. They also have the financial clout to acquire small local brands to strengthen their position in the category. These companies also make considerable investment in R&D to sharpen and maintain the edge in the business.

Most of the global majors have their origins in Europe or USA. They find home markets saturated and are banking on the third world for future growth. These companies are setting up shops and are aggressively expanding their base in these countries. They also look out for opportunities to acquire local brands to jump-start or consolidate their position in these markets.

In relative terms, marketing function has greater importance in FMCG companies. The players have to reach out to the masses or target markets in competition with several other brands offering essentially similar products. The perceived differences are greater than the real differences in the products.

In India, Nirma, which started at cottage industry level, has become a leading FMCG brand in a short span of 20 years giving good competition to the leading established MNC's. Thus, competition scene, although very fierce in the segment, can be taken care of by cluster approach.

G. 7.2.1 Market Research

Consumers' purchase decisions are based on perceptions about brands. They also keep on changing with fashion, income and changes in lifestyle. Unlike industrial products, it is difficult to differentiate products on technical or functional grounds. Market research and test marketing become inevitable.

Most small-scale third-party manufacturers have benefits of direct control of the owner and greater ability to manage local environment, where large organizations run the risk of unionization and disruption of work. Further, it is beneficial (in terms of logistics) and sometimes essential, to get certain products manufactured at locations near the market. A company can tie up with several manufacturers in separate locations, rather than set up own manufacturing facilities.

The marketing company gives technology, lays down quality standards, and typically exercises supervision on manufacturing, cost and quality standards. The marketing company may also co-ordinate raw material procurement to optimize on bulk discounts. While in most cases, the manufacturing process is fairly simple, certain products require supply of some critical ingredients by the marketing company (which in turn may be imported from the parent company). It is common to find support in working capital finance also.

G.7.3 Proposed Business Structure

Most of the FMCG products in Bhutan are imported from India and Thailand, even though most of the products require only small scale/ cottage scale manufacturing units with no intervention of high-end technologies.

This project envisages a two tier corporate structure:

- Individual Manufacturing Units
- Corporate Headquarter Unit

The individual units will be mostly in the small and cottage sector and will be also part of the bigger large corporate entity with equal share holding. The umbrella company will provide the following value addition:

1. Common Branding & Packaging
2. Technology issues
3. Marketing
4. Backward integration support in terms of procurement help for raw material, common testing and quality control standards.
5. Set up retail marketing chain, C& F and distribution chain, logistics and ensure smooth supplies.

The large corporate entity will be managed by professionals but the board of directors will be from the shareholders. The profit from the corporate entity will be equally distributed to the share holders (unit holders). The corporate entity can be set under FDI with leading Indian/ International FMCG brands.

The individual units will be manufacturing different items and will be responsible for feeding the supply chain systems established by the Corporate Headquarters Unit. Thus, the individual unit holder will stand to gain in two ways by getting a profit margin on the production of the item and finally sharing from the profit of the main corporate entity.

For this cluster, the following units are proposed under four broad categories to cover similar range of products:

Cosmetics, Beauty Products and Oral Care Product Units

1. Toilet soaps, washing soap, detergents / washing powder
2. Shampoo, conditioner and hair oil
3. Herbal skin care cream, winter care cold cream lotion, moisturizing cream etc.
4. Toothpaste, mouth freshener, tooth brush and oral care products
5. Fragrances and talcum powder

Home Care Hygiene Product Units

6. Phenyl, toilet cleaner
7. Brooms, floor sweeper
8. Incenses
9. Herbal utensil cleaner

Plastic Product Units

10. Plastic mug, bucket and cover etc.
11. Plastic disposable items
12. Plastic miscellaneous home use items

Miscellaneous

13. School bags, camping bags, tarpaulin and rain coat
14. Craft paper bag
15. Molded paper packaging products

The proposed FMCG cluster is planned in a total area of 15,000 sq meters keeping provision for internal roads, individual flatted factories (15 units) and space for common facilities.

The following are the common facilities:

1. CFC Center (Central Facility Centre) will be consisting of:
 - Administrative Block
 - Conference cum training room
 - Quality Control and Testing Lab
 - Resource Centre
 - Marketing Centre
 - Display Centre
 - Vocational Training Institute
 - Pantry
 - Facilities
 - Warehouse
2. Warehouse consisting of two sections:
 - Raw Material Store
 - Finished Goods Store
3. Common effluent treatment and internal roads.

For an individual unit, a 2000 sq. feet shed on flatted factory concept is planned and will be allotted under the four segments as above. Total 15 units are planned to cover the products range for launching as above. The individual units will be investing in the plant and machinery and working capital for manufacturing the specific items or range of items. The final production of these units will be purchased by the corporate unit and fed into the distribution channel for national and international marketing.

G.7.4 Project Location and Size of Project

It is proposed that this cluster be set up at the proposed Jigmeling Industrial Estate near Gelephu, from where it can cater to the Bhutanese market as well as the Indian market.

G.7.5 Infrastructure Requirements

All the units under this cluster park will be set up at one location for ease of coordination. A plot size of 15,000 sq. meter will be required, with adequate power and water supply connectivity.

G.7.6 Technology/Manufacturing Process

Basic technology for manufacturing of above items is easily available. Also, technology for most products has been fairly stable. Modifications/ improvement rarely changes the basic process.

G.7.7 Product Quality Standards

The different products will have to follow different standards, under the broad category. It is suggested to follow Indian BIS standard. Quality today is not only confined to the product or service alone, it also extends to the process and environment in which these are prepared.

The ISO 9000 defines standards for Quality Management Systems and ISO 14001 defines standards for Environmental Management System for acceptability at the international level. The corporate entity unit may therefore adopt these standards for global competition.

G.7.8 Consumption of Raw Materials, Power and Water

It is estimated that a total of 1500 KVA power load will be required for the Park and approximately 70,000 liters of water per day will be required for all the units and the corporate company.

G.7.9 Project Cost/Total Investment**Summary:**

▪ Number of Units	15
▪ No. of Shift	One
▪ Working days in Year	300
▪ D.S.C.R.	3.08
▪ B.E.P.	20.73%
▪ IRR	21.55%
▪ NPV	Nu.212.85 lacs

It has been assumed that the 15-unit cluster will be fully operational within one year from inception. The financial analysis and calculation are worked out for the bigger corporate company of which individual 15 units will be integral part as vendors. The following assumptions have been made.

The corporate unit will make all the investment in the development of the industrial estate area viz. the common facilities, 15 modular 2,000 sq feet units, internal roads, power and water facilities and common effluent treatment.

The individual units will be given the monthly production targets by the corporate entity. The individual units will make investments in plant and machinery, raw materials and operational expenses including the labor, electricity and water. The professionals employed by the corporate entity will give full support to individual units in procurement of raw materials, providing the testing and quality parameters for the production including monthly production schedule.

The corporate entity will not charge any rental from the individual units. However, it will keep 25% sales margin on the sales and the balance will be paid back to the individual units. For the financial analysis, only the corporate entity's financial performance projections have been considered. However, based on the production norms of selected items, it is estimated that annual production of individual units will be approx. Nu.80.00 lacs on an average.

COST OF PROJECT

The total cost of the project is estimated at Nu. 673.16 lacs as per the particulars given in the table G.7.1.

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 15,000 sq. meters (On lease)	
2	Building and Civil Construction	356.15
3	Plant & Machinery	30.00
4	Misc. Fixed Assets	129.12
5	Preliminary Expenses	1.00
6	Pre-operative Expenses	89.11
7	Margin Money for Working Capital	16.25
8	Contingencies 10%	51.53
Total		673.16

Table G.7.1 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	383.69
2	Term Loan from FI's	289.46
Total		673.15

Table G.7.2 Means of Finance

The term loan has been arrived at based on the break up of individual investment items and bank's financing pattern as given in table G.7.13.

BUILDING AND CIVIL WORK

About 15000 sq. meter of land will be required for this project and built up area required will be 5,255 sq. meter as detailed in table G.7.3:

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total
A	Building					
	Common Facilities Center (CFC)					
1	Administrative Block	100	30	3,000	650.00	19.50
2	Conference cum training room	100	20	2,000	650.00	13.00
3	Quality Control and Testing Lab	100	40	4,000	650.00	26.00
4	Resource Centre	50	50	2,500	650.00	16.25
5	Marketing Centre	100	30	3,000	650.00	19.50
6	Display Centre	20	20	400	650.00	2.60
7	Vocational Training Institute	100	30	3,000	550.00	16.50
8	Pantry	20	15	300	550.00	1.65
9	Facilities	20	15	300	550.00	1.65
10	Warehouse	100	60	6,000	550.00	33.00
B	Production Area					0.0

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total
1	Small manufacturing shed (15 Nos.) (Size 50'*40'=2000 sq. ft each)	2000	15	30000	550.00	165.00
2	Guard Room (2 Nos. Size 15'*10')	150	2	300	500.00	1.50
3	Internal Roads & Drive Way					20.00
4	Boundary Wall					20.00
Total						356.15

Table G.7.3 Building and Civil Work

PLANT AND MACHINERY

The plant machinery considered for this project are those used in providing the common services to all the units. Cost of these plant & machinery is estimated at Nu.30.00 lacs including installation and commissioning. The cost estimates for plant & machinery have been worked out based on the cost figures available from budgetary offers from Indian suppliers.

Freight and insurance have been considered on the assumption that all goods are transported by road. Goods of foreign origin would be handled at the Kolkata port.

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Lab Testing Equipment		20.00	20.00
2	Workshop Equipment		10.00	10.00
Total				30.00

Table G.7.4 Plant and Machinery

MISC. FIXED ASSETS

Nu.162.80 lacs have been estimated under the heading of MFA. The details of electrical installations for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery and equipment, equipment for water supply, laboratory, workshop, fire fighting equipment etc. are provided on a lump sum basis. The details of miscellaneous fixed assets and their associated costs are shown in table below:

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Office Equipment	1	6.00	6.00
2	Furniture & Fixture with Interior	1	8.00	8.00
3	Computers with Accessories	6	0.42	2.52
4	Laptops	2	0.55	1.10
5	Photo Copier & Printer	1	0.50	0.50
6	LCD & OHP	1	1.50	1.50
7	MIS Software	1	10.00	10.00
8	Fire Fighting Equipment	30	0.10	3.00
9	Cargo Van	4	3.50	14.00
10	Loading Three Wheeler	6	1.75	10.50
11	Maruti Omni	2	3.00	6.00
12	Electrical Installation	1	50.00	50.00
13	Common Treatment Plant	1	8.00	8.00
Total				162.80

Table G.7.5 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal & Liaisoning	1.00	1.00
Total			1.00

Table G.7.6 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Provision has been kept for expenses to be incurred prior to commencement of commercial production.

Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest during construction, insurance during construction and other miscellaneous expenses. Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing in of the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required.

Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements, interest during construction has been computed. Other expenses under this head have been estimated on a block basis, based on information available for similar projects.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	18.82
2	Insurance during Construction Period	0.25% of factory assets	1.29
3	Electricity Charges during Construction Period		3.00
4	Marketing Launch Expenses		3.00
5	Technology know-how fees		30.00
6	Trade Mark, Quality Standard Marks		5.00
7	Training Expenses		10.00
8	Traveling Expenses		18.00
Total			89.11

Table G.7.7 Pre-Operative Expenses

COST OF CONSUMABLES

S. No.	Item	Total Value (Nu. in Lacs)
1	Consumables and Stationery	5.00
Total		5.00

Table G.7.8 Cost of Consumables

LAND LEASE CHARGES

Required land is 15,000 sq. meter (161,463 sq. ft.), which has been considered on lease @ Nu. 4.00 per sq. ft. per annum for first three years and @Nu. 6.00 per sq feet for the fourth year and subsequently @ 3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	6.46
2	2 nd Year	4.00	6.46
3	3 rd Year	4.00	6.46
4	4 th Year	6.00	9.69
5	5 th Year	6.20	10.01
6	6 th Year	6.40	10.33
7	7 th Year	6.60	10.66

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
8	8 th Year	6.80	10.98
9	9 th Year	7.00	11.30
10	10 th Year	7.20	11.63

Table G.7.9 Land Lease Charges

SALES REALISATION

For the sales of the corporate company it is assumed that individual 15 units will be feeding production of Nu.80.00 lacs on average to the corporate entity's marketing channel in the first year, Nu.90.00 lacs in the second year and Nu.100.00 lacs in the third year. The corporate entity will earn 25% margin on this sales.

It is assumed that 60% capacity utilization will be achieved during first year of operation, 70% in second year and 80% from third year onwards.

S. No.	Particular	Total Amount Per Annum (Nu. in Lacs)
1	Sales Margin @ 25% on sales of Nu. 80 lacs per unit (average) on 15 units	300.00
Total		300.00

Table G.7.10 Sales Realization

(Nu. in Lacs)

- Total sales realization in first year 300.00
- Second year sales of 90 lacs per unit 337.50
- Third year sales of 100 lacs per unit 375.00

SALARY AND WAGES

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The break down of manpower and incidence of salaries and wages has been detailed in following table:

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
1	Chief Executive Officer	1	50,000	0.50	6.00
2	Manager (Corporate)	1	20,000	0.20	2.40
3	Manager (HR)	1	20,000	0.20	2.40
4	Manager (Purchase)	2	20,000	0.40	4.80
5	Manager (MIS, Logistics)	1	20,000	0.20	2.40
6	Manager (Marketing)	3	20,000	0.60	7.20
7	Manager (Training)	2	12,500	0.25	3.00
8	Marketing Executives	6	8,000	0.48	5.76
9	Purchase Executives	3	8,000	0.24	2.88
10	Estate Manager	1	20,000	0.20	2.40
11	Maintenance Engineers	2	12,500	0.25	3.00
12	Accountant	2	8,500	0.17	2.04
13	Office Assistant	4	5,000	0.20	2.40
14	Drivers	10	4,500	0.45	5.40
15	Security Guards	6	4,000	0.24	2.88
Total					54.96

Table G.7.11 Salary and Wages

Note: 1. Fringe benefits @ 15 % of the salary.
2. Salary to increase by @ 5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power & water charges are increased @ 5% every year. The unit cost of electricity has been considered @ Nu.1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation water tariff of Nu 2.25/ m³ (base rate: Nu.1.5/ m³ + 50% for sewage charges).

S. No.	Description	Amount Per Annum (Nu. in Lacs)
1	Power Consumption	4.00
2	Water Consumption	1.00
Total		5.00

Table G.7.12 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Land 1,50,000 sq meters	0%	0.00	0.00	0.00
2	Building & Civil Construction	50%	356.15	178.08	178.08
3	Plant & Machinery	30%	30.00	9.00	21.00
4	Misc. & Fixed assets	30%	129.12	38.74	90.38
5	Preliminary Expenses	100%	1.00	1.00	0.00
6	Pre-operative Expenses	100%	89.11	89.11	0.00
7	Margin Money for Working Capital	100%	16.25	16.25	0.00
8	Contingencies	100%	51.53	51.53	0.00
Total			673.16	383.71	289.46

Table G.7.13 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Material	15 days	25%	0.21	0.05	0.16
2	Receivable	30 days	25%	25.00	6.25	18.75
3	Cash for Expenses	30 days	100%	9.94	9.94	0.00
Total				35.15	16.24	18.91

Table G.7.14 Working Capital Requirement

ESTIMATED COST OF PRODUCTION AND PROFITABILITY

The profitability projection have been worked out for 10 years, at 60% capacity utilization during first year, 70% in second year and 80% from third year onwards and the following assumptions and basis as relevant and applicable to Bhutan, have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @13% p.a. on term loan & working capital loan.
- Insurance charges @0.25% on all assets in first year, then @5% decrease every year.
- Power & water charges are increased @5% every year.
- Administrative expenses have been increased @5% every year.
- Margin money on bank loan has been considered @40% on building, @25% on plant & machinery and @ 25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one-year moratorium.

- Preliminary exp. will be written off @10% every year in next 10 years.
- Pre operative exp. will be written off from II year @10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent and interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Revenue Realization (Nu. in Lacs)	300.00	337.50	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
2	COST OF PRODUCTION										
2.1	Consumables	5.00	6.00	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
2.2	Power, Fuel & Water	5.00	5.25	5.51	5.79	6.08	6.38	6.70	7.04	7.39	7.76
2.3	Salary & Wages	54.96	57.71	60.59	63.62	66.80	70.14	73.65	77.33	81.20	85.26
2.4	Fringe Benefits @15%	8.24	8.66	9.09	9.54	10.02	10.52	11.05	11.60	12.18	12.79
2.5	Insurance	1.29	1.16	1.04	0.94	0.85	0.76	0.69	0.62	0.56	0.50
2.6	Repairs & Maintenance 4%	6.36	6.68	7.02	7.37	7.74	8.12	8.53	8.96	9.40	9.87
2.7	Lease Rent	6.46	6.46	6.46	9.69	10.01	10.33	10.66	10.98	11.30	11.63
2.8	Other Admn. Exp.	12.00	12.60	13.23	13.89	14.59	15.32	16.08	16.89	17.73	18.62
2.9	Branding & Distribution Expenses	20.00	21.00	22.05	23.15	24.31	25.53	26.80	28.14	29.55	31.03
	Total	119.31	125.52	131.59	140.59	147.00	153.7	160.76	168.16	175.91	184.06
3	TOTAL REVENUE	300.00	337.50	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
4	PROFIT BEFORE INTT. & DEP.	180.68	211.98	243.40	234.41	228.01	221.29	214.25	206.85	199.09	190.95
5	Interest on Term Loan @13%	37.63	35.28	30.57	25.86	21.16	16.45	11.75	7.04	2.34	0.00
6	On Working Capital @13 %	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
7	Total Interest	40.09	37.73	33.03	28.32	23.62	18.91	14.20	9.50	4.79	2.46
8	Profit Before Dep.	140.60	174.25	210.38	206.08	204.39	202.38	200.04	197.35	194.30	188.49
9	DEPRECIATION	34.55	34.55	34.55	34.55	34.55	34.55	26.60	10.68	10.68	10.68
10	Profit After Depreciation	106.04	139.70	175.82	171.53	169.84	166.83	173.44	186.66	183.61	177.81
11	Pre-operative Exp. write off	0.00	8.91	8.91	8.91	8.91	8.91	8.91	8.91	8.91	8.91
12	Preliminary Exp. write off	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
13	PROFIT BEFORE TAXATION	105.94	130.69	166.81	162.52	160.83	158.82	164.43	177.66	174.60	168.80
14	Taxation on @30% of Net Profit	31.78	39.21	50.04	48.76	48.25	47.65	49.33	53.30	2.38	50.64
15	Profit After Taxation	74.16	91.48	116.77	113.76	112.58	111.17	115.10	124.36	122.22	118.16
16	Accumulated Profits	74.16	165.64	282.41	396.17	508.75	619.92	735.03	859.39	981.61	1099.77
17	PROFIT AFTER TAXATION	74.16	91.48	116.77	113.76	112.58	111.17	115.10	124.36	122.22	118.16
18	Add: Depreciation	34.55	34.55	34.55	34.55	34.55	34.55	26.60	10.68	10.68	10.68
19	Add: Interest on Term Loan	37.63	35.28	30.57	25.86	21.16	16.45	11.75	7.04	2.34	0.00
	Total (A)	146.34	161.31	181.89	174.18	168.29	162.18	153.45	142.08	133.24	128.84
20	Interest on Term Loan	37.63	35.28	30.57	25.86	21.16	16.45	11.75	7.04	2.34	0.00
21	Repayment on Term Loan	0	36.20	36.20	36.20	36.20	36.20	36.20	36.20	36.06	0.00
	Total (B)	37.63	71.48	66.77	62.06	57.36	52.65	47.95	43.24	38.40	0.00

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
	SURPLUS (A) - (B)	108.71	89.83	115.12	112.12	110.93	109.53	105.50	98.84	96.85	128.84
	DSCR (A/B)	3.89	2.26	2.72	2.81	2.93	3.08	3.20	3.29	3.52	N.A.
	AVERAGE DSCR	3.08									

Table G.7.15 Estimated Cost of Production and Profitability

CALCULATION OF INTEREST ON TERM LOAN

(Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	289.46	0	289.46	37.63	37.63
B	2nd year					
	I Qtr	289.46	9.05	280.41	9.26	
	II Qtr	280.41	9.05	271.36	8.97	
	III Qtr	271.36	9.05	262.31	8.67	
	IV Qtr	262.31	9.05	253.26	8.38	35.28
C	3rd year					
	I Qtr	253.26	9.05	244.21	8.08	
	II Qtr	244.21	9.05	235.16	7.79	
	III Qtr	235.16	9.05	226.11	7.50	
	IV Qtr	226.11	9.05	217.06	7.20	30.57
D	4th year					
	I Qtr	217.06	9.05	208.01	6.91	
	II Qtr	208.01	9.05	198.96	6.61	
	III Qtr	198.96	9.05	189.91	6.32	
	IV Qtr	189.91	9.05	180.86	6.02	25.86
E	5th year					
	I Qtr	180.86	9.05	171.81	5.73	
	II Qtr	171.81	9.05	162.76	5.44	
	III Qtr	162.76	9.05	153.71	5.14	
	IV Qtr	153.71	9.05	144.66	4.85	21.16
F	6th year					
	I Qtr	144.66	9.05	135.61	4.55	
	II Qtr	135.61	9.05	126.56	4.26	
	III Qtr	126.56	9.05	117.51	3.97	
	IV Qtr	117.51	9.05	108.46	3.67	16.45
G	7th year					
	I Qtr	108.46	9.05	99.41	3.38	
	II Qtr	99.41	9.05	90.36	3.08	
	III Qtr	90.36	9.05	81.31	2.79	
	IV Qtr	81.31	9.05	72.26	2.50	11.75

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
H	8th year					
	I Qtr	72.26	9.05	63.21	2.20	
	II Qtr	63.21	9.05	54.16	1.91	
	III Qtr	54.16	9.05	45.11	1.61	
	IV Qtr	45.11	9.05	36.06	1.32	7.04
I	9th year					
	I Qtr	36.06	9.05	27.01	1.02	
	II Qtr	27.01	9.05	17.96	0.73	
	III Qtr	17.96	9.05	8.91	0.44	
	IV Qtr	8.91	8.91	0.00	0.14	2.34

Table G.7.16 Calculation of Interest on Term Loan

DEPRECIATION CHART (As per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 15,000 sq. meter (On lease)	0.00	0	0.00	0	0	0	0
2	Building & Civil Construction	356.15	3%	10.68	3%	10.68	3%	10.68
3	Plant & Machinery	30.00	15%	4.50	10%	3.00	0%	0
4	Misc. Fixed Assets	129.12	15%	19.37	10%	12.912	0%	0
Total		515.27		34.55		26.60		10.68

Table G.7.17 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1st Year	2nd Year	3rd Year
Variable Cost	111.57	117.90	124.09
Fixed Cost	47.84	45.35	40.53
Break Even Point (B.E.P.)	25.39%	20.65%	16.15%
Average B.E.P.	20.73%		

Table G.7.18 Break Even Point

NPR & RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	35.31%	38.72%	44.48%	43.34%	42.79%	42.35%	43.85%	47.38%	46.56%	45.01%
Return on Investment (RI)	19.33	23.84	30.43	29.65	29.34	28.97	30.00	32.41	31.85	30.80

Table G.7.19 NPR & RI

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	74.16	91.48	116.77	113.76	112.58	11.17	115.10	124.36	122.22	118.16
1.2	Depreciation	0	34.55	34.55	34.55	34.55	34.55	34.55	26.60	10.68	10.68	10.68
1.3	Interest on term loan & W.C.	0	40.09	37.73	33.03	28.32	23.62	18.91	14.20	9.50	4.79	2.46
1.4	Preliminary exp. write off	0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
1.5	Pre-operative exp. write off	0	0.00	8.91	8.91	8.91	8.91	8.91	8.91	8.91	8.91	8.91
1.6	Net cash inflows	0.00	148.90	172.78	193.36	185.65	179.76	173.65	164.92	153.55	146.71	140.31
2	OUTFLOWS											
2.1	Investment in fixed assets	656.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.2	Investment in working capital	16.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	673.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	- 673.15	148.90	173.78	193.36	185.65	179.76	173.65	164.92	153.55	146.71	140.31

Table G.7.20 Cash Flow Statement

- Internal Rate of Return (IRR) 21.55%
- Net Present Value (NPV) Nu. 212.85 Lacs
- Weighted Average Cost of Capital (WACC) 13%

Project Viability: - Internal Rate of Return of the project is 21.55%, which is much higher than the WACC of 13%. Hence the project is financially viable. The NPV shows the present value of the net cash flow, or the project's worth today. The discount rate used here is the WACC. A positive NPV indicates a profitable project (i.e. the project generates sufficient funds to cover its cost, including loan repayments and interest payments).

G.7.10 Environmental Issues**Pollution Control**

Specific pollution control measures will be required for each unit, which will be handled and guided by the cluster company depending on the product taken up for manufacture by the individual entrepreneurs. As per the National Environment Commission regulation, RGoB, the individual cluster units may fall in the list of activities requiring environmental clearance. Environmental hazards, if any, of the individual units will be identified and suitable environment mitigation measures as per NEC guidelines during the construction and operation phases adopted.

Application as per the guidelines of NEC has to be submitted along with detailed project report for environmental clearance before commencement of the project.

Energy Conservation

The company will also take up energy-saving measures like using community solar water heating systems, having proper maintenance systems for the power-operated machines and resorting to their judicial use.

G. 7.11 Source of Technology/ Plant Machinery Supplier

Addresses of laboratory machinery and workshop equipment manufacturers are given below:

1. **M/s I. P. Singh Machinery (Pvt.) Ltd.**
75, Ganesh Chandra Avenue,
Kolkata - 700 013
2. **M/s. Nandy and Co.**
125 Belilious Road, Howrah - 711 101
3. **M/s. Turnwell Machine Tools 16,**
Ganesh Chandra Avenue, Kolkata - 700 013
4. **M/s. Turner and Tools,**
15. Ganesh Chandra Avenue,
2nd Floor, Kolkata - 700 013
5. **M/s. Pathak Machine Tools Pvt. Ltd.**
116, G.T. Road. Salkia, Howrah - 711 106
6. **M/s. Goliya Electricals Pvt. Ltd.**
Plot no. 64. G.I.D.C Estate, Phase I.
Opp. Sunita Textiles, Vapi 396195, Distt. Bulsar, Gujarat.

The plant machinery details of the individual units are not given here. However, for preparing the 15 project's details viz. technology, plant and machinery specification, raw material and processing specifications, a sum of Nu.30.00 lacs (Nu 2.00 lac per unit) has been considered in the pre-operative expenses of the cluster company. The corporate entity will get these prepared and provide to the prospective entrepreneurs to have a combined synergy for common brand, marketing, logistics and distribution issues. The selected items of technologies, plant and machineries and raw materials are readily available in neighboring India.

G.8 Business Process Outsourcing Unit

G.8.1 Introduction

One of several innovations of Internet is the way it has transformed how people work and conduct business. Call centre (or contact centre) where support services of a company are attended by a third party, using internet, is a case in point. It's a booming business worldwide, estimated to be worth, with other outsourcing work, a staggering US\$ 1,130 billion. Contact centers are a major part of Business Process Outsourcing (BPO), where rich nations outsource their work to developing nations because it is cheaper. India is by far the biggest low cost offshore market. Labour costs in India are a fraction of the wages paid in the US. A US bank, which outsources work of 1,000 American workers to India saves, about \$18 million a year. IT service companies are making a quick entry into the BPO space on the strength of their existing set of clients. After the success of India, more and more developing countries are entering this business.

In addition to the growth in scale, the portfolio of services outsourced globally continues to expand into higher-value, more complex value-added activities – further reinforcing the growing maturity of the global delivery model in a 'flat world'.

Emergence of Newer Locations

- As global delivery matures, newer locations are emerging, and Bhutan can take advantage of this situation.
- Bhutan can take advantage from India in developing its ITES industry and emerge as the new location for offshoring BPO services.
- Bhutan can emphasize security and quality.

The Specific Internal Advantages for Bhutan are:

- Bhutanese youth prefer white-collar skill jobs.
- With proximity to India and easy access in terms of education and skill development, advanced IT training programs can be started.
- Capital cost per seat in Bhutan is estimated to be 20-30% cheaper than India depending on the nature of the BPO services offered, in contrast to a similar facility in India.
- Lower Income Tax Rates than India for people working in Bhutan with an effective savings of 10-12% and comparatively higher salaries.
- Cheaper cost of living compared to Bangalore or any other city in India.
- Cleaner Environment to work in.

Business Process Outsourcing

Although the term "business process outsourcing" (BPO) has gained visibility in the IT services industry only in the past four to five years, the service offering itself has existed for decades. For example, several of the largest service providers have significant legacy revenue streams that are derived from medical claims processing contracts. In many instances, BPO contracts include the entire back-office function like customer interaction services, HR / payroll services, insurance claim processing, mortgage, financial services, data digitization, GIS, technology support centers etc.

(The Philosophy behind BPO is Specific - “do what you do best and leave everything else to business process outsourcers”). Companies are moving their non-core business processes to outsource providers. BPO saves precious management time and resources and allows focus while building upon core competencies. The list of functions being outsourced is getting longer by the day. Call centres apart, functions outsourced span from purchasing and disbursement, order entry, billing and collection, human resources administration, cash and investment management, tax compliance, internal audit, pay roll...the list gets longer everyday. In view of the accounting scandals in 2002 (Enron, WorldCom, Xerox etc.), more and more companies are keen on keeping their investors happy. Hence, it is important for them to increase their profits. BPO is one way of increasing their profits. If done well, BPO results in increasing shareholder value.

Typically, a customer calls the call center [usually a toll-free number]. After pressing numerous numbers [1 for English, 2 for Spanish, 3 for bank balance], the operator will answer your query by accessing the database. Call centers address sales support, airline/hotel reservations, technical queries, bank accounts, client services, receivables, tele marketing and market research.

If a bank shifts work of a thousand people from US to outsource locations, it can save about \$18 million a year due to cost savings in these emerging locations. According to Mckinsey, giant US Pharmaceutical firms can reduce the cost of developing a new drug, currently estimated at between \$600 million and \$900 million by as much as \$200 million if development work is outsourced to cheaper locations.

Benefits derived from BPO can be summarized as follows:

- Productivity improvements
- Access to expertise
- Operational cost control
- Cost savings
- Improved accountability
- Improved HR
- Opportunity to focus on core business

The following table shows how many jobs from US are moving offshore indicating the increasing potential in this sector:

Number of U.S. Jobs Moving Offshore				
Job Category	2000	2005	2010 (Projected)	2015 (Projected)
Management	0	37,477	117,835	88,281
Business	10,787	61,252	161,722	48,028
Computer	27,171	108,991	276,954	72,632
Architecture	3,498	32,302	83,237	84,347
Life Sciences	0	3,677	14,478	36,770
Legal	1,793	14,220	34,673	74,642
Art, Design	818	5,576	13,846	29,639
Sales	4,619	29,064	97,321	26,564
Office	53,987	295,034	791,034	1,659,310
Total	102,674	587,592	1,591,101	3,320,213

Table 8.1 US Jobs Moving Offshore

(Source: U.S Department of Labour and Forrester Research, Inc.)

SWOT Analysis of Bhutan for BPO Industry

Strengths

- Highly skilled, English-speaking quality manpower.
- Cheaper workforce than their Western counterparts.
- Lower attrition rates than in the West.
- Bhutanese youth aspiring to make a long-term career in the field, looking at the success stories from India.
- Round-the-clock advantage for Western companies due to the 10-12 hours time difference.
- Lower response time with efficient and effective service.
- Conducive business environment.

Weaknesses

- Recent months have seen a rise in the level of attrition rates among ITES workers who are quitting their jobs to pursue higher studies. Of late, workers have shown a tendency not to pursue ITES as a full-time career.
- The cost of telecom and network infrastructure is much higher in Bhutan compared to India.
- Educated manpower shortage for expansion and continuous development of the industry.
- Local infrastructure (Bandwidth and Internet connectivity) is limited.
- Establishing seamless connections to customers at an affordable rate is costlier in Bhutan. Bhutan's only telecom company- Bhutan Telecom- charges about US\$ 167,000 for 1.0 mbps of international lease line, which is costly. That means about US\$ 1,400 a month on connectivity circuit cost alone. On the other hand, lease line of 1.0 mbps in India cost about US\$ 3,000 a year.

Opportunities

- To work closely with Indian companies and associations for shifting or joint venture with Indian established companies under FDI.
- The cool environment and peaceful ambience makes Bhutan a very good destination for BPO industry.
- Indian ITES companies can look towards Bhutan as investment destination in this sector and develop the local skills
- Bhutan can be developed as a quality ITES destination rather than a low-cost destination.
- Scope for development of training institutes and international educational institutes for serving the BPO industry.

Threats

- The anti-outsourcing legislation in some of the countries may dampen the market.
- Other ITES destinations such as China, Philippines and South Africa could have an edge on the cost factor.
- Slowdown of demand.

G.8.2 Markets and Global Competitiveness Scene

Table 8.2 gives details of the global BPO market and Indian share for the last four years

Revenue \ Year	2004	2005	2006	2007
Offshore BPO Revenue	3,017	6,439	12,563	24,230
Indian BPO Revenue	1,961	3,928	7,412	13,811
Total BPO Market	131,171	143,090	157,033	173,070

Table 8.2 Global BPO Market (Figures in \$ million)

The other countries, which are now becoming major players in the world BPO market are Philippines, Canada, Ireland, Australia, South Africa, China, Mexico, Russia, Czech Republic, Hungary and Malaysia. In terms of cost, Philippines and Malaysia are competitive with India. However, Bhutan can place itself in the higher end BPO market and can develop higher HR and more value added outsourcing service delivery compared to large volume markets like Call centers.

Worldwide spending on IT-ITES witnessed steady growth in 2005, on the back of healthier spending across key markets of the US and Western Europe, and strong growth in emerging markets. Outsourcing continued to be the primary growth engine with global delivery forming an integral part of the strategies adopted by customers as well as service providers.

Computer Software is one of the fastest growing industry in the world. The present world market of software is estimated at US \$ 3000 billion. Software development being basically a skill-based labour intensive activity, offers a large scope for export from Bhutan.

G.8.3 Proposed Business Structure

This BPO unit can be set up in private sector or joint sector with Indian IT/ITES companies taking the advantage of Bhutan's cool and peaceful climatic conditions.

G.8.4 Project Location

Thimphu/ Paro/ Phuentsholing are the suggestive locations for this project.

G.8.5 Infrastructure Requirements

2,000 sq. meters of land with built up area of 695 sq. meter has been envisaged for this unit with dedicated data communication connectivity link on lease.

G.8.6 Technology/ Manufacturing Process

The BPO / ITES units have to follow the international guidelines as specified in ISO 9001: 2000 and SEI CMM (Software Engineering Institute –Capability Maturity Model) levels for the delivery and development process of BPO services and specialize in various segments:

Segments	Skills
Call center	Good communication and language skills, accent understanding team leadership, basic computing skills
Remote customer interaction	Language and accent understanding
Data search and Integration	Computing, language and analytical skills
Human Resource Services	Country specific HR policies, rules and regulations
Remote education	Subject knowledge, computing and language skills
Engineering and design	Technical and engineering design and computing skills
Translation, medical transcription and Localization	Language understanding, basic computing (word processing knowledge) and understanding of various medical terminologies
Animation	Drawing and creative skills, computer graphic skills
Finance and accounting	International/ country specific accounting rules
Market research	Understanding statistical sales and marketing concepts
Network consultancy and management	Understanding different network configurations and support equipment, technical/ computing skills

Table G.8.3 Skills Set for BPO Services

G.8.7 Product Quality Standards

ISO 9126 specifies the quality standards for BPO units. This standard covers broadly the delivery model based on following parameters :

- 1.Functionality - suitability, accuracy, interoperability, security, compliance
- 2.Reliability - maturity, fault tolerance, recoverability, compliance
- 3.Usability - understandability, learn ability, operability, attractiveness, compliance
- 4.Efficiency - time behavior, resource utilization, compliance
- 5.Maintainability - analyzability, changeability, stability, testability, compliance
- 6.Portability - adaptability, installability, co-existence, replaceability, compliance

Implementation of quality management system, ISO 9001: 2000 is suggested in the beginning of the project with gradually moving to acquire SEI CMM level 3 or higher after operations are stabilized.

G.8.8 Project Cost/ Total Investment for one unit (tentative)

Summary:

▪ No. of Shift	One (Per Day)
▪ Working Days in Year	300 days
▪ D.S.C.R	3.24
▪ B.E.P.	18.24%
▪ IRR	27.96%
▪ NPV	Nu.123.49 Lacs

COST OF PROJECT

The total cost of the project is estimated at Nu. 220.34 lacs as per the particulars given in table G.8.4.

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 2,000 sq. meters (On lease)	
2	Building & Civil Construction	47.84
3	Plant & Machinery	48.85
4	Misc. Fixed Assets	53.14
5	Preliminary Expenses	2.00
6	Pre- operative Expenses	38.21
7	Margin Money for Working Capital	15.32
8	Contingencies 10%	14.98
Total		220.34

Table G.8.4 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	115.15
2	Term Loan from FI's	105.19
Total		220.34

Table G.8.5 Means of Finance

The term loan has been arrived at based on the break up of individual investment items and bank's financing pattern as given in table G.8.16.

BUILDING AND CIVIL WORK

About 2,000 sq. meter of land will be required for this project and built up area required will be 695 sq. meter as per following details:

(Nu. in Lacs)

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total
A	Building					
1	Chief Executive Room	15	20	300	650.00	1.95
2	Conference Room	40	50	2000	650.00	13.00
3	Reception Area	15	40	600	650.00	3.90
4	Development Room	40	35	1400	650.00	9.10
5	Development Room	40	35	1400	650.00	9.10
6	Library cum Resource Center	40	20	800	650.00	5.20
7	Pantry	15	15	225	650.00	1.46
8	Facilities & Guard Room	30	25	750	550.00	4.13
Total						47.84

Table G.8.6 Building and Civil Work

PLANT AND MACHINERY

The cost of Plant & Machinery is estimated at Nu.48.85 lacs including installation and commissioning. The cost estimates for plant & machinery have been worked out based on the cost figures available from the budgetary offers of the Indian suppliers. The itemized list of equipment is given in table G 8.7.

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Servers	4	3.50	14.00
2	Computers with Accessories	30	0.42	12.60
3	Voice Delivery Accessories	30	0.05	1.50
4	Laptop	5	0.52	2.60
5	Photo Copier	1	0.25	0.25
6	Printer, Scanner and Fax	4	0.60	2.40
7	LCD Projector	1	1.50	1.50
8	Networking & Broadband		3.00	3.00
9	Working Software		10.00	10.00
10	Installation and Commissioning	1	1.00	1.00
Total				48.85

Table G.8.7 Plant and Machinery

MISC. FIXED ASSETS

Nu. 53.14 lacs has been estimated under the heading of MFA. The details of electrical installations for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery & equipment, equipment for water supply, laboratory, workshop, fire fighting equipment etc. have been provided on a lump sum basis as per information available with the consultants for similar assets. The details of miscellaneous fixed assets and their associated costs are shown in the table below:

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Office Equipments	1	4.50	4.50
2	Furniture & Fixture with Interior	1	18.00	18.00
3	Miscellaneous Accessories	1	5.00	5.00
4	Fire Fighting	15	0.05	0.75
5	Car	1	8.00	8.00
6	Mini Bus	1	12.00	12.00
7	Electrical Installation		4.89	4.89
Total				53.14

Table G.8.8 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal & Liaisoning	2.00	2.00
Total			2.00

Table G.8.9 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Expenses incurred prior to commencement of commercial production are covered under this head that total Nu. 38.21 lacs.

Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest during construction, insurance during construction and other miscellaneous expenses. Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing in the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required.

Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements, interest during construction has been computed. Other expenses, under this head have been estimated on a block basis, based on information available for similar projects.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	6.84
2	Insurance during Construction Period	0.25% of units assets	0.37
3	Electricity Charges during Construction Period		1.00
4	Marketing Launch Expenses		3.00
5	Technology Know-how fees		15.00
6	Training Expenses		4.00
7	Traveling Expenses		8.00
Total			38.21

Table G.8.10 Pre-Operative Expenses

COST OF RAW MATERIAL

S. No.	Item	Total Value (Nu. in Lacs)
1	Blank CD & Thumb Drive	1.00
2	Consumables & Stationery	12.00
Total		13.00

Table G.8.11 Cost of Raw Material

LAND LEASE CHARGES

Required land is 2,000 sq. meter (21,528 sq. ft.), which has been considered on lease @ Nu. 4.00 per sq. ft. per annum for first three years and @Nu 6.00 per sq feet for the fourth year and subsequently @ 3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	0.86
2	2 nd Year	4.00	0.86
3	3 rd Year	4.00	0.86
4	4 th Year	6.00	1.29
5	5 th Year	6.20	1.33
6	6 th Year	6.40	1.38
7	7 th Year	6.60	1.42
8	8 th Year	6.80	1.46
9	9 th Year	7.00	1.51
10	10 th Year	7.20	1.55

Table G.8.12 Land Lease Charges

SALES REALISATION

For the purpose of sales realization, revenue based on the prevailing hourly rates in India of \$8.00 to \$10.00 per hour has been considered. The revenue projection under various heads is given in table G.8.13. The other ITES services are also considered to be offered from this unit like IT and Web applications, remote customer handling and back office services like claim processing etc.

It is assumed that 60% capacity utilization will be achieved during first year of operation, 70% in second year and 80% from third year onwards.

S. No.	Particulars	Total Amount Per Annum (Nu. in Lacs)
1	IT and Web Application Module Outsourcing	48.00
2	Business Process Outsourcing	60.00
3	Remote Customer Handling	120.00
5	Back Office Outsourcing	120.00
6	Other Services	24.00
Total		372.00

Table G.8.13 Sales Realisation

	(Nu. in Lacs)
▪ Total sales realisation at 100%	372.00
▪ First year 60%	223.20
▪ Second year 70%	260.40
▪ Third year 80%	297.60

SALARY AND WAGES

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The break down of manpower and incidence of salaries & wages has been detailed in the following table:

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
	Administrative				
1	Chief Executive Officer	1	60,000	0.60	7.20
2	GM (Operation)	1	50,000	0.50	6.00
3	Head Marketing	1	40,000	0.40	4.80
4	Head Administration	1	40,000	0.40	4.80
5	System Analysts	10	20,000	2.00	24.00
6	Functional Consultants	5	25,000	1.25	15.00
7	Software Developer	5	20,000	1.00	12.00
8	Customer Care Executives	10	12,000	1.20	14.40
9	Back Office Support	3	12,000	0.36	4.32
10	Accountant	1	7,000	0.07	0.84
11	Drivers	2	4,500	0.09	1.08
12	Security Guards	1	4,500	0.05	0.54
Total					94.98

Table G.8.14 Salary and Wages

Note: 1. Fringe benefits @ 15 % of the salary.
2. Salary to increase by @5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power & water charges are increased @5% every year. The unit cost of electricity has been considered @ Nu.1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation water tariff of Nu 2.25/ m³ (base rate: Nu.1.5/ m³ + 50% for sewage charges).

S No.	Description	Amount Per Annum (Nu. in Lacs)
1	Power Consumption	3.00
2	Water Consumption	0.25
Total		3.25

Table G.8.15 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Land 2,000 sq. meters (On lease)	0%	0.00		0.00
2	Building and Civil Construction	40%	47.84	19.14	28.70
3	Plant & Machinery	25%	48.85	12.21	36.64
4	Other Misc.& Fixed assets	25%	53.14	13.28	39.85

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
5	Preliminary Expenses	100%	2.00	2.00	0.00
6	Pre-operative Expenses	100%	38.21	38.21	0.00
7	Margin Money for Working Capital	100%	15.32	15.32	0.00
8	Contingencies	100%	14.98	14.98	0.00
Total			220.34	115.14	105.19

Table G.8.16 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

Working capital requirements have been worked out in the following table:

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Material	15 days	25%	0.54	0.14	0.41
2	Receivable	15 days	25%	9.30	2.33	6.98
3	Cash for Expenses	30 days	100%	12.86	12.86	0.00
Total				22.70	15.32	7.38

Table G.8.17 Working Capital Requirement

ESTIMATED COST OF PRODUCTION AND PROFITABILITY

The profitability projection have been worked out for 10 years, at 60% capacity utilization during first year, 70% in second year and 80% from third year onwards and the following assumptions and basis as relevant and applicable to Bhutan, have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @13% p.a. on term loan & working capital loan.
- Insurance charges @0.25% on all assets in first year, then @5% decrease every year.
- Power & water charges are increased @5% every year.
- Administrative expenses have been increased @5% every year.
- Margin money on bank loan has been considered @40% on building, @25% on plant & machinery and @25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one-year moratorium.
- Preliminary exp. will be written off @10% every year in next 10 years.
- Pre operative exp. will be written off from II year @10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent & interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Annual Revenue at Installed Capacity (Nu. in Lacs) 100%	372.00	372.00	372.00	372.00	372.00	372.00	372.00	372.00	372.00	372.00
2	Capacity Utilization	60%	70%	80%	80%	80%	80%	80%	80%	80%	80%
3	Actual Sales in Nu.in Lacs	223.20	260.40	297.60	297.60	297.60	297.60	297.60	297.60	297.60	297.60
4	COST OF PRODUCTION										
4.1	Raw Material Consumed	7.80	9.10	10.40	10.40	10.40	10.40	10.40	10.40	10.40	10.40
4.2	Consumables @5%	0.08	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
4.3	Power, Fuel & Water	3.25	3.41	3.58	3.76	3.95	4.15	4.36	4.57	4.80	5.04
4.4	Salary & Wages	94.98	99.73	104.72	109.95	115.45	121.22	127.28	133.65	140.33	147.35
4.5	Fringe Benefits @15%	14.25	14.96	15.71	16.49	17.32	18.18	19.09	20.05	21.05	22.10
4.6	Insurance	0.37	0.33	0.30	0.27	0.24	0.22	0.20	0.18	0.16	0.14
4.7	Repair & Maintenance @4%	4.08	4.28	4.50	4.72	4.96	5.21	5.47	5.74	6.03	6.33
4.8	Land Lease Rent	0.86	0.86	0.86	1.29	1.33	1.38	1.42	1.46	1.51	1.55
4.9	Other Admn. Exp.	3.00	3.15	3.31	3.47	3.65	3.83	4.02	4.22	4.43	4.65
Total		128.67	135.92	143.48	150.47	157.40	164.69	172.34	180.37	188.81	197.67
5	Selling & Distribution Expenses @15% on Sales	33.48	39.06	44.64	44.64	44.64	44.64	44.64	44.64	44.64	44.64
6	COST OF SALES	162.15	174.98	188.12	195.11	202.04	209.33	216.98	225.01	233.45	242.31
7	SALES	223.20	260.40	297.60	297.60	297.60	297.60	297.60	297.60	297.60	297.60
8	PROFIT BEFORE INTT. & DEP.	61.05	85.42	109.48	102.49	95.56	88.27	80.62	72.59	64.15	55.29
9	Interest on Term Loan @13%	13.67	12.82	11.11	9.40	7.69	5.98	4.27	2.55	0.85	0.00
10	On Working Capital @13 %	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
11	Total Interest	14.63	13.78	12.07	10.36	8.65	6.94	5.23	3.51	1.80	0.96
12	Profit Before Depreciation.	46.42	71.64	97.42	92.14	86.91	81.34	75.40	69.07	62.35	54.33
13	DEPRECIATION	16.73	16.73	16.73	16.73	16.73	16.73	11.63	1.44	1.44	1.44
14	Profit After Depreciation	29.69	54.91	80.68	75.40	70.18	64.60	63.76	67.64	60.91	52.90
15	Pre Operative Exp. write off	0.00	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82
16	Preliminary Exp. write off	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
17	PROFIT BEFORE TAXATION	29.49	50.89	76.66	71.38	66.16	60.58	59.74	63.62	56.89	48.88
18	Taxation @30% of Net Profit	8.85	15.27	23.00	21.41	19.85	18.17	17.92	19.09	17.07	14.66
19	Profit After Taxation	20.64	35.62	53.66	49.97	46.31	42.41	41.82	44.53	39.82	34.21
20	Accumulated Profit	20.64	56.26	109.93	159.89	206.20	248.61	290.43	334.96	374.78	409.00
21	PROFIT AFTER TAXATION	20.64	35.62	53.66	49.97	46.31	42.41	41.82	44.53	39.82	34.21
22	Add: Depreciation	16.73	16.73	16.73	16.73	16.73	16.73	11.63	1.44	1.44	1.44
23	Add: Interest on Term Loan	13.68	12.82	11.11	9.40	7.69	5.98	4.27	2.55	0.85	0.00
Total (A)		51.05	65.17	81.51	76.10	70.73	65.12	57.72	48.52	42.10	35.65
24	Interest on Term Loan	13.68	12.82	11.11	9.40	7.69	5.98	4.27	2.55	0.85	0.00
25	Repayment on Term Loan	0.00	13.16	13.16	13.16	13.16	13.16	13.16	13.16	13.07	0.00
Total (B)		13.67	25.98	24.27	22.56	20.85	19.14	17.43	15.71	13.92	0.00
SURPLUS (A) - (B)		37.37	39.19	57.24	53.54	49.88	45.98	40.29	32.81	28.19	3565
DSCR (A/B)		3.73	2.51	3.36	3.37	3.39	3.40	3.31	3.09	3.03	N.A.
AVERAGE DSCR		3.24									

Table G.8.17 Estimated Cost of Production and Profitability

CALCULATION OF INTEREST ON TERM LOAN

(Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	105.19	0	105.19	13.67	13.67
B	2nd year					
	I Qtr	105.19	3.29	101.90	3.37	
	II Qtr	101.90	3.29	98.61	3.26	
	III Qtr	98.61	3.29	95.32	3.15	
	IV Qtr	95.32	3.29	92.03	3.04	12.82
C	3rd year					
	I Qtr	92.03	3.29	88.74	2.94	
	II Qtr	88.74	3.29	85.45	2.83	
	III Qtr	85.45	3.29	82.16	2.72	
	IV Qtr	82.16	3.29	78.87	2.62	11.11
D	4th year					
	I Qtr	78.87	3.29	75.58	2.51	
	II Qtr	75.58	3.29	72.29	2.40	
	III Qtr	72.29	3.29	69.00	2.30	
	IV Qtr	69.00	3.29	65.71	2.19	9.40
E	5th year					
	I Qtr	65.71	3.29	62.42	2.08	
	II Qtr	62.42	3.29	59.13	1.98	
	III Qtr	59.13	3.29	55.84	1.87	
	IV Qtr	55.84	3.29	52.55	1.76	7.69
F	6th year					
	I Qtr	52.55	3.29	49.26	1.65	
	II Qtr	49.26	3.29	45.97	1.55	
	III Qtr	45.97	3.29	42.68	1.44	
	IV Qtr	42.68	3.29	39.39	1.33	5.98
G	7th year					
	I Qtr	39.39	3.29	36.10	1.23	
	II Qtr	36.10	3.29	32.81	1.12	
	III Qtr	32.81	3.29	29.52	1.01	
	IV Qtr	29.52	3.29	26.23	0.91	4.27
H	8th year					
	I Qtr	26.23	3.29	22.94	0.80	
	II Qtr	22.94	3.29	19.65	0.69	
	III Qtr	19.65	3.29	16.36	0.59	
	IV Qtr	16.36	3.29	13.07	0.48	2.55
I	9th year					
	I Qtr	13.07	3.29	9.78	0.37	
	II Qtr	9.78	3.29	6.49	0.26	
	III Qtr	6.49	3.29	3.20	0.16	
	IV Qtr	3.20	3.20	0.00	0.05	0.85

Table G.8.18 Calculation of Interest on Term Loan

DEPRECIATION CHART (As per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 2,000 sq. meter	0.00	0	0.00	0	0	0	0
2	Building and Civil Construction	47.84	3%	1.44	3%	1.44	3%	1.44
3	Plant & Machinery	48.85	15%	7.33	10%	4.89	0%	0
4	Misc. Fixed Assets	53.14	15%	7.97	10%	5.3135	0%	0
Total		149.83		16.73		11.63		1.44

Table G.8.19 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1 st Year	2 nd Year	3 rd Year
Variable Cost	160.91	173.79	186.95
Fixed Cost	15.87	14.97	13.23
Break Even Point (B.E.P.)	25.47%	17.29%	11.96%
Average B.E.P.	18.24%		

Table G.8.20 Break Even Point

NPR & RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	13.21%	19.54%	25.76%	23.99%	22.23%	20.36%	20.07%	21.38%	19.12%	16.42%
Return on Investment (RI)	17.93	30.94	46.60	43.39	40.22	36.83	36.32	38.67	34.58	29.71

Table G.8.21 NPR & RI

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	20.64	35.62	53.66	49.97	46.31	42.41	41.82	44.53	39.82	34.21
1.2	Depreciation	0	16.73	16.73	16.73	16.73	16.73	16.73	11.63	1.44	1.44	1.44
1.3	Interest on term loan & W. C.	0	14.63	13.78	12.07	10.36	8.65	6.94	5.23	3.51	1.80	0.96
1.4	Preliminary exp. Write off	0	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1.5	Pre-operative exp. write off	0	0.00	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82
1.6	Net cash inflows	0.00	52.21	70.15	86.49	81.08	75.71	70.10	62.70	53.50	47.08	40.63
2	OUTFLOWS											
2.1	Investment in fixed assets	205.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.2	Investment in working capital	15.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	220.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	- 220.34	52.21	70.15	86.49	81.08	75.71	70.10	62.70	53.50	47.08	40.63

Table G.8.22 Cash Flow Statement

▪ Internal Rate of Return (IRR)	27.96%
▪ Net Present Value (NPV)	Nu.123.49 Lacs
▪ Weighted Average Cost of Capital (WACC)	13%

Project Viability: - Internal Rate of Return of the project is 27.96%, which is much higher than the WACC of 13%. Hence the project is financially viable. The NPV shows the present value of the net cash flow, or the project's worth today. The discount rate used here is the WACC. A positive NPV indicates a profitable project (i.e. the project generates sufficient funds to cover its cost, including loan repayments and interest payments).

G.8.10 Environmental Issues

BPO and ITES units do not generate any pollution, so there is no environmental issue related with this project. Suitable environmental mitigation measures as per National Environment Commission, RGoB guidelines during the construction and operation phases have to be adopted. Application as per the guidelines of NEC has to be submitted along with detailed project report for environmental clearance before commencement of the project.

G. 8.11 Source of Technology/Plant Machinery Supplier

a. Hardware Suppliers:

1. Rasnet Systems

B-70B Kalkaji (Basement),
New Delhi - 110 019, India
Phone: + (91)-9811408764

2. Laptop Notebook World

M-22, Hemkunt Chambers, 89 Nehru Place,
New Delhi - 110 019, India
Phone: + (91)-(11)-41617897/41618896

3. Aaura Data Networks Private Limited

446, 8th Main, 4th Block, Koramangala,
Bangalore-560 037 India
Phone: +91-80-41468545
Fax: +91-80-41317545

b. Software Supplier:

1. Softmart Solutions

H-19 A, First Floor, Kalkaji Main Road
New Delhi –110019 (India)
Phone +91-11-26446435, 26446436, 26446437, 28898298, 41604788, 26446297
Fax +91-11-26446175
Email : sales@softmartonline.com, softmart@vsnl.com

G.9

Construction Materials Cluster

G.9.1 Introduction

With the rapid infrastructure development in Bhutan, construction is a booming activity. There is increasing requirement of various raw materials for construction sector. The construction materials are mostly affected by transportation costs and producing them in the country for meeting the local requirement makes good business venture.

Thus, one of the prioritized projects, as the outcome of the investment opportunity study is construction material cluster. It is proposed that similar type of units having common raw materials but different output products for use in construction sector are planned in the same vicinity.

The technology, production issues and the support systems requirement are also common for such type of cluster.

The basic raw materials viz. cement, grit and construction wood is locally available and the plastics raw material can be imported from India or China. In this cluster, 12 units are proposed to be covered in two broad segments of cement-based and plastics/ wood material-based units:

A. Cement Based Units:

1. R.C.C. Spun Pipes
2. Cement Concrete Tiles and Paving Blocks
3. Cement Mosaic Flooring Tiles
4. Solid Pre-stressed Concrete Poles
5. Cement Paint
6. Semi-mechanized R.C.C Hollow Brick Making Plant

B. Plastic / Wood Material Based Units:

1. PVC Roofing Sheets
2. PVC Doors, Windows and Frames
3. Plastic Pallets and dividers
4. Roto Moulded Water Storage Tanks
5. PVC Pipes
6. Wood window and door frames

G.9.2 Markets and Global Competitiveness Scene

Infrastructure development is key to growth in real GDP for any developing nation. For Bhutan, the indigenous development in construction industry will be the key requirement for growth. More and more infrastructure development, housing units, civic infrastructure, creating road connectivity to various inaccessible areas in the country will be planned and taken up creating demand in this sector. Traditional (Bhutanese architecture) houses with blend of modern technology are built now using lot of RCC components in the buildings.

Thus, construction components have a good market in the growing infrastructure activities and also for self-sustainability in the country. Since the raw materials (cement, grit and water) are available in the country, thus, the transportation cost, which is a very heavy component usually for these products provide cost advantage.

The manufacturing technology available in neighboring India can be adopted suitably and all the products can be easily manufactured locally. The common issues like, quality, raw material storage, standards compliances and finished goods supply chain management issues can be taken care by the cluster easily.

Globally, the construction activity is increasingly becoming technologically oriented with reliance on modular, prefabricated and factory fitted components for ease of transportation and speed of construction. The cluster units will not be subjected to global competition as the local market itself will consume the output of all the units in coming years.

G.9.3 Proposed Business Structure

Most of the construction industry products in Bhutan are imported from India, although most of the products under construction cluster category require small scale/ cottage scale investment.

The business structure for the cluster approach follows the successful pattern established in India and other parts of the world. This envisages the provision of an enabling infrastructure with full coverage for external backward and forward linkages for a group of units manufacturing similar / related products. This infrastructure provides:

1. The complete technology and financial inputs to prospective individual entrepreneurs, for setting up manufacturing units of various listed products /items.
2. 'Flatted factory' space (plant machinery and raw material investment to be made by the individual entrepreneurs).
3. Power, Water and Communication facilities.
4. Common facilities / central laboratory, research & development facility.
5. Central purchasing and central marketing facility (common branding).
6. Central warehousing for raw materials and finished goods including bonded warehousing.

The cluster company will buy the entire production of the individual units and market it under a common brand name, recovering its investment from the profit earning on the sales of these branded products.

Thus, a two tier corporate structure is proposed for this cluster.

The individual units will be mostly in the small-scale sector and will form a bigger large corporate entity in which these manufacturers will be equal shareholders and the cluster company will look after the following areas:

- Common marketing of cluster products
- Requirement assessment and Production Issues
- Technology and new product development issues
- Institutional marketing (with Government agencies, developmental agencies and private agencies)
- Setting up retail marketing for some of the products at building construction, sanitary ware and hardware shops
- Backward integration support in terms of procurement help for raw materials, common testing and quality control standards.

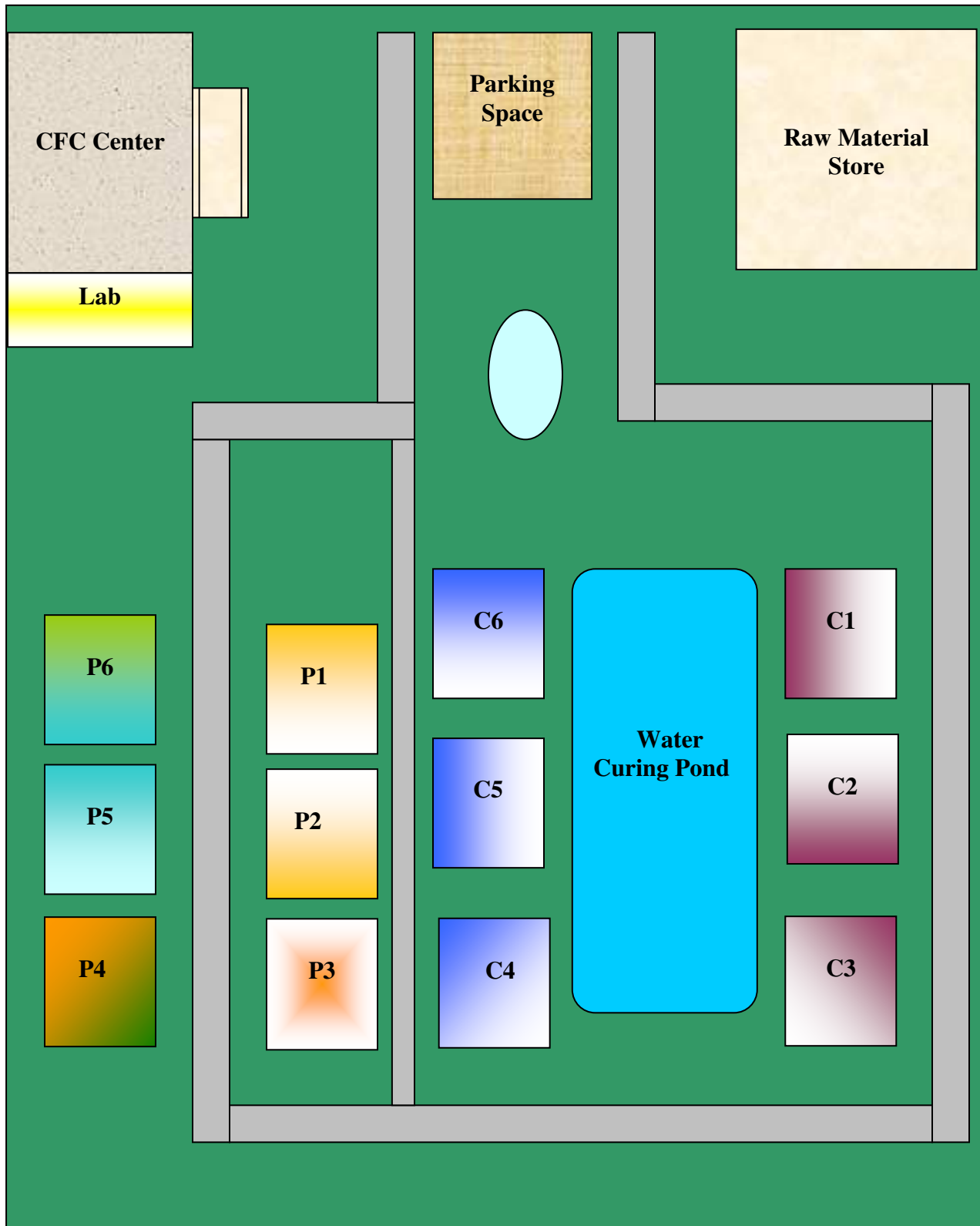
In figure, 1 the construction cluster is shown schematically.

G.9.4 Technology/ Manufacturing Process

Technology for most of the products in this cluster is already proven and is easily available in neighboring India. Some of the product technology can be obtained from Central Building Research Institute, Roorkee (India). Most of the project technologies are available from the suppliers of plant machinery.

G.9.5 Product Quality Standards

Since Bhutan has officially adopted BIS standard for most of the products and all the products have BIS standards, the cluster company can suitably ensure that individual units follow the same. The cluster company can also implement International Quality Management Systems ISO 9001: 2000 for day to management of its working and to formulate quality standards for individual units in the cluster.

Fig 1. Construction Material Cluster

G.9.6 Consumption of Raw Materials, Power and Water

The cluster company will provide the built in flatted factory space with backward and forward integration facilities, thus, it will not be consuming any raw material. However, the power and water required for running the common facilities are provisioned in the project.

The raw materials for the units manufacturing cement-based products will be cement, grit, chips and water. The raw materials for plastic/wood-based products segment will be Linear Low Density Polyethylene/Low Density Polyethylene and PVC granules and construction wood. The plastic compounds have to be imported from India or China. The individual units will place their requirement for procurement of the raw material based on their monthly production projections to the cluster company. The procurement executives of cluster company will undertake common procurement and adopt best supply arrangement from the suppliers for the individual units. There will be provision for common storage where the raw materials will be stored on behalf of the member units and issued to individual units as per the production requirements.

G.9.7 Project Cost/ Total Investment

Individual unit's project investment starts from Nu.30.00 lacs and can go upto Nu. 100.00 lacs for Roto Moulded Tanks. The project cost and financial profitability for the cluster unit has been worked out here, which will house these 12 units and provide the infrastructure support for backward and forward integration as explained in previous pages.

The individual units, which will be owned by individual entrepreneurs as members of the cluster company will be provided the projects technology details by the cluster company. There is provision of Nu.35.00 lacs for development of individual projects, compilation of best technology and financial feasibility.

The cost of the project and detailed financial feasibility worked out here is for the cluster company. The revenue of the cluster company has been considered based on the average sales of individual units keeping a sales margin of 25%. For arriving at the feasibility of the project, it has been assumed that average sales of individual units will be Nu.80.00 lacs for the first year, Nu.100.00 lacs for the second year and Nu.120.00 lacs for the third year and 60%, 70% and 80% targets will be achieved in first, second and third year respectively.

Summary:

▪ Plant capacity	12 Units
▪ No. of Shifts	One shift per day
▪ Working Days in Year	300 days
▪ D.S.C.R	2.77
▪ B.E.P	24.51%
▪ IRR	18.84%
▪ NPV	Nu.127.81 lacs

COST OF PROJECT

The total cost of the project is estimated at Nu. 594.12 lacs as per the particulars given in the tables G.9.1.

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 10,000 sq. meters (On lease)	
2	Building and Civil Construction	278.80
3	Plant & Machinery	35.00
4	Misc. Fixed Assets	133.03
5	Preliminary Expenses	1.00
6	Pre- operative Expenses	85.83
7	Margin Money for Working Capital	1578
8	Contingencies 10%	44.68
Total		594.12

Table G.9.1 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	337.10
2	Term Loan from FI's	257.02
Total		594.12

Table G.9.2 Means of Finance

The term loan has been arrived based on the break up of individual investment items and bank's financing pattern as given in table G.9.13.

BUILDING AND CIVIL WORK

About 10,000 sq. meter of land will be required for this project and built up area required will be 5,824.83 sq. meter as detailed in table G. 9.3.

(Nu. in Lacs)

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total
A	Building					
	Common Facilities Center (CFC)					
1	Administrative Block	100	30	3000	650.00	19.50
2	Conference cum Training Room	50	20	1000	650.00	6.50
3	Quality Control and Testing Lab	50	40	2000	550.00	11.00
4	Design and Development Centre	50	30	1500	650.00	9.75
5	Raw Material Go Down	100	50	5000	550.00	27.50
6	Water Pond	200	100	20000	50.00	10.00
7	Facilities	20	15	300	550.00	1.65
B	Production Area					
1	Small manufacturing shed (PVC Section 6 Nos.) (Size 40'*100'=4000 sq. feet each)	4000	6	24000	550.00	132.00
2	Small manufacturing shed (Cement Section 6 Nos.) (Size 20'*30'=600 sq. feet each)	600	6	3600	400.00	14.40
3	Guard Room (2 Nos. Size 15'*10')	150	2	300	500.00	1.50
4	Internal Roads & Drive Way					20.00
5	Boundary Wall					25.00
Total						278.80

Table G.9.3 Building and Civil Work

PLANT AND MACHINERY

The cost of Plant & Machinery is estimated at Nu.35.00 lacs including installation and commissioning. The cost estimates for plant & machinery have been worked out based on the cost figures available from budgetary offers received from Indian suppliers updated to cover the price escalation in the intervening period. The details of items considered are given in table G.9.4. The prices considered are FOR Bhutan based on road transportation from India.

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Value (Nu. in Lacs)
1	Lab Testing Equipment	-	15.00	15.00
2	Material Handling Equipment	-	20.00	20.00
Total				35.00

Table G.9.4 Plant and Machinery

MISC. FIXED ASSETS

Nu.133.03 lacs have been estimated under the heading of MFA. The details of electrical installations for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery and equipment, equipment for water supply, laboratory, workshop, fire fighting equipment etc. have been provided on a lump sum basis as per information available with the consultants for similar assets.

The details of miscellaneous fixed assets and their associated costs are shown in table below:

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Office Equipment	1	10.00	10.00
2	Furniture & Fixture with Interior	1	8.00	8.00
3	Computers with Accessories	4	0.42	1.68
4	Laptops	2	0.55	1.10
5	Photo Copier & Printer	1	0.50	0.50
6	LCD	1	1.50	1.50
7	MIS & Design Softwares	1	10.00	10.00
8	Fire Fighting Equipments	20	0.10	2.00
9	Car	1	6.00	6.00
10	Loading Three Wheeler	3	1.75	5.25
11	Maruti Omni	1	3.00	3.00
12	Truck	6	6.00	36.00
13	Electrical Installation	1	48.00	48.00
Total				133.03

Table G.9.5 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal & Liaisoning	1.00	1.00
Total			1.00

Table G.9.6 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Expenses incurred prior to commencement of commercial production are covered under this head that total Nu. 85.83 lacs.

Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest during construction, insurance during construction and other miscellaneous expenses. Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing in the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required.

Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements, interest during construction has been computed.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	16.71
2	Insurance during Construction Period	0.25% of factory assets	1.12
3	Electricity Charges during Construction Period		8.00
4	Marketing Launch Expenses		3.00
5	Technology Know-how fees		35.00
6	Training Expenses		10.00
7	Traveling Expenses		12.00
Total			85.83

Table G.9.7 Pre-Operative Expenses

COST OF CONSUMABLES

The cost of consumables is Nu. 5 lacs, which are easily available in Bhutan.

S. No.	Item	Total Value (Nu. in Lacs)
1	Consumables and Stationery	5.00
Total		5.00

Table G.9.8 Cost of Consumables

LAND LEASE CHARGES

Required land for the project is 10,000 sq. meter (107,643 sq. ft.), which has been considered on lease @ Nu. 4.00 per sq. ft. per annum for first three years and @Nu. 6.00 per sq feet for the fourth year and subsequently @3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	4.31
2	2 nd Year	4.00	4.31
3	3 rd Year	4.00	4.31
4	4 th Year	6.00	6.46
5	5 th Year	6.20	6.67
6	6 th Year	6.40	6.89
7	7 th Year	6.60	7.10
8	8 th Year	6.80	7.32
9	9 th Year	7.00	7.53
10	10 th Year	7.20	7.75

Table G.9.9 Land Lease Charges

SALES REALISATION

The revenue of the cluster company has been considered based on the average sales of individual units keeping a sales margin of 25%. It has been assumed that average sales of individual units will be Nu.80.00 lacs for the first year, Nu.100.00 lacs for the second year and Nu.120.00 lacs for the third year.

It is assumed that average 60% capacity utilization will be achieved during first year of operation, 70% in second year and 80% from third year onwards by the individual units.

The sales revenue to be collected by the cluster company on the sales of 12 units as given in table G9.10

S. No.	Items	Total Amount Per Annum (Nu. in Lacs)
1	Sales Margin @ 25% on sales of Nu. 80 lacs per unit (average) of 12 units	240.00
Total		240.00

Table G.9.10 Sales Realisation

	(Nu. in Lacs)
▪ Total revenue realisation in first year	240.00
▪ Second year sales of 100 lacs per unit	300.00
▪ Third year sales of 120 lacs per unit	360.00

SALARY AND WAGES

The cluster company will provide the backward and forward integration to the member units. The individual units will handle the itemized production under various product groups as above. The marketing, production planning based on the market forecast and the cluster company professional staff will also support raw material planning for the individual units. Thus, the professional staff as per table G.9.11 will be recruited.

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The break down of manpower and incidence of salaries & wages are detailed in following table:

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
	Administrative				
1	Chief Executive Officer	1	50,000	0.50	6.00
2	Manager (Corporate)	1	20,000	0.20	2.40
3	Manager (HR)	1	20,000	0.20	2.40
4	Manager (Purchase)	1	20,000	0.20	2.40
5	Manager (MIS, Logistics)	1	20,000	0.20	2.40
6	Manager (Marketing)	2	20,000	0.40	4.80
7	Manager (Training)	1	12,500	0.13	1.50
8	Marketing Executives	4	8,000	0.32	3.84
9	Purchase Executives	2	8,000	0.16	1.92
10	Estate Manager	1	20,000	0.20	2.40
11	Maintenance Engineers	2	12,500	0.25	3.00
12	Accountant	2	8,500	0.17	2.04
13	Office Assistant	5	5,000	0.25	3.00
14	Drivers	12	4,500	0.54	6.48
15	Security Guards	6	4,000	0.24	2.88
Total					47.46

Table G.9.11 Salary and Wages

Note: 1. Fringe benefits @ 15 % of the salary.
2. Salary to increase by 5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power & water charges are increased @5% every year. The unit cost of electricity has been considered @ Nu.1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation water tariff of Nu. 2.25/ m³ (base rate: Nu.1.5/ m³ + 50% for sewage charges).

S. No.	Description	Amount Per Annum (Nu. in Lacs)
1	Power Consumption	9.00
2	Water Consumption	3.00
Total		12.00

Table G.9.12 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Land 10,000 sq. meters	0%	0.00	0.00	0.00
2	Building and Civil Construction	50%	278.80	139.40	139.40
3	Plant & Machinery	30%	35.00	10.50	24.50
4	Misc. & Fixed assets	30%	133.03	39.91	93.12
5	Preliminary Expenses	100%	1.00	1.00	0.00
6	Pre- operative Expenses	100%	85.83	85.83	0.00
7	Margin Money for Working Capital	100%	15.78	15.78	0.00
8	Contingencies	100%	44.68	44.68	0.00
Total			594.12	337.10	257.02

Table G.9.13 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

Working capital requirements have been worked out in the following table:

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Material	15 days	25%	0.21	0.05	0.16
2	Receivable	30 days	25%	20.00	5.00	15.00
3	Cash for Expenses	30 days	100%	10.73	10.73	0.00
Total				30.94	15.78	15.16

Table G.9.14 Working Capital Requirement

ESTIMATED COST OF PRODUCTION AND PROFITABILITY

The profitability projection have been worked out for 10 years, at 60% capacity utilization during first year, 70% second year and 80% from third year onwards and following assumptions and basis as relevant and applicable to Bhutan, have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @13% p.a. on term loan & working capital loan.
- Insurance charges @0.25% on all assets in first year, then @5% decrease every year.
- Power & water charges are increased @5% every year.
- Administrative expenses have been increased @5% every year.
- Margin money on bank loan has been considered @40% on building, @25% on plant & machinery and @25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one-year moratorium.
- Preliminary exp. will be written off @10% every year in next 10 years.
- Pre operative exp. will be written off from II year @10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent & interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Revenue Realisation in lacs Nu.	240.00	300.00	360.00	360.00	360.00	360.00	360.00	360.00	360.00	360.00
2	COST OF PRODUCTION										
	Consumables	5.00	6.00	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
	Power, Fuel & Water	12.00	12.60	13.23	13.89	14.59	15.32	16.08	16.89	17.73	18.62
	Salary & Wages	47.46	49.83	52.32	54.94	57.69	60.57	63.60	66.78	70.12	73.63
	Fringe Benefits @15%	7.12	7.47	7.85	8.24	8.65	9.09	9.54	10.02	10.52	11.04
	Insurance	1.12	1.01	0.91	0.82	0.73	0.66	0.60	0.54	0.48	0.43
	Repairs & Maintenance @ 4%	6.72	7.06	7.41	7.78	8.17	8.58	9.01	9.46	9.93	10.43
	Lease Rent	4.31	4.31	4.31	6.46	6.67	6.89	7.10	7.32	7.53	7.75
	Other Admn. Exp.	15.00	15.75	16.54	17.36	18.23	19.14	20.10	21.11	22.16	23.27
	Branding & Distribution Expenses	30.00	33.00	36.30	39.93	43.92	48.32	53.15	58.46	64.31	70.74
	Total	128.73	137.03	145.46	156.02	165.26	175.16	185.78	197.16	209.38	222.51
3	TOTAL REVENUE	240.00	300.00	360.00	360.00	360.00	360.00	360.00	360.00	360.00	360.00
4	PROFIT BEFORE INTT. & DEP.	111.27	162.97	214.54	203.98	194.74	184.84	174.22	162.84	150.62	137.49
5	Interest on Term Loan @13%	33.41	31.32	27.15	22.97	18.80	14.62	10.45	6.27	2.09	
6	On Working Capital @13 %	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97
7	Total Interest	35.38	33.30	29.12	24.94	20.77	16.59	12.42	8.24	4.07	1.97
8	Profit Before Dep.	75.89	129.68	185.42	179.03	173.97	168.25	161.81	154.59	146.55	135.52
9	DEPRECIATION	33.57	33.57	33.57	33.57	33.57	33.57	25.17	8.36	8.36	8.36
10	Profit After Depreciation	42.32	96.11	151.85	145.46	140.40	134.68	136.64	146.23	138.19	127.16
11	Pre Operative Exp. Write off	0.00	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58
12	Preliminary Exp. Write off	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
13	PROFIT BEFORE TAXATION	42.22	87.42	143.17	136.78	131.72	125.99	127.96	137.55	129.50	118.48
14	Taxation @30% of Net Profit	12.67	26.23	42.95	41.03	39.52	37.80	38.39	41.26	38.85	35.54
15	Profit After Taxation	29.56	61.20	100.22	95.75	92.20	88.20	89.57	96.28	90.65	82.93
16	Accumulated Profits	29.56	90.75	190.97	286.72	378.92	467.13	556.68	652.97	743.62	826.55
17	PROFIT AFTER TAXATION	29.56	61.20	100.22	95.75	92.20	88.20	89.57	96.28	90.65	82.93
18	Add: Depreciation	33.57	33.57	33.57	33.57	33.57	33.57	25.17	8.36	8.36	8.36
19	Add: Interest on Term Loan	33.41	31.32	27.15	22.97	18.80	14.62	10.45	6.27	2.09	0.00
	Total (A)	96.54	126.09	160.93	152.29	144.57	136.39	125.18	110.92	101.11	91.30
21	Interest on Term Loan	33.41	31.32	27.15	22.97	18.80	14.62	10.45	6.27	2.09	0.00
22	Repayment of Term Loan	0.00	32.12	32.12	32.12	32.12	32.12	32.12	32.12	32.12	0.00
	Total (B)	33.41	63.44	59.27	55.09	50.92	46.74	42.57	38.39	34.28	0.00
	SURPLUS (A) - (B)	63.12	62.65	101.66	97.20	93.65	89.64	82.62	72.53	66.84	91.30
	DSCR (A/B)	2.89	1.99	2.72	2.76	2.84	2.92	2.94	2.89	2.95	N.A.
	AVERAGE DSCR	2.77									

Table G.9.15 Estimated Cost of Production and Profitability

CALCULATION OF INTEREST ON TERM LOAN

(Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	257.02	0	257.02	33.41	33.41
B	2nd year					
	I Qtr	257.02	8.03	248.99	8.22	
	II Qtr	248.99	8.03	240.96	7.96	
	III Qtr	240.46	8.03	232.93	7.70	
	IV Qtr	232.93	8.03	224.90	7.44	31.32
C	3rd year					
	I Qtr	224.90	8.03	216.87	7.18	
	II Qtr	216.87	8.03	208.84	6.92	
	III Qtr	208.84	8.03	200.81	6.66	
	IV Qtr	200.81	8.03	192.78	6.40	27.15
D	4th year					
	I Qtr	192.78	8.03	184.75	6.13	
	II Qtr	184.75	8.03	176.72	5.87	
	III Qtr	176.72	8.03	168.69	5.61	
	IV Qtr	168.69	8.03	160.66	5.35	22.97
E	5th year					
	I Qtr	160.66	8.03	153.63	5.09	
	II Qtr	152.63	8.03	144.60	4.83	
	III Qtr	144.60	8.03	136.57	4.57	
	IV Qtr	136.57	8.03	128.54	4.31	18.80
F	6th year					
	I Qtr	128.54	8.03	120.51	4.05	
	II Qtr	120.51	8.03	112.48	3.79	
	III Qtr	112.48	8.03	104.45	3.53	
	IV Qtr	104.45	8.03	96.42	3.26	14.62
G	7th year					
	I Qtr	96.42	8.03	88.39	3.00	
	II Qtr	88.39	8.03	80.36	2.74	
	III Qtr	80.36	8.03	72.33	2.48	
	IV Qtr	72.33	8.03	64.30	2.22	10.45
H	8th year					
	I Qtr	64.30	8.03	56.27	1.96	
	II Qtr	56.27	8.03	48.24	1.70	
	III Qtr	48.24	8.03	40.21	1.44	
	IV Qtr	40.21	8.03	32.18	1.18	6.27
I	9th year					
	I Qtr	32.18	8.03	24.15	0.92	
	II Qtr	24.15	8.03	16.12	0.65	
	III Qtr	16.12	8.03	8.09	0.39	
	IV Qtr	8.09	8.09	0.00	0.13	2.09

Table G.9.16 Calculation of Interest on Term Loan

DEPRECIATION CHART (As per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 15,000 sq. Meter	0.00	0	0.00	0	0	0	0
2	Building and Civil Construction	278.80	3%	8.36	3%	8.36	3%	8.36
3	Plant & Machinery	35.00	15%	5.25	10%	3.50	0%	0
4	Misc. Fixed Assets	133.03	15%	19.95	10%	13.303	0%	0
Total		446.83		33.57		25.17		8.36

Table G.9.17 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1 st Year	2 nd Year	3 rd Year
Variable Cost	123.30	131.72	140.25
Fixed Cost	40.81	38.61	34.33
Break Even Point (B.E.P.)	34.97%	22.94%	15.62%
Average B.E.P.	24.51%		

Table G.9.18 Break Even Point

NPR & RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	17.59%	29.14%	39.77%	37.99%	36.59%	35.00%	35.54%	38.21%	35.97%	32.91%
Return on Investment (RI)	8.77	18.15	29.73	28.40	27.35	26.16	26.57	28.56	26.89	24.60

Table G.9.19 NPR & RI

G.9.8 Profitability of Units

Each unit in the cluster will be benefiting two ways - the profit from product sold to the cluster company and the profit sharing from the cluster company as shareholders. Based on the analysis of similar units in India, it is estimated that individual units will have an ROI of around 24 to 45% varying from project to project.

The profitability projections and IRR calculation given here are for the cluster company only.

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	29.56	61.20	100.22	95.75	92.20	88.20	89.57	96.28	90.65	82.93
1.2	Depreciation	0	33.57	33.57	33.57	33.57	33.57	33.57	25.17	8.36	8.36	8.36
1.3	Interest on term loan & W.C.	0	35.38	33.30	29.12	24.94	20.77	16.59	12.42	8.24	4.07	1.97
1.4	Preliminary exp. write off	0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
1.5	Pre-operative exp. write off	0	0.00	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58
1.6	Net cash inflows	0.00	98.61	136.74	171.59	162.94	155.22	147.04	135.84	121.57	111.76	101.95
2	OUTFLOWS											
2.1	Investment in fixed assets	578.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
2.2	Investment in working capital	15.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	594.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	-594.12	98.61	136.74	171.59	162.94	155.22	147.04	135.84	121.57	111.76	101.95

Table G.9.20 Cash Flow Statement

- Internal Rate of Return (IRR) 18.84%
- Net Present Value (NPV) Nu. 127.81 Lacs
- Weighted Average Cost of Capital (WACC) 13%

Project Viability: - Internal Rate of Return of the project is 18.84%, which is higher than the WACC of 13%. Hence the project is financially viable. The NPV shows the present value of the net cash flow, or the project's worth today. The discount rate used here is the WACC. A positive NPV indicates a profitable project (i.e. the project generates sufficient funds to cover its cost, including loan repayments and interest payments).

G.9.9 Environmental Issues

As per the regulations of the National Environment Commission, Royal Government of Bhutan, all the projects under this cluster fall in the list of activities requiring environmental clearance. So individual project wise clearance will be obtained and non-polluting technology will be recommended for all the cluster units. At cluster company level, suitable environment mitigation measures as per NEC guidelines during the construction and operation phases have to be adopted.

Application as per the guidelines of NEC has to be submitted along with detailed project report for environmental clearance before commencement of the project.

G. 9.10 Source of Technology/ Plant Machinery Supplier

1. Building Materials and Technology Promotion Council

Core 5 -A, First Floor,
India Habitat Centre, Lodi Road
New Delhi- 110 003
Phone: +91-11-24638096, 24638097,
Fax: +91-11-24642849
E-mail: info@bmtpc.org

Building Materials & Technology Promotion Council (BMTPC) set up in 1990 by Government of India under Ministry of Housing & Urban Poverty Alleviation is an apex level inter-Ministerial organization for promotion, development and large scale dissemination of appropriate, cost-effective, eco-friendly and energy-efficient building materials and technologies.

It has developed following low cost technologies and machines. It is suggested that the cluster company approach this organisation and develop the 12 projects suiting to local environment conditions:

- Alternate Station Hydraulic Brick Press (AS-4/2)
- Bi-Directional Vibro Press (AS-189)
- Bi-Directional Vibro Press (AS-1818)
- Bi-Directional Vibro Press (AS-1824)
- Solid/Hollow Concrete Block Machine (Egg Laying Type) (CB-1)
- Solid/Hollow Concrete Block Machine (Standing Type) (CB-2)
- Concrete Block Machine (SAKAR) (CB-3)
- Stationary Block Machine (ASH-168)
- Solid / Hollow Concrete Block Machine (Handheld Type) (SVC-1)
- C-Brick Machine (SL-1)
- Compressed Earth Block Machine (Balram) (MB-1)
- Compressed Earth Block Machine (Mardini) (MB-2)
- Compressed Earth Block Machine (Hydraform) (M-5)

- Ferrocement Wall Panel Machine (WP-1)
- Ferrocement Roofing Channel Machine (FCR-1)
- Precast RCC Plank Machine (CP-1)
- RCC Plank Casting Machine (Rotating Type) (CP-2)
- Precast RCC Plank Machine (Egg Laying Type) (CP-3)
- Precast RCC Joist Machine (CJ-1)
- RCC Joist Casting Machine (Egg laying Type) (CJ-2)
- Ferrocement C-Beam Machine (FB-1)
- Micro Concrete Roofing Tile Machine (MCR-1)
- Precast L-Panel Machine (LP-1)
- Terrazo/Chequered Tile Machine (ASH-40)
- Precast concrete Door/Window Frame Machine (CC-1)
- Combination Machine (LP-2)
- Multipurpose Stone Processing Machine (SP-1)
- Stone/Coal Disintegrator (AS-1714)
- Bar and Pipe Cutting Machine (AS-12)
- Finger Jointing & Finger Shaping M/C

Central Building Research Institute, Roorkee, Uttarkhand (India), a well-known institution of Government of India under Council of Scientific & Industrial Research, working exclusively in technology development for construction sector can also be approached for technology licensing.

G.10 Integrated Dairy

G.10.1 Introduction

Livestock is an integral part in all-Bhutanese farming systems contributing 10 percent to the GDP. This figure however, does not account for value-added contributions made to agriculture through manure and draught power. The large variations in the environmental conditions have led to a range of livestock production systems, ranging from the high altitude transhumance yak-sheep system to systems where animals are used primarily for draft and manure only.

The butter and cheese from yaks are generally bartered for grain from the lower areas on a seasonal basis. Important cheese products that find a ready market are 'chugo' (dried cubes of cheese) from the west and central Bhutan and 'zoetey' (fermented cheese) from eastern Bhutan.

Dairy products are important and form a core of the Bhutanese diet. About 22,491,854 liters of milk, 24,48,849 kg of butter and 55,42,119 number of cheese balls were produced in year 2005. The quality of milk sold by the unorganized sector is inconsistent and so is the price, which varies from season to season.

There is a good potential for the development of integrated dairy for value-added specialty dairy products like pasteurized pouch milk, cheese, butter, cream, flavored milk, frozen fruit yogurt for local consumption and export to North Indian States and Bangladesh.

For livestock products, there is little scope for export unless scientific collection to processing is set up in milk surplus areas. The first objective would be to meet the domestic demand and reduce the import of livestock products from abroad. In terms of dairy, the collection and processing of milk is important, but the marketing of the products is at least as important. As the Bhutanese dietetic preferences are changing, the products offered by Bhutanese manufacturer should try to meet these new demands. A huge portion of dairy imports consists of Amul (Indian co-operative) cheese and butter and milk powder. Efforts should be made to offer a Bhutanese alternative for these products.

Thus, an integrated dairy project has been recommended as one of the ten prioritized projects for investment at national level as it meets not only the domestic requirement but also benefit from the neighboring markets in India and Bangladesh where milk and dairy products constitute a good market.

The proposed project has been designed for a raw milk processing capacity of 5,000 liters per day.

G.10.2 Markets and Global Competitiveness Scene

There are practically no organized marketing centres for traditional milk products in Bhutan. The marketing channel is mostly unorganized. There are many constraining factors in the production of traditional milk products. The main problems are: -

- Lack of hygienic measures in milk production and in the preparation of traditional milk products.
- Inadequate technical support services.
- Marketing and distribution difficulties and lack of organization.
- Pricing policy.
- Poor infrastructure.
- Lack of funds.

However, organized efforts have been made in the past for exploiting this resource by RGOB as well as the private sector. Department of Livestock with a financial support from GTZ started a cheese processing plant in 2004 in Gogona, Wangdue Phodrang Dzongkhag. As of now, the plant produces almost 4,000 kg of Gouda cheese (a Swiss cheese) per year.

Bhutan Dairy and Agro Products Limited based in Phuentsholing produces 5,000 litres of processed milk everyday under the brand name 'Druk'. It sells half litre milk pouches at Nu. 7.50 in Phuentsholing, Nu.7.00 in Samtse and Nu. 8.50 in Thimphu. The company has two outlets in Phuentsholing, one each in Thimphu, Samtse, and the Indian towns of Jaigaon and Siliguri. The outlets are grocery shops that sell the milk for a commission. About 80 percent of the produce is consumed mainly in Phuentsholing, about 10 percent in Thimphu and the rest in other places.

Daily, the company acquires raw milk (the raw material) from the national jersey-breeding center in Samtse and gets an additional 1,500 litres through local collection from the outskirts of Phuentsholing town including Pasakha. Bhutan Dairy believes that 20 percent of their produce will be enough to cater to the domestic market while the remaining bulk will go to North Indian markets and Bangladesh. The company has already identified dealers who will sell their produce in the Indian towns of Guwahati, Kolkata, Siliguri, Gangtok, Kalimpong and Darjeeling in India and also in Dhaka and Bangladesh.

10.2.1 Indian Market:

Market size for milk (sold in loose/ packaged form) is estimated to be 36million MT valued at Rs 470 bn. The market is currently growing at round 4% per annum in volume terms. The milk surplus states in India are Uttar Pradesh, Punjab, Haryana, Rajasthan, Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu. The manufacturing of milk products is concentrated in these milk surplus States. The top 6 states viz. Uttar Pradesh, Punjab, Madhya Pradesh, Rajasthan, Tamil Nadu and Gujarat together account for 58% of national production.

10.2.2 Major Players:

The packaged milk segment is dominated by the dairy cooperatives. Gujarat Co-operative Milk Marketing Federation (GCMMF) with its Amul Brand is the largest player. All other local dairy cooperatives have their local brands e.g. Gokul, Warana in Maharashtra, Saras in Rajasthan, Verka in Punjab, Vijaya in Andhra Pradesh, Aavin in Tamil Nadu, etc. Other private players include J K Dairy, Milk Food, Heritage Foods, Indian Dairy, Dairy Specialties etc.

10.2.3 North Eastern Indian Market: Milk has been an integral part of Indian food for centuries. The per capita availability of milk in India has grown from 172 gm per person per day in 1972 to 182 gm in 1999 and 218 gm in 2005-06. This is expected to increase to 232 gms by 2009-10. However, a large part of the population cannot afford milk. This per capita consumption is below the world average of 285 gm and even less than the 220 gm recommended by the Nutritional Advisory Committee of the Indian Council of Medical Research.

There are regional disparities in production and consumption also. The per capita availability in the north is 278 gm, west 174 gm, south 148 gm and in the east only 93 gm per person per day. This disparity is due to the concentration of milk production in some pockets and high cost of transportation. Also the output of milk in cereal growing areas is much higher than elsewhere, which can be attributed to abundant availability of fodder, crop residues etc., with high food value for animals.

Thus, Bhutan milk has a ready market in North Eastern Indian states, where the present availability is the lowest and it is costlier to transport from other regions of India. With the resource data supporting a new integrated dairy and assured market in Bhutan as well as in neighboring countries, this project's prospects are bright.

G.10.3 Proposed Business Structure

Dairy development is essentially a process of collecting raw milk, transporting in hygienic conditions to processing plant, pass through processing and after adding value by processing, selling it to consumers at reasonable rates. This project can be set up in private/cooperative sector. A cooperative based dairy would be more advantageous as it will ensure quality of input milk by participation of the dairy farming members. Generally dairy cooperatives are formed for proper milk collection and agreement for assured and regular milk supplies.

G.10.4 Project Location and Size of Project

The first ideal location of the plant would be near the intersection of Paro-Chukha-Haa road. The available milk in this region is in the range of 54,73,260 liters per annum.

The second location could be in Gelephu as in the Tsirang-Wangdue-Dagana-Sarpang region the available milk is in the range of 62,66,000 liters per annum. After local consumption, there would be milk availability for the proposed 5,000 liters per day plant in both the regions.

10.4.1 Managerial and Logistics Aspects:

It is proposed that milk collection centers in various village headquarters be set up. The company should also set up chilling centers on franchise basis. Milk will be collected on daily basis with fat and SNF checking parameters. Payments to the farmers will be decided on the basis of percentage content of these two parameters and prevailing market rates.

10.4.2 Technical Collaboration:

Since the process is simple, no technical collaboration is envisaged for the project. However, the Milk Unions/Private Dairy Plants would be providing guidance to the societies/collection centres in purchase and installation of Bulk Milk Coolers and in training of manpower in operation and maintenance.

G.10.5 Infrastructure Requirements

The land area required for this project is 5,000 sq. meter and 1,352 sq. meter constructed shed will be required for this plant at initial stage. The following are the infrastructure requirement for this project:

- Raw Milk Reception Dock (RMRD) - consisting of can conveyor, can washer, weighing balance, dump tank etc.
- Processing Hall - cream separator, chiller, homogenizer, pasteuriser and other related machinery are installed.
- Storage area - for milk storage tanks.
- Packing area - for packing of liquid milk and other products.
- Cold storage - for keeping the milk and milk products before sending to market.
- Quality Control Laboratory - for testing the quality of milk and milk products.
- Utilities area - for installing boiler, water treatment plant, maintenance and store area for spares.
- Waste water treatment plant area - for treating the dairy effluents before releasing to the fields.
- Quarters and office area - for all the essential staff.
- Vehicle parking area - both for the milk procurement and distribution vehicles.
- Input supply area - for providing veterinary service, supply of feed, fodder seeds etc.

G.10.6 Technology/ Manufacturing Process

Generally Buffalo milk has 3.6% protein, 7.4% fat, 5.5% milk sugar, 0.8% ash and 82.7% water whereas cow milk has 3.5% protein, 3.7% fat, 4.9% milk sugar, 0.7% ash and 87% water.

The processed packaged milk can be divided according to fat content as follows:

- Whole (full cream) milk - 6% fat
- Standardized (toned) milk - 4.5% fat
- Doubled toned (low fat) milk - 3% fat

Another category of milk, which has a growing market, is flavored milk.

Milk is pasteurized by treating it to high temperature for a short time. The main aim in treating milk at high temperature is to destroy the disease causing pathogens and to improve in keeping quality. Separation machine is typically a high-powered centrifuge. The centrifugal force makes milk fat globules and emerges as cream from the separator bowl. Separation of cream produces skim milk from which several dairy products are made.

The manufacturing process of other value-added products are given below:

Butter: Whole milk is first separated into skim milk and cream by centrifugal force in a separator. The cream is then pasteurized either through batch process or a continuous process. In batch process, cream is heated to a minimum of 74°C and held at the temperature for 30 minutes, while in continuous process it is heated at 85°C and is held for only 15 seconds.

The heat treatment destroys bacteria, inactivates enzymes and gives the cream a cooked flavour. After pasteurization, a tempering process is applied in which cream is held at 10 °C to allow rearrangement of the fat crystals. The cream is then churned to produce butter. Continuous churning converts cream into butter in a few minutes while batch churning takes a longer time. Composition and color adjustment is also done at the churning stage and a salt solution is added to give the finished butter a salty taste. About 13 liters of milk with 6% fat is required to produce 1 kg of butter.

Cheese: There are thousands of varieties of cheese in the world. The type of manufacturing process used in the production of cheese determines its flavor, which ranges from extremely mild to very sharp, and its texture, which can be semi-solid to almost stone hard. Cheese making requires four main ingredients - good quality milk, rennet or coagulating acids, culture and salt. Cheese is generally made from cow's milk. About 10 liters of milk with 3% fat is required for making 1 kg of cheese. Natural cheese is made by coagulating or curdling milk, stirring & heating the curd, draining off the whey and collecting or pressing the curd. The desired flavor and texture is obtained by varying the temperature, humidity and time period of the curing process.

Sweetened condensed milk is usually made from fresh milk by adding sugar to the milk pre-warming and concentrating the mixture in the high vacuum. The syrupy milk is then cooled so that the lactose crystallizes as very fine crystals and then the product is coagulated.

G.10.6.1 Plant Machinery and Equipments

For the proposed project, a 5000-litre per day plant expandable to 10,000 liters per day of milk plant with provision of butter and fat has been considered.

The section-wise equipment required, their specifications, quantity and costs for 5000 litres per day capacity plant are given in table G.10.4. The machineries should be as per the BIS. Most of the dairy machineries are manufactured in neighboring India by ALFA-LAVAL, L&T, HMT, Nichrome Pvt. Ltd., Samarpan Fabricators, Goma Engineering Ltd, SSP Pvt Ltd. and Food & Biotech Engineers (I) etc.

G.10.7 Product Quality Standards

Milk is classified by fat and SNF it contains, and there are no product standards. However, ISO 9001:2000, HACCP (Hazard Analysis and Critical Control Point) and food safety regulations viz. ISO 22000 are the mandatory requirement in terms of international practices.

G.10.8 Consumption of Raw Materials, Power and Water

Power:

Since all machineries are motorized, the plant will require continuous supply of electricity. A plant having capacity to process 5,000 litres of milk per day will approximately require 125 kw of power to run the entire machinery.

Water:

A milk processing plant requires water in the ratio of 2:1 (2 liters of water for 1 liter of milk processed) for cleaning of equipment, cold storage and drinking purposes. Fresh and hygienic water is the prime requirement for milk processing plant.

Thus, the source of water supply, quantity available and suitability for the purpose has to be studied and assured. For the project, suitable provision of water @ 10,000 liters per day is required to be designed and depending on the quality of water, a water softening plant may be considered. A 5,000-liter storage water tank needs to be built.

Steam:

The steam requirement of 600 kg/hr has been envisaged for this project and a suitable boiler provisioned.

G.10.9 Project Cost/Total Investment

Summary:

▪ Plant Capacity	5,000 Liters per day
▪ No. of Shift:	One(Eight hours per shift)per day
▪ Working Days in Year	300 days
▪ DSCR	2.06
▪ B.E.P.	32.98%
▪ IRR	17.39%
▪ NPV	Nu. 51.82 Lac

COST OF PROJECT

The total cost of the project is estimated at Nu. 331.66 lacs as per the particulars given in table G.10.1.

S. No.	Particulars	Value (Nu. in Lacs)
1	Land 5,000 sq. meters (On lease)	
2	Building and Civil Construction	84.40
3	Plant & Machinery	114.50
4	Misc. Fixed Assets	56.70
5	Preliminary Expenses	2.00
6	Pre-operative Expenses	32.25
7	Margin Money for Working Capital	16.25
8	Contingencies 10%	25.56
Total		331.66

Table G.10.1 Cost of Project

MEANS OF FINANCE

S. No.	Particulars	Value (Nu. in Lacs)
1	Promoters Equity	152.62
2	Term Loan from FI's	179.04
Total		331.66

Table G.10.2 Means of Finance

The term loan has been arrived at based on the break up of individual investment items and bank's financing pattern as given in table G.10.13.

BUILDING AND CIVIL WORK

About 5,000 sq. meter of land will be required for this project and built up area required will be 1,352.34 sq. meter consisting of production hall, packing and storage etc.

S. No.	Particulars	Dimensions (Ft.)		Area (Sq. Ft.)	Rate Per Sq. Ft. (Nu.)	Total (Nu. in Lacs)
A	Administrative Block	25	10	250	550.00	1.38
1	Store (Raw material)	50	65	3250	550.00	17.88
2	Chilling & Storage area	40	60	2400	600.00	14.40
3	Processing Area	40	60	2400	550.00	13.20
4	Machinery Room	40	60	1600	550.00	8.80
5	Laboratory	20	20	400	550.00	2.20
6	Packaging Section	40	40	1600	550.00	8.80
7	Store (Finished products)	50	50	2500	550.00	13.75
8	Meter room	10	10	100	500.00	0.50
9	Guard room	10	10	100	500.00	0.50
B	Boundary wall fencing along with One big and one small gate					3.00
Total						84.40

Table G.10.3 Building and Civil Work

PLANT AND MACHINERY (Turnkey Basis)

The cost of Plant & Machinery is estimated at Nu.114.50 lacs including installation and commissioning on turnkey basis. The Plant capacity is 5,000 liters of milk per day. The cost estimates for plant & machinery have been worked out based on the cost figures available from budgetary offer received from M/s SSP Ltd. Faridabad. The details of the plant machinery and equipment are given in table G.10.4. Freight and insurance have been considered on the assumption that all goods are transported by road.

S. No.	Description	Capacity	Qty.	Rate (Nu. in Lacs)
1.0	MILK RECEPTION & PROCESSING SECTION			
1.1	Tanker Unloading pump with hose pipe	2000 LPH	1	
1.2	Milk weigh bowl with weigh scale	0-500 kg	1	
1.3	Dump Tank	500 L	1	
1.4	Milk Transfer Pump	2000 LPH	1	
1.5	Duplex Strainer	2000 LPH	1	
1.6	Milk Chiller	2000 LPH	1	
1.7	Milk Pasteurizing Plant with hot water generator	1000 LPH	1	
1.8	Milk Storage Tank	3000 L	2	
1.9	Cream Separator	1000 LPH	1	
1.10	Milk Transfer Pump	2000 LPH	1	
1.11	Pouch Filling Machine in 1/2 L & 1 L	2500 pouches/h	1	
2.0	CREAM SECTION			
2.1	Cream Pasteurizer	500 LPH	1	
2.2	Cream Storage Tank	1000 L	1	
2.3	Cream Transfer Pump	1,000 LPH	1	
3.0	UTILITIES/SERVICES			
3.1	Steam Generating Set (Boiler) with necessary accessories	600 kg/h	1	
3.2	Refrigeration Unit with standby compressor and other accessories	5 TR	1	
3.3	Air Compressor	30 Nm ³ /h	1	
3.4	MCC & Electrical	Suitable		
3.5	Pipe and Fittings	Suitable		
3.6	Electronic Milk Tester		1	
Total				114.50

Table G.10.4 Plant and Machinery

MISC. FIXED ASSETS

Nu. 56.70 lacs has been estimated under the heading of MFA. The details of electrical installation for power distribution have been considered commensurate with the power load and process control requirements. Other miscellaneous fixed assets including furniture, office machinery and equipment, equipment for water supply, laboratory, workshop, fire fighting equipment, etc. have been provided on a lump sum basis as per information available with the consultants for similar assets.

The details of miscellaneous fixed assets and their associated costs have already been shown in table below:

S. No.	Particulars	Qty.	Rate (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Office Equipment		2.50	2.50
2	Furniture & Fixture		2.50	2.50
3	Miscellaneous Accessories		2.00	2.00
4	Fire Fighting	5	0.05	0.25
5	Computer with Accessories & software	1	1.00	1.00
6	Car	1	6.50	6.50
7	Loading Tempo	6	1.50	9.00
8	Pick-up Van	3	4.50	13.50
9	Truck	1	8.00	8.00
10	Electrical Installation		11.45	11.45
Total				56.70

Table G.10.5 Misc. Fixed Assets

PRELIMINARY EXPENSES

S. No.	Particular	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Company Formation Expenses, Legal & Liaisoning	2.00	2.00
Total			2.00

Table G.10.6 Preliminary Expenses

PRE-OPERATIVE EXPENSES

Expenses incurred prior to commencement of commercial production are covered under this head that total Nu. 32.25 lacs. Pre-operative expenses include establishment cost, rent, taxes, traveling expenses, interest during construction, insurance during construction and other miscellaneous expenses.

Based on the financing pattern envisaged, interest during construction has been estimated considering the phasing of the cash requirements and the norms prevalent for various sources of funds. It has been assumed that the funds from various sources shall be available, as required.

Based on the project implementation schedule, the expected completion dates of various activities and the estimated phasing of cash requirements, interest during construction has been computed. Other expenses under this head have been estimated on a block basis, based on information available for similar projects.

S. No.	Particulars	Estimation (Nu. in Lacs)	Amount (Nu. in Lacs)
1	Interest up to Production	for 1 year on term loan	11.61
2	Insurance during Construction Period	0.25% of factory assets	0.64
3	Electricity Charges during Construction Period		2.00
4	Marketing Launch Expenses		5.00
5	Technology Know-how Fees		6.00
6	Training Expenses		4.00
7	Traveling Expenses		3.00
Total			32.25

Table G.10.7 Pre-Operative Expenses

COST OF RAW MATERIAL

The raw milk requirement of the project will be 5000 Liters per day and the cost of raw milk has been taken as Nu.16.00 per liter based on the average prices of milk arrival in Thimphu in 2006.

S. No.	Particulars	Qty. in Liter Per Day	Rate (Nu.) Per Liter	Total Value (Nu. in Lacs)
1	Milk	5,000	16.00	292.00
2	Consumables			32.00
Total				324.00

Table G.10.8 Cost of Raw Material

LAND LEASE CHARGES

Required land is 5,000 sq. meter (53,821.31 sq. ft.), which has been considered on lease @ Nu. 4.00 per sq. ft. per annum for first three years and @ Nu. 6.00 per sq. feet for the fourth year and subsequently @ 3% increase every year.

S. No.	Year	Lease Rate Per Sq. Ft. Per Year (Nu.)	Lease Charges Per Annum (Nu. in Lacs)
1	1 st Year	4.00	2.15
2	2 nd Year	4.00	2.15
3	3 rd Year	4.00	2.15
4	4 th Year	6.00	3.23
5	5 th Year	6.20	3.34
6	6 th Year	6.40	3.44
7	7 th Year	6.60	3.55
8	8 th Year	6.80	3.66
9	9 th Year	7.00	3.77
10	10 th Year	7.20	3.88

Table G.10.9 Land Lease Charges

SALES REALISATION

The sales prices has been considered as ex. factory price and worked out in comparison with the retails sales prices of the local packaged milk sold in Thimphu and neighboring countries. It is assumed that 60% capacity will be achieved during first year of operation and subsequently 70% in second year and 80% in third year onwards.

S. No.	Item	Production Liter (Per Annum)	Rate Nu. Per Liter/kg.	Total Amount Per Annum (Nu. in Lacs)
A	Milk	1,46,0,000	22.00	321.20
B	Butter	73,000	200.00	146.00
C	Cheese	91,250	80.00	73.00
D	Other Product	18,2,500	40.00	73.00
Total				613.20

Table G.10.10 Sales Realisation

	(Nu. in Lacs)
▪ Total sales realisation at 100%	613.20
▪ First year 60%	367.92
▪ Second year 70%	429.24
▪ Third year 80%	490.56

SALARY AND WAGES

Salaries & wages (including benefits) for different categories of employees have been considered based on present day expenses being incurred by other industries in the vicinity. Adequate adjustments have been considered for expatriates. The break down of manpower and incidence of salaries & wages has been detailed in following table:

S. No.	Description	Requirement	Salary Per Month (Nu.)	Salary Per Month (Nu. in Lacs)	Salary Per Annum (Nu. in Lacs)
	Administrative				
1	General Manager	1	25,000	25,000	3.00
2	Manager (Pur & Marketing)	1	14,000	14,000	1.68
3	Manager (MIS, Logistics)	1	14,000	14,000	1.68
4	Maintenance Engineer	1	12,000	12,000	1.44
5	Accountant	1	7,500	7,500	0.90
6	Purchase Executives	1	7,000	7,000	0.84
7	Sales Executives	2	7,000	14,000	1.68
8	Drivers	10	5,000	50,000	6.00
9	Helpers	6	3,500	21,000	2.52
10	Security Guards	2	3,500	7,000	0.84
				Sub Total	20.58
	Production				
1	Production Manager	1	10,000	10,000	1.20
2	Lab Technologist	1	7,500	7,500	0.90
3	Supervisor	1	6,500	6,500	0.78
4	Skilled Workers	5	6,000	30,000	3.60
5	Semi Skilled Workers	8	4,500	36,000	4.32
				Sub Total	10.80
				Total	31.38

Table G.10.11 Salary And Wages

Note: 1. Fringe benefits @ 15 % of the salary.
2. Salary to increase by 5% every year.

ELECTRICAL AND WATER CONSUMPTION CHARGES

Power & water charges are increased @5% every year. The unit cost of electricity has been considered @ Nu. 1.50/ kwh assuming that the entire power requirement is met from the grid. This seems a valid assumption on account of the negligible incidence of power outages. The expense on water supply, treatment and distribution has been suitably considered, based on the Thimphu City Corporation water tariff of Nu. 2.25/ m³ (base rate: Nu 1.5/ m³ + 50% for sewage charges).

S. No.	Description	Amount Per Annum (Nu. in Lacs)
1	Power	3.20
2	Water Consumption	0.10
	Total	3.30

Table G.10.12 Electrical and Water Consumption Charges

TERM LOAN REQUIREMENT FROM FINANCIAL INSTITUTIONS

S. No.	Particulars	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Land 5,000 sq. meters	0%	0.00	0.00	0.00
2	Building & Civil Construction	40%	84.40	33.76	50.64
3	Plant & Machinery	25%	114.50	28.63	85.88
4	Misc. & Fixed assets	25%	56.70	14.18	42.53
5	Preliminary Expenses	100%	2.00	2.00	0.00
6	Pre-Operative Expenses	100%	32.25	32.25	0.00
7	Margin Money for Working Capital	100%	16.25	16.25	0.00
8	Contingencies	100%	25.56	25.56	0.00
Total			331.66	152.62	179.04

Table G.10.13 Term Loan Requirement

WORKING CAPITAL REQUIREMENT

Working capital requirements have been worked out in the following table:

S. No.	Particulars	Period	Margin %	Amount (Nu. in Lacs)	Promoters Contribution (Nu. in Lacs)	Bank Loan (Nu. in Lacs)
1	Raw Material	15 days	25%	13.50	3.38	10.13
2	Receivable	15 days	25%	15.33	3.83	11.50
3	Cash for Expenses	30 days	100%	9.05	9.05	0.00
Total				37.88	16.25	21.62

Table G.10.14 Working Capital Requirement

ESTIMATED COST OF PRODUCTION AND PROFITABILITY

The profitability projection have been worked out for 10 years, at 60% capacity utilization during first year, 70% in second year and 80% from third year onwards and the following assumptions and basis as relevant and applicable to Bhutan have been considered while preparing the profitability.

- Repairs & maintenance have been taken as @ 4% p.a. on plant & machinery & misc. fixed assets.
- Bank interest rate has been calculated @ 13% p.a. on term loan & working capital loan.
- Insurance charges @ 0.25% on all assets in first year, then @ 5% decrease every year.
- Power & water charges are increased @ 5% every year.
- Administrative expenses have been increased @ 5% every year.
- Margin money on bank loan has been considered @ 40% on building, @ 25% on plant & machinery and @ 25% on misc. fixed assets.
- Bank loan has been considered for repayment in 8 years with one year moratorium.
- Preliminary exp. will be written off @ 10% every year in next 10 years.
- Pre operative exp. will be written off from II year @ 10% every year in next 10 years.
- Depreciation has been charged on Straight Line Method.
- Insurance, lease rent & interest has been taken as fixed cost for calculating B.E.P.
- Income tax has been charged @ 30% every year as per Bhutan's tax rates.

PROFITABILITY

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
1	Revenue at Installed Capacity (Nu. in Lacs) 100%	613.20	613.20	613.20	613.20	613.20	613.20	613.20	613.20	613.20	613.20
2	Capacity Utilization	60%	70%	80%	80%	80%	80%	80%	80%	80%	80%
3	Actual Sales in lacs Nu.	367.92	429.24	490.56	490.56	490.56	490.56	490.56	490.56	490.56	490.56
4	COST OF PRODUCTION										
4.1	Raw Material Consumed	194.40	226.80	259.20	259.20	259.20	259.20	259.20	259.20	259.20	259.20
4.2	Consumables @ 5%	1.94	2.27	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
4.3	Power, Fuel & Water	3.30	3.47	3.64	3.82	4.01	4.21	4.42	4.64	4.88	5.12
4.4	Salary & Wages	31.38	32.95	34.60	36.33	38.14	40.05	42.05	44.15	46.36	48.68
4.5	Fringe Benefits @ 15%	4.71	4.94	5.19	5.45	5.72	6.01	6.31	6.62	6.95	7.30
4.6	Insurance	0.64	0.58	0.52	0.47	0.42	0.38	0.34	0.31	0.28	0.25
4.7	Repair & Maintenance @ 4%	6.85	7.19	7.55	7.93	8.32	8.74	9.18	9.64	10.12	10.62
4.8	Land Lease Rent	2.15	2.15	2.15	3.23	3.34	3.44	3.55	3.66	3.77	3.88
4.9	Other Admn. Exp.	2.40	2.52	2.65	2.78	2.92	3.06	3.22	3.38	3.55	3.72
	Total	247.77	282.86	318.08	321.79	324.66	327.69	330.86	334.19	337.69	341.36
5	Selling & Distribution Expenses @ 15% on Sales	55.19	64.39	73.58	73.58	73.58	73.58	73.58	73.58	73.58	73.58
6	COST OF SALES	302.96	347.25	391.67	395.37	398.25	401.27	404.44	407.78	411.28	414.95
7	SALES	367.92	429.24	490.56	490.56	490.56	490.56	490.56	490.56	490.56	490.56
8	PROFIT BEFORE INTT. & DEP.	64.96	81.99	98.89	95.19	92.31	89.29	86.12	82.78	79.28	75.61
9	Interest on Term Loan @ 13%	23.28	21.82	18.92	16.00	13.08	10.17	7.26	4.35	1.44	0.00
10	On Working Capital @ 13 %	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81
11	Total Interest	26.09	24.63	21.72	18.81	15.89	12.98	10.07	7.16	4.25	2.81
12	Profit Before Depreciation.	38.87	57.36	77.17	76.38	76.42	76.31	76.05	75.63	75.04	72.80
13	DEPRECIATION	28.21	28.21	28.21	28.21	28.21	28.21	19.65	2.53	2.53	2.53
14	Profit After Depreciation	10.66	29.15	48.96	48.17	48.20	48.10	56.39	73.09	72.50	70.27
15	Pre Operative Exp. write off	0.00	3.23	3.23	3.23	3.23	3.23	3.23	3.23	3.23	3.23
16	Preliminary Exp. write off	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
17	PROFIT BEFORE TAXATION	10.46	25.72	45.54	44.74	44.78	44.67	52.97	69.67	69.08	66.84
18	Taxation @ 30% of Net Profit	3.14	7.72	13.66	13.42	13.43	13.40	15.89	20.90	20.72	20.05
19	Profit After Taxation	7.32	18.01	31.88	31.32	31.35	31.27	37.08	48.77	48.36	46.79
20	Accumulated Profit	7.32	25.33	57.21	88.53	119.87	151.14	188.22	236.99	285.34	332.13
21	PROFIT AFTER TAXATION	7.32	18.01	31.88	31.32	31.35	31.27	37.08	48.77	48.36	46.79
22	Add: Depreciation	28.21	28.21	28.21	28.21	28.21	28.21	19.65	2.53	2.53	2.53
23	Add: Interest on Term Loan	23.28	21.82	18.91	16.00	13.08	10.17	7.26	4.35	1.44	0.00
	Total (A)	58.81	68.04	79.00	75.53	72.64	69.65	63.99	55.65	52.33	49.32

S. No.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
24	Interest on Term Loan	23.28	21.82	18.91	16.00	13.08	10.17	7.26	4.35	1.44	0.00
25	Repayment on Term Loan	0.00	22.40	22.40	22.40	22.40	22.40	22.40	22.40	22.24	0.00
	Total (B)	23.28	44.22	41.31	38.40	35.48	32.57	29.66	26.75	23.68	0.00
	SURPLUS (A) - (B)	35.54	23.82	37.69	37.13	37.16	37.08	34.33	28.90	28.65	49.32
	DSCR (A/B)	2.53	1.54	1.91	1.97	2.05	2.14	2.16	2.08	2.21	N.A.
	AVERAGE DSCR	2.06									

Table G.10.15 Estimated Cost of Production & Profitability

CALCULATION OF INTEREST ON TERM LOAN

(Nu. in Lacs)

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
A	1st year	179.04	0	179.04	23.28	23.28
B	2nd year					
	I Qtr	179.04	5.60	173.44	5.73	
	II Qtr	173.44	5.60	167.84	5.55	
	III Qtr	167.84	5.60	162.24	5.36	
	IV Qtr	162.24	5.60	156.64	5.18	21.82
C	3rd year					
	I Qtr	156.64	5.60	151.04	5.00	
	II Qtr	151.04	5.60	145.44	4.82	
	III Qtr	145.44	5.60	139.84	4.64	
	IV Qtr	139.84	5.60	134.24	4.45	18.91
D	4th year					
	I Qtr	134.24	5.60	128.64	4.27	
	II Qtr	128.64	5.60	123.04	4.09	
	III Qtr	123.04	5.60	117.44	3.91	
	IV Qtr	117.44	5.60	111.84	3.73	16.00
E	5th year					
	I Qtr	111.84	5.60	106.24	3.54	
	II Qtr	106.24	5.60	100.64	3.36	
	III Qtr	100.64	5.60	95.04	3.18	
	IV Qtr	95.04	5.60	89.44	3.00	13.08
F	6th year					
	I Qtr	89.44	5.60	83.84	2.82	
	II Qtr	83.84	5.60	78.24	2.63	
	III Qtr	78.24	5.60	72.64	2.45	
	IV Qtr	72.64	5.60	67.04	2.27	10.17
G	7th year		5.60			
	I Qtr	67.04	5.60	61.44	2.09	

S. No.	Year	Opening Balance	Repayment	Closing Balance	Interest	
	II Qtr	61.44	5.60	55.84	1.91	
	III Qtr	55.84	5.60	50.24	1.72	
	IV Qtr	50.24	5.60	44.64	1.54	7.26
H	8th year		5.60			
	I Qtr	44.64	5.60	39.04	1.36	
	II Qtr	39.04	5.60	33.44	1.18	
	III Qtr	33.44	5.60	27.84	1.00	
	IV Qtr	27.84	5.60	22.24	0.81	4.35
I	9th year		5.60			
	I Qtr	22.24	5.60	16.64	0.63	
	II Qtr	16.64	5.60	11.04	0.45	
	III Qtr	11.04	5.60	5.44	0.27	
	IV Qtr	5.44	5.44	0.00	0.09	1.44

Table G.10.16 Calculation of Interest on Term Loan

DEPRECIATION CHART (As per Income Tax Law, Bhutan)

S. No.	Description	Total Investment (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)	Rate of Dep. %	Amount of Dep. (Nu. in Lacs)
	On S. L. Method up to 6 years				for 7 th year		for 8 th year onwards	
1	Land 2,000 sq. meter	0.00	0	0.00	0	0	0	0
2	Building and Civil Construction	84.40	3%	2.53	3%	2.53	3%	2.53
3	Plant & Machinery	114.50	15%	17.18	10%	11.45	0%	0
4	Misc. Fixed Assets	56.70	15%	8.51	10%	5.67	0%	0
	Total	255.60		28.21		19.65		2.53

Table G.10.17 Depreciation Chart

BREAK EVEN POINT

Calculation of B.E.P.	1 st Year	2 nd Year	3 rd Year
Variable Cost	300.17	344.52	389.00
Fixed Cost	28.88	27.36	24.39
Break Even Point (B.E.P.)	42.62%	32.29%	24.01%
Average B.E.P.	32.98%		

Table G.10.18 Break Even Point

NPR & RI

Ratio	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Net Profit Ratio (NPR)	2.84%	5.99%	9.28%	9.12%	9.13%	9.11%	10.80%	14.20%	14.08%	13.63%
Return on Investment (RI)	4.80	11.80	20.89	20.52	20.54	20.49	24.29	31.95	31.68	30.66

Table G.10.19 NPR & RI

CASH FLOW STATEMENT

(Nu in Lacs)

S. No.	Years	0	1	2	3	4	5	6	7	8	9	10
1	INFLOWS											
1.1	Net profit after taxation	0	7.32	18.01	31.88	31.32	31.35	31.27	37.08	48.77	48.36	46.79
1.2	Depreciation	0	28.21	28.21	28.21	28.21	28.21	28.21	19.65	2.53	2.53	2.53
1.3	Interest on term loan & W. C.	0	26.09	24.63	21.72	18.81	15.89	12.98	10.07	7.16	4.25	2.81
1.4	Preliminary exp. write off	0	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1.5	Pre- operative exp. write off	0	0.00	3.23	3.23	3.23	3.23	3.23	3.23	3.23	3.23	3.23
1.6	Net cash inflows	0.00	61.82	74.27	85.23	81.76	78.88	75.89	70.23	61.88	58.56	55.56
2	OUTFLOWS											
2.1	Investment in fixed assets	315.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.2	Investment in working capital	16.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.3	Total outflows	331.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	NET CASH FLOW	- 331.66	61.82	74.27	85.23	81.76	78.88	75.89	70.23	61.88	58.56	55.56

Table G.10.20 Cash Flow Statement

- Internal Rate of Return (IRR) 17.39%
- Net Present Value (NPV) Nu. 51.82 Nu. Lacs
- Weighted Average Cost of Capital (WACC) 13%

Project Viability: - Internal Rate of Return of the project is 17.39%, which is higher than the WACC. Hence the project is financially viable. The NPV shows the present value of the net cash flow, or the project's worth today. The discount rate used here is the WACC. A positive NPV indicates a profitable project (i.e. the project generates sufficient funds to cover its cost, including loan repayments and interest payments).

G.10.10 Environmental Issues

The pollution norms will be adhered to for this plant, although a dairy plant is not a polluting industry. The whey liquid, which is initially a reject, has to be treated before releasing into any water body or stream. Later on, the plant can be expanded to set up a dryer for extraction of whey from the effluent water and discharge only treated water into the stream. Suitable environmental mitigation measures as per National Environment Commission, RGoB guidelines during the construction and operation phases have to be adopted.

Application as per the guidelines of NEC has to be submitted along with detailed project report for environmental clearance before commencement of the project.

G.10.11 Source of Technology/Plant Machinery Supplier

In order to improve the quality of traditional milk products, the following suggestions are given for this project: -

- Training for hygienic milk production should be given to farmers at farm gate level.
- Dairy Technical Support Services should be provided.
- Marketing of traditional milk products should be channelised through identified institutions.
- Improved breeds of animals should be introduced through active collaboration with RNR centers.
- As many farmers live in scattered areas and under poor conditions, a cooperative society of small farmers association should be formed to organize milk transport to markets.
- A locally relevant research and development plan with special attention to appropriate technology is needed.
- It is suggested that the plant and machinery is taken on a turnkey basis from established manufacturers in India.
- The manufacturer will also provide the technology, training and commissioning till trial production run.

The following are the turnkey dairy plant manufacturer:

1. Food and Biotech Engineers (I) Private Limited

Plot No. 6, IDC Gurukul Industrial Area, P.O. Amar Nagar,
Sarai Khwaja, Faridabad - 121 003, Haryana, India
Phone: +91-129-2510924/2510988/2510077
Fax: +91-129-2510924
Email: foodeng@bol.net.in
Website : www.dairyfoodtech.com

2. SSP Private Limited

Shaukat Ali/ Anwar Ahmad
19-DLF Industrial Area, Phase-II, 13/4-Mathura Road
Faridabad, Haryana- 121003, India
Phone: +91-129-2277442/2275968
Fax: +91-129-2277441
Email: info@sspindia.com and saltplant@ssp.co.in
Website: www.sspindia.com

3. Goma Engineering Pvt. Ltd.

Behind Universal Petrol Pump,
Off. L.B.S. Marg, Majiwada,
Thane - 400 601. (Mumbai), India
Phones : +91-22-2534 6436 / 0875 /1438 /1937.
Fax : +91-22-533 3634.
Email : dairydivision@goma.co.in,
pumpdivision@goma.co.in

4. Alfa Laval India Ltd.

Mumbai Pune Road, Dapodi
Pune-, 411 012, India
Phone: +91 (20) 6611 61 00
Fax: +91 (20) 2714 77 11
E-mail: india.info@alfalaval.com