

# CHAPTER-I

## INTRODUCTION

### 1.1 Background of the Study

Nepal is a developing mountainous country as such economic revolution and industrialization is not virtually running. More than 80% of population in our country depends on farming that is on agriculture but the productivity on it is not satisfactory one. Therefore the economic growth of the country remained far behind than an ideal developing country should have. The national census shows Nepal's economy that had around 6% growth rate in the second half of 1990s happened to get negative growth rate in the year 2001 with -0.44 growth rate. But in fiscal year 2059/60 the economic growth rate increased to 3.9%. In the same way, the growth rate increased to 4.7% during the fiscal year 2060/2061. But it decreased by 1.6% during FY 2061/2062. (*Kantipur National Daily, 13 June 2007*)

Economic growth rate of the country has not improved substantially over time to overtake population growth. The current population growth is estimated to 2.2% per annum as such the achievement of the development activities has been overshadowed by growing population. Little over half (58.2%) of the population of working age were usually economically active in the year 2001. Population census of the year 2001 reports that 53.1% population of age 10 years and over is employed and 5.1% are unemployed. Contribution of non agriculture activities are gradually increasing in the GDP. The preliminary estimates of per capita GDP and per capita GNP in term of US dollar are 294 and 300 respectively for the year 2004/05 and 31% populations are below the absolute poverty line. (*Nepal in figures 2005: 12*)

To overcome weak economy of our country, Nepal, it is very essential to develop the infrastructure and facilities for the establishment of manufacturing industries in the country. For the sound economic development of the country,

only development in agriculture sectors can not fulfill the country's needs so it is necessary to develop industrial sector, too. Industrial sector has been playing a vital role for the economic development. However, the pace of industrialization in Nepal is very slow. It is completely new phenomenon in the country. *Biratnagar* Jute Mill, established in the year 1936, marked the beginning of organized manufacturing industry in Nepal. After this Morang Cotton Mills, Raguphati Jute Mills and Juddha Match Factory were established by 1946 in Biratnagar. During the period of Second World War these industries could reap windfall profit within a very short period because of extreme shortage of essential customer's goods in world market. This made the attraction for establishment of various new industries in the country. More than sixty-three industries were established in the country during the period of ten year from 1936 to 1946.

In Nepal, after the restoration of democracy in 2046 B.S some important changes took place in the field of industry. Many industries were established by the private sector afterward. The role which manufacturing industry has been playing in the national economy is marginal but gradually, it is in increasing trend and market is also expanding due to increased customer needs and desires.

Establishing and running an enterprise is a risky business and it needs sound knowledge of Management for planning the profit. A business has to depend on economic environment for the required inputs to transfer into output. Further, a business depends on economic environment to sell the finished products and goods .A business may be understood as the organized efforts of enterprise to supply consumers with goods and services and to make profit in the process. The main objective of the business is the production and distribution of goods and services that people want and can pay for. In Nepalese context manufacturing organizations are facing numerous problems. Most organizations are suffering huge loss. But profit is a must for the survival and growth of any organization. Therefore understanding of profit planning is very essential for the successful operation of business. In the lack of

knowledge of tools for planning the profit, business organizations can't forecast sales of the products for recovering the cost and making profit. One of the most important tools in profit planning is CVP analysis. It plays a vital role to locate zero profit. Success of any business organization is measured by the capacity of surplus generation and it is not a matter of chance. Profit does not just happen but it should be the result of planning. Therefore every business organization should make a plan to estimate the profit required to earn for the survival of the enterprise with a help of budget.

## **1.2 Profiles of Herbal Production and Processing Company Ltd.**

Herbs production supports agricultural sector as well as industrial sector. Herbs have been used as medicine since the early period of our history. People of western countries are also interested to use herbs as medicines. Wild plants have been a source of food and medicines from the very human civilization. The improved and better varieties of fruit, vegetables, cereals and most of the other plants of today are the work of modern scientists by making use of technologies on the ancient information which has been taking an innovative role in the path of progress of the society. We can find many events of cure by Himalayan herbs in Hindu mythology. Medicinal and Aromatic plants are the valuable forest resources of the kingdom of Nepal. In the range of Himalayan, valuable herbs can be found which are used in medicine. In the past days, the country had significant role in trading of crude herbs. Till now about seven hundred varieties of herbs have been identified. The major thrust of the nation is to process these natural resources domestically balancing their depletion in nature with regeneration. As a Public enterprise HPPCL is an institution operating a service of economic or social character on behalf of the government but an independent legal entity. As a public enterprise, Herbs production and processing company limited (HPPCL) is established in 12<sup>th</sup> *poush* 2038 B.S. This is the first company in the country to harness the rich treasure of herbs and aromas of processing and producing medicinal extracts and essential oil drugs, food and perfumery industries. The head office of the company is located at its

own land at *Koteshwor*, Kathmandu. The companies have many branches and rosin collection center at different locations which are as followed:

**Table No.1.1**

<b>S.N.</b>	<b>Name</b>	<b>Location</b>
1	<i>Tamagadhi Herbal Center</i>	Bara
2	<i>Belbari Herbal Center</i>	<i>Manang</i>
3	<i>Tarhara Herbal Center</i>	<i>Sunsari</i>
4	<i>Nepalgung Branch Office</i>	<i>Nepalgung</i>
5	Farm Expansion Program	<i>Kailali</i>

*Source: A Profile of HPPCL*

HPPCL deals various types of medicinal and aromatic plants in both processed and unprocessed form. Now a days HPPCL has produced different kind of product to sell which are as fallows:

Tagetes oil

Jatamasi oil

Palma Rosa oil

Clams oil

Juniper oil

Chamomile oil

Lemongrass oil

Palmarsa oil

Cintronella oil

French basil oil

Turpentile oil

#### **1.2.4 Objectives of HPPCL**

The main objective of the company is to find out, save and utilize the valuable medicinal and aromatic plants which are available in country and contribute to the national economy .Other objectives are as following:

1. To collect and process raw medicinal herbs
2. To cultivate the essential herbs.
3. To encourage the private sector in herbs forming, collecting and processing.
4. To provide materials to domestic industries.
5. To create employment.
6. To promote export of processed herbs.
7. To assist import substitution.

### **1.3 Focus of the Study**

The analytical technique used to study the behaviour of profit in response to the changes in volume, costs and prices is called the cost-volume-profit (CVP) analysis. It is a device used to determine the usefulness of the profit planning process of the firm. In fact, the entire field of profit planning has become associated with the CVP inter-relationships. However, it should be noted that the formal profit planning and control also involves the use of budgets and other forecasts. As a starting point in profit planning, CVP analysis helps to determine the minimum sales volume to avoid losses and the sales volume at which the profit goal of the firm will be achieved. As an ultimate objective, it helps managements in seeking the most profitable combination of costs and volume. A dynamic management, therefore, uses CVP analysis to predict and evaluate the implications of its short-run decisions about fixed costs, variable costs, volume and selling price for its profit plans on a continuous basis.

CVP analysis is a greater helpful in managerial decision making, especially cost control and profit planning. “It provides attention-directing and problem solving backgrounds for important planning decisions, such as selecting distribution channels, pricing, special promotions and personnel hiring. ‘Know your cost’ is an essential theme for any managers. And CVP analysis helps to direct managerial attention to important problems and paves the way to their solution”.

CVP analysis examines the responses of profit to changes in volume. It is useful for single product as well as multiple product firms. This analysis will be designed to include the firm's variable costs of order getting and order-filling. It predicts the effects of changes in costs and sales level on the income of the business.

“In its simplest form, it involves the determination of the sales level at which a company neither earns a profit nor incurs a loss, or in other words, the point at which it breaks even. For this reason, CVP analysis is often called break-even analysis. However the technique can be expanded to answer additional questions, such as; what sales volume is necessary to earn a desired net income? What net income will be earned if unit selling prices are reduced in order to increase sales volume? What net income will be earned if a new machine that will reduce unit labor costs is installed? What net income will be earned if the sales mix will be changes? When the technique is expanded to answer such additional questions, the descriptive phrase CVP analysis is more appropriate than break-even analysis.”

Hence, a company may use CVP analysis as a planning tool when the sales volume is known and management need to find out how much profit will result. Another way of planning is to begin with a target profit. Then, through CVP analysis a company can decide the level of sales needed to reach that profit. Similarly, for the cost control purpose, CVP analysis is a way to measure how well different departments in the company are doing. At the end of a period, the company analyzes sales volume and related actual costs to find actual profit. It measures performance by comparing actual costs with expected costs. These expected costs are computed by applying CVP analysis to the actual sales volume. The result is a performance report on which management can base the control of operations.

It is highly essential for the management to have the complete knowledge about the inter-relationship among the cost, volume and profit. For this purpose CVP analysis can be regarded as a sophisticated method or

analytical tool used in management. The use of this method helps in determining the different levels of product or sales to avoid losses, to earn a desired profit and so on.

It is an important tool for management to take the important managerial decision which affects the profit planning. It analyses the inter-relationship between cost, volume, profit; to attain the objective of profit maximization. In other words, the CVP analysis is used to plan the profit, as well as, to obtain valuable information required to take managerial decisions.

#### **1.4 Statement of the Problems**

Public enterprises were established in order to prepare infrastructure services to produce required goods in the country, to increase export items, to help in controlling price situation, to create opportunities for employment, to increase government revenues and to contribute significantly in the national development as well as to assist in the country's economic development.

After the restoration of democracy, there are various manufacturing concerns established under foreign investment. Most of the business fails after a few years because they tend to do anything for volume without much study as to how it is going to affect the bottom line. CVP analysis is a management accounting task to show the relationship between the elements of profit planning. It provides the technique of profit planning from work. Based on the annual report published, the performance of the Nepalese industries can not be considered as satisfactory. The weak performance is the outcome of poor planning, controlling and decision-making. This has raised the question whether Nepalese managers are able for the post. Do they practice CVP analysis tool and technique to carry out planning, decision making and controlling function? Based on above:

1. What are the causes of difficulties for the applying of CVP Analysis?
2. How much sales should be made to avoid loss?
3. What should be the sales volume to earn desired profit?
4. Is HPPCL practicing CVP analysis for comparing the result?

### **1.5 Objectives of the Study**

The main objective of the study is to examine "cost volume profit Analysis of HPPCL." The other specific objections of this study are:

1. To analyze the variance between target sales and actual sales.
2. To analyze the impact of fixed cost upon profitability of the firm.
3. To compute break even point, contribution margin, safety margin and profit volume under cost volume profit analysis.
4. To provide necessary suggestion and recommendations where ever necessary based on findings.

### **1.6 Significance of the Study**

This research work is the study of the practice of CVP analysis in manufacturing companies. This study will be useful to various parties (like potential managers, accountants, policy makers and planners) in various ways and those are stated below:

1. It examines the application of CVP analysis in the company.
2. It provides necessary theoretical as well as contemporary situational conceptions to make appropriate decision for the companies.
3. The study also aimed to provide necessary recommendations to the companies.
4. The study helps to make effective and efficient decision for management team.

### **1.7 Limitations of the Study**

The study is limited to only CVP analysis. So other technique is not used for the study. The efforts of this research have been made to present and analyze facts clearly, truly and within the boundary. Every research has he same limitation, basically not availability of required data and information would be the major limitation of the study. This study enlists the following limitations:

1. Only five years financial data has been used (i.e. F/Y 2060/61 to 2064/065).
2. This study will be base mostly in the secondary data
3. CVP analysis is computed in the overall from the companies.

### **1.8 Organization of the Study**

The main purpose of this study is to examine, evaluate, analyze and interpret the application of CVP in planning and control in HPPCL.

This study has divided in to five chapters. The **first chapter** presents a brief introduction of the study. It includes background, focus of the study, and statement of the problem, objective of the study and limitation of the study.

The **second chapter** will deal with the review of literatures relating to CVP analysis i.e. review of book, journals, article, review of previous research and report with research gap etc.

The **third chapter** includes research design population and sample, sources of data, tools of data analysis and limitation of the study etc.

Similarly, in **chapter four** the acquired data are presented and analyzed through the way in methodology and major findings.

At last in **chapter five**, summary, conclusion and recommendation has been presented in fifth chapter. Bibliography and appendixes are included at the end of the study. Similarly acknowledge, table of contents, list of tables, list of diagrams, abbreviations etc are included in the front part of the report.

## CHAPTER – II

### REVIEW OF LITERATURE

#### 2.1 Conceptual Frame Work

Present chapter helps to find out what research studies have been conducted in chosen field of study. For this report study various books, articles and journals, bulletins annual reports, news statement and related topic of research papers etc are the bases for preparing it.

Review of literature is an essential part of all studies. It is a way to discover what other research in the area of our problem has not covered. It is also a way to avoid investigating problems that have already been definitely answered. The review of literature accomplishes the following function:

- ) It establishes a point of departure for future research.
- ) It avoids needless duplication of costly research effort.
- ) It reveals area of needed research.

Profit planning and control is an important approach, mainly in profit oriented enterprises. Profit planning is merely a tool of Management. It is not an end of Management or substitute of management. It facilitates the managers to accomplish managerial goal in a systematic way.

Planning and controlling are the primary function of business. Without planning and controlling business can not run smoothly in competitive and global environment. Profit planning is a summary of overall planning process of an organization. In fact, it is a managerial technique written from which all aspects of business operations for a defined period is included. It is a formal statement of policy, plan, objectives and goals established by the top Management. Profit planning decides in advance as what to achieve in the future. It comprises determination of desired future and the steps to be carried out. It is a process where companies reconcile their objectives and opportunities. Profit planning is a fundamental part of the overall management functions and is a vital part of the total budgeting process. The management

determines the profit of goods and preparation that will lead them to the realization of their goals. Profit planning can take the best use of firm's opportunities and resources to meet the target profit. The profit planning is further made cleared with the point wise explanation given below:

### **2.1.1 Profit**

Profit is the ultimate goal of every business house. They involve in business for making profit. Profit cannot be achieved easily. It should be managed well with better managerial skills. So profit is the planned and controlled output of management. By element, profit is difference of revenue and cost.

Profit is taken to measure the competency and efficiency of the management. Profit is a residual income left after the payment to other factors of production. The difference between the outflow of expenses and inflow of income is called profit. It is a reward for business activities. Profit determines the strength of financial position of the company.

Profit is the only one target of business organization, in the other word profit is the primary measure of business success in any economy. This basic objective of running any business organization is to earn profit. Profit serves as a yardstick for judging the competence and efficiency of Management. *(Maneshori, 2000: 171)*

Profit is the fundamental factor for success of every enterprise. "Profit planning involves stream lining activities in order to get employee profit minded to secure maximum benefit from minimum effort and expenditure. Best result seems to be obtained by assessing a profit planner to investigate the entire factor attesting the profit obtained from the product. The organization, the model of operations, the pricing, the marketing of any other factor of making and selling the product that is in judgment affects profit accruing from that product, the concentration of profit efforts upon one product and to obtain concerned profit budgeting efforts are the fundamental factors that contribute the success of profit planning." *(George, 1968: 62)*

### **2.1.2 Planning**

Planning is the process of developing enterprise's objective and selecting future course of action to accomplish them. Planning is the method of thinking about act and purpose before planning starts for forecasting and determination of future event. It includes the establishing business organization's objectives developing promises about the environment in which they are to be accomplished, selecting the course of action for implementing the objectives, imitating activities necessary to translate plans in to action and current re-planning to correct deficiency.

A planning process includes goal setting, resource evaluating, forecasting by different methods and formulating a master plan Planning depends upon the organized objectives. For the planning purpose a firm's objectives can be distinguished mainly by three types: prime, instrumental and specific. The prime objective is to complete the action, instrumental objective is for accomplishment of divisional and individual goal and specific objective is an objective that has been specified to time and Magnitude, which are known as organizational goals. Therefore, companies' objectives provide the ultimate criteria for resolving difficulties of company and company objectives are the base for long range profit planning.

### **2.1.3 Profit Planning**

After defining about profit and planning now is going to present some theoretical concept of profit planning. When management plans for a certain period of time, it is called profit plan. Profit plan is define as, an estimation and predetermination of revenue and express that estimate how much income shall be generated and how it would be spent in order to meet investment and profit requirement. In the case of institutional operation it presents a plan of operations, covers a definite period of time and formulates the planning decision of management.

Generally two types of profit plans are generated, for long term objectives strategic plans and short term objectives tactical plans are developed. The type of profit plan depended upon the nature of business entity. Generally for a manufacturing enterprises following plans are prepared (1) Sales Plan (2) Production Plan (3) Raw Material Plan (4) Purchase Budget (5) Inventory Budget (6) Labour Hours and Cost Budget (7) Manufacturing Overhead Budget (8) Administrative Expenses Budget (9) Selling expenses Budget (10) Cash Budget (11) Capital Expenditure Budget (12) Flexible Budget (13) Projected Income Statement (14) Project Balance Sheet (15) Variance Analysis of performance report (*Prasad, 2002: 28*)

In summary profit planning means the developing of objectives, goals, and moving and organizational efficiently to achieve the objectives and goals.

#### **2.1.4 Basic Element of Profit Planning**

The basic elements of profit planning are as follow:

- ) Comprehensive and co-ordinate plan: - The profit planning considers all activities and operation of an organization. The budgets prepared by different departments inside an organization have to be compiled or co-ordinate which is done by profit planning. So before preparing a profit planning, first of all the departments have to be compiled and budget is known as comprehensive budget or profit planning.
- ) Operational expenses and resource planning: - It is the plan for the firm's operation or activities. The two aspects of every operation are revenue and expenses. The budgets must plan for quantity revenue and expenses related to a specific operation. Planning should not be done for revenue and expenses only. The planning for resource will include planning assets and sources of funds.
- ) Expressed in financial term: - An activities covered by budget are related with funds. So the budget has to be expressed in monetary unit, i.e. Rupees, Dollar or Pound etc.

Future plan: - It is a future plan of specific period. Time dimension must have added to a budget. A budget is meaningful only when it is related to a specific of time. The budget estimates will be relevant for some specific period. (*Welsch, 1979: 73-75*)

**(i) Profit Planning**

Profit planning is the planning for future operation in such a way as to maximize the profit or to maintain a specified level of profit. A comprehensive profit planning also known as broad budgeting schedule developed in financial terms. Profit planning deals with the development of strategic and tactical profit plan. In other word, profit plan is a detail expression of the expected result from the planning decision. Profit planning is an important approach developed to facilitate for effective performance of management process like planning, controlling, organizing and staffing etc. Therefore, profit planning carryout the responsibility of forward thinking about the future operation of the organization. It is the precise measurement in terms of quantity (i.e. the matters of profit planning are expressed in numerical value.)

Profit planning is, therefore a fundamental part of the overall management functions and is a vital part of the total budgeting process. The management determines the profit goals and prepares budgets that will lead them to the realization of these goals. Profit planning can be done only when the management has the information about the cost of the product both fixed and variable and the selling price at which will be in a position to sell the product of the company. (*Maheshwari, 2000: 171*)

**(ii) C-V-P Analysis as a Component and Tools of Profit Planning and Control (PPC)**

Profit planning and control is a systematic and formalized approach for accomplishing the planning, coordination and control responsibilities of management. Component of PPC are bones of business/an enterprises which

helps it operate properly, efficiently and effectively (Welsch,1979: 74)

Various components are in the PPC, C-V-P analysis is the supplementary components of PPC. It provides the data for PPC.

C-V-P analysis is an important tools of PPC because it provides the information about the behavior of cost in relation to volume. It is an analytical tool for studying the relationship between volume, cost, price and profit. It is a great helpful tool in managerial decision making specially related to cost control and profit planning. Therefore C-V-P analysis may be defined as a managerial tool showing the relationship between various ingredients of profit planning.

### **(iii) Use of C-V-P Analysis (Importance)**

Planning, Controlling and decision making are the essential managerial functions. C-V-P analysis helps manager to plan for profit, to control cost and make decision. It helps: (*Munakarmi, 2002: 123*)

- a) To determine the break-even-point in terms of unit or sales value.
- b) To estimate the margin of safety.
- c) To estimate profits or losses at various level of output.
- d) To assess the likely effect of management decisions such as an increase or decrease in selling price, adoption of new method of production to reduce direct labor and increase output.
- e) To help management to find the most profitable combination of costs and volume.
- f) To determine the optimum selling price.
- g) To determine the sales volume at which the profit goal of the firm will be achieved.
- h) To determine maximum sales volume to avoid losses.
- i) To determine new break-even-point- for change in fixed or variable cost.

### **(iv) Assumptions of C-V-P- Analysis**

C-V-P analysis should be used with caution, It is only an approximate

guide for decision making as it rests upon the various over simplified assumptions such as: (*Wagle and Dahal 2004: 4.1*)

- a) All cost can be segregated into fixed and variable element.
- b) Fixed cost will remain unchanged and variable varies proportionately with activity.
- c) Single factor affecting costs and revenues are volume.
- d) There will be no change in technology, production methods, efficiency and general price level.
- e) There are no Stock level change i.e. there is synchronization between production and sales.
- f) There is single product or in case of multi-product, the sales mix does not change.
- g) Uncertainty does not prevail etc.

#### **(v) Cost Volume Profit Analysis**

It is an analytical technique for studying the relationship between volume, cost prices and profits. It is used to determine the profit planning process of the firm in fact, entire field of profit planning has become associated with cost, volume, and profit relationship. Total cost represents the fixed and variable cost for desired volume of output required for anticipated amount of profit. An extensive market research is to be conducted in advance for forecasting the volume of sales which is required for attainment of desired level of profit.

#### **2.1.5 Cost Volume-Profit Analysis as a Tool of Profit Planning and Budgeting**

Cost-volume profit analysis is a supplementary tool of profit planning. It tells everything about the relationship between the business variables. Cost volume profit provides the information about the behavior of cost in relation to

volume, volume of production or sales when the business will break even, sensitivity of profit due to variation of output, amount of profit for a projected sales volume and quantity of production and sales for a target profit level etc. CVP analysis is great helpful in managerial decision- making. Especially cost control and profit planning is possible with the help of CVP analysis. Profit planning is the fundamental part of the overall management functions. Profit planning can be done only when the management has the information about the cost of product and selling price of the product.

### **2.1.5.1 Concept of Cost Volume Profit Analysis**

Cost volume profit analysis is a systematic method of examining the relationship between changes in activity and changes in total sales revenue, expenses and net profit. As a model of these relationships CVP analysis simplifies the real-world conditions that a firm will face. Like most models which are abstractions from reality, CVP analysis is subject to a number of underlying assumptions and limitations. It is a powerful tool for decision making in certain situations. (*Bajracharya, 2005: 225*)

An application of the concept of expenses variability is in cost- volume-profit analysis. It involves a study of the interrelationship between the following factors:

- ) Price of product
- ) Volume or level of Activity
- ) Per unit variable costs
- ) Total fixed costs
- ) Mix of production

Cost volume profit analysis can be regarded as a sophisticated method or analytical tool used in management. The use of this method helps in determining the different levels of product or sales to avoid losses, to earn a desired hit profit and so on the cost volume profit relationship also helps management to find out right solution for following questions: (*Dangol, 2062: 160*)

1. What sales volume is needed to break even?
2. What sales volume is necessary to earn a desired net profit?
3. How will the change in selling price affect the profit position of the company?
4. How will the change in cost affect profit?
5. Which product or product mix is profitable?
6. Which product or operation of a plant should be discontinued?
7. What will be new break even sales if these certain changes and fixed and variable cost? Etc.

#### **2.1.5.2 Use of CVP Analysis in Profit Planning**

Planning controlling and decision making are the essential managerial function. Cost volume profit analysis helps the managers to plan for profit to control cost and make decision. As such it helps (*Munankarmi, 2003: 4.01*)

- 1 To determine the break even point in terms of unit or sales value.
- 2 To ascertain the margin of safety.
- 3 To estimate profit or losses at various level of output.
- 4 To help management to find the most profitable combination of cost and volume (units).
- 5 To determine optimum selling price.
- 6 To determine the maximum sales volume to avoid losses.
- 7 To determine most profitable and least profitable product.
- 8 To determine new break even point for changes in fixed or variable cost.
- 9 To assess the likely effect of management decisions such as an increase or a decrease in selling price adoption of new method production to direct labor and increase output.

#### **2.1.5.3 Approaches to the Analysis**

The most widely known form of CVP analysis is the break even analysis. Break even determines the breakeven point or level of sales at which cost and revenue are in equilibrium and net income is zero.

There are three approaches to CVP analysis. They are:

- ) Cost and revenue equation approach
- ) Contribution margin approach
- ) Graphic approach (*Dangol, 2062: 161*)

### **Cost and Revenue Equation Approach**

The most often practiced approach of CVP analysis is the equation or formula approach. This approach is based on the income statement concept. The various formulations in CVP are derived from the revenue and cost function. The relationship between cost, volume and profit can be expressed algebraically as.

$$\text{Sales} = \text{Variable cost} + \text{Fixed cost} \square + \text{Profit/Loss}$$

### **Contribution Margin Approach**

Contribution margin is the difference between selling price and variable cost. So, contribution margin is the balance of the sales revenue left after covering the variable expenses, available to recover the fixed expenses and then contributes to realize profits for the period contribution margin is used first to cover the fixed expenses, and then whatever remains after the fixed expenses goes toward profits. If contribution margin is not sufficient to cover the fixed cost, then a loss occurs for the period. It can be expressed by the following formula.

$$\text{Contribution} = \text{Sales revenue} - \text{Variable cost}$$

Or

$$\text{Contribution} = \text{Fixed cost} + \text{Profit}$$

We can derive from it that profit can't result unless contribution exceeds fixed cost. In the other word, the point of no profit no loss will be arrived at where contribution is equal to fixed cost.

Contribution margin ratio (profit volume ratio) expresses the relationship of contribution to sales. It is also termed as contribution sales ratio or variable profit ratio. If the contribution margin is divided by sales revenue, the result is profit volume ratio (*Dangol, 2062: 163*)

$$P/V \text{ Ratio} = \frac{FC + Profit}{Sales}$$

$$\text{Or } P/V \text{ Ratio} = \frac{CM}{Sales}$$

$$\text{or } P/V \text{ Ratio} = 1 - \frac{Variable \text{ Cost}}{Selling \text{ Price}}$$

The management can eliminate the unprofitable lines which are having either a lower profit volume ratio or low volume. A lower ratio means less profitability and vice versa. The terms usually used in CVP analysis are:

**(i) Sales value:**

The sales value is calculated by quantity of total sales multiplied by selling price per unit i.e.  $Total \text{ sales} = SU \times SPPU$

**(ii) Variable Cost:**

Costs which change proportionately with volume of output or service are called variable costs. They increase or decrease in total amount with the increase or decrease in volume of output.

**(iii) Fixed cost:**

Fixed cost remains unchanged in total despite the change in level of activity. But by increasing level of activity, per unit fixed cost decrease and vice versa.

**(iv) Semi – variable cost:**

Some costs change disproportionately with change in the volume

of production. Those costs don't change proportionately like variable costs but their increase will be less than proportionate unlike the variable costs. Such types of costs are defined as semi-variable costs.

**(v) Step fixed cost:**

Some costs remain fixed over a wide range of activity but jump to different amount for activity levels outside that range. Such costs are called step fixed cost or moving fixed cost.

**Break Even Analysis**

Break even Analysis is that part of cost volume profit analysis which tells us about the level of sales at which revenue equals expenses showing a zero net profit more precisely. Such a sales point is called the break even point. CVP analysis is sometimes referred to simply as break even analysis. This is unfortunate because break even analysis is just one part of the entire CVP concept. Yet, it is always taken as an important part of profit planning as it gives the planner many insights in to the data with which he or she is working. Profit planning of each firm begins with break even. It is a point of no profit, no loss. If the sales or production is higher than break-even volume, there will be profit and vice versa. These can be summarized as follows:

<b>Condition</b>	<b>Result</b>
If actual sales is equal to BE sales	No profit, No loss
If actual sales exceed to BE sales	Profit
If actual sales is less than BE sales	Loss

Computation of Break even point:

- (a) Algebraic or formula method
- (b) Contribution margin method
- (c) Graphic or chart method. (*Dangol, 2062: .164*)

**(a) Algebraic or Formula Method:**

Break-even point can be determined by the use of formula. It is also termed as algebraic method. According to the definition of break-even point, it is such a level of sales or activity, where there is neither profit, nor loss. It is that level of sales, where total cost is equal to total revenue. It can be presented in equation form in the following way.

$$\text{Sales revenue} = \text{Total cost}$$

$$\text{i.e. } SP \times Q = FC + (UVC \times Q)$$

$$\text{Or } (SP \times Q) - (UVC \times Q) = FC$$

$$\text{Or } Q (SP - UVC) = FC$$

$$\text{Or } Q = \frac{FC}{SP - UVC}$$

Where,  $Q$  = Break even point in unit

**(b) Contribution Margin Method:**

Break even point can be determined by use of contribution margin method as well it can be presented as:-

$$\text{BEP in units} = \frac{FC}{SP - UVC} \times \frac{FC}{CMPU}$$

$$\text{BEP in amount} = \frac{FC}{P/V \text{ Ratio}} \times \frac{\text{Fixed cost}}{CMPU} \mid SPPU$$

Or

$$\text{BEP in amount} = \text{BEP in unit} \times SPPU$$

**(c) Graphic or Chart Method:**

The BEP can also be computed graphically. The relation among cost, volume and profit with the help of diagram is described as break even chart. The BEP indicate in the chart will be one at which total cost line and total sales line intersect.

### Break -even Chart

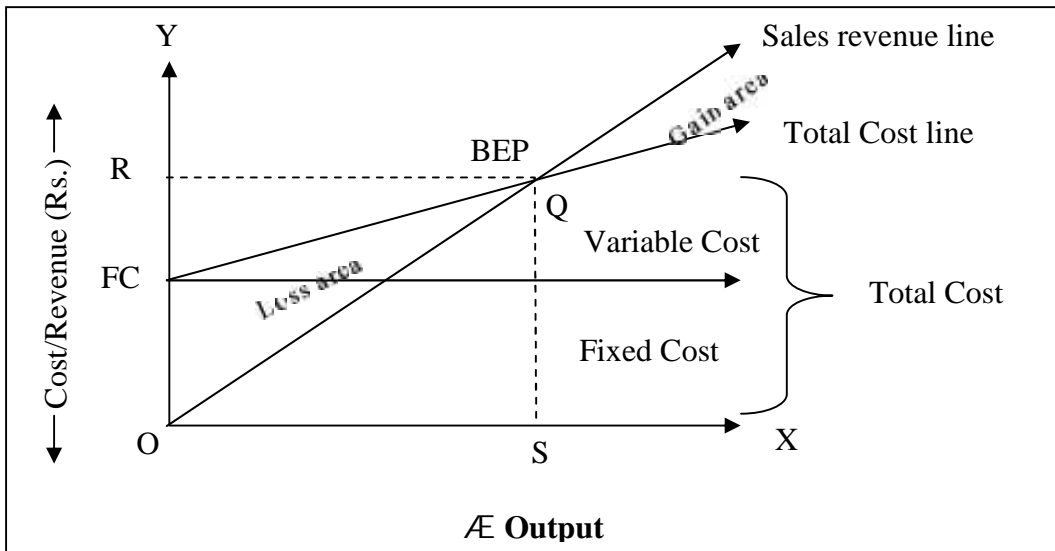


Figure No. 2.1

In the above break even chart an equilibrium point between sales and total cost curve is "Q" known as BEP. Therefore "OS" is the BE sales volume and "OR" is the BE sales in organization. If the actual sales are less than the break even sales, the organization will suffer from loss and vice versa.

### Cash Break-even Point

It consider the fixed cost related to cash expenses only and excludes the non cash expenses, such as depreciation, bad debts etc. It calculates the cash expenses which is equivalent to sales revenues. The formula used for calculation of cash break even is (Munankarmi, 2058: .497)

$$\text{Cash BEP} = \frac{\text{Cash Fixed Cost}}{\text{CMPU or P/V Ratio}}$$

Or

$$= \frac{\text{FC} - \text{Non Cash Expenses}}{\text{CMPU or P/V Ratio}}$$

### Break Even Capacity

Break even capacity provide information about at what

percentage of normal capacity will result the Break even point. That is, what percentage of normal capacity break even point will result? It is calculated following formula: (Munankarmi, 2002: 135)

$$\text{Break Even capacity} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} \times \frac{100}{\text{Sales}} = \dots \%$$

#### **2.1.5.4 Assumptions of Cost Volume Profit Analysis**

Cost volume profit analysis is based on the following assumption. (Munankarmi, 2058: 483)

- 1 The fixed cost remains constant and variable cost changes proportionally.
- 2 The selling price remains same at different level of activity.
- 3 The direct material and labour cost per unit don't change at different level of activity.
- 4 No change in capacity and productivity.
- 5 Volume of output is the only factor which can affect the cost.
- 6 Negligible amount of inventories. In other words, the sales volume equals to production volume.

#### **2.1.5.5 Limitations of Breakeven Analysis**

The break even analysis is based on some unrealistic assumptions. Its main limitations are as follows: (Dangol, 2062: 168)

1. According to the assumption of breakeven point, total cost can be divided in to fixed and variable cost only which is not practicable in real life. There are some costs, which are neither fixed nor variable. Those costs are described as semi variable cost.
2. The assumption that fixed cost always remains constant is not true. Some times it can be increased, especially in that situation when production or operation technique is change.
3. The assumption that variable cost per unit always remains constant can not be entirely true.

4. Constant selling price is not true. In case of increase in sales volume, some modification can be made in selling price by considering the nature of demand for the good.
5. The assumption that either firm produces only a single product or product mix ratio remains constant is also obviously quite unrealistic. An industry producing several types of goods has to bring modification in the product mix ratio from time to time.
6. The assumption that the production level and sales level should be equal is another draw back of even point. Such in condition is hardly found in practice.
7. The capital invested in business is also a significant element of profit planning and control. However, the place is not given to it break even point.

#### **2.1.5.6 Special Problems in CVP Analysis**

In applying the CVP analysis, three problems may be faced. (*Goet, 2062: 12.7*)

- (a) Selection of suitable activity base
- (b) Inventory changes
- (c) Non-operating expenses and incomes.

##### **(a) Activity Base:**

Product units are preferable if the analysis is applied to one product. For multiple products the activity base must be in additive units using a common denominator of volume or output. The net sales amounts are usually the only satisfactory common denominator.

##### **(b) Inventory Changes:**

If the budgeted changes in inventories are immaterial, they may be disregarded in CVP analysis. In case the changes are significant; they must be included in the analysis. Hence, the two approaches often used

are. (i) Disregard the inventory change and (ii) Include the inventory change.

**(c) The Non-Operating Income and Expenses:**

The non-operating income and expenses (extra ordinary gains and losses) cause another problem in CVP analysis. The problem is that whether they should be included or excluded in the analysis.

Management policy may be to:

- ) Include the non-operating income and expenses.
- ) Exclude the non-operating in come and expenses.

**2.1.5.7 Margin of Safety**

Margin of safety is an important concept in the context of Marginal costing and CVP analysis. The margin of safety refers to the amount by which sales revenue can fall before a loss is incurred. In other word, it is the difference between the actual sales and sales at the break even point. Margin of safety can be expressed in absolute sales amount or in percentage. For example if a company can break even at 50% if expected sales, then it has a margin of safety is 50%. If the presented sales level is Rs 1000 or 1000 unit and the break even volume may be sales Rs 500 or 500 units, so the margin of safety is Rs 500 or 500 units. The margin of safety is given by the formula.

$$MOS = \frac{\text{Actual/Budgeted Sales} - \text{Break Even Sales}}{\text{Actual Sales}} \times 100$$

$$= \frac{\text{Rs. 1000} - \text{Rs. 500}}{\text{Rs. 1000}} \times 100 = 50\%$$

$$\text{Rs. 1000} - \text{Rs. 500} = \text{Rs. 500}$$

Or,

Margin of safety can also be calculated by applying the fallowing formula.

$$MOS = \frac{\text{Profit}}{P/V \text{ Ratio}}$$

$$\text{Or } MOS = \frac{\text{Profit}}{\text{Contribution Margin Per Unit}}$$

$$MOS \text{ (in Rs.)} = \text{Actual sales} - \text{BE sales}$$

$$MOS \text{ (in units)} = \text{Actual sales unit} - \text{BE sales unit}$$

Margin of safety is an important indicator of the strength or weakness of an enterprise. The large margin of safety indicates the soundness of a business because even with substantial fall in sales or fall in production, some profit shall be made. Small margin of safety and the other hand is an indicator of the weak position of the business and even a small reduction in sales or production will adversely affect the profit position of the business. (*Nigam, 1984: 604*)

The margin of safety can be increased by the following steps:

- (1) Reducing fixed or variable cost
- (2) Increasing production
- (3) Increasing selling price
- (4) Substituting unprofitable production with profitable one
- (5) Dropping unprofitable product.

#### **2.1.5.8 CVP Analysis for Step or Jumping or Moving Fixed Cost**

Determination of break-even sales volume, so far was based on the very assumption that the items of fixed cost will remain stable over a broad, relevant range of normal operating volume. But it may not be so. Though some items of fixed cost such as depreciation and rent may remain constant but other items such as supervision, repair, and maintenance may change various times between the capacity volume and relevant range of normal operating volume. So, special attention is required during determination of BEP in the presence of step fixed cost. (*Wagle 2004: 4.7*)

Let's say the repair and Maintenance cost is incurred Rs 10,000 for every 6,000 units of outputs, and then it can present graphically as follows

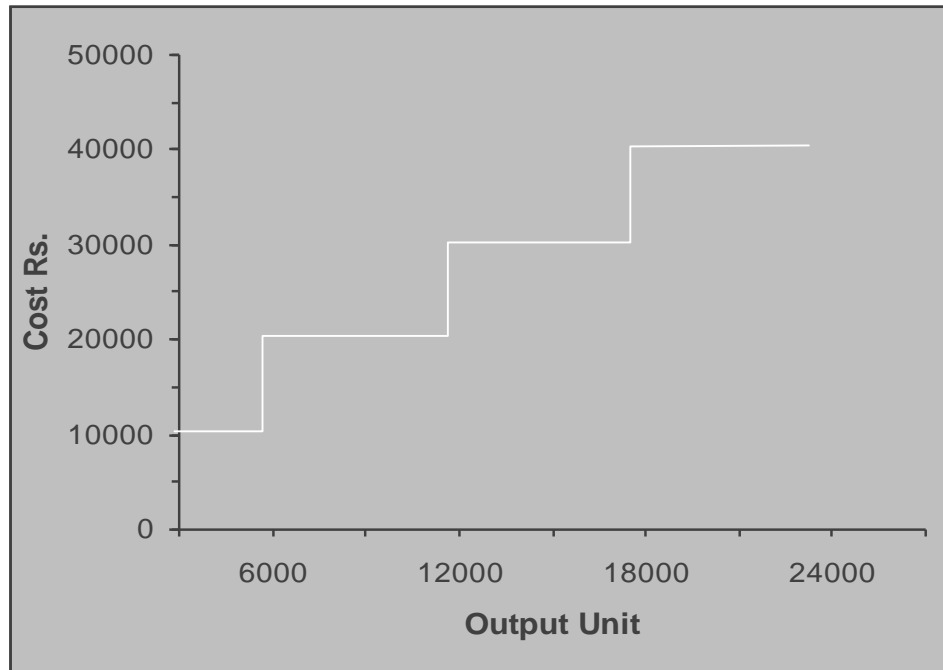


Figure No. 2.2

#### 2.1.5.9 CVP Analysis for Multi Product Firm

Sales mix can be defined as the relative combination of two or more products represented in total. It is not only the sales revenue that makes profit. The proportion of the sales contributed by different products greatly changes the amount of profit. Manager try to achieve that combination or mix that will yield the greatest amount of profit. If a company sales more than one product these may not be equally profitable. So the company's profit will depend upon the ratio of each product's sales to total sales revenue. Profit will be greater if high margin items make up a relatively large proportion of total sales than if sales consist mostly of low margin items. Changes in sales mix can cause great variations in a company's profit. A shift to low-margin items can cause the total profit to decrease even through total sales increase. On the contrary, a shift in the sales mix from low margin items to high margin items can cause the reverse effect total profit may increase even though total sales decrease. (*Bajracharya 2005: 260*)

Incase of more than one product, the first step is to compute the

weighted average contribution margin. The next step is to aggregate all fixed costs. Lastly apply the some general to compute the required variable as in the case of the single product.

The overall or company BE sales is computed by using the following formula.

$$\text{Company BE Sales (in units)} = \frac{\text{Total Fixed Cost}}{\text{Weighted CMPU}}$$

Where,

$$\text{Weighted CMPU} = \Sigma (\text{weight} \times \text{CMPU})$$

$$\text{Company BE sales (in Rs)} = \frac{\text{Total Fixed Cost}}{\text{Weighted P/V Ratio}}$$

Where,

$$\text{Weighted CM Ratio} = \Sigma (\text{weight} \times \text{CM Ratio})$$

Or

$$\frac{\text{Total CM}}{\text{Total Sales Revenue}}$$

#### **2.1.5.10 CVP Analysis under Constraint or Limiting Factors**

In our decision so far we forecasted profitability as a function of the volume and mix of product sales. While doing so, we ignored the presence of any production constraints that are common in practice. Accordingly we emphasized on increasing the output of high contribution margin product. Existences of production or resource or input constraints like availability of materials, labor, machine etc, in real world situation limit the amount of product the firm can deliver. In the presence of production constraints the high contribution margin product may no longer be the most profitable i.e. profitability may be affected by other factors beyond the contribution margin. (Wagle, 2004: 4.11)

#### **Single Production Constraint**

Single production constraint exists when the production is constrained by only one resource. For example, if all the firm's products required the same

basic raw materials, then the firms output will be limited by the available quantity of basic raw materials. Like wise if all the firms' products require the same labor, then the firms output will limited by the available labor hours.

### **Multiple Production Constraints**

Multiple production constraints exist when more than one resource limits the quantity that can be produced any time in an aggregate manner. In situation of multiple production constraints, contribution margin per unit of scarce resource approach used in single production constraints doesn't work, as ranking of products across different constraining resources will generally differ. Instead, linear programming helps us to make an optimal allocation or to determine an optimal product mix.

Linear programming is a mathematical technique for finding the best uses of a firm's limited resources. The basic requirements of a L.P problem that fits to multiple production constraints problem also can be enumerated as:

- 1 There must be an objective the firm wants to achieve i.e. criterion on which alternatives are assessed e.g. profit maximization or cost minimization. As profit is not linearly related to sales volume, contribution is the appropriate term to be used instead of profit.
- 2 These must be alternative courses of action; one of which will assist in achieving the objective.
- 3 Resources or facilities must be in limited supply.
- 4 The variable in the problem must be interrelated.
- 5 Objective and constraints must be able to be expressed as mathematical equations or inequalities and these must be linear equations or inequalities.

### **2.1.5.11 Cost Volume Profit Analysis under Uncertainty**

#### **Introduction**

CVP analysis based on single value estimates assume that all cost and resources are known with certainty. That is, it does not include department for

risk and uncertainty as it severally limit its usefulness. Profit is very much dependent mostly on the quantity of sales units, unit selling price, variable cost and fixed cost but also an uncertainty in one or more of these factors. Although margin of safety ratio explains the degree of sensitivity of the project and product in general but it fails to explain among of certainty in the product and also between the alternative. To overcome such difficulty, risk and uncertainty analysis like in other management decision making can also be used in CVP analysis.

The objective in CVP analysis under condition of uncertainty is to assess the probably distribution of the profit volume under given distribution of one or more of the factors, sales price or profits. (*Munankarmi, 2003: 5.1*)

### **Probability Distribution**

Probability distribution approach is simple statistical tools, which may be used to measure the risk and uncertainty involved in CVP analysis. A probability distribution theory normally suggests for postulation of various possibility of happening of the events in consideration. This may be done either taking in to consideration of the experience in the past or may be done by considering the personnel in tuition of the persons doing so. In business reference of past experience no person is likely to behave some manner in the similar situation in different time. Therefore personal judgment plays significant role in the management decision making. The conditions thus postulated are assigned probability (i.e. ones judgment forwards likeliness of happening of the condition forecasted). It must be understood here that probability assigned here is a subjective probability based in personnel judgment of the man making such an analysis. (*Pandey, 2003: 17*)

### **Standard Deviation of Random Variable**

The mean or expected value of random variable is not sufficient to study the actual behavior of random variable. The dispersion of random variable about its expected value should be measured and standard deviation provides

measures of this dispersion.

In statistical terms, standard deviation is defined as the square root of the mean of square deviation, where deviation is the difference between an outcome and the expected value of all outcomes. Further more, to calculate the value of standard deviation. We provide weight to the square of each deviation by its probability of occurrence. (*Dangol, 2062: 238*)

The computation of standard deviation is as follows:

$$\sigma = \sqrt{\sum f dv^2 / P}$$

Where,

$P = \text{Probability}$

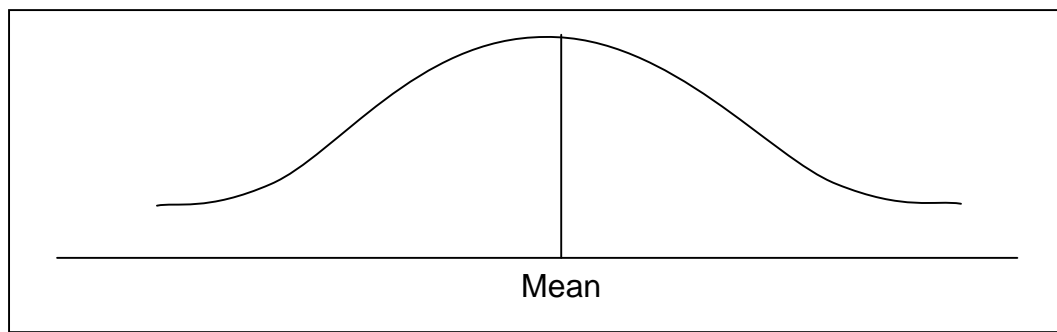
$dv (\text{deviation}) = \text{Sales value } (s) - \text{Expected Sales Value } (\mu)$

$dv^2 = \text{Square of deviation}$

### **Normal Distribution**

Normal distribution is the most important and frequently used continuous probability distribution. This distribution is well fitted in many types of problems. Most of the data related to economic and business statistic can take a form of this distribution.

The normal probability distribution is a smooth, symmetric, continuous, bell shaped curve as shown below. The area under the curve sums to one.



**Figure No. 2.3**

### **Multi Product CVP Analysis under Uncertainty**

For multi product CVP analysis under uncertainty, it is required to know not only the mean and standard deviation of the distribution for each product but also the correlation in sales between all pairs of product. For this contribution margin, fixed cost, product mean sales, standard deviation and correlation co-efficient are necessary to determine step by step. The following values must be determined under multi product CVP analysis under uncertainty. (*Munankarmi, 2003: 5.12*)

Expected profit for multiple products.

- 1 Variance of profit the multiple products.
- 2 Standard deviation of profit for given value of correlation co-efficient between/among sales of product.
- 3 Calculation of probability.

### **2.2 Review of Previous Thesis**

Literature review is the study of past research. This was conducted by previous research in selected area or topic of profit planning. The purpose of literature review is to find out what research studies have been conducted in one's chosen field of study and what remain to be done? It provides the base for developing comprehensive theoretical frame work from which hypothesis can be developed for testing literature review can be done by conducting library

where there are all kinds of published.

Research in the area of CVP analysis as a tool to measure effectiveness of PPC/budgeting of a company in Nepalese context are not made sufficiently. As PPC and management accounting cover major aspects of CVP analysis, researches made on these sectors are taken into consideration for review. Many of the researches have been made of manufacturing concerns and except a few most of them are not profound. An attempt is made here to review some of the researches, which have been submitted in PPC and management in the context of Nepal.

**Dangol (2001)** had done research on " Profit planning in manufacturing public enterprise'; A case study in Hetauda cement industry Ltd., focused her study in the application of profit planning concepts in PES. Necessary data and information were collected from both primary and secondary source. Ms. Dangol has summarized her unforgettable were: No proper application of any effective sales fore casting technique.

Planning of budgeting policy of the company is very poor and there is no system of taking corrective action for pre- planning, Decision making powers are centralized, there are no clear cut duties and responsibilities of the employees.

**Sharma (2002)** had done research on "Management Accounting practices in the listed companies of Nepal.", concerned his study to examine and study the practice or management accounting tools in the listed companies in Nepal. His research is based on primary data only. Stratified random sampling with proportionate allocation of percentage is followed to draw the sample. In his research he has pointed out various findings and recommendations. Some remarkable findings were as follows.

Different types of management accounting tools, which are taught in the colleges, are not found applied by the listed companies of Nepal.

Management Accounting is to help managers in overall managerial activities by providing information and helping in planning, controlling and decision making.

Nepalese listed companies are in infant stage in practicing of management accounting tools. Such as capital budgeting, annual budgeting, cash flow, ratio analysis, zero based budgeting, Activity based budgeting, Activity costing, target costing and value engineering.

Lack of information and extra cost burden are the main reasons behind not practicing such tools.

As Nepal is proceeding towards globalization and get membership of WTO. Companies are recommended to apply management accounting tools to fit with the global environment

**Shrestha (2005)** had conducted his MBA level thesis on the topic “A comparative study on production and sales in Dolkha Dairy udhyog and submitted to public youth campus, TU, Katmandu.

The main objectives of his research are as follows:

- ) To examine the capacity utilization of Dolkha Dairy Udhyog
- ) To analyze the production and sales budget of Dolkha Dairy.
- ) To analyze the various functional budgets adopted in Dolkha Dairy.
- ) To find the financial performance of Dolkha Dairy with the help of BEP analysis.
- ) To provide need suggestion and advice for utilization of profit planning and accounting system in Dolkha Dairy.

Mr. Shrestha has pointed out some findings which are as follows:

- ) Total production and sales of Dolkha Dairy are increasing every year.
- ) There is no proper management to supply sufficient milk in urban areas.

- ) The production capacity of the industry is high but actual production is less.
- ) The profit earned by the industry during that beginning three years time is not satisfactory.

Further the following points are selected from his recommendations:

- ) The planning committee of the company has to prepare production and sale budget.
- ) The management of the company needs to increase in production and sales volume for the utilization of available capacity.
- ) The profitability of the company is low. The unnecessary expenses should be removed.

**Rijal (2005)** had conducted a research entitled "Cost volume-profit analysis as tools to measure effectiveness of profit planning and control: A case study of NEBICO Pvt. Ltd.". He had mainly centered his study on application of CVP analysis in NEBICO Pvt. Ltd under PPC system. The time period covered by this research was five years. Necessary data and other information collected from different the secondary and primary sources of data. In his research, Mr.Rijal had pointed out various findings. Some remarkable of research were:

1. The company's sales trend has fluctuated trend, but not satisfactory trend of increasing.
2. The company's variable cost is high proportion than fixed cost in total cost amount, which contribute for lower contribution margin.
3. The company has high fixed cost.
4. In Nepalese manufacturing company, especially in NEBICO, there is no any plan to reduce cost. There is lack of effective cost control program or techniques.
5. The profit trend of the company is not satisfactory. As compare

- to profit, proportion is very low with fluctuated trend.
6. The company has no detailed and any systematic expenses plan. The fixed, variable and mixed expenses plan is the necessary elements for PPC.
  7. The goal and objectives of the company are not clearly communicated to operating level of management.
  8. In the company, there is no effective inventory policy.
  9. The inventory management, raw material handling and controlling system are not efficient and effective.
  10. The company does not apply any appropriate and effective sales forecasting techniques.
  11. There no any specially system of taking corrective action for the re planning.
  12. Wages structure is based on accordance with the level of skill. Since, unskilled workers are great in number with approximately 84% wages captured in total production wages.
  13. Most of the employees are male, which covers 42 are female employees are male of the total.
  14. NEBICO Pvt. Ltd. distributes their products in all over Nepal, which produce qualitative biscuits and confectioneries for substitute imported biscuits and confectioneries.
  15. There are no proper co-ordination among production, administration, distribution, inventory and sales department.
  16. Financial position of the company is not so good. Net profit margin, profitability ratios and other things are not satisfactory.
  17. NEBICO Pvt. Ltd. has not utilized its capacity.

**Pokhrel (2006)** had conducted his MBS level thesis on the topic “Cost Volume Profit” analysis of manufacturing organization (special reference to Himalayan Distillery limited)” and submitted to Nepal commerce campus, T.U. Katmandu.

The main objectives of that research were as follows:

- ) To analyze the impact of fixed cost on profit
- ) To compute B-E-P, CM analysis, M/O safety analysis and P/V analysis of C-V-P analysis.
- ) To analyze the different component of cost.
- ) To suggest on cost/ revenue/ profit planning to the company on the basis of finding of the study.
- ) To achieve all above objectives, he had adopted case study research design by using historical data of the concerned company. He had also use a primarily as well as secondary sources of data.

Mr. Pokhrel had pointed out some major findings in his research. Some findings are as follows:

- a) The Company had not practice of classification of cost into fixed costs and variable costs.
- b) CM ratio is much low to cover fixed costs.
- c) There were perfect negative correlation between actual sales and budgeted sales.

Further following points are selected from his recommendations:

- ) The management should segregate cost into fixed and variable through cost behavior mechanism.
- ) The company should control fixed costs by various techniques.
- ) The company also should minimize variable cost.
- ) Suitable sales promotion activities should be done to prevent damaging sale.
- ) The company should analyze other profit planning tool.

**Manandhar (2007)** had conducted her MBS level thesis on the topic “cost-volume-profit” analysis in Katmandu Dairy” and submitted to Nepal commerce campus, TU, Katmandu.

The main objectives of that study are to examine cost-volume-profit analysis as a tool to measure effectiveness of profit planning and control of K.D.

Some findings of her research are as follows:

- ) The company has failed to achieve budgeted sales during the study period.
- ) The financial position of the corporation is not satisfactory.
- ) The corporation has not utilized its full capacity due to the lack of raw material and skilled workers.
- ) The company has not applied any special technique for segregation of costs into fixed and variable costs.
- ) There is no costing system for allocation of cost to each product.
- ) KD has not practiced cost-volume profit analysis tools for profit and control.

Further the following points are selected from her recommendations:

- ) A systematic approach should be made towards comprehensive profit planning.
- ) KD should make a specific framework and responsibility centre for classification of expenses variable cost, fixed cost and semi variable cost which helps to control and reduce the costs.
- ) KD should effort to increase sales volume.
- ) KD should try to use optimal capacity.

**Mr. Kul Shekhar Mishra (2007)** had conducted his MBS level thesis on the topic “Cost-Volume-Profit Analysis” in Kantipur publication private ltd. and

submitted to Nepal Commerce Campus, TU.

The main objectives of the thesis is to examine the application of cost=volume-profit analysis in kantipur publication private limited.

Some findings of his research are as follows:

- ) The publication's variable cost is high than fixed costs in total, which contribute for lower fixed cost.
- ) There is no plan to reduce cost.
- ) There is no proper coordination among production administration, distribution, store and sales department.
- ) Kantipur publication private limited has not proper practice of segregating the costs into fixed and variable, controllable and uncontrollable.

Further, the following points are selected from his recommendations:

- ) Kantipur publications Pvt. Ltd. Should clearly define its broad objectives.
- ) Kantipur publication Pvt. Ltd. Should consider B-E-P analysis preparing sales plan, production plan and setting the price of products.
- ) Kantipur publication Pvt. Ltd. has invested big amount in fixed cost and poor utilization of it
- ) There is no effective inventory policy. Therefore, use of the tools for effective and efficient inventory management.

Finally, a systematic approach should be made towards comprehensive profit planning.

### **2.3 Research Gap**

There are various theses which have done on the current topic 'CVP Analysis'. Researcher tries to prove this research as an original one as it has studied two main leading manufacturing organizations. One of them is public limited and another is private limited. Both of the organizations have not been studied earlier together in their analysis of CVP. Researcher hopes this thesis will definitely help the new researchers to study in the corresponding subject. It will find out the problems in their management of cost, volume and sales. It will also suggest these companies to analyze CVP effectively and increase the profit.

## **CHAPTER – III**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Research methodology refers to a various sequential steps to be adopted by researcher in studying a problem with certain objective in view. Research methodology is a way of finding solution problem systematically. It describes the method and process applied in the entire subject of the study.

"The Term Research Methodology' refers to a critical careful and exhaustive investigation, inquiry or examination or experimentation having as its aim the revision of accepted conclusion in the light of newly discovered facts." (*Wolff and pant, 2002;29*)

Research Methodology is the process of arriving at the solution of the problem through planned and systematic dealing the collection, analysis and interpretation of facts and figures. Hence, this chapter includes research designs, nature and sources of data, data collection activities, population and samples, techniques and tools for data analysis and interpretation etc.

#### **3.2 Research Design**

The research design serves as a frame work for the study, guiding collection and analysis of data. The research is necessary to fulfill the objective of the study aim to evaluate managerial efficiency and performance regarding CVP of HPPC. This (CVP) applies managerial or variable costing principle while establishing the effect of the future course of activities (specified or charged) on the financial result of the form. It could be termed as analytical and descriptive.

#### **3.3 Population and Sample**

The research design is the plan structure and strategy for investigation of the facts in order to arrive at conclusion. The plan is the overall scheme of program of the research. It includes and outlines of what the investigator will

do from writing the hypothesis and their operational implication to the financial analysis if data. This research design is a plan to obtain the answer of research question through analysis of data. Research is systematic search for knowledge it application of scientific methods to the study of universe. The term population of data devotes for the date of each organization, which is with in boundary of specific organization. Under the study of CVP analysis there are many manufacturing company are operation at present in Nepal. It is not possible to study all of it regarding the research topic. Therefore among them two reputed manufacturing company Herbs Production and Processing Co. Ltd is taken as Sample Company from population for this research study.

### **3.4 Sources of Data**

Every research and study has its own data needs and data sources. Data and information can be obtained from primary and secondary sources. This study will be taken as secondary data. Source of data will be published and unpublished records of companies, previous studies and different articles, formals and news papers. In some cases paper providing data will also be obtained in order to clear various available data and to get more pertinent information from related person's interview and small scale are also undertaken.

### **3.5 Tools for Analysis**

To analyzed CVP analysis of Herbs Production and Processing Co. Ltd, accounting and financial tools, statistical and mathematical tools are used. They are as follows:

#### **Accounting and Financial Tools**

Generally the accounting and financial tools are used for the purpose of the assessment of the financial position to a particular organization. They are as follows:

### a) Contribution Margin

Contribution margin is the difference between selling price and variable cost.

$$\begin{aligned} \text{Contribution Margin (CM)} &= \text{Sales} - \text{Variable cost} \\ &\text{or} \\ &= \text{FC} + \text{Profit} \end{aligned}$$

### b) Profit Volume Ratio

Profit volume ratio expresses the relationship of contribution to sales. It is also termed as contribution margin ratio, contribution sales ratio or variable profit ratio.

$$\begin{aligned} \text{Profit volume Ratio /contribution margin Ratio} &= \frac{\text{Contribution Margin}}{\text{Sales}} \\ &\text{or} \\ &= \frac{\text{FC} + \text{Profit}}{\text{Sales}} \\ &= 1 - \frac{\text{Variable Cost}}{\text{Selling Price}} \end{aligned}$$

### c) Break even analysis

Break even analysis determines the break even point or a level of sales at which cost and revenue are in equilibrium and net income is zero.

$$(a) \text{ BEP in unit} = \frac{FC}{SP - UVC} = \frac{FC}{CMPU} = \dots\dots\dots \text{units}$$

$$(b) \text{ BEP (in Rs)} = \frac{FC}{P/V \text{ Ratio}} = \frac{FC}{CMPU} \times \dots\dots\dots \text{SPPU}$$

$$(c) \text{ Cash BEP} = \frac{\text{Cash Fixed Cost}}{P/V \text{ Ratio}}$$

#### **d) Margin of safety**

Margin of safety is the excess of actual or budgeted sales over the break even sales.

(a) *Margin of safety Ratio* =

$$\frac{\text{Actual/Budgeted Sales} - \text{Breakeven Sales}}{\text{Actual Sales}} \times 100$$

or  $\frac{\text{Profit}}{\text{P/V Ratio or CMPU}}$

(b) *Safety Margin (in Rs)* = *Actual sales* – *BE sales*

(c) *Safety Margin (in units)* = *Actual sales unit* – *BE sales unit*

#### **e) Segregation of Semi-Variable (Mixed) Costs**

All costs, other than fully variable and fixed, which are neither perfectly variable nor absolutely fixed in relation to volume changes, are semi variable costs. Semi variable cost is also known as mixed costs as they consist both of fixed costs and variable costs. CVP analysis requires segregation of all semi variable costs between two parts: fixed and variable. Following method might be of use to breakdown mixed costs in to their fixed and variable cost.

##### **(i) High Low Method**

In the high low method, the semi-variable or mixed costs are segregated into fixed and the variable components using exactly two data points. The two points consist of selecting the periods of the highest and lowest activity levels comprising the changes in costs that result from the two levels.

$$\text{Variable cost per unit (b)} = \frac{\text{High Cost} - \text{Low Cost}}{\text{High Unit} - \text{Low Unit}}$$

Or

$$\frac{\zeta \text{ Cost}}{\zeta \text{ Output}}$$

*Fixed cost (a) = Total costs – (Variable cost per unit × Activity volume)*

$$a = y - bx$$

## **(ii) Least Square Method**

The term Least Square means that the sum of the squares of the deviations from the plotted points to the regression line is smaller than would be obtained from any other line fitted to the data. So in trend line analysis drawn from the relationship between the independent and dependent variables, a least square straight line trend gives a more reliable estimate than any other methods.

In cost estimation in relation to activity levels, activity volume are defined as independent variable ( $x$ ) and the mixed costs relating to that activity as dependent variable( $y$ ).

Then the amount of dependent variable or cost ( $y$ ) for any given level of independent variable or production ( $x$ ) can be explained through the following least square straight line;

$$\text{Least square straight line } y = a + bx$$

Where,

$a$  = Fixed costs per period/ per range of activities

$b$  = Variable costs per unit

$N$  = Number of observations

$x$  = Activity Measures (unit or hours)

$y$  = Total mixed costs observed

Since ( $b$ ) stands for variable costs per unit and ( $a$ ) stands for fixed cost per period, we have to compute the value of ( $b$ ) and ( $a$ ) to segregate the mixed costs in to variable and fixed components. Value of ( $a$ ) and ( $b$ ) can be directly estimated by using simple mathematical formula.

$$\text{Variable cost per unit (b)} = \frac{N \sum xy - \sum x \sum y}{N \sum x^2 - (\sum x)^2}$$

$$\text{Fixed Cost (a)} = \frac{y - b(\sum x)}{N}$$

### **Statistical and Mathematical tools**

Generally the statistical tools are used for attaining accuracy on analysis as well as on study. They are as follows:

#### **a) Arithmetic Mean**

Arithmetic mean or simply a 'mean' of a set of observations is the sum of all the observations divided by the number of observations.

$$\text{Mean } (\bar{X}) = \frac{\sum X}{N}$$

#### **b) Standard Deviation**

Standard deviation is the positive square root of the mean of the square of the deviation taken from the arithmetic mean.

$$\text{Standard deviation } (\sigma) = \sqrt{\frac{\sum U^2}{N} - \left(\frac{\sum U}{N}\right)^2}$$

#### **c) Coefficient of Variation**

Hundred times of the coefficient of dispersion based upon standard deviation is called coefficient of variation.

$$\text{Coefficient of variation (C.V)} = \frac{\sigma}{\bar{x}} \times 100$$

#### **d) Correlation**

Correlation analysis is the statistical tools that we can use to describe the degree to which one variable is linearly related to another. It does not tell us anything about causes and effect relationship. It helps in determining

relationship between two or more variables. Of the several mathematical method of measuring correlation, the Karl Person's method is most widely used in practice.

$$\text{Correlation } (r) = \frac{N \sum UV - \sum U \cdot \sum V}{\sqrt{N \sum U^2 - (\sum U)^2} \sqrt{N \sum V^2 - (\sum V)^2}}$$

#### e) Probable Error

The probable error of the coefficient of correlation helps in interpreting its value. With the help of probable error it is possible to determine the reliability of the value of the coefficient in so far as it depends on the condition of random sampling.

$$\text{Probable Error (P.E)} = 0.6745 \left| \frac{r}{\sqrt{N}} \right|$$

Where

$r$  = Correlation coefficient

$N$  = Number of pairs of observation

0.6745 = constant value

#### f) Graph Method

In this method the given data are plotted on a graph paper and line of best fit is drawn, where as semi-variable expenses is plotted on y-axis and activity measure is plotted on x-axis. Corresponding to each volume of production cost is plotted on the paper, thus several points are shown on it. By the help of these points lines of best fit are drawn. The point where this line intersects the y-axis is taken to be the amount of fixed element. Then a line to the horizontal axis (x-axis) is drawn from the point where the line of best fit intersects the y-axis. This is the fixed cost line, variable cost at any level can be known by difference between fixed and total cost line.

## **CHAPTER – IV**

### **DATA PRESENTATION AND ANALYSIS**

#### **4.1 Introduction**

Planning sets the proper objectives and goals for an organization and profit planning develops the specific action plans to achieve the predetermined goals and objectives. CVP analysis can be used to plan the profit and it also measures the effectiveness of profit planning and control. CVP analysis analyses the relation among cost, revenue and profit. It helps the management in cost control and profit planning.

This chapter is concentrated to the presentation analysis and interpretation through different tools following the research methodology many suitable tables, graphs, lines and diagrams have been also used to clarify the actual position of the companies. Various Accounting and financial, Mathematical and statistical tools have been used in this chapter. In this section the CVP analysis of HPPCL is analyzed with the help tools CM, PV Ratio, BE analysis, Margin of safety, Mean, S.D, Coefficient of variation and Correlation of Coefficient. It presents the analysis and interpretations of data from FY 060/061-064/065.

Above all computations are done for analysis and interpretation of the company regarding objectives of the study, major findings and to provide valid recommendations.

#### **4.2 Sales Plan of HPPCL**

The starting point in preparing profit plan is the sales plan, which displays the projected sales in units and rupees. The sales planning process is an essential part of profit plan and control because, it provides for the basic management decisions about marketing and based on these decisions, it is an organized approach for developing a comprehensive sales plan. Unless there is a realistic sales plan, practically all other elements of a profit plan will be out of touch reality. The sales plan is the foundation of periodic planning in the firm

because practically all other planning is based on it. The primary sources of cash is sales, the capital additions needed, the amount of expenses to be planned, the manpower requirements, the production level and other important operational aspects depend on the volume of sales.

HPPCL is a Manufacturing Company, which produces and sells different types of product. Its product are sold in domestic market as well as exported to different countries. They have generally used four alternative distribution channels for different product. They are

Zero Level: Producer – customer

One Level: Producer – Retailer – consumer

Two Level: Producer–wholesaler – Retailer – consumer

Three Levels: Producer –Agent –Wholesaler –Retailer – Consumer

HPPCL is manufacturing companies producing and selling different types of products. To identify the sales trend of past and to forecast the possible future of the companies, past year budgeted sales and their achievement is presented in the table. To analyze the past sales of the companies, the following table shows the actual sales and budgeted sales trend of HPPCL from fiscal year 060/61 to 064/065 HPPCL.

**Table No. 4.1**  
**Actual and Budgeted Sales Trend of HPPCL**

(Rs '000)

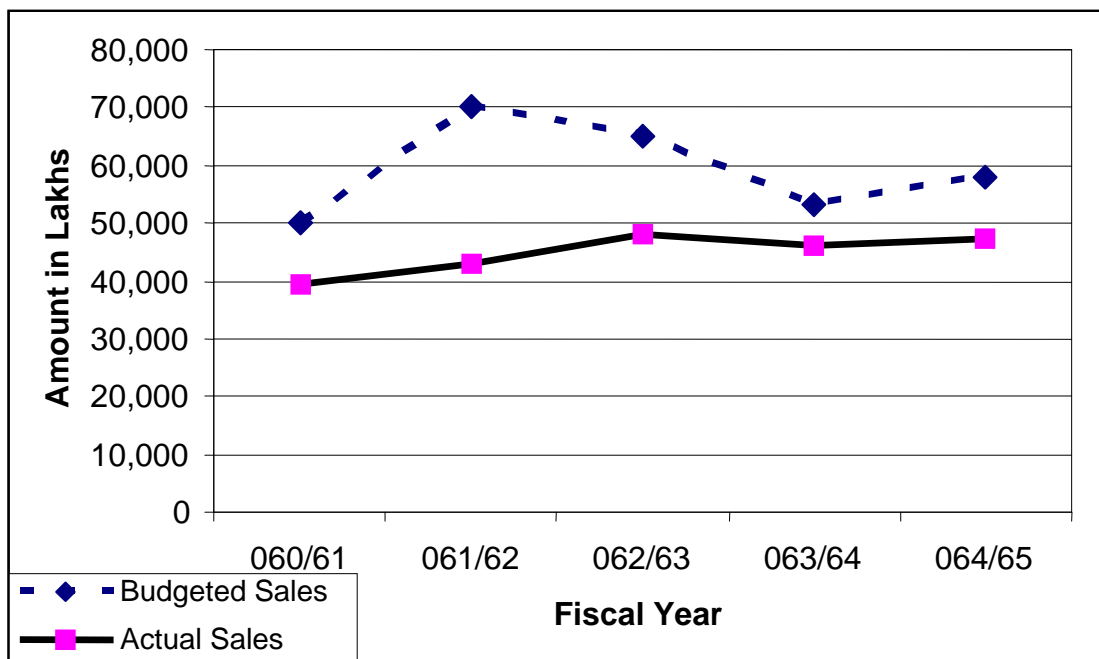
Fiscal Year	Budgeted Sales	Actual sales	Achievement %	Variance	
				In amount	in %
060/61	49902	39345.70	78.84	10556.29	21.154
061/62	70334	42876.16	60.96	27457.83	39.039
062/63	65135	47888.35	73.52	17246.64	26.478
063/64	53036	45916.58	86.57	7119.41	13.424
064/65	57950	47247.04	81.53	10702.95	18.4692

*Source: Annual report of Account and Research Department of HPPCL*

Above table no. 4.1 shows the highly unfavorable in F/Y 2060/61 and smaller unfavorable in F/Y 063/064. Variance percentage shows that management should try to reduce variance between Budgeted and actual sales. It can be said that there is not systematic and scientific sales plan. It shows that target sales are not set on realistic basis. It means target sales are not based on historical data and previous year's sales performance. The results express the weakness of top level management in co-ordination and integrating the efforts of other. Therefore, top level management should consider this issue seriously for the improvement.

We can present the sales target and achievement more effectively by graph and bar diagram as below.

**Figure No.: 4.1**  
**Budgeted Sales and Actual Sales of HPPCL F/Y 060/061 to 064/065**  
*(Rs '000)*



Above graph shows that the trend of Budgeted sales and Actual sales of HPPCL. The graphical presentation indicates that the gap between target sales and actual sales is very high in HPPCL.

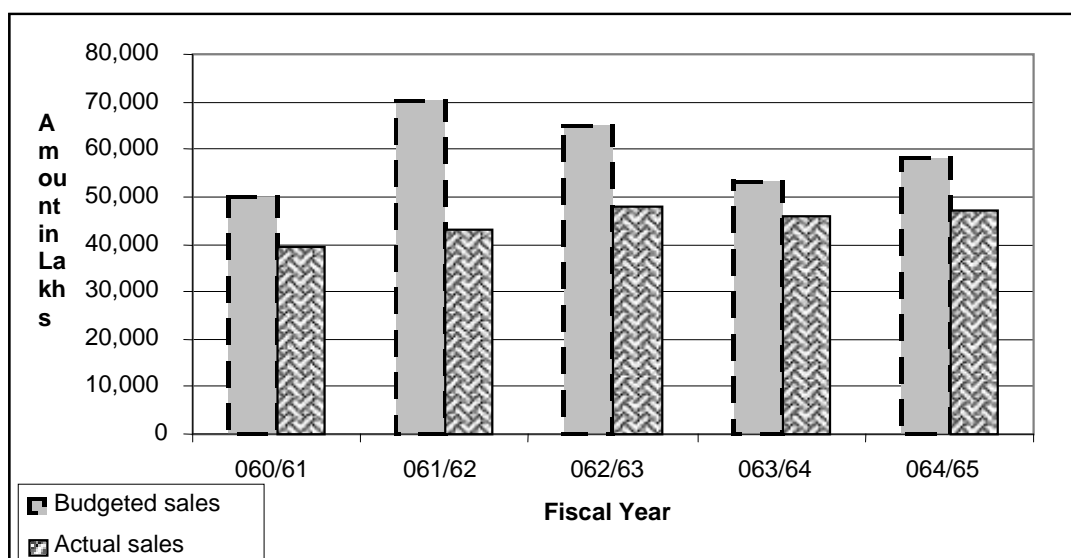
We can present the budgeted sales and actual sales figure more effectively by following diagram.

**Figure No.: 4.2**

## Budget Sales and Actual Sales of HPPCL

F/Y 060/61 to 064/65

(Rs '000)



The above diagram no 4.2 indicates that the sales achievement is increase in F/Y 061/62 and decrease in F/Y 060/61. Similarly in figure no 4.2 indicates that the sales achievement is increase in 062/63 and decrease in 063/64.

In order to examine the nature of variability of Budgeted sales and Actual sales of different years, we have to calculate arithmetic mean, standard deviation, coefficient of variance and probable error of the Budgeted and Actual sales figure of HPPCL for five years are applied.

These statistical tools are calculated by using spreadsheet method and summarized as under,

Here,

$$\text{Budgeted sales} = x$$

$$\text{Actual sales} = y$$

**Table No.: 4.2**  
**Summary of Statistical Calculation of HPPCL**

Statistical tools	Budgeted sales (x)	Actual sales (y)
Means	$\bar{x} = 59271.4$	$\bar{y} = 44654.7$
Standard Deviation	$\sqrt{x} = 7552.54$	$\sqrt{y} = 3165.99$
Coefficient of variance (CV)	12.74%	7.089%
Correlation (r)	0.3156	
Probable error correction (P.E)	0.2715	

*Source: Calculation from appendix-I & II*

Above table no 4.2 shows Budgeted Sales mean is greater than actual sales mean for HPPCL. Similarly S.D of Budgeted sales is greater than Actual sales for HPPCL. In Coefficient variance (C.V.) of Budgeted sales is greater than Actual sales of HPPCL. This showed that the budgeted sales fluctuate less than actual sales. Having smaller C.V, budgeted sales are more homogenous or less variability or uniform or more consist ant than actual sales.

Similarly, the correlation coefficient (r) between two variables (i.e. Budgeted sales and Actual sales) is 0.315 of HPPCL. Correlation coefficient (r) of HPPCL is greater than zero, so researcher concluded that, there is positive correlation between two variables of both companies.

The probable error of correlation coefficient (P.E) is the measure of testing the reliability of the calculated value of r. It is used in interpretation whether calculated value of r is significant or not. If  $r < P.E$ , the value of 'r' is not significant no matter how r value is i.e. there is no evidence of correlation between the variables. If  $r > P.E$ , the value of r is significant i.e., correlation is significant.

The calculated value of r is greater than PE (i.e.  $0.3 > 0.2715$ ). Hence researcher found that, the value of r is significant for HPPCL also.

### **Regression Analysis:**

A regression lines also can be fitted to show the degree of

relationship between budgeted and actual sales and to forecast the achievement with given targets. For this proposes Budgeted sales (x) is assumed to be independent and actual sales (y) are assumed to be dependent variable:-

The regression line Y on X:

$$y - \bar{y} = r \frac{\sum y}{\sum x} \frac{\sum x - \bar{x}}{\sum y - \bar{y}}$$

$$\text{Or, } y - 44654.77064 = 0.31561 \left| \frac{3165.998132}{7552.541085} \right| (x - 59271.4)$$

$$\text{Or, } y - 44654.77064 = 0.132302 (x - 59271.4)$$

$$\text{Or, } y - 44654.77064 = 0.132302x - 7841.7247$$

$$\text{Or, } y = 0.132302x - 7841.7247 + 44654.77064$$

$$\text{Or, } y = 0.132302x - 36813.04594$$

By this regression equation, there is positive relationship between the Budgeted sales and actual sales of both companies. This computation shows that the expected actual sales would be 0.13302 times of budgeted sales-36813.04594 for HPPCL. Therefore if have the budgeted sales of next fiscal year, we can calculate the expected sales by substituting the value of budgeted sales in the above equation.

### 4.3 Cost Analysis of HPPCL

Cost is defined as the amount of expenditure incurred on a specified thing or activity. A cost is the value of economic resources used as a result of producing the thing cost. Costs can be classified from different angle. Classification is the process of grouping costs according to their common characteristics. It is necessary to classified cost to find out accurate costs and profit for proper control and managerial decisions, management is to be provided with necessary data analysis and classify costs.

Cost analysis is necessary to attain enterprise goals. There are different types of cost incurred in the company. Generally costs are classified four sectors.

- (1) Cost of Sales
- (2) Administrative Expenses

(3) Selling and Distribution Expenses

(4) Financial Expenses

Cost of sales is a part of production cost which relates with raw material, packing WIP, electricity power and fuel, laboratory expenses, cartage and coolie etc.

Administration cost refers to the cost management, and of secretarial accounting and administrative service, which cannot be directly related to production, selling or other development functions of the enterprise. Example are salaries to staff, accountants, rent rates, depreciation of fixed assets, postage, stationery, legal and professional charge, board meeting fee, insurance, audit fee, indirect repair and maintenance, donation and subscription, general charges, warehouse expenses, business development expenses and administrative expenses etc.

All the indirect expenses incurred selling and distribution of finished goods is known as selling & distribution overhead. Selling overheads are incurred for creating demand, attracting present and potential customers and retaining old customers. Distribution overheads incurred in maintaining stock and carrying the goods to showroom or customer's place. Distribution expenses includes all costs related to selling, distribution, advertisement and sales promotion, royalty, freight outward, excise duty etc. distribution cost are not production and not allocated to special products.

Where as financial expenses include interest short term and long term loan.

#### **4.3.1 Variable Cost Analysis**

The total cost changes according to change in level/activity of production. If the level of production increases then total amount of variable cost also increase and vice versa. When production is zero, the total amount of variable cost also is zero. But per unit variables cost will remain constant and per unit variable cost is denoted by 'b'. To produce finished goods and transfer these goods to market, the company bears different types of variable costs.

Following table 4.3 shows the details variable cost of HPPCL.

**Table No.: 4.3**  
**Statement of Detail Variable Costs of HPPCL**

<b>Particulars</b>	<b>060/61</b>	<b>061/62</b>	<b>062/63</b>	<b>063/64</b>	<b>064/65</b>
Cost of good sales:					
Purchase of Herbs	9550040.43	12265516.79	10361152.51	11713795.63	18566524.77
purchase of container	1043998.50	696858.93	369952.86	125731.53	198045.24
Petrol & Mobil expenses	455736.27	435007.45	418499.91	348591.10	339384.01
Salary of technician	5575147	6059781	6172907	6478350	6213022
Labour & wages	2973121.25	3607449.17	3355647.84	3150580.90	3296656.19
Production and trade expenses	11166511.29	12948268.08	10028145.48	9139034.04	11930481
Custom Duty	1413149	1541505	1461886	477565	266582
Repair & Maintenance cost	858558.98	1127913.54	824047.85	806895.96	600933.00
Plantation Expenses	-	10000.00	10000.00	6685.00	-
Apron	-	-	19705.00	29625.50	27768.5
Feasibility	-	-	45215.00	-	-
Discount and sales	-	6336.00	300175.03	497981.98	474578.82
<b>Total (A)</b>	<b>33036250</b>	<b>38698633</b>	<b>33367330</b>	<b>32774832</b>	<b>41913973</b>
Increase/Decrease	-	0.14	-0.159	-0.018	0.2180

*Source: Annual Report of HPPCL. (060/61 to 064/65)*

HPPCL classify all cost of sales and selling and distribution cost as variable cost. Above table no 4.3 showed that there is fluctuation in variable cost under different headings because various factor effected to those cost from different angles. Variables costs in total of HPPCL are increased by 14% and 21% in F/Y 061/62 and 063/64 and total variable costs are decreased by 15% and 1.8% in F/Y 062/63 and 063/64 than the base year respectively. The rate of increase in total variable cost is higher than the rate of decrease.

#### **4.3.2 Fixed Cost Analysis**

Fixed costs remain constant in total amount with in given range or activity for a given period of time. Fixed cost per unit decreases as production increase and increases as production decrease. These costs are not always wholly fixed in nature. If a business increased its capacity, it has to go in for additional fixed assets and manpower to meet the changed requirement of production. Fixed cost in total are varies for different fiscal year effected by internal and external environment factors of the company.

**Table No.: 4.4**  
**Fixed Cost Details of HPPCL**

*(Rs '00000)*

<b>Particulars</b>	<b>060/61</b>	<b>061/62</b>	<b>062/63</b>	<b>063/64</b>	<b>064/65</b>
Administrative expenses	4216469	4399904	4654385	4594497	4654385
P.F contribution	801493.00	829728.11	867688.49	892298.88	871549.42
House Rent exp	189495.00	149905.00	175605.00	138978.16	61800.00
Board meeting Allowances	52000.00	84700.00	100700.00	65500.00	154000.00
Audit Fees	57000.00	30000.00	30000.00	30000.00	30000.00
Management exp	156360.00	249930.36	110672.50	203424.31	166158.85
Insurance exp	467258.85	462581.48	506869.36	574678.76	633071.14
Gratuity & Medical exp	8922576.00	3701576.00	3732332.00	3117662.00	2885586.00
Depreciation	1985296.21	1759695.94	1532091.71	1466339.25	1542434.99
Interest on Loan	2960940.00	2960940.00	2960940.00	2960940.00	2960940.00
Advertisement exp	31549.00	90108.00	23000.00	7006.25	4650.00
Bank commission	17423.08	27348.97	15877.93	15007.43	16800.10
Telephone exp.	291258.03	324375.89	255055.66	218290.33	226988.97
Stationery exp.	165784	201804.01	148957.87	141800.36	139384.01
Hospitality exp	161110	127090	129386	77401	76870
Electricity, Fuel & Water	137734	115894	66454	76939	80696
Miscellaneous exp	310690	242292	209987	160250	182582
TADA	629583	641354	512085	366177	1016977
Total Fixed cost	21553964	16426261	16049586	15103172	15723529
Increase/Decrease	-	-0.2379	-0.022	-0.062	0.0394

*Sources: Annual Report of HPPCL*

Table no 4.4 shows that total fixed cost of HPPCL is increasing by 3.94%. But total fixed cost are decreasing in F/Y 061/62, 062/63 and 063/64 by

23.79%, 2.2% and 6.2% respectively.

#### **4.3.3 Semi Variable/Semi Fixed Cost Analysis**

It is the direct expenditure which is partly fixed and partly variable. These costs neither remain constant nor change proportionally as per change in level of output. It is the aggregate of variable and fixed cost. Classification of cost into two variable and fixed is very important to plan and control of costs. It helps to determine the volume of operation required to maintain the desired profitability. HPPCL has no practice of using systematic method of classifying the costs which are identified as semi variable cost. So, there is rough practice of classify of expenses in to fixed and variable component. Discussion with the company's accountant and other related employees reveal that practice of identification of semi-variable cost and their segregation in to fixed and variable was not found.

#### **4.4 Analysis of Sales and Cost Relationship of HPPCL**

Cost structure refers to the relative proportion of fixed and variable cost in an organization. There is no categorical answer possible of which cost structure is best. A firm might have many-fixed price but few variable cost or mixed cost and vice versa. A firm's cost structure can have a significant impact on decision; in the matter of risk etc company with high fixed cost will incur losses much more quickly than company with lower fixed cost if the recessionary condition strikes the industry. In sum, company with high fixed cost will experiences wider movement in net income as changes take place in sales, with greater profit in good year and greater loss in bad year. Company with low fixed cost will enjoy some what greater stability in net income, but it will do so at the risk of losing substantial profit if sales trend upward in the long run.

The cost analysis of HPPCL is briefly analyzed in the below table.

**Table No.: 4.5**  
**Cost Structure Analysis of HPPCL**

*(Rs '00000)*

<b>Fiscal Year</b>	<b>Sales Revenue</b>	<b>Total cost</b>	<b>Total VC</b>	<b>Total FC</b>
060/61	393.457	545.89	330.36	215.53
061/62	428.76	551.25	386.98	164.27
062/63	478.8835	494.16	333.67	160.49
063/64	459.16	478.77	327.74	151.03
064/65	472.4794	576.36	419.13	157.23

*(In percent)*

	<b>060/61</b>	<b>061/62</b>	<b>062/63</b>	<b>063/64</b>	<b>064/65</b>
% of variable cost to total cost HPPCL	60.00	70.00	67.00	68.00	72.00
% of Fixed cost to total cost HPPCL	40.00	30.00	33.00	32.00	28.00
% of variable cost to sales revenue HPPCL	83.00	90.00	69.00	71.00	88.00
% of Fixed cost to sales revenue HPPCL	54.00	38.00	33.00	32.00	33.00
% of sales Increase/ Decrease HPPCL	-	8.97	11.66	-4.11	2.89

Table no 4.5 shows that the proportion of variable cost and fixed cost to total cost of HPPCL for F/Y 060/61 to 064/65 are 60% & 40%, 70% & 30%, 67% & 33%, 68% & 32% and 72% & 28% respectively. Overall the proportion of variable cost is higher than fixed cost in the company. Similarly, the proportion of variable cost and fixed cost to total sales of HPPCL F/Y 060/61 to 064/65 are 83% & 54%, 90% & 38%, 69% & 33%, 71% & 32% and 88% & 33% respectively.

The details of sales and total cost of HPPCL for five F/Y are presented below.

**Table No. 4.6**  
**Sales and Total Cost Analysis of HPPCL**

<i>(Rs '00000)</i>				
<b>Fiscal Year</b>	<b>Sales</b>	<b>Change %</b>	<b>Total Cost</b>	<b>Change %</b>
060/61	393.45	-	545.90	-
061/62	428.76	8.97	548.24	0.43
062/63	478.88	11.68	494.16	-9.86
063/64	459.16	-4.11	478.78	-3.11
064/65	472.479	2.89	576.375	20.38

Comparison of the sales trend with the total cost trend shows that in case of HPPCL for F/Y 061/62, 062/63 & 064/65 sales the sales increased by 8.97%, 11.68% & 2.89% total cost is increased by 0.43% decreased by 9.86% and increased by 20.38% in 064/65 in respective year. Similarly, when the decreased by 4.11% and in F/Y 063/64, total cost decreased by -3.114%. It may be concluded from analysis that when sales increase total cost also increase and vice versa.

#### **4.5 Cost Volume Profit Analysis of HPPCL**

The analysis of the relationship between cost, volume and profit is said CVP analysis. CVP analysis is significant tool of profit planning and control it helps to formulate the policies strategies regarding the revenue of the organization and cost estimation as well. CVP analysis summarizes the effects of changes in an organization's volume of activity on its costs, revenue and profit. Nowadays, CVP analysis has become a powerful instrument in management decision making especially cost control and profit planning. It helps to determine the minimum sales volume required to avoid loses and the sales volume at which the profit goal of the company will be achieved. So it is very important for sales and productions plan because without the knowledge

of BEP, it is difficult to determine the sales level for certain level of profit. Profit planning can be done only when the management information about the cost of products and the selling price of the products. CVP analysis provides management with a comprehensive overview of the effects on revenue and costs of all kinds of short run financial changes.

**Table No.: 4.7**  
**Income Statement of HPPCL for F/Y 060/61 to 064/65**  
*(Rs`00000)*

Particulars	060/61	061/62	062/63	063/64	064/65
(A) Sales Revenue	39345708	42876162	47979208	45941949	47555545
(B) Cost of goods sold:	33036250	38698633	33367330	32774832	41913973
Add: Opening stock	34067193	33227916	38448938	30525878	28822258
Less: Closing stock	33227916	38448938	30525878	28822258	38323820
Total cost of goods sold	33875527	33477611	41290390	34478452	32412411
(c) Contribution margin (A-B)	5470181	9398551	6688818	11463497	15143134
(D) Fixed cost	21553964	16426261	16049586	15103172	15723529
(E) Profit/Loss (C-D)	(16083783)	(7027710)	(9360771)	(3639675)	(580395)
P/V Ratio = (CM/Sales	0.1390	0.2192	0.1394	0.2495	0.3184
BEP=(fixed cost/PV ratio)	155064489	74937322	115133350	60533755	49382942
MOS (AS-BEP)	(115718781)	(32061160)	(67154142)	(14591806)	(1827397)
Percentage of (BEP/Sales)	3.94	1.74	2.39	1.3176	1.038
Percentage of (MOS/Sales)	(2.94)	(0.747)	(1.399)	(0.3176)	(0.038)
Operating Leverage (CM/Profit)	(0.34)	(1.33)	(0.71)	(3.14)	(26.09)

#### 4.5.1 Contribution Margin Analysis

The profit after deducting all variable cost from sales revenue is said contribution margin. It is used to cover of fixed cost for the period and the balance amount towards the net profit.

Contribution margin can be presented as follows:

$$\text{Contribution Margin} = \text{Sales} - \text{Variable Costs}$$

Or,

$$\text{Contribution Margin} = \text{Fixed Cost} + \text{Profit}$$

$$\text{CM for 064/65} = \text{Rs } (475, 55,545 - 324, 12,411) = \text{Rs } 151, 43,134$$

Or

$$= \text{Rs } (157, 23,529 + - 580,395) = \text{Rs } 151, 43,134$$

The above table no 4.7 showed the calculation of HPPCL for the five fiscal years from 60/61 to 064/65. CM for the five year shows the fluctuating trend. High CM is signal of profit and vice versa. Above table showed that, HPPCL in F/Y 061/62 and 063/64 represents the high CM and F/Y 064/65 and 060/61 represents the low CM respectively.

#### 4.5.2 Profit Volume Ratio

Profit volume ratio shows the relationship between contribution margin and sales. It is known as contribution margin ratio. It is denoted by PV ratio or CM ratio. PV ratio can be computed by using following formula:

$$\text{Profit Volume Ratio} = \frac{(\text{Sales Revenue} - \text{Variable Cost})}{\text{Sales Revenue}}$$

$$= \frac{\text{Contribution Margin}}{\text{Sales Revenue}}$$

$$PV \text{ Ratio for } 064/65 = 151,43,134/475,55,545 = 0.3184$$

The above table no 4.7 shows the PV ratio of HPPCL for the F/Y 060/61 to 064/65. PV ratio of HPPCL is in fluctuating trend. The highest PV ratio is 0.3184 in the F/Y 064/65 and lowest is 0.1390 in the F/Y 060/61. An increase in CM means increase in profit only because only fixed cost is assumed to be constant at certain level of activity. Management tries to increase the value of the ratio by reducing the variable cost or by increasing the selling price.

#### **4.5.3 Break Even Point (BEP) Analysis**

The break-even analysis established a relationship between revenues and cost with respect to volume. It indicates the level of sales at which costs and revenues are in equilibrium. The equilibrium point is commonly known as the break-even point. The BEP is that point of sales volume at which total revenue is equal to total costs. It is no profit and no loss point. So it is very necessary to know the BEP for every organization. BEP can compute in Rs or unit.

$$BEP \text{ in unit} = \text{Fixed Cost} / CMPV$$

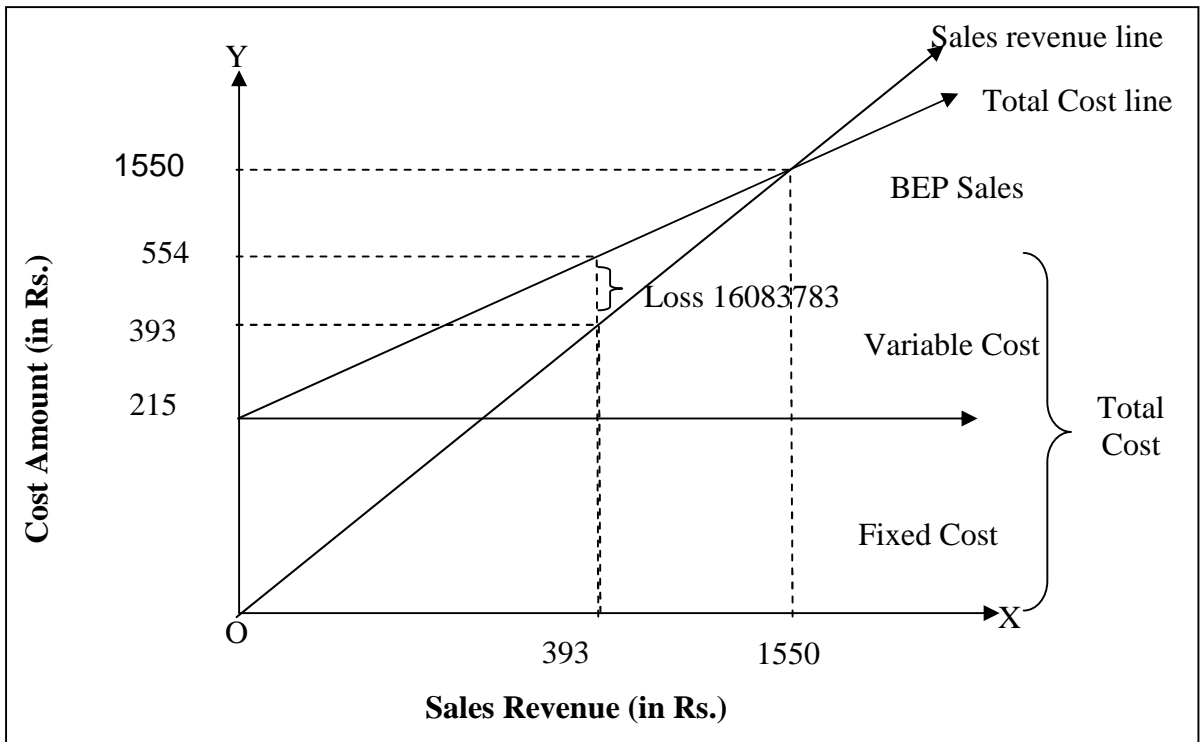
$$\text{and } BEP \text{ in Rs} = \text{Fixed Cost} / PV \text{ ratio}$$

$$BEP \text{ for the F/Y } 064/65 = 157,23,529/0.3184 = \text{Rs } 493,82,942.83$$

The BEP of HPPCL as shown in table no 4.7 is in increasing and fluctuating trend respectively. In case of HPPCL highest BEP is Rs 15,50,64,489 in the F/Y 060/61 and lowest BEP is Rs 4,93,82,942 in F/Y 064/65. The break even point can be also determined with the help of graph. Simple illustration of a hypothetical break even chart of HPPCL for the F/Y 060/61 to 064/65 is given below, where sales revenue is shown in x-axis and cost amount is shown in y-axis.

**Figure No. 4.3**

**Breaks Even Chart Analysis of HPPCL for F/Y 060/61**



**Figure No. 4.4**

**Breaks Even Chart Analysis of HPPCL for F/Y 061/62**

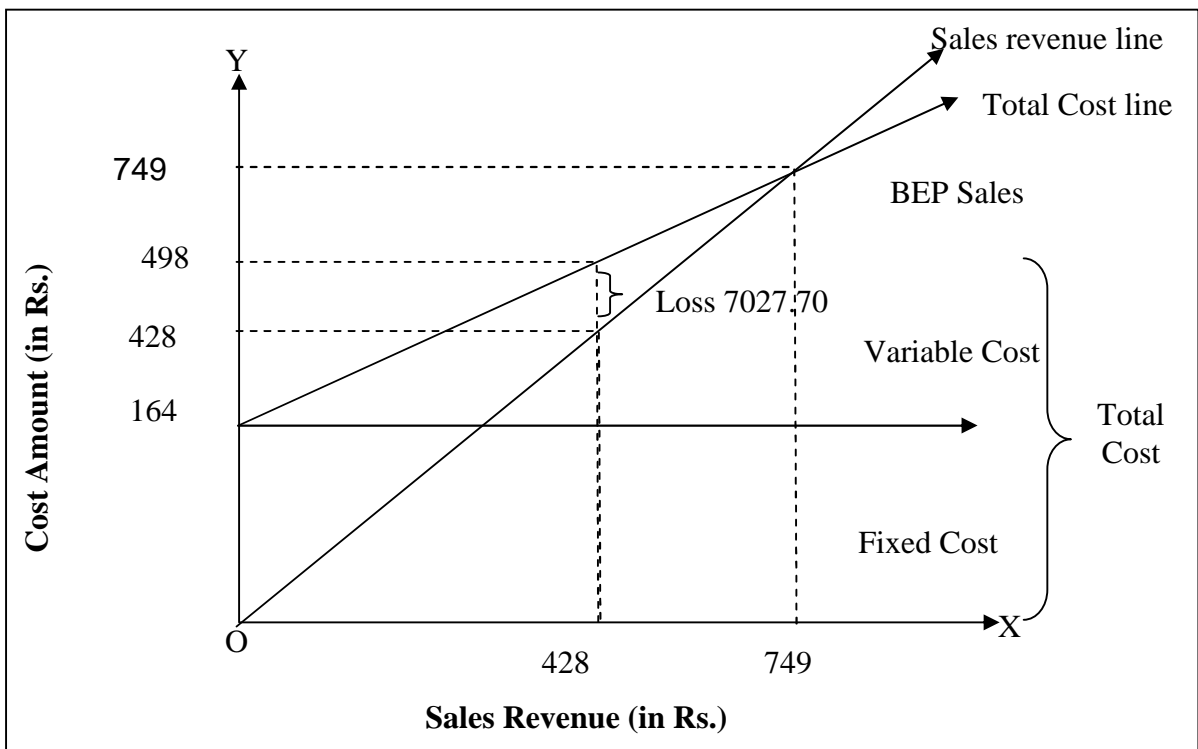


Figure No. 4.5

Breaks Even Chart Analysis of HPPCL for F/Y 062/63

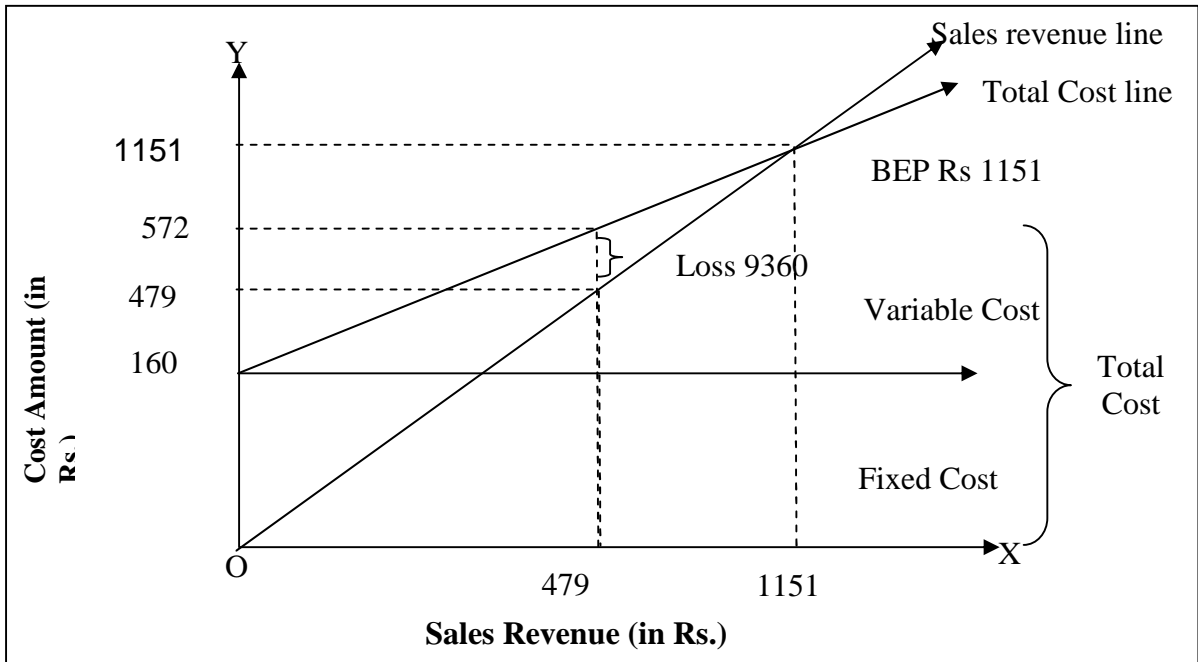
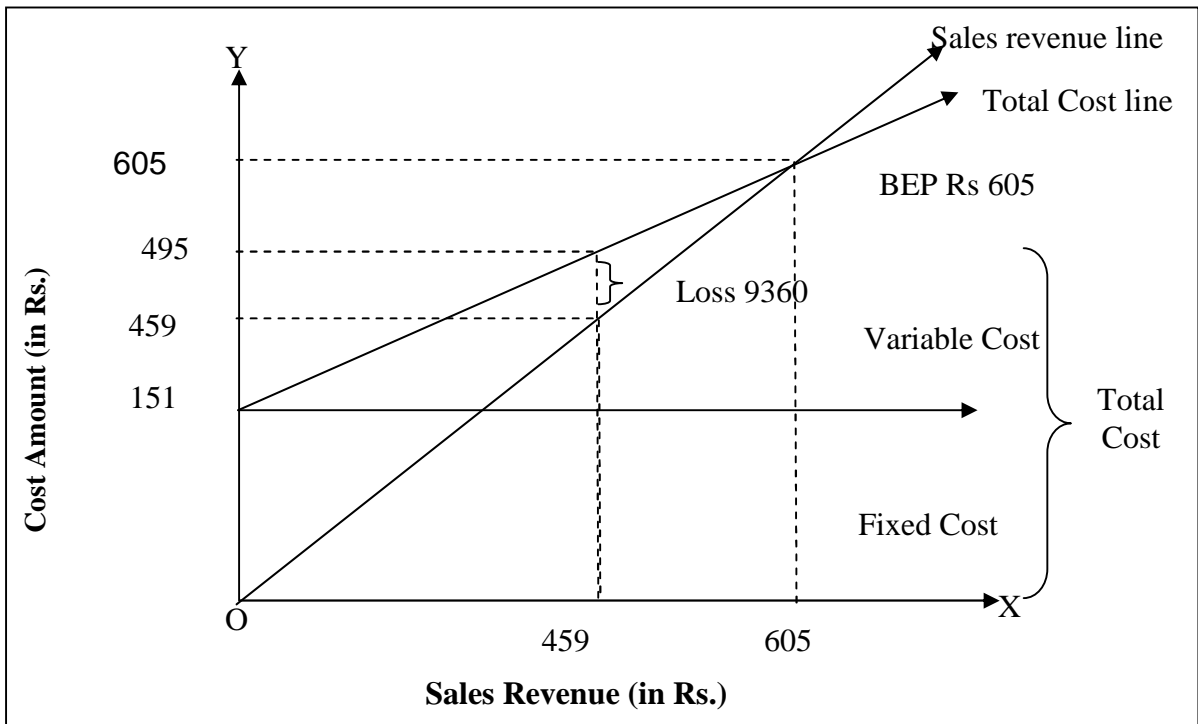


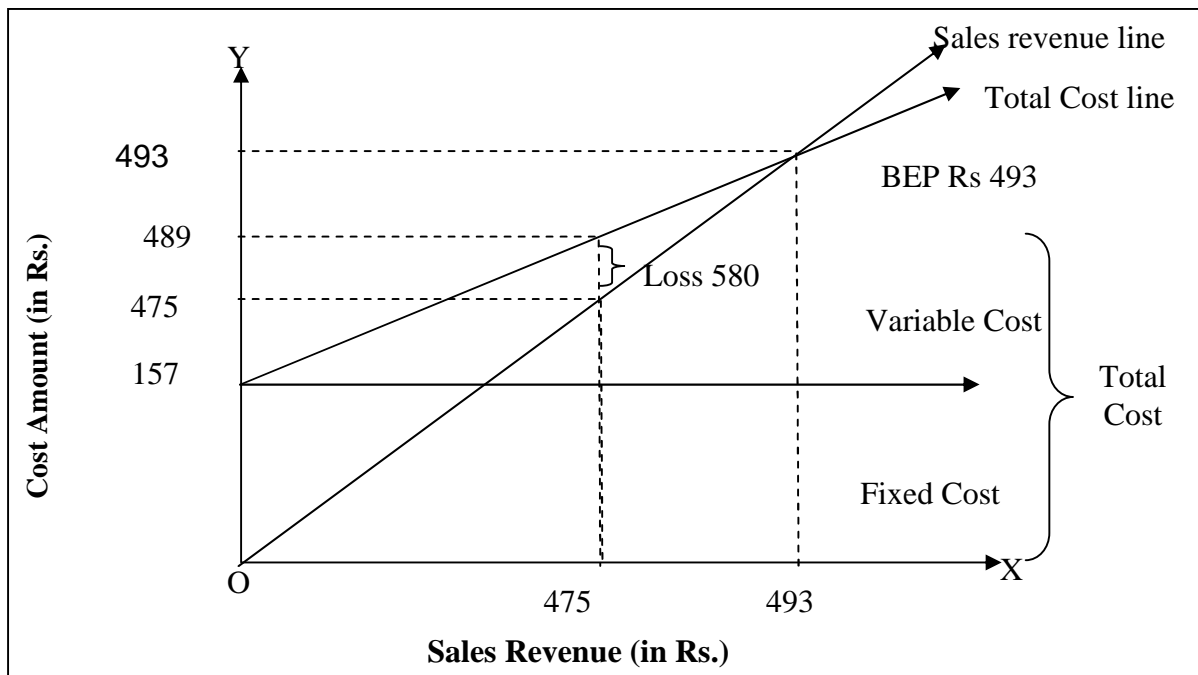
Figure No. 4.6

Breaks Even Chart Analysis of HPPCL for F/Y 063/64



**Figure No. 4.7**

**Breaks Even Chart Analysis of HPPCL for F/Y 064/65**



Given figures showed that, the fixed cost remains constant with the relevant range. The fixed cost in such situation goes in parallel to x-axis. Total cost increase if output or activity increase. So it is sloping upward to right side. The total cost curve will start from the point of intersection of fixed cost line and x-axis. The sales curve will be originate from the origin point. It is because the revenue will be zero if sales are zero. It is also sloping upward to right side. An equilibrium point between revenue and total cost curve is known as Break Even Point when both the cost and revenue is equal at BEP. If actual sales volume is BE sales, the business will earn profit and if actual sales volume is less than BE sales, the business will get loss.

**4.5.4 Margin of Safety Analysis**

The sales beyond BEP are said margin of safety. The difference between actual sales and BE sales is identified as margin of safety. It is an indicator of goodness for a business. High margin of safety indicates strong position of business since there still profit either in substantial falling to sales. On other hand, lower level of margin of safety indicates the weak position of business.

Margin of safety can be increased by increasing the volume of unit by increasing selling price or by reducing the cost.

Symbolically,

Margin of Safety (MOS) = Actual sales – Break even sales

$$\begin{aligned} \text{MOS of HPPCL for FY 064/65} &= \text{Rs}4,75,55,545 - 4,93,82,942 \\ &= \text{Rs} (18, 27,397) \end{aligned}$$

The above calculation showed the margin of safety of HPPCL. Similarly, the above table no 4.7 showed the margin of safety for five fiscal year 060/61 to 064/65. The MOS of HPPCL is always negative which shows poor financial position.

Similarly, MOS can be expressed in percentage form. The formula for its calculation is:-

$$\% \text{ MOS} = \frac{\text{MOS}}{\text{Sales}} \times 100$$

The above table no 4.7 showed the details of calculation.

#### **4.5.5 Degree of Operating Leverage (DOL)**

A Ratio between contribution Margin and EBIT is known as operating leverage. Operating leverage measures the sensitivity of operating profit (EBIT) with respect to sales. Business risk refers to the risk associated with the use of fixed operating costs. To measure the business risk exactly, DOL should be measured higher DOL indicate higher degree of risk in business because of use of high operating fixed cost in the business and late BEP. It can be calculated by

$$\text{DOL} = \frac{\text{Contribution Margin}}{\text{Earning before interest \& tax}}$$

$$\begin{aligned} \text{Operating leverage of HPPCL for F/Y 064/65} &= 151, 43,134 / (580,395) \\ &= (26.09) \end{aligned}$$

The degree of operating leverage for base year is (26.09) of HPPCL. The above table no 4.7 showed the DOL of five fiscal year of HPPCL from 060/61 and 064/65. The operating leverage provides the company with a tool that can signify quickly what impact various percentage changes in sales will have no profit without the necessity of preparing detailed income statements.

#### 4.6 Change Effect and Relationship of CVP Analysis Factors

Profit is the function of variety of factors. It is affected by changes in volume, cost and prices. Profit may be affected by changes in price, volume, variable cost, fixed cost and combination of factors, which shows proportionate relationship, positive relationship, inverse relationship and no relationship. Lower BEP is better than the higher BEP for the comparison of results.

##### 4.6.1 Change in Sales

The impact of changes in sales value will be affected to p/v ratio and BE sales. Increase in the sales value increases the p/v Ratio and Increases in the BE sales. It is assumed that the sales increase and decrease by 10% and other things remains constant and then following result gets for the F/Y from 060/61 to 064/065.

**Table No. 4.8**  
**Income Statement Changes with Sales Value of HPPCL for F/ Y 060/61**  
(Rs '00000)

Particulars	Change of sales value		
	Original	10% Increase	10% Decrease
Sales Revenue	393.46	432.81	354.11
Less: Variable cost	330.36	330.36	330.36
Contribution Margin	63.10	102.45	23.75
Less: Fixed Cost	215.53	215.53	215.53
Profit/Loss	(152.43)	(113.08)	(191.78)
PV Ratio (CM/Sales)	0.1604	0.2368	0.067
BE Sales (FC/PV Ratio)	1343.70	910.18	3216.86

Above table showed that, when selling price of HPPCL is increased by 10%, net loss is decreased to Rs. 113.08 Lakhs. P/V Ratio increased up to 0.1604 from 0.067, BE sales is reduce from 1343.70 to Rs 910.18 lakh. But decrease in sales value by 10% there is loss increased to Rs.191.78 lakhs and BEP increased to 3216.86 lakhs.

**Table No. 4.9**  
**Income Statement Changes with Sales Value of HPPCL for F/ Y 061/62**  
(Rs '00000)

Particulars	Change of sales value		
	Original	10% Increase	10% Decrease
Sales Revenue	428.76	471.64	385.88
Less: Variable cost	386.98	386.98	386.98
Contribution Margin	41.78	84.66	(1.1)
Less: Fixed Cost	164.27	164.27	164.27
Profit/Loss	(122.49)	(79.61)	(165.37)
PV Ratio (CM/Sales)	0.097	0.1795	0.0028
BE Sales (FC/PV Ratio)	1693.50	915.15	58667

Above table showed that, when selling price of HPPCL is increased by 10%, net loss is decreased to Rs. 79.61 Lakhs. P/V Ratio increased up to Rs. 0.0028 from 0.097, BE sales is reduce from 1693.50 to Rs 915.15 lakh. But decrease in sales value by 10% there is loss increased to Rs.165.37 lakhs and BEP increased to 58667 lakhs.

**Table No. 4.10**  
**Income Statement Changes with Sales Value of HPPCL for F/ Y 062/63**  
(Rs '00000)

Particulars	Change of sales value		
	Original	10% Increase	10% Decrease
Sales Revenue	478.88	526.77	430.99
Less: Variable cost	333.67	333.67	333.67
Contribution Margin	145.21	193.10	99.32
Less: Fixed Cost	160.49	160.49	160.49
Profit/Loss	(15.28)	32.61	(61.17)
PV Ratio (CM/Sales)	0.3032	0.3666	0.2258
BE Sales (FC/PV Ratio)	529.32	437.78	710.76

Above table showed that, when selling price of HPPCL is increased by 10%, net loss is decreased by Rs.47.89 Lakhs. P/V Ratio increased up to Rs. 0.2258 from 0.3032, BE sales is reduce from 437.78 to Rs 529.32 lakh. But decrease in sales value by 10% there is loss increased to Rs.61.17 lakhs and BEP increased to 710.76 lakhs.

**Table No. 4.11**  
**Income Statement Changes with Sales Value of HPPCL for F/ Y 063/64**  
*(Rs '00000)*

Particulars	Change of sales value		
	Original	10% Increase	10% Decrease
Sales Revenue	459.16	505.076	413.244
Less: Variable cost	327.74	327.74	327.74
Contribution Margin	131.42	177.336	85.504
Less: Fixed Cost	151.03	151.03	151.03
Profit/Loss	(19.61)	26.306	(65.526)
PV Ratio (CM/Sales)	0.2862	0.3511	0.2069
BE Sales (FC/PV Ratio)	527.71	430.16	729.97

Above table showed that, when selling price of HPPCL is increased by 10%, net loss is decreased by Rs.45.916 Lakhs. P/V Ratio increased up to Rs. 0.2069 from 0.2862, BE sales is reduce from 527.71 to Rs 430.16 lakh. But decrease in sales value by 10% there is loss increased to Rs.65.526 lakhs and BEP increased to 729.97 lakhs.

**Table No. 4.12**  
**Income Statement Changes with Sales Value of HPPCL for F/ Y 064/65**  
*(Rs '00000)*

Particulars	Change of sales value		
	Original	10% Increase	10% Decrease
Sales Revenue	475.55	523.11	427.995
Less: Variable cost	324.12	324.12	324.12
Contribution Margin	151.42	198.99	103.875
Less: Fixed Cost	157.23	157.23	157.23
Profit/Loss	-5.81	41.75	-53.360
PV Ratio (CM/Sales)	0.3184	0.380	0.242
BE Sales (FC/PV Ratio)	493.81	413.76	649.71

Above table showed that, when selling price of HPPCL is increased by 10%, profit increase by Rs. 41.75 Lakhs. P/V Ratio increased up to 0.38 from

0.3184, BE sales is reduce from 493.81 to Rs 413.76. But decrease in sales value by 10% there is loss occurred by 53.360 lakhs and BEP increased to 649.71 lakhs.

#### 4.6.2 Changes in Variable Cost

Increase in variable costs mainly concerns with the operating efficiency of the corporation. And increase in variable cost will make low P/V ratio, push up the BEP and reduce profit. On the other hand, if the variable cost decline, P/V Ratio will increase, BEP will be lower and profit will rise if the increase and decrease of variable cost by 10% with other factors assumed to remain same, it gets following results for F/Y from 060/61 to 064/65 respectively as follows:-

**Table No. 4.13**  
**Income Statement with Change of Variable Cost of HPPCL for F/Y 060/61**  
(Rs '00000)

Particulars	Change in Variable Cost		
	Original	10% Increase	10% Decrease
Sales Revenue	393.46	393.46	393.46
Less: Variable Cost	330.36	367.06	297.32
Contribution Margin	63.10	26.4	96.14
Less: Fixed Cost	215.53	215.53	215.53
Profit/Loss	(152.43)	(189.13)	(119.39)
P/v Ratio	0.1603	0.067	0.244
BE Sales	1550	1722.22	1395

Above table showed that, with 10% increase in variable cost BE sales have increased to Rs. 1722.22 lakhs. This indicates that variable cost and BEP has positive relationship. Similarly, with the decrease in variable cost by 10% BE sales has been decreased by Rs. 1395 lakhs.

**Table No. 4.14**  
**Income Statement with Change of Variable Cost of HPPCL for F/Y 061/62**  
*(Rs'00000)*

Particulars	Change in Variable Cost		
	Original	10% Increase	10% Decrease
Sales Revenue	428.76	428.76	428.76
Less: Variable Cost	386.98	429.97	348.28
Contribution Margin	41.78	(1.21)	80.48
Less: Fixed Cost	164.27	164.27	164.27
Profit/Loss	(125.49)	(165.48)	(83.79)
P/v Ratio	0.097	0.0028	0.1877
BE Sales	749	823.90	674.10

Above table showed that, with 10% increase in variable cost BE sales have increased to Rs. 823.90 lakhs. This indicates that variable cost and BEP has positive relationship. Similarly, with the decrease in variable cost by 10% BE sales has been decreased by Rs. 674.10 lakhs.

**Table No. 4.15**  
**Income Statement with Change of Variable Cost of HPPCL for F/Y 062/63**  
*(Rs'00000)*

Particulars	Change in Variable Cost		
	Original	10% Increase	10% Decrease
Sales Revenue	478.88	478.88	478.88
Less: Variable Cost	333.67	370.44	300.30
Contribution Margin	145.21	108.44	178.58
Less: Fixed Cost	160.49	160.49	160.49
Profit/Loss	(15.28)	(52.05)	18.09
P/v Ratio	0.3032	0.2264	0.3729
BE Sales	1151	1266.1	1035.90

Above table showed that, with 10% increase in variable cost BE sales

have increased to Rs. 1266.10 lakhs. This indicates that variable cost and BEP has positive relationship. Similarly, with the decrease in variable cost by 10% BE sales has been decreased to Rs. 1035.90 lakhs.

**Table No. 4.16**  
**Income Statement with Change of Variable Cost of HPPCL for F/Y 063/64**  
(Rs'00000)

Particulars	Change in Variable Cost		
	Original	10% Increase	10% Decrease
Sales Revenue	459.16	459.16	459.16
Less: Variable Cost	327.74	360.51	294.96
Contribution Margin	131.42	98.65	164.20
Less: Fixed Cost	151.03	151.03	151.03
Profit/Loss	(19.61)	(52.38)	13.17
P/v Ratio	0.2862	0.2148	0.3576
BE Sales	605	665.5	544.50

Above table showed that, with 10% increase in variable cost BE sales have increased to Rs. 665.50 lakhs. This indicates that variable cost and BEP has positive relationship. Similarly, with the decrease in variable cost by 10% BE sales has been decreased to Rs. 544.50 lakhs.

**Table No. 4.17**  
**Income Statement with Change of Variable Cost of HPPCL for F/Y 064/65**  
(Rs'00000)

Particulars	Change in Variable Cost		
	Original	10% Increase	10% Decrease
Sales Revenue	475.55	475.55	475.55
Less: Variable Cost	324.12	356.532	291.708
Contribution Margin	151.43	119.018	183.842
Less: Fixed Cost	157.23	157.23	157.23
Profit/Loss	(5.8)	(38.212)	26.612
P/v Ratio	0.3184	0.2502	0.3865
BE Sales	493.82	628.41	406.80

Above table showed that, with 10% increase in variable cost BE sales have increased to Rs. 628.41 lakhs. This indicates that variable cost and BEP has positive relationship. Similarly, with the decrease in variable cost by 10% BE has been decreased by Rs. 87.02 lakhs.

#### 4.6.3 Change in Fixed Cost

Fixed costs are not changed during the relevant range. But the Fixed cost will be changed due to different condition. Other factors remaining unchanged, a fall in the fixed cost will however lower the BEP and raise profit. An increased in fixed cost, caused either due to some changes will rise the BEP. If increased and decreased by 10% with other factors assumed to remain same, it gets following results for the F/Y 060/61 to 064/65 respectively as follows:-

**Table No. 4.18**  
**Income Statement with Change of Fixed Cost of HPPCL for F/Y 060/61**

*(Rs'00000)*

Particulars	Change in Fixed Cost.		
	Original	10% Increase	10% Decrease
Sales revenue	393.46	393.46	393.46
Less: Variable cost	330.36	330.36	330.36
Contribution Margin	63.10	63.10	63.10
Less: Fixed Cost	215.53	237.08	193.97
Profit/Loss	(152.43)	(173.98)	(130.87)
P/V Ratio	0.1603	0.1603	0.1603
BE sales	1550	1705	1395

Above table no 4.18 showed effects of change in fixed cost of HPPCL. When fixed cost is increased by 10% net loss of HPPCL is increased to 173.98 lakhs. A BEP sale is increased up to Rs. 1705 lakhs from Rs. 1550 lakhs. Which is 10% more than original BE sales. But PV ratio is same because there no any effect on contribution Margin while fixed cost is changed. When the fixed cost is reduced by 10% net is decreased to 130.87 lakhs. PV ratio is not

changed but BE sales is decreased due to reduction in fixed cost and BE sales is become Rs. 1395 lakhs from Rs. 1550 lakhs.

**Table No. 4.19**  
**Income Statement with Change of Fixed Cost of HPPCL for F/Y 061/62**

*(Rs '00000)*

Particulars	Change in Fixed Cost.		
	Original	10% Increase	10% Decrease
Sales revenue	393.46	393.46	393.46
Less: Variable cost	330.36	330.36	330.36
Contribution Margin	63.1	63.1	63.1
Less: Fixed Cost	157.23	172.953	141.507
Profit/Loss	(5.8)	(21.523)	9.923
P/V Ratio	0.3184	0.3184	0.3184
BE sales	493.81	543.19	444.43

Above table no 4.19 showed effects of change in fixed cost of HPPCL. When fixed cost is increased by 10% net loss of HPPCL is increased by (21.523 – 5.8) Rs. 15.723 lakhs. A BEP sale is increased up to Rs. 543.19 lakhs from Rs. 493.81 lakhs. Which is 10% more than original BE sales. But PV ratio is same because there no any effect on contribution Margin while fixed cost is changed. When the fixed cost is reduced by 10% net is decreased by Rs. 15.723 lakhs. PV ratio is not changed but BE sales is decreased due to reduction in fixed cost and BE sales is become Rs. 444.43 lakhs from Rs. 493.81 lakhs.

**Table No. 4.20**  
**Income Statement with Change of Fixed Cost of HPPCL for F/Y 062/63**

*(Rs '00000)*

Particulars	Change in Fixed Cost.		
	Original	10% Increase	10% Decrease
Sales revenue	478.88	478.88	478.88
Less: Variable cost	333.67	333.67	333.67
Contribution Margin	145.21	145.21	145.21
Less: Fixed Cost	160.49	176.54	144.44
Profit/Loss	(15.28)	(31.33)	0.77
P/V Ratio	0.3032	0.3032	0.3032
BE sales	1151	1266.10	1035.9

Above table no 4.20 showed effects of change in fixed cost of HPPCL. When fixed cost is increased by 10% net loss of HPPCL is increased by 31.33 lakhs. A BEP sale is increased up to Rs. 1266.10 lakhs from Rs. 1151 lakhs. Which is 10% more than original BE sales. But PV ratio is same because there no any effect on contribution Margin while fixed cost is changed. When the fixed cost is reduced by 10% net is decreased by Rs. 32.1 lakhs. PV ratio is not changed but BE sales is decreased due to reduction in fixed cost and BE sales is become Rs. 1035.9 lakhs from Rs. 1151 lakhs.

**Table No. 4.21**  
**Income Statement with Change of Fixed Cost of HPPCL for F/Y 063/64**

*(Rs'00000)*

Particulars	Change in Fixed Cost.		
	Original	10% Increase	10% Decrease
Sales revenue	459.16	459.16	459.16
Less: Variable cost	327.74	327.74	327.74
Contribution Margin	131.42	131.42	131.42
Less: Fixed Cost	151.03	166.13	135.93
Profit/Loss	(19.61)	(34.71)	(4.51)
P/V Ratio	0.2862	0.2862	0.2862
BE sales	605	665.50	544.50

Above table no 4.21 showed effects of change in fixed cost of HPPCL. When fixed cost is increased by 10% net loss of HPPCL is increased to Rs. 34.71 lakhs. A BEP sale is increased up to Rs. 665.50 lakhs from Rs. 605 lakhs. Which is 10% more than original BE sales. But PV ratio is same because there no any effect on contribution Margin while fixed cost is changed. When the fixed cost is reduced by 10% net is decreased to Rs. 4.51 lakhs. PV ratio is not changed but BE sales is decreased due to reduction in fixed cost and BE sales is become Rs. 544.50 lakhs from Rs. 605 lakhs.

**Table No. 4.22**  
**Income Statement with Change of Fixed Cost of HPPCL for F/Y 064/65**

*(Rs '00000)*

Particulars	Change in Fixed Cost.		
	Original	10% Increase	10% Decrease
Sales revenue	472.48	472.48	472.48
Less: Variable cost	419.13	419.13	419.13
Contribution Margin	53.35	53.35	53.35
Less: Fixed Cost	157.23	172.95	141.51
Profit/Loss	(103.88)	(119.60)	(88.16)
P/V Ratio	0.1129	0.1129	0.1129
BE sales	493	542.30	443.70

Above table no 4.22 showed effects of change in fixed cost of HPPCL. When fixed cost is increased by 10% net loss of HPPCL is increased to Rs. 119.60 lakhs. A BEP sale is increased up to Rs. 542.30 lakhs from Rs. 493 lakhs. Which is 10% more than original BE sales. But PV ratio is same because there no any effect on contribution Margin while fixed cost is changed. When the fixed cost is reduced by 10% net loss is decreased to Rs. 88.16 lakhs. PV ratio is not changed but BE sales is decreased due to reduction in fixed cost and BE sales is become Rs. 542.30 lakhs from Rs. 493 lakhs.

#### **4.7 Net Profit Position of HPPCL**

Profit is primary factors, which can be used to measure the success of the firm. Generally, profit can be defined as difference between sales revenue and total cost. In real sense, profit is the return on investment or the return of labor exercised over business enterprises. Every organization needs profit. Without profit organization cannot run smoothly and fail to achieve its goal. Profit earning is compulsory to every company. Here the profit /loss position of HPPCL is shown in table as follows:

**Table No. 4.23**  
**Profit and Loss Position of HPPCL**

*(Rs '00000)*

Year	HPPCL		
	Profit/Loss	Rs.Change	% Change
060/61	(160.83)	-	-
061/62	(70.27)	(90.56)	56.30
062/63	(93.60)	23.33	33.20
063/64	(36.39)	(57.21)	61.12
064/65	(5.8)	(30.59)	84.06

Above table shows the profit trend of HPPCL. HPPCL is suffering from less in the study period. HPPCL is unable to earn profit due to its high fixed and variable cost. In FY 0560/61 loss on HPPCL is 160.83 lakhs which decreases in FY 061/62 70.27 lakhs which is 56.3% less than previous year. During the FY 062/63 the HPPCL's loss increases by 23.33%. In FY 063/64 HPPCL is able to reduce its loss to Rs 36.39 lakhs in comparison with previous year loss of Rs 93.60 lakhs. In this year HPPCL is able to reduce the loss by 61.12%. In FY 064/65 HPPCL's loss reduce to 5.8 lakhs which is 84.06% less than previous FY 063/64.

#### **4.8 Major Findings of the Study**

Every research work is done to find some things new, based on the objective of the study. On the basis of different analysis, observation and informal discussion, the following major findings have been drawn.

- )] HPPCL's budgeted sales and actual sales are in fluctuating trend. Actual sales are always lower than budgeted sales.
- )] The correlation coefficient between budgeted sales and actual sales of HPPCL is positive. It indicates that increase in the budgeted sales will also increase in actual sales and vice versa.
- )] HPPCL has found that, there is a fluctuating trend of sales.

- ) The company has no detail and systematic expenses plan. The fixed, variable and mixed expenses plan is the necessary element for profit planning and control.
- ) HPPCL has not used the practice of CVP analysis. The cost is not segregated as fixed cost, variables cost and Semi variable cost. The fixed, variable and mixed expenses plan is necessary elements for profit planning and control.
- ) HPPCL is suffering from Loss caused by no any systematic plans have been implemented for preventing the loss and improve profit by HPPCL.
- ) The portion of variable cost is higher than fixed cost in total amount of the company, which contribute for lower contribution margin.
- ) HPPCL's PV Ratio is in fluctuating trend.
- ) HPPCL's margin of safety is negative due to higher BEP sales than actual sales.
- ) HPPCL's operating leverage is in fluctuating trend.
- ) HPPCL's loss is in decreasing trend.
- ) Cost volume profit analysis is very important and popular tools to measure the financial performance of the company. But cost volume profit analysis is not applying to analyze the financial performance of the company.

## **CHAPTER-V**

### **SUMMARY, CONCLUSION & RECOMMENDATIONS**

This chapter is a complete, conclusive and suggestive which contains summary, conclusion of the findings and releases some suggestions for further improvements. Conclusions are made on the basis of the analysis of relevant data by using various Accounting and statistical tools, which presents the strengths, weakness, Opportunities and threats of the companies. The recommendation is presented in terms of suggestions, which are prepared on the basis of findings and conclusion.

#### **5.1 Summary**

Cost volume profit analysis attempts to determine the effect of a change in volume, cost, price or product mix on profit. It stresses the relationships between the factors affecting profits. The first step in such analysis is to classify all expenses as either fixed or variable. The second step is to determine the ratio of variable costs to sales revenue. The analysis of cost behavior in relation to changing volume of sales and its impact on profit is known as breakeven analysis. Break-even chart is a graphic chart which presents the varying costs along with the changing sales revenue, indicates the sales volume at which costs are fully covered and reveals the estimated profit or loss which will be realized at different level of activity. Break-even point is the point on the chart at which total cost is equal to total revenue. Break-even analysis has several uses but it is made with a number of simplifying assumption, some of which are valid only in the short period. It is based on a static hypothesis. There are several practical applications of break even analysis and the break even chart e.g, forecasting and budgeting cash requirements, planning financial needs, make or buy decision making profit appropriation, determining optimum output, comparing budgeted and actual profits etc.

Most of the business fails in a few years, sometimes within months of

starting because they tend to do anything for volume without thinking how. It is going to affect the bottom line. In a changing environment, future is uncertain which create risk. And to reduce risk, the only reliable weapon is good management. CVP analysis is a technique for studying the relationship between cost, volume and profit, which helps to manage future cost and profit.

When the organization finds its BEP sales it can determine the price, sales, volume and cost for profit earning. In this way company may use CVP analysis as a planning tool when unit selling price, variable cost and fixed cost are known, then to find out profit, as a target profit at certain sales volume. By using CVP analysis tools, the management of the company can control the all costs.

The main objective of the research is to examine CVP of HPPCL and comparative studies. As per the nature of the study, the secondary and primary data, with descriptive and analytical approach, studies sales revenue, PV Ratio, BE sales and safety margin. Primary data were collected by direct interview with concerned employees of both the companies. Secondary data were drawn from various documents like annual report, Journal published by the companies and concerned authority.

The analysis of various data of the companies shows the different result. HPPCL is suffering from loss and has less contribution margin. Actual sales are always less than budgeted sales. Gross profit is low and net profit margin and margin of safety is always negative, BEP is over than actual sales.

The study has been organized in five main chapter consisting of (I) introduction (II) Review of literature (III) Research methodology (IV) Data presentation and Analysis and (v) Summary conclusion and recommendations.

## **5.2 Conclusion**

It is found that there is a lack of systematic use of CVP analysis in these two companies. Cost volume profit is the systematic relationship between cost, Volume and profit. But this tools and technique are not applied and practiced in Nepalese companies. In CVP analysis it is necessary to segregate different

types of costs in to fixed and variable costs. These two companies are not following definite policies to segregate the different type's costs.

There is high deviation in actual sales and budgeted sales of HPPCL. The budgeted sales are on *ad hoc* basis. There is a lack of entrepreneurship. So there is not commercial operation. Due to the burden of management, administrative expenses and interest on loan, the profitability of the company has been affected. The company is suffering from huge loss. It has not good margin of safety, operating ratio and gross profit ratio. The company follows the traditional method to determine the price of the goods which is not suitable in today's competitive environment.

### **5.3 Recommendations**

- The study shows that there is a high amount of fixed cost in both of the companies, which shows that they have high investment in fixed assets. The companies should plan for effective utilization of these fixed assets.
- HPPCL should give their attention to BEP analysis, while preparing sales and production plan and the pricing the products.
- The unskilled manpower of the companies should be trained for improving their productivity.
- HPPCL should apply the practice of CVP analysis in systematic manner. They can improve the performance of business by the use of cost, revenue and profit.
- Companies should segregate the cost as variable, fixed and semi-variable. This helps to control the cost.
- The companies should maintain systematic cost plan. So the cost of every sector should plan properly and establish cost control program. It will maintain the discipline on cost control.
- HPPCL should have competitive pricing according to the market situation to gain the high market share.
- HPPCL should also follow the effective publicity policy to introduce its

product to the users.

- HPPCL have burden of long term borrowing which is one of the cause of the reduction in profit. So, they should reduce the loan by other source of financing.
- HPPCL should introduce new technology for economic production process which consumes low fuel, electricity, resulted low wastage and yield higher output.

## BIBLIOGRAPHY

### A. Books

- Agrawal, Govinda Ram. (2002). ***Dynamics of Business Environment in Nepal***. Kathmandu: M.K Publisher and Distributors.
- Bajracharya, B.C. (2057). ***Business Statistics and Mathematics***. Kathmandu: M.K. Publishers and distributors.
- Benerjee, Bhabatosh. (2005). ***Financial Policy and Management***. New Delhi: Prentice-Hall of India Pvt. Ltd.
- Bratt, E.C. (1958). ***Business Forecasting***. New Delhi: Tata Mc Graw Hill Publishing Ltd.
- Dongol, Ratna Man & Dangol Jeetendra. (2001). ***Management Accounting***. Kathmandu: Taleju Prakashan.
- Dury, Colin. (2000). ***Management and Cost Account***. London: Business Press, Thomson Learning.
- Fago, Ghanendra. (2003). ***Profit Planning & Control***. Kathmandu: Buddha Academic Publishers and Distributors Pvt. Ltd.
- Fischer, Paul M. and Frank, Werner G. (1985). ***Cost Accounting***. Cincinnati, Ohio: South Western Publishing Co.
- Grace, C.E.. (1964). ***Management Control***, New York: Maredick Mitchall & Co.
- Gupta, SP. (1996). ***Statistical Method***. Himalayan Publishing House.
- Hammer, Lawernce H., Carter, William K. and Usry Milton F. (1994). ***Cost Accounting***. Cincinnati, Ohio: South western Publishing Co.
- Hampton, John J. (1990)..***Financial Decision Making***. New Delhi: Prentice Hall of India Pvt. Ltd.
- Handerson Grey, G.V. and W Ands Lewis. (1995). ***Managerial Economics***, Publishing House of India
- Hongorania, N.L. and Ramanathan, A.R. (1983). ***Management Accounting***. Delhi: Sultan Chand & Sons.
- Horngreen, C.T. (2000). ***Cost Accounting A Management Emphasis***.

- Tata Mc Graw Hill Publishing Co. Ltd.
- Horngreen Charles T., Foster, George and Datar, Srikant M. (1999). **Cost Accounting**. New Delhi: Prentice Hall of India Pvt. Ltd.
- Jawahar, Lal. (1996). **Cost Accounting**. New Delhi: Tata Mc Graw-Hill Publishing Company Limited.
- Joshi, Shyam. (2057). **Managerial Economic**. Kathmandu: Talaju Prakshan.
- Khan, M. Y. and Jain, P.K. (1993)..**Management Accounting**. New Delhi: Tata Mc Graw Hill Publishing Company Limited.
- Kulkarni, P.V. (1987). **Financial Management**. Himalayan Publishing House.
- Lasser, J. K. CPA. (1954). **Hand Book of Accounting Methods**. New York: D. Van Nostrand Company.
- Lynch, R. M. and Williamson, R.W. (1999). **Accounting for Management**, Tata Mc Graw Hill Publishing Company Ltd.
- Moh, Graham. (1994)..**Accounting for Manager**. London: Kagon page Limited
- Moore, Carl H. and Jaedicke, Robert K. (1976). **Management Accounting**. Cincinatic, Ohio: South Western Publishing Co.
- Munankarmi S.P. (2003). **Management Accounting**.Kathmandu: Buddha Academic Publishers and Distributors Pvt. Ltd.
- Narain, Laxmi. (1972). **Principle and Practice of Public Enterprises Management**. India: Sultan Chand & Sons Co. Ltd.
- Needles, Jr. Belverd E., Anderson, Henry R., and Caldwell, James C. (1984). **Principles of Accounting**. Boston: Houghton Miffilin Company.
- Nigam & Sharma. (1984). **Cost Accounting**. Bombay: Himalaya Publishing House.
- Pandey, I. M. (1999). **Management Accounting**. New Delhi: Viskash Publishing House Pvt. Ltd.

- Panta, P.R.. (2003). ***Business Environment in Nepal***. Kathmandu: Buddha Academic Publisher and Distributors Pvt. Ltd.
- Rathnam, P.V. (1994). ***Budgeting***. Bombay: Himalaya Publishing House.
- Shrestha, B.P. (1981). ***An Introduction to Nepalese Economy***. Kathmandu: Ratna Pustak Bhandar.
- Shrestha, K.N. and Manandhar, K. D. (2056). ***Statistics and Quantitative Technique for Management***. Kathmandu: Valley Publisher.
- Shrestha, Suniti and Silwal Dhruva. (2057). ***Statistical Methods in Management***. Kathmandu: Talaju Prakashan.
- Wagle, K.N and Dahal, R.K. (2004). ***Management Accounting***.Minbhawan, Kathmandu: Khanal Books and Stationary.
- Welsch, G.A., Hilton, R.W. and Gordon, P.N. (2000). ***Budgeting: Profit Planning & Control***. New Delhi: Prentice Hall of India Pvt. Ltd.
- Weston, J. Fred and Copeland, Thomas E. (1989). ***Managerial Finance: Financial Planning & Control***. Florida: The Dryden Press.
- Willsmore, A.W. (1960). ***Business Budgets and Budgetary Control***. London: Sir Isaac Pitman and Sons Ltd.
- Wolf, H. K. and Pant, P. R. (2003). ***Social Science Research and Thesis Writing***. Kathmandu: Buddha Academic Publisher and Distributors Pvt. Ltd.

## **B. Journals, Reports and Articles**

Annual Reports of HPPCL, (Various Issues)

Business Age, April- 2008

Memorandum and Articles of HPPCL, Kathmandu.

*Nepal in Figure*, Department of Statistics, 2008

New Business Age, July, 2008.

Paul A. Philips, Welsh Hotel: ***Cost-volume-profit Analysis and Uncertainty***, International Journal of Contemporary Hospitality Management, Vol. 6 No. 3, 1994, pp. 31-36 @MCB University Press Limited, 0959-6119.

**Statistical Pocket Book**, CBS, 2007

**Unpublished Handouts** of R. M. Dangol

### **C. Unpublished Theses and Dissertations**

Dangol, P. (2001). ***Profit Planning in Manufacturing Public Enterprises: A case study in Hetauda Cement Industry Limited.*** An unpublished Master Level Thesis, Central Department of Management, TU.

Mishra, Kul Shekhar (2007). ***Cost-Volume-Profit Analysis in Kantipur Publication Private Ltd.*** An Unpublished Mater's Degree Dissertation submitted to Nepal Commerce Campus, TU.

Manandhar, Ragini. (2007). ***Cost-Volume-Profit Analysis in Katmandu Dairy.*** An Unpublished Mater's Degree Dissertation submitted to Nepal Commerce Campus, TU.

Ojha, K P. (1999). ***Profit Planning in Manufacturing Public Enterprises: A case Study of Royal Drugs Limited. And Herbal Production and Processing Company Limited.*** An unpublished Master Level Thesis, Central Department of Management, TU.

Rijal, Madhav. (2005). ***Cost Volume Profit Analysis to Measure the Effectiveness of Profit Planning and Control: A Case Study of Nebico Pvt. Ltd.,*** An Unpublished Master's Degree Dissertation Submitted to Shanker Dev Campus, TU.

Shakya, M R. (1999). ***Profit Planning in Lumbini Sugar Mill Limited.***

An unpublished Master Level Thesis, Central Department of Management. TU.

Sharma, Sagar. (2002). ***Management Accounting Practice in the Listed Companies of Nepal***. An Unpublished Mater's Degree Dissertation Submitted to Shanker Dev Campus, TU.

Shrestha, R. B. (2005). ***A Comparative Study on Production and Sales in Dolkha Dairy Udhyog***, An Unpublished Mater's Degree Dissertation submitted to Public Youth Youth Campus, TU.

## APPENDIX-1

### Various Statistical Calculations

Let,

**Budgeted sales of HPPCL = X**

**Actual sales of HPPCL = Y**

Fiscal year	Budgeted sales Target(x)	Actual sales Y	U=X-A	V=Y-B	U <sup>2</sup>	V <sup>2</sup>	UV
060/61	49,902	39,345.70842	-3134	-6570.8719	9821956	4316357.53	20593112.53
061/62	70,334	42,876.16267	17298	-3040.41765	299220804	9244139.486	-52593144.51
062/63	65,135	47,888.35957	12099	1971.77925	146385801	3887913.411	23856557.15
063/64	53,036	45,916.58032	0	0	0	0	0
064/65	57,950	47,247.0422	4914	1330.46188	24176889	1770128.814	6537889.678
	x=296357	y=223273.853	U=31177	V=-309.04842	U <sup>2</sup> =479605450	V <sup>2</sup> =58078539.24	UV=-1605585.152

#### For Budgeted Sales

$$\text{Mean } \bar{x} = \frac{296357}{5} = 59271.4$$

#### For Actual Sales

$$\bar{y} = \frac{223273.8532}{5} = 44654.77064$$

Let Assumed Mean for  $x = 53,036$

$$y = 45916.58038$$

$$t_x = \frac{U}{N} \times \sqrt{\frac{V^2}{N}} = \frac{31177}{5} \times \sqrt{\frac{79605450}{5}} = 7552.541085$$

$$t_y = \frac{U}{N} \times \sqrt{\frac{V^2}{N}} = \frac{309.04842}{5} \times \sqrt{\frac{58078539.24}{5}} = 3165.998132$$

## Computation of Co-efficient of variations

### For Budgeted Sales (x)

$$C.V_x = \frac{\frac{\sum x}{x}}{\frac{\sum x^2}{x^2}} | 100 = \frac{7552.541085}{59271.4} | 100 = 12.7423025$$

### For Actual Sales y

$$C.V_y = \frac{\frac{\sum y}{y}}{\frac{\sum y^2}{y^2}} | 100 = \frac{3165.998132}{44654.77064} | 100 = 7.089944$$

## Computation of correlation coefficient r

$$r = \frac{N \sum UV - \sum U \sum V}{\sqrt{N \sum V^2 - (\sum V)^2} \sqrt{N \sum U^2 - (\sum U)^2}}$$

$$= \frac{5 | \sum 1605585.152 - \sum 31177 \sum 6309.04842}{\sqrt{5 | \sum 479605450 - \sum 31177^2} \sqrt{5 | \sum 58078539.24 - \sum 6309.04842^2}}$$

$$= \frac{188669276.8}{597783274}$$

$$= 0.31561$$

## Probable error of r (P.E)

$$= 0.6745 | \frac{1 - r^2}{\sqrt{N}} = 0.6745 | \frac{1 - 0.31561^2}{\sqrt{5}} = 0.27159$$

