COST –VOLUME- PROFIT ANALYSIS OF DAIRY DEVELOPMENT CORPORATION

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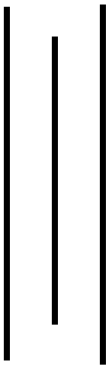
A Thesis Submitted to:
Office of the Dean
Faculty of Management
Tribhuvan University



In partial fulfillment of the requirement for the Degree of Master of Business Studies (M.B.S)

Kathmandu, Nepal
June, 2009

RECOMMENDATION

This is to certify that the Thesis

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COST –VOLUME- PROFIT ANALYSIS OF DAIRY DEVELOPMENT CORPORATION

has been prepared as approved by this Department in the prescribed format of the Faculty of Management. This thesis is forwarded for examination.

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VIVA-VOCE SHEET

We have conducted the viva –voce of the thesis presented

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And found the thesis to be the original work of the student and written according to the prescribed format. We recommend the thesis to be accepted as partial fulfillment of the requirement for the ***Degree of Master's in Business Studies (M.B.S)***

Viva-Voce Committee

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DECLARATION

I hereby declare that the work reported in this thesis entitled "**COST –VOLUME-PROFIT ANALYSIS OF DAIRY DEVELOPMENT CORPORATION**" submitted to Office of the Dean, Faculty of Management, Tribhuvan University, is my original work done in the form of partial fulfillment of the requirement for the Master's Degree in Business Study (M.B.S.) under the supervision of **Joginder Goet** of Shanker Dev Campus.

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ACKNOWLEDGEMENT

This thesis entitled “Cost –Volume- Profit Analysis of Dairy Development Corporation” has been carried out within the conceptual framework of profit planning and control. It has been prepared to examine the CVP analysis of the Dairy Development Corporation as a whole. This has been prepared in the form of the requirement of the faculty of management of Tribhuvan University for the partial fulfillment of the masters of business studies. I am very grateful to all the respected persons who helped me, guided me and supervised me to complete this thesis.

I would like to express my gratitude to my thesis adviser Joginder Goet who is the fulltime teacher of Shanker Dev Campus for giving me his precious time to guide, support and complete this thesis.

I would like to say my heartful thanks to all the members of Dairy Development Corporation especially, Mr. Ram Bahadur Thapa chief Accountant from finance department for providing me the data and other necessary information while writing this thesis. Although they were very busy, they helped me a lot in every possible way.

Finally, I take this opportunity to thank all the teachers, administrative staffs and librarians of Shanker Dev Campus as well as the librarians of central library of Tribhuvan University for their co-operation and help.

Dhiraj Rijal
Researcher

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CHAPTER – I

INTRODUCTION

1.1 General Background of the Study

In the modern business globalization age, there are so many accounting tools to analyze the qualitative and quantitative aspects of risk, profitability and performance of the organization. Among them, Cost -Volume -Profit Analysis technique is the one of the major accounting tool to evaluate the organizations. Cost- volume- profit analysis is a technique, often used to determine the effect on profit with the change in volume, cost, price or product mix. In other words, it stresses the relationship between the various factors affecting profits. Such analysis can help management to ascertain which product is the most profitable one, what effect a reduction in sale price will have on profit, what effect a shift in volume or product mix will have on cost of products and profits, what will be the effect on costs if Profit and sales volume will be increased and vice versa.

The first step needed in cost- volume- profit analysis is to classify all expenses as either fixed or variables semi-variable expenses have to be classified into these fixed and variable components. The second steps are the determination of the variable cost ratio i.e. the ratio of variable costs to sales volume. These steps are important prerequisites to cost volume profit analysis and proper understanding of these is essential. Further profit is a resultant of the interplay of cost, price and volume. The measurement of the effect of each of these factors is the basis to policy formulation and profit planning.

Cost- volume -profit analysis can be used to determine the level of sales necessary to achieve may be either fixed or variable with respect to volume. A fixed profits objective is an absolute desired profit not related to sales and is commonly expressed as a percentage return on assets. A variable profit objective is stated as a function of sales.

Cost- volume- profit analysis or break even analysis is used to compute the volume level at which total revenues are equal to total costs. When total costs and total revenues are equal, the business organization is said to be “Break Even”. The analysis is based on a set of linear equations for a straight line and the separation of variable and fixed costs (www.google.com).

In other words, CVP analysis applies the variable costing approach to analyze the built- -in -relationship between cost, volume and profit. It analyses the short term static relationship between cost, volume and profit. It assumes that under constant underlying condition, CVP analysis can be the analysis of break even volume, break even analysis and contribution margin analysis in profit planning.

The assumptions over emphasize the market sovereignty of producer (i.e. seller) than that of consumer. Therefore, to assume that seller has choice to sell as many as of his product in the market at the given price fixed by him is neither true nor possible. Competitive market with a wide range of substitute products in the market has minimized the role of the seller and has over focused on the sovereignty of the customers. Though it has been criticized by the authors, CVP analysis is a powerful tool in the hands of management for profit planning. The contribution margin analysis provides the best possible answers of many ‘what if’ questions of management. Most management decisions require a careful analysis of cost behavior in relationship to output volume. This is possible only through CVP analysis. Besides, CVP analysis deals with how profits and cost change with change in volume (Bajracharya, et. al., 2004:225).

A difference between actual profit and budgeted profit can be caused by changes in one or more of the following factors:-

1. The contribution or (mix) in which Sales price
2. Volume or quantity of goods sold
3. Variable cost
4. Fixed cost

5. The various product lines are sold.

All these factors must be considered in profit planning. Cost volume profit analysis is a method of relationship between these variables which form the basis of profit planning.

Specially, CVP analysis attempts to answer the following questions:

i. What sales volume is required to break even?
ii. What sales volume is necessary in order to earn desired profit?
iii. What profit can be expected on a given sales volume?
iv. How would changes in selling price, fixed cost and output affect Profit?
v. How would a change in mix of products sold affect the break even target volume and profits potential.

1.2 Introduction of Dairy Development Corporation

Nepal is a least developed mountainous country. Private sector is not excited for the development of industry and business. Before 2007 B.S, the environment was also unfavorable to develop the industrial sectors and government and had no vision about their matter. 6 years passed after democracy, keeping the nation in political in consistency from 2013 B.S, the government started 5 years developmental plans which are also running now and the government has been conducting the development works according to these plans.

Along with the starting of five year planned development, Government has established various enterprising in different sectors for the economic development of the country. Among them Dairy Development Corporation (DDC) is one of the majors P.E.s established under corporation Act 2021 B.S.

The Dairy development activities in Nepal stated in Tusal Village of Kavre district along with the establishment of “Central Dairy Plant” on experimental basis with a small scale milk processing plant under the department of agriculture in the year 2010 B.S, at the initiative of Dairy Development Board.

The Dairy Development commission was formed in 2012 B.S..Since the demand of milk and dairy product had been increasing day to day, the dairy plant became necessary. The "Central Dairy plant" which was establishes in 2010 B.S. at Bhotahity was shifted to Lainchaur in 2013 B.S due to the inadequacy of space. The Dairy Development commission was constituted to guide the Dairy Development section. At that time, Dairy experts were provided by Swiss association for Technical Assistance. Then it started milk collection processing and marketing activities from 2014. The Dairy Development commission was converted into Dairy Business Development in 2019 B.S. Ultimately in 2026 Shrawan 1, the DDC was established under the corporation Act, 2021 by the government but its performance is not so good. It is financially supported by foreign grants and loans such as World Food Programmers (WFP), New Zealand and Denis Government.

Before establishment of Dairy Development Corporation, there is no potential market for the farmer. To provide the reasonable price for the milk products of the rural side and also pasteurized milk DDC has been working from its set up. The demand of milk is increasing order because of the rapid increase in populations. So, the DDC has been trying to collect the milk on the occupation base. DDC has its branch office in different parts of the countries such as Kathmandu, Biratnagar, Hetauda, Pokhara, Lumbini and other places produce different products as pasteurized Milk, Dahi, Ice-Cream, Butter, Panir, Cheese, Ghee and Skim milk power etc.

1.2.1 Products of Dairy Development Corporation:-

a. **Pasteurized Milk**:- Milk is collected from rural areas standardized to contain 3 percentage fat, 8 percentage solid not FT (SNE) and pasteurized by a HTST pasteurizes.

b. **Dahi -** it is formed by milk. Large scale people consume it in solid form of milk.
c. **Ice-cream** -It is frozen dairy products rich source of calcium phosphorus and other mineral. Ice-cream produced by DDC is available in 80 ml and 1 liter containers.

d. **Cream:-** It is obtained cow and buffalo milk. It is filled in ½ liter plasti contains and sealed well.
e. **Butter:** Butter is solidified fat of milk obtained from cream usually by chumming.
f. **Pannier:** Pannier is one of the indigenous varieties of milk products obtained from fresh buffalo milk.
g. **Ghee:** Ghee is the pure clarified fat derives solely from cow or buffalo milk which no color is added.
h. **Cheese**- Other one most important product of DDC is cheese. There are three different cheese i.e. Yack, kanchan cheese and buffalo cheese.
i. **Skim milk power:** DDC is also manufacturing skim milk i.e. deride to powder by evaporating its content in spray drier.

1.2.2 Objective of Dairy Development Corporation

The main objectives of DDC are to provide guaranteed market and fair price to the rural milk products and to supply hygienic pasteurized milk and standard dairy products to the urban consumer. DDC provides qualitative milk and milk products to the consumer at national level. Other objectives are as follows.

1. To develop milk collection system, processing system and distribution system.
2. To promote for occupational milk producer.
3. To provide quality milk and milk products.

Except the above objectives, DDC was established for providing incentives to farmers by collecting and preserving milk, supplying the hygienic milk to the customer and that type of food which contains protein carbohydrate mineral and vitamins. For this reason, milk and milk products are realized very important to the public health.

Before the establishment of DDC, there was no potential market to the formers and livestock occupation wasn't getting any return to improve the economic condition of Nepali farmers adopting this occupation. Along with the establishment of DDC, a revolution was started in milk business in some of few years.

1.2.3 Organization

The board of directors formed by Nepal Government has been revising its organizational structure according to the charging need at the regional level. Following this, the recent Management structures of DDC at the central level are as follows:

- Departments of Administration
- Departments of Production Administration
- Departments of Financial Administration
- Department of planning, monitoring and Evolutions
- Departments of internal Audit
- Department of Quality control and Technology development
- Department of marketing management

Chairman is nominated by Nepal Government. The general manager which is appointed by Nepal Government holds the position of member secretary. When DDC started its operation, it had only Kathmandu milk supply scheme and one cheese production and supply scheme with four cheese production centers under its fold. With the pass of time, DDC has gradually extended its activity area outside Kathmandu valley. There are now 7 milk supply schemes and 11 cheese production centers in different parts of the country.

1.3 Statement of the Problem

The business is being largely depended on how business operation is planned. Poor performance is the outcome of poor planning, controlling and decision making. The key motive of every business enterprise is to make and maximize profit. Profit just doesn't happen by chance, it is to be managed. Cost volume profit analysis provides the technique and profit planning framework. Based on the annual report published, performance of Nepalese public enterprise can not be considered satisfactory. There are so many problem to get success i.e. focus only short term objective, poor implementing policies, poor management, lack of communication between line and

staffs and authorized persons, poor decision, lack of proper planning, impractical performance, Lack of continuity and stability of the Nepalese public enterprise.

To see the above problems, the researcher selects the Dairy Development Corporation in a sample out of many public enterprises for the study. There are many questions arise in the researcher's opinion. They are:

1. Is there variance between targets and actual sales plan of DDC?
2. Is there any specific relation between costs – volume profits?
3. Is there impact of CVP analysis profitability?
4. How to examine sensitivity analysis?

1.4 Objective of the Study

The main objective of this study is "Impact of Cost Volume Profit Analysis on Profitability". More specifically, the following sub - objectives have been set:

1. To examine the variance between target and actual sales plan of DDC.
2. To explore the relationship of cost, volume and profit.
3. To analyze the effectiveness of cost-volume-profit analysis on profitability.
4. To examine the sensitivity analysis.
5. To provide suggestions and recommendations for the betterment of the DDC.

1.5 Significance of the Study

The main objective of profit plan is to forecast the events to over come the risk from uncertainties. Few studies have been made in relation to the tools of profit planning in Nepalese context and most of the studies are selected to profit planning and control of the enterprises where CVP as one of the tool PPC is hardly studied. This study is significance in the sense that it has treated to study the CVP of the manufacturing company, which are most important tools of PPC. The study is useful for entrepreneurs, decision makers, Researcher and the Managers because it deals with the practice of CVP analysis of manufacturing industry very important tools of PPC.

This study has been significant in the following way.

i. This study has been focus on the application of CVP on profit planning.

ii. It provides information on application of the tools under profit planning indifferent circumstance.
iii. It has been useful to the potential Manager, Accountant, Policy maker and Planner etc.
iv. This study also directs towards providing necessary recommendation to selected development of the company.

1.6 Limitation of the Study

This study confines Impact of Cost-Volume- Profit Analysis on Profitability of Dairy Development Corporation. The researcher has been study within these limitations which are as follows:

i. Cost-volume- profit analysis covers of past five years only (2058/059-2062/063).
ii. An availability of relevant data and other information has been determining its scope.
iii. Accuracy of the study has been based on the data available from Management of DDC and the response made by respondent.
iv. The limited time available with the researcher and the resources constraints has been also limited in the work.

1.7 Organization of the Study

These research paper contents only 5 chapters. They are as follows:

Chapter - I: Introduction
Chapter - II: Review of Literature
Chapter - III: Research Methodology
Chapter - IV: Data Presentation and Analysis
Chapter - V: Summary, Conclusion and Recommendation

Chapter - I: -It deals with introduction and includes background improvement of study, statement of problem, objectives of study, limitation of study, organization of study.

Chapter - II: - It has been deals with the available literature. It includes theoretical framework, review of selected books, journals articles and previous unpublished master's Degrees Dissertation etc.

Chapter - III: - This chapter will be to explain the research methodology used in the study. It includes research design population and sampling sources of data, methods of data analysis.

Chapter - IV: - The fourth chapter is the important chapter of the study and has been the presentation and analysis of data as well as major findings of the study.

Chapter - V: - The fifth chapter covers the summary of the study, the main conclusion that flows from the study and after some recommendations as well as suggestions for further improvement.

Bibliography, Appendix and other supporting document are also incorporated at the end of the study.

CHAPTER - II

REVIEW OF LITERATURE

2.1 Conceptual Framework

2.1.1 Concepts of Cost

Cost may be defined as the sacrifice or giving up of resources for a particular purpose. Monetary units that must be paid for goods and services frequently measure cost. Costs are initially recorded in elementary form. Then these costs are ground in different ways to help managers make decisions such as evaluating subordinations and sub-units for the organizations, expanding or deleting equipment. To aid decisions manager want to know the cost of something they want to do or acquire. This something is called a cost objective, or cost object, which may be defined as any activity for which a separate measurement of cost is desired (Horngren, 1991:197).

Generally, cost plan refers to the plan for variable cost, fixed costs, mixed costs and jumped cost. Variable cost is that cost which is directly affected by change in the activity level. If the activity level or production level increases then the variable cost also increases and vice versa, if decrease. Change in variable cost effects to P|V ratio, BEP and Net income. When variable cost increases, net income, P|V ratio and margin of safety will be decrease but helps to increase BEP.

Fixed cost remains constant in total amount despite the changes in the level of activities. That is, fixed cost remains unchanged in total as the activity level varies, when other factor remains unchanged, the changes in fixed cost effect to BEP and Net income. When the fixed cost is increased, it increases the volume of BEP and decrease the net income or vice-versa. Fixed costs are also called capacity cost.

Expenditure that cannot be categorized as purely fixed or variables is termed as mixed cost or semi-variable cost. Mixed cost contains both variable and fixed cost elements. Repair and maintenance, supervision cost, telephone cost, electricity charge are some examples of mixed cost. It should be operated from the variable and fixed cost

elements as the function of profit planning, cost control and decision making. 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 jumping costs or step fixed cost or moving fixed cost or ladder fixed costs.

2.1.2 Volume

Volume states the level of activity usually measured in terms of units or rupees value. But it is not necessary that the volume is to be expressed in terms of machine hours. It states the quantity or amount of production or sales in a given period, especially in accounting period. A volume of activity of an organization concentrates one mind towards capacity utilization. Remaining other things same an organization operating with its normal capacity (or maximization capacity if necessary for short run) is said to be good which can utilize its facilities optimally. Volume maximization and optimum utilization of the organizational resources is one of the challenging jobs, which is possible only when right man right time in right place is possible (Horngren, 1991:197).

2.1.3 Profit

Usually, profits do not just happen. Profits are managed. Before we can make an intelligent approach to the managerial process of profit planning, it is important that w understand the management concept of profit. There are after all several different interpretations of the term “profit”. An economist will say that profits are the reward for entrepreneurship for risk taking. A labor leader might say that it is a measure of how efficiently labor has produced and that it provides a base for negotiating a wage increase. An investor will view it as a gauge of the return on his or her money. An interval revenue agent might regard it as the base for determent income taxes. The accountants will define it simply as the excess of a firm’s revenue over the expenses of producing revenue in a given fiscal period.

Using the accountants measuring stick, management thinks of profits as. A tangible expression of the goals it has set for the firm. Measures of the performance toward the

achievements of its goals, it means of maintaining the health, growth, and continuity of the company (Williamson and Lynch, 1999:99).

Management thinks of profit as a tangible expression of the goals is has set for the firm; a measure of performance for the achievement if its health, growth and continuity of the company (Lynch and Williamson, 1995:100).

Profits are the main test of the individual firm's performance. In other words, it is the acid test of business. Profits are primary objective of a business.

Economic theories on profit may be put in three broad categories: the first theory upon profit as the reward for bearing risks: the seconds views profits as the consequence of friction and imperfection in the competitive adjustment of the economy to dynamic changes; the third sees profits as the reward for successful innovation (Dean, 1982:6). Profits are a yardstick of management's ability to co-ordination plan act in the interest of the consumer. No business sustains if there is regular loss, profit is essential for each enterprise.

Thus, it is quite obvious that profit is obtained by subtracting the cost from the revenues and it is also the reward for taking risks. Profit plays, a vital role, not only in management decisions but also in the general life standard of human beings. Therefore, management should continuously evaluate efficiency of its company in terms of profits (Lynch and Williamson, 1984:99).

2.1.4 Cost Volume Profit Analysis

Cost volume profit(CVP) analysis examine the behavior of total revenues totals and operating income as changes occur in the output level, the selling price, the variable cost per unit and or fixed costs of a produce (Horn Gren, Dater and Foster, 2003:195).

Cost volume profit analysis is a systematic method of examine the relationship between changes in activity (i.e. output) and changes in total sales revenue expenses

and net profit. As a model of their relationship CVP analysis simplifies the real world condition 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. Nevertheless, it is a powerful tool for decision making in certain situations (Drury, 2000:112).

Most of the business fail after years, sometimes months, of starting because they tend to do anything for volume without thinking how it's gong to affect bottom line. Cost volume profit analysis is a management accounting tools to show the relationship between the elements of profit planning. Profit planning is the function of the selling price of product demand, variable costs, fixed costs, taxes etc. The whole picture of profit planning is associated with cost volume profit interrelationship (Bajaracharya, et.al; 2004:225).

Cost volume is an important media through which is the management can have an insight into effects on profit on account of variations in cost and sales and take appropriate decision. Profit planning can be done only when management has the information about the cost of the products and the selling price of the product.

The key motive of business enterprise is to make and maximize profit. Profit does not happen by chance. It is to be managed. CVP is a supplementary tool of planning of profit. It is immensely helpful for developing alternative strategies in sales planning and estimation. CVP is an accounting technique is equally important in profit making and non-making organization. Cost volume profit analysis is a management accounting tool to show the relationship between the ingredients of profit planning. Profit planning is the function of selling price of the product the variable costs and costs and volume to be sold. The entire scope of profit planning associated with CVP interrelationship widely used techniques to study CVP relationships. A wisely used technique to study CVP relationship is break even analysis. Break even analysis is concerned with the study of revenues and costs in relation to sales at which the firm's revenue and total costs will be exactly equal (or Net income is zero). Thus the Break

even point (BEP) may be defined a point at which the firm's total revenues are exactly equal to total costs, yielding zero income. The 'no profit' 'no loss' is a brake even point or a point or a point at which losses case and profit begins (Khan and Jain, 2000; 145).

Cost volume profit analysis can be regarded as a sophisticated method or Analytical tools used in management. It is extremely useful in profit planning and control, management decision, Cost control, budgeting etc.

Cost volume profit analysis is the process of examining the relationship among revenues, costs and profit for a relevant particulars time frame (Bajaracharya et. al, 2004; 226).

Generally, Cost Volume Profit Analysis provides information regarding (Munakurmi, 2003; 124).

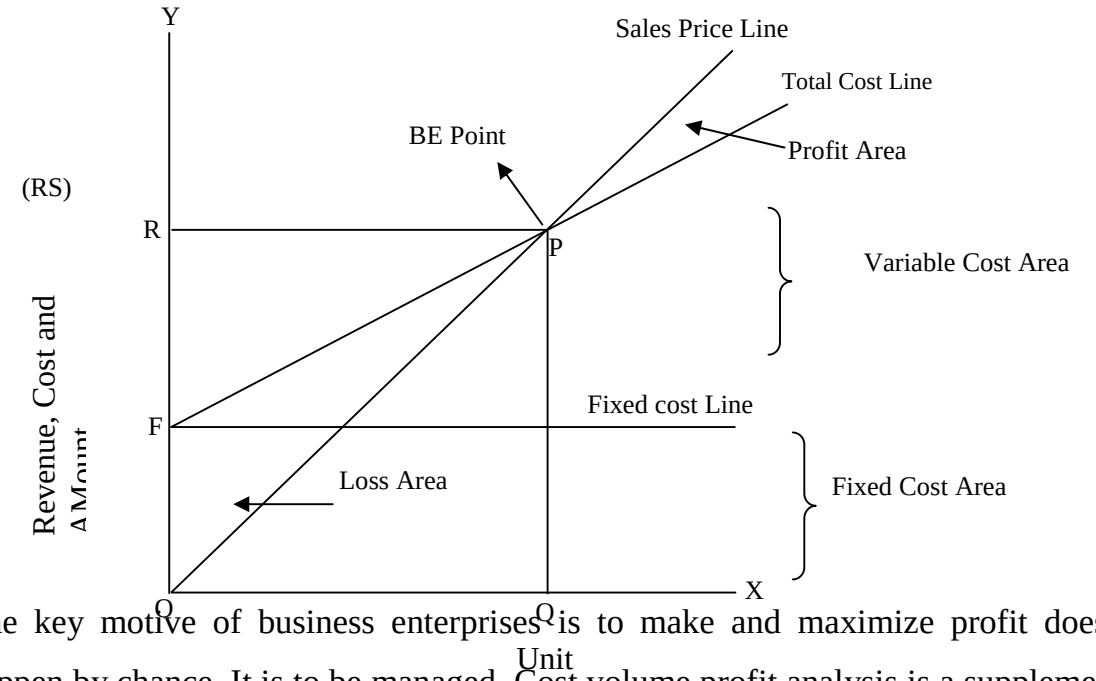
1. Minimum level of sales to avoid losses.
2. Sales level of earn target profit.
3. Effects of charges in prices, costs and volume of profits.
4. Effect of charges in mix on profit.
5. New break even point for changes.
6. Impact of expansion plan on CVP relationship.
7. Products those are most profitable and least profitable.
8. Whether to continue or discontinue the sales of products or operation of plant.
9. Whether to close or not the firm for a short term.
10. Effect on operating profit with the increase in fixed cost, etc.

Most of the business fails after a few years, sometimes month, of starting because they tend to do anything for volume without thinking how it's going to affect the bottom line. Cost volume profit analysis is a management accounting tools to show the relationship between the elements of profit planning. Profit planning is the function of the selling price of product, demand, variable costs fixed costs, taxes etc. The whole

picture of profit planning is associated with cost volume profit interrelationships. A popular technique to study cost volume profit relationship is break even analysis. Break even analysis is concerned with the study of revenue and costs is relation to sales at which the firm's revenues and total costs will be exactly equal or the net income will be zero. It is a "No Profit No Loss" situation. This point is a cornerstone of profit planning. This can be explained, through cost volume profit graph as follows:-

Figure 2.1

Cost Volume Profit Graph



The key motive of business enterprises is to make and maximize profit does not happen by chance. It is to be managed. Cost volume profit analysis is a supplementary tool of planning for profit. Cost volume profit analysis is immensely helpful for developing alternative strategies in sales planning and the cost estimation. A certain relationship exits, between the variable like selling price, sales volume, expenses and taxes. Cost volume profit analysis is an accounting technique showing the relationship between these variables This techniques is applicable in all economic sectors (manufacturing, whole selling, retailing, and service industries),because the same type of managerial functions are performed in each type of organization. Cost volume profit analysis, through most offer illustrates business cases, is equally applicable for non- profit planning organization to allocate scarce economic resource most effectively among the competing alternative. Allocating of scare resources among the

various demanding sectors is the most important parts of national planning (Bajaracharya, et. Al, 2004:225).

2.1.5 Features of Cost Volume:

Basic features of cost volume information can be pointes out as follows: (Bajracharya, et.al, 2004; 226).

Sales Revenue: total sales volume fluctuates in direct proportion to the units sold. Revenue per units is assumed to remain constant.

Variable Cost: Total variable costs change in the same proportion and in the same direction as the volume of output changes and the per unit variable cost remain fixed.

Fixed Cost: Total fixed cost remain unchanged for the same period of time, whatever may be the level of output within the relevant range per unit fixed costs are variable.

Semi Variable Cost: Those costs which are neither constant in total amounts nor constant per units are mixed or semi – variable costs.

Cost volume profit analysis requires a separation of fixed and variable costs. Semi variable or mixed costs can be segregated into variable and fixed components by applying any of the cost segregation methods as visual fit method; high- low point method or least square regression analysis is method.

2.1.6 Important of CVP Analysis

CVP analysis is an important powerful tool for management to take crucial and vital managerial decision which effects the profit planning. It also helps to analyze the inter-relationship between cost volume-profit and to attain the objective of profit maximization and cost control programs. Also helpful to make plan for profit and obtain important information which are required to take managerial decision other important points are:

- It helps in determining the break even point in return of units and in Rs to avoid losses.
- It helps in determining reasonable price of the products.
- It helps in identifying the effect of charges in prices, costs and volume on profit,
- It helps in selection of most profitable alternative.
- It helps in determining the volume of sales required to achieve the target profit.
- It helps in determining the margin of safety and profit at different level of sales.
- It helps in developing the optimum combinations of product mix to attain the desired level of profit (Gyawali, et.al, 2004; 4.2).

2.1.7 Profit-Volume Relationship

The first point to be noted is that contribution margin and net profit are different things. For example;

Contribution Margin = Sales Revenue – Variable Costs

Net Profit = Sales Revenue – Variable Cost – Fixed Costs

Since fixed costs do not change with the change in sales volume within the relevant range of capacity. Profits change more rapidly than the changes in sales. In other words, profit is more volatile than sales.

2.1.8 Purpose of CVP Analysis

Cost- volume- profit analysis helps management in a number of ways. The following purpose are served by it (Dangol, 2004; 39).

- Calculation of profit resulting from a budgeted sales volume.
- Calculation of sales volume to break even.
- Effect or change on price, costs and profits.
- Determination of new break even point for changes in cost and selling prices.
- Measurement of effect of changes in profit factors.

- Choosing the most profitable alternatives.
- Determining the optimum sales mix.
- Determination of capacity and equipment of selection.
- Long term decision on continuance of products.
- Make or buy decisions on sub assemble or part.
- To contemplate the increase or decrease in profits due to the change in method of production, etc.

2.1.9 Application of CVP Analysis

Cost volume profit analysis is an important tool for profit planning. It has been defined as a management tools showing the relationship among cost selling price, profit and volume of activity. CVP analysis can be applies in the following respects (Dangol, 2004; 41).

- It helps in fixation of selling price.
- It is helpful in cost control.
- It also assets the management in understanding the behavior of cost and helps in budgeting control.
- It helps in determining the level of output where all the costs can be met.
- It assets the management in profit planning.
- It also assists the management in performance evaluation for the purpose of management control.
- It helps very much in making managerial decisions such as make or buy a part, drop or continue a department or products line, accept or reject a special order selection of a profitable product mix etc.

2.1.10 Cost –Volume- Profit Analysis and its use in PPC

Cost volume profit analysis is the study of relationship between the variable cost, activity volume and profit. What happens if a slight change occurs in volume of activity or cost or required profit is examined in this relation. It is one of the most popular in PPC. PPC remains incomplete without CVP.

CVP analysis is an analytical tool for analyzing the relationship among cost price, sales and production volume. Mainly, there are three elements in CVP analysis. They are cost, sales and production volume and profit. All these terms are interconnected and dependent on one another. For instance, profit per unit of a product depends on its selling price and cost of sales. The selling price to a greater extent will depend on the cost and cost depends on the volume of production. It is highly essential for the management to have the complete knowledge about the interrelationship among these. A study concerning this inter connection is undertaken through cost- volume- profit analysis. CVP analysis is extremely helpful in profit planning and control, management decision and cost control.

Before incorporating profit plans into a detailed, it is useful to obtain some preliminary information on the feasibility of those plans. Cost volume profit analysis is one way of doing this. By manipulating cost- volume-profit relationships, management can determine the sales volume corresponding to a desired profit Management might then evaluate the feasibility of this sales volume. If the profit plans are feasible, a complete budget might be developed for this activity level. The required sales volume might be infeasible because of market conditions or because the required volume exceeds production or service capacity, in which case management must lower its profit objective or consumer other ways of achieving it. Alternatively, the required sales volume might be less than management believes the firm is capable of selling, in which case management might raise its profit objective.

Cost- volume -profit analysis is generally defined as a planning tool by which managers can evaluate of a change(s) in price, volume, variable cost and fixed cost. Additionally, CVP analysis is the basis for understanding contribution margin pricing, related short run decisions, target costing, and transfer pricing. As CVP analysis is covered in all managerial accounting's most basic analytical tools, CVP analysis is covered in all introductory managerial accounting texts.

Hence, CVP analysis examines the behaviour of total revenue, cost, and profit as the output level (volume), selling price, variable costs, or fixed cost changes. CVP analysis helps managers to answer "what if" type questions: what if volume increase how will profit, revenue and costs are affected? What if we raise our price what will be the effect of profit? CVP analysis is planning tools that utilize information about cost behaviors to provide managers with an overview of the effects of short run financial changes.

2.1.11 Approaches to Cost Volume Profit Analysis

The CVP relationship can be analyzed through different approaches which are:

i. Contribution margin analysis
ii. Breaks even analysis

2.1.11.1 Contribution Margin Analysis

The difference between the sales revenue and variable cost (i.e. the marginal cost) is known as 'contribution margin' or 'gross margin'. In other words, fixed cost plus the amount of profit is equivalent to contribution margin. It can be expressed by the following formula:-

Contribution Margin = Sales- Variable Cost = Fixed Cost + Profit

We can derive from it that profit cannot result unless contribution exceeds fixed cost. In other words, the point of no profit no loss shall be arrived where contribution margin is equal to fixed costs (Maheshwari, 2000;176).

CVP analysis is the amount of contribution margin available from the sales volume of absorbed fixed cost and also deducting all variable cost of sales. When the contribution margin is high then profit is also high. Contribution margin is usually expressed as a percentage of sales or contribution margin ratio i.e.

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

$$= 1 - \frac{\text{Variable Cost}}{\text{Sales}}$$

The variables usually use in cost-volume -profit analysis is:

a) Sales Value

Any firm or company may have different products, services etc. The sale value actually includes the quantity of total sales multiply by selling price per unit.

b) Variable Cost

Variable cost is that cost which is directly affected by change in the activity level .The per unit variable cost is always constant. If the activity level is decreased, the variable cost also decrease. If the activity level or production level increase then the variable cost also increase. Change of variable cost effects to p\v ratio, BEP and net income. When variable cost increases, net income, p\v ratio and margin of safety will be decreased but it helps to increase BEP.

c) Fixed Cost

Fixed cost remains constant in total amount despite the changes in the level of activities. That is the fixed cost remains unchanged in total as the activity level various. When other factors remain unchanged, the change in fixed cost effect on BEP and net income. When the fixed cost is increased, it Increases the volume of BEP and decreases the Net income or vice- versa. Fixed costs are also called capacity cost.

d) Mixed Cost

Expenditure that cannot be categorized as purely fixed or variable is termed as mixed cost or semi- variable cost. Mixed cost contains both variable and fixed cost elements. Repair and maintenance, supervision, telephone cost, electricity charge are some examples, of mixed cost. It should be separated from the variable and fixed cost elements, as the function of profit planning, cost control and decision making.

e) Jumping Fixed Cost

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

2.1.11.2 Breaks Even Analysis

Breaks even analysis is widely used technique to study cost volume profit relationship. The narrower interpretation of the term break even analysis refers to a system of analysis which determines probable profit at any level of activity. CVP analysis includes the entire games of profit planning, while break even analysis is one of the techniques used in this process. However, it is so popular for studying CVP analysis that the two terms are used as synonymous terms (Maheshwari, 2000: 175).

2.1.11.2.1 Break Even Point

The point while breaks the total cost and selling price evenly to show the level of output or sales at which there shall be neither profit nor loss, is regarded as breakeven point. At this point, the income of the business exactly equals its expenditure. Breakeven point can be determined by the two methods (Maheshwari, 2000; 175).

a) The Equation Method

Breaks even point can be calculated by using following algebraic equations.

BE sales = fixed cost + variable cost ± profits

b) The Unit Contribution Method

BEP can also be ascertained through unit contribution margin approach. In this approach, BEP can be calculated by using following formula:

$$\text{BEP in units} = \frac{\text{Fixed cost}}{\text{CMPU}} = \frac{\text{Fixed cost}}{\text{SPPU ZVCPU}}$$

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

At breakeven point, the desired profit is zero. In case the volume of output or sales is to be computed for ‘a desired profit’ the amount of formula is given above.

2.1.11.2.2 Cash breakeven Point

It is the point where cash break even (i.e. the value of sale where cash realizations on account of sales will be just sufficient to meet immediate cash liabilities). While the calculating this point cash fixed cost (i.e. excluding depreciation and deferred

expenses) and cash contribution (i.e. selling price less the cash variable cost) are considered. The point helps the management in determining the level of activity below which there are chances of in solving on account of the firm's inability to meet cash obligations unless alternative arrangement are made (Maheshwari, 2000;179).

$$\text{Cash BEP} = \frac{\text{Cash Fixed Cost}}{\text{Cash Contribution Per Units}}$$

2.1.11.2.3 Composite Break Even Point

In case a concern is dealing in several products, a composite breakeven point can be computed according to the following formula (Maheshwari, 2000; 179).

$$\text{Composite BEP unit} = \frac{\text{Total Fixed Cost}}{\text{Composite P/V ratio}}$$

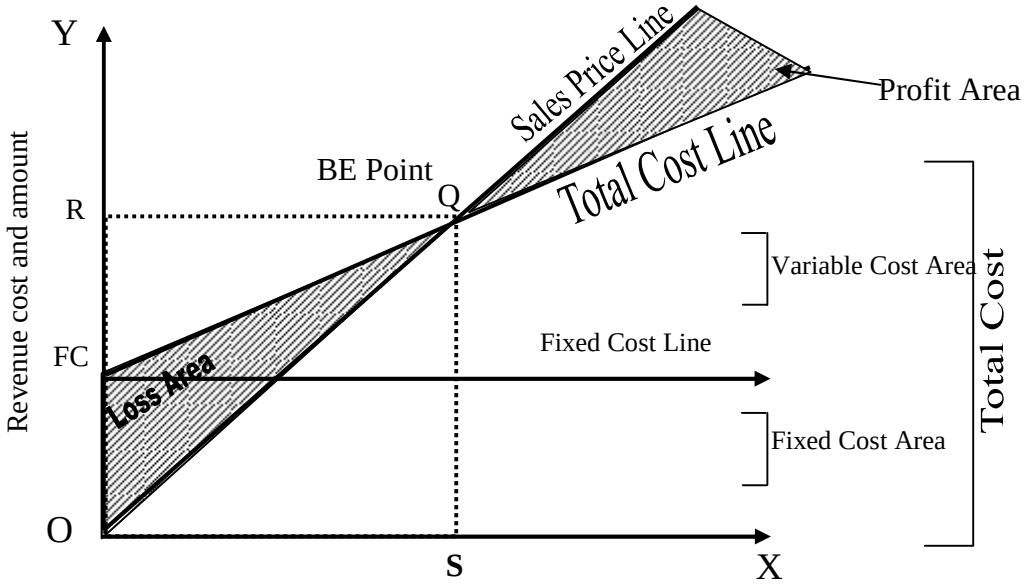
2.1.11.2.4 Cost Break Even Point

It refers to a situation where the costs of operating two alternatives plant are equal. The point enables the firm to identity which plant is the best of operate at or a given level of output assuming that sales price per unit is the same (Maheshwari, 2000; 179).

2.1.11.2.5 Break Even Chart

The relationship between costs, sales and profit can be shown in the form of a chart. Such a chart not only depicts the level of activity where there will be neither loss nor profit but also shows the profit or loss at various level of activity (Maheshwari, 2000; 181).

Figure 2.2
Break Even Chart



In the above break even chart, an equilibrium point between sales or revenue curve and total cost curve is "Q" known as BEP. Therefore "OS' is the break even sales volume and "OR" is the break even sales in amount .If the actual sales volume is more than break even sales, the organizations will earn profits and if the actual sales is less than the break even sales, he organization will suffer from loss.

2.1.12 Application of Break Even Analysis

Break even concept can be used to formulate different policies in a business enterprise. Some of these applications are (Maheshwari, 2000; 182).

- Determination of profit at different level of sales and margin of safety.
- To effect the level of output to get the desired profit.
- Effect of price reduction on sales volume and changes in sales mix.
- Effect of fixed cost or variable cost changes on sales volume.
- Selection of most profitable alternative, make or buy decision and drop and or add decisions.

2.1.13 Assumptions of Break Even Analysis

Contribution analysis and break even analysis are based on a specific set of assumptions that should be clearly understood. These underlying assumptions are (Maheshwari, 2000: 182-183).

- There is a relevant range of validity (activity) for using the results of the analysis and sales price does not changes as unit of sales change.
- There is only product in case of multiple products, the sales mix among the produce remain constant.
- Basic management policy about operation will not change materially in short run.
- The general price level (inflation / deflation) will remain essentially stable in the short run.
- Sales and production level are synchronized that is inventory remains essentially constant or zero.
- Efficiency and productivity per person will remains essentially unchanged in the short run.

If any of the above assumptions was changed, revised budget would be needed for a new analysis.

2.1.14 Limitations of Break Even Analysis

Break even analysis in many business situations can be used for effective decision making, but there are many short coming or limitations in its analysis and interpretations. Some of these can be listed as (Maheshwari, 2000; 183-184).

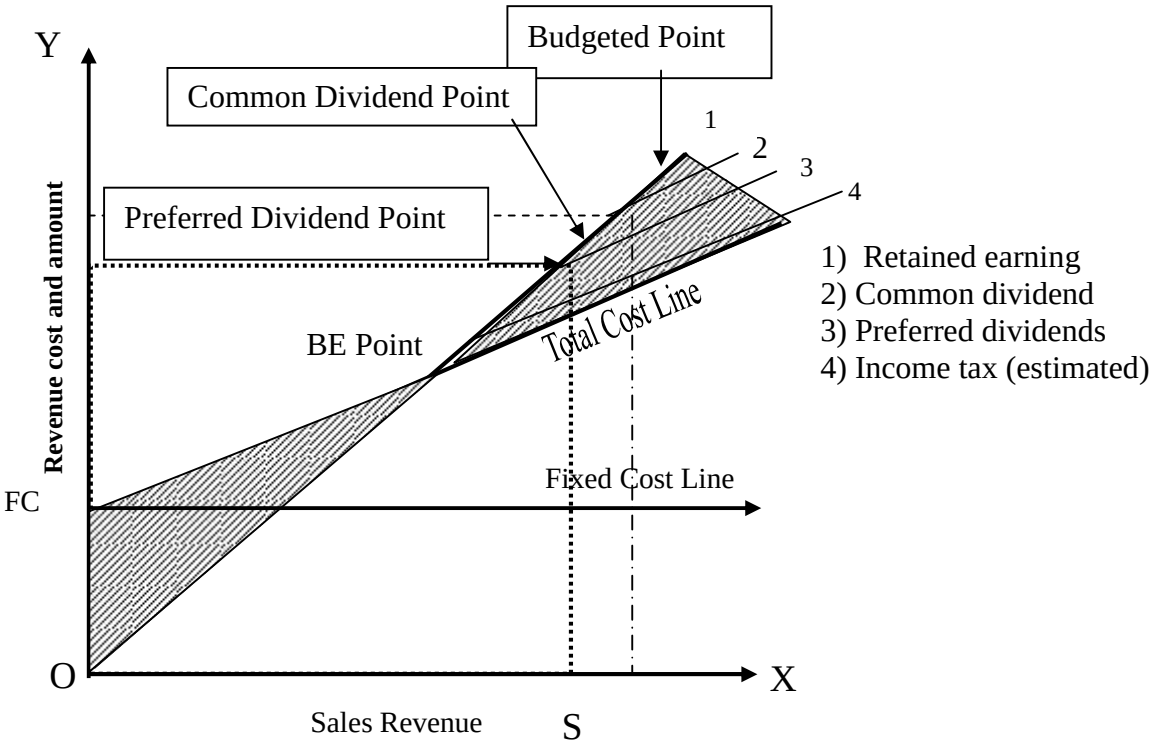
- The assumptions for producer's market phenomenon not hold good for all types of commodities.
- The fixed costs may not remain constant as well the variable costs may not very in fixed proportions as different level of output.
- With variations in the prices of the items or services which also depend on the factors affecting its demand and supply will certainty affect the demand of the commodity? This phenomenon is not covered in break even analysis.

- Identification of fixed and variables costs involved in productions process is very complicated. A shift in product mix may charge the break even point.
- Customers may be given certain discount on purchases to promote sales. This revenue may not be perfectly variable with level of sales output

2.1.15 Economic Characteristics of Cost Volume Profit Analysis

Where cost volume profit analyses are reasonably accurate, they can help management decision making. Essentially, CVP analysis offers greater insight into the economic characteristics of a company and may be used to determine the approximate effect of various alternatives. CVP analysis is based on estimated however, the arithmetical manipulations generally involve averages; hence the results should never be interpreted as precise. Rather, the analysis may be characterized approximately as a 'slide rule' approach that may be used to develop and test, with a minimum of effects, the approximate effect on costs profits of several types of management decisions (Welsch, et. at, 1976; 467-468).

Figure 2.3
Economic Characters of BEP Chart



Above breakeven chart with economic characteristic indicates few of the economic characteristics of a business, which are (Welsch, 1979; 468):-

- Fixed costs, variable costs and total costs at varying volumes.
- The profits and loss potential, before and after income taxes, at varying volumes.
- The margin of safety the relationship of budget volume to break even volume.
- The breakeven point.
- The preferred dividend or danger point– the point below which preferred dividend is not earned.
- The dead point- the point where management earns only the 'going rate' on the investment.
- The common dividend or unhealthy point- the point below which earning and the expected dividend on the common stock.

All these points, and as others, can be computes of data are developed for cost volume profit purpose.

2.1.16 Margin of Safety

Margin of safety is the excess of budgeted or actual sales over the break even sales volume. In other words, it is the difference between the budgeted or actual sales revenue and the break even sales revenue. It is the position above the break even point. It gives management a feel how close perfected operations are to be organization's breakeven point. Managers often consider the size of the company's margin of safety when making decisions about various business opportunities. The larger is the safety margin, the greater is the chance for the company to earn profit (i.e. larger the margin of safety, Safer the company). A high margin of safety is particularly significant in times of depression when the demand for the company's or firm's product is falling. A low margin of safety may result for a firm which has a low contribution ratio. When both the margin of safety and the p/v ratio are low, management should think of the possibilities of increasing the selling price, provided it does not adversely affect the sales volume or reducing variables costs by brining improvement in the manufacturing process. Margin or safety can be ascertained by using the following formula (Munakarmi, 2003; 127).

Margin of safety = (Actual sales value- Break even sales value)

$$= \frac{\text{Profit in Amount}}{\text{Profit Volume Ratio}}$$

$$= \frac{\text{NPBT}}{\text{Units Contribution Margin}}$$

The relation between margin of safety and actual sales in know as margin safety ratio, which is determined as follows: (Munakarmi, 2003; 127)

$$\text{Margin of safety Ratio} = \frac{\text{Actual Sales Z Break Even Sales}}{\text{Actual Sales}}$$

The following steps are needed to rectify margin of safety:

- With increasing selling price.
- With increasing sales volume, of the capacity of fixed cost is not utilized.
- With reducing fixed cost if possible.
- With reducing variable cost (with reducing the cost of raw material, wages and other direct cost).
- With substituting product line by more profitable one.

2.1.17 Cost –Volume- Profit Analysis for a Multi- Product Firm

The relative proportion of sales of product is called the sales mix or the product ix. In case of a multi- product firm, the contribution for each product can be found out by deducting its variable costs from sales revenue .The breakeven point for each product can be calculated only if the total fixed costs of the firm are distributed and fixed cost for each product is known. The firm's overall breakeven point can be calculated by dividing the total fixed costs by contribution ratio for the firm. The multi product firm's P\V ratio will be the weighted average of the P\V ratio for the entire product, the weights being the relative proportion of each product's sales. The P\V ratio for the multi product firm can also be calculated by dividing the total contribution from all products by total sales.

Changes in the product mix will not affect the firm's breakeven point and profit if each product has the same P|V ratio. However, a change in the product mix will changes the breakeven point and profit when products have unequal p/v ratios (Maheshwari, 2000; 187).

2.1.18 Break Even Point for Multi Product Company/Firm

In multi product firm we have to calculate the BEP in aggregate. The sales mix is used to compute a weighted average unit contribution. This is the average of the several product unit contribution margin weighted by the relatives sales proportion of each product.

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 contribution by different products generally changes the amount of profit. Managers try to achieve that combination or mix that will yield the greatest amount of profit, if a company sells more than one product, these may not be equally profitable. So the company's profits 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 the 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 can cause the total profit to decrease even though total sales increase. On the contrary, a shift in the sales mix from low margin item to high margin items can cause the reverse effect - total profit may increase even though total sales decrease (Bajracharya, et. al, 2004; 260).

Following procedures are followed to calculate BEP for sales mix or multi-product (Munakarmi, 2003; 137).

- Calculate Contribution Margin or Profit-volume Ratio for each product.
- Calculate proportion of sales mix in units or values as follows:

$$\text{Sales Mix} = \frac{\text{Individual Product's Sales Units or Value}}{\text{Total of All Products Sales Units or Value}}$$

- Calculate Weighed average for all products as follows:

Weighted average = [Sales mix (units) × Units Contribution Margin]

= [Sales mix (value) × P/V ratio]

- Calculate Break-even Point(BEP):

$$\text{Break-Even Point} = \frac{\text{Fixed Cost}}{\text{Weighted Average}}$$

2.1.19 Cost-Volume-Profit Analysis and Limiting Factors

CVP analysis is helpful in profit planning and a company will be able to produce any number of output, numbers of its choice (desires). But in real world, it is not possible

because of some critical factors like finishing machine or raw material or labor. These critical factors in the CVP analysis are known as constraint

2.1.20 CVP Analysis with a Single Constraint

Scarce resource should be efficiently allocated on order to maximize the contribution margin. A particular simple and instructive situation arises when there is only one constraining resource. This can occur if firm's products are produced on a single machine and output is limited by hours available on this machine. In the same way, single resource constraint arise, if the firm's products are all produced with only one material and output is limited by quantity available for that material . When there is a constraint for a scarce resource to have alternative uses, the contribution per unit should be calculated for each of these uses. Then, the available capacity for such resource should be allocated to the alternative uses on the basis of contribution per scarce resource (Munakarmi, 2003; 146).

2.1.21 CVP Analysis with a Multiple Constraints

Where more than one scare resource exists, the optimum production program can not easily be established by the simple process applies in single resource constraint. Under the circumstances simple allocation of resource or the basis of contribution margin per units neither feasible nor desirable. Contribution margin per unit of scarce resource may different for different scarce resources may be ranking of product; because production processes are affected by many constraints factors rather than single constraints .in such situation, linear programming technique to determine a production plan that maximizes contribution from the product mix. Linear programming is a mathematical technique, which shows how to arrive at the optimum results, allocation of available resource in a meaningful manner. It is basically concerned with the problem of allocating limit resource among competitive activities in an optimal manner. It is a technique to optimize the allocation of scarce resources in product mix which provides a valuable extension to cost volume profit analysis (Munkarmi, 2003; 148).

2.1.22 Assumptions Underlying CVP Analysis

Break even analysis is the most useful technique of profit planning and control. It is a device to explain the relationship between cost, volume and profit. The discussion of the CVP analysis (or break even analysis) so far is based on the following assumptions (Pandey, 1994; 241).

- Cost segregation:- The total cost can separated into fixed and variable components constant fixed is the total fixed cost that remains unchanged with changes in sales volume. Constant unit variable cost is the variable cost per unit is constant and total variable cost changes in direct proportion to the sales volume.
- Constant selling price: The selling price per unit remains the constant; that is it does not changes with volume or because of other factors.
- Constant sales mix: The firm manufactures only one product or if there are multiple products, the sales mix does not change.
- Synchronized production and sales: Production and sales are synchronized that is, inventories remain the same.

2.1.23 Limitations of CVP Analysis

Assumptions limit the utility and general applicability of the CVP analysis. Therefore, the analysis should recognize these limitations and adjust data, wherever possible to get meaningful results. The CVP analysis suffers from the following limitations (Pandey, 1999; 214).

- It is difficult to separate into fixed and variable components.
- It is not correct to assume that fixed cost would remain unchanged over the entire range of volume.
- It is difficult to use the break even analysis for a multi product firm.
- The break even analysis is a short run concept and has a limited use in long range planning.
- The break even analysis is a static tool.

2.1.24 Special Problems in Cost Volume Profit Analysis

Cost volume profit analyses are applied to individual products or parts of a business and all the products or activities combined. In the latter case, there are three special problems may be encountered (Welsch, et. al. 2001; 513-518).

- **The Activity Base**: when two or more products or activities are combined for break even analysis, the activity base is usually in amount. Production unit is used for single product. The activity base must be in additive units using a common denominator of volume or output in multiple products. Therefore, for the company as a whole, net sales amount are usually the only satisfactory common denominator because manufacturing, selling and administrative activities are expressed in combination.
- **The Changes in Inventory**: usually the budgeted changes in inventories (i.e. finished goods and work-in –progress) are immaterial in amount and thus be disregarded in cost- volume-profit analysis. On the other hand, when the changes in budgeted inventory are significant, it should be included in the analysis. Including the effect of inventory changes in cost volume profit analysis requires subjective about what management might do (about making inventory changes) at different volume levels and the conceptual precision that is desired. Management considers two practical approaches or policies in inventory changes often used: (a) Disregards the inventory changes (b) include the inventory changes.
- **The Non- Operating Incomes and Expenses**: Non-operating incomes (gains) and expenses (losses) and extra-ordinary gains and losses, of material in amount, cause another problem in CVP analysis. The basic issue is whether they should be included or excluded. Extra- ordinary gains and losses are non-recurring and unusual; therefore, they should be excluded. Non-operating incomes and expenses are recurring but they are not related to ongoing operations. Management considers the policy may be to: (a) Include the non-operating incomes and expenses. (b) Exclude the non-operating incomes and expenses.

2.1.25 Profitability Analysis

The word ‘profitability’ may be defined as the ability of given investment to earn a return from its use. Profitability has been considered, to a great extent, role of the main criteria to judge the extent to which the management has been successful in efficient utilizing the funds at its disposal or in other words, how for the management has been successful in maximizing its profits or minimizing its losses, if any.

Profitability analysis helps in critically analyzing and interpreting the current and prospective earning capacity a business corporation within and outside the business, the indices of profit are considered as reliable indicators of the operational efficiency and organization effectiveness of the firms in utilizing its resources to earn satisfactory earning.

Profitability in relation to the sales indicates the profit margin on sales. The measure of return on the capital employed can be used evaluate and to compare profitability of different division of an enterprise as well as the enterprise as a whole. It indicates how well the management has used the funds supplies by creditors and the owners. It measure profitability as productivity.

The importance of profitability analysis has further been heightened in recent years because it helps in critically analyzing and interpreting the current and prospective, earning capacity of Business Corporation.

Profitability analysis becomes all the more important when within the business there is an earning goal that helps to guide the behavior of the managers and other employee. Outside the business to distribution of earning to stockholders, creditors, governmental bodies and other is the basis for social influences and pressure on the activities of the firm. Thus both within and outside the business, the indices of profit are considered the reliable of the operational efficiency and organizational effectiveness of the firm in utilizing its resources to earn satisfactory earning.

In the process of analysis and interpretation certain methods are adopted to measure more systematically the trends of business profits. Profitability analysis owing to its empiricism or methods enables both official and unofficial agencies to measure the trends of profits, to construct a number of indicators of business activity and to analyze, evaluate and interpret in perspective the earning capacity of business.

Economic wealth of an individual enterprise is measure by net earning; hence the profit earning capacity and performance of an enterprise should be viewed and measured in relation to the resource or funds utilized by it. In a capitalistic or free economy, where profits are the more important of every business enterprises, the usefulness and validity of measuring its profitability on the basis of trends of profits is not challenged, but in a centrally controlled economy, it is enjoyed up every enterprise to operate within the framework of national planning and make the target contribution to gross national product or national income.

In a country where the new credo of mixed economy has been accepted for fostering private sector and promoting public sector side by side in a planned way for the overall development of the country, while the free enterprise is given the prerogative of maximizing its profits.

2.1.26 Measurement of Profitability

The most important precaution in connection with the measurement of profitability is that the investment figure used should be related to its associated income figure. Profit is a constantly changing phenomenon and is the end product of business activity based on some many variables like volume of sales, price and cost on the hand the size of capital investment on other hand. Hence, in order to ascertain the degree of profitability it is necessary to establish a quantitative relationship between profits and either the volume of sale or the level of investment. Relationship of profits to various items of profit and loss statement can be established with the help of common size percent on one hand and the ratio of profit to its various investment segment on the other hand.

The profitability of an undertaken may be measured by means of different techniques, but ratio technique is one of the best the most understandable technique to measure the profitability of any concern. “Profitability ratios are of two types, those showing profitability in relation to investment”.

The result of ratio analysis is for particular interest to those potential creditors or owners who are contemplating long term commitments in the business under considerations as well as to management in judging its own effectiveness

Profitability can be measured in different point view such as:

1. Profitability in relation to sales.
2. Profitability in relation to assets.
   i. The profit margin realized on sales.
   ii. Ratio of net profit to total assets.

2.1.27 Sensitivity Analysis

Sensitivity analysis is a “What if” technique that measures how the expected values in a decision models will be affected by changes, in the critical date inputs. In the context of cost volume profit analysis, Sensitivity analysis answer questions such as “what will my net income be if the units variable cots or the sales prices change by some amount from the original prediction” (Walter, 1995; 52).

Sensitivity analysis is the measurement of elasticity of the changes in cost, volume and factors or breakeven point or given the strategist should focus more on the factors, which is more sensitive or responsive for profit. To measure the sensitivity of cost volume profit factors one can see the impact of certain percentages or amount changes in volume, price or cost factors on net profit. In other words, sensitivity analysis is the measurement of responsiveness in out come with the charge in determinant variable. We know that the goal of a business enterprise is to maximize profit. Profit is the excess of revenues over the total costs.

Net profit = Total Sales Revenue – Total cost

= Sales Units × SPPU – (Sales unit × VCPU) – fixed cost- taxes

So that, Profit = F (Sales volume, Selling Price, VC FC, Taxes etc).

It means, profit is the function of Price, VC, FC, Taxes and So on.

But none of the factors remain unchanged; sometimes the manager can intentionally change the price and cost factors as a part of strategic decision. But the strategy should focus more on the factors, which is more sensitive or response foe profit. Therefore to measure the sensitive of cost volume profit factors, we can see the impact of certain percentages or amount charge in volume, price or cost factors on net profit (Bajaracharya, et.al. , 2004: 245).

The major benefit of sensitivity analysis is its provision of immediate financial measures of the consequences of possible predictions errors. It helps to focus on those aspects that are very sensitive needed, and it cases the manager's mind regarding those applications that have little impact on decisions.

The advantages of using certainty model coupled with sensitivity analysis are their relative simplicity and economy. The major disadvantages are the possible overlooking of better actions that might be forth coming, it more formal models that include uncertainty was used.

2.1.28 Impact of Changes on Profits

Profit is function of a variety: it is affected by changes in volume, cost and prices. Profits may be affected by the changes, (increase or decrease), in the following factors (Pandey, 1999; 203-208).

- **Effect of Price Changes**: - An increase in the selling price will the increase the p\v ratio and, as a result, will lower the breakeven point. On the contrary, decreases in selling price will reduce the p\v ratio and therefore, result in a higher breakeven point.
- **Effect of Volume Changes**: - A changes in volume, not accompanied with changes in the selling price and /or costs, will not affect p\v ratio. As a result,

the breakeven point remains unchanged. Profit will increases with an increase in volume and will be reduced with a decrease in volume.

- **Effect of Price and Volume Changes**: A change in price invariably affects volume. A price reduction may increase demand of the product and consequently, may result in increased volume. On the other hand, increase in price may adversely affect the demand and thus, reduce volume. The impact on profits under these circumstances is not obvious. Profit may increase with price reduction if volume increases substantially. Similarly, a price rise may reduce profits if there is material fall in volume.
- **Effect of Changes in Variable Costs**: - The impact of the changes in variable costs on profits is straight if it does not cause any change in selling price and/or volume. An increase in variable costs will lower p\v ratio, push up the BEP and reduce profits. On the other hand, if the variable costs decline, p\v ratio will increase, BEP will be lowered and profit would rise.
- **Effect of Changes in Fixed Costs:** A changes in fixed cost does not influence p\v ratio. Other factors remaining unchanged, a fall in the fixed costs will, however, lower the BEP and raise profits. An increase in fixed costs caused either due to some external factors or due to some changes in the management policy, will raise the BEP. Increase in factory rent or insurance and taxes are examples of external factors, while increased depreciation or salaries of managers may be the result of management decisions.

2.1.29 Impact of Income Taxes

Incomes taxes are imposed on individual and for profit organizations by government agencies. The amount of an individual's or organizations income tax is determined by laws that specify the calculation of taxable income (the income subject to taxes) and the calculation of the amount of tax on taxable income. Income taxes are computed as percentages of taxable income, with increase in taxable income usually subject to progressively higher tax rates. The laws governing the computation of taxable income differ in many ways from the accounting principles that guide the computation of

accounting income. Consequently, taxable income and accounting income are seldom the sales.

In the early stages of profit planning, income taxes are sometimes incorporated in CVP models by assuming that taxable income and accounting income are identical that the tax rate is constant. Although these assumption are seldom true, that are useful for assisting management in developing an early prediction of the sales volume required to earn a desired after profit. One management has developed a general plan, this early predictions should be refined with the advice of tax experts.

After Tax Profit = Before Tax Profit – (Before Tax Profit × Tax Rate)
After tax profit can also be expressed as before tax profits times 1 minus the tax rate.
After Tax Profit = Before Tax Profit × (1- Tax Rate)
This formula can be rearranged to isolate before tax profits as follows.

$$\text{Before tax profit} = \frac{\text{After Tax Profit}}{1 - \text{Tax Rate}}$$

Since all costs and revenues in the profit formula are expressed on a before tax basis, the most straight forward way of determining the unit sales volume requires to earn a desired after tax profits is to:

1. Determine the required before tax profit.
2. Substitute the required before tax profit into the profit formula.
3. Solve for required units sales volume.

2.2 Review of Previous Studies

2.2.1 A Brief Review of Book

The study of the interrelationship of sales, costs and net income is usually called cost-volume profit analysis. CVP analysis examines the response of profit changes in volume. It relies in linear cost analysis and on linear revenue assumptions. To gain understanding of CVP analysis, the common example of a firm which produce only single product will be used. The analysis will expand to cover firms with several products by multiple divisions (Fisher, et. al., 1997; 109).

CVP analysis consists essentially in examining the relationship between changes in volume (output) and changes in profit. The scope of CVP analysis is from the determination of the optimal output level of a single-product Department, to the determination of the optimal mix of large multi-product firm. All these decision really the simple relationship between changes in revenue and costs and changes in output levels (mixes). Output should be expanded or the output mix altered if the incremental revenue resulting from the changes exceeds the incremental costs of making the change. Thus, all cost, volume and profit analysis is characterized by their emphasis on cost and revenue behavior over ranges of output levels and mixes" ((Dopuch, et. al., 1974; 107).

Cost, volume and profit analysis includes the related concepts of (a) contribution analysis and (b) break even analysis. These concepts entered the mainstream of management accounting starting in the 1930's, with major emphasis in the 1950's. Both concepts rest upon the concept of cost variability (i.e. flexible or variable expenses budgets) contribution analysis involves a serial of analytical technique to determine and evaluate the effects on profits of a change in sales volume, sales prices, fixes expenses and variable expenses. Basically minus fixed variable expenses equals profit.

Break even analysis focuses on the breakeven point: fixed expenses divided by the contribution margin equals break even sales volume (the point at which profit is zero because revenue equals total cost). The result of break even analysis is usually graphed to show the relationships between revenue i.e. sales (Welsch, et. al., 2001; 531).

CVP analysis is concerned with examine the relationship between changes in volume and changes in total revenue and costs in the short term. Drury compared the economist's and accountant's models of CVP behavior. The major difference is that the total cost and total revenue functions are curvilinear in the economist's model, whereas the accountant's model assumes linear relationships. However, we have noted

that the accountant's model was intended to project CVP behavior only within the relevant range, where a firm is likely to be operating on constant returns to sales. A comparison of the two models suggested that, within the relevant production range, the total costs and revenue functions are fairly similar" (Colin Drury, 2004; 173).

2.2.2 A Brief Review of Previous Research Work

Dipendra Raj Dhakal (2003) has conducted a research entitled "Cost- volume -Profit Analysis as tools of profit planning and control, a case study of Gorakhkali Rubber Industry Limited". He has centered his study to examine CVP analysis of GRIL and to analyze CVP and it impact in profit planning. In this research, the researcher has focused the following objectives:

- To study the relationship of CVP analysis and its applicability as a tools budgeting.
- To analyze the variance between targets and the actual data of the industry.
- To study the sensitivity analysis of GRIL.
- To study the analysis considering the product mix of the products of company.
- To study cost classification practice of the company.

Dhakal's study is based on secondary data. The study period is has covered five years. Dhakal has pointed out various findings. They were as following:

- Out of total cost of GRIL, variable cost is almost 60% in every year which causes the low contribution margin.
- GRIL is in high interest brackets out of the total fixed costs almost 60% id to be paid for interest and the profitability of the company is greatly influenced by high fixed cost.
- The industry does not have any detailed and systematic practice of planning of cost which is one of the essential elements of profit planning and control.
- The financial position of the industry is not satisfactory. Gross profit margin ratio and net profit margin ratio are not satisfactory.

- Gril does not practice the scientific and appropriate cost classification technique. Costs are classified into fixed and variable as per the decision of the management.

Dhakal has recommended the following points:

- The industry doesn't have any practice of budgeting. Therefore, it is recommended that the company should develop the budgeting practice, which is one of the tools of profit planning. To improve the financial condition of the industry, it should develop annual(tactical) and long term profit plan.
- GRIL doesn't have separate costing department. Costing is done by traditional methods combining with judgment basis and no precise distinction has been made regarding the nature of the cost as fixed or variable, controllable and non-controllable, direct and indirect etc. So, the industry should establish a separate costing department if possible and cost classification must be made within a specific framework of responsibility and time.
- The industry should consider the cost-volume-profit relationship while fixing the price of its products.
- Price raising is not only one alternative to increase revenue or sales amount, controlling is necessary and by which wasteful expenses are automatically decreased.

Tenzin Namdak (2005) has conducted the research on the topic "CVP Analysis of DDC". The main objective of his thesis is to determine the relationship between, cost volume and profits and profitability of the DDC. In this research the researcher has focused the following objectives:

- To study the relationship between cost volume and profit as a tools of budgeting.
- To evaluate the profitability and sensitivity of DDC in relationship to sales.
- To analyze the productivity of the labor by single different productivity ratio.
- To analyze the CVP of the corporation and its impact on its profit planning.

This research covered the time period of five year from 2055/2056 to 2059/60. Research methodology was through primary as well are as secondary sources.

His major findings are as follows:

- DDC has been planning only on short term basis.
- The practice of CVP analysis has not been used yet.
- There is no practice of segregating cost into fixed and variable.
- Over utilization of capacity resulting in increasing operation and Maintains cost in every year.
- DDC has low contribution margin with high variable cost.
- DDC has also high fixed cost with low contribution margin, resulting in high BEP sales.
- The profitability of DDC is also very poor.

Madav Rijal (2005) has conducted a research entitled "cost-volume- profit analysis as a tools measure effectiveness of profit planning and control (A Case study of Nebico Private Limited)". He has centered his study to examine CVP analysis as tool in manufacturing industry and to analyze CVP and its impact in profit planning.

Rijal's study is based on primary and secondary data. The study period covers five years. Rijal has pointed out various findings. Some remarkable finding was as following.

- The Company's variable cost is high in proportion than fixed cost amount, which contribute for lower contribution margin.
- The company has fixed costs i.e. high salary and wages, technical and computer fees, depreciation interest, provident fund and subsidies.
- The profit trend of the company is not satisfactory.
- The company has no detailed of any systematic expenses plan. The fixed, variable and mix expenses plan is the necessary elements for profit planning and control.

He has recommended the following points:

Nebico Pvt. Ltd. has invested big amount in fixed cost for generating profit by maximum utilization, but analysis shows that poor utilization of fixed costs. Therefore, company should put stress on effective utilization of fixed costs.
There is no effective inventory policy, so recommended that use of the tools effectively for efficient inventory management, raw material handling and controlling system.

Company should consider about the product line to improve its profit. Market studies on demand, supply and pricing of biscuit and confectionery products should be carried out and loss oriented costs identify and control them.

Mohan Aryal (2006) has conducted research entitled "CVP Analysis as a tool to Measure effectiveness of PPC (A case study of Herbs production and processing Co. Ltd".

He has conducted the research to acquire the following objectives:

- To analyze the variance between target and actual sales of HPPCL.
- To evaluate the profitability and financial position of HPPCL.
- To analyze the cost-volume-profit of HPPCL.

He used primary as well as secondary sources of data and used seven years from (2054/055 to 2060/61).

His major findings are as follows:

- Budget was prepared on traditional method.
- HPPCL adopted traditional pricing method to determine price, which may not be appropriate into day's competitive market.
- The cost is roughly classified and that classification is not scientific and appropriate.
- HPPCL has high burden of management and administration expenses and interest on loan which is directly influencing the probability.

- Margin of safety of the company is in negative trend. So, company, couldn't sold properly and suffering from losses.

Bhusal (2006) has conducted a research entitled "Use of cost volume profit analysis to the plan in Nepalese manufacturing comprises (A case study of Bottlers Nepal ltd). The main objective of his study was to examine the use of CVP analysis to plan the profit in bottlers Nepal limited. The other specific objective of this study was:

- To study the present application of CVP analysis in Bottlers Nepal limited.
- To study the profitability and financial position of Bottlers Nepal limited.
- To analyze the CVP and its impact in profit ability of Bottlers Nepal limited.

His research was based on the secondary data and his majors findings in his research are as follows:

- The company hasn't maintained the broad and long range objective and periodic report and objective are limited to the high ranking official.
- Sales and production target aren't achieving because there isn't an effective foresting system.
- BNL has not proper practice of segregating the costs into fixed and variable or controllable and non controllable.
- There is no any effective plan for cost reduction and control and lack of effective cost control programmed.
- The profit trend of the company isn't satisfactory.

Doleshwor Paudel (2007), Has concluted a research entitled "Cost- Volume-Profit Ananlysis tool used to project : A Study of Salt trading Corporation Limited". In this research, the researcher has the following objectioves:

Objective of the Study:

- To analyze the cost and profit and loss of STCL
- To study the relationship of Cost Volume Profit.
- To analyze the impact of Cost Volume Profit of the company on productivity.

- To provide suggesstion and recommendation for improving the condition of STC.

Findings of the Study:

- Total Slaes of the coporation were unstable.
- Expreses of STCL were fluctuated variable cost as well as fixed cost increased or decreased during the period.
- Form correlation analysis, it was found that there were high degree of positive correlation between sales and net profit. Change in sales made change in profit but change wasn't in the same ratio.

Recommendations of the Study:

- There are many export and skilled manpower but CVP analysis is not used. Semi- variable costs are not segregated systematically into fixed or variable. It is essential to classify the cost for controlling purpose also.
- STCL should increase the proportion of fixed cost and should reduce the proportion of variable cost on its cost structure to be a leverage Organization.
- New market areas should be identified for the coverage increase of company.

Rajan, Khakurel (2008), has conducted a research entitled "Cost- Volume Profit Analysis of Nepal Lever Limited: Unilever Nepal Limited". In this research, the researcher has focused the following objectives:

Objective of the Study:

- To find out the level of turnover with cost component.
- To find out level of profit of the company.
- To find out level of Contribution margin.
- To find out level of Ratio be margin.
- To find out impact of changes in various factor like selling price, VC and FC on BE and Profit.

- To enhance the capability among ourselves regarding cost analysis segregation.

Findings of the Study:

- The product having less contribution margin has been duly dropped from the production repacking and sales.
- Coefficient of Variation of actual sales in less than BEP sales. So, actual sales is less volatile.
- The relationship between sales and profit and less is not significant. There is no clear relationship, so it can be concluded at pattern of FC and VC is not consistent.

Recommendations of the Study

- To increase the profitability, sales volume should be increased and unproductive expenses should be decreased.
- NLL should maintain if can't improvise its systematic and scientific sales plan by considering different factors which may affect sales. Sales forecasting should be done on realistic ground.
- Domestic product mix needs to be reshuffled taking into consideration the contemporary consumers demand.

CHAPTER - III

RESEARCH METHODOLOGY

The methodology for obtaining above different objectives consists of research design, source and types of data, population and sample, data collection technique and data analysis.

3.1 Research Design

In order to make any type of research, planned and systematic research design is necessary which fulfill the objective of the study. Generally, research design means defining procedures and techniques which guide to study and propound ways for research validity. A research design is the arrangement of condition for collection and analysis of data in such a manner that it aims to combine relevant to the study purpose with economy in procedures. This study attempts to show the relationship among cost, volume and profit and various functional budgets for their achievement and effective application within the conceptual framework of profitability for solving the problems that have accused in DDC. Therefore, this study is closely related to various accounting statements as well as the actual results of the budget. These information and data are presented by analytical method. But the qualities aspect of the research such as effectiveness of CVP in the public enterprises i.e., DDC, views of various managers and personnel and the theoretical prescriptions are explained in word wherever necessary. Therefore, analytical as well as descriptive research has been applied as the research design for the study.

3.2 Sources and Types of Data

The data used in the study is secondary and it has been collected from concern authority. Secondary data has been taken mainly from Annual reports, Auditor's reports, Profit and loss account, Balance sheet, previous thesis and other relevant Published and Unpublished documents of DDC and other publications data.

3.3 Population and Sample

There are altogether 36 PEs, which have been considered as total population. Out of 36 PEs, Dairy Development Corporation is selected as sample using judgmental basis.

3.4 Data Analysis Tools

Collected data from primary or secondary sources are analyzed using the following accounting and statistical tools.

3.4.1 Accounting Tools

CVP analysis was included the following technique:

1. Contribution Margin (CM) = Sales – Variable Cost
2. Contribution Margin Ratio $= 1 - \frac{\text{Variable cost}}{\text{Sales}}$
3. Break Even Point (BEP) in units $= \frac{\text{Total fixed cost}}{\text{SPPU Z VCPU}}$
4. Break Even Point (BEP) in Rs. $= \frac{\text{Total fixed cost}}{\text{CM Ratio}}$
5. Break Even Point (%of Capacity) $= \frac{\text{BEP in units/Rs}}{\text{Total Capacity in Units/Rs}}$
6. Cash BEP (in Rs) $= \frac{\text{Fixed cost Z non cash outlay}}{1 \text{ Z} \frac{\text{variable cost}}{\text{sales Z non cash outlay}}}$
7. Safety Margin (in units) = Actual Sales Units – BEP in unit
8. Safety margin (in Rs) Actual Sales- BEP in Rs
9. Margin of safety Ratio = Actual Budgeted Sales-BE Sales
10. Net profit margin Ratio $= \frac{\text{Net Profit}}{\text{Sales}} \times 100\%$

The accounting tools are contribution margin ratio, BEP Charts, margin of safety, sensitivity analysis etc.

3.4.2 Statistical Tools

a) Arithmetic Mean

Arithmetic mean or simply a 'Mean' of a set of observation is the sum of all the observation divided by numbers of observation. Arithmetic mean is also known as the arithmetic average (Bajacharya, 2057;101).

Arithmetic mean denoted by

$$\bar{X} = \frac{X}{N}$$

b) Standard Deviation

The standard deviations are the absolute measure of dispersion in which the drawbacks present in other measures of dispersion are removed. IT is said to be the best measure of dispersion as it satisfies most of the requisites of a good measure of dispersion Standard deviation is defined as the positive square root of the mean of the square of the deviations taken from the arithmetic mean (Bajracharya, 2057:177).

$$\text{Standard Deviation } (\sigma) = \sqrt{\frac{\sum(x-\bar{x})^2}{N}}$$

c) Coefficient of Variation

The coefficient of dispersion based on standard deviations multiplied by 100 is known as the coefficient of variation (C.V). If x be the arithmetic mean and, the standard deviation of the distributions, then the C.V is denoted by

$$\text{C.V.} = \frac{\sigma}{\bar{X}} \times 100\%$$

It is independent of units, so two distributions can bitterly be compared with the C.V. for their variability. Less the C.V. more will be the uniformity and consistency.

d) Probable Error (PE)

The probable error is used to measure the relationship and test of significance of correlation coefficient. It is calculated by the following formula.

$$P.E = 0.6745 \times \frac{1-r^2}{\sqrt{n}}$$

e) Correlation Coefficient

Two variables are said to have correlation when they as so related that the change in the value of one variable is accompanied by the change in the value of the other. The important thing that is to be noted here is that correlation analysis only helps to determine the extent to which the two variables are correlated but it does not tell us about cause and effect relationship. Though, there is a high degree of correlation between two variable one cannot say which one is the cause and which one the effect (Bajracharya, 2057; 250).

$$r_{12} = \frac{\sum x_1 x_2}{\sqrt{\sum x_1^2}\sqrt{x_1^2}} \qquad x_1 = x_1 Z\bar{x}_1 \text{ and } x_2 = x_2 - \bar{x}_2$$

f) Regression Analysis

It is used as a tools of determine the strength of relationship between two variables.

Regression equation of actual sales(y) depends upon the time (x), which is expressed as

$$Y = a + bX$$

The value of a constant and b (variable) can be obtained by solving following two equations:

$$\sum y = na + b\sum x$$

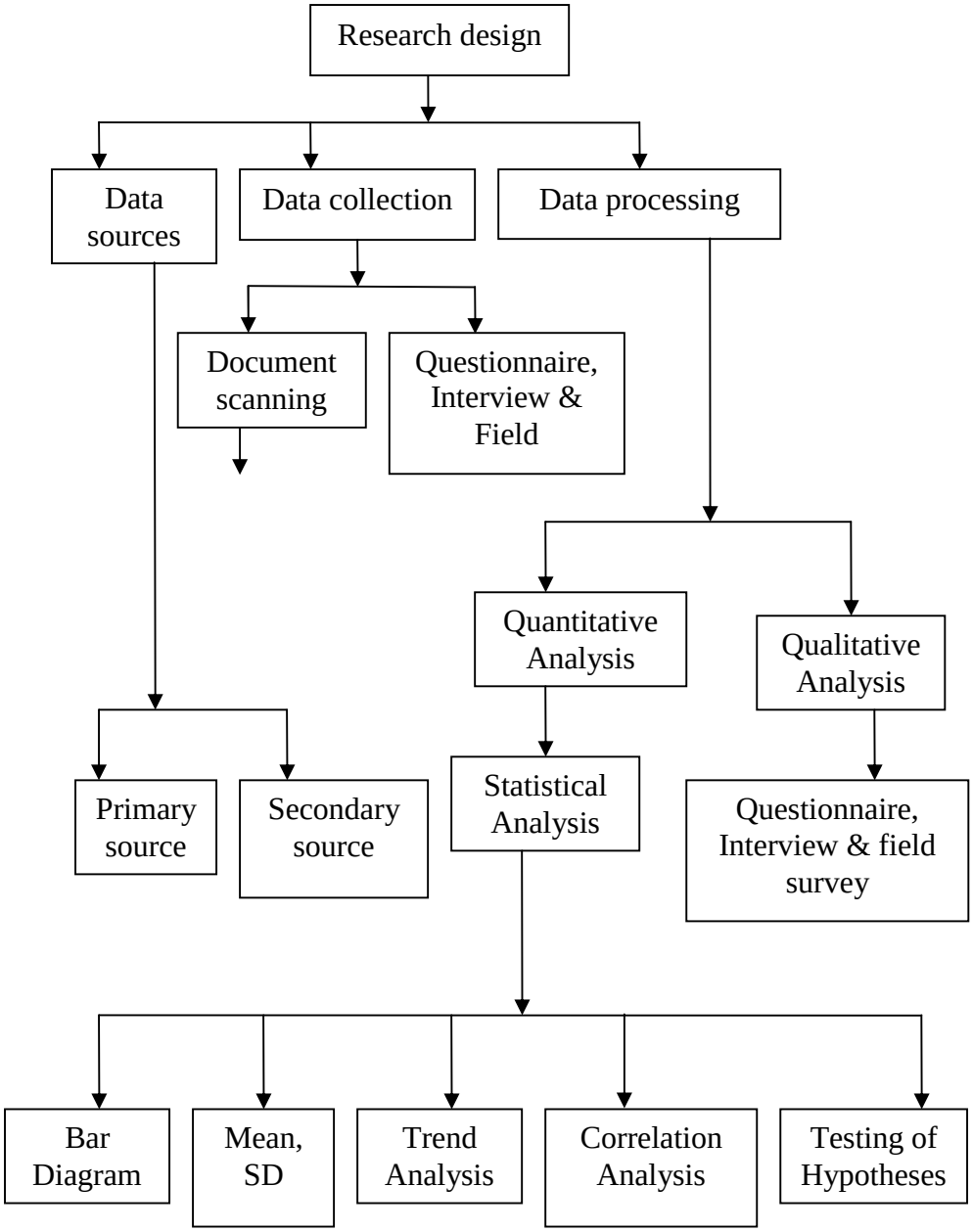
$$\sum xy = a\sum x + b\sum X^2$$

g) Hypothesis Testing

Hypothesis means a statistical statement about the value of one or more parameters of the population. After setting the hypothesis, it is necessary to test the reliability of such statistical statement. For this purpose an experiment is conducted by using sample information and hypothesis, is rejected of the results obtained are improbable under this hypothesis. If the results are not improbable, the hypothesis is accepted. The procedure of drawing such conclusion based on sample information is known as testing of hypothesis (Sthapit, 2007:221).

In the research, the researcher has been testing the Hypothesis, between sales revenue and cost and total income and cost.

At last, the summary of the research methodology can be shown in the tabular form as follows (Wolf and Pant, 2005 ;).


Research design
Data sources
Data collection
Data processing
Document scanning
Questionnaire, Interview & Field
Quantitative Analysis
Qualitative Analysis
Primary source
Secondary source
Statistical Analysis
Questionnaire, Interview & field survey
Bar Diagram
Mean, SD
Trend Analysis
Correlation Analysis
Testing of Hypotheses

CHAPTER - IV
DATA PRESENTATION AND ANALYSIS

CVP analysis has become a powerful instrument in management decision making especially cost control and profit planning. The cost volume profit planning is a specific way of presenting and studying the relationship between costs, volumes and profits.

The basic objective of the study is to examine impact and use of CVP analysis on profitability and identify the areas where the CVP analysis could be applied to strengthen the DDC. This chapter presents the analysis and interpretation of the data.

This study has tried to cover the activities of DDC for past five years (i.e. 2058/59 to 2062/63). The information's which has been collected and from DDC are given and analysis of data on similarly pages.

4.1 Secondary Data Analysis

4.1.1 Sales Plan Analysis

An analysis of past sales has been made to find out previous sales trend and to forecast the possible future the trend of DDC. The following table presents the budgeted and actual sales achievement from the fiscal years 2058/59 to 2062/63.

Table 4.1

Total Budgeted and Actual Sales Value

In Rs (000000)

Year	Budgeted	Actual	%Achievement
2058/59	164678	154824	94.01
2059/60	167250	159591	95.42
2060/61	161290	153581	95.22
2061/62	169871	158966	93.58
2062/63	163340	153634	94.05

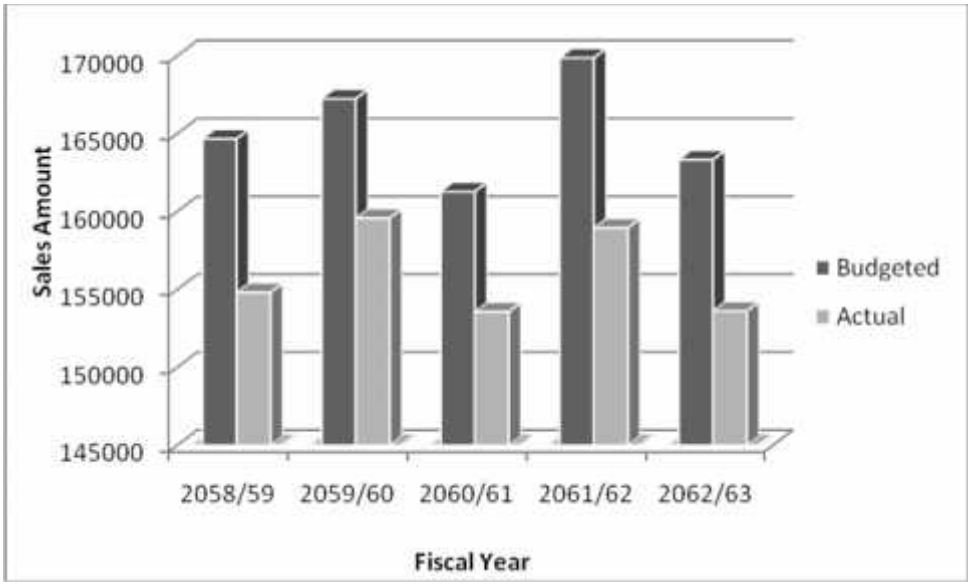
Source: - DDC Annual Report

Analysis of the above sales figures show that the actual sales of the DDC are always less than budgeted sales. In the fiscal years 2058/59, 2059/60, 2060/61, 2061/62, and 2062/63,. The percentage of achievement is 94.01%, 95.42%, 95.22%, 93.58%, and 94.05% respectively of estimated sales. The comparison of sales plan and actual achievement shows that, there is lacks of experts planner and lack of good researcher of market areas where milk and milks products can be sold.

The budgeted sales and actual sales also can be shown by graphical presentation as follows:

Figures 4.1

Comparison between Budgeted and Actual Sales Values



In order to find out the nature of variability of budgeted sales and actual sales of different years, it is necessary to calculated the arithmetic mean, standard deviation and co-efficient of variation.

Table 4.2
Summary of Statistical Calculation

Detail	Budgeted sales 'X' Rs in (0000)	Actual sales Rs in (0000)
Mean	165285	156119
Standard deviation	2884	4243
Coefficient of Variation(C.V.)	1.74%	2.72%
Correlation Coefficient	.5823	
Correlation of determination	.039601	
Probable error of correlation	.1990	

Source : From Appendix

The above table shows the co-efficient of variation of Budgeted (C.V.X) sales and Actual sales (C.V.X). A distribution with smaller C.V is said to be more homogeneous or uniform or less variable than other. It shows that the budgeted sales have more homogeneous or uniform or less variable then the actual sales, which indicates the low efficiency of planner. The actual sales have more heterogeneous or more variable than the budgeted sales with high percentages of co-efficient of variation.

For the purpose of calculating 'r' Budgeted figures denoted by x are assumed to be independent variable and actual figures denoted by 'y' are assumed to be dependent variable. It is assumed that actual sales will increase when the Budgeted sales increase.

Probable error (P.E.) of the correlation co-efficient (r) is the basis for the interpretation of its value. In other word the significant of 'r' is tested with probable error of 'r'. The value of 'r' less than 6P.E. is 0.580< 1.194. It means 'r' is insignificant.

Regression line can also be defined to show the degree of relationship between budgeted sales and actual sales and to forecast or estimate the possible actual sales with given budgeted figures. For this purpose, actual sales have been assumed to be dependent up on the budgeted sales. It can be concluded that the DDC has been

approximately success to meet the objectives because; there is no vast difference between budgeted sales and actual sales.

So the regression line of actual sales 'y' on budget sales 'x' is as follows (From Appendix).

We have

$$Y - \bar{y} = \gamma \frac{\sigma y}{\sigma X}(X - \bar{X})$$

$$\text{Or, } y\text{-}156119 = 0.5823 \times \frac{4243}{2884} \times (x\text{-}165285)$$

$$\text{Or, } y\text{-}156119 = .8567X - 141598$$

$$\text{Or, } y = 14521 + .856X$$

This regression equation shows positive relation between budgeted and actual sales i.e. .856 lakhs will increase the actual sales the budgeted sales Rs per lakh. With the help of these regression equations, we can estimate the expected sales achievement for the running period i.e. fiscal year 2063/2064 with the given value of target sales (x).

Budgeted sales for 2063/64 = 165000 lakh

The expected sales achievement

$$Y = 14521 + .856X$$

$$= 14521 + .856 \times 165000$$

$$= 155761 \text{ lakh.}$$

4.1.2 Cost of Dairy Development Corporation

DDC has classified the costs in four categories which are,

4.1.2.1 Collection Cost

It is related with production related costs i.e. of purchase of milk, transportation fuel, chemical cost, repair and maintenance rent, telephone office welfare fund etc.

4.1.2.2 Processing Cost

It is related with processing time period cost. I.e. skim milk power, raw material, packing, chemical, cheese related cost, wages, bonus insurance, fees, fax, telephone, Bank commission cost.

4.1.2.3 Selling Costs

It is the cost incurred for selling and distribution of the product and includes cash discount, transportation, export expenses, loading, unloading, discount in sales, sales promotion, sales bonus etc.

4.1.2.4 Administration Cost

They are related to management and include TADA, printing and stationery, communication expenses, donation, legal expenses, meeting allowances, training and other expenses, bank commission, office expenses, repair and improvement cost, advertisement costs, insurance etc.

Each of the costs has both fixed costs and variable costs included in it. As per the nature and information of DDC, costs are classified fixed and variable. Under the appendix (I), the researcher has not got semi-variable cost because DDC has not been classified semi- variable cost. The corporation does not have any particulars methods or technique to classify the costs into variable and fixed. Therefore, the costs that are classified for four purposes are purely based on judgmental approach.

4.1.3 Variable Costs Analysis of DDC

Variable costs are those costs which various in direct proportions to the change in output or activities level but per unit/ lit/kgs, are constants within a certain period.

Variable costs sheet under fiscal year 2058/59 to 2062/63 are presented in the following table:

Table 4.3

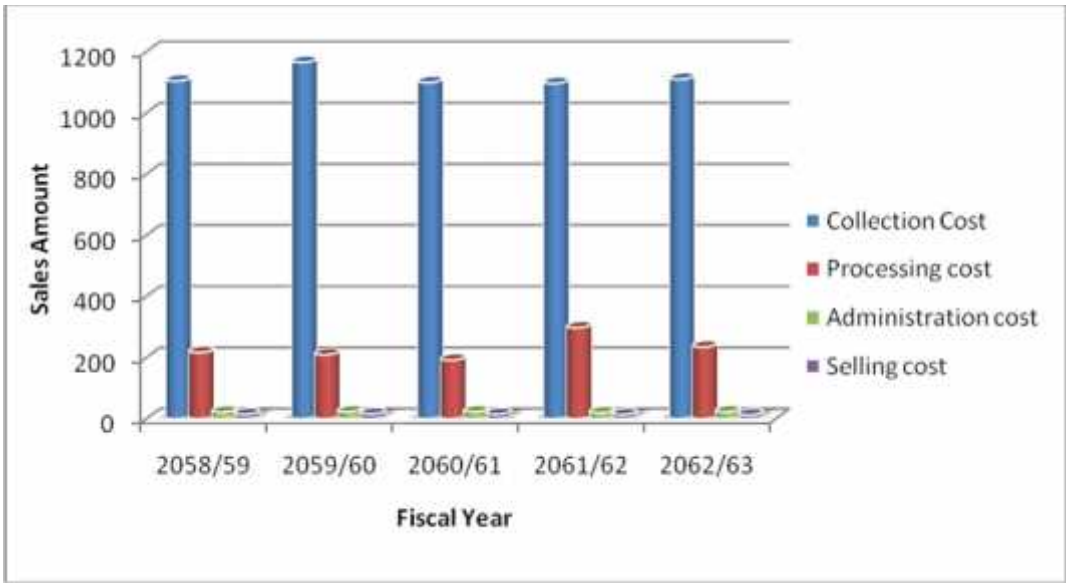
Actual Function Wise Cost its Index and ARPC

Years	Collection cost				Processing cost				Administration cost				Selling cost			
	Amount	%	Index	ARPC	Amount	%	Index	ARPC	Amount	%	Index	ARPC	Amount	%	Index	ARPC
2058/59	1105	19.80	100	-	217	19	100	-	22	20	100	-	15	21	100	-
2059/60	1166	20.90	101.055	1.055	210	18	96.78	(3.22)	23	21	101.45	1.45	16	21	10.67	1.67
2060/61	1100	19.72	99.55	(1.505)	192	17	88.48	(8.3)	23	21	101.45	-	15	21	-	-
2061/62	1097	19.66	99.28	(.27)	298	26	101.38	12.9	20	18	90.90	(10.55)	14	19	93.99	(8.34)
2062/63	1111	19.20	101	1.72	235	20	101.83	.45	23	21	101.45	10.55	13	18	86.67	(6.66)
Total	5579				1152				111				73			

Source:-DDC Annual Report

Figure 4.2

Actual Variable Function Wise Cost its Index and ARPC



Above table 4.3 shows that there are variations of variable cost i.e. collection, processing, and administration and selling cost. All the variable cost is in fluctuated trend. In the above table, collection cost increases in 2059/60 than 2058/59. But under the fiscal year 2060/61, 2061/62 collection cost decrease and in the fiscal year 2062/63 collection cost increase more than basic year of 2058/59. Index and ARPC have been calculated on basis of the basis year 2058/59. Collection cost is more than other cost because milk and raw material of milk are collected from outside.

Processing cost is decreased to fiscal year 2060/61 on the basis of 2058/59 and fiscal year 2061/62, 2062/63 has been increased by ARPC 37.33and 8.29 respectively. Administration cost is increased by 4.55% in fiscal years 2059/60 and 2060/61 than in the basic fiscal year 2058/59. But in fiscal year 2061/62, administration cost decrease by 9.1% than in the fiscal year 2058/59. Again in fiscal year 2062/63 it has been increased by 4.55% than basis year 2058/59.

A trend of selling cost is also fluctuating .In fiscal year 2059/60, it has been increased by 6.67% than in fiscal year 2058/59. There is constant in fiscal year 2060/61and 2062/63 respectively basis of the FY 2058/59. It has been decrease by 6.675, 13.33%

in the FY 2061/62 than the basis year 2058/59. It can be concluded that collection cost is more than other cost because the DDC collects the milks from outside. But other costs are lesser than collection cost because there is good management in processing and administration system. The DDC has focused only valley area, so selling cost is lesser than other costs.

4.1.4 Fixed Cost Analysis of DDC

Fixed cost is those costs which remain constant in total despite the changes in the level of activity within every year (within relevant ranges). As the production units increases fixed cost per unit decrease. It is because some cost will be dispersed income production units, but fixed costs in totaling may vary for different FY. The fixed cost of DDC is presented in the table below:-

Table 4.4

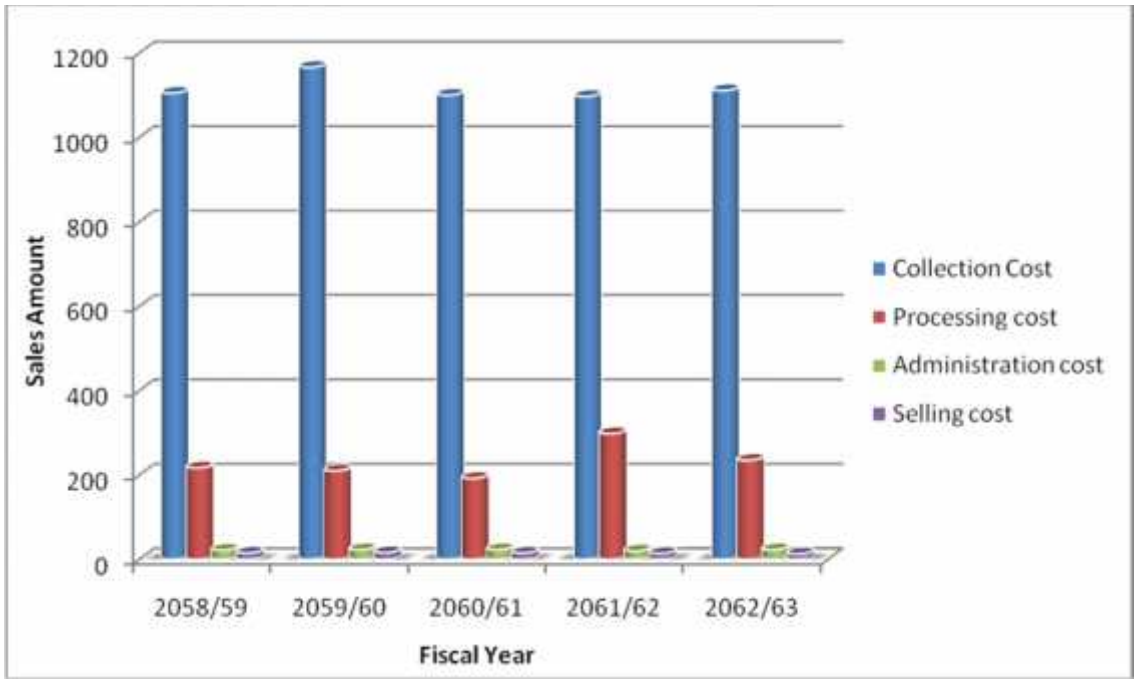
Function -Wise Cost, Its Index and ARPC of DDC

Year	Collection Cost				Processing Cost				Selling Cost				Administration Cost				Depreciation				Interest			
	Amount	%	Index	ARPC	Amount	%	Index	ARPC	Amount	%	Index	ARPC	Amount	%	Index	ARPC	Amount	%	Index	ARPC	Amount	%	Index	ARPC
2058/59	37	22	100	-	56	22	100	-	17	19	100	-	68	23	100	-	30	20	100	-	12	32	100	-
2059/60	33	20	89	(11)	61	23	101.83	1.83	18	20	101.05	1.05	64	21	94	(6)	29	19	96	(4)	12	32	100	-
2060/61	28	17	76	(13)	42	16	75	(26.83)	16	18	94	7.05	46	15	61	(27)	30	20	100	4	4	10	33	(67)
2061/62	35	21	95	19	49	20	88	13	21	23	101.23	7.23	62	21	101.96	34.96	29	19	96	(4)	5	16	42	9
2062/63	33	20	89	6	48	19	86	(2)	18	20	101.17	(0.06)	60	20	88	(13.96	31	22	101.33	5.33	4	10	33	(9)
Total	166				256				90				300				149				37			

Source: DDC Annual Report

Figure 4.3

Fixed Cost, its Index and ARPC of DDC



The function wise i.e. collection cost, processing, selling and administration, depreciation, interest cost of DDC for the five year has been presented in the above table. The table also shows the index and annual rate of percent change cost for five years. Index is calculated assuming the FY 2058/59 as base years.

The above table shows that the collection cost is fluctuated tends. Collection cost has been decreased in comparison to FY 2058/59. In FY 2060/61 has the highest negative ARPC, which means Collection cost decreased by 13% in 2060/61 than as comparison of other years.

Taking the year 2058/59 as a base year processing cost is found fluctuated trends during the study periods. The highest processing cost is incurred in FY 2059/60. Processing cost decrease in 2060/61 than comparisons to the basis year 2058/59.

The selling expenses is also fluctuate trends. Selling expenses pattern is found to increase 101.2%. ARPC is the highest in FY 2061/62, in which the selling expenses have been increased by 7.23% from the previous year.

Taking the year 2058/59 as the base year, administration cost pattern is found fluctuated. The administration cost is increased by 101.96% in 2061/62 in which the administration cost has been increased by 34.96% from previous year. FY 2061/62 has highest negative ARPC, which means the administration cost decrease by 27% as the compared to other years.

Depreciation cost pattern is also found fluctuated. The depreciation cost increased by 101.33% in 2062/63 in which the depreciation cost has been increased by 5.33% from previous years.

Interest cost has more fluctuated trends within FY 2058/59 to 2062/63. In FY 2060/61,there is highest negative ARPC i.e. 67% than previous year. It means interest cost has been decreased by 67% than the previous year. It can be conclude that processing cost is higher cost than other cost, it means there is lack of management to decrease in processing cost. Collection, selling administration Depreciation, interest cost are decreasing order from fiscal year 2058/59 to 2062/63 it means DDC performs the good management to reduces cost system.

4.1.5 Profitability Analysis of DDC

Since the corporation suffering the loss from the beginning years and other study period years i.e. 2058/59, 2061/62, 2062/63. For this reason, it is not relevant to analyze only the net profit of the DDC. For this reason gross profit and operating profit are also analyzed apart from net operating profit. Gross profit is the amount left after deducting cost of sales from total sales revenue. Operating profit has been derived after adding gross profit with other income and then deducting selling & distribution and administration cost.

The net operating profit of the DDC is calculated by subtracting interest, depreciation, employees' welfare fund which is shown in appendix

Table 4.5

Profitability Analysis of DDC

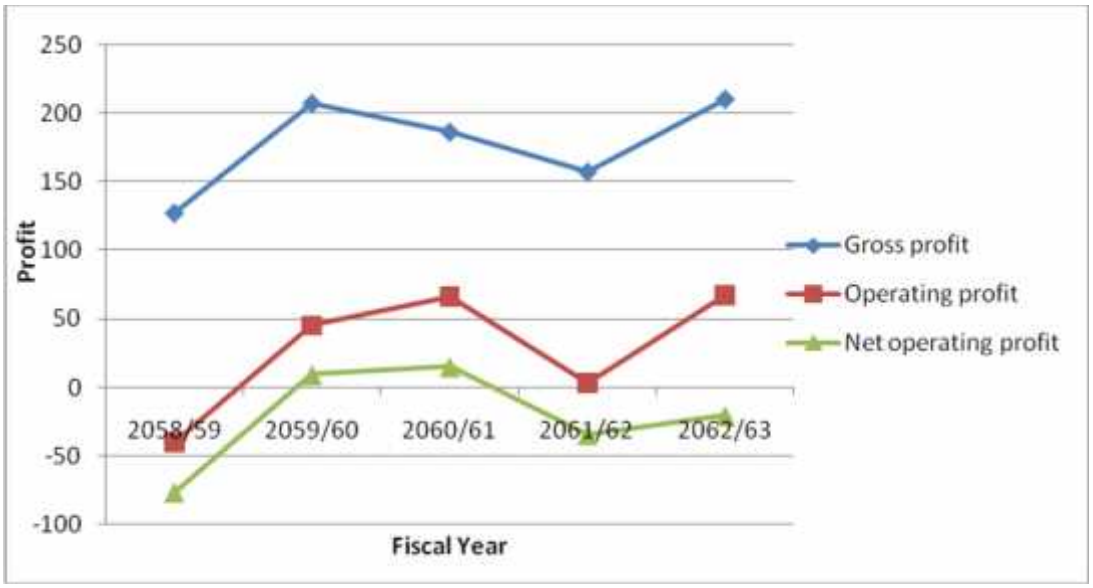
Rs in (000000)

Years/particulars	Gross profit	Operating profit	Net operating profit
2058/59	127	(40)	(77)
2059/60	207	45	9
2060/61	186	66	15
2061/62	157	3	(35)
2062/63	210	67	(21)

Source: DDC Annual Report

Figure 4.4

Profitability Analysis of DDC



The corporation is suffering from net loss from FY 2058/59, 2061/62; 2062/63.There is little profit in FY 2059/60, 2060/61.

There are numerous aspects for continuous loss which are: lack of experts, small market size, day to day increase in market price, unstable environment, high competition, little support of government, fluctuation price of raw material, increasing cost etc.

Table 4.6

Income Statement for the year 2062/63

Rs in (000000)

Particulars	Rs.
Sales	1536
Less: cost of sales	1326
Gross profit	210
Add; other income	17
Total GP including other income	227
Less: fixed cost	
Collection	33
Processing	49
Administration	18
Selling	60
Operating profit	67
Less: other fixed cost	
Interest	4
Depreciation	31
Employees welfare fund	53
Net operating profit	(21)

Source: - DDC Annual Report

4.1.5.1 Gross Profit Margin Ratio

One of the most common ratios in operations analysis is the calculations of gross profit as percentages of net sales. Corporation should have a reasonable gross profit margin to ensure adequate coverage for operating expenses of the firm and sufficient return to the owners of the business. Gross profit ratio expresses the relationship between gross profit and sales and is usually expressed in percentages. The gross profit should be adequate to cover operating expenses and to provide charge to pay dividend and build up reserves and it is calculated by dividing gross profit by net sales as follows:

$$\text{Gross Profit Margin Ratio} = \frac{\text{Gross profit}}{\text{Sales}} \times 100\,\%$$

Gross profit indicates the degree to which the selling price of goods per unit may decline without resulting losses to the firm. A high gross profit to sales is a sign of good management as it impels that the cost of production of the firm is relatively low. A relatively low gross profit ratio is definitely a danger signal and requiring a careful and detailed analysis of the factors responsible for it.

Table 4.7

Gross Profit Margin from 2058/59 to 2062/63

(In Rs '000000)

Year	Sales	Gross profit	Gross profit margin ratio (%)
2058/59	1548	127	8.20
2059/60	1596	207	12.96
2060/61	1536	186	12.10
2061/62	1590	157	9.84
2062/63	1536	210	13.67

Source: - DDC Annual Report

The above Gross profit ratio represents comparatively low gross profit margin which cannot be assumed as good management.

4.1.5.2 Net Profit Margin Ratio

This ratio measures the overall profitability of the corporation by establishing relationship between net profit and sales. The relationship net profit and sales indicates management's ability to operate the business with sufficient success not only to cover the cost of production, operating expenses of business and cost of borrowed fund but also to leave a margin of reasonable compensation to the owners for providing their capital as risk. This ratio is calculated by dividing net profit after taxes and interest by sales and expressed as percentages of net sales as follows:

$$\text{Net Profit Margin Ratio} = \frac{\text{Net profit}}{\text{Sales}} \times 100\,\%$$

Net profit margin ratio indicates of compensation left to the owners for providing return capital, after all expenses have been met. It helps in determining the efficiency

with which the affair for the business is being managed. A high net profit margin ratio enables the corporations to withstand adverse economic condition and a low margin will have opposite implication.

Table 4.8

Net Profit Margin from 2058/59 to 2062/63

(In Rs '000000)

Year	Sales	Net profit	Net profit margin ratio (%)
2058/59	1548	(77)	(4.97)
2059/60	1596	9	.54
2060/61	1536	15	.97
2061/62	1590	(35)	(2.20)
2062/63	1536	(21)	(1.37)

Source: - DDC Annual Report

This result shows that the company has suffered the huge amount of net loss and this is not indication of efficiency of the business and utilization of resources. But still this figure indicates that one rupees increase in sales helps to further increase by loss Rs .01367 in (000000) in 2062/63.

4.1.6 Cost Volume Profit Analysis of DDC

Cost volume profit is a management accounting tool to show the relationship between the ingredients of profit planning. CVP analysis is the technique that explores the relationship which exists among costs, revenue of output level and resulting profits. (cost–volume -profit) analysis can be extended to cover the effects on profit percent changes on selling price or service fees, cost, income tax rate and product mix. The aim of CVP analysis is to have affair estimate of total cost, total revenue and profit at various sales volumes. CVP analysis provides the management with a comprehensive overview of the effects on revenue and costs of all kinds of sales volumes and cost. CVP analysis helps to determine the minimum sales volume to avoid losses and sales volume at which the profit goal of the company will be achieved. And this analysis is possible only when the management has information about variable cost and fixed cost and selling of the product sales revenue.

Table 4.9

Income Statement for the year 2058/59 to 2062/63

Rs in (000000) round figures

Particulars/Years	2058/59	2059/60	2060/61	2061/62	2062/63
Sales revenue	1548	1596	1536	1590	1536
Less: variable costs					
Cost of sales (collection + processing + beginning-closing stock)	1384	1350	1312	1399	1289
Selling cost	22	22	23	20	24
Administration cost	15	16	15	14	13
Total variable cost	1421	1389	1350	1433	1326
Contribution margin	127	207	186	157	210
Less: fixed cost					
Collection	37	33	28	35	33
Processing cost	56	61	42	49	49
Selling cost	17	18	16	21	18
Administration cost	68	64	46	62	60
Depreciation cost	30	29	30	29	31
Interest expenses	12	12	4	5	4
Employees welfare fund	(5)	(5)	17	4	53
Total fixed cost	215	212	183	205	248
Less: other income	11	14	12	13	17
Adjusted fixed cost	204	198	171	192	231
Net income	(77)	9	15	(35)	(21)

Source: - DDC Annual Report

4.1.7 Analysis of Contribution Margin Ratio, BEP and Margin of Safety

Contribution margin is the difference between sales amount and the variable costs. It is an amount which is equal to fixed cost plus the profit. Contribution margin can be written in the formula form as, CM = sales revenue – variable cost. Contribution margin ratio is also knows as profit volume ratio, P/V ratio or C/M ratio.

$$\text{Contribution Margin Ratio (CM Ratio)} = \frac{\text{Contribution Margin}}{\text{Sales}}$$

Table 4.10

Analysis of Contribution Margin Ratio, BEP and Margin of Safety

Rs in (000000)

Particulars/ years	2058/59	2059/60	2060/61	2061/62	2062/63
Sales	1548	1596	1536	1590	1536
Contribution margin	127	207	186	157	210
CM ratio or P/v ratio(CM/sales)	.082	.129	.12	.098	.1367
BEP in Rs (FC/ P/v ratio)	2623	1643	1525	2092	1814
BEP as percentage of sales	168.79	102.97	99.58	131.57	118.09
Margin of safety(AS-BE sales)	(1074)	(947)	11	(502)	(278)
MOS as percentage of sales	(68.79)	2.94	.72	(31.760	(18.09)

Source: - DDC Annual Report

From the above table P/V ratio is in fluctuating trends for the five FY. The table clearly shows that P/V ratio is high in 2062/63 and low in 2058/59.

Margin of safety except FY 2060/61 are negative because it has not reached the breakeven point yet. Higher the margin of safety safer the business.

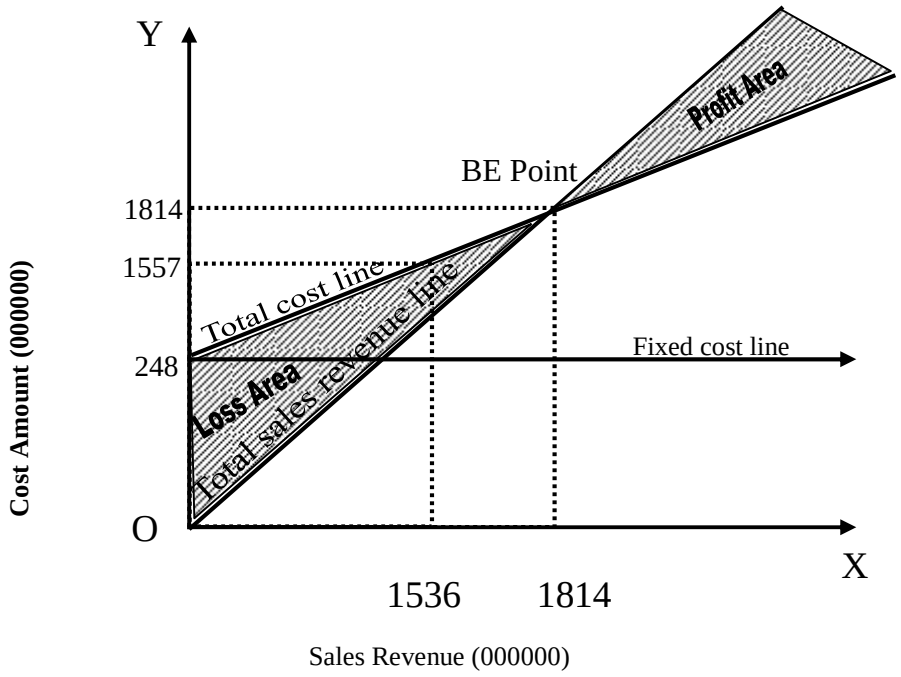
The point at which the corporations make neither profit nor loss is termed as BEP. At this point the total sales revenue is just sufficient to cover both variable and fixed costs. Following computations shows the BEP in Rs for the FY 2062/63:

$$\text{BEP in Rs} = \frac{\text{Fixed cost}}{\text{P/Vratio}} = \frac{248}{.1367} = \text{Rs } 1814000000$$

The computation can be represented in the graphical form which is as follows:

Figure 4.5

Analysis of Contribution Margin Ratio, BEP and Margin of Safety



A simple break even chart of DDC for the fiscal year 2062/63 is shown in above figure in which sales revenue is shown in x- axis and cost amount is shown in y-axis.

From the above figure the total fixed cost of the DDC is Rs 248000000. It is parallel to x-axis since the variable cost directly varies with unit of production therefore, it is scoping upward to right side. If no production is made variable cost is zero but still the corporation should bear the fixed cost Rs 248000000. Total sales revenue curve originates from the origin because sales revenue is zero when there is no sales unit increases. The equilibrium point of the graph where, total sales revenue and total costs cross with each other is known as breakeven point. Below this point, the corporation cannot bear it cost as a result it suffers from loss. And above this point, sales revenue exceeds the total cost which provides the profit of DDC. In the above figures DDC has

not even reached at the break even condition. Total cost Rs 000000 exceeds the total sales revenues Rs 1536, resulting the loss of Rs 21 for the year 2062/63.

4.1.8 Relationship between Sales Cost and Profit

Table 4.11

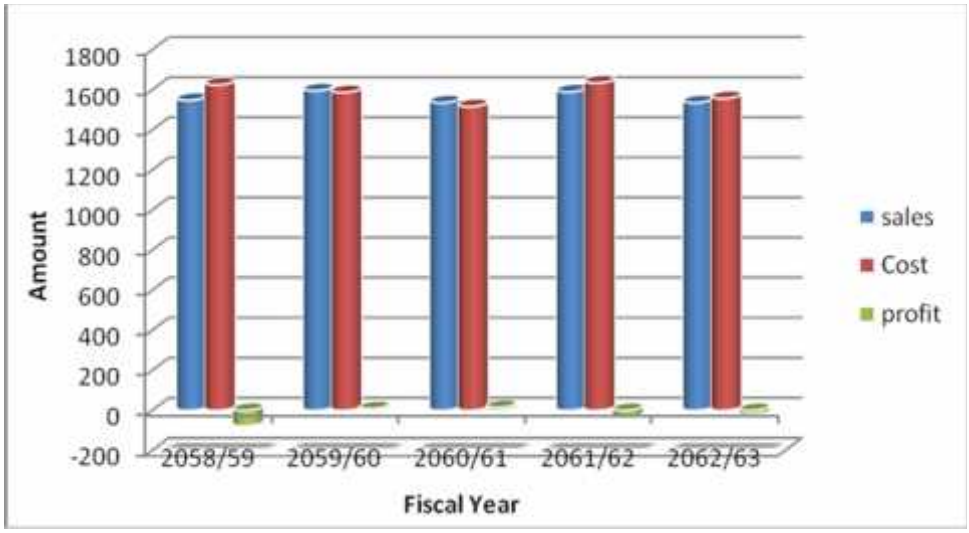
Relationship between Sales, Cost and Profits

(In Rs 000000)

Year	Sales	Cost	Profit	%of profit on sales	% of profit on cost
2058/59	1548	1625	(77)	(4.97)%	(4.73)
2059/60	1596	1587	9	.563	.567
2060/61	1536	1517	15	1.24	1.25
2061/62	1590	1635	(35)	(2.20)	(2.14)
2062/63	1536	1557	(21)	(1.36)	(1.34)

Figure 4.6

Relationship between Sales, Cost and Profit



In the above table and figure, the trend of profit is found fluctuate during FY 2058/59 to 2062/63. There is highest negative relationship between sales and profit in FY 2058/59 it means if there is 1% increase in sales, it decreases 4.97%. in profit.

Profit on cost is also is fluctuating trends. In fiscal year 2058/59, there is highest negative relation between cost and profits. It means if there 1% increase in profit, cost is increased by is 4.73.

The researcher has analyzed the relationship between sales, cost and profit by the multiple regression equations where Profit (X_1) is dependent variable and sales (x2) and cost (x3) respectively are independent variable .the calculated multiple regression equation for the five years is :

$x_1 = 1.049x_2 - .9358x_3$

This multiple regression equation shows that if the sales increase by 1.049 lakh, it will increase the profit by Rs per lakh and if the profit increases by Rs per lakh, cost will be decreased by Rs .93583 lakh. It means, there is inversion relation between cost and profit. It can be concluded DDC should be able to increase the sales by 1.049% and also should be able to reduce the cost by .9358% to increase the profit of DDC by 1%.

4.1.9 Correlation of Coefficient

Correlation coefficient is one of the most important statistical tool used to analyze the degree of relationship or association between two or more variable i.e. sales, cost and profit.

Table 4.12
Correlation Table

Between	Zero level correlation(r)	Probable error	6 P.E
Sales revenue and total cost	.81	.1035	.621
Total cost and total income	-.7358	.1380	.828
Variable and fixed cost	-.1039	.2978	1.7868

4.1.9.1 Correlation Coefficient between Sales and Cost

The value of correlation coefficient between sales and cost is .81. There should be positive correlation between sales and cost. In other word, the cost should increase as the budgeted sales increase and vice versa.

For the purpose of calculating correlation coefficient, sales figures denoted by x are assumed to be independent variable and costs figures are denoted by y are assumed to be dependent variables.

To find out the percentages of change on dependent variable when change on the independent variable, the researcher has calculated coefficient of determination i.e. (r^2). The value of coefficient of determination is .6539 i.e. 65.39%. It means 65.39% of the total variations in cost (dependent variable) is due to sales (independent variable) and remaining 34.61% variation is due to other independent variable yet to be located.

4. 1.9.2 Correlation Coefficient between Total Income and Total Cost

The value of correlation coefficient between income and cost is -.7358. There should be negative correlation between income and cost. It means profit should be decreased as the cost should increase.

To find out the percentages of change on dependent variable when the change on the depending variable, the researcher has calculated the coefficient of determination (r^2). The value of coefficient of determination is .5414.i.e 54.14% of the total variation in

the dependent variable (profit) is due to independent variable (cost) remaining 45.58% variation is due to other independent variable yet to be located.

4.1.9.3 Correlation Coefficient between Variable Cost and Fixed Cost

The value of correlation coefficient between variable cost and fixed cost is -.1039. There should be negative correlation between variable and fixed cost. It means if the variable cost increases, fixed cost will decrease.

To find out the percentage of change on dependent variable when the change on the depending variable, coefficient of determination (r^2) is calculated. The value of coefficient of determination is .01079, which means only 1.07% of the total variation in the dependent variable (fixed cost) are due to the variable cost and remaining 98.93% variations are due to other independent variable yet to be located.

4.1.10 Hypothesis Testing

4.1.10.1 Between sales and cost

To know the relationships between sales and cost, following hypothesis has been formulated and tested by applying t-test.

Null Hypothesis (H^0):- There is no correlation between the sales and cost of DDC within the period of study.

Alternative Hypothesis (H^1) = There is correlation between the sales and cost of DDC with in the period of study.

4.1.10.2 between Total Income and Total Cost

Null Hypothesis (H^0) = There is no correlation between total income and total coat of DDC within the period of study.

Alternative Hypothesis (H^1) = There is correlation between total income and total cost of DDC within the period of study

The relationship between sales and cost and income and cost of DDC has been observed even precisely by studying their correlation values which has been presented in table:

Table 4.13

Tabulated and Calculated Value between Sales and Cost Income and Cost

Between	r	r^2	t-value calculated	t-value tabulated	D.F	result
Sales revenue and cost	.81	.656	3.215	3.182	3	H_1 accepted
Total income and cost	-.7358	.5412	-.967	3.182	3	Ho accepted

Source: - DDC Annual Report and (From appendix VII)

In relation between sales and cost, tabulated value of t is less than calculated value of t. So, alternative hypothesis is accepted. It means, there is correlation between sales and cost. Again in relation between total income and total cost, there is tabulated value of t is greater than calculated value of t, so null hypothesis is accepted. It means, there is no correlation between income and cost

4.1.11 Sensitivity Analysis: Assessing the Impact of the Changes in Cost- Volume –Profit Analysis

Sensitivity analysis is the measurement of elasticity of the change in cost –volume-profit factors on breakeven point or given profit. To measure the sensitivity of cost-volume- profit factors one can see the impact of certain percentages or amount of change in volume price or cost factors on net profit. In other words, sensitivity analysis is the measurement of responsiveness in outcome with the change in the determine variables. As we know that the profit is the function of volume price, fixed cost, variable cost etc. Here, the researcher systematically deals with the following sensitivity analysis.

4.1.11.1 Assessing the Impact When Selling Price is changed

Breakeven point will also be changed if the selling price or value is changed because change in selling price brings the change in profit volume ratio and finally brings the change in breakeven point. Change in selling price also brings the change in profit/ loss.

Table 4.14

Sensitivity Analysis of Dairy Development Corporation Income Statement by 10% change in Sales Revenue (Base on FY 2062/63)

Amount in (000000)

Particulars	Original sales value	10% increase in sales revenue	10% decrease in sales revenue
Sales	1536	1690	1382
Less: variable cost	1326	1326	1326
Contribution margin	210	364	56
Less: fixed cost (Adjust)	231	231	231
Net income	(21)	133	175
Change in net income	-	154	196
P/V ratio	.1367	.2154	.0405
BEP in Rupees	1690	.1072	5704
% changes in BEP	-	36.56%	237%

Source: - DDC Annual Report

The above table shows that with the increase in sales by 10%, the break even amount decrease by 36.56% which indicates that the price or value of sales and breakeven point has inverse relationship. Similarly, with the decreased in sales value by 10%, breakeven point amount has increased by 237.5%.

4.1.11.2 Assessing the Impact when Variable Cost is Changed

The impact of the change in variable cost on profit, price or volume is that an increase in variable cost will lower profit volume ratio, push up the breakeven point and reduce the profit. On the other hand, if the variable cost decline P/V ratio increase, BEP will lower and profit would rise. If the increasing and decreasing of variable cost 10% with other factors assumed to remain same, it gets following result for the year 2062/63

Table 4.15

Income Statement with Change Variable Cost Value

for the fiscal year 2062/63

Rs in (000000)

Particulars	Original value	10% increase in variable cost	10% decrease in variable cost
Sales	1536	1536	1536
Less: variable cost	1326	1458	1193
Contribution margin	210	78	343
Less: fixed cost (Adjust)	231	231	231
Net income	(21)	153	112
Change in net income	-	174	133
P/V ratio	.1367	.05078	.2267
BEP in Rupees	1690	4549	1019
% changes in BEP	-	169.17	39.70

Source: - DDC Annual Report

Above table 4.15 shows that with 10% increase in variable cost, breakeven point increases by 169.17% which is indicates that the variable cost and breakeven point have positive but not proportionate relationship. Similarly, with the decrease in variable cost by 10%, breakeven point has decreased by 39.70%.

4.1.11.3 Assessing the Impact when Fixed Cost is Changed

A change in fixed cost does not influence P/V ratio. When other factors remain unchanged a fall in the fixed cost will, however lower the BEP and raises the profit. An increase in fixed cost is caused either due to some external factors or due to some changes in management policy will raise the BEP. If fixed cost is increased or decreased by 10% with other factors assumed to remain same, it gets following result for the year 2062/63:

Table 4.16

Income statement with changes of Fixed Cost for the fiscal year 2062/63

Rs in (000000)

Particulars	Original value	10% increase in fixed cost	10% decrease in fixed cost
Sales	1536	1536	1536
Less: variable cost	1326	1326	1326
Contribution margin	210	210	210
Less: fixed cost (Adjust)	231	254	208
Net income	(21)	(44)	2
Change in net income	-	154	46
P/V ratio	.1367	.1367	.1367
BEP in Rupees	1690	1858	1522
% changes in BEP	-	10%	10%

Source: - DDC Annual Report

Above table 4.16 shows that with 10% increase in fixed cost, BEP amount increases by same percentages i.e. 10% and with 10% decrease in fixed cost, BEP amount decrease by 10%. From this situation, it can be concluded that breakeven point and fixed cost have got proportionate relationship.

4.2 Major Findings of the Study

The major findings of this study based on the analysis of available secondary and other information are pointed out as follows:

- The DDC's actual sales trend has fluctuated during the five years period but not satisfactorily fluctuating to meet the budgeted sales. There is less difference between budgeted sales and actual sales achievement.
- The DDC's does not apply any appropriate and effective sales forecasting technique.
- The DDC's has high variable cost proportion than fixed cost, which contribute for low contribution margin.
- The DDC has more depreciation, selling and administration cost out of total fixed cost.

- In DDC, there is no any plan to reduce cost. There is lack of effective cost control programs or technique.
- Profit trend of DDC is not satisfactory. DDC has earned little profit in the fiscal year 2059/60 and 2060/61 only which cannot bear the loss occurred during the fiscal year2058/59,2061/62 and2062/63.
- There is no any specially system to reduce the loss for the coming years.
- DDC has not proper practice of segregating the cost into fixed and variable or controllable and non controllable.
- The DDC has neither analyzed the breakeven point properly nor has it taken any measure seriously to reduce the BEP volume. BEP in the past five year is much higher than sale volume.
- Financial position of the DDC is not so good. Net profit margin, profitability ratios and other things are not satisfactory.
- There is no sensitivity analysis technique to measure the effect of change in one variable to another variable.
- There is lack of co-ordination between collection, processing, administration, and selling department.

CHAPTER - V
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

In present era, public enterprises have become essential elements for the development of country. Management effectively achieves rational objective through the efficient use of scarce resource in a changing environment. Cost volume profit analysis is an analytical technique for studying the relationship between volumes costs prices and profit which helps to manage costs and profits. CVP analysis is a device used to determine the usefulness of profitability of public enterprises.

Success of any enterprises basically depends on the strengths of management along with efficiency in managing the various functional aspects and modeling them to achieve the company's objective. Though the enterprises are accepted as an effective instrument to speed up to economic growth in the developing countries like Nepal in practice, the public enterprises that have been established so far have not been able to contribute in this process. One of the main reason is that the administrations problem arises both the conceptual as well as practices.

The PE's poor performance or even negative results may be described to the factors such as; lack of system and inefficiency in management, formal and informal intervention of the influential channels, the prevalence of corruption and abuse of power, vested and self interest of some of the public authorities including PE official over PE's affairs.

Dairy Development Corporation is government owned public enterprise. Without operation of the business successfully, the corporation cannot achieve their goal and objective. If there is no improvement in the efficiency of PE's, it cannot exist for a long run period because investment in such enterprise is financial wastage for the government. Hence the PEs, should at least generate reasonable surplus for the existences.

The main objective of research was to examine the impact of Cost -Volume- Profit Analysis on Profitability of DDC. So, this study is undertaken to evaluate CVP analysis of the company. Among 36 PEs, DDC is selected as sample with judgmental basis. The profit trend of DDC has fluctuated. During the period of five years from FY2058/59 to 2062/63, Corporation earned little profit on two years only and suffering more loss on three years.

As per the nature of data, descriptive and analytical approach for sales analysis, cost analysis, profitability ratio analysis contribution margin analysis, P/V ratio analysis, BEP analysis and sensitivity analysis etc are used. The company has low contribution margin, low P/V ratio, High BEP, and low margin of safety that shows the company's effectiveness. The DDC has more variable cost to its contribution margin levels. The sensitivity test of CVP analysis shows that if cost increases, the BEP will also increase and vice versa. But the BEP will decrease resulting from the increase in sales volume. It indicates that relationship between cost and BEP is positively correlated where as the relationship between sales revenue and BEP in negative. To fulfill the corporation's costs but not effectively control, DDC'S profit condition is not satisfactory. It has been suffering from loss over for the last years i.e. 2058/2059, 2061/62 and 2062/63. However, there is little income for FY 2059/60 and 2060/61. The main reasons behind not practicing tools of CVP analysis are lack of detail information and extra cost burdens.

5.2 Conclusion

It can be concluded that cost volume profit analysis is not applied by DDC. DDC has not adopted the cost control technique because there is high level of cost. The classification of costs is not scientific and systematic. DDC has not sales forecasting technique because there is different between budgeted sales and actual sales.

DDC has low contribution margin, it could succeed to increase the contribution margin by increasing sales revenue than increasing variable cost. Due to the increase of fixed cost, the DDC'S BEP has also increased, but heavy increase in sales revenue could increase profit and safety margin. The sensitivity of CVP analysis in response to change in fixed cost equal whereas it is very high in response to change in sales revenue and variable cost.

Goal and objective of the DDC are not communicating to the lower level. Consequently, there are substantial gap between budgeted and actual achievement. CVP relationship is not considered while developing sales plan and pricing strategy. A percentage decrease in sales revenue or a percentage increase in total cost can lead the DDC to bear more losses. So, the Company is also risky. There is only a little bit distance between revenue line and total cost line.

On the other hand, DDC's products are qualitative and its demand is in increasing trend, but DDC is suffering from loss due to traditional management system. Though DDC is one of the largest competitors which has enough resources among the dairy companies, it is in loss. But other private company earns profit in spite of lack of resources. It is clearly shown that traditional management system, not motivated untrained and unskilled employees, little support of government, small size of market, lack of experts, lack of co-ordination between top level and middle level, influence by political sectors etc are the main factors of DDC suffering from loss.

In following summary has been derived from the above conclusions are:

- DDC is still following the traditional method of cost classification.
- The amount of variable cost has exceeded the fixed in the past five year and there is no vast difference in the increasing ratios.
- In variable wise cost, collection cost covers the major's part of total variable cost which indicates that there is no control over such expenses.
- Variable costs are more consistent than fixed costs.
- There is no practice of CVP analysis and cost separation is not satisfactory.

- There is no co-ordination between income and expenses.
- The gross profit margin is poor.
- BEP is very high and the DDC is unable to obtain such point with present cost capacity structures
- Due to the negligence of cost reduction plan, DDC is suffering from excessive loss.
- It has no policies and programmers for the research and development of cost control

5.3 Recommendations

On the basis of the study "Cost- Volume -Profit Analysis of Dairy Development Corporation", it seems necessary to develop, implement and improve the process of CVP analysis. In the modern globalization, public enterprises are the main sectors to develop the country. If DDC improves the qualitative and quantitative aspect, DDC can get more profit. Nepalese public enterprises should have fit vision, goal and objective. For betterment utilization of the limited resources and achieving goal through cut-threat competition, application of CVP analysis tools can be of great help. Thus the following recommendations based on finding of the research study are:

- DDC should consider CVP analysis while preparing sales plan and setting the price of its product.
- DDC has been following functional classification of cost. It divided cost into collection, Processing, Administration, selling, depreciation and interest on loan only. Hence the DDC should try to classify its cost in modern and a scientific ways.
- DDC's sales revenue is lower than BEP. The corporation has not met the BEP level. Variable cost is nearly 90% and fixed cost is also high. So, BEP is higher than sales revenue. Margin of safety is also high. So DDC should try to cross at least BEP level by minimizing various costs.
- DDC should consider about the product line to improve its profit. Market studies on demand, supply and pricing of its milk product should be carried out and loss oriented costs should be identified and controlled.

- Cost control department should separately be established by products and should control the costs.
- DDC has invested a big amount in fixed cost. There is poor utilization of its capacity. To overcome this problem, it should emphasis on effective utilization of its capacity.
- To measure strength and competitiveness of the organization, CVP analysis tools should be used. It is recommended to analyze cost and benefit of the tools.
- Finally, a systematic approach should be made towards comprehensive profit planning. This can considerably contribute to the increase in profitability of Dairy Development Corporation.

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APPENDIX I

Income Statement for the year 2058/59 to 2062/63

Particulars/years	2058/59	2059/60	2060/61	2061/62	2062/63
Sales revenue	1548	1596	1536	1590	1536
Less: variable cost					
collection cost	1105	1166	1100	1097	1111
Processing cost	217	210	192	298	235
Variable Mfg. cost	1322	1376	1292	1395	1346
Add Beginning inventory	101	39	65	45	41
Cost of good available for sales	1423	1415	1357	1440	1387
Less: ending inventory	39	65	45	41	98
Variable cost of good sold	1384	1350	1312	1399	1289
Variable selling expenses	22	23	23	20	24
Variable administration	15	15	15	14	13
Total variable cots	1421	1389	1350	1433	1326
Contribution margin	127	207	186	157	210
less: fixed cost					
Collection cost	37	33	28	35	33
Processing cost	56	61	42	49	49
Selling cost	17	18	16	21	18
Administration cost	68	64	46	62	60
Depreciation cost	30	29	30	29	31
Interest in loan	12	12	4	5	4
Welfare fund	(5)	(5)	17	4	53
Total fixed cost	215	212	183	205	248
Less: other income	11	14	12	13	17
Adjusted fixed cost	204	198	171	192	231
Net income	(77)	9	15	(35)	(21)

Source: - DDC Annual Report

APPENDIX II

Correlation between Sales and Total Cost

Year	Sales(X)	Total(Y)	x= X- $\bar{x}$	x^2	y= Y- $\bar{Y}$	y^2	xy
2058/59	1548	1625	-13	169	41	1681	533
2059/60	1596	1587	35	1225	3	9	315
2060/61	1536	1517	-25	625	-67	4489	1675
2061/62	1590	1635	29	841	51	2601	1479
2062/63	1536	1557	-25	625	-27	729	675
Total	7803	7921	1	3485	1	9509	4677

Source: - DDC Annual Report

$\bar{x} = \frac{X}{N}$ X1561

Now r = $\frac{xy}{\sqrt{x^2}\sqrt{y^2}} = \frac{4677}{\sqrt{3485}\sqrt{9599}} = \frac{4677}{5799} = 0.81$

There is high degree positive correlation between sales and costs

Probable error

P.E = $0.6745 \times \frac{1Zr^2}{\sqrt{N}}$ $= 0.6745 \times \frac{1Z(.8102)®}{\sqrt{5}}$ =.1035

= 6. P.E = 6 × .1035 = .621

Since r > 6 P. E. So the calculated value of r is significant

APPENDIX III

Correlation between Total Income and Total Cost

Year	Total(X)	Total income(Y)	x= X- $\bar{x}$	$x2$	y= Y- $\bar{Y}$	$y2$	xy
2058/59	1625	(77)	41	1681	-55	3025	-2255
2059/60	1587	9	3	9	31	961	93
2060/61	1517	15	-67	4489	37	1369	-2479
2061/62	1635	(35)	51	2601	-13	169	-663
2062/63	1557	(21)	-27	729	1	1	-27
Total	7921	-109	1	9509	1	5525	-5331

Source: Annual DDC Report

$\bar{x} = \frac{X}{N} \text{X } \frac{7921}{5} \text{ X1584}$

$\bar{y} = \frac{Y}{N} \text{X } \frac{\text{Z109}}{5} \text{ XZ22}$

Now r = $\frac{xy}{\sqrt{x^2}\sqrt{y^2}} = \frac{\text{Z}\,5331}{\sqrt{9509}\ \sqrt{5525}} = \frac{\text{Z}5331}{7248.25} = -0.7358$

There is high degree negative correlation between Total cost and total income

Probable error

P.E = $0.6745 \times \frac{1\text{Z}r^2}{\sqrt{N}} = 0.6745 \times \frac{1\text{Z}(.\text{Z}0.7358)®}{\sqrt{5}} = 0.1383$

= 6. P.E = 6 × 0.1383 = 0.8298

Since r < 6 P.E. So the calculated value of r is insignificant.

APPENDIX IV

Correlation between Variable Cost and Fixed Cost

Year	Variable cost(X)	Fixed cost(Y)	x= X- $\bar{x}$	$x2$	y= Y- $\bar{Y}$	$y2$	xy
2058/59	1421	204	37	1369	5	25	185
2059/60	1389	198	5	25	-1	1	5
2060/61	1350	171	-34	1156	-28	784	952
2061/62	1433	192	49	2401	-7	49	343
2062/63	1326	231	-58	3364	32	1021	-1896
Total	6919	996	-1	8315	1	1883	-411

Source: Annual DDC Report

$$\bar{x} = \frac{X}{N} \text{X } \frac{6919}{5} \text{ X1384}$$

$$\bar{y} = \frac{Y}{N} \text{X } \frac{996}{5} \text{ X199}$$

$$\text{Now r} = \quad = \quad \frac{xy}{\sqrt{\quad x^2}\sqrt{\quad y^2}} \quad = \quad \frac{\text{Z } 411}{\sqrt{8315}\ \sqrt{183}} = -.1039$$

There is high degree positive correlation between variable cost and fixed cost

Probable error

$$\text{P.E} = \quad 0.6745 \times \frac{1\text{Z}r^2}{\sqrt{N}} \quad = 0.6745 \times \frac{1\text{Z}(.1039)^2}{\sqrt{5}} \quad = 0.2978$$

$$= 6.\ \text{P.E} = 6 \times 0.2978 = 1.78$$

Since r < 6P.E. So the calculated value of r is insignificant between variable cost and fixed cost. Perhaps there is no evidence of correlation.

APPENDIX V

Correlation Between Budgeted Sales and Actual Sales

(0000)

Year	Budgeted sales(X)	Actual sales (Y)	x= X- $\bar{x}$	$x2$	y= Y- $\bar{Y}$	$y2$	xy
2058/59	164678	154824	-607	368449	-1295	1677025	786065
2059/60	167250	159591	1965	3861225	3472	12054784	6822480
2060/61	161290	153581	-3995	15960025	-2538	6441444	10139310
2061/62	169871	158966	4586	21031396	2847	8105409	13056342
2062/63	163340	153634	-1945	378302.5	-2485	61725225	4833325
Total	∑X= 826429	∑Y= 780596	4	41599397.5	1	90003887	35637522

Source: Annual DDC Report

$\bar{x} = \frac{X}{N} \text{X} \frac{826429}{5}$ X165285.8

$\bar{y} = \frac{Y}{N} \text{X} \frac{780596}{5}$ X156119.2

Standard deviation ($(\pm X) = \sqrt{\frac{(\quad x \text{Z} \bar{x})^2}{N}}$ $\text{X}\sqrt{\frac{41599397.5}{5}}$ $\text{X}\sqrt{8319879.5}$ = 2884

C.V (x) = $\frac{2884}{165285}$ X1.74%

Standard deviation ($(\pm Y) = \sqrt{\frac{(\quad y \text{Z} \bar{y})^2}{N}}$ $\text{X}\sqrt{\frac{90003887}{5}}$ $\text{X}\sqrt{18000777.4}$ = 4243

C.V (y) = $\frac{4243}{156119}$ X2.72%

Correlation coefficient (r) = $\frac{xy}{\sqrt{x^2}\sqrt{y^2}}$ = $\frac{35637522}{61191150}$ X.5823

Probable error of (r) = $0.6745 \times \frac{1 \text{Z} r^2}{\sqrt{N}}$ = $\frac{.4458}{2.24}$ X.1990

6PE = 6×.1990= 1.194

Since r<6PE, the calculated value of r is insignificant

APPENDIX VI

Multiple regressions between Profit (X_1) on sales (X_2) and cost (X_3)

(000000)

Year	X_1	X_2	X_3	$x_1 = (X_1 - \bar{X}_1)$	$x_2 = (X_2 - \bar{X}_2)$	$x_3 = (X_3 - \bar{X}_3)$	x_1x_2	x_2x_3	x_3x_1	x_1^2	x_2^2	x_3^2
2058/59	(77)	1548	1625	-55	-13	41	715	-533	-2255	3025	169	1681
2059/60	9	1596	1587	31	35	3	1085	105	93	961	1225	9
2060/61	15	1536	1517	37	-25	-67	-925	1675	-24798	1369	625	4489
2061/62	(35)	1590	1635	-13	29	51	-377	1479	-663	169	841	2601
2062/63	(21)	1536	1557	1	-25	-27	-25	675	-27	1	625	729
Total	(105)	7806	7921	1	1	1	473	3401	-5331	5525	3485	9509

Source: Annual DDC Report

$$\bar{x}_1 = \frac{X_1}{N} \text{X} \frac{(105)}{5} \text{ XZ21.8XZ22}$$

$$\bar{x}_2 \text{ X } \frac{X_2}{N} \text{X } \frac{7806}{5} \text{ X1561}$$

$$\bar{x}_3 \text{ X } \frac{X_3}{N} \text{X } \frac{7921}{5} \text{ X1584}$$

The multiple regression equations of X_1 on X_2 and X_3

$$x_1 = b_1 \; x_2 + b2 \; x_3$$

The value of b_1 and b_2 can be determined by solving following two normal equations

$$\sum x_{1\,X_2} = b_1 \quad x_2{}^2 + b_2\, x_{2\,X\,3}$$

$$\sum x_{3X_1} = b_1\, x_{2\,X\,3} + \quad b_2 \quad x_3^{\circledR}$$

Putting the value of sum of all in given equations

We get b_2 = - 9358

And b_1 = 1.049

Putting the value of b_1 and $b2$ in equations

We get, X_1 = 1.049 x_2 - .9358 x_3

The regression line of actual sales 'Y' on budgeted 'X" or y on x is as follows:

We have= Y- $\bar{Y}$ = $r\frac{\pm x}{\pm y}(x\,\mathrm{Z}\,\hat{x})$

y- 156119 = $.5823\frac{4243}{2884}(x\,\mathrm{Z}165285)$

Or y = 14521+ .856x

If budgeted sales for 2063/64 165000 lakh

y = 14521+ .856 × 165000

= 155761 lakh

APPENDIX - VII

Hypothesis Testing

Between sales and Costs

Test statistics under H_o, the test statistics is

$$T = \frac{r}{\sqrt{1 - r^2}} \sqrt{n - 2}$$

$$= \frac{.81}{\sqrt{1 - .81^2}} \sqrt{5 - 2}$$

$$= \frac{.81}{.4359} 1.73$$

$$= 3.215$$

Between total income and Costs

Test statistics

$$T = \frac{r}{\sqrt{1 - r^2}} \sqrt{n - 2}$$

$$= \frac{-.7358}{\sqrt{1 - (-.7358)^2}} \sqrt{5 - 2}$$

$$= -.967$$