

**A COMPARATIVE ANALYSIS OF COST-VOLUME-PROFIT OF  
PUBLIC AND PRIVATE ORGANIZATION IN NEPAL**

**(A CASE STUDY OF NEPAL ELECTRICITY AUTHORITY AND BUTWAL POWER COMPANY LTD.)**

**A THESIS**

**Submitted by:**

**Aanapurn Thapa**  
Nepal Commerce Campus  
T.U. Regd.:  
College Roll No.:  
Exam Roll No.:

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Faculty of Management  
Tribhuvan University

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## RECOMMENDATION

This is to certify that the thesis:

Submitted by

**Annapurna Thapa**

*Entitled*

**A COMPARATIVE ANALYSIS OF COST-VOLUME-PROFIT OF PUBLIC  
AND PRIVATE ORGANIZATION IN NEPAL  
(A CASE STUDY OF NEA AND BPCL)**

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

.....  
(Dr. Sushil B. Mathema)  
Head of Research Department  
& Thesis Supervisor

.....  
(Diwakar Pokhrel)  
Campus Chief

Date: .....

VIVA-VOCE

We have conducted the viva-voce examination of the thesis presented by

**Annapurna Thapa**

*Entitled*

**A COMPARATIVE ANALYSIS OF COST-VOLUME-PROFIT OF PUBLIC  
AND PRIVATE ORGANIZATION IN NEPAL  
(A CASE STUDY OF NEA AND BPCL)**

and found the thesis to be the original work of the student written according to the prescribed format. We recommend this thesis to be accepted as partial fulfillment of the requirements for Master of Business Studies (M.B.S.)

**Viva-voce Committee:**

Chairperson, Research Committee: .....

Member (Thesis Supervisor): .....

Member (External Expert): .....

Head, Research Department: .....

Date: .....

## **DECLARATION**

I hereby declare that the work reported in this thesis entitled “**A COMPARATIVE ANALYSIS OF COST-VOLUME-PROFIT OF PUBLIC AND PRIVATE ORGANIZATION IN NEPAL (A CASE STUDY OF NEA AND BPCL)**” submitted to Office of the Dean, Faculty of Management, Tribhuvan University is my original work. It is done in the form of partial fulfillment of the requirements for the Master of Business Studies (M.B.S.) under the supervision and guidance of **Dr. Sushil Bhakta Mathema.**

.....  
**Annapurna Thapa**

Date: .....

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## **ABBREVIATIONS**

%	: Percent
$\Sigma$	: Summation
AD	: Anno Domino
BEP	: Break Even Point
BPC	: Butwal Power Company
BS	: Bikram Sambat
CPPC	: Comprehensive Profit Planning and Control
CM	: Contribution Margin
CV	: Coefficient of Variation
CVP	: Cost Volume Profit
CVPA	: Cost Volume Profit Analysis
DPAT	: Desired Profit after Tax
e.g.	: Example
etc.	: Etceteras
FC	: Fixed Cost
FY	: Fiscal Year
HMG	: His Majesty of Government
i.e.	: That is
LEDCO	: Lamjung Electricity Development Company Ltd.
Ltd.	: Limited
MBA	: Master of Business Administration
Mgmt.	: Management
MOS	: Margin of Safety

MW	: Mega Watt
NEA	: Nepal Electricity Authority
NEC	: Nepal Electrify Corporation
NIDC	: Nepal Industrial Development Corporation
NORAD	: Norwegian Agency for Development Corporation
PE	: Probable Error
PEs	: Public Enterprises
PV Ratio	: Profit Volume Ratio
Pvt.	: Private
r	: Correlation
SD	: Standard Deviation
TQM	: Total Quality Management
TU	: Tribhuvan University
VC	: Variable Cost
VCPU	: Variable Cost Per Unit
ZBB	: Zero Based Budget

# CHAPTER – I

## INTRODUCTION

### 1.1 General Background

A success of the business depends on the performance of organization which measures in terms of Profit. Profit is the primary measurement and the blood of success in any economy, if firm is not able to earn profit than it fails to hold the capital for long period. When business firm can't hold capital, it can't secure and retain other sources, such as manpower, materials and machine etc. In other words the more profitable firm/enterprises are more attractive to the holders of the available capital. These firms can attract capital, which they need to buy the other resources. Here key is that capital and other resources are scarce they are allocated to the profit makers in roughly descending order of their profit potential.

Usually, profit doesn't just happen. Profit is managed, when a management plans its profit performance that is known as profit planning. Profit planning is a part of overall planning process of an organization. Before we can make an intelligent approach to the managerial process of profit planning, it is important that we understand the management concept of profit. There are several different interpretations of the term 'profit'. According to an economist, profit is the reward for entrepreneurship for risk taking, leader of labor might say that profit is a measure of how efficiently labor has produced and that it provides a base for negotiation a wage increase an investor will view it as a gauge of the return on his/her money. An internal revenue agent might regard it as a base for determining income taxes. An accountant will explain it simply as the excess of firm's revenue over expenditure of producing revenue in a given fiscal year.

Profit is the ultimate goal of every business house. They involve in business for making profit. Profit cannot be achieved easily. It should be managed well with better managerial skill. So, profit is the planned and controlled output of management. By element, profit is the difference of revenue and cost. Profit plan, thus, refers to the planning of revenue (i.e. increase the revenues) and planning of cost (i.e. increase the efficiency of cost).

Planning is the first essence of management and all other functions are performed with in the framework of planning, planning means deciding in advance what is to be done in future?

Planning starts from forecasting and predetermination of future event. Planning is the whole concept of any business organization. No firm can achieve its predetermined goal and objectives in the absence of proper plan. Hence, it is life blood of any organization which makes efficiently run towards the competitive environment.

Control can be defined as the process of measuring and evaluating performance of each organizational component of an enterprise and initiating corrective action when necessary to ensure efficient accomplishment of enterprise objectives, goals, policies and standards, planning establishes the goals objectives, policies and standards of an enterprise. Thus, profit planning and control is an important approach, mainly in profit-oriented enterprises. Profit planning is merely a tool of management. It is not an end of management or substitute of management. It facilitates the managers to accomplish managerial goals in a systematic way.

Profit planning and control is used for the development and acceptance of objectives and goals and moving organization efficiently to achieve the objectives and goals. The broad concept of PPC entails an integration of numerous managerial approaches and techniques, such as sales forecasting, sales quota system, capital budgeting, cash flow analysis, cost-volume-profit analysis and variable budget, time and motion study, standard cost accounting, strategic planning, production planning, management by objectives, organizational planning, managerial planning and cost control. PPC has wide application. It can be applied in profit and non-profit, manufacturing and non-manufacturing organization.

Out of various profit planning tools, C-V-P analysis is the most important tool. The systematic relationship between cost, volume and profit is known as cost-volume-profit analysis. It is an analytical tool for analyzing the relationship among cost, price, profit, sales and production volume. Mainly there are three elements in cost-volume-profit analysis. They are cost, sales or production volume and profit. All these terms are interconnected and depended on one another. For instance, profit per unit of a product depends on its selling price and cost per sales. The selling price to a greater extent will depend upon the cost and cost depends upon the volume of production.

It is highly essential for the management to have the complete knowledge about the interrelationship among the cost, volume and profit. A study concerning this interconnection

is undertaken through cost-volume –profit analysis. Cost-volume-profit analysis is extremely helpful in profit planning and control management decision, cost control, budgeting etc.

### **a. Profit Planning**

Profit planning is the process determining the required amount of profit from each principle unit of business. A profit plan is an advance decision of expected achievement based on the most efficient operating standards of in prospect of time. It is established against which actual accomplishment it regularly compared.

Profit planning is the estimation and predetermination of revenues and expenses that estimates how much income will be generate and how it should be spent in order to meet investment and profit requirement. In the case of institutional operation, it presents a plan spending income in a manner that does not result in a loss (Ninemeirer and Schmidgal, 1984:133). Explaining the use of profit plans and budget, they further mention that one it is developed, managers know that when actual expenses exceed budget limitations, there may be problems. The profit plan tells managers how much money remains to be spent in each expenses category, profit plans are also used to develop new budgets. Profit planning is head parts of CVP analysis. So, without discussing profit planning before CVP analysis, it will be half work.

Cost-volume-profit (CVP) analysis examines the behaviour of total revenues, total costs and operating income as changes occur in the output level. The selling price, the variable cost per unit and/or fixed costs of a product (Homgreen, Datar and Foster, 2003:105).

Cost-volume-profit analysis is a systematic method of examining 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 conditions that a firm will face. Like most models, which are abstractions from reality. CVP analysis is subject to a number of underlying assumptions and limitations. Nevertheless, it is a powerful tool for decision making in certain situations (Drury, 2000:107)

Most of the business fail after a few years, sometimes months, of starting because they tend to do anything for volume without thinking how it's going to affect bottom line.

Cost-volume-profit analysis is a management accounting tool 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, fixed cost, taxes etc. The whole picture of profit planning is associated with cost-volume-profit interrelationships (Bajracharya, Ojha, Goet and Sharma, 2004: 225).

CVP analysis is an important media through which is the management can have an insight into effects on profit on account of variation in cost and sales and take appropriate decisions. Profit planning can be done only when the management has the information about the cost of the product 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 panning of profit. It is immensely helpful for developing alternative strategies in sales planning and cost estimation. CVP is an accounting technique showing the relationship between the above mentioned variables. This technique is equally important in profit making and non-profit 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 the volume to be sold. The entire scope of profit planning associated with CVP interrelationships. A wisely used technique to study CVP relationship is break even analysis. Breakeven 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 break even point or a point at which losses cease and profit begins (Khan and Jain, 2000).

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

## **b. Nepal Electricity Authority (NEA)**

Hydro power is a vital input needed to fuel the engine of economic growth and to fulfill the basic needs of the entire population of a country. Energy differentiates a least developed or developing economy from a developed economy. Empirical evidence suggests that lack of energy can whittle down the pace of economic development while its abundance can stimulate the development. Data shows that on an average an American consumes approximately 40% more energy than an Indian does. Electricity is the most critical input for agricultural, industrial production, information technology and telecommunications and raising the quality of life of people. Power development ought to be the top most economic priority of the state.

Nepal is bestowed with snow clad Himalayas, lush green mountains, fascinating valleys and lakes as well as diversified eco-systems to attract both foreign and domestic tourists. Apart from basic infrastructure development works, sustainable energy supply is the key factor to boost of tourism industry. It has been acknowledged that tourism is a driving force for poverty alleviation and sustainable development.

The multiple use benefits of hydropower, particularly in relation to the availability, reliability and quality of fresh energy has been globally recognized for its valuable contribution to sustainable development providing access of energy especially for the poor and for maintaining natural ecosystem mitigating greenhouse gas emissions. At present, the source accounts only for 20% of world electricity supply.

Electricity is one of the basic inputs for the acceleration of economic growth of the country but generation of hydropower for supplying electricity to fulfill even to the domestic demand is delaying resulting to the adverse impact in the national economy. The annually increased population and increasing trend of electricity use due to people's awareness of improving quality of life demands sustainable means of supplying source. About two third of population have no access of electricity, which blight their prospects for health, education and achievement. The enormous hydropower potential of Nepal is the main alternative sustainable source of energy that is environmentally friendly, socially responsible and economically viable. Development of hydropower contributes to the development of rural electrification meeting the domestic need, employment generation, stemming deforestation

need, and expanding domestic agricultural production and development of industry as well as business, there by contributing to sustain poverty reduction.

The availability of electricity in affordable cost can be utilized as a vehicle of industrial development and provide basis for competitive manufacturing industries, which in turn can lead to cheap manufactured export. Proper utilization of hydro energy in different industrial sector, transportation sector besides electrification, heating, cooking etc. can reduce the present investment of more than 25 billion Nepalese rupees to import of fossil fuel products, contributing the economic growth of the country.

The main outcomes of hydropower project development in the social aspects are providing improved living condition of affected people, improving public health condition, ensuring equitable distribution of benefit sharing particularly to the affected and vulnerable communities by the process of revenue sharing, training program and educational facility and supporting additional benefits of infrastructure development for drinking water supply and electrification services associated with project.

Rapid advanced in technology for the industrial development in the developed countries as well as in some developing countries of the world forced to the extensive use of fossil fuels and high rate of deforestation annually. The overuse of fossil fuel, chemical fertilizer etc. and deforestation increased the level of carbon dioxide in the atmosphere from 0.02% to 0.036% since last two centuries. Carbon dioxide is the most responsible factor for increasing greenhouse gas emission in the atmosphere is raising the temperature in the Earth continuously. Earth's average temperature reported to be increased from 0.3-0.6 degree Celsius since 1960 and will be continued. Change (IPCC), decade of nineties was found to be the warm decade and 1998 was the warmest year on record. Development of hydropower project and making proper utilization of energy may have direct impact to the reduction of the negative consequences in the climate change. Besides, use of water for electricity generation is essentially a non-consumptive use of natural resource.

The huge hydropower potential of Nepal that can be developed in an economically, socially and environmentally sustainable manner represents the storage of energy in South Asian Region. It can provide easier access to financing in a new drive to encourage sustainable hydropower throughout the world.

Nepal Electricity Authority is the largest government enterprise in Nepal with the countries highest capital investment, assets and human resources. NEA has been established in the year 2042 Bhadra 1, under the Nepal Electricity act 2042, by the amalgamation of the existing GoN department of electricity, Nepal Electricity Corporation and several development boards in order to make effective and independent institution to generate economic production, transmission and distribution of electricity and to manage proper supply of electricity.

**The Major Responsibilities of NEA are:**

- To develop short-term and long term hydropower development policy and to recommend these to Government of Nepal (GON).
- Planning and construction of new power plants, transmission lines, distribution lines, substations and operation & maintenance of those power plants.
- Selection of proper hydropower sites to promote cottage and agro-based industries, and
- Train the staff to make them more efficient in their job.

**c. Butwal Power Company Limited**

BPC Limited (BPC) or the 'Company' was established in 2022 B.S. (1966 A.D.) as a private limited company registered under company Act., 2021 of Nepal by the promoters-united mission to Nepal, Govt. of NEA and NIDC with objectives to develop the hydropower project using appropriate training and technology transfer and human resources as well. The company is one of the pioneering hydropower developers in Nepal from private sector. It has developed 1 MW Tinau, 5.1 MW Andhikhola and 12 MW Jhimruk hydropower projects. BPC is one of the sponsors of 60 MW Khimti hydropower project.

The compnay was converted into limited company in 2049 B.S. (1993 A.D.) and privatized in 2059 B.S. (2003 A.D.) resulting main shareholders Shnagrila Energy Limited and Interkraft as, Norway.

**1.2 Statement of the Problem**

Nepal is known as a rich country in hydro resources. There are more than 6000 rivers having potential of 83000MW hydropower. These perennial river systems carry about 225 billion cubic meter of water every year and flow down to Indian Ocean via India. The government

of Nepal has given high priority to the hydropower. On the other hand most of Nepalese can not have opportunity to use electricity and they are living with kerosene lamps.

In the sector of hydro electricity utilization only 40% of the total population has access to electricity, mainly in urban area and in some pockets of the rural at the end of ninth plan. Among 40% electricity benefited people 33% of people are from national electricity supply system and rest 7% are from alternative energy. The majority of population who has access can also not effort to use electricity for cooking, heating etc. Because of high tariff they are forced to depend on indigenous sources of energy as forest, agriculture residue, animal waste and imported petroleum products.

In present situation commercial banks are investing their huge cash in Treasury bill in very low return due to the lack of favorable opportunity. Local investors and financial institutions are not much willing to invest in the hydropower project.

Investments on hydropower projects require huge amount of money, skilled manpower, improved technology, machineries and long period of time etc. Most of the investment seeks foreign bilateral and multilateral grants, loans etc. This study has tried to answer the following questions.

- What is the existing position of cost of NEA and BPC?
- What is the position of BEP of selected company?
- Are the cost bear by both NEA and BPC realistic?

### **1.3 Objectives of the Study**

The study is undertaken the related problems' with objectives:

- To study and analyze existing position of costs of NEA and BPC Pvt. Ltd.
- To identify breakeven point of both enterprises for avoiding losses.
- To compare and analyze P/V ratio, BEP, MOS and volume of these enterprises.
- To examine problems being faced by these two enterprises and recommend for solving these problems on the basis of study results.

### **1.4 Significance of the Study**

To develop the nation enterprises should pay crucial role through huge investment. NEA and BPC are contributing the nation through large amount of tax paying, easy services to people

or customer of Nepal. So, study about them is very crucial one. Any study without significance will not have any value. So, the significant of study is summarized below:

1. It examines the application of CVP analysis of the company.
2. It highlights the problem and potentiality of public company Vs private company. So, it will be helpful to policy makers and planners at decision making level of government and also beneficial to managers, accountant etc. at corporate level.
3. It provides literature to the researchers who want to carry on further research in this field.
4. Recommendations and suggestions about NEA and BPC will also help to concerned stakeholders.

### **1.5 Limitations of the Study**

Due to various reasons this research work is not able to study the all market analysis techniques in detail. For the sake of case this tries to study its subject matter by concentrating on some important variables & ignoring others. That is why this research work is also not far from the limitations. The major limitation of the study is presented below in nutshell.

The study has certain limitations due to lack of sufficient time and resources. They are as follows:

- The study has been carried out within a range of latest fiscal year data starting from 2006/07 to 2010/11.
- CVP analysis is based on secondary data provided by respective organization and past performance of organization may not be the best indicator for future evaluation.
- Though there are also other tools to measure the efficiency and effectiveness of the company.
- the study is only related to NEA and BPC.

## **1.6 Organization of the Study**

The whole study is prepared in line with prescribed format and structured into five sections:

### **Chapter I: Introduction**

This chapter has deal with background of the study, introduction of the study, statement of problems, objective of the study, significance of the study, limitation of the study and organization of the study.

### **Chapter II: Review of Literature**

In this chapter various relevant study such as different books, journals, articles and pervious thesis will be mentioned. Conceptual framework about risk, return and portfolio management will be shown in this chapter.

### **Chapter III: Research Methodology**

This unit presents methodology used in the study. It consists of following sub topics: population and sample, data collection procedure, tools for analysis, method of Presentation and Analysis etc.

### **Chapter IV: Presentation and Analysis**

In this chapter, collected data has presented, analyzed and interpreted using financial and statistical tools.

### **Chapter V: Summary, Conclusion and Recommendation**

The final or last chapter contains the summary of the whole study, conclusions and recommendation of the study.

Besides this bibliography and appendix were included in the last of the research work.

## **CHAPTER – II**

### **REVIEW OF LITERATURE**

#### **2.1 Conceptual Framework**

In order to make order to make a research on the subject some other literature should also be reviewed. Main purpose of literature review is to find out the work done in the subject on the areas of the research. Some possible study and conceptual matter available in this respect have been reviewed. The different books, journals, reports and research study published by various institutions and some thesis submitted by master level students have been reviewed. Before reviewing about the CVP analysis knowing about the profit planning is necessary because CVP analysis is a tool to handle the profit planning.

#### **2.2 Concept of Profit**

Generally profit is defined as the part of income of the firms. Profit is the motivating force in the business. Success of business depends on profit. Profit promises to provide satisfaction to consumer. We can simply define the word 'profit' as the primary measurement of success of management effective in business enterprise. In other words, profit means the excess of total revenue over total cost of production. Usually, profits do not happen, they are managed or produced.

Management thinks of profit as an expression of the goals it has set for the firm, a measure of performance for the achievement of its health, growth and continuity of the company (Lynch and Williamson 1995: 100). Profit is the main test of the individual firm's performance. In other words, it is the acid test of business. Profit is a primary objective of a business.

Economic theories on may be put in three broad categories: the first theory looks upon profit as the reward for bearing risks: the second views profits as the consequence of friction and imperfection in the competitive adjustment of the economy to dynamic change: the third sees profit as the reward for successful innovation (Dean Joel:1982:6). Profit is a yardstick of management's ability to co-ordinate, 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 rewards for taking risks. Profit plays a vital role, not only managerial decision but in the general life standard of human beings. Therefore management should continuously evaluate efficiency of its company in terms of profit

### **2.3 Concept of Planning**

The word 'planning' states thinking and deciding what ought to be done in advance is also a process of developing enterprise's objective and selecting future course of action to accomplish them.

Planning is a hard task because it involves the ability to think to periodic, to analyze and to come to decide to control the action the personnel and to cope with complex dynamic fluid environment. They bridge the gap between, where they are and where they want to go (Memoria CB, 1990:36). His statement obviously shows that planning as a complex and hard job and as a tool of developing and getting organizational objectives. Planning consists of the following steps (Scott: 1957:152).

- Recognizing and making a tentative statement of the problem :
- Collection and classifying relevant facts.
- Evaluating pros and cons associated with these course and
- Selecting the course of action (the plan).

Planning means setting of goals for the firm, considering various ways of meeting those goals and picking out what appears to be the best way to meet those goals (Lynch and Williamson: 1995:18). In planning, the management is concurred with lying down objective and determining the courses of action to be followed out of the several alternatives available to meet those objectives.

Planning is the process of developing enterprise objectives and selecting future course of action to accomplish them. It includes (Welsch, Hilton and Gordon, 1999:3).

- Establishing enterprising objectives.
- Developing premises about the environment in which they are to be accomplished.
- Selecting a course of action for accomplishing the objectives.
- Initiating activities necessary to translate plans into action.

- Current re- planning to current deficiencies.

Panning is essential to accomplish goals. It reduces uncertainty and provides effective direction to the employees by determining the course of action in advance. The planning process of an enterprise would generally involve four fundamental steps (Pandey, 1985:556).

- Establishing the objectives.
- Determining the short range objectives or goals.
- Developing strategies.
- Formulating profit plan or budgets.

Planning involves selecting mission and objectives and the action to achievement them it required decision making that is choosing from among alternative future courses of action (Koontz, Harold &Weihrich, 1999:45).

Thus planning establishes the objectives, goals, strategies, policies and standards of enterprises. Past is the father of present is a guild for future.

Therefore, planning for future needs proper guidance to be taken from past event and adequateness should be made of present event.

## **2.4 Concept of Control**

Once the planning is determined, it must be carried out under control. Controlling shares management activity and for this, managers compare actual performance and fine out the deviations taking remedial steps to remove the deviations. Immediate action should be taken remove the deviation to make an improvement in the performance because promptness is the essence of an effective of an effective control.

Controlling is the measurement and correction of performance in order to make sure that enterprise objective and the plans devised to attain them are accomplish (Heinz, 1999:45).

Controlling means evaluating the firm's activities against the plan and deciding what should be done if the plan is not being followed (Lynch & Williamson, 1995:18).

Control is the process of ensuring that actual activities confirm to planned activities. Control helps in correction. Therefore, planning and controlling are the major functions of profit management.

- According to Welsch, controlling involves.
- Establishing goals and standards.
- Comparing measured performance against the established goals and standards.
- Reinforcing successes and correcting shortcomings.
- Control provides timely information that may prompt the revision of goals.

The purpose of control is achieved with setting standards, comparing predicted and actual results against these standards, and taking corrective actions.

Planning and controlling are interdependent and thus closely related with each other because a manager can not control unless he has planned a course of action for effective and smooth managerial behavior into proper profit and progress on behalf of company, firm or enterprise. Under this condition to be applied, both planning and controlling are mutually inseparable.

## **2.5 Meaning and Definition of Profit Planning**

Profit planning is one of the most important managerial functions. Profit planning is merely a tool of management which is used to control business operation interaction.

When a management plans, profit for a specific period of time that is known as profit planning. Every firm has to make a plan of profit if it has to survive and grow in the business line or business world in future.

The phrase, "Comprehensive profit planning and control" is a new term in the language of business but it is not a new concept in the management. Commonly, comprehensive profit planning and control have been identified as 'a way of managing.' The term, "comprehensive" means the application of the broad concept of profit planning and control to all phases of operations in an enterprise and the application of a total system approach.

Profit planning is the process of determining the required amount of profit from each principal unit of business. A profit plan is an advance decision of expected achievement based

on most efficient operation standards of in prospect of time. It is established against which actual accomplishment is regularly compared.

Profit planning is the estimation and predetermination of revenues and expenses that estimates how much income will be generated and how it should be spent in order to meet investment and profit requirement. In the case of institutional operation, it presents a plan for spending income in a manner that does not result in a loss (Nimemeirer and Schmidgall, 1984:133). Explaining the use of profit plans and budget, they further mention that once it is developed, managers know that when actual expenses exceed budget limitation, there may be problems. The profit plan tells managers how much money remains to be spent in each expense category. Profit plans are also used to develop new budgets.

Profit planning or budgeting is a forward planning and involves the preparation in advance of the quantitative as well as financial statements to indicate the intention of management in respect of the various aspects of the business. Profit planning, in fact, is a managerial technique and it is a written plan in which all aspects of business operation with respect of definite future period are included. It is a formal statement of policy, plan, objective and goal established by the top management in respect of some future period. Profit planning is a predetermined detailed plan of action developed and distributed as a guide to current operations and as a partial basis for the subsequent evaluation of performance. Thus, we can say that profit planning is a tool which may be used by the management in planning the future course of action and in controlling actual performance (Gupta, 1992:521).

Profit planning is a systematic and formal means of decision-making and attaining organizational objectives and goals at a specific future period of time by the application of diversified managerial tools for utilization of available resources at a reasonable manner.

To plan profits intelligently, Lynch suggests that a management needs to know (Lynch & Williamson, 1995:100).

- The economic characteristics of the firm's operation,
- The nature of the market for its product,
- The nature and severity of its competition,
- The cost of its factors of production: (The material, the labor, the productive capacity, the capital)

The sound and intelligent planning of profit, costs and sales are important in the age of rapid technological change.

Modern profit planning encourages action and recognizes the divisional and development autonomy and responsibility of managers, motivation them to strive for attainment of the corporate goal (Matz &Curry, 1972: 406).

Profit planning is especially effective in enabling middle management to help plan profit and control costs.

Profit planning is a technique of preparing and using an operating plan for the purpose of achieving the maximum profit or, a profit target set by management. Such a planning may be done for a short period or for a long period (Pandey, 1995:329).

Profit planning is preplanning what to do in terms of choosing an optimum profit course of action from among several alternatives.

Profit planning is management's primary tool to accomplish its objectives, because it (Noll and Radetsky, Vol. XLV: 36).

- Provides a disciplined approach to the solution of business problems.
- Develops throughout the organization an atmosphere of profit-mindedness, encouraging an attitude of cost-consciousness and minimum assets utilization.
- Coordinates the operating plans of the diverse segments of the business into a single, comprehensive plan.
- Encourages a high standard of performance by stimulating competition, providing a sense of urgency and serving as an incentive to perform more effectively.
- Affords the opportunity to appraise systematically every facet of the business as well as examine and restate periodically its basic policies and guiding principles.
- Aids in directing capital and effort into the most profitable channels.
- Provides yardsticks or standards to measure performance and gauge the managerial judgment and ability of the individual executive.

Profit planning represents an overall plan of operations, covers a definite period of time and formulates the planning decisions of management. It consists of the operating budget, the financial budget and the appropriation budget (Kulkarni, 1992:10).

Profit planning thus becomes a well throughout operational plan with its financial implications expressed as both long and short range profit plans in the form of financial statements, including balance sheet, income statements and cash and working capital projections.

Profit planning is now an important responsibility of the finance managers or the chief executive has the ultimate responsibility for profit planning and control program. Welsch suggests that "A comprehensive Profit Planning and Control (CPPC) as a systematic and formalized approach for performing significant phases of the management planning and control functions."

Long-range profit is a systematic and formalized process for purposefully directing and controlling future operations with a view to achieving desired objectives for periods extending beyond one year. And the success of each enterprise in realizing its optimum profit is determined by the extent, to which it attains its objectives, develops coordinated plans to realize them and exercises control of its entire process constitutes a budgetary planning and control program (Kulkarni, 1992:315).

According to Welsch, the three most relevant aspects of PPC concepts are:

- PPC requires major planning decision by management,
- PPC entails pervasive management control activities and,
- PPC recognizes many of the critical behavioral implications throughout the organization.

In the same way, comprehensive profit planning and control (PPC) specially involves:

- Development and application of broad and long range objectives of the enterprises,
- Specification of enterprise goals,
- Development of a strategic long-range profit plan in broad terms,
- Specification of a tactical short of periodic performance reports detailed by assigned responsibilities (division, departments, projects),
- Establishment of a system of periodic performance reports detailed by assigned responsibilities, and
- Development of follow-up procedures.

In the opinion of J. Batty, when dealing the question of profit planning it is usual to consider (Batty, 1982:322).

- The volume of output in terms of numbers of product or other units.
- The variety to be produced (the product mix)
- The cost to be incurred.
- The prices to be charged.

The aim of profit planning should be to ensure an adequate return on capital employed and financial stability. Therefore, profit planning includes a complete financial and operational plan for all phases and facets of the business.

A profit plan is a comprehensive statement of intentions, expressed in financial terms, for the operations of the firm for a short period. It is a plan of the firm's expectations and is used as a basis for measuring and controlling the actual performance of managers and their units (Pandey, 1999:257).

Thus, profit planning is used for development and acceptance of objectives and goals and moving an organization efficiently to achieve those objectives and goals. Profit planning is developed to meet the objective of effective performance of the management process.

Profit planning is an integral part of the management; by the help of it any enterprise should earn realistic profit return on investment. It is a financial and narrative expression of the expected results from the planning decision. By using profit planning technique, one can easily achieve the desired goals. Profit plan is flexible and depends upon the size and nature of the firms.

## **2.6 Components of Profit Planning and Control**

Components of PPC are bones of an enterprise which help it operate properly, efficiently and effectively. The components of PPC as stated by Welsch Glenn A. (Welsch, 1979:74).

### **A. The Substantive Plan**

- Broad objectives of the enterprise
- Specified enterprise goals
- Enterprise strategies

- Executive management planning instruction

## **B. The Financial Plan**

### i. Strategic Long-range profit plan.

- Sale, cost and profit projections
- Major projects and capital additions
- Cash flow and financing
- Personnel requirements

### ii. Tactical Short-range (annual) Profit Plan:

#### a. Operating Plan

- Planned income statement
- Sales plan
- Production for merchandise purchases plan
- Administrative expense budget
- Appropriation-type budget

#### b. Financial Position Plan (Planned Balance Sheet)

- Assets
- Liabilities
- Owner's equity

#### c. Variable Expenses Budgets: (Output expense formula)

#### d. Supplementary Data: (C.V.P., Ratio Analysis)

#### e. Performance Reports

#### f. Follow-up, Corrective Action, and Preplanning Reports

## **2.7 The basic Elements of Profit Planning and Control**

The basic elements of profit planning and control are as follows (Welsch, 1979:73).

### **Comprehensive and Co-ordinate Plan:**

The profit planning considers all activities and operations of an organization. The budgets prepared by different departments inside an organization are to be compiled or co-ordinate and it is done by profit planning. So, before preparing a profit planning, firstly all the departments have to be compiled and the budget is known as comprehensive budget or profit planning.

**Expressed in Financial Terms:**

All activities covered by budget are related with funds. Therefore, the budget has to be expressed in money units i.e. in Rupees, Dollars, and Pounds etc.

**Plan for Operational Resources and Expenses:**

It is a plan for the firm's operating and resources of budget in mechanization to plan for the firm's all operations or activities. The two aspects of every operation are revenue and expenses. The budgets must plan for and quantity revenue and expenses related to specific operation. Planning should not be done for revenue and expenses only. The plan should be for carry out the operations. The planning for resources will include planning assets and source of funds.

**Future Plan:**

Time dimensions must be added to a budget. A budget is meaningful only when it is related to a specific time. The budget estimates will be relevant only for some specific period.

**2.8 The Profit Planning and Control Process**

A profit planning and control program includes more than the traditional idea of a periodic or master budget. Rather, it encompasses the application of a number of related management concepts through a variety of approaches, techniques, and sequential steps. The term comprehensive means the application of the broad concept of profit planning and control to all phases of operations in an enterprise and the application of a total system approach. The major process of profit planning and control are as:

- Identification and evaluation of external variables.
- Development of the broad objectives of the enterprise.
- Development of specific goals for the enterprise.
- Development and evaluation of company strategies.
- Executive management planning institutions.
- Preparation and evaluation of Project plans.
- Development and approval of strategic and tactical profit plan.
- Implementation of profit plan.
- Use of periodic performance reports.

- Use of flexible expenses budget.
- Implementation of follow-up.

Now we will discuss the eleven steps in the PPC process below:

### **1. Identification and Evaluation of External Variables**

The variable identification phase of the PPC process focuses on identifying and evaluating the effects of the external variables. As the management planning focuses on the best possible manipulation of controllable and non controllable variables, these variables are considered separately. This is done in order to minimize the potential unfavorable impacts.

A particularly significant phase of this analysis includes the evaluation of the present strength and weakness of the enterprise. Planning must start with an objective and realistic understanding of the present status of products, services, markets, profits and returns on investments, cash flow, availability of capital, productive capabilities, and the competence of both management and non management because deficiencies and inefficiencies are frequently difficult to identify and evaluate objectively by those directly involved. The comprehensive PPC approach is based on the expectation that these significant aspects of operations will be critically analyzed and evaluate periodically in an orderly manner.

### **2. Development of the Board Objectives of Enterprise**

In this phase of the PPC process, the executive management should express the mission, vision, and ethical character of the enterprise. Its purpose is to provide identity, continuity of purpose and definition. However the statement of broad objectives normally should not specify the quantitative goals. Rather, it should be a narrative expression of the purpose, objectives and philosophical character of the business. It should be signed for wide dissemination and should be believable, which means, in the long run the company's actions must be in harmony with the statement.

### **3. Development of Specific Goals for the Enterprise**

This phase provides both narrative and quantitative goals that are definite and measurable. These are specific goals that relate to the enterprise as a whole and to the major responsibility centers. Executive management should exercise leadership in this planning phase so that there will be a realistic and clearly articulated framework within which operations will be

conducted toward common goals. This statement of specific goals should define such operational goals as expansion or contraction of products and service lines, geographical areas, share of the market by major products and service lines, growth trends, production goals, profit goals, profit margins, return on investment, and cash flow. When the goals are specific they could offer basis for performance measurement.

#### **4. Development and Evaluation of Company Strategies**

The purpose of developing and disseminating enterprise strategies (long term or short term) is to find the best alternatives for attaining the planned broad objectives and specific goals. Strategies focus on 'how', therefore they outline a plan of action for the enterprise. Executive management must be creative and directly involved in the development of new strategies and in the adaptation of currently ongoing strategies in harmony with the relevant variables with which management must cope. While developing the basic enterprise, the executive must focus on identification of the critical area that influences the long-range success of the enterprise. Critical areas should be pinpointed through evaluation of relevant variables. Although strategy formulation is of continual concern to executive management, periodic reassessment of the strategies is essential in the light of a careful analysis of all relevant variables and their probable future impact on the enterprise.

#### **5. Executive Management Planning Instruction**

This is communication phase between the top management to middle and lower management levels. It explains the broad objectives, enterprise goals, strategies, and any other executive management instruction needed to develop the strategic and tactical profit plans. The executive planning instructions issued by the top management communicate the planning foundation that is necessary for the participation of all levels of management in the development of the strategic and tactical profit plans for the upcoming budget year. At this point of planning process, the foundation has been established to articulate the broad and specific objectives of the enterprise and the strategies that facilitate their attainment.

#### **6. Preparation and Evaluation of Project Plans**

Apart from tactical planning and strategic planning, the concept of profit planning and control covers a systematic and integrated approach to project planning. Project plans encompass such items as plans for improvement of present products, new and expanded physical facilities, and entrance into new industries, exist from products and industries, new technology and other major activities that can be separately identified for planning purposes.

The nature of projects is such that they must be planned as separate units. In planning for a project, the time span considered must normally be the anticipated life span of the project. Projects approved must then be timed into the strategic and tactical profit plans. In addition to any ongoing projects, management should encourage on a continuing basis project proposal from any source within the enterprise. Consistent with this approach, during the formal planning cycle, management must evaluate and decide upon the plan status of each project in process and select and select any new projects to be initiated during time dimensions covered by the upcoming strategic and tactical profit plans.

## **7. Development and Approval of Strategic and Tactical Profit Plans**

Strategic or long range plan and the tactical or short range profit plan are usually developed at the same time. It is generally seen that the executive management develops the strategic and tactical profit plans but the backlash of this practice is that denies the full participation by middle managers in the planning process. And this can give rise to unfavorable behavioral effects.

So here we assume a participatory and the managers of each responsibility centers have received instructions of the executive management. Now the manager of each responsibility center will immediately initiate activities within their responsibility center to develop a strategic long range profit plan and in harmony with the long range plan, a tactical short range profit plan. However a certain format and procedural instructions should be provided by a centralized source to establish the general format, amount of detail and other relevant procedural and format requirement essential for aggregation of the plans of the responsibility centers into the overall profit plans.

After the completion of the two profit plans the approval must be initiated. This process involves approval, disapproval or revision based on action by executive management or presentation and justification by the managers of the responsibility centers to the next higher level of authority.

## **8. Implementation of Profit Plans**

Once the plans are developed and approved, they need to be implemented in such a way that leads the subordinates in attaining enterprise objectives and goals. Thus effective management at all levels requires that enterprise objectives and goals, strategies, and policies be communicated and understood by subordinates. There are many facets involved in management leadership. However, a comprehensive profit planning and control program may aid substantially in performing this function. Plans, strategies, and policies developed through significant participation establish the foundation for effective communication.

The plans should have been developed with the managerial conviction that they are going to be met or exceeded in all major respects. If these principles are effective in the development process, the various executive and supervisors will have a clear understanding of their responsibilities and the expected level of performance, which will ultimately lead to effective implementation of profit plans.

## **9. Use of Periodic Performance**

Performance reports are those reports that show actual results, planned results and variations between those two, to be analyzed to take necessary corrective measures in the future. These performance reports are prepared by the accounting department on a monthly basis however some special performance reports are prepared whenever needed.

A clear distinction must be made between external and internal financial reports. Internal reports can be further classified as

- a. Statistical reports that give the basic quantitative internal statistics about the operations of the enterprise;
- b. Special managerial reports about nonrecurring and special problems; and
- c. Periodic performance reports. The latter reports focus on dynamic and continuous control tailored to the assigned managerial responsibilities. These reports are primarily repetitive, short term reports developed for each of the responsibility centers, which are essential for effective control.

## **10. Use of Flexible Expenses Budget**

Flexible budget is completely different from the profit plan but it is used as a complimentary to the profit plan. Flexible budget gives realistic information about expenses that make it possible to compute budget amounts for various output volumes or rates of activity in each responsibility center. To do this, the flexible budget provides a formula for each expense in each responsibility center. The formula gives the relationship of each expense to output in the center. Each formula includes a constant expenses factor and a variable expense rate. To apply this concept in a department, each expense must be classified into one of the three categories: (a) Fixed expense, (b) Variable expense, and (c) Semi-variable expense. In the case of a fixed expense the variable rate is zero and in the case of a variable expense, the constant factor is zero, and in the case of semi-variable expenses, there is a value for both the constant factor and the variable rate.

Flexible expense budget formulas can be used in two phase of the PPC process. They can be used in performance control reports and in developing the tactical profit plan. If the flexible expense formulas are developed concurrently with the strategic and tactical profit plans, they are used to compute the budgeted expense amounts in the tactical profit plan. This is done by multiplying the planned output or activity of each responsibility center by the related variable expenses rate for each center and then adding any fixed cost for the center.

Flexible expenses budgets are usually constructed early in the budget planning period because, as indicated, they provide cost data for the tactical profit plan.

## **11. Implementation of Follow-up**

To determine whether things are going on as per plans, a continuous follow up action is important. Because performance reports are based on assigned responsibilities, they are the basis for effective follow-up actions. It is important to distinguish between the causes and results of that. The performance variations are the results and the management must determine the underlying cause. Analysis to determine the underlying causes of both favorable and unfavorable performance variances should be given immediate priority. In the case of unfavorable performance variances, after identifying the basic causes, as opposed to the results, an alternative for corrective action must be selected and the corrective actions must be selected and the corrective actions be identified and this is helpful for improving efficiency and for developing positive rainforests to the less successful operations and employees. This is called 'transference of success".

And finally there should be a special follow up to the prior follow up actions to determine the effectiveness of prior corrective actions to provide a basis for improving future planning and control procedures.

## **2.9 Major Tools Used in Profit Planning and Control**

Profit planning and control represents an overall plan of operations which covers a definite period and formulates of planning decision of management. It consists of three main budgets, which are:

### **1. Operating Budget**

Operating budget covers revenue and expenses. In other words, operating budget relates to the physical activities or operations of a firm such as sales, production, purchases, labour, and other different expenses budgets. In specific term an operating budget has the following term:

- a. Sales Budget.
- b. Production Budget.
- c. Purchase Budget.
- d. Direct material Budget.
- e. Direct labour Budget.
- f. Manufacturing overhead budget.

g. Selling and administrative overhead budget.

## **2. Financial Budgets**

Financial Budgets are concerned with expected cash receipts/cash distribution financial position and result of operation. The components of financial budget are:

- a. Budgeted income statement
- b. Cash budget
- c. Budgeted balance sheet

## **3. Appropriation Budget**

The appropriation budget covers all types of expenditure on advertising and research sectors. A part from above budgets, PPC also has relationship with following addition budgets, CVP analysis, and completion of profit plan and performance reports:

- a. Flexible Budget
- b. Capital Expenditure Budget
- a. Zero Based Budgeting
- b. Activity Based Budgeting
- c. Cost-Volume-Profit Analysis
- d. Completion of Profit Plan
- e. Performance Reports

## **2.10 Analysis of Cost Volume Profit Variables**

### **2.10.1 Sales Plan**

Sales planning process is a necessary part of PPC because a. it provides for the basic management decision about marketing and b. Based on those decisions, it is an originated approach for developing a comprehensive sales plan. If the sales plan is not realistic most if not all, of the other parts of the overall profit plan also are not realistic. Therefore, if the management believes that a realistic, sales plan can not be developed, there is little justification for PPC, and despite the views of a particular management, such a conclusion may be an implicit, admission of incompetence. Simply, if it is really impossible to assess the

future revenue potential of a business, there would be little incentive for investment in the business initially or for continuation of it except for purely speculative ventures that most managers and investors prefer to avoid.

A comprehensive sales plan includes separating, but related, plans the strategic and the tactical sales plans. A comprehensive sales plan incorporates such management decisions about planned volume (units or jobs) of goods and services, prices, promotion, and selling efforts.

The primary purpose of a sales plan are a. to reduce uncertainty about future revenues. b. to incorporate management judgments and decisions into the planning process (e.g. in the marketing plans) c. to provide necessary information for developing other elements of a comprehensive profit plan, and d. to facilitate management's control of sales activities (Welsch, Hilton and Gordon, 1999:171-172).

### **2.10.2 Cost Plan**

Generally cost plan refers to the plan for variable cost, fixed cost, 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 decreases. Change in variable cost effects to P/V ratio, BEP and net income. When variable cost increase: Net Income P/V ratio and margin of safety will be decrease but it helps to increase BEP.

Fixed cost remains constant in total amount despite the changes in the level of activities. The is the fixed cost remains unchanged in total as the activity level various. When other factors remain unchanged, the changes in fixed costs effects to BEP and net income. When increase the fixed cost: increase the volume of BEP and decrease the net income or vice-versa. Fixed costs are also called capacity cost.

Expenditures 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, telephone cost, electricity change are some example of mixed costs. It should be operated from the variable 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 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.

### **2.11 Purpose of CVP Analysis**

Cost volume profit analysis helps management in a number of ways. The following purposes are served by it (Dangol, 2004:103).

- a. Calculation of profit resulting from a budgeted sales volume.
- b. Calculation of sales volume to break-even.
- c. Calculation of sales volume to produce desired profit.
- d. Effect or changes on price, costs and profits.
- e. Determination of new break-even point for changes in cost and selling price.
- f. Measurement of effect of changes in profit factors.
- g. Choosing the most profitable alternatives.
- h. Determining the optimum sales mix.
- i. Determination of capacity and equipment selection.
- j. Long term Decision on continuance of products.
- k. Make or buy decisions on sub-assemble or part.
- l. To contemplate the increase or decrease in profits due to the change in method of production, etc.

### **2.12 Application of CVP Analysis in Profit Planning and Control**

Cost-volume-profit analysis is an important tool for profit planning. It has been defined as a managerial tool showing the relationship among cost selling price, profit and volume of capacity. CVP analysis can be applied in the following respects (Dangol, 2004).

- a. It helps in fixation of selling price.
- b. It is helpful in cost control.

- c. It also assists the management in understanding the behaviours of cost and helps in budgetary control.
- d. It helps in determining the level of output where all the costs can be met.
- e. It assists the management in profit planning.
- f. It also assists the management in performance evaluation for the purpose of management control.
- g. It helps very much in making managerial decisions such as make or buy a part, drop or continue a department or product line, accept or reject a special order, selection of a profitable product mix etc.

## **2.13 Approaches to Cost-Volume-Profit Analysis**

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

- i. Contribution margin approach.
- ii. Formula (Equation) approach.
- iii. The graphic (Break even chart) approach

### **2.13.1 Contribution Margin Approach**

Contribution margin is the difference between the sales revenue and variable cost of production. Contribution margin consists the fixed cost and profit i.e. contribution margin is the amount that contribute the coverage of all fixed costs and to the generation of profit.

The contribution margin income approach to cost volume profit analysis allows the preparation of pro-forma statesmen from the available information. BEP and other required CVP relationship can be explained through a contribution margin statement whose philosophy is all fixed cost are period cost that should be deducted from the contribution margin of the same period only the variable costs vary proportionally to the level of output or sales. It can be expressed as:

Contribution margin = Sales – Variable Cost

Contribution margin = Fixed Cost + Profit

Contribution margin is usually expressed as a percentage sales which is known as contribution margin ratio or profit volume ratio. That is:

$$\text{CM Ratio or PV Ratio} = \frac{\text{Contribution Margin}}{\text{Sales}} = 1 - \frac{\text{Variable Cost}}{\text{Selling Price}}$$

### 2.13.2 Formula Approach

The most popularity practice approach to the break even point and cost volume profit analysis is the formula, also known as the equation. It is particularly because the equation provides the most general and the easiest to remember-approach uses an algebraic equation to calculate the break even point. The answers provided by solving the equation may sometimes, need to be rounded to whole numbers of units or lot sizes. The rounding of break even points is always done upward because this will provide a small profit rather than the small loss that would be shown from rounding downward (Raiborn, Barfield and Kinney 1993:203).

The calculation in the equation approach is similar to that of the contribution margin statement approach. The equation is merely a restatement of the other.

$$\text{BE sales values} = \text{FC} + \text{VC} \pm \text{Profit}$$

$$\text{BE Sales Units} \times \text{SPPU} = \text{FC} + (\text{BE Sales units} \times \text{VCPU}) \pm 0$$

<b>Contribution Margin Approach</b>	<b>Symbol or Equation</b>
Sales Volume (Units)	Q
Selling Price Per Units	P
Sales Revenue (Rs.)	Q × P
Less, Variable Costs	Q × VCPU
Contribution Margin	Q × P – Q × VCPU
Less, Fixed Costs	FC
Net Profit	Q × P – Q × VCPU - FC

There fore, BE Sales Value = FC + VC ± Profit

$$\text{BE Sales Units} \times \text{SPPU} = \text{FC} + (\text{BE Sales Units} \times \text{VCPU}) \pm \text{Profit}$$

### 2.13.3 The Graphic Approach to CVP Analysis

A break even chart is used to graphically depict the relationship among revenues, variable cost, fixed costs and profit (or losses). The no profit, no loss point (the break even point) is located at the point where the total cost and total revenue lines cross. Below this point, the firm losses, and above this point, the firm earns profit (Bajracharya, Ojha, Goet and Sharma, 2004:231-232).

In the graph given below the fixed costs remain constant within the relevant range the fixed cost curve is parallel to 'OX' axis. Variable cost slope downward from the origin to right but the slope depends on variable cost ratio. The total costs curve parallels the variable cost curve. So the angle 'O' equals the angle 'V', it is because Total Cost = Total Fixed Costs plus total variable costs at volume 'Q'.

$$\text{Total Costs} = \text{TFC} + Q \times \text{VCPU}$$

At volume 'Q + n'

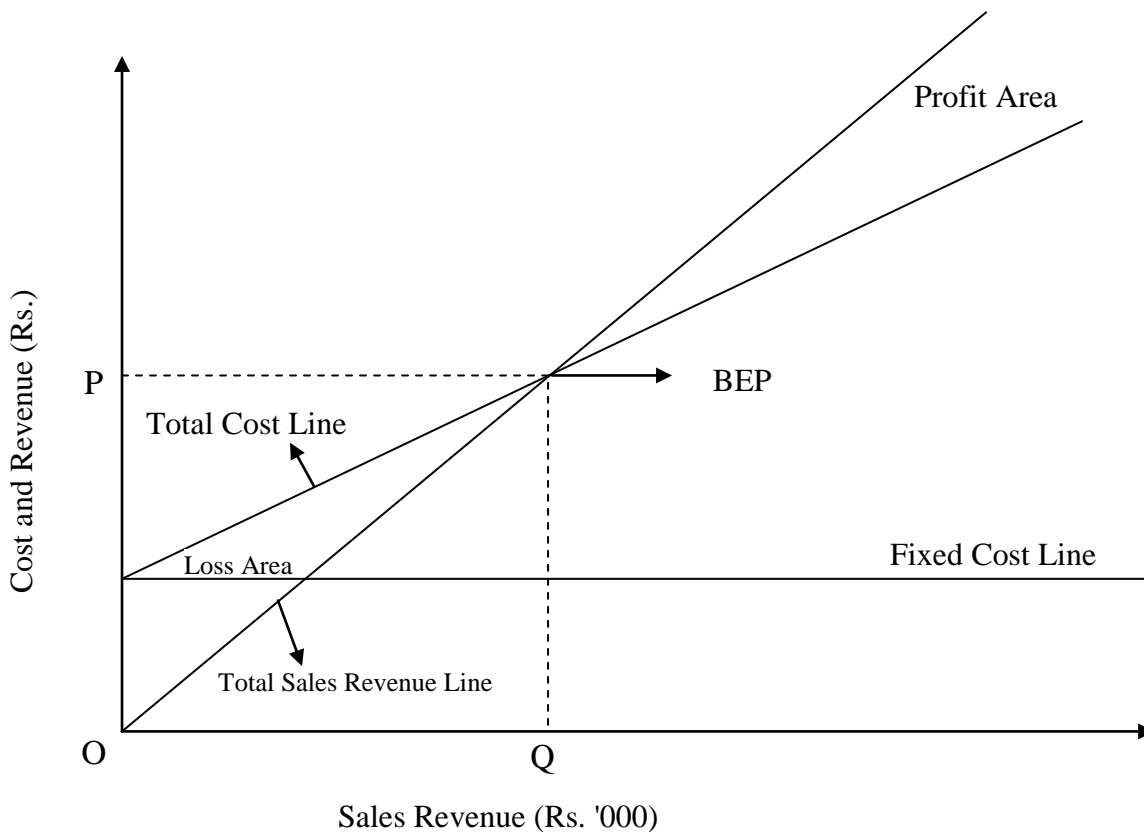
$$\text{Total Costs} = \text{TFC} + (Q + n) \times \text{VCPU}$$

$$\Delta \text{ Total Costs} = O + n \times \text{VCPU}$$

$$\Delta \text{ Total Costs} = \Delta \text{ Variable Costs}$$

That's why the slope of the total cost curve equals the slope of variable cost curve.

**Figure 2.1: Graphical Approach to CVP**



The above graph clearly shows that if the company can reach the point of BEP it can generate sufficient revenues to cover all its operating expenses. At this point, the total revenue equal the total cost. Here, the revenue curve breaks up (interacts) the total cost curve, that's why

this point is called Break Even Point. In short, break even point is that point where, total sales revenue = total costs.

#### **a. 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 levels of sales and margin of safety.
- To find 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 decisions and drop and/or add decisions.

#### **b. 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).

- All cost can be classified into two parts, fixed cost and variable cost. There is no cost other than fixed and variable.
- There is a relevant range of validity (activity) for using the results of the analysis and sales price does not change as units of sales change.
- There is only one product or in case of multiple products, the sales mix among the products remain constant.
- Basic management policy about operation will not change materially in short run.
- The general price level (inflation/deflation) will remain essentially constant or zero.
- Efficiency and productivity per person will remain essentially unchanged in the short run.

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

### **c. Limitations of Break-Even Analysis**

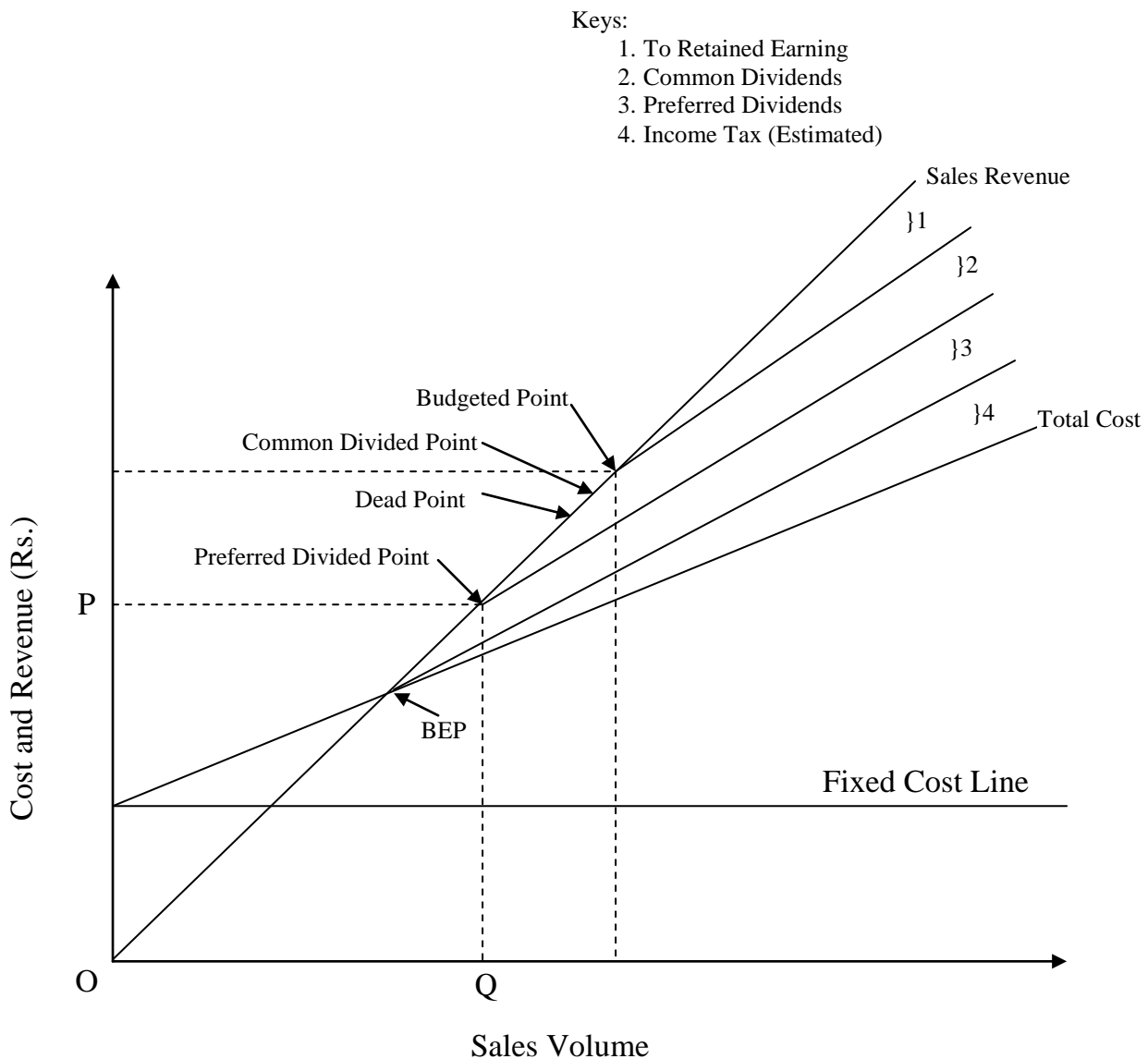
Break-even analysis in many business situations can be used for effective decision making, but there are many shortcomings or limitations in its analysis and interpretations. Some of these can be listed as (Maheshwari, 2000: 183-184).

- The assumptions of producer's market phenomenon not hold good for all types of commodities.
- The fixed costs may not remain constant as well as the variable costs may not vary in fixed proportions at different levels of output.
- With variation in the prices of the items or services which also depend on the factors affecting its demand and supply will certainly affect demand of the commodity. This phenomenon is not covered in break-even analysis.
- Identification of fixed and variable costs involved in production process is very complicated. A shift in product mix changes the break-even point.
- Customers may be given certain discount on purchase to promote sales. This revenue may not be given certain discount on purchase to promote sales. This revenue may not be perfectly variable with level of sales. Output.

### **2.14 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 estimates, however, the arithmetical manipulations generally involve average, 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 effort, the approximate effect on costs and profits of several types of management decisions (Wealch, 1979: 467-468).

**Figure 2.2: Economic Characteristics of Cost-Volume-Profit Analysis**



Above break-even chart with economic characteristic indicates few of the economic characteristics of a business, which are (Welch, 1979:468).

- Fixed costs, variable costs and total costs at varying volumes.
- The profit 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 break-even point.
- The preferred dividend or danger point-the point below which preferred dividends are 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 earnings are insufficient to pay the preferred dividends and the expected dividend on the common stock.

All these points, and as others, can be computed if data are developed for cost-volume-profit purposes.

## 2.15 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 for how close projected operations are to be organization's break-even point. Managers often consider the size of the company's margin of safety when making decision about various business opportunities. The large is the safety when making 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 increase the selling price, provided it does not adversely affective volume or reducing variables costs by brining improvement in the manufacturing process. Margin or safety can be ascertained by using the following formula (Munankarmi, 2003:127).

Margin of safety = (Actual Sales Value – Break-even Sales Value)

$$= \frac{\text{Profit}}{\text{Profit – Volume Ratio}} \text{ (In Amount)}$$

$$= \frac{\text{Profit}}{\text{Unit Contribution Margin}} \text{ (In Units)}$$

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

$$\text{Margin of Safety Ratio} = \frac{\text{Actual Sales} - \text{Break - Even Sales}}{\text{Actual Sales}}$$

The following steps are needed to rectify margin of safety:

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

## **2.16 Cost-Volume-Profit Analysis for a Multi-Product Firm**

The relative proportion of sales of product is called the sales mix or the product mix. In the case of a multi-product firm, the contribution for each product can be found out by deducting its variable costs from sales revenue. The break-even 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 break-even point can be calculated by dividing the total fixed costs by the contribution ratio for the firm. The multi-product firm's P/V ratio will be the weighted average of the P/V ratios 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.

A change in the product mix will not affect the firm's break-even point and profit if each product has the same P/V ratio. However, a change in product mix will change the break-even point and profit when products have unequal P/V ratios (Maheshwari, 2000: 187).

## **2.17 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 weighed average unit contribution. This is the average of the several product unit contribution margin weighted by the relative 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 contributed 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 sell more than one product, these may not be equally profitable. So the company's profit will depend upon the ratio of each product's sales to total sales revenue. Profit large promotion of total sales than if sales consist mostly of low margin items. Changes in sales 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, Ojha, and Sharma, 2004: 260).

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

- Calculate contribution margin or profit-volume ratio for each product.
- Calculate proportion of sales mix in units or values as follows:

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

- Calculated Weighed Average for all products as follows:

$$\text{Weighed Average} = [\text{Sales Mix (units)} \times \text{Unit Contribution Margin}]$$

$$= [\text{Sales mix (value)} \times \text{P/V Ratio}]$$

- Calculate Break-Even Point (BEP)

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

## 2.18 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, number of outputs of its choice (desires).but in real word it is not possible, because of some critical factors like finishing machine or raw material or labour. These critical factors in the CVP analysis are known as constraint.

## **2.19 CVP Analysis with a Single Constraint**

Scarce resource should be efficiently allocated in order to maximize the contribution margin particular simple and instructive situation arises when there is only one constraining resource. This can occur if the firm's products are all 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).

## **2.20 CVP Analysis with Multiple Constraints**

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

## **2.21 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 costs can be separated into fixed and variable components. Constant fixed cost 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 change 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.

## **2.22 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 costs into fixed and variable components.
- It is not correct to assume that total 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 static tool.

## **2.23 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, Hilton and Gordon, 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 Change in Inventory:**

Usually the budgeted changes in inventories i.e. finished goods and work-in-process are immaterial in amount and thus may be disregarded in cost-volume-profit analysis. On the other hand, when the change budgeted inventory is significant; it should be included in the analysis. Including the effect of inventory changes in cost-volume-profit analysis requires subjective judgments 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) Disregard the inventory changes (b) Include the inventory changes.

### **The Non-operating Incomes and Expenses:**

Non-operating income (gains) and expenses (losses) and extra ordinary gains and losses, if 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.

## **2.24 Risk Measurement: the Operating Leverage**

Operating leverage is a measure of the extent to which fixed costs are being used in organization. The relationship if company's variable and fixed costs is reflected in its operating leverage. Generally highly labour intensive organizations have high variable costs and low fixed costs and this has low operating leverage and relatively low break-even point.

Conversely, organizations that are highly capital intensive have a cost structures that includes low variable and high fixed costs which reflects high operating leverage with high break-even point. It shows that fixed costs and operating leverage has direct relationship. Higher the amount of fixed costs higher the operating leverage and break-even point and vice versa. In other words, the firm with relatively high operating leverage has proportionally high fixed expenses; the firm with relatively high operating leverage has proportionally high fixed expenses; the firm's break-even point will be relatively high. The operating leverage factor is determined as under (Munankarmi, 2003:145).

$$\text{Degree of Operating Leverage} = \frac{\text{Contribution Margin}}{\text{Net Income}}$$

## 2.25 Sensitivity Analysis

Sensitivity Analysis is the measurement of elasticity of the change in cost, volume and profit factors or break even point or given profit. The strategist should focus more on the factor, which is more sensitive or responsive for profit. To measure the sensitivity of cost–volume profit factors one can see the impact of certain percentage or amount change in volume, price or cost factors on net profit. In other words, sensitivity analysis is the measurement of responsiveness in outcome with the changes 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.

$$\begin{aligned} \text{Net Profit} &= \text{Total Sales Revenues} - \text{Total Costs} \\ &= \text{Sales Unit} \times \text{SPPU} - \text{Sales Units} \times \text{VCPU} - \text{Fixed Cost} - \text{Taxes} \end{aligned}$$

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

Means, Profit are the function, Price, VC, FC, taxes and so on.

But none of the factors remain unchanged; sometimes the manager can intentionally change the price and cost as a part of strategic decisions. But the strategy should focus more on the factor, which is more sensitive or responsive for profit. Therefore, to measure the sensitivity of cost-volume-profit factors, we can see the impact of certain percentage or amount change in volume, price or cost factors on net profit (Bajracharya, Ojha, Goet and Sharma, 2004:245).

## 2.26 A Brief Review of Books

“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 to changes in volume. It relies on linear cost analysis and on linear revenue assumptions. To gain understanding of CVP analysis, the common example of a firm which produces only single product will be used. The analysis will be expanded to cover firms with several products by multiple divisions”. [*Fisher & Frank, 2000; 109*]

“C-V-P analysis consists essentially in examining the relationship between changes in volume (output) and changes in profit. The scope of C-V-P analysis ranges 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 rely on the simple relationship between changes in revenues and costs and changes in output levels (mixes). Output should be expanded or the output mix altered if the incremental revenue resulting from the change 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 various ranges of output levels and mixes”. [*Nicholas, Birnberg, Jacob & Demski, 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 series of analytical techniques to determine and evaluate the effects on profits of changes in sales volume, sales prices. Fixed expenses and variable expenses. Basically, it applies the concept of a contribution margin income statement: Revenues minus variable expenses equals contribution margin, and contribution margin minus fixed 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 breakeven analysis is usually graphed to show the relationships between revenue (i.e. sales), fixed expenses, and variable expenses, within a relevant range of sales volume”. [*Welsh, Hilton & Gordon, 1992; 531*]

“C-V-P analysis is concerned with examining the relationship between changes in volume and changes in total revenue and costs in the short term. Drury has compared the economist’s

and accountant's models of CVP behavior. The major differences are 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 predict CVP behavior only within the relevant range, where a firm is likely to be operating on constant returns to sale. A comparison of the two models suggested that, within the relevant production range, the total costs and revenue functions are fairly similar.”  
[Drury, 2000;287]

## **2.27 Review of Previous Study**

There are few research paper concerning cost volume profit analysis has been conducted. Most of the researches are in the profit planning and control. Very few dissertations have been submitted related to cost volume profit analysis. Out of the previous research studies only few research are conducted to analyze the cost volume profit of private enterprise and the study is limited by various constraints. Therefore this study is attempted to review the previous research work on profit planning and control as well as management accounting. As CVP is one of the tools of PPC, the previous studies related to PPC are reviewed.

A study done by **Sagar Sharma (2005)** had conducted a research entitled “*Management Accounting Practices in the Listed Companies of Nepal*”. Mr. Sharma had concerned his study to examine and study the practice of management accounting tools in the listed companies in Nepal.

Research is based on primary data only. Stratified random sampling with proportionate allocation of percentage is followed draw the sample No secondary data has been used for his study. He selected 9 manufacturing companies for the purpose. In his research, Researcher has pointed out various finding and recommendations. Some remarkable findings were as follows.

- Lack of information and extra cost burden are the main reason behind not practicing such tools.
- 100% of manufacturing companies were practicing the tools of cost segregation and 89% of companies work practicing break even analysis. Practicing of method of segregation into variable and fixed cost in manufacturing companies in Nepal are 44% practiced analytical method, 22% of the companies use high low method, and average method.

- Management accounting is to help managers in overall managerial activities by providing information and helping in planning, controlling and decision making.
- Practicing of regression method for segregating mixed cost into fixed and variable was nil. The reason behind this was regression method is statistical method which is difficult in application. Besides, it requires expert manpower in statistical methodology. Companies were not ready to hire statistical expert to segregated cost.
- Different types of management accounting tools, which are taught in the colleges, are not found applied by the listed companies in Nepal.
- Nepalese listed companies are in infant stage in practicing of management accounting tools. Such as capital budgeting annual budgeting, cash flow, ratio analysis, zero base budgeting activity based costing, activity costing, target costing and value engineering.
- As Nepal is processing towards globalizing and get membership of WTO, companies are recommended to apply management accounting tools to fit with the global environment.

A study done by **Ishwor Raj Chalise (2008)** entitled with “*Profit planning in Manufacturing Company (a case study of Nepal Lever Limited)*”.

The primary objective of this research was to highlight the system of profit panning applied and its effectiveness in Nepal Lever Ltd in coordination to these main objectives that was focused to meet the following objectives.

- To evaluate the variances between target and actual of Nepal Lever Ltd.
- To analyze the various functional plans formulated and implemented in Nepal Lever Ltd.
- To examine the practice and effectiveness of profit panning in Nepal Lever Ltd.
- To evaluate the profit planning process applied in Nepal Lever Ltd with conceptual prescriptions.
- To point out feasible suggestion and recommendation to make betterment of Nepalese manufacturing enterprise with special reference on Nepal Lever Ltd.
- To analyze the various functional budgets adopted in this enterprise.

On the basis of different analysis, observation and informal discussion, the following major findings have been drawn;

- The company has no panning division; it has no skilled and expert planners as well.

- The company has no proper practice of cost segregation.
- Yearly budget for income and expenditure prepared by general manger with mutual cooperation of other top level managers and which the board of directors finally approves. The middle and lower level manager and other workers are not participated in preparing the budget.
- The company has been suffering from many internal and external factors in formulating and implementing plans. However, it has no proper practice of environment scanning.
- In Nepal Lever Ltd target is more variable than actual because there is no any proper plan and policy during the operating period of the company.
- In Nepal Lever Ltd there is detail plan of manpower and systematic approach to labour planning. The company plans for direct labor hour and direct labour cost needed to produce the planned quantities of goods.
- The company has not a practice of preparing long range production plan; The Company prepares annual production plans of each product.
- The company has no depth analysis of the company's strength and weakness or opportunity and threats.
- The company has no practice of sales forecasting Sales and production are made on ad-hoc basis.
- The company has not a problem in production labour force and material but suffers from unavailability of market.

Some suggestions have been recommended on the basis of major finding of the study of profit planning in Nepal Lever Ltd.

- Trained and qualified manpower of profit planning should be hired and present manpower should be trained to develop and implement the profit plans effectively.
- The company should improve productivity of its product by providing sufficient technical staff and technical equipment.
- There is a lack of periodical performance reports about the activities of the industry. Therefore system of periodical performance reports should be strictly followed to be considered towards poor performance and to take correct action timely.
- The company should make every effort to run the existing plans and utilize the idle equipment and facilities.
- For better performance, company should prepare strategic and tactical profit plans.

- Nepal Lever Ltd should appoint reliable agents and dealers to improve its sales performance.
- Different cost in the company should be diagnosed as controllable and non-controllable within a specific framework of responsibility and time and effective programs should be launched to reduce the controllable expenses.
- Modern strategic management system should be introduced instantly.
- Finally, the company should adopt a systematic approach to profit planning.

A study done by **Madav Rijal (2008)** had studied on the topic “*Cost Volume Profit Analysis to Measure the Effectiveness of Profit Planning and Control (a case study of Nebico Pvt. Ltd.)*”. The study was based on both primary data as well as secondary data and analysis was based on only five years data.

The main objectives of that research analysis are as follows.

- To study relationship of cost volume and profit as an applicable tools of budgeting.
- To evaluate the stability, financial position and sensitivity of Nebico’s activities.
- To analysis the cost volume and profit of the company and its impact in profit planning and
- To provide suggestions and recommendations for improving Nebico’s condition etc.

Mr. Rijal had pointed out some major findings in his research although most of his findings were out of objectives of the study. Some major findings are as follows;

- The company’s sales trend has fluctuation but not satisfactory trend of increasing.
- The company’s variable cost is in high proportion than fixed cost in comparison with total cost. This contributes for lower contribution margin.
- NEBICO had no any plan to reduce cost.
- The profit trend of the company was not satisfactory.
- The company had no effective inventory policy.
- There were not effective sales forecasting techniques.
- NEBICO Pvt. Ltd. had not practice of segregating the cost into fixed variable and controllable or non-controllable.
- Net profit margin profitability ration and other things were not satisfactory.
- The company has not utilized its full capacity.
- CVP relation is not considered while developing sales plan production plan and pricing strategy.

The following suggestions have been recommended on the basis of this research;

- NEBICO should consider BEP analysis while preparing sales plan production plan and setting the price of its products.
- Classification of expenses as variable and fixed or controllable or uncontrollable must be made within a specific framework of responsibility and time.
- Cost control department separately established which is divided the cost by production and control the cost.
- A systematic approach should be made towards comprehensive profit planning. This can considerably contribute to the increase in profitability of NEBICO Ltd.
- CVP analysis and PPC manuals should be communicated from top to lower levels.
- As company is unable to generate more profit as per investment made in fixed cost, company should put address on effective utilization of fixed cost.
- All personnel should be participated on decision making and planning process.

A study done by **Yam Prasad Gautam(2009)** has studied on the topics of “*An Analytical and Comparative study on Cost Volume Profit Analysis of Unilever Nepal Ltd and Dabur Nepal Private Limited*” His research was in partial fulfillment of MBS, submitted to the Nepal commerce campus, TU. His objective of the study was;

- To calculate of profit resulting from a budgeted sales volume.
- To calculate break even point, CM analysis, margin of safety analysis and profit volume analysis.
- To calculate sales volume to produce desired profit
- To contemplate the increase or decrease in profit due to the change in volume of production
- To suggest and recommended with the help of major findings.
- To encourage greater use of CVP approach to manufacturing enterprise in profit planning and control.

Researcher has pointed out various findings and recommendations based on the analysis of data and information.

Some of the major recommendations are as follows.

- Classification of expenses items as variable and fixed or controllable and non controllable must be made within specific framework of responsibility and time.

- Separate cost control department should be established for the effective management of cost.
- UNL and DNPL should be consider BEP analysis while preparing sales plan, production plan and selling price of its products.
- Both companies should consider about the product line to improve its profit. Market studies on demand, supply and pricing of product should be carried out and loss oriented cost should be identified and controlled.
- As UNL and DNPL is multi-product company, more emphasis should be provided the product having high contribution so as more have more profit.
- Some porson of profit should be allocated to research and development program so that new technology could be found which provide more competitiveness in the market.
- UNL and DNPL should have proper manpower planning.
- System of periodical performance reports should be strictly followed to be consists about poor performance and take corrective action immediately and timely.
- New market areas should be identifying for the coverage of increased activities of companies.
- A systematic approach should be made towards comprehensive profit. This can considerably contributed to the increase in profitability to UNL and DNPL. Since separate on of cost in to their fixed and variable elements each and the heart of CVP analysis, all decision makers sought to be fully aware of, and understand the cost structure of their operation otherwise CVP analysis will provide meaning less information.

A study done by **Udya Kumar Dahal(2010)** has studies on the topics of “*Cost Volume Profit Analysis as a tool to measure the Effectiveness of Profit Planning with special reference to Dabur Nepal Ltd.*” This was submitted to Nepal commerce Campus, TU in Partial fulfillment of Master’s Degree in the year 2010.

The main objective of the research was;

- Examine the variance between target and actual sales and production.
- To show the capacity utilization of Dabur Nepal Ltd.
- To forecast future production and sales.
- To analyze financial performance.
- To analyze the CVP of company and its impact of profit planning.

- To analyze the trend of profit over the time covered by the study.
- To provide recommendations and suggestions for improving the profit planning systems of Dabur Nepal Pvt. Ltd.

To conclusion of the research regarding the present practice of profit planning of Dabur Nepal Pvt Ltd. has given below.

- Dabur Nepal Pvt. Ltd constitutes lack of adequate inventory policy.
- No control over external factor i.e. it has poor SWOT analysis.
- Dabur Nepal Pvt. Ltd does not prepare strategic and policies for long term.
- Dabur Nepal Pvt Ltd is not able to coordinate among various departments.
- Dabur Nepal Pvt Ltd not prepares raw material requirement budget and raw material purchase budget systematical.

The researcher also provides the following recommendations;

- CVP analysis should be considered while formulating profit plan.
- Profit planning manuals should be communicated from top level to lower level.
- The company management should look carefully into the basis of setting target for sales and achieving those targets meaningfully.
- Dabur Nepal Pvt. Ltd should focus on the relationship between expenditure and benefit, expenses planning and controlling is necessary to obtains companies goals.
- To get the idea of future cash requirement and application of the form, it should make cash budget systematically.
- The company should prepare raw material budget and production budget scientifically.

## **2.28 Research Gap**

There is a significant gap between present research work and the previous research works. There are hundred of researches which are conducted mainly on profit planning and control and management accounting of public enterprises. In most of the researches, profit planning tools are analyzed in one way or the other but their impact are rarely explained. Cost-Volume-Profit analysis and the sensitivity of their variables in modern business is a current issue but these facts are rarely studied by the previous researcher. To fill this gap, the researcher is intended whole heartedly to conduct this research. For this purpose the

researcher will examine the current practice of Cost-Volume-Profit analysis in the Nepal Electricity Authority and Butawal Power Company.

Probably, it is the first thesis which studies the CVP analysis of Public Enterprises and Private Company Limited of same sectors. So, this study will be fruitful those interested parties, scholars, teachers, students, business man and government for academically as well as policy prospects.

## **CHAPTER - III**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

Stated simply, research means to search again. We study the social problems again and again to find out something more about the phenomena. The first look may not always be adequate. It may be prone to error. This process of searching again and again is known as research.

Research is a systematic and organized effort to investigate a specific problem that needs a solution. This process of investigation involves a series of well-thought-out activities of gathering, recording, analyzing and interpreting the data with a purpose of finding answers to the problem. Thus, the entire process by which we attempt to solve problems or search the answers to questions is called research. Research methodology consists of research design, data collection procedure, data processing procedures and techniques.

#### **3.1 Research Design**

By research design we mean an overall framework or plan for the collection and analysis of data. The research design serves as a framework for the studies, guiding the collection and analysis of the data. Specifically speaking the research design describes the general plan for collecting, analyzing and evaluating data after identifying:

- a. What the researcher wants to know: and
- b. What has to be dealt with in order to obtain the required information?

Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance.

Study is based on descriptive and analytical research design. The study is based on recent historical data, policy, rules etc.

#### **3.2 Period Covered**

The study covered a time period of five years from FY 2006/07-2010/11 for both BPC and NEA. Data are taken from annual report and other sources of BPC and NEA and the analysis is basically made on the basis of these five years data.

### 3.3 Population and Sample

Research population would be all public enterprises and private company ltd. of Nepal. Due to various circumstances it would not be possible to attempt all the number of research population regarding in these dissertation. Two enterprises BPC and NEA are only taken for the research purpose.

### 3.4 Nature and Source of Data

To achieve the basic objective of this research study, secondary as well as primary data have been used.

**Primary Data:** Primary data are original data generated by the researcher for the research project at hand. Thus these data are collected through interviews, questionnaires, observation and direct meeting with concerned persons.

**Secondary Data:** Secondary data refer those for already gathered by other. The source of secondary data can be divided into two groups i.e. Internal and external. The internal secondary data are found within the collected from published document of the company. External secondary data are collected from sources outside the company.

The data and information that have been used in this study are collected from the following sources:

- Report of auditor General Office of BPC and NEA.
- Financial Statement of BPC and NEA.
- Some published as well as unpublished official records of BPC and NEA.
- Some previous studies made regarding in this field.
- Relative magazines and newspapers.
- Book-let published by GoN on the relevant matters.
- Reports submitted to various meetings and seminars.
- Files and documents downloaded from the websites of the enterprises.

### 3.5 Data Collection Procedure

In this research secondary data were used for CVP analysis of BPC & NEA. For the propose of this study, the secondary data are collected from published accounting statement of BPC and NEA, reports of National Planning Commission, Central Bureaus of Statistics and other sources. The review of theory relating this study is based on text books, official publication and previous research studies. Primary data are collected through questionnaire. In most of the case face to face interviews with concerned persons of the company was done. The profile of the respondents can be shown in the following ways.

**Table 3.1: Profile of the Respondents**

S.N.	Categories of Respondent	Questionnaire	
		Number	Percentage
1	Top Level	10	58.82
2	Middle Level	4	23.52
3	Lower Level	3	17.64
Total		17	100

### 3.6 Statistical Tools Used

To find out the major problems and recommend of every research there must be needed data analysis tools, terms and techniques, crude data are managed and analysis in proper tables and formats.

To analyze the selected data, some financial and statistical tools such as mean regression, graphs, bar diagram, least square method, time series, mean, standard deviation, C.V., correlation analysis have been used.

#### **a. Bar Diagram:**

Bar diagram one of the easiest and the most commonly used methods of presenting the numerical data. They present the data by means of bars, or rectangle of equal width. The length of the bars represents the given figures and the width may be of any size.

## **b. Mean, Standard Deviation and C.V.:**

**i. Mean:** The sum of all the observations divided by the number of observations is called mean. In such cases all the items are equally important. It is usually denoted by  $\bar{X}$ . It is defined by the following formula:

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

Where,  $\sum X$  = The sum of observations

$N$  = No. of Observation

**ii. Standard Deviation (S.D.):** The standard deviation is defined as the positive root of the mean of the squared deviations from their mean of a set of values. It is also known as root mean square deviation. It is usually denoted by the Greek letter  $\sigma$  (small sigma). The SD is calculated by the following formula:

$$\sigma = \sqrt{\frac{\sum X^2}{N} - \frac{(\sum X)^2}{N}}$$

**iii. Coefficient of Variation (C.V.):** The relative measure of dispersion based on SD is called coefficient of S.D. Thus,

$$\text{Coefficient of SD} = \frac{\sigma}{\bar{X}}$$

100 times coefficient of SD is called coefficient of variation. It is denoted by C.V. thus,

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

**iv. Time Series Analysis (Trend Analysis):** The collection of readings or data regarding to different time period is called time series. There are two variables in this case one must be time and other variables may be population, production, sales, profit etc. a widely and most commonly used method to describe the trend is the method of least square.

The straight line is given by the following formula:

$$Y = a + bx$$

Where,

Y = Values of dependent variables.

a = Y – intercept

b = Slope of the trend line

X = values of independent variables (Time)

**V. Correlation Analysis:** The degree of relationship between two variables at a time is called correlation. In other words, two variables are correlated in such way that if one variable changes then other variables also changes subsequently. It can be calculated by using following formula.

$$\text{Co-efficient of Correlation (r)} = \frac{N\sum XY - \sum X\sum Y}{\sqrt{N\sum X^2 - (\sum X)^2} \sqrt{N\sum Y^2 - (\sum Y)^2}}$$

$$\text{Co-efficient of Determination (r)}^2 = \left[ \frac{N\sum XY - \sum X\sum Y}{\sqrt{N\sum X^2 - (\sum X)^2} \sqrt{N\sum Y^2 - (\sum Y)^2}} \right]^2$$

$$\text{Probable Error of r (P.E.)} = 0.6745 \times 1 - \frac{r^2}{\sqrt{n}}$$

### 3.7 Method of Analysis

In order to make an analysis of available data, following methods have been employed.

- a. Related data from secondary sources are selected, grouped and tabulated for the purpose of this study.
- b. Tabulated secondary data are analyzed by using different accounting tools.
- c. With the help of analysis, conclusions were drawn and recommendation were suggested.

### 3.8 Analytical Tools Used

#### 3.8.1 Accounting Tools Used

For the purpose of analysis of available data following accounting tools are used:

- Contribution marginal analysis.
- Cost volume profit analysis.
- Contribution margin ratio.
- Break even analysis.
- Margin of safety.

1. Contribution Margin (CM) = Sales – Variable Cost

2. Contribution Margin =  $1 - \frac{\text{Variable Cost}}{\text{Sales}}$

3. Break Even Point (BEP) in Unit =  $\frac{\text{Total Fixed Cost}}{\text{SPPU} - \text{VCPU}}$

4. Break Even Point (BEP) in Rs. =  $\frac{\text{Total Fixed Cost}}{\text{CM Ratio}}$

5. Break Even Point (% of Capacity) =  $\frac{\text{BEP in Unit}}{\text{Total Capacity in Unit}}$

Or,

$$= \frac{\text{BEP in Rs.}}{\text{Total Capacity in Rs.}}$$

6. Cash BEP (in Rs.) =  $\frac{\text{Fixed Cost} - \text{Non Cash Outlays}}{1 - \frac{\text{Variable Cost}}{\text{Sales} - \text{Non Cash Outlay}}}$

7. Required Sales for Desired Profit in Units =  $\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{CMPU}}$

8. Required Sales for Desired Profit in Rs. =  $\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{CM Ratio}}$

9. Required Sales in Units for DPAT =  $\frac{\text{FC} + \text{DPAT}/(1-t)}{\text{CMPU}}$

10. Required Sales in Rs. For DPAT =  $\frac{\text{FC} + \text{DPAT}/(1-t)}{\text{CM Ratio}}$

11. Safety Margin (in Units) = Actual Sales Units – BEP in Units

12. Safety Margin in (Rs.) = Actual Sales in Rs. – BEP in Rs.

13. Margin of Safety Ratio =  $\frac{\text{Actual or Budgeted Sales} - \text{BE Sales}}{\text{Actual or Budgeted Sales}}$

For Multi-Product Firm

1. Overall BEP in Units =  $\frac{\text{Total Fixed Cost}}{\text{Weighted CMPU}}$
2. Overall BEP in Rs. =  $\frac{\text{Total Fixed Cost}}{\text{Weighted CM Ratio}}$
3. Required Sales Volume for Desired Profit in Units =  $\frac{\text{Total Fixed Cost} + \text{DP}}{\text{Weighted CMPU}}$
4. Required Sales Volume for Desired Profit in Rs. =  $\frac{\text{Total Fixed Cost} + \text{DP}}{\text{Weighted CM Ratio}}$
5. Required Sales Volume for Desired Profit after Tax in Rs. =  $\frac{\text{Total Fixed Cost} + \text{DPAT}/1 - t}{\text{Weighted CM Ratio}}$

### 3.9 Research Variable

The research variables of the present study are sales, costs, profit, BEP, P/V ratio, profit Margin of these enterprises.

### 3.10 Testing of Hypothesis

A quantitative statement about the population parameter is called hypothesis. In other words, it is an assumption that is made about the population parameter and then its validity is tested. It may or may not be found valid on verification. The act of verification involves testing the validity of such assumption which, when undertaken on the basis of sample evidence is called statistically hypothesis or test of significance.

Generally, two complementary hypothesis are set up at one time. If one of the hypothesis is accepted, then the other hypothesis is rejected and vice versa. The two complementary hypotheses that are set up in the testing of are the null hypothesis.

**Null Hypothesis:** A statistical hypothesis or assumption made about the population parameter to testing its validity for the purpose of possible acceptance is called null hypothesis. Null hypothesis is also called hypothesis of no difference. We should adopt neutral or null attitude regarding the outcome of the sample while setting up the null hypothesis. The null hypothesis is usually denoted by  $H_0$ .

**Alternative Hypothesis:** A complementary hypothesis to the null hypothesis is called alternative hypothesis. In other words, hypothesis, which is set up against the null hypothesis, is called an alternative hypothesis. An alternative hypothesis is called hypothesis of difference. It usually denoted by  $H_1$ .

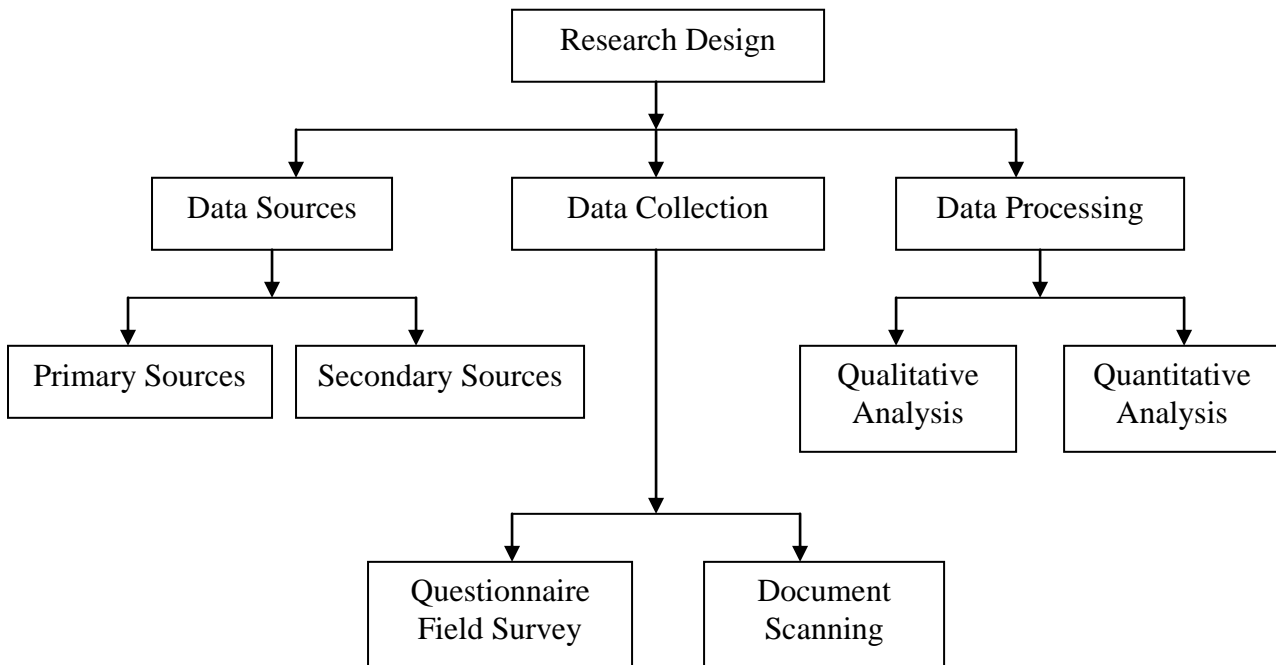
In the light of the objective of the study following null and alternative hypothesis have been developed for this research:

Null Hypothesis  $H_0$ :  $\mu_1 = \mu_2$  there is no significant different between the CVP of NEA and BPC.

Alternative Hypothesis  $H_1$ :  $\mu_1 \neq \mu_2$  there is significant different between the CVP of NEA and BPC. (Two Tailed)

At last, the summary of the research methodology can be shown in the tabular of form as follows:

**Figure 3.1: Summary of the Research Methodology**



## **CHAPTER –IV**

### **PRESENTATION AND DATA ANALYSIS**

#### **4.1 Introduction**

Data presentation and analysis is the important part of the research work. It is known as heart of research. Major findings of the research depend on the data presentation and analysis. Here, the researcher has tried to present and interpret the collected data in a systematic manner and meaningful ways. Mainly, to fulfill the objectives of the study required factors about C-V-P analysis are presented and analyzed. C-V-P analysis is important and very popular tool to measure the financial statement of the organization. It is also important tool used for profit planning in any organization. It shows which volume or level of activities is necessary to breakeven point or to the corporation's profit. It shows the relationship among the variables. Cost-Volume-Profit analyses of these enterprises (BPC and NEA) are comparatively presented. For that purpose sales revenue, profit, contribution margin and sensitivity test are done. Because these are the major variables of cost volume profit analysis.

#### **4.2 Sales Plan of BPC and NEA**

Sales planning are the primary and important steps as well as the primary sources of information, which can be used in functional planning. The capital additions needed, the amount of expenses to be planned, the manpower requirement, and cash requirement are based on the sales plan. It can be said that sales plan opens the door for other planning activities of the business. The sales plan is the basic step, which opens the door of the financial plan. When the actual sales are not deviated from the planned sales then it is known as good plan. Then efficiency of planners or planning experts can be evaluated from the comparison between actual and planned sales.

Sales planning are the necessary components of profit planning and control. It provides the basic management decision about marketing and help to develop comprehensive sales plan. Every organization prepares sales plan. If the sales plan is unrealistic then it will not be beneficial for the organization. Revenues of the organization should be managed and tried to increase continuously. The sales unit determines the volume or quantity of final products to be produced. Labor production and other expenses plans are prepared on the basis of production volume. So, it can be said that the sales plan is the backbone of the profit plan.

Sales are the major sources of revenue and profit. The sales plan should be as realistic as possible. If the sales plans are unrealistic then all other elements of profit plans will be out of reality.

Sales plan will be prepared on the basis of sales forecast. Generally sales plan and sales forecast are used in the same sense but sales forecast and sales plan are not the same. Sales forecast have to be translated into a sales plan after adjustment of various factor associated with sales. Sales plan preparation involves the following interrelated steps:

- The sales forecast
- The marketing plan
- The promotion expenses plan
- The selling expenses plan

The overall responsibility of preparing sales plan lies on the sales manager, although chief executives should also be involved in such activities. There is no realistic sales plan in Nepalese organization. BPC and NEA only fix the sales target for the coming year. BPC and NEA have no practice of preparing the long term sales plan. Only sales target for the upcoming year to each sector is fixed. There is no exercise of preparing sales plan by lines and services. BPC and NEA have not the problems of selling its services but problems of providing services in the demanding time.

#### **4.2.1 Sales Plan of NEA**

Nepal Electricity Authority has been playing crucial role in the sector of utilities. Electricity service is very important of both developed and developing countries. Hydro electricity plays a vital role in the development of country. Development of a country without electricity is totally unimaginable in present world. Electricity service is very essential to every people. Nepal Electricity Authority is not able to fulfill the demand of customers. Electricity service in Nepal is in very weak position. There is mainly lack of electricity in remote areas of Nepal. The Electricity Authority is running in loss since last five years. The main causes for the loss of authority are leakage of electricity and burden of huge amount of fixed expenses. Authority is earning profit from operation but high expenses on interest and depreciation; it is forced to bear loss. Revenue of Electricity Authority is sales of electricity. Sales plan of electricity is very essential for its performance improvement. Electricity Authority has

categorized its customers in various types and charges the price based on that category. Sales revenue of NEA for five years from fiscal year 2006/07 to 2010/11 has been presented in the table below:

**Table 4.1: Sales Revenue**

(Rs. In million)

Year	Actual Sales	Rs. Change	% Change
2006/07	9476.20	-	-
2007/08	11012.60	1536.40	16.21
2008/09	11874.70	862.10	7.83
2009/10	12605.20	730.50	6.15
2010/11	13416.00	810.80	6.43

Sources: Annual Report, 2010/11(NEA)

Above table shows that Sales revenue of NEA for five years from fiscal year 2006/07 to 2010/11. The sales revenue of NEA has increased in the F.Y. 2007/08 by Rs. 1536.4 million which is 16.21% more than the F.Y. 2006/07. In the F.Y. 2008/09 the sales revenue of NEA increased by 7.83% than that the F.Y. 2007/08. In the F.Y. 2009/10 sales revenue of NEA increased by Rs. 730.50 million which is 6.15% more than the previous F.Y. But sales revenue increased in a decreasing rate. In the F.Y. 2010/11 sales revenue increased by Rs. 810.80 million which is 6.43% more than that of previous year. The sales revenue of NEA increased from fiscal year 2006/07 to 2010/11 but the percentage change in sales is decreased from F.Y. 2006/07 to F.Y. 2009/10 and again from F.Y. 2009/10 the percentage change in sales has increased, which is a good indication of the company's future performance.

**Table 4.2 Sales in unit of NEA**

(in millions)

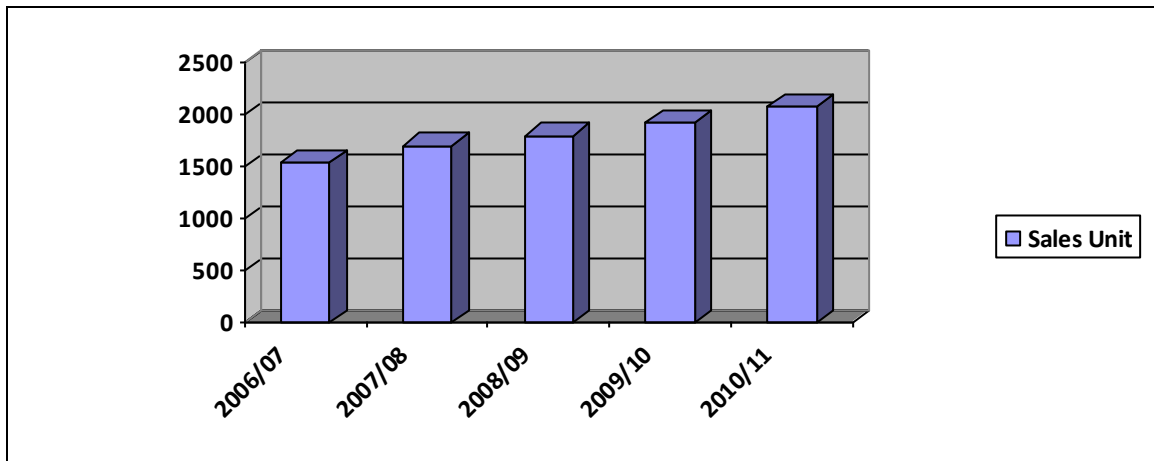
Year	Sales Unit	Increase in Sales P.A.	% Change
2006/07	1534.313	-	-
2007/08	1696.816	162.503	10.59
2008/09	1795.233	98.417	5.80
2009/10	1918.35	123.117	6.86
2010/11	2066.27	147.92	7.71

Sources: Annual Report 2010/11, (NEA)

In the above table the sales unit of NEA increases in the F.Y. 2007/08 by 162.503 million unit which is 10.59% increase in sales unit of previous F.Y. 2006/07. Similarly in the F.Y. 2008/09 the sales unit increased by 98.417 million unit and the percentage increases in sales of F.Y. 2007/08 by only 5.80%. It shows the sales unit of NEA increased in decreasing order from F.Y. 2006/07 to 2008/09. In F.Y. 2009/10 sales unit increased by 123.117 million unit and percentage increased than previous year sales was 6.86%. Similarly in F.Y. 2010/11 sales unit increased by 147.92 million unit and percentage increased than previous year was 7.71%. It shows that the sales unit of NEA increased in an increasing rate from F.Y. 2008/09 to 2010/11, which is positive indication. And viewing the last five years sales unit we find the fluctuating trend of NEA's sales unit.

The presentation of above sales unit of NEA will be more effectively represented by the following graph:

**Figure 4.1: Graph Showing Sales Unit of NEA in Different Year**



To analyze the trend of actual sales of the company least square method can be used to format possible future scales for given time or year.

**Table 4.3: Time series analysis of NEA**

Year	Income (Y)	Time (x)	X <sup>2</sup>	XY
2006/07	9476.20	1	1	9476.2
2007/08	11012.6	2	4	22025.20
2008/09	11874.7	3	9	35624.1
2009/10	12605.2	4	16	50420.8
2010/11	13416	5	25	67080
N=5	$\sum Y = 58384.7$	$\sum X = 15$	$\sum X^2 = 55$	$\sum XY = 184626.3$

Sources: Annual Report 2010/11, (NEA)

Straight line trend of actual sales (y) depends upon time(x), which is expressed as

$$y = a + bx$$

Substituting the value in equation (1) & (2)

$$\sum y = na + b \sum x \dots\dots\dots(1)$$

$$\sum xy = a \sum x + b \sum x^2 \dots\dots\dots(2)$$

Here:

$$58384.7 = 5a + 15b \dots\dots\dots(3)$$

$$184626.3 = 15a + 55b \dots\dots\dots(4)$$

By solving

$$a = 8835.25$$

$$b = 947.22$$

Thus,  $y = a + bx$

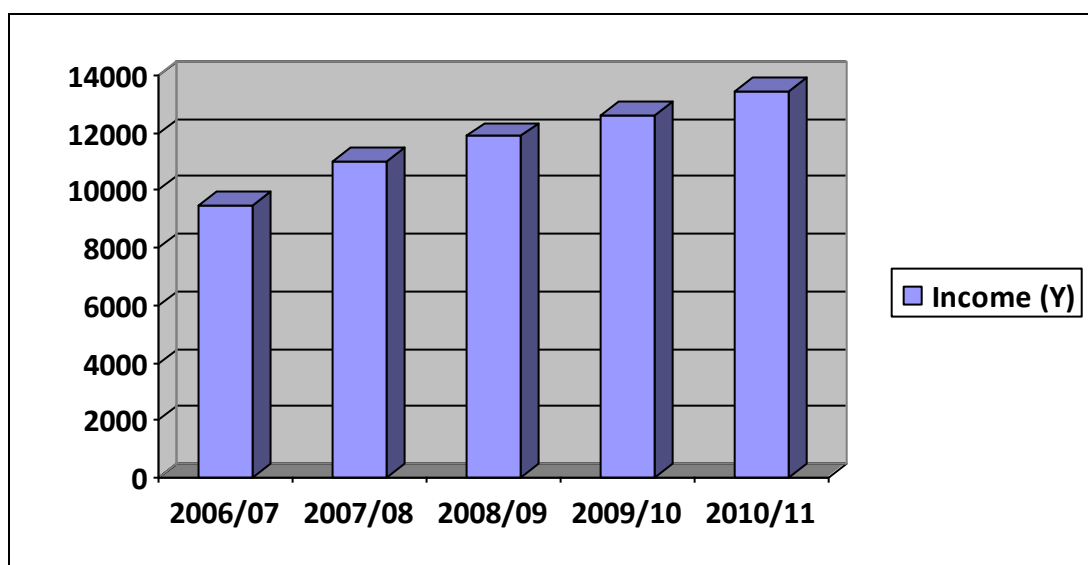
Therefore,  $y = 8835.28 + 947.22x$  is the trend line of sales which shows the positive sales revenue in the future. By using this trend we can estimate the actual sales for 2011/12.

$$y = 8835.28 + 947.22 \times 6$$

$$= 8835.28 + 5683.32, = 14518.6 \text{ million.}$$

Therefore if the trend does not change, possible sales of NEA for the year 2011/12 will be Rs. 14518.6 million.

**Figure 4.2: Graph Presentation of Sales Trend of NEA**



#### 4.2.2 Sales Plan of BPC

The main business of the company is generation of hydro electricity, distribution of electricity and providing consultant services relating to generation and distribution of electricity. In addition the company has major investment in shares and has conducted fund management activities as well.

Sales revenue (income) of BPC has been presented in the table for 5 years from fiscal year 2006/07 to 2010/11.

**Table 4.4: Income of BPC in Different Year**

Year	Income	Amount Change P.A.	% Change
2006/07	281521	-	-
2007/08	108144	(173377)	(61.58)
2008/09	531611	423467	391.58
2009/10	395712	(135899)	(25.56)
2010/11	493710	97998	24.76

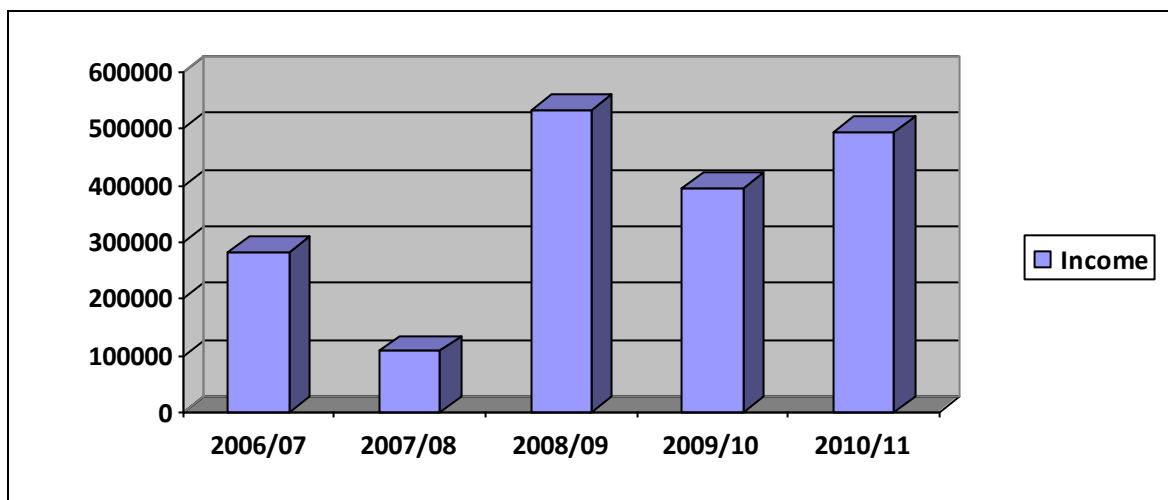
*Sources: Annual Report 2010/11, (BPC)*

From the above table it shows the sales revenue of BPC for 5 years F.Y. 2006/07 to F.Y. 2010/11. Sales revenue of BPC is decreased in the F.Y. 2007/08 by Rs. 173377 thousand which is 61.58% less than the year 2006/07. In the F.Y. 2008/09 the sales revenue of BPC

decreased by 391.58% than that of F.Y. 2007/08 in the F.Y. 2009/10 sales revenue of BPC decreased by Rs. 135899 thousand which is 25.56% less than the previous F.Y. In the F.Y. 2010/11 sales revenue increased by Rs. 97998 thousand which is 24.76% more than that of previous year. From this calculation it can be concluded that the revenue of BPC is highly fluctuated in last 5 years. And it gives the high risk to company. So stabilization of income is necessary.

The presentation of the above total operating income figure will be more effective by following graph:

**Figure 4.3: Income of BPC in Different Year**



To analyze the trend of actual sales of the company least square method can be used to forecast possible future sales for given time or year. The straight line trend of actual sales “y” depends upon the time “x” which is expressed as

$$y = a + bx$$

For calculation, the value of a and b can be obtained by solving the following two equations:

$$\sum y = na + b \sum x \dots\dots\dots(1)$$

$$\sum xy = a \sum x + b \sum x^2 \dots\dots\dots(2)$$

**Table 4.5: Time Series Analysis of BPC**

Year	Income (Y)	Time (x)	X <sup>2</sup>	xy
2006/07	281.50	1	1	281.5
2007/08	108	2	4	216
2008/09	531	3	9	1594.8
2009/10	395.7	4	16	1582.8
2010/11	493.7	5	25	2468.5
N=5	$\Sigma Y = 1810.5$	$\Sigma X = 15$	$\Sigma X^2 = 55$	$\Sigma XY = 6143.6$

Sources: Annual Report 2010/11, (BPC)

Substituting the value of table in equation (1) and (2)

$$1810.5 = 5a + 15b \dots\dots\dots(3)$$

$$6143.6 = 15a + 55b \dots\dots\dots(4)$$

Therefore,

$$a = 148.47$$

$$b = 71.21$$

Thus,  $y = 148.47 + 71.21x$ , is the trend line of sales which shows the positive sales revenue in the future.

By using this trend we can estimate the actual sales for F.Y. 2011/12.

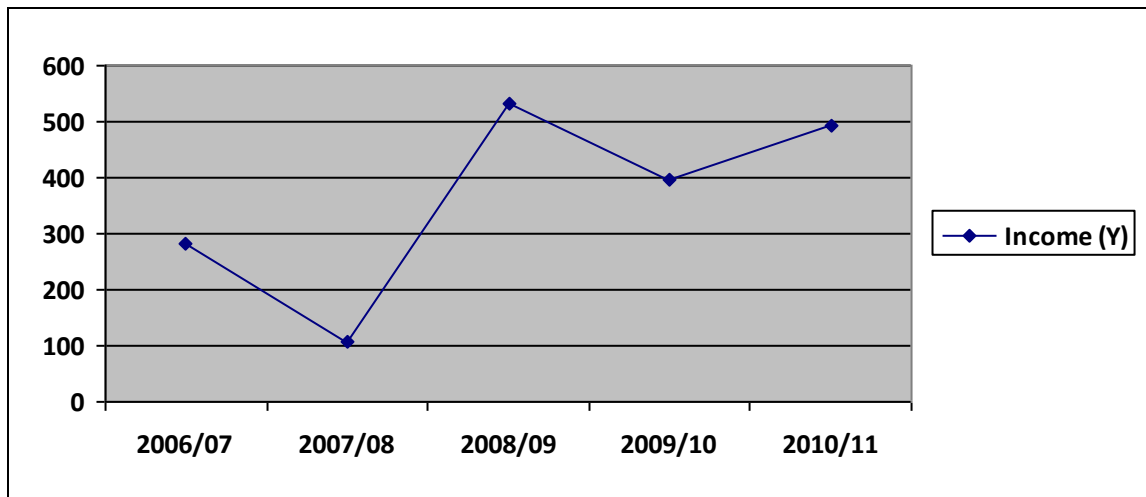
$$y = 148.47 + 71.6 \times 6$$

$$= 148.47 + 427.26$$

$$= 575.73$$

Therefore, if the trend does not change, the possible sales of BPC for the year 2011/12 will be Rs. 757.73 millions.

**Figure 4.4: Graphical Presentation of Income Trend of BPC**



### 4.3 Cost plan of NEA and BPC

Cost represents the resource that has been or must be sacrificed to attain particular objectives, the resource may have tangible (material or machinery) or they may take the form of service (wages, rent, power, or time spent). The cost is the amount which is expenses for production of goods and services or used in operation. When we take any goods or services we have to pay some amount for that. Organization has to bear various types of costs, like variable costs, fixed costs or semi-variable costs. Variable cost represents that part of cost, which varies with change in volume of activity. It varies in total but its incidence on unit cost remains constant. Variable cost can be control so; it is also called controllable cost. But fixed cost cannot control and it is known as uncontrollable cost. Fixed cost represents costs, which remain constant in total with in current budget period regardless of changes in volume of activity. This concept of fixed costs remains valid within certain output and turnover limits. Fixed costs do not vary in total. The incidence of fixed cost on unit cost decreases as production. For operation of business cost is required but it should control to earn profit. Different organization bears different types of costs. For the cost volume profit analysis production and operation cost should be segregated. Variable cost and fixed cost is very much necessary to find for CVP analysis. Every organization must determine the level of BEP to save from the loss. Level of cost and sales revenue become equal at breakeven point. So the organization should segregate their various types of cost into fixed and variables. Both NEA and BPC have different types of cost or expenses. But the enterprises in Nepal have not practice CVP analysis. So, they don't have segregated the cost into fixed or variable.

#### 4.4 Variable Cost of BPC and NEA

Variable cost is that part of total cost which changes directly in proportion with volume. Total variable cost changes with changing volume of output. Increase in output will lead to increase in total variable cost and decrease in output will lead to reduction in total variable cost. However, variable cost per unit of production remains the same irrespective of increase or decrease in volume of production. Variable costs are very sensitive in nature and are influenced by a variety of factors. Variable costs are uncontrollable cost. So, management has to give priority to control variable cost. In BPC and NEA cost volume profit analysis is not practicing. So, costs are not segregated into variable and fixed. Based on the nature of the cost and assumption, various types of cost of both enterprises are segregated into fixed and variable cost of BPC and NEA are as follows:

**Table 4.6: Variable cost of NEA and BPC**

(in million)

Particulars	Variable Cost of NEA				
	2006/07	2007/08	2008/09	2009/10	2010/11
Generation cost	5728.70	5169.40	6565.9	7246.5	8374.8
Transmission cost	158	178.60	199.50	215.90	232.50
Distribution cost	1174.40	1308.60	1376.10	1484.20	1652.90
Total Variable cost	7061.10	6656.60	8141.50	8946.60	10260.20
Percentage change	-	(5.73)	22.30	9.89	14.68
Variable cost of BPC					
Power plant expenses	39.826	3.703	47.369	59.6	57.727
Distribution expenses	29.673	27.170	27.170	30.296	31.125
Staff bonus	3.297		8.933	4.046	6.791
Total variable cost	72.806	0.872	74.539	93.942	95.643
% change	-	(2.66)	5.17	26.03	1.81

Sources: Annual Report 2010/11, (NEA and BPC)

In NEA variable cost is decreased by 5.73% in the Fiscal year 2007/08 and reached the amount Rs 6656.60. In the F.Y. 2008/09 the variable cost of NEA is increased by 14.68% and reached the amount Rs. 10260.20 million. From the analysis of the table, it is clear that the variable cost of NEA is increased continuously expect on F.Y. 2007/08. But the percentage charged in variable cost is in fluctuating trend.

Total variable cost of BPC is the sum of power plant expenses, distribution expenses and staff bonus. Total variable cost in the year 2006/07 is Rs 72.806 million and decreased by 2.66% in the FY 2007/08. In F.Y. 2008/09 variable cost is increased by 5.17% and than 26.03% and 1.81% increase in cost in following consecutive years. But the cost is increased in fluctuating rate.

#### **4.5 Fixed Cost of BPC and NEA**

Fixed cost represents cost, which remain constant in total within current budget period regardless of changes in volume of activity. Fixed cost is ordinarily indirect with respect to department or plant. Fixed costs are not influenced by managerial problems. It should, however be noted that an expenditure is fixed within specified limit relating to time or activity. Fixed costs remain constant in total despite the charges in the level of activity within every year. When production cost or service cost are charged but fixed cost remains same. The per unit fixed cost may decrease while the numbers of production units are increased. Though, fixed cost in total may vary for different fiscal year. The fixed costs of BPC and NEA presented here are based on the assumption and nature of cost. Because of cost segregation tools are not applied in these enterprises. Fixed cost of BPC and NEA is presented in table below.

**Table 4.7: Fixed Cost of NEA and BPC**

(in millions)

Particulars	Fixed Cost of NEA				
	2006/07	2007/08	2008/09	2009/10	2010/11
Administrative Cost	447.4	536.10	489.10	622.4	653.7
Interest	1395.5	2973.40	2991.5	2079.8	3281.5
Depreciation	1420.1	1656.70	1686	1733.5	1751.3
P\L on Foreign Exchange	271.60	-	59.1	230	48.5
Referred Revenue Expenditure	512.5	411.1	320.1	123.3	85
Total Fixed Cost	4047.1	5577.3	5545.8	5329	5820
% Charge	-	37.81	0.56	3.91	9.21
Variable Cost of BPC					
Consultancy Service Expenses	19.794	14.984	10.946	14.903	13.692
Administrative Expenses	15.249	25.066	38.371	41.201	36.438
Depreciation	44.770	42.093	46.1312	47.413	49.959
Foreign Currency Exchange Gain/Loss	(11.206)	11.181	2.62	10.222	(7.483)
Total fixed cost	68.607	93.324	98.068	113.739	92.6
% change	-	36.03	5.08	15.98	(18.59)

Sources: Annual Report 2010/11, (NEA and BPC)

In Nepal, total fixed costs is in fluctuation trend. Total fixed cost of NEA is Rs. 4047.1 million in F.Y. 2006/07 and increased by 37.81% and reached Rs. 5577.3 million in F.Y. 2007/08. In F.Y. 2007/08 its total fixed cost increased by very high percentage nearly 38% but in F.Y. 2008/09 fixed cost is decreased by 0.56%. And in F.Y. 2009/10 the fixed is again decreased by 3.91% In the F.Y. 2010/11 total amount of fixed cost is Rs. 5820 million and the percentage change is 9.21%. The total fixed cost of NEA is very because of high amount of interest on long term loan and depreciation. High fixed cost increases the break even level. So, the management should try to reduce the unusual fixed cost by preparing strategies plans.

From the above table it shows that fixed of BPC is in increasing trend from FY 2006/07 to FY 2010/11. In FY 2010/11 fixed cost of BPC being decreased by 18.59% in comparison of fixed cost of FY 2009/10. In FY 2007/08 fixed cost of BPC is increased by 36.03% in comparison with FY 2006/07 and in FY 2008/09 a slight change has been occurred i.e. increased by 5.08% of previous year fixed cost. In FY 2009/10 fixed cost of BPC increased to

Rs. 113.739 million from Rs. 98.068 million of previous FY 2008/09. The fixed cost increased in FY 2007/08 is very high in comparison with previous year. But in FY 2010/11 fixed cost of BPC is decreased to Rs. 93.6 million from Rs. 113.739 million of previous FY 2009/10. The company is able to reduce the fixed cost by 18.59% in this FY.

#### **4.6 Semi Variable Cost Analysis**

Semi-variable cost is that part of cost which is partly fixed and partly variable. These costs show mixed relationship, when plotted against volume. Semi-variable cost may remain fixed within a certain activity level, but once that level is exceeded they may vary without having direct relationship with volume changes. Semi-variable costs do not fluctuate in direct proportion to volume. The examples of semi-variable costs are repair and maintenance, supervision, fuel, energy, etc. These costs consist of both fixed and variable costs. BPC and NEA have not segregated the cost into variable or fixed. So, semi-variable costs are also accumulated in total cost. Therefore, above mentioned costs are classified into variable and fixed as per suggestion and detail by the guide of senior staff of the enterprise.

#### **4.7 Cost-Volume-Profit Analysis of BPC and NEA**

Profit is a must for the survival and growth of any business entity. But profit does not just happen or improve. They are managed. Management of profit requires planning, activating, coordinating and controlling of organizational activities bearing direct or indirect effect on profits. Cost-volume-profit analysis serves as a powerful tool for the management of profit planning. The volume at which the firm operates is an integral factor on its profit plan. Volume affects revenue, expenses and net income or profit. Cost-volume-profit analysis applies marginal or variable costing principles while establishing the effect of the future courses of activities on the financial results of the firm. Knowledge of how cost behaves in response to change in cost and volume helps management to make numerous short-term optimal decisions relating to cost control and profit maximization. CVP analysis helps to determine the minimum sales volume to avoid losses and the sales volume at which the profit of the company will increase. When the management has detail information about the variable and fixed costs, selling price and sales volume of the product then the company can determine the break-even level of its product. Income statement shows the picture of company, how it is earning profit. Here, the income statement of BPC and NEA are shown based on its revenues, variable and fixed costs etc.

**Table 4.8: Income statement of NEA for the year 2006/07 to 2010/11**

(Rs in million)

Particular	2006/07	2007/08	2008/09	2009/10	2010/11
1. Sales revenue	9476	11013	11875	12605	13416
2. Total variable cost	7061	6657	8142	8947	10260
3. CM (contribution margin) (1-2)	2415	4356	3733	3658	3156
4. Total fixed cost	4047	5577	5546	5329	5820
5. Profit/loss (3-4)	(1632)	(1221)	(1813)	(1671)	(2664)
6. Other income	460	513	671	618	597
7. Profit/loss including other income	(1172)	(708)	(1142)	(1053)	(2067)
8.P/L% on sales	(12.37)%	(6.43)	(9.62)%	(8.53)%	(15.41)%

*Sources: Annual Report 2010/11, (NEA)***Table 4.9: Income statement of BPC for the year 2006/07 to 2010/11**

(Rs in millions)

Particular	2006/07	2007/08	2008/09	2009/10	2010/11
Operating revenue	256.445	107.979	294.858	335.494	375.27
Total variable cost	72.806	70.872	74.539	93.942	95.643
CM (contribution margin) (1-2)	183.639	37.107	220.319	241.552	279.627
Total fixed cost	68.607	93.324	98.068	113.739	92.6
Profit/loss (3-4)	115.032	(56.217)	122.251	127.813	187.027
Other income	13.870	11.346	239.374	70.440	110.957
Profit/loss including other income	128.902	(44.871)	361.623	198.253	297.984
P/L% on sales	44.86%	(52.06)%	41.46%	38.1%	49.84%

*Sources: Annual Report 2010/11, (BPC)*

From above table it is seen: Nepal Electricity authority (NEA) is suffering from loss since FY 2006/07 to FY 2010/11. In FY 2010/11 loss on sales is 12.37%. In FY 2007/08 loss on sales is 6.43% which is lower than that of previous year. In year 2008/09 and 2009/10 there are 9.62% and 8.35% loss respectively. But in year 2010/11 loss on sales is very high than other

previous years. In this year loss on sales is 15.41%. The regular loss condition of NEA indicates the necessity of cost planning and applying and applying controlling tools to improve financial condition. It should find out its break even level of sales revenue to earn profit.

On the other hand BPC is earning profit is increasing trend. The profit of BPC is increasing in fluctuating rate through out the study period except on FY 2007/08. In FY 2007/08 profit of BPC is decreased by 52.06% in comparison with previous year's profit. Variable and fixed costs are also increasing. Profit on sales is 44.86% and 41.46% in year 2006/07 and 2008/09 respectively. In year 2010/11 profit is 49.84% which is more than previous year's increment. In year 2009/10 company's profit is reduced by nearly 3% and able to maintain the previous years profit percentage.

#### **4.8 Analysis of Contribution Margin Ratio, BEP, Margin of Safety**

In cost volume profit analysis, we have to compute various ratios which are important part of C-V-P analysis. Cost Volume Profit analysis aim will fulfill when we are able to analyze these all parts of CVP's tools. Contribution margin is the difference between sales revenue and variable cost, i.e. marginal cost. This amount equals with fixed cost and profit. Contribution margin equals sales minus variable cost. Contribution margin is known as profit volume ratio or CM ratio, which is computed by dividing the sales to contribution margin. Break even point is no profit no loss point where cost and sales revenue becomes equals. It is very necessary to know the BEP for every organization. BEP can be computed in Rs. and unit.

$$\text{BEP in Unit} = \frac{\text{Fixed Cost}}{\text{CMPU}}$$

$$\text{BEP in Rs.} = \frac{\text{Fixed Cost}}{\text{CM Ratio}}$$

Margin of safety represents the difference between sales at a given activity and sales at break even point. Consequently it indicates the extent to which a fall in demand could be absorbed before company begins to sustain losses. The margin of safety is explained as percentage of sales. The validity of safety always depends on the accuracy of cost estimates. The wide margin of safety is advantageous for the company. Margin of safety depends on level of fixed

cost, rate of contribution and level of sales. The relationship of margin of safety with sales can be explained;

$$\text{Actual sales} - \text{BEP Sales} = \text{Margin of Safety}$$

**Table 4.10: Computation of Various Ratios of NEA**

(Rs in millions)

S.N.	Particulars	2006/07	2007/08	2008/09	2009/10	2010/11
1	Sales	9476	11013	11875	12605	13416
2	CM	2415	4356	3733	3658	3156
3	P/V ratio	0.25	0.40	0.31	0.29	0.24
4	Fixed cost	4047	5577	5546	5329	5820
5	BEP	16188	13943	17890	18376	24250
6	BEP % on sales	170.83%	126.60%	150.65%	145.78%	180.75%
7	MOS		(2930)	(6015)	(5771)	(10834)
8	MOS % on sales		(26.60)%	(50.65)%	(45.78)%	(80.75)%
<b>BEP(Rs) Considering Other Income and Expenses</b>						
9	Other income	460	513	671	618	597
10	FC after deducting other income	3587	5064	4875	4711	5223
11	BEP(Rs) 10/PV ratio	14348	12660	15726	16245	21763
12	MOS(1-11)	(4872)	(1647)	(3851)	(3640)	(8347)
13	MOS % on sales	(51.41)%	(14.96)%	(32.43)%	(28.88)%	(62.22)%

Sources: Annual Report 2010/11, (NEA and BPC)

**Table 4.11: Computation of Various Ratios of BPC**

(Rs. in millions)

S.N.	Particulars	2006/07	2007/08	2008/09	2009/10	2010/11
1	Sales	256.445	107.979	294.858	335.494	375.27
2	CM	183.639	37.107	220.319	241.552	279.627
3	P/V ratio	0.72	0.34	0.75	0.72	0.75
4	Fixed cost	68.607	93.324	98.068	113.739	92.6
5	BEP	95.2875	274.48	130.76	157.97	123.47
6	BEP % on sales	37.16%	254.2%	44.35%	47.39%	32.90%
7	MOS	161.16	(103.5)	164.098	177.52	251.8
8	MOS % on sales	62.84%	(95.85)%	55.65%	52.91%	67.1%
<b>BEP(Rs) Considering other Income and Expenses</b>						
9	Other income	13.87	11.346	239.374	70.44	110.957
10	FC after deducting other income	54.737	81.978	(141.306)	43.299	(18.357)
11	BEP(Rs) 10/PV ratio	76.02	241.11	(188.408)	60.1375	(24.48)
12	MOS(1-11)	180.425	(133.131)	483.27	275.36	399.75
13	MOS % on sales	70.36%	(123.29)%	163.90%	82.08%	106.52%

Sources: Annual Report 2010/11, (NEA and BPC)

BEP considering other income and expenses = (fixed cost-non operating income + other expenses)/PV ratio.

Above table shows the contribution margin, CM or PV ratio, break even sales, margin of safety and its percentage as well as BEP and margin of safety is calculated again considering other income of NEA. In cost Volume Profit analysis calculation of these ratios are compulsory.

Contribution margin of NEA is not satisfactory. Contribution margin ratio of NEA in FY 2006/07 is 0.25. In this year NEA's break even sales is higher than actual sales revenue, so safety margin is negative and less by 70.83%. Similarly the NEA's PV ratio is very less in year 2007/08 by 0.4 and negative and less by 26.60%. In FY 2008/09 PV ratio is 0.31, percentage of BEP on sales is 150.65% and margin of safety as percentage of sales is 50.65% which shows the poor financial condition of NEA. Again in FY 2009/10 and 2010/11 the

ratios are 0.29 and 0.24 and percentage of BEP on sales are 145.78% and 180.75% and margin of safety as percentage of sales are 45.78% (negative) and 80.75% (negative) respectively. Break even sales is higher than actual sales of NEA which shows that it is necessary to increase in sales to recover loss and management should plan for its cost control. Contribution margin of NEA is very low as well as fixed cost is very high. It increase BEP and the margin of safety becomes negative.

When other income is considered and deducted from total fixed cost income reduces the cost as a result BEP sales level of NEA is decreased than previous time, margin of safety is increased than prior time. But still margin of safety is negative.

On the other hand, above table shows the detail Cost Volume Profit system of BPC. Relationship among various variables show the actual position of PBC amount contribution margin and its percentage as well as BPE volume of the BPC is computed including other income. This shows different break even volume than when excluding it in previous part.

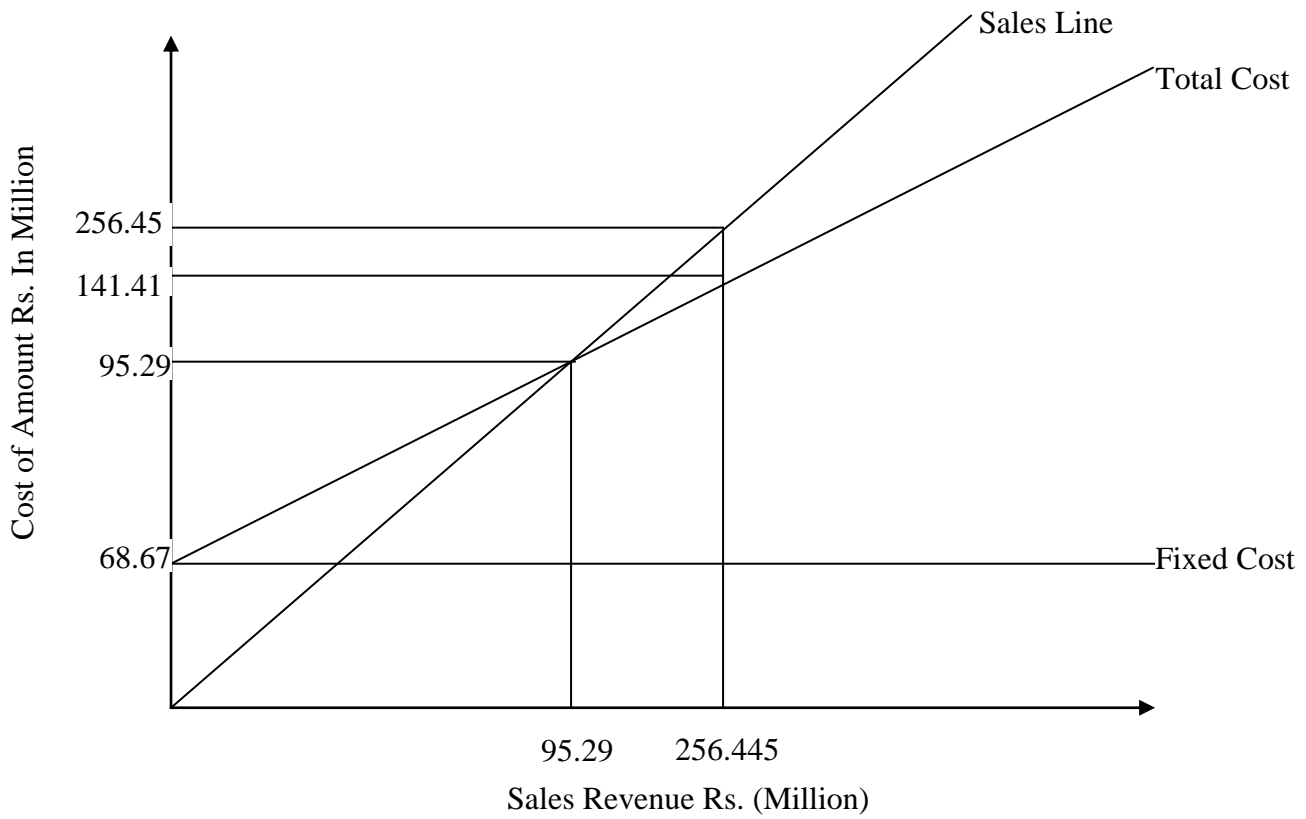
Contribution margin ratio of BPC is 0.72, 0.34, 0.75, 0.72 and 0.75 in fiscal year 2006/07 to 2010/11 respectively.

Company is in profit position because its margin of safety is able the break even volume except in FY 2007/08. Percentage of BEP on sales is 37.16%, 254.20%, 44.35%, 47.09% and 32.9% from year 2006/07 to 2010/11 respectively. BPC has Rs. 161.16 million safety margin in 2006/07 which is 62.84% of actual sales. The margin of safety is (95.85)%, 55.65%, 52.91% and 67.1% in remaining four years. Margin of safety stock is Rs. 251.8 million in year 2010/11. The above table shows that the percentages of BEP on sales are fluctuating from 37.16% to 32.90%. The fluctuating percentage of BEP on sales indicates the fluctuating trend of profit.

Other income, which is non operating incomes of PBC is included in fixed cost and computed BEP and margin of safety. It has reduced the BEP volume and increased the safety margin and its percentage. It clearly indicates the greater amount of indirect incomes than indirect expenses. Greater amount of indirect incomes reduce the BEP level and increases margin of safety.

The Computation can be represented in graphical from which is as follows:

**Figure 4.5: Graphical Presentation of BEP of BPC of 2006/07**



Here,

Fixed Cost = Rs. 68.607 million

Variable Cost = Rs. 72.806 million

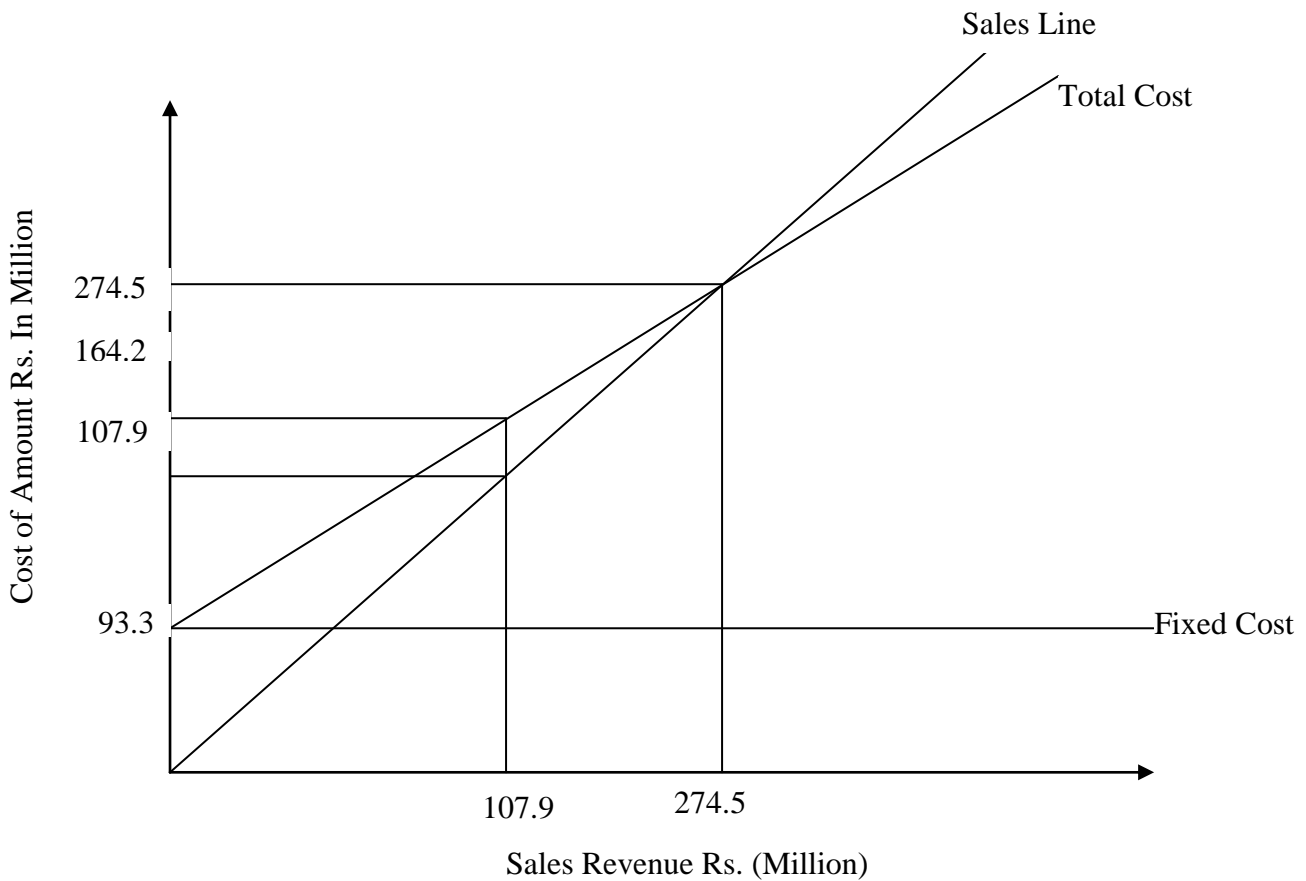
Total Cost = Rs. 141.413 million

BEP Sales = Rs. 95.287 million

Profit = Rs. 115.032 million

Sales = Rs. 115.032 million

**Figure 4.6: Graphical Presentation of BEP of BPC of 2007/08**



Here,

Fixed Cost = Rs. 93.324 million

Variable Cost = Rs. 70.872 million

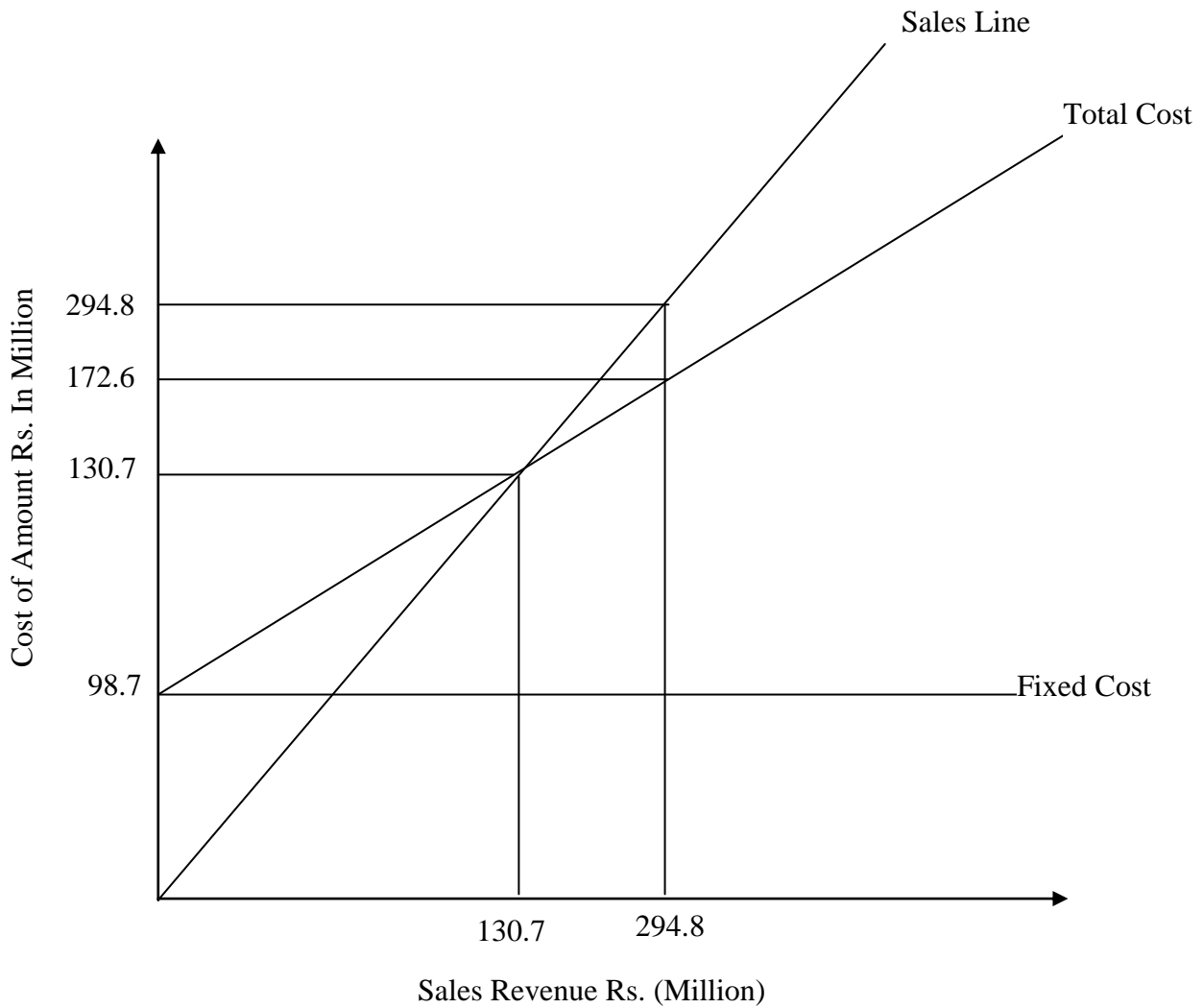
Total Cost = Rs. 164.196 million

BEP Sales = Rs. 274.48 million

Loss = Rs. 56.217 million

Sales = Rs. 107.979 million

**Figure 4.7: Graphical Presentation of BEP of BPC of 2008/09**



Here,

Fixed Cost = Rs. 98.06 million

Variable Cost = Rs. 74.539 million

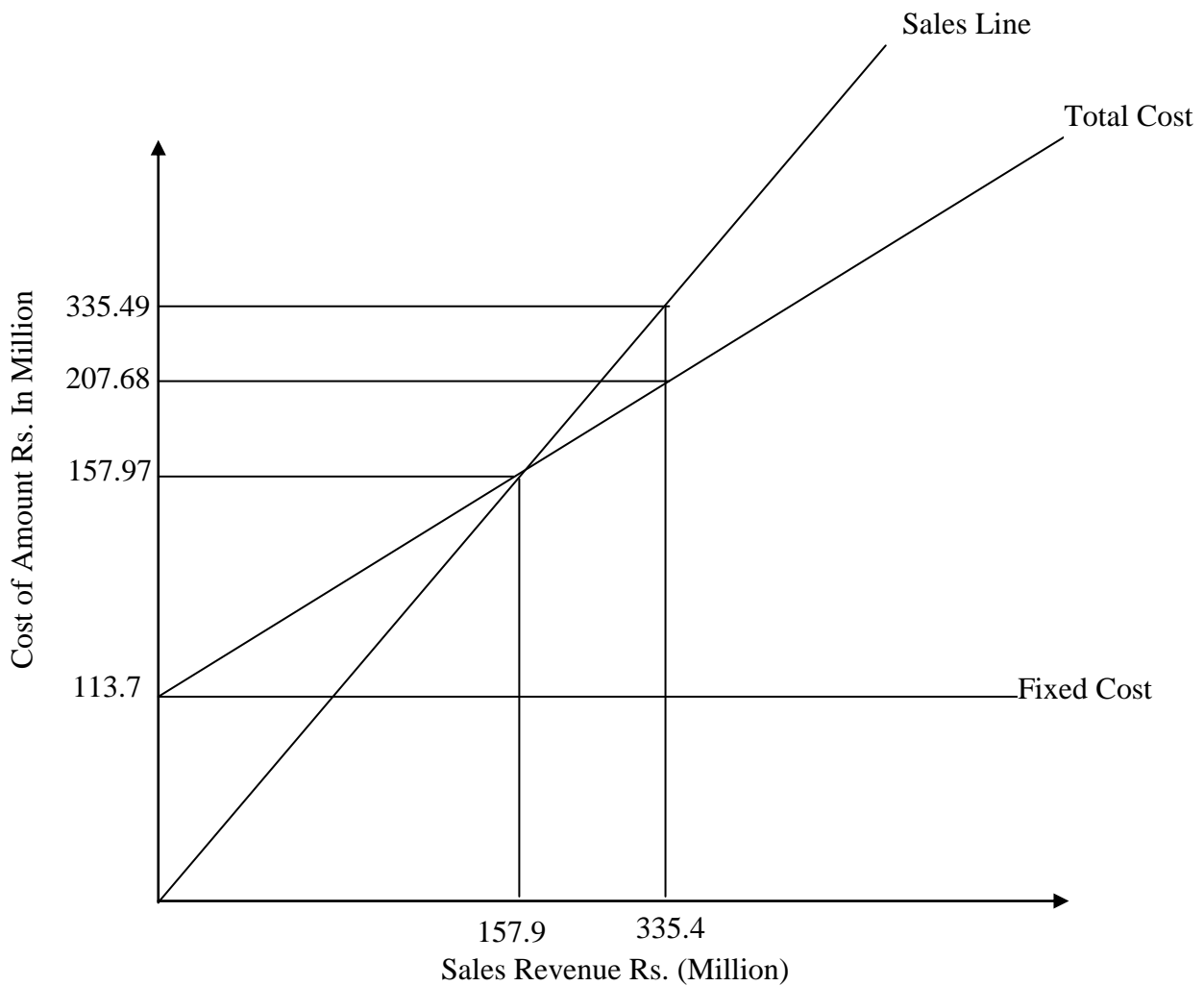
Total Cost = Rs. 172.607 million

BEP Sales = Rs. 130.76 million

Profit = Rs. 122.251 million

Sales = Rs. 294.858 million

**Figure 4.8: Graphical Presentation of BEP of BPC of 2009/10**



Here,

Fixed Cost = Rs. 113.739 million

Variable Cost = Rs. 93.942 million

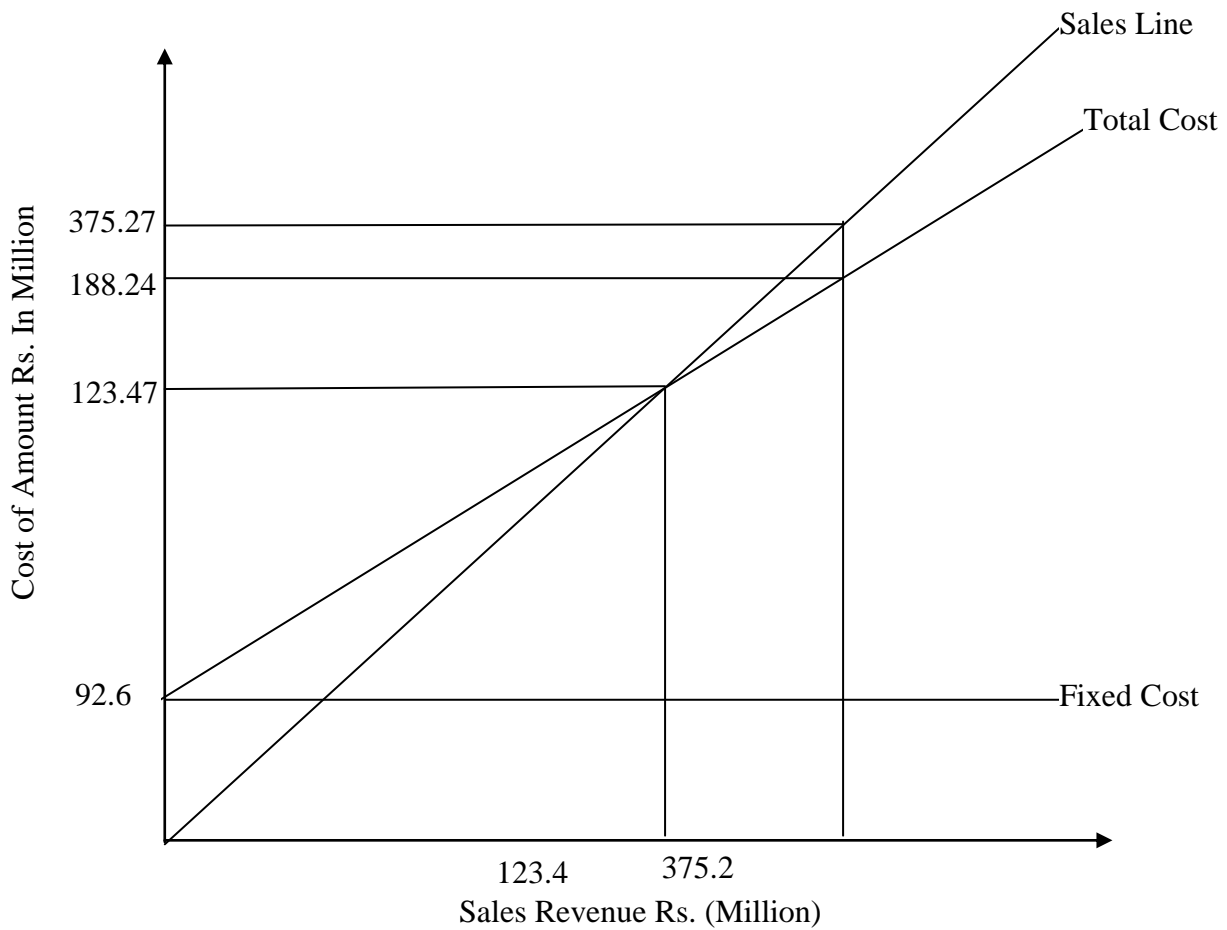
Total Cost = Rs. 207.681 million

BEP Sales = Rs. 157.97 million

Profit = Rs. 127.813 million

Sales = Rs. 335.494 million

**Figure 4.9: Graphical Presentation of BEP of BPC of 2010/11**



Here,

Fixed Cost = Rs. 92.6 million

Variable Cost = Rs. 95.643 million

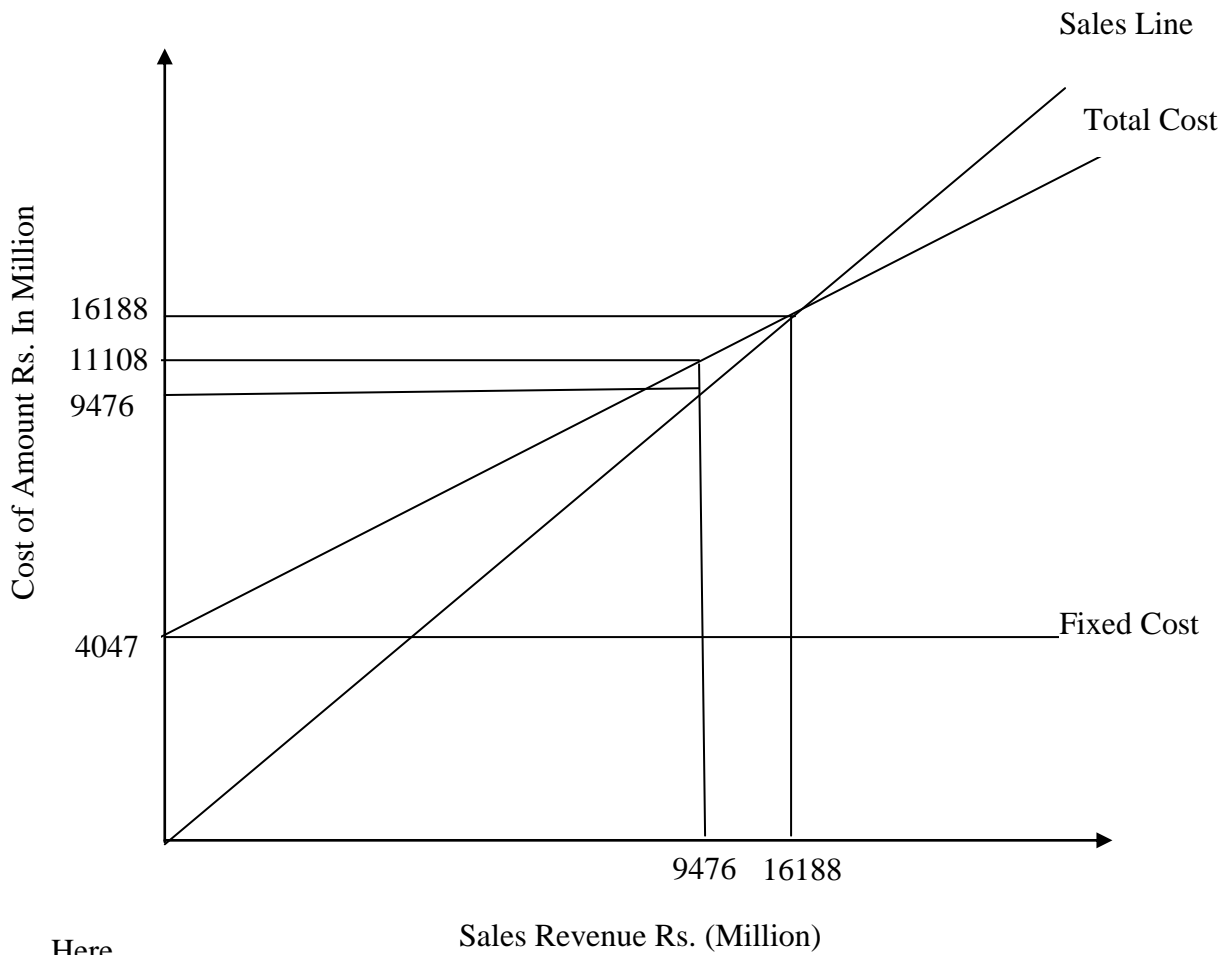
Total Cost = Rs. 188.243 million

BEP Sales = Rs. 123.47 million

Profit = Rs. 187.027 million

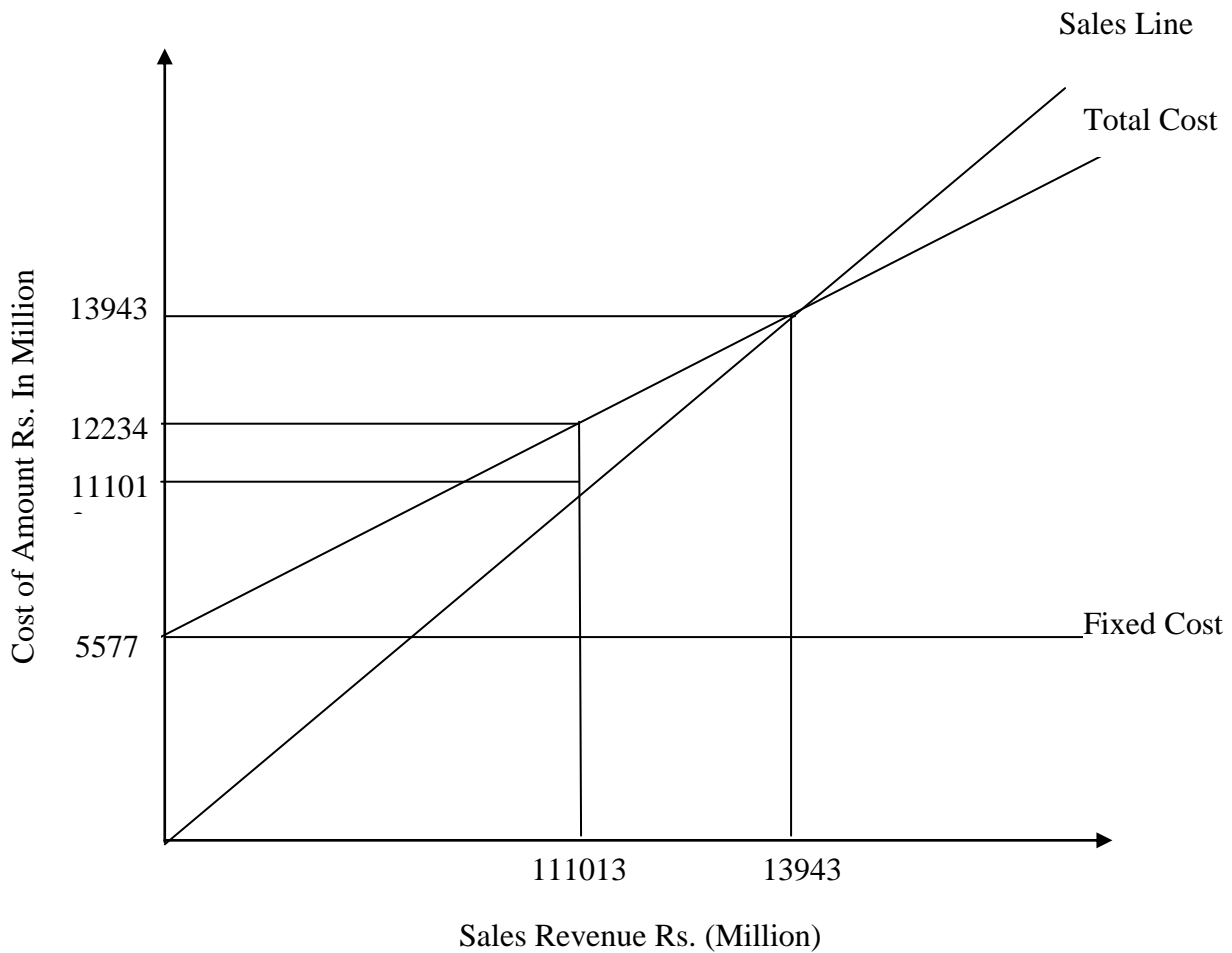
Sales = Rs. 375.27 million

**Figure 4.10: Graphical Presentation of BEP of NEA of 2006/07**



Fixed Cost = Rs. 4047 million  
 Variable Cost = Rs. 7061 million  
 Total Cost = Rs. 11108 million  
 BEP Sales = Rs. 16188 million  
 Profit = Rs. 1632 million  
 Sales = Rs. 9476 million

**Figure 4.11: Graphical Presentation of BEP of NEA of 2007/08**



Here,

Fixed Cost = Rs. 5577 million

Variable Cost = Rs. 6657 million

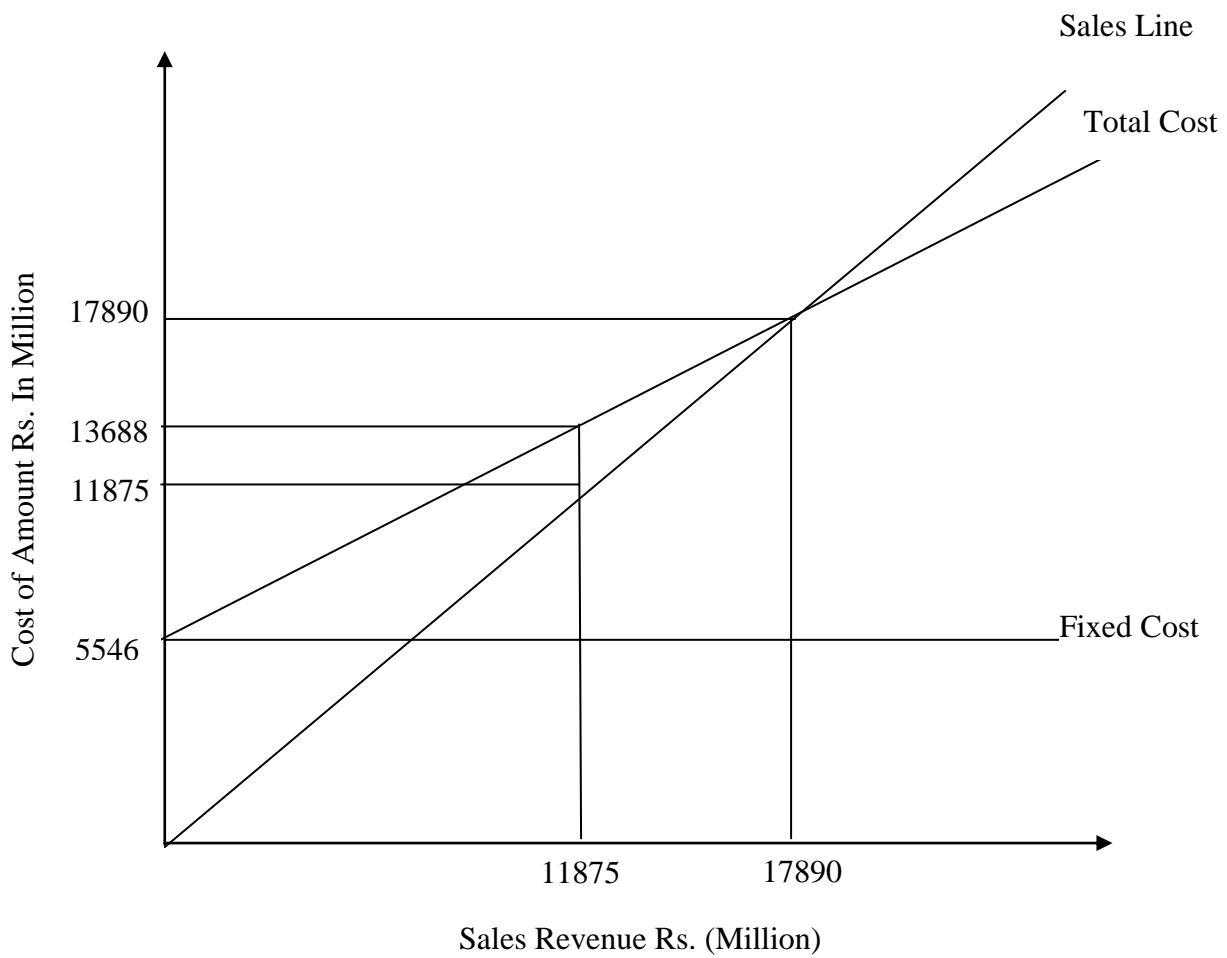
Total Cost = Rs. 12234 million

BEP Sales = Rs. 13943 million

Loss = Rs. 1221 million

Sales = Rs. 11013 million

**Figure 4.12: Graphical Presentation of BEP of NEA of 2008/09**



Here,

Fixed Cost = Rs. 5546 million

Variable Cost = Rs. 8142 million

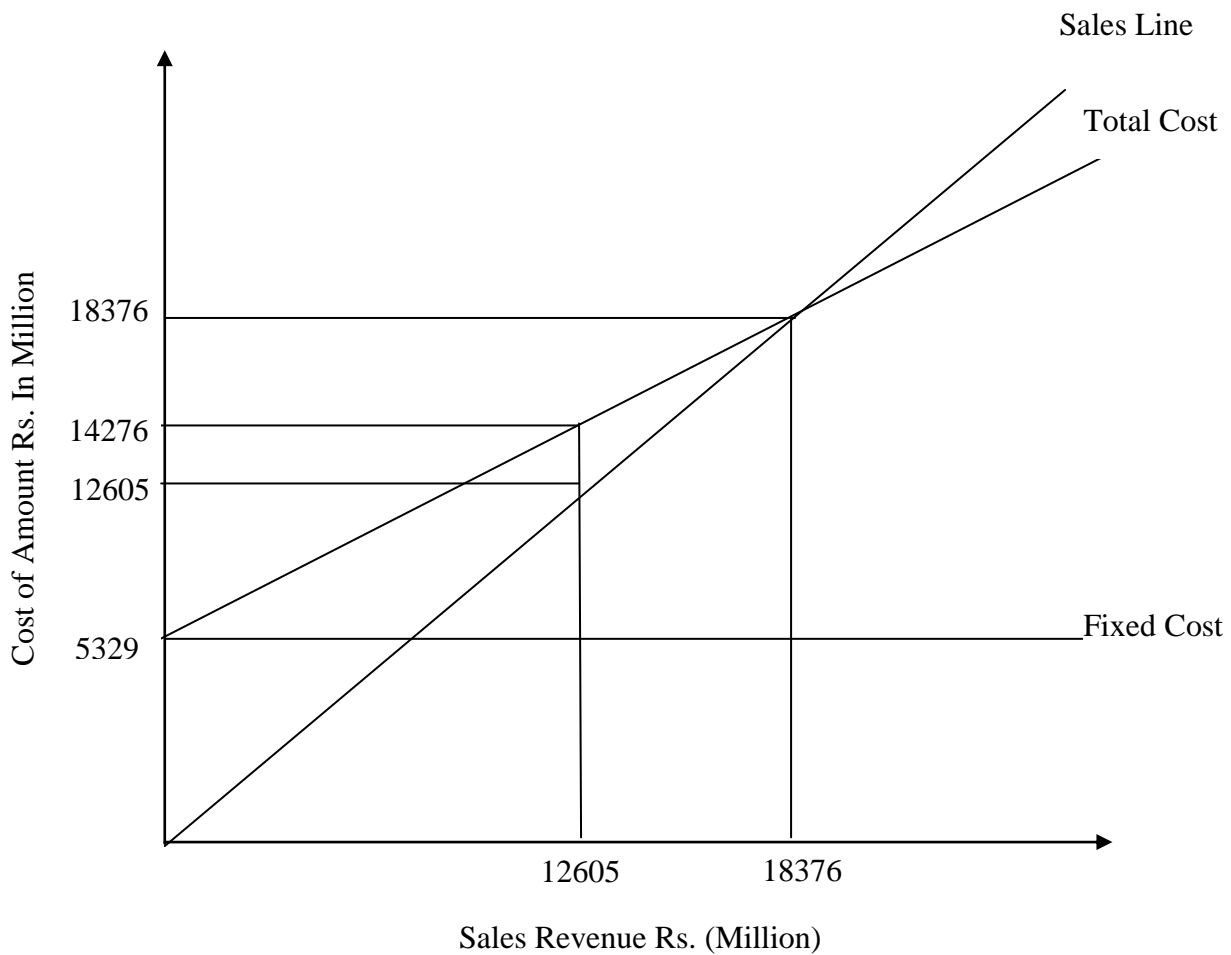
Total Cost = Rs. 13688 million

BEP Sales = Rs. 17890 million

Loss = Rs. 1813 million

Sales = Rs. 11875 million

**Figure 4.13: Graphical Presentation of BEP of NEA of 2009/10**



Here,

Fixed Cost = Rs. 5329 million

Variable Cost = Rs. 8947 million

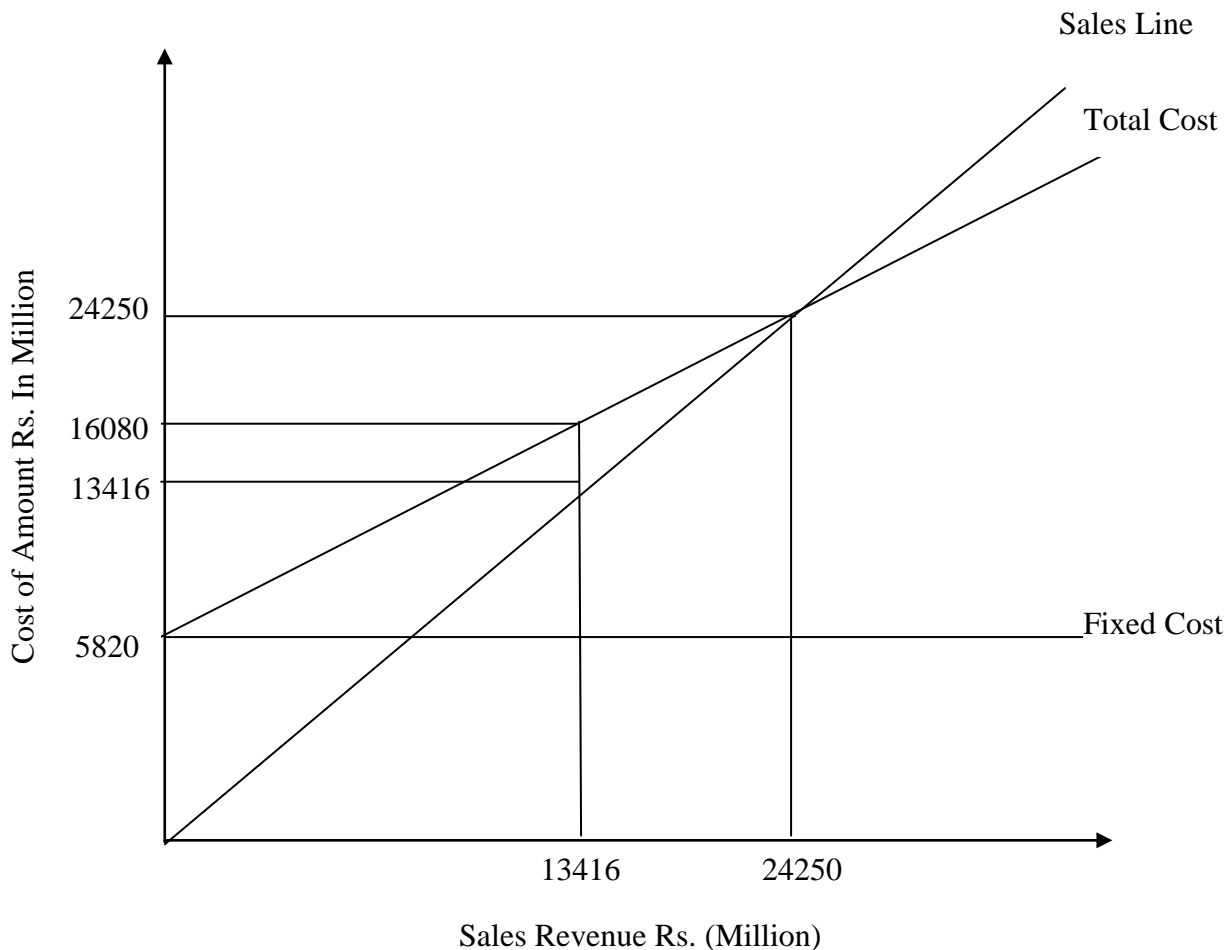
Total Cost = Rs. 14276 million

BEP Sales = Rs. 18376 million

Loss = Rs. 1671 million

Sales = Rs. 12605 million

**Figure 4.14: Graphical Presentation of BEP of NEA of 2010/11**



Here,

Fixed Cost = Rs. 5820 million

Variable Cost = Rs. 10260 million

Total Cost = Rs. 16080 million

BEP Sales = Rs. 24250 million

Loss = Rs. 2664 million

Sales = Rs. 13416 million

Above graph shows the sales, cost and break even level of the NEA and BPC. Break even level of sales and actual sales are shown in the above presented graph. Y-axis shows the cost and X-axis shows the sales revenue. Break even sales of authority is higher than actual sales. So, NEA is not earning profit and losses. Total sales revenue curve originates from the origin because sales revenue is zero when sales volume is zero and as service or sales volume increase sales revenue also increases. The equilibrium point where sales revenues and total

cost line intersected point is called break even point. In the above figure it is clearly show that actual sale of NEA is lower than BEP sales. It represents the condition of loss.

A simple break even chart of BPC for the FY 2006/07 is shown in X-axis and cost amount is shown in Y-axis. Required information and BEP chart for other given in appendix.

Above chart show that BPC has higher sales revenue than cost. It represents the condition of profit. Total sales revenue is Rs. 256.445 million where as total cost in Rs. 141.413 million. As a result the BPC is able to earn Rs. 115.032 million profit.

#### **4.9 Sensitivity Analysis: Assessing the Impacts of Changes in Cost Volume Profit Variables**

Sensitivity analysis is another popular technique of testing the Cost Volume Profit variables. It shows the impact on other factor if there is any change in distinct variable. Sensitivity analysis measures the elasticity of the change in CVP factors on break even point or given profit. To changes in volume, price or cost factors on net profit. For measurement of sensitivity we have various variables but these all are not possible to test. So the main factors like sales, fixed cost and variable cost change impact are shown below for both enterprises.

##### **4.9.1 Assessing the Impact when Sales Revenue or Operating Income Changed**

Breakeven level of enterprises will change when sales per unit it changed. But break even level is not changed when the total amount of sales revenue is changed due to change in sales unit. Because change in sales revenue impacts on contribution margin and its ratio too. In the case of increase or decrease in the selling price its effects on contribution margin which is the cause in PV ratio, BEP and margin of safety.

**Table 4.12: Sensitivity Analysis of NEA (Income Statement by 10% Change in Selling Price, FY 2010/11)**

<b>Particulars</b>	<b>Original</b>	<b>10% Increase in Sales Price</b>	<b>10% Decrease in Sales Price</b>
Sales	13416	14757.6	12074.4
Less, Variable Cost	10260	10260	10260
Contribution Margin	3156	4497.6	1814.4
Less, Fixed Cost	5820	5820	5820
Net Income	(2664)	(1322.4)	(4005.6)
Change in Net Income/Loss		1341.6	1341.6
P/V Ratio	0.24	0.305	0.15
BEP in Rs.	24250	19082	38800
% change in BEP		(21.31)	60

Sources: Annual Report 2010/11, (NEA)

**Table 4.13: Sensitivity Analysis of BPC (Income Statement by 10% Change in Selling Price, FY 2010/11)**

<b>Particulars</b>	<b>Original</b>	<b>10% Increase in Sales Price</b>	<b>10% Decrease in Sales Price</b>
Sales	256.445	282.0895	230.8005
Less, Variable Cost	72.806	72.806	72.806
Contribution Margin	183.639	209.2835	157.9945
Less, Fixed Cost	68.607	68.607	68.607
Net Income	115.032	140.6765	89.3875
Change in Net Income / Loss		25.64	(25.64)
P/V Ratio	0.72	0.74	0.68
BEP in Rs.		92.71	100.89
% change in BEP	95.2875	(2.7)%	5.88%

Sources: Annual Report 2010/11, (BPC)

Above table shows that when selling price of NEA is increased by 10%, net loss is reduced by Rs. 1341.6 million. PV ratio is increased up to 0.305 from 0.24, break even sales is reduced from Rs. 24250 million to Rs. 19082 million which is 21.31% less than actual level. When selling price is reduced by 10% net loss of the authority is increased by Rs. 1341.6

million. PV ratio is reduced to 0.15 from 0.24 and the break even sales are increased to Rs. 24250 million to Rs. 38800 million.

On other hand when selling price of BPC is increased by 10%, net income is increased by Rs. 25.64 million. Profit volume ratio is increased to 0.74 from 0.72. And bread even amount is decreased to Rs. 92.71 million which is 2.7% less than actual level. When the selling price is reduced by 10% the income of BPC is decreased by Rs. 25.64 million. PV ratio decreased to 0.68 from 0.72 and BEP is Rs. 100.89 million which is higher than actual.

#### 4.9.2 Assessing the Impact when Variable Cost is Changed

When the variable cost is changed without changing the sales revenue and fixed cost we can find the change result in PV ratio, profit BEP and its percentage also. When variable cost increase CM ratio will decreased as result BEP will high and vice-versa. Change in the variable cost changes all the variables related with CVP analysis like contribution margin, PV ratio and BEP.

**Table 4.14: Sensitivity Analysis of NEA (Income Statement by 10% Change Variable Cost, FY 2010/11)**

Particulars	Original	10% Increase in Sales Price	10% Decrease in Sales Price
Sales	13416	13416	13416
Less, Variable Cost	10260	11286	9234
Contribution Margin	3156	2130	4182
Less, Fixed Cost	5820	5820	5820
Net Income	(2664)	(3690)	(1638)
Change in Net Income / Loss		(1026)	1026
P/V Ratio	0.24	0.16	0.13
BEP in Rs.	24250	36375	18774
% change in BEP		50	(22.58)

Sources: Annual Report 2010/11, (NEA)

**Table 4.15: Sensitivity Analysis of BPC (Income Statement by 10% Change Variable Cost, FY 2010/11)**

<b>Particulars</b>	<b>Original</b>	<b>10% Increase in Sales Price</b>	<b>10% Decrease in Sales Price</b>
Sales	256.445	256.445	256.445
Less, Variable Cost	72.806	72.806	72.806
Contribution Margin	183.639	176.355	190.915
Less, Fixed Cost	68.607	68.607	68.607
Net Income	115.032	107.748	122.308
Change in Net Income/Loss		(7.28)	7.28
P/V Ratio	0.72	0.69	0.74
BEP in Rs.		99.43	92.71
% change in BEP	95.2875	4.34%	(2.7)%

*Sources: Annual Report 2010/11, (BPC)*

In above table variable cost of NEA is changed by 10% when variable cost is increased by 10%, net loss of NEA is increased by Rs. 1026 million. PV ratio is decreased to 0.16. Break even sales is increased to Rs. 36375 million from Rs. 24250 million which is 50% more than actual level. When variable cost of NEA is reduced by 10%, net loss is decreased by Rs. 1026 million. Where PV ratio is increased to 0.31 from 0.24. So break even sales reduced to Rs. 18774 million which is 22.58% less than actual level.

Above table shows that when variable cost of BPC is increased by 10%, net income of the company is decreased by Rs. 7.28 million. PV ratio decreased to 0.69 from 0.72 and BEP increases from 95.2875 million 99.43 million by 4.34%. When the various costs is decreased by 10%, net income of the company is increased by 7.28 million. Where PV ratio is 0.74 and break even sales becomes Rs. 92.71 million and BEP decreases by 2.7% on actual level.

**Table 4.16: Sensitivity Analysis of NEA (Income Statement by 10% Change Fixed Cost, FY 2010/11)**

<b>Particulars</b>	<b>Original</b>	<b>10% Increase in Sales Price</b>	<b>10% Decrease in Sales Price</b>
Sales	13416	13416	13416
Less, Variable Cost	10260	10260	10260
Contribution Margin	3156	3156	3156
Less, Fixed Cost	5820	6402	5238
Net Income	(2664)	(3246)	(2082)
Change in Net Income/Loss		(582)	582
P/V Ratio	0.24	0.24	0.24
BEP in Rs.	24250	26675	21825
% change in BEP		10%	(10%)

*Sources: Annual Report 2010/11, (NEA)*

**Table 4.17: Sensitivity Analysis of BPC (Income Statement by 10% Change Fixed Cost, FY 2010/11)**

<b>Particulars</b>	<b>Original</b>	<b>10% Increase in Sales Price</b>	<b>10% Decrease in Sales Price</b>
Sales	256.445	256.445	256.445
Less, Variable Cost	72.806	72.806	72.806
Contribution Margin	183.639	183.639	183.639
Less, Fixed Cost	68.607	75.4677	61.7643
Net Income	115.032	108.1715	121.8927
Change in Net Income/Loss		6.8607	6.8607
P/V Ratio	0.72	0.72	0.72
BEP in Rs.	95.2875	104.82	85.76
% change in BEP		10%	(10%)

*Sources: Annual Report 2010/11, (BPC)*

Above table shows the effect of change in fixed cost of NEA. When fixed cost is increased by 10% net loss of the authority is increased by Rs. 582 million. It is 21.84% more amount than original loss. Break even sales is increased up to Rs. 26675 million from Rs. 24250 million which is 10% more than original break even sales. But PV ratio is same because there is no

any effect on contribution margin while fixed cost is changed. When the fixed cost of NEA is reduced by 10%, net loss of the authority is decreased by Rs. 582 million. It is 21.84% reduction on loss. PV ratio is not changed but break even sales become Rs. 21825 million from Rs. 24250 million.

On other hand when fixed cost of BPC is increased by 10 percent, net income of the company is decreased to Rs. 108.1715 million from Rs. 115.032 million. There is no effect on PV ratio while fixed cost is changed. So, PV ratio is same, but break even revenue of the company is increased up to Rs. 104.82 million from Rs. 95.2875 million. The level of BEP increases due to increase in fixed cost because to recover additional amount of fixed cost, it is required to increase in sales. When the fixed cost of BPC is reduced by 10%, net profit is increased by Rs. 6.8607 million. PV ratio remains constant because variables of PV ratio cannot change due to change in fixed cost. BEP reduces to Rs. 85.76 million from Rs. 95.2875 million due to decreases in fixed cost.

#### **4.10 Net Profit Position of BPC and NEA**

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

**Table 4.18: Profit and Loss Position of BPC and NEA**

(Rs. In million)

Year	NEA			BPC		
	Rs. Profit / Loss	Rs. Change	% Change	Rs. Profit / Loss	Rs. Change	% Change
2006/07	(1632)	-	-	115.032	-	-
2007/08	(1221)	(411)	(25.18)	(56.217)	(171.249)	148.87
2008/09	(1813)	592	48.49	122.251	178.468	317.46
2009/10	(1671)	(142)	(7.83)	127.813	5.562	4.55
2010/11	(2664)	993	59.43	187.027	59.214	46.33

Sources: Annual Report 2010/11, (NEA and BPC)

Above table shows that NEA is suffering from loss in the study period. NEA is unable to earn profit due to its high fixed and variable cost. In FY 2006/07 loss of NEA is Rs. 1632 million. In fiscal year 2007/08 NEA is able to reduce its loss to Rs. 1221 million in comparison with the previous year loss of Rs 1632 million. In this year NEA is able to reduce the loss by 25.18%. Again in FY 2008/09 NEA has Rs. 1813 million loss which is 48.49% more than FY 2007/08. In FY 2009/10 NEA's loss reached to Rs. 1671 million which is 7.83% less than fiscal year 2008/09. So rate of increase in loss indicates the managerial inefficiency in NEA and it creates doubt of not taking proper planning for reducing of loss. And this increasing trend of loss shows the future difficulty for financial strength.

In other hand, profit position of BPC is increasing in fluctuating trend. In FY 2007/08 it decreases by 148.871% while in FY 2008/09 it is increased by greater percentage of 317.46% and able to earn additional amount of Rs. 178.468 million. In 2009/10 profit is increased by profit is increased by Rs. 5.562 million which is 4.55% more than previous fiscal year. Again in 2010/11 net profit of BPC increased in higher amount i.e. Rs. 59.214 million which is 46.33% more than previous FY's income.

## 4.11 Test Hypothesis

Null Hypothesis:

1.  $H_0: \mu_1 = \mu_2 = \mu_3$  that is there is no significant difference between average cost, volume and profit.
2.  $H_0: \mu_1^1 = \mu_2^1 = \mu_3^1$  that is there is no significant difference between average cost, volume and profit in different years.

Alternative Hypothesis:

1.  $H_1: \mu_1 \neq \mu_2 \neq \mu_3$  that is there is significant difference between average cost, volume and profit.
2.  $H_1: \mu_1^1 \neq \mu_2^1 \neq \mu_3^1$  that is there is significant difference between average cost, volume and profit in different years.

Test statistics: under  $H_0$ , the test statistics is:

$$F_c = \frac{MSC}{MSE}$$

$$F_R = \frac{MSR}{MSE}$$

Where,

MSC = Mean sum square of variation between different cost, volume, profit.

MSR = Mean sum square of variation between different years.

MSE = Mean sum square of variation due to error.

In order to find MSC, MSR and MSE, we need to find SST, SSC, SSR and SSE.

**Table 4.19: Computation of Variances of NEA**

Year	Cost	Volume	Profit	Row Total (Tr)
2006/07	11108	9476	(1632)	18952
2007/08	12234	11013	(1221)	22026
2008/09	13688	11875	(1813)	23750
2009/10	14276	12605	(1671)	25210
2010/11	16080	13416	(2664)	26832
Column Total (Tc)	67386	58385	(9001)	T=116770

Sources: Annual Report 2010/11, (NEA)

**Table 4.20: Computation of Variances of BPC**

Year	Cost	Volume	Profit	Row Total (Tr)
2006/07	14.413	256.445	115.032	385.89
2007/08	164.196	107.979	(56.217)	215.958
2008/09	172.607	294.858	122.251	589.716
2009/10	207.681	335.494	127.813	670.988
2010/11	188.243	375.27	187.027	550.54
Column Total (Tc)	874.14	1370.046	495.906	T=2413.092

Sources: Annual Report 2010/11, (BPC)

Now, T = Grand Total = Tc = Tr

$$N = 5 \times 3 = 15$$

$$\text{Correction factor (CF)} = \frac{T^2}{N}$$

For NEA,

$$\begin{aligned} \text{CF} &= \frac{(116770)^2}{15} \\ &= 909015527 \end{aligned}$$

For BPC,

$$\begin{aligned} \text{CF} &= \frac{(2413.092)^2}{15} \\ &= 500540 \end{aligned}$$

$$\text{Total sum of square (SST)} = \text{RSS} - \text{CF}$$

For NEA,

$$\text{SST} = 1631092162 - 909015527$$

$$= 722076635$$

For BBC,

$$\begin{aligned} \text{SST} &= 655719.77 - 500540 \\ &= 155179.77 \end{aligned}$$

Where,

$$\text{RSS} = \Sigma \text{Cost}^2 + \Sigma \text{Volume}^2 + \Sigma \text{Profit}^2$$

For BPC,

$$\begin{aligned} \text{RSS} &= 155317.96 + 417748.53 + 82653.28 \\ &= 655719.77 \end{aligned}$$

For NEA,

$$\begin{aligned} \text{RSS} &= 922790340 + 690971451 + 17330371 \\ &= 1631092162 \end{aligned}$$

$$\text{Sum of square due to column factor (SSC)} = \frac{\sum T_c^2}{N_r} - CF$$

For NEA,

$$\begin{aligned} \text{SSC} &= \frac{67386^2}{5} + \frac{58385^2}{5} + \frac{9001^2}{5} - 909015527 \\ &= 908174599 + 681761645 + 16203600 - 909015527 \\ &= 697124317 \end{aligned}$$

For BPC,

$$\begin{aligned} \text{SSC} &= \frac{874.1^2}{5} + \frac{1370.46^2}{5} + \frac{495.906^2}{5} - 500540 \\ &= 152824 + 375405 + 49185 \\ &= 577414 \end{aligned}$$

$$\text{Sum Square due to row factor (SSR)} = \frac{\sum T_r^2}{N_c} - CF$$

For NEA,

$$\begin{aligned} \text{SSR} &= \frac{18952^2}{3} + \frac{22026^2}{3} + \frac{23750^2}{3} + \frac{25210^2}{3} + \frac{26832^2}{3} - 909015527 \\ &= 119726101 + 151714892 + 188020833 + 211848033 + 239985408 - 909015527 \\ &= 12279740 \end{aligned}$$

For BPC,

$$\begin{aligned} \text{SSR} &= \frac{385.89^2}{3} + \frac{215.958^2}{3} + \frac{589.716^2}{3} + \frac{670.988^2}{3} + \frac{550.54^2}{3} - 500540 \\ &= 119726101 + 151714892 + 188020833 + 211848033 + 239985408 - 500540 \\ &= 56458 \end{aligned}$$

Hence,

$$\text{Sum of Square due to error (SSE)} = \text{SST} - \text{SSC} - \text{SSR}$$

For NEA,

$$\begin{aligned} \text{SSE} &= 722076635 - 697124317 - 12279740 \\ &= 12672578 \end{aligned}$$

For BPC,

$$\begin{aligned} \text{SSE} &= 155179.77 - 577414 - 56458 \\ &= 478692 \end{aligned}$$

**Table 4.21: Two Way ANOVA Table for NEA**

Sources of Variation	Sum of Square	d.f.	Mean Sum of Square	F-ratio
Due to Column	SSC = 697124317	c-1 = 2	MSC = 348562158	Fc = 220.04
Due to Year	SSR = 12279740	r-1 = 4	MSR = 3069935	Fr = 1.93
Due to Error	SSE = 12672578	(c-1)(r-1) = 8	MSE = 1584072	

**Table 4.22: Two Way ANOVA Table for BPC**

Sources of Variation	Sum of Square	d.f.	Mean Sum of Square	F-ratio
Due to Column	SSC = 577414	c-1 = 2	MSC = 288707	Fc = 4.82
Due to Year	SSR = 56458	r-1 = 4	MSR = 14114.5	Fr = 0.23
Due to Error	SSE = 478692	(c-1)(r-1) = 8	MSE = 59836.5	

Where,

$$\text{MSC} = \frac{\text{SSC}}{c-1}$$

$$\text{MSR} = \frac{\text{SSR}}{c-1}$$

$$\text{MSE} = \frac{\text{SSE}}{(c-1)(r-1)}$$

$$F_c = \frac{MSC}{MSE}$$

$$F_r = \frac{MSR}{MSE}$$

The tabulated value of  $F_c$  and  $F_r$  at 5% level of significance for d.f. (2, 8) and (4, 8) are given by

$$F_c 0.05(2, 8) \text{ tab} = 4.4590$$

$$F_r 0.05(4, 8) \text{ tab} = 3.8379$$

### **Decisions:**

Since the calculated value of  $F_c$  is greater than tabulated value of  $F_c$  of both enterprises, It is significant and null hypothesis is rejected. It means there is significant relationship between costs, volume and profit analysis.

Again the calculated value of  $F_r$  of both enterprises is less than tabulated value of  $F_r$ , it is significant and null hypothesis is accepted. It means there is no significant relationship between year wise distribution of cost, volume and profit.

## **4.12 Primary Data Analysis**

An empirical investigation has been conducted to find out different aspect of CPV Analysis of Public and Private Organization in Nepal. The major tool used in survey research was an opinion questionnaire was distributed to 17 persons. The questionnaire included the various aspects of CPV analysis concerning with NEA and BPC. A total of 17 (100%) filled questionnaire were received. Among these 10 (58.82%) were Top Level, 4 (23.52%) Middle level and 3 (17.64%) were lower level respondents.

### **a. Technology Suppliers**

To know the view of the respondents about the suppliers of technology a question was asked “Who are the suppliers of Technology?” The responses received from the respondents are tabulated as follows:

**Table 4.23: Technology Suppliers**

Respondents Group	Indigenous		Foreign		Total	
	No.	%	No.	%	No	%
Top Level	2	11.76	8	47.06	10	58.82
Middle Level	1	5.88	3	17.65	4	23.53
Lower Level	1	5.88	2	11.76	3	17.65
<b>Total</b>	<b>4</b>	<b>23.53</b>	<b>13</b>	<b>76.47</b>	<b>17</b>	<b>100</b>

Source: Opinion Survey, 2010/11

From the above table it is clear that the technology suppliers of indigenous are less than foreign. It is observed that out of total 100 percent samples, there were 23.53 percent respondents follows the indigenous technology and 76.47 percent follows the foreign technology. So, it is concluded that the foreign technology follows the company.

#### **b. Types of Plant and Machinery Installed**

It has clearly mentioned the types of machinery installed. To know the view of the respondents about types of plant and machinery has been installed a question was asked, “What type of plant and machinery has been installed?” The responses of the respondents are as follows:

**Table 4.24: Types of Plant and Machinery Installed**

Respondents Group	Automatic		Semi-automatic		Total	
	No.	%	No.	%	No.	%
Top Level	9	52.94	1	5.88	10	58.82
Middle Level	2	11.76	2	11.76	4	23.53
Lower level	2	11.76	1	5.88	3	17.65
<b>Total</b>	<b>13</b>	<b>76.47</b>	<b>4</b>	<b>23.53</b>	<b>17</b>	<b>100</b>

Source: Opinion Survey, 2010/11

The above table clearly shows that the types of plant and machinery have been installed. The respondents' views have automatic types of plant and machinery has been installed i.e. 76.47 percent automatic and 23.53 percent semi-automatic types of plant and machinery has been Installed. It were responses that 52.94 percent of top level, 11.76 percent middle level and

11.76 percent lower level respondents responses automatic plants and machinery has been installed. In the same way, 5.88 percent top level, 11.76 percent middle level and 5.88 percent lower level respondents responses semi-automatic type of plant and machinery has been installed. So, it is concluded that the automatic type of machinery has been installed.

### c. Process of Decision Making

To know the view of the respondents about the opinion on process of decision making a question was asked, “What is the process of managerial decision making?” The responses of the respondents are as follows:

**Table 4.25: Process of Decision Making**

Respondents Group	Top to Bottom		Bottom to Up		Participating all Staffs		Total	
	No.	%	No.	%	No.	%	No.	%
Top Level	3	17.65	3	17.65	4	23.53	10	58.82
Middle Level	2	11.76	1	5.88	1	5.88	4	23.53
Lower Level	1	5.88	1	5.88	1	5.88	3	17.65
<b>Total</b>	<b>6</b>	<b>35.29</b>	<b>5</b>	<b>29.41</b>	<b>6</b>	<b>35.29</b>	<b>17</b>	<b>100</b>

*Source: Opinion Survey, 2010/11*

From the above table it is clear that the process of managerial decision making is high percent i.e. 58.82 percent. Top to bottom and participating all staffs are equal responses percentage i.e. 35.29 percent and bottom to up is only 29.41. So, it is concluded that the top to bottom and participating all staffs method must be used for process of decision making by company.

### d. Practicing CVP Analysis Tools

To know the view of the respondents about the company practicing CVP analysis tools to forecast cost, volume and profit a question was asked, “Is the company practicing CVP analysis tools to forecast cost volume and profit?” The responses of the different respondent group are as follows:

**Table 4.26: Practicing CVP Analysis Tools**

Respondents Group	Yes		No		Occasionally		Total	
	No.	%	No.	%	No.	%	No.	%
Top Level	5	29.41	1	5.88	4	23.53	10	58.82
Middle Level	2	11.76	1	5.88	1	5.88	4	23.53
Lower Level	1	5.88	1	5.88	1	5.88	3	17.65
<b>Total</b>	<b>8</b>	<b>47.06</b>	<b>3</b>	<b>17.65</b>	<b>6</b>	<b>35.29</b>	<b>17</b>	<b>100</b>

Source: Opinion Survey, 2010/11

From the above table we can observe that 47.06 percent for 'Yes', 35.29 percent for 'Occasionally' and 17.65 percent for 'No' suggested that the all respondents the company practicing CVP analysis tools to forecast cost, volume and profit. So, it is concluded that the CVP analysis tools must be used for the company measure or forecast the volume and profit.

#### e. Cost Segregates

To know the management of the company segregates cost a question was asked, “How the management of the company segregates cost?” The responses received from the respondents group are as follows:

**Table 4.27: Cost Segregates**

Respondents Group	By Operation		By Behaviors		Total	
	No	%	No	%	No	%
Top Level	10	58.82	-	-	10	58.82
Middle Level	3	17.65	1	5.88	4	23.53
Lower Level	2	11.76	1	5.88	3	17.65
<b>Total</b>	<b>15</b>	<b>88.23</b>	<b>2</b>	<b>11.76</b>	<b>17</b>	<b>100</b>

Source: Opinion Survey, 2010/11

From the above table it is observed that the management of the company segregates cost responses by all respondents groups to by operation. There are 88.23 percent of by operation

and 11.76 percent responses by behaviors. So, it is concluded that the by operation must be used for the management of the company segregates cost.

#### **f. The Company Measure and Control of Overall Performance**

In order to know the company measure and control of overall performance at the end of the year a question was asked, "How does the company measure and controls the overall performance at the end of the accounting year?" The responses of the respondents group are as follows:

**Table 4.28: The Company Measure and Control of Overall Performance**

Tools	Top Level	Middle Level	Lower Level	Total	
				No	%
P/L Account made by the Company	4	2	2	8	47.09
Budgeting Control	1	-	1	2	11.76
Standard Costing	2	1	-	3	17.65
Ratio Analysis	3	1	-	4	23.53
Others	-	-	-	-	-
<b>Total</b>	<b>10</b>	<b>4</b>	<b>3</b>	<b>17</b>	<b>100</b>

*Source: Opinion Survey, 2010/11*

From the above table it is observed that out of total 17 respondents, 47.09 percent respondents suggested for P/L account made by the company, 23.53 percent respondents suggested for ratio analysis, 17.65 percent responses suggested for standard costing and 11.76 percent suggested to budgeting control. So, it is concluded that the P/L account made by the company must be used for the company measure and control the overall performance.

#### **g. Techniques for Pricing of Services**

To know the techniques for pricing of services, a question was asked, "What techniques do the company practice for pricing of services?" The responses received from the different respondent group are as follows:

**Table 4.29: Techniques for Pricing of Services**

Tools	Top Level	Middle Level	Lower Level	Total	
				No	%
Cost Based Pricing	7	2	2	11	64.71
Going Rate Pricing	1	-	-	1	5.88
Target Return on Investment Pricing	1	1	-	2	11.76
Activity Based Pricing	1	1	1	3	17.65
Others	-	-	-	-	-
<b>Total</b>	<b>10</b>	<b>4</b>	<b>3</b>	<b>17</b>	<b>100</b>

*Source: Opinion Survey, 2010/11*

There were 17 responses received pertaining to the question. The views of these respondents have been presented in above table. It is observed that 64.71 percent respondents suggested to cost based pricing, 17.65 percent respondents suggested to activity based pricing, 11.76 percent respondents suggested to target return on investment pricing and 5.88 percent respondents suggested for going rate pricing. So, it is concluded that the cost based pricing must be used for the company practice for pricing of services.

#### **h. The Company Going to Drop or Launch New Service**

To know the company going to drop or launch new service, a question was asked, “Is the company going to drop or continue new launch of any services?” The responses received from the different respondents group are as follows:

**Table 4.30: The Company Going to Drop or Launch New Service**

Respondents Group	Yes(launch)		No (Drop)		Total	
	No	%	No	%	No	%
Top Level	7	41.18	3	17.65	10	58.82
Middle Level	3	17.65	1	5.88	4	23.53
Lower Level	1	5.88	2	11.76	3	17.65
<b>Total</b>	<b>11</b>	<b>64.71</b>	<b>6</b>	<b>35.29</b>	<b>17</b>	<b>100</b>

*Source: Opinion Survey, 2010/11*

From the above table it is observed that the company going to launch new service. The views of these respondents have been presented in above table. It is find that 64.71 percent respondents suggested to the company going to launch new service and 35.29 percent respondents suggested for the company going to drop service. So, it is concluded that the company going to launch new service.

## **4.13 Major Findings of the Study**

### **4.13.1 Major Findings from Secondary Data**

Every research work is done to find something new based on the objectives of the study. On the basis of annual reports and other financial analysis the following major findings from secondary data have been drawn:

- Sales of the BPC are increasing every year in fluctuating rate while sales of NEA has increased in lower rate than BPC. BPC forecasted sales plan of both BPC and NEA are not systematic. So it is difficult to achieve their target of increasing operating income.
- Both of the enterprises have not used the practice of CVP analysis. Segregation of fixed and variables cost is ignored by both enterprises. So there are many difficulties arising to make cost control plan.
- Variable cost of BPC is less compare to its fixed cost. Contribution margin ratio of NEA is very less while it is satisfactory in place of BPC.
- BPC is running in profit while NEA is suffering from loss. BPC has earned reliable profit and has made it able to stand as one of the most successful enterprise of the country. In other hand, loss of NEA is gradually increasing. No any systematic plans have been implanted for preventing the loss and improve profit by NEA.
- BPC's margin of safety is in average above 50 percent which indicates the safety of the company. But NEA's margin of safety is negative due to higher BEP sales than actual sales or there is no safety in NEA.
- Profit position of BPC is good but not satisfactory in comparison to emerging market of electricity in Nepal. On the other hand NEA is not earning profit despite of its monopoly market in distribution of electricity. Its percentage of loss has been increased in recent years. Both the enterprises have no systematic plan and controlling mechanism.

- Overhead expenses are not classified systematically and it creates problem to analyze its expenses properly.
- NEA has no clear cut vision and concept of profit planning system but after privatization of BPC it has clear cut vision and extent to some knowledge of profit planning system.
- In NEA there is lack of proper communication and coordination among various responsible departments. There are not two way communication systems. There is only one way and only up to down communication available. But BPC has strong management system.
- Red Tapism has highly dominated in implementation, evaluation and monitoring side of budgeting and other organizational activities in NEA but in BPC all these function happens efficiently and effectively.
- CVP analysis is very important and popular tools to measure the financial performance of enterprises.

#### **4.13.2 Major Findings from Primary Data**

On the basis of different analysis, observation and formal as well as informal discussion the following major findings from primary data have been drawn:

- The technology suppliers of indigenous are less than foreign. It is observed that out of total 100 percent samples, there were 23.53 percent respondents follows the indigenous technology and 76.47 percent follows the foreign technology.
- The respondents' views have automatic types of plant and machinery has been installed i.e. 76.47 percent automatic and 23.53 percent semi-automatic types of plant and machinery has been Installed
- It is clear that the process of managerial decision making is high percent i.e. 58.82 percent. it is concluded that the top to bottom and participating all staffs method must be used for process of decision making by company.
- The company practicing CVP analysis tools to forecast cost, volume and profit. So, it is concluded that the CVP analysis tools must be used for the company measure or forecast the volume and profit.

- There are 88.23 percent of by operation and 11.76 percent responses by behaviors. So, it is concluded that the by operation must be used for the management of the company segregates cost.
- 11.76 percent respondents suggested degree of variability method and 5.88 percent respondents suggested others method. So, it is concluded that the least square method by the company must be used for the management adopt to classify semi-variables or semi-fixed cost
- It is find that 64.71 percent respondents suggested to the company going to launch new service and 35.29 percent respondents suggested for the company going to drop service. So, it is concluded that the company going to launch new service.

## **CHAPTER – V**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Summary**

Management effectively achieves organizational objectives through the efficient use of scarce resources in a changing environment. Future is uncertain which creates risk and to reduce risk the only reliable weapon is good management. CVP analysis is an analytical technique for studying the relationship between volume, costs and profit which helps to manage future costs and profit. Profit planning is a management technique and it is a written plan in all aspect of business operation for specific future period. CVP analysis is a device used to determine the usefulness of profit planning process of the firm. In fact, the entire field of profit planning has become associated with the CVP inter relationship.

The main objective of the present research is to examine cost-volume profit analysis as a tool to measure effectiveness of profit planning of BPC and NEA. So, this was undertaken to evaluate CVP analysis of the companies. As per of the nature of the study, the secondary data with descriptive and analytical approach for sales analysis, cost analysis profitability analysis, contribution margin analysis, PV ratio analysis, BEP analysis, and hypothesis test are used. And to support the study primary data are collected formally and informally from concerned person of the companies.

Government of Nepal has established so many public enterprises to facilitate the people of the nation. Majority populations of developing countries reside in rural area and most of them do not get minimum physical facilities which are necessary for human being. So the public sector plays great role in the developing countries like Nepal, no doubt at all. Public enterprises should be established for mobilizing enough economic funds for the rapid development of different kinds of planning. Public enterprises play vital role to keep the accelerating speed of economic development. Private sector is motivated by the merit purpose and cannot handle the public development in developing countries. Private sector does not have interest where they can't get more income immediately. The government can mobilize the development work by producing saving from sub monopoly profession. But it is the age of liberalization. Least government is considered as a best government. Government cannot only handle all the activities properly and efficiently. Private sector can mobilize

resource better than public sector. So, cooperation with private sector is necessary. By knowing it, government of Nepal privatized many enterprises. BPC is one among them.

Two enterprises, BPC and NEA have glorious history in the field of electricity services. Government of Nepal has invested huge amount in NEA. NEA is a largest government enterprise in Nepal with the country's highest capital investment, assets and human resources. The NEA has undertaken the overall responsibility for planning, construction Operation, and generation of electricity in the nation. BPC is running smoothly by earning profit while NEA is suffering from loss. Profit is a parameter of financial position of a company. A profitable company indicates its financial strength in other hand; loss shows the weak financial position.

Profit is a necessity for every organization. It is a dominant goal of business enterprises and profit making should be the main objective in terms of the general effectiveness of organization, which measures the performance of the institutions. Profit is excess amount over the cost. Financial position, cash flow statements, ratio analysis, profit and loss account, balance sheet, budgeting etc. cost volume profit analysis is one of the most popular tools of management accounts. It is a part of profit planning and control. It shows the relationship among the variables like selling prices, sales volume, cost, profit, break even level, safety margin etc. When the organization finds its BEP sales it can determine the price sales, volume and cost for profit earnings. The main objective of the study was to highlight the cost volume analysis of BPC and NEA and comparatively studied its sales revenue, profit volume ratio BEP sales, safety margin etc.

As per the objectives of the study, various primary and secondary data were collected for five years from FY 2006/07 to 2009/10. The collected data were analyzed with descriptive and analytical approach. Sales revenue analysis, sales trend analysis, cost analysis, P/V ratio analysis, BEP analysis, sensitivity analysis, profitability analysis were done with the help of various financial tools. Primary data were collected by direct interview with concerned employee and senior staff of both enterprises. Secondary data were drawn from various documents lie annual report, journal published by these enterprises and concerned authority. From analysis of various data collected by the primary and secondary sources the enterprises showed the different results. BPC has made the reliable profit, high contribution margin and its operating income is increasing in fluctuating trend during the period. Total variable cost of BPC is approximately equal to fixed cost. Due to given reason profit volume ratio of BPC is high and BPE is less. On other hand, NEA is suffering from loss and has less contribution

margin. Sales revenue of NEA is in increasing trend. Because of high variable cost contribution margin very less and BEP is more than sales revenue. BPC is earning profit and its profit is in increasing trend while NEA is suffering from loss and its loss amount is increasing every year. Both the enterprises have not practiced CVP analysis techniques as a tool to measure the effectiveness of profit planning and control.

## **5.2 Conclusion**

In the developing countries like Nepal most of the theoretical knowledge is not applied in practical. There is vast gap between theory and practice. Top level management have enough knowledge about tools and techniques which measures the financial performance of the company but in practice very few managers used tools to analyze financial performance. In practice, use of these tools and techniques for measuring the financial performance is very rare. Cost-Volume-Profit analysis is one of the most popular tools of management accounts. It is part of profit planning and control. It shows the relationship among the variables like selling price, sales volume, cost, profit, breakeven level, safety level etc. but this tool is not applied or practice in Nepalese enterprise. In cost volume profit analysis it is necessary to segregate different types of costs in to variables and fixed.

There is no any scientific tool used to segregate the cost in to fixed and variable in both of these enterprises. Here, costs of these enterprises were segregated on the basis of nature of cost and general assumptions. After segregation of costs contribution margin, P/V ratio, BEP, margin of safety are computed and analyzed. Being a monopolist company in electricity sector NEA has not satisfactory operating revenue. The company NEA could not able to expand the service to rural areas. Their capacity is not effectively utilized. Due to monopoly market of NEA fails to analyze their strength and weakness in depth to gain future opportunities. Though BPC has high contribution margin and actual sales is grater than BEP sales of BPC has been able to earn profit.

NEA is bearing loss due to high cost; variable and fixed both costs are very high. Leakage, outgate and theft of the electricity are the major problems of NEA. This leakage is reducing the NEA's profit annually. Controlling of the leakages and theft of electricity could also be a relief to NEA. NEA is not able to facilitate its service nationwide. Being second rich country in water resources we have no sufficient water energy NEA was establish to the general publics. But for hydropower projects long term plans, hug amount of capital, technology,

skill, and semiskilled manpower and environmental feasibility analysis is necessary. Lack of these factors NEA is not producing sufficient electricity. Very high costs on large projects are other problems of NEA. Most of the possible sites for hydro electricity are located in remote areas. Due to this reason the cost of developing its infrastructure is also very high. Most of the public enterprises are financial burden to the government. To run these enterprises smoothly there is need of cooperation among the various factors: participative management approach, expert, qualified manpower, out of from government intervention and controlling unusual cost are the essential remedies.

### **5.3 Recommendations**

On the basis of the study of CVP analysis as a tool to measure effectiveness of profit planning and control of BPC and NEA, it seems necessary to develop, implant and improve the process of CVP analysis from beginning to end with PPC. Nepal is proceeding toward globalization with membership of WTO. Nepalese companies should fit with the global environment with best fit managerial strategies development. As the competitions are very high in the context of liberalization, company should provide attention toward cost minimization rather than profit maximization. For this, CVP analysis tools can be of great help. Based on the above study the following suggestions are recommended to improve the cost volume profit analysis system of enterprises mainly in BPC and NEA.

- In Nepal most of enterprises have no practice of CVP analysis in systematic manner. So, it is suggested that every enterprises should apply or practice CVP analysis.
- CVP analysis shows the relationship among the variables related to cost, revenue and profit. Study of relationship between these variables helps to improve the business condition. So, this tool is very much to every organization.
- BPC and NEA have many expert and skilled manpower but these enterprises have ignored the practice of CVP analysis. They have not classified or segregated various types of costs into fixed and variable. It is essential to classify the costs which help in controlling cost.
- Generally, BPC and NEA have shown third overheads as administrative expenses, it should be classified in scientific way as administrative overhead, selling and distribution expenses, repairs and maintenance expenses and production overhead which makes easy to control the overhead properly.

- Cost plan of both enterprise are not system maintained. So cost of every sector should plan properly. It is necessary to established cost control program in these enterprises. It will maintain the discipline on cost control.
- NEA is operating in monopoly situation, strength, weakness, threats, and opportunity should properly analyze to gain future opportunities.
- Sales revenue of both enterprises is in increasing trend but it is not sufficient to cover the cost and earn desired profit. The variable cost of NEA is very high which is required to reduce in future to make profit. Sales plan of these enterprises should clearly maintain and improve to catch the market opportunity.
- BPC is running smoothly by earning profit whereas NEA is suffering loss. NEA should learn the lesson from the BPC management and its success. Though BPC's profit is not sufficient it should control fixed cost. NEA is bearing very high fixed and variable cost. Interest on loan increased the fixed cost of NEA. So, long-term loan of the NEA should reduce to earn profit in future and variable cost should be controlled.
- Contribution margin ratio of BPC is 60% in average due to less variable cost whereas NEA has about 30%. CM ratio because of high variable cost. It is suggested to NEA that it should control variable cost and increase contribution margin.
- An actual sale of BPC is very high in comparison to BEP sales, grater the difference between actual sales and BEP sales represents the greater amount of profit. Actual sales of NEA are very low in comparison to BEP sales. So, BPC is earning profit and NEA is bearing loss. NEA should reduce its break even sales by reducing variable and fixed costs as well as increasing sales revenue.
- Margin of safety is nearly 48% of total sales after deducting the variable costs. But NEA had negative safety margin nearly 55% which shows that it is necessary to increase the current sales by 55% reach in BEP. So, it is suggested to increase sales volume to NEA.
- BPC and NEA are the service oriented organizations, it cannot play high amount on interest (especially NEA). So, NEA should take soft loan with minimum rate of interest. Subsidy and accumulated loss should be set-off by the way of reduction in equity capital, which may help to eliminate the losses and make financial position strong.
- Regular inspections, evaluations, monitoring activities should be undertaken by the central level to different departments of both enterprises for the controlling purpose.

Delegation of authority under decentralization and participatory management approach are useful for improvement of these enterprises.

- One of the major objectives of enterprise is to provide low cost and reliable service to general public so, BPC and NEA should control the cost and improve the quality of services. The costs are main factors to increase price of the products. So, controllable costs should minimize if possible.
- PBC's and NEA's management performance do not show satisfactory results about profit, BEP level, contribution margin, so the management of both these enterprises are recommended to perform their programmed and task in planned way.
- NEA has problem of power loss due to leakage, theft etc. It is required to control power loss to improve profit.
- Classification of expenses item as variable and fixed or controllable and non-controllable must be made within specific framework of responsibility between expenditure and benefits derived from that expenditure.
- Separate cost control department should be established for the effective management of cost.

BPC and NEA should consider BEP analysis while preparing sales plan, production plan, and setting price of its products.

**A COMPARATIVE ANALYSIS OF COST-VOLUME-PROFIT OF  
PUBLIC AND PRIVATE ORGANIZATION IN NEPAL**

**(A CASE STUDY OF NEPAL ELECTRICITY AUTHORITY AND BUTWAL POWER COMPANY LTD.)**

**A THESIS**

**Submitted by:**

**Aanapurn Thapa**  
Nepal Commerce Campus  
T.U. Regd.:  
College Roll No.:  
Exam Roll No.:

**Submitted to:**

Office of the Dean  
Faculty of Management  
Tribhuvan University

**In Partial Fulfillment of the Requirements for the  
Master of Business Studies (M.B.S.)**

**New Baneshower, Kathmandu  
December, 2011**

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# APPENDIX –I

## Sales Revenue

(Rs. In million)

Year	Actual Sales	Rs. Change	% Change
2006/07	9476.20	-	-
2007/08	11012.60	1536.40	16.21
2008/09	11874.70	862.10	7.83
2009/10	12605.20	730.50	6.15
2010/11	13416.00	810.80	6.43

## Sales in unit (KWH) of NEA

(in millions)

Year	Sales Unit	Increase in Sales P.A.	% Change
2006/07	1534.313	-	-
2007/08	1696.816	162.503	10.59
2008/09	1795.233	98.417	5.80
2009/10	1918.35	123.117	6.86
2010/11	2066.27	147.92	7.71

## Time series analysis of NEA

Year	Income (Y)	Time (x)	X <sup>2</sup>	XY
2006/07	9476.20	1	1	9476.2
2007/08	11012.6	2	4	22025.20
2008/09	11874.7	3	9	35624.1
2009/10	12605.2	4	16	50420.8
2010/11	13416	5	25	67080
N=5	$\sum Y = 58384.7$	$\sum X = 15$	$\sum X^2 = 55$	$\sum XY = 184626.3$

$y = a + bx$

$\sum y = na + b \sum x$  .....(1)

$\sum xy = a \sum x + b \sum x^2$ .....(2)

$58384.7 = 5a + 15b$ .....(3)

$$184626.3 = 15a + 55b \dots\dots\dots(4)$$

By solving

$$a = 8835.25$$

$$b = 947.22$$

Thus,  $y = a + bx$

By using this trend we can estimate the actual sales for 2011/12.

$$y = 8835.28 + 947.22 \times 6$$

$$= 8835.28 + 5683.32, = 14518.6 \text{ million.}$$

**Income of BPC in Different Year**

Year	Income	Amount Change P.A.	% Change
2006/07	281521	-	-
2007/08	108144	(173377)	(61.58)
2008/09	531611	423467	391.58
2009/10	395712	(135899)	(25.56)
2010/11	493710	97998	24.76

**Time Series Analysis of BPC**

Year	Income (Y)	Time (x)	X <sup>2</sup>	xy
2006/07	281.50	1	1	281.5
2007/08	108	2	4	216
2008/09	531	3	9	1594.8
2009/10	395.7	4	16	1582.8
2010/11	493.7	5	25	2468.5
N=5	$\Sigma Y = 1810.5$	$\Sigma X = 15$	$\Sigma X^2 = 55$	$\Sigma XY = 6143.6$

$$1810.5 = 5a + 15b \dots\dots\dots(3)$$

$$6143.6 = 15a + 55b \dots\dots\dots(4)$$

Therefore,

$$a = 148.47$$

$$b = 71.21$$

Thus,  $y = 148.47 + 71.21x$ , is the trend line of sales which shows the positive sales revenue in the future.

The actual sales for F.Y. 2011/12.

$$y = 148.47 + 71.6 \times 6$$

$$= 148.47 + 427.26$$

$$= 575.73$$

### Profit and Loss Position of BPC and NEA

(Rs. In million)

Year	NEA			BPC		
	Rs. Profit / Loss	Rs. Change	% Change	Rs. Profit / Loss	Rs. Change	% Change
2006/07	(1632)	-	-	115.032	-	-
2007/08	(1221)	(411)	(25.18)	(56.217)	(171.249)	148.87
2008/09	(1813)	592	44.48	122.251	178.468	317.46
2009/10	(1671)	(142)	(7.83)	127.813	5.562	4.55
2010/11	(2664)	993	59.43	187.027	59.214	46.33

### Computation of Variances of NEA

Year	Cost	Volume	Profit	Row Total (Tr)
2006/07	11108	9476	(1632)	18952
2007/08	12234	11013	(1221)	22026
2008/09	13688	11875	(1813)	23750
2009/10	14276	12605	(1671)	25210
2010/11	16080	13416	(2664)	26832
Column Total (Tc)	67386	58385	(9001)	T=116770

### Computation of Variances of BPC

Year	Cost	Volume	Profit	Row Total (Tr)
2006/07	14.413	256.445	115.032	18952
2007/08	164.196	107.979	(56.217)	22026
2008/09	172.607	294.858	122.251	23750
2009/10	207.681	335.494	127.813	25210
2010/11	188.243	375.27	187.027	26832
Column Total (Tc)	874.14	1370.046	495.906	T=116770

Now, T = Grand Total = Tc = Tr

$$N = 5 \times 3 = 15$$

$$\text{Correction factor (CF)} = \frac{T^2}{N}$$

For NEA,

$$\begin{aligned} \text{CF} &= \frac{(116770)^2}{15} \\ &= 909015527 \end{aligned}$$

For BPC,

$$\begin{aligned} \text{CF} &= \frac{(2740.092)^2}{15} \\ &= 500540 \end{aligned}$$

$$\text{Total sum of square (SST)} = \text{RSS} - \text{CF}$$

For NEA,

$$\begin{aligned} \text{SST} &= 1631092162 - 909015527 \\ &= 722076635 \end{aligned}$$

For BBC,

$$\begin{aligned} \text{SST} &= 655719.77 - 500540 \\ &= 155179.77 \end{aligned}$$

Where,

$$\text{RSS} = \Sigma \text{Cost}^2 + \Sigma \text{Volume}^2 + \Sigma \text{Profit}^2$$

For BPC,

$$\begin{aligned} \text{RSS} &= 155317.96 + 417748.53 + 82653.28 \\ &= 655719.77 \end{aligned}$$

For NEA,

$$\begin{aligned} \text{RSS} &= 922790340 + 690971451 + 17330371 \\ &= 1631092162 \end{aligned}$$

$$\text{Sum of square due to column factor (SSC)} = \frac{\sum T_c^2}{N_r} - \text{CF}$$

For NEA,

$$\begin{aligned} \text{SSC} &= \frac{67386^2}{5} + \frac{58385^2}{5} + \frac{9001^2}{5} - 909015527 \\ &= 908174599 + 681761645 + 16203600 - 909015527 \\ &= 697124317 \end{aligned}$$

For BPC,

$$\begin{aligned} \text{SSC} &= \frac{874.1^2}{5} + \frac{1370.46^2}{5} + \frac{495.906^2}{5} - 909015527 \\ &= 152824 + 375405 + 49185 \\ &= 577414 \end{aligned}$$

$$\text{Sum Square due to row factor (SSR)} = \frac{\sum T_r^2}{N_c}$$

For NEA,

$$\begin{aligned} \text{SSR} &= \frac{18952^2}{3} + \frac{22026^2}{3} + \frac{23750^2}{3} + \frac{25210^2}{3} + \frac{26832^2}{3} - 909015527 \\ &= 119726101 + 151714892 + 188020833 + 211848033 + 239985408 - 909015527 \\ &= 12279740 \end{aligned}$$

Hence,

$$\text{Sum of Square due to error (SSE)} = \text{SST} - \text{SSC} - \text{SSR}$$

For NEA,

$$\begin{aligned} \text{SSE} &= 722076635 - 697124317 - 12279740 \\ &= 12672578 \end{aligned}$$

For BPC,

$$\begin{aligned} \text{SSE} &= 155179.77 - 577414 - 56458 \\ &= 12672578 \end{aligned}$$

**Two Way ANOVA Table for NEA**

Sources of Variation	Sum of Square	d.f.	Mean Sum of Square	F-ratio
Due to Column	SSC = 697124317	c-1 = 2	MSC = 348562158	Fc = 220.04
Due to Year	SSR = 12279740	r-1 = 4	MSR = 3069935	Fr = 1.93
Due to Error	SSE = 12672578	(c-1) (r-1) = 8	MSE = 1584072	

**Table 4.22: Two Way ANOVA Table for BPC**

Sources of Variation	Sum of Square	d.f.	Mean Sum of Square	F-ratio
Due to Column	SSC = 577414	c-1 = 2	MSC = 288707	Fc = 4.82
Due to Year	SSR = 56458	r-1 = 4	MSR = 14114.5	Fr = 0.23
Due to Error	SSE = 478692	(c-1) (r-1) = 8	MSE = 59836.5	

Where,

$$MSC = \frac{SSC}{c-1}$$

$$MSR = \frac{SSR}{r-1}$$

$$MSE = \frac{SSE}{(c-1)(r-1)}$$

$$F_c = \frac{MSC}{MSE}$$

$$F_r = \frac{MSR}{MSE}$$

The tabulated value of Fc and Fr at 5% level of significance for d.f. (2, 8) and (4, 8) are given by

$$F_{c \ 0.05(2, 8) \text{ tab}} = 4.4590$$

$$F_{r \ 0.05(4, 8) \text{ tab}} = 3.8379$$