

CHAPTER – ONE

INTRODUCTION

1.1. Background of the Study

Nepal is a landlocked country situated in the lap of the Himalayas. It is located between 26° 22' to 30° 27' north longitude and 80° 4' to 88° 12' East longitude. The average length being 885 km east to west and average breadth is about 193 km north to south. It is an independent and developing country, that which lies between two powerful countries, India in the east, south, west and China in the north.

Nepal has an area of 147181 sq.km. This area is 0.3% of Asia and 0.03% of the world. It is covered by Terai in the south, Region by mountains in the middle and by evergreen snow-white Himalaya in the northern region. Terai occupies 17% of the total land, mountain 68% and Himalaya region 15%. Nepal is divided into five development regions they are Eastern region, Central region, Western region, Mid Western region, and Far Western region. Geographically there are three regions namely The Himalayan region, Hilly region and Terai region.

Nepal is one of the least developed countries of the world. More than 90% of total population is still in the rural areas and most of them are not yet getting minimum physical facilities that are necessary for human being because of under developed of those areas and their poverty. Nepal at the end of Ninth five year plan, Nepal has more than 38% people living below poverty line will be reduced to 30% at end of the Tenth five year plan.

Nepal has abundant natural resources, but still is backward in terms of socio-economic development because of the inability in exploiting the resources. Among the various resources available in the nation, water resource is the greatest one. It is the second richest country in the world in water resources. The water resources of Nepal can be considered as incomparable means of all round development, if it is used wisely. From our rivers we cannot only generate hydroelectricity but it

can be multipurpose source of energy. Proper utilization of this huge potential nature resource could be one of the important means for the economic development of the country. Efficiently generating hydroelectricity emphasizes tourism development, industrial development, provides job opportunities and improves the socio- economic condition of the country by reducing the investment in other petroleum products.

Nepal has mixed economy where contribution of private and public sector are co-existed in harmony. However Nepal government has been involving in some specific sectors like infrastructure, essential commodities producing, social welfare and industries. Basically, the public enterprises are established for the purpose of socio- economic development of the country. The economic development of the nation is possible only through the striving of the public enterprises as well. Social welfare is focused more than economic objective in Nepalese public utilities enterprises like Nepal Electricity Authority, Nepal Telecom. Nepal Drinking Water Corporation.

1.2 Introductions of Profit Planning and Control

Management is essential for very types of organization. Management is the process of planning, organizing, directing controlling and coordinating effectively, efficiently and economically to achieve goals and objective. Management process of an enterprises, organization may be viewed as the total management effort operating in a application of selected techniques and procedures and the motivation of individual and group to accomplish specified objective. Management manage every aspect of organization, planning enables manager to achieve confidence in its ability establish realistic objective and device efficient strategies to attain those objectives. The first essence of management is planning. No firm can get its goal and objective without proper plan. All function of Management is performed within the framework of planning. As it is known as slow concept of enterprise whether it is large size or not. Planning is generally recognized as the most difficult task facing by the manager and it helps manager to take right

decision at right time, efficiently, effectively and economically. It is a continues process and life blood of any organization because a firm can get hardly success without presentation of proper and scientific planning.

Profit planning and control is a newly broad concept as a greatly important way in the business organization, which has been developed for facilitating effective performance of Management system mainly in profit oriented enterprises. It is a systematic approach for the performance of any organization to achieve success.

Theoretically profit is a broad aspect and sometime it cannot be early seen but in actual practice it is management and some extent it is controllable.

Profit is an essential part of business to survive. Usually it "does not just happen it is managed". profit is the excess amount over cost of production. It is the contribution of all factor of production. No company can run without profit for long time. So it is taken as ultimate measure of effectiveness for an enterprise. That's why it is a primary an objective of any organization.

The primary purpose of control is to ensure attainment of the objective, goals and standard of the enterprises. Control has many facts; such as direct observation, oral expression and performance report.

The concepts and techniques of profit planning and control have wide application in individual business enterprises. Government units, charitable organization and virtually all group or individuals. comprehensive profit planning and control viewed of a process designed to help Management effectively perform significant phases of the planning and controlling function.

Profit planning and control includes the following matters: (1) Development and application of broad and long-range objective of the enterprises. (2) Specification of enterprises goals. (3) Development of a strategic long-fanged profit plan in broad terms. (4) Specification of a tactical short range profit plan detailed by

assigned responsibilities (division departments and projects). (5) Establishment of a system of periodic performance report detailed by assigned responsibility and (6) Development of follow up procedures.

Thus the term, comprehensive profit planning and control is defined as systematic and formulized approaches for performing significant phase of management planning and cost function. It refers the organizational techniques and procedure, where, long and short range plans are formulated, considered and approved responsibility. In profit planning and control we can use various of managerial approach and techniques such as; sale forecasting, capital budgeting, cash flow analysis, variable budgeting, time and motion stud, standard costing accounting, strategic planning, production planning and control, management of organization objective and organization planning and control.

Some people say that comprehensive profit planning and control is only to be applicable for large and complex organization. But this is not true in all cases, it is applicable or can be adopted by any organization where, it is profit oriented manufacturing, service oriented of not.

General two types of profit plans are generated; long range objective (strategic long rang plan) and short range plan (tactical short range plans). By the help of the comprehensive profit planning and control every business aims to gain realistic profit and return from their investment appropriately.

1.3 Public Enterprises

Public enterprises are autonomous bodies which are owned and managed by the government and which provide goods or service for a price. The ownership with the government should be 51% or more or to make an entity PEs. public enterprises have assumed significant role in almost every countries of the world, yet there has so far been no standard definition of its own. The term public enterprises had been defined differently by different agencies and government to

suit their own respective situation. UN has defined PEs "those organization, namely governmental enterprises and public corporeity consisting of establishment which by virtue of their kind of activities, technology and mode of operation are classified as industries. Public enterprises play a major role in achieving the twin objectives of social and economical development of a country and it plays visual role for the future expectation of the national policies.

1.4 Public Enterprises in Nepal

Public enterprise in Nepal is considered as great important instrument for socio-economic development of the country. It enjoys strategic and crucial position in our mixed economy. They have been established in many sectors for overall development of the country with different goals and objectives.

Since 1956, Nepal has been making of growth and development of public enterprises for the purpose of creating necessary infrastructure and run some of the large manufacturing industries for the people. Thus it is realized that the creation of number of public enterprises play as an instrumental for the infrastructural development of a country. We have observed some points which are rational for the establishment of public enterprise which are:

1. Acceleration the rate of economy.
2. Infrastructural development.
3. Employment opportunities.
4. Reducing economic inequalities.
5. Increasing foreign exchange.
6. Provision of essential public goods easily, economically and regularly.

The establishment of Nepal Bank Ltd. initiated the PEs establishment in Nepal. To provide commercial banking services it was established at 1994 B.S. but after 2010 B.S. government owned 51% share then it was automatically converted in the PEs. After 2nd world war some other enterprises were established however, they could not make only substantial progress. Nepal has started its planned economic

development in 1956 with the launching of 1st five year plan since then, the number of public enterprises has increased and to keep (in existence) in the various field of nation economy there were 64 PEs before the privatization program of his majesty's Government and now there are 44 public enterprises which are undercooking in the production or supply if sugar, cement, agricultural tools, financial activities service activity, public utilities etc. among them 44 existing PEs three are 3 public utilities PEs namely:

- i. Nepal Electricity Authority.
- ii. Nepal water Supply corporation.
- iii. Nepal Telecommunication Corporation.

1.5 Public Utilities in Nepal

There are various objects to establish public enterprises. One of the major objectives is to serve vary essential or day to day need in chief price; for this purpose government established three PEs, as a public utilities. We he already mentioned that public enterprises play a major role in achieving the twin objective of social and economic development around in the national policy, the objective for which PEs are set up and are specified in there respective legal characters. For developing the economic, establishing prices, maintaining the regular supply of essential commodities, import substitution and export promotion and employment generation. To serve the country and consumers with dedication and zeal, to develop indigenous resources, to achieve with dedication and zeal, to develop indigenous resources, to achieve greater efficiency and no conduct its business in an open and transparent manner are the corner stone's of public utility must build on.

Nepal Electricity Authority as a Public Utility

NEA was established in 1985 as the largest government corporation of Nepal. It is the backbone of the economy upon which national industrial development hinges. There is little private organization in the field of hydro electricity. NEA has a major's responsibility, as public utilities. The NEA as a public utility concern has a

primary objective of providing service that are basically important to the people in the general, since a public utility concern with public interest, status, its profit planning system deserves the top most attention. Nepal Electricity authority has tried to structure itself into an institution oriented toward self- sustainable commercial operations and also meeting social obligation in the nation's interest. NEA is the largest government enterprises in Nepal. Being public enterprises, it has been financed by government ad several bilateral and multilateral donor agencies. In the current rate privation also, government has rational to keep it under public sector. Thus, electricity, especially NEA becomes one of the main sectors of PEs which the government will not privatize. As same in the future also, any not touched with the new environment of privatization.

1.6 Role of PEs in Nepalese Economy

PEs has become both necessary and useful as vehicles of development in developing countries. They are being loaded upon as effective instrument of program implementation of accomplishing he desired rational development goals. PEs constitute large and rapidly growing sector of the economy in the majority of countries in the world today, including Nepal. The economy of Nepal is basically a mixed economy where the public and private sector freely operate in the business environment except in the case of defense which is not open to private sector. There is coexistence of both the public and the private sector in Nepal for the overall development of the country.

1.7 Profitability in Public Enterprises

It is will accept principles that public enterprises should be run on business principle and generate commercial profit. Which it an accepted accounting practice, where by performance result are gauged terms of net disposable profit after tax and cost including the provision for depreciation.

We all accepted that public enterprises should be run on business principle and generate commercial profit, which is accepted accounting practice sounds efficient

which has practice where by performance result are appears in term of net disposable profit after tax and cost including the provision or depreciation. Profit can view from several angles. The most acceptable criteria are to look at the percentage of profit before tax to capital employed which is measure of return in investment. Generally an enterprise sounds efficient which has a good profitability base of its own good market standing. "Profit is one simple and all embracing index, accepted and understood both by the public and parliament which has a tremendous impact on the morale of the enterprise itself.

In today's context of economic liberalization, public enterprises have to play their dual role i.e., one for supporting governments policies and programs and another for their own survivability and growth.

1.8 Industrialization and Public Enterprises

Industrialization is still in its infancy stage in Nepal. Industrial sector have contributed in the national economy not more that 10%, moat of the Nepalese people are still depending on agriculture. So agriculture is the main basis of Nepalese economy that we have seen. Industrialization is essential for the sustainable long term development of the country in make a remarkable contribution to creating employment opportunities for the growing population solving the problems of unemployment and underemployment. Besetting the country earning foreign exchange and balancing the payment position as well as foreign capital and technology have significant role in a lest developed country like our which is just moving toward industrialization.

The first step toward industrial development was taken in 1930 by establishing industrial council. But this action did any concrete result. However after the Nepal Company Act was enacted in 1936 and some industrial enterprises came into existence in the private sector, planned effort toward industrialization were made only after 1951. NIDC was established in 1959 as a development bank with the objective of providing financial support to industries. Public enterprises were

established in developed countries from the 18th century. It was established as strong mean of development after the Second World War. In developing countries it plays the major role to follow the industrialization activities in the country. Which help government making infrastructure for developing which consist of communication, transportation and power facilities? It is well known that public enterprises were established for rapid socio-economic development of the country because of different public enterprises have different set of objective.

This research is centered upon Nepal electricity authority, role for electrification in the country for social need, rapid and smooth industrial development. All for those, NEA is performing its various activities and well committed for the development of hydropower.

1.9 Historical Background of Electricity Development in Nepal

The development of electricity in Nepal based on the development of hydropower, the development of this infrastructure has been essentially carried by the government but the private sector was recently also contributed and set a qualitatively important footing in this sector. There has been several government organization through which the development is considered. The first project is parching, which was established in 1911 A.D. (1968B.S.) with the capacity of 500 kw and it covered 302 ropanies. Then 2nd project is sundarijal established 1935 A. D. with the capacity of 640 kw it covers 16 ropanies which were operate to supply domestic load to very limited areas without any significant planning giving the first taste of electricity to Nepal. In 1940 some small project with capacities around 100 kw began with separate operation from others. The morang Hydropower Co. was established. It was followed by the Birgunj Electric Supply Co. and the Dharan Electric power Co. the first step of the institutional development within the ministry of water resources, which was organized with the specific role to develop electricity in Nepal. In the second 3 year plan (1962-1965) the Nepal electricity corporation (NEC) was established on August 18th 1962 as public enterprises to

undertake marketing and development electricity as better way. In 1975, the small hydro development board was established to cover the specific sub sector of hydro power range between 100-5000 kw, because of keep apart rural area, promoting their electrification while suddenly coming the difficulties of electricity transmission to remote area and different local situation. In 1976 the water and energy commission (WECS) to work out the policy recommendation for the water and energy commission (WEC).

During the sixth five year plan (1980-1985) because of, the poor performance of public enterprises, the government camp out with a new corporation policy with the intention for better performance, modifying operational principle toward commercial principles. So that, as per policy analogizing similar PEs. In this context setup a single institution responsible for the power sector, the NEA was established by the government.

1.10 Significance of Hydro-Electric Power in Nepalese Economy

Electric energy has an important role to play in the economic development of a nation. On the one hand, the availability of electricity is a basic of overall development, and on the other, the consumption of electricity is regarded an indicator of economic situation in the country. Hence, for the supply of electricity that plays an important role in the overall development of the nation, it has become necessary to change existing immense quality of water resource into electricity. Potent and installed capacity we can suggest that there is an ample opportunity and potentiality for hydropower development in Nepal. Since energy plays an important role in the development of agriculture, industry and other sector it is essential to supply energy in affordable price and utilize it effectively. Undoubtedly, energy development is an impetus for balanced development of the nation. Since large amount of financial investment is need for the development of energy sector, maximum utilization of available financial resources is essential. We can show its relationship between other sector to increasing economic development which as follows:

1. Relationship between electricity and agriculture: Nepal is an agricultural country. Agriculture plays an important role in the Nepalese economy. 81% of total GDP also comes from this sector. Again, 80% of export earnings are contributed by agriculture, mostly in the form of food grains and semi-processed agricultural products. While most of the raw materials used in the domestic industries are provided by this sector. In the agricultural sector, we would not apply scientific methods of production for rising productivity facilities. Electricity brings about economic welfare by the development of agriculture. In view of these, to improve the existing irrigation facilities, energy consumption patterns, ecological imbalances, HMG has laid much emphasis on laying out planned schemes for water resources development to help and promote agriculture.
2. Relationship with Industries: Nepal is one of the less developed countries of the world. Without electricity, large-scale industries are impossible to set up. Electricity plays a vital role in the economic development of the country, providing energy to the industrial sector of any nation. Utilizing more electricity, the country will progress faster.
3. Relationship with transport: In the field of transportation, hydro-electricity is very essential in Nepal. It is because in Nepal, with a low cost of indigenous hydro-electrical power, the high cost of imported fuels for transportation may be substitutable. Nepal is a country where there is a lot of potentiality of hydro-electricity, for this we must utilize hydroelectricity in transportation. In our country, transportation is dependent mostly on coal and petroleum. But these are not regularly available and cause environmental pollution. So, the best way for the environment is to use hydro-electricity. In Nepal, trolleybuses and ropeways are examples. The tourism industry can be developed in the project area when a hydropower project is started in those areas, some heavy equipment will have to be

transported and without road facilities such equipment of the project can not be talked these tourists industries can also be developed.

4. Background and Introduction of NEA: NEA was established by HMG/N through NEA Act 2041 and began its operation on 17th Aug, 1985 (2042/05/11)¹² concerned with generation and supply of electricity without doubt, efficiently, economically and in an orderly. its central office is in Kathmandu and authorized capital was (one) billion. NEA was founded as an independent corporation owned entirely by the government and set according to the act to operate autonomously and according to commercial principles. Among its duties under the term of act, NEA has three principle objectives.

1. To plan construct operate and maintain the electric power sub sector.
2. As per economical situation of industrial and non-industrial consumer of sector, utilize the different plan for production transmission and distribution of electricity.
3. To use the available resources necessary for the development of electricity supply by the most efficient and effective manner.

1.11. A Brief Overview of Nepal Electricity Authority (NEA)

Nepal Electricity Authority (NEA) is one of the full government undertaken public enterprises, was established on August 16, 1985 (Bhadra 1, 2042) under the Nepal Electricity Authority Act 1984, through the merger of the Department of Electricity of Ministry of water resources, Nepal Electricity Corporation and related Development Boards.

Nepal Electricity Authority is the largest public utility enterprise in Nepal. It has established its branch offices, distribution sector, power houses, grid houses in all over the kingdom is about 200. The main purpose of NEA is to generate transmit and distribute adequate, reliable and affordable power by planning, constructing, operating and maintaining all generation, transmission and distribution facilities in

Nepal's power system both interconnected and isolated. Therefore NEA is playing vital role as the key player in the nation's power sector.

1.12. Focus of the Study

Sales and production budgeting is an important tool of every business enterprises to achieve their goals by removing uncertainty and risk. Without proper planned sales revenue, planned production volume and controlled expenses, desired profit cannot be secured. Thus these budgets are used for the planning of profit, their follow up procedure and they are compared with the actual achievement using different means such as cost volume profit analysis, variance analysis, coefficient of variation etc.

This study is mainly focuses on the sales and production budgeting and its impact on profitability in Nepal Electricity Authority.

1.13. Statement of the Problem

Nepal Electricity Authority, as the largest corporate body in the country with country's high capital investment, is a leading public enterprises functioning in public utility sector. It has been financed by government as well as foreign agencies. Without grant loan and donation from the government and donor foreign agencies, NEA could not able to operate their activities.

NEA is large scale PE of the country and single government institution in the power sector. It has to play vital role than other PEs as manufacturing and non manufacturing industries depend upon the power supplied. For this sense as per the other PEs, it has no difficulty in selling its products and services as demand of electricity in the nation. It is facing very little or no market competitions, enjoying almost full monopoly over distribution of service in Nepal.

Government of Nepal has invested huge amount in NEA aiming to provide its service to common people and to generate sufficient amount of dividend to fulfill

the national economic goal. However the government has not got the dividend as expected. NEA has not been able to generate the required fund to operate its activities as well. Despite of full support of government most of the PEs are running in losses at the minimum return which can not be justified. We can also divide NEA in the same category, which was in continuous losses from few years. The main cause of such PEs are the lack of integration of activities, less utilization of capacity, lack of motivate skilled manpower, paying huge amount of interest loan, investing large amount for repairing etc. So under this study budgeting system especially sales and production budget system will be studied with special emphasis on following question:

- 1) Is there a sales and production budgeting system in NEA?
- 2) How is sales and production plan formulated in NEA?
- 3) What are the major problems faced by NEA for sales and production budgeting?
- 4) What role has the sales and production planning played in profit planning and control?
- 5) Leakage of electricity is one of the problems.

1.14. Objective of the Study

The main objective of the study is to analyze the sales and production budgeting along with analysis of supply system of electricity. Apart from above following are the other specific objectives.

- 1) To evaluate the sales pattern of NEA.
- 2) To study the production pattern of the NEA.
- 3) To analyze distribution system of NEA.
- 4) To compare among the sales budget, production budget and profit of NEA.

1.15. Significance of the Study

Public enterprises play vital role in most of developing countries like Nepal. It is true that Nepal Electricity Authority is the largest public enterprise which was established in 1985 according to NEA Act 1984 to supply electricity reliable,

efficient and accessible to all by undertaking the generation, transmission and distribution electricity networking in accordance with the prevailing law. Government of Nepal has spent a huge amount of money in NEA to provide its service to common people and to generate sufficient amount of dividend for nation development. However NEA has not been able to yield as expected dividend and provide electricity service to all people sufficiently due to lack of proper planning. In this context, profit planning or budgeting system especially sales and production budgeting system will be studied.

NEA should be managed or planned the profit to attain the organizational objective either short run or long run. For this purpose, first of all sales and production budgeting should be adopted. The sales and production planning process is an essential part of profit planning and control, which is an estimation of future sales revenue, sales volume and production volume. It is a first planning from which other planning roll on. So it should be sensible and real.

Sales and production budgeting is very important and crucial tool for every enterprises because it lead an organization to ultimate success. It contributes to improve the profitability as well as overall financial performance of enterprises. Proper sales and production budget minimizing future risk and maximizing the output from the scarce resources and predicts the future. So sales and production budgeting is most important tool in the field of managerial decision making in every business enterprises. Mainly this study will important for the following groups and individual.

- 1) HMG Board of Directors and management body of NEA.
- 2) Further researcher to do further research in future.
- 3) For NEA to improve sales and production budget.
- 4) The university students who will be conducting studies in same area.
- 5) For major parties who are interested on sales and production planning of NEA.

1.16. Limitation of the Study

This study is concerned with only sales and production budgeting and its relation with profit planning in NEA. The following factors have limited the scope of this study.

- 1) This study is mainly based in secondary data.
- 2) This study covers only last five years period from FY 2061/062 to 2065/066.
- 3) This study concern only sales and production budgeting and it relation with profit planning in NEA.
- 4) This study is based on the annual report and various published unpublished document of NEA.
- 5) Being a student, time and resources are constraints.

1.17. Plan / Scheme of the Study

This study will be designed into five main chapters. They are

- I. Introduction
- II. Conceptual Framework
- III. Research Methodology
- IV. Data Presentation and Analysis
- V. Summary, Conclusion and Recommendations.

Chapter 1: Introduction

This is a first chapter of the thesis (research) which includes general introduction, a brief overview of NEA, focus of the study, statement of problem, significance of the study, and limitation of the study.

Chapter 2: Review of Literature

This chapter is mainly concerned with conceptual framework and relevant studies of research. The conceptual framework includes concept and theory of profit planning and control, budgeting, sales and production budgeting. Then relevant studies include review of the previous related research studies.

Chapter 3: Research Methodology

This chapter includes introduction, research design, sources and nature of data, period covered, research variables and research tools used for the study.

Chapter 4: Data Presentation and Analysis

This chapter is concerned with the presentation and analysis of data that has been collected through various sources. Data are interpreted and analysis with the help of various analytical tools and techniques.

Chapter 5: Summary, Conclusion and Recommendations

It is a last stage of the thesis, which includes summary and conclusion of the study. And recommends some suggestion also included to solve the present problems regarding sales and production budgeting of NEA.

Besides these, bibliography, appendices and other related items or figures are also included at the end of the study.

CHAPTER – TWO

REVIEW OF LITERATURE

This chapter has two sub chapter;

- 1) Conceptual Framework
- 2) Review of Previous Theses

1) Conceptual Framework;

2.1.1 Profit

Profit earned by a firm is its primary measure of success. In modern days many alternative objective of firm have been cited, nobody has been able to completely wipe out the profit-maximizing objective of earning responsible rate of profit. Profit is the main tests of the individual firm's performance. Every business organization is running behind the profit. Different people have defined the term profit in different way. "An economist may say that, profit is the reward for entrepreneurship for taking risk. A labor leader might say that it is a measure, which can be used to examine the efficiency of labour because the labourer produces profit and profit provides a base for negotiating a wage increase. An investor will view it as a gauge of return on his or her money. An internal revenue agent might regard it as the base for determining taxes. The accountant will define it simply as the excess of the firm's revenue over the expenses in a given fiscal period. Using the accountant's measuring stick, management thinks of profit as:

1. A tangible expression of the goals it has set for the firm.
2. A measure of performance toward the achievement of its goals.
3. A means of maintaining the health, growth and continuity of the company.

Profit is the amount of revenue earned above the expenses incurred to operate the business. The word "Profit" implies a comparison of the operations of business between two specific dates, which are usually separated by an interval of one year. "It should be noted that profit are residual income left the payment of the contractual rewards to other factors of production.

"The accounting concept of company profit is concept of net business income. The sales transaction of a period are regarded as bringing new assets into the business and profit results if the there are in excess of the assets saving the business in the same period. Profit is thus the surplus income that remains after paying expenses and providing for that part of capital that has been consumed in producing revenue,"

Finally, it can conclude that the profit is the excess of revenues over the costs of doing business. Without obtaining sufficient profit, any firm cannot operate for long-term period.

2.1.2 Planning

Planning means deciding in advance, what is to be done in future? It is method of thinking out acts and purpose beforehand. Planning starts from form forecasting and determination of future events.

"Planning is the fed forward process to reduce uncertainty about the future. The planning process is base on the conviction that management can plan its activities and conditions of the state of the enterprise that determine its destiny."

"Planning is the process of developing enterprises objectives and selecting a future course of action to accomplish them. Ti includes:

- a) Establish enterprise objectives,
- b) Developing premises about the environment in which they are to be accomplished,
- c) Selecting a course of action for accomplishing the objectives,
- d) Initiating activates necessary to translate plans into action and
- e) Current re-planning to correct current deficiencies."

Planning is the first function of management. Planning is generally recognize, as the most difficult task facing by the manager and it is one on which it is very easy to procrastinate.

"Formal planning indicates the responsibility of management and provides alternative to grouping without direction. Planning on the other hand, involves the determination of what should be done, how the goal may be reached and what individuals or units are to assure responsibility and be held accountable,"

Planning and forecasting are not same things. Forecasting is a prediction of a future event, condition or situation where as planning includes a program of intended future actions and interconnected with each other. Forecasting is the prerequisite for planning. Forecast means statement of expected future conditions. These expectations depend upon the assumptions. If assumptions are plausible, the forecast has better chance of being useful. Planning should be performed under conditions of certainty, uncertainty or ignorance about the future. It is in that situation involving uncertainty that forecasting provides the maximum help to planners. When certainty exists, forecasting does not require. Much more effort since predictions about the future are trivial, when there is ignorance the must that forecasting can provides some clues about future possibilities.

Finally, it can be concluded that planning is a financial or quantitative statement prepared and approved before a definite period time. Planning is the primary functions of management activities. Without efficient planning any organization cannot accomplish its pre-determined goals and objectives.

2.1.3 Profit Planning and Control (PPC)

After having some knowledge about profit and planning now it is relevant to present some theoretical concept of profit plan. "The term comprehensive profit planning and control is defined as systemic and formalized approach for

performing significant phases of the management planning and control functions.

Specially, it involves:

1. The development and application of board and long- range objective for the enterprise.
2. The specification of enterprise goals.
3. A long-range profit plan developed in board terms.
4. A short-range profit plan detailed by assigned responsibilities (Division, Products, Projects)
5. A system of periodic performance reports detailed by assigned responsibilities,
6. Follow up procedures."

"Profit planning is an example of short-range planning. This planning focuses on improving the profit especially from a particular product over a relatively short period. Therefore, as used here, it is not the same as corporate planning of a cost rendition program."

Profit planning effect is managerial technique and a profit plan is such a written plan in which all aspects of business operations with respect to definite period are included. It is a formal statement of policy, plan, objective and goal established by top management in respect of some future period. Profit planning is a predetermined detail plan of action developed and distributed as 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 future course of actions and in controlling the actual performance. In summary, profit planning has ultimate objectives of attaining the optimum profit. It is the development of objective and goals assignment of responsibilities to fulfill the objectives, implementation of plans and the follow up procedures for correction and adjustment in planning.

2.1.4 Long-Range and Short-Range Profit Planning

While preparing a systematic profit plan, two types of profit plans are developed:

1. Strategic (Long Range) Profit Plan
2. Tactical (Short Range) Profit Plan

The strategic profit plan takes a time horizon of three or more than three years in future and the later for short period. A part of this plan is more or less informal as presented by tentative commitments made by the executive committee in the organizational planning seasons. "The long range plan covers all the key areas anticipated activity: Sales, expenses, research and development, capital expenditure, cash, profit and return on investment."

The tactical (short-range) or operational profit plan is developed by anticipatively by all management levels. It can actually be viewed as the first year of the strategic profit plan. It is detailed plan for the entries and for each of its responsibility centers. It refines the enterprise and for each of its responsibility centers. It refines the enterprise objectives to develop programmer's policies and performance expectations. It involves timing that is intermediate-range to short-range. It focuses on levels of assigned authority and responsibility and provides "budget information" for performance reports.

2.1.5 Profit Planning Process

The profit planning process should involve periodic consistent and in depth re-planning, so that all the aspect of operations are carefully re-examined and re-evaluated. "The major process of profit planning is as follows:

Table No. 1.1

Overview of the PPC Process

Management Function	Sequential Phases of the PPC Process	Primary Responsibility
<p align="center">↑ Planning ↓</p>	1. External relevant variables-identify and evaluate	<p align="center">↑ Executive Management ↓</p>
	2. Broad objectives of the business – develop or revise	
	3. Specific enterprise goals develop consistent with the item 2 above	
	4. Enterprise strategies – specify major thrusts to attain the objectives and goals	
	5. Executive management planning instructions specify planning premises (or guidelines) for managers (based on items 1-4 above)	
	6. Project plans – develop and evaluate for each project	<p align="center">↑ Middle Management ↓</p>
	7. Strategic profit plan (long-range)- develop for 3,5,10 year	
	8. Tactical profit plan (short-range) – develop for upcoming year	
Leading	9. Implementation of profit plans – implement throughout the budget year	All Management Levels
<p align="center">↑ Controlling ↓</p>	10. Performance reports – prepare monthly responsibility	<p align="center">↑ All Management Levels ↓</p>
	11. Follow-up – provide feedback, take corrective action, and replant	

The PPC process is repeated each budget year.

1. Identification and Evaluation of External Variables :-

The internal and external variables have major influences on an enterprise. The variable identification phase of profit planning process in focus on the effect of external variables. Identification also involves separate consideration of variables that are non-controllable and those that are controllable. This means that management planning must focus on how to manipulate the controllable variables. More over, there must be managerial planning of hoe to work with non-controllable variables. The analysis of these relevant variables shows the strength and weakness of the enterprise. The executive management has responsible of identification and evaluation.

2. Development of the Broad Objectives of the Enterprise:-

The statement of broad objectives should be expressed the mission, vision and ethical character of enterprises. The purpose of this phase is to provide enterprise identify, continue of purpose and definition. The executive management has responsibility and can specify or restate the broad objectives of the enterprise on the basis of evaluated variables and assessment of the strength and weakness of organization.

3. Development of Specific Goals for the Enterprise:-

This phase of profit planning provides both narrative and quantitative goals that are definite and measurable. The statement of specific enterprise goals should define such operational goals as expansion or contraction of product and service line, geographic areas, share of the market, growth trends, production goals, profit margin, return on investment and cash flow. This specific goal in large measure qualified for each major subdivision of the enterprise.

4. Development and Evaluation of Company Strategic:-

Company strategies are the basic thrust ways and practice that will be used to attain planned objective and goals. The strategy may be short term or long term. The purpose of development and evaluation of strategies it is found the best

alternatives for attaining the planned broad objective and specific goals. It focuses on how to plan of action for the enterprises.

5. Executive Management Planning Instruction:-

It explains the broad objective enterprise goals, enterprise strategies and other executive management instruction needed to develop the strategic and tactical profit plans. This phase involves communication of the substantive plan to middle and lower management levels.

6. Preparation and Evaluation of Project Plans:-

Preparation and evaluation of current and future project plans are essential on a formal basis as one of the profit planning phase; project plans encompass variable time horizon because each project has a unique time dimension project plans encompass such items as plans for improvement of present products, new and expanded physical facilities, entrance into new industries, exit from product and industries, new technology and other major activities that can be separately identified for planning purposes. In planning for a project, the preparation and evaluation of current and future project plans are essential on a formal basis.

7. Implementation of Profit Plans:-

Implementation of management plans that have been developed and approved in the planning process involves the management function of leading subordinates in attending enterprise objectives and goals. Thus, effective management communicated and understood. However, a comprehensive profit- planning program may subordinate in performing this function. Plan strategies and policies developed through significant participation establish the foundation for effective communication. The plan should have been developed with the managerial convention that they are going to be met or exceed in all major respects. If these principles are effective in the development process, various executive and supervisor will have a clear understanding of their responsibilities and the expected level of performance.

8. Use of Periodic Performance Report:-

As profit plans are being implemented during the period of time specified in the tactical plan, periodic performance reports are needed. These are prepared by the accounting department on a monthly basis. In addition, some special performance reports are prepared more often on an as-needed basis. The comparisons of actual and planned performance yield variance. In an organization, internal and external reports can be applied. Internal reports can be further classified as:

- a) Statistical
- b) Specified management report and
- c) Periodic performance report

9. Use of Flexible Budget:-

The flexible expenses budget is also referred to as the variable budget. It is a sliding scale budget, expense control budget and formula budget. Flexible budgets give realistic information about expenses that make it possible to compute budget amounts for various output levels in the center.

10. Implementation of Follow-up:-

Performance reports are the basis for effective follow-up action. This is a part of effective control. It is important to distinguish between cause and effect. The performance variations that affect the management must determine the underlying causes. The identification of causes of both favorable and unfavorable performance variables after identifying the basic causes as opposed to results, an alternative for corrective action must be selected. The corrective action must be implemented.

2.1.6 Budgeting: a Significant Tool of Profit Planning

The actions that managerial decisions normally involve several aspects of the business, such as the marketing, production, purchasing and finance functions, and it is important that management should co-ordinate these various interrelated aspects of decisions that they believe are in the best interests of the organization.

when, in fact, taken together they are not; for example, the marketing department may introduce a promotional campaign that is designed to increase sales demand to a level beyond which the production department can handle. The various activities within a company should be co-ordinated by the preparation of actions for future periods; these detailed plans are usually referred to as budgets.

A budget is a quantitative expression of a plan of action and an aid to co-ordination and implementation. Budgets may be formulated for the organization as a whole or for any sub-units. Budgeting include sales, production, distribution and financial aspects of an organization. Budget programmers are designed to carry out a variety of function, planning, evaluating performance, co-coordinating activities, implementing plan, communicating, motivating and authorizing activities.

A budget is not a mere forecast to the future, but rather a consideration of the future expressed in terms of plans and policies for the period. It is, in short, a programmer for the actives of a particular section based on a co-coordinated and profitable programmer for the business as whole.

2.1.6.1 Reasons for Preparing Budget

The reasons for preparing budgets are as follows-

1. To avoid the planning of annual operations.
2. To coordinate the actives of the various parts of the organization and to ensure that the parts are in harmony with each other.
3. To communicate plans to the various responsibility centre managers.
4. To motivate managers to strive to achieve the organizational goals.
5. To control activities.
6. To evaluate the performance of managers.

In detail these six factors can be examined as follows:

Planning:-

The major planning decision will already have been made as a part of the long-term planning process. However, the annual budgeting process leads to the refinement of those plans, since managers must produce detailed plans of the implementation of the long-range plan. Without the annual budgeting process, the pressures of day-to-day operating problems may tempt managers not to plan for future operation. The budgeting process ensures that managers do plan for future operations, and that they consider how conditions in the next year might change and what steps they should take now to respond to these changed conditions. This process encourages managers to anticipate problems before they arise, and hasty decisions that are made on the spur of the moment, based on expediency rather than reasoned judgment, will be minimized.

Co-ordinate:-

The budget serves as a vehicle through which the actions of the different parts of an organization can be brought together and reconciled into a common plan. Without any guidance, managers may each make their own decisions, believing that they are working in the best interests of the organization. It is the aim budgeting to reconcile these differences for the good of the organization as a whole, rather than for the benefit of any individual area. Budgeting therefore compels managers to examine the relationship between their own operations and those of other departments, and, in the process, to identify and resolve conflicts a sound budgeting system helps to co-ordinate the separate organizational activities and ensures that all parts of the organization are in mutual harmony.

Communication:-

If an organization is to function effectively, there must be definite lines of communication so that all the parts will be kept fully informed of the plans and the policies, and constraints, to which the organization is expected to conform. Everyone in the organization should have a clear understanding of the part they are expected to play in achieving the annual budget. This process will ensure that the

appropriate individuals are made accountable for implementing the budget. Through the budget, top management communicates its expectations to lower-level management, so that all members of the organization may understand these expectations and can coordinate their activities to attain them. It is not just the budget itself that facilitates communication-much vital information is communicated in the actual act of preparing it.

Motivation:-

The budget can be a useful device for influencing managerial behavior and motivating managers to perform in line with the organizational objectives. A budget provides a standard that under certain circumstances, a manager may be motivated to strive to achieve. However, budgets can also encourage inefficiency and conflict between managers. If individuals have actively participated in preparing the budget, and it is used as a tool to assist managers in managing their departments, it can act as a strong motivational device by providing a challenge. Alternatively, if the budget is dictated from above, and imposes a threat rather than a challenge, it may be resisted and do more harm than good.

Control:-

A budget assists managers in managing and controlling the activities for which they are responsible. By comparing the actual results with the budget amounts for different categories of expenses, managers can ascertain which costs do not conform to the original plan and thus require their attention. This process enables management to operate a system of management by exception, which means that a manager's attention and effort can be concentrated on significant deviations from the expected results. By investigating the reasons for the deviations, managers may be able to identify inefficiencies such as the purchase of inferior quality materials. When the reasons for the inefficiencies have been found, appropriate control action should be taken to remedy the situation.

Performance Evaluation:-

A manager's performance is often evaluated by measuring his or her success in meeting the budgets. In some companies bonuses are awarded on the basis of an employee's ability to achieve the targets specified in the periodic budgets, or promotion may be partly dependent upon a manager's budget record. In addition, the managers may wish to evaluate his or her own performance. The budget thus provides a useful means of informing managers of how well they are performing in meeting targets that they have previously helped to set. The use of budgets as a method of performance evaluation also influences human behavior.

2.1.6.2 Stages in the Budgeting Process

The important stages in the budgeting process are as follows:

1. Communicating details of budget policy and guidelines to people
2. Determining the factor that restricts output.
3. Preparation of the sales budget.
4. Initial preparation of various budgets.
5. Negotiation of budgets with superiors.
6. Coordination and review of budgets.
7. Final acceptance of budgets.
8. Ongoing review of budgets.

These stages are discussed in detail below:

Communicating Details of the Budget Policy:-

The long-range plan is the starting point for the preparation of the annual budget. Thus top management must communicate the policy effects of the long-term plan to those responsible for preparing the current year's budgets. Policy effects might include planned changes in sales mix, or the expansion or contraction of certain activities. In addition, other important guidelines that are to govern the preparation of the budget should be specified-for example the allowances that are to be made for price and wage increases and the expected changes in productivity. Also, any

expected changes in industry demand and output should be communicated by top management to the managers responsible for budget preparation. It is essential that all managers be made aware of the policy of top management for implementing the long-term plan in the policy of top management for implementing the long-term plan in the current year's budget so that common guidelines can be established. The process also indicates to the managers responsible for preparing the budgets how they should respond to any expected environmental changes.

Determining the factor That Restricts Performance:-

In every organization there is some factor that restricts performance for a given period. In the majority of organizations this factor is sales demand. However, it is possible for production capacity to restrict performance when sales demand is in excess of available capacity. Prior to the preparation of the budgets, it is necessary for top management to determine the factor that restricts performance, since this factor determines the point at which the annual budgeting process should begin.

Preparation of the Sales Budget:-

The volume of sales and the sales mix determine the level of a company's operations, when sales demand is the factor that restricts output. For this reason, the sales budget is the most important plan in the annual budgeting process. This budget is also the most difficult plan to produce, because total sales revenue depends on the action of customers. In addition, sales demand may be influenced by the state of the economy or the actions of competitors.

A numbers of methods may be used to estimate sales demand. The simples approach is to produce estimates based on the opinions of executives and sales personnel. An alternative approach is to estimate sales demand by using statistical techniques incorporating general business and market conditions and past growth in sales. Market research may be necessary if it is intended to develop new products or new markets.

Initial Preparation of Budgets:-

The managers who are responsible for meeting the budgeted performance should prepare the budget for those areas for which they are responsible. The preparation of the budget should be bottom-up process. This means that the budget should originate at the lowest levels of management and be refined and coordinated at higher levels. The justification for this approach is that it enables managers to participate in the preparation of their budgets and increase the probability that they will accept the budget and strive to achieve the budget targets.

There is no single way in which the appropriate quantity for a particular budget item is determined. Past data may be used as the starting point for production of the budgets, but this does not mean that budgeting is based on the assumption that what has happened in the past will occur in the future. Changes in future condition must be taken into account, but past information may provide useful guidance for the future. In addition, managers may look to the guidelines provided by top management for determining the content of their budgets.

Negotiation of Budget:-

To implement a participative approach to budgeting, the budget should be originated at the lowest level of management. The managers at this level should submit their budget to their superiors for approval. The superior should then incorporate this budget for approval to his or her superior. The manager who is the superior then becomes the budgeted at the next higher level.

At each of the stages the budgets will be negotiated between the budgetees and their superiors, and eventually both parties will agree them. Hence figures that are included in the budget are the result of a bargaining process between a manager and his superior. It is also necessary to be watchful that budgets, or attempts to deliberately understate budgets in the hope that the budget that is finally agreed will represent an easily attainable budget, or attempt to deliberately understate budgets in the hope that the budget that is finally agreed will represent an easily

attainable target. It is equally unsatisfactory for a superior to impose difficult targets in the hope that an authoritarian approach will produce the desired results. The desired results may be achieved in the short term, but only at the cost of a loss of morale and increased labour turnover in the future.

The negotiation process is of vital importance in the budgeting process, and can determine whether the budget becomes a really effective management tool or just a clerical device. If managers are successful in establishing a position of trust and confidence with their subordinates, the negotiation process will produce a meaningful improvement in the budgetary process.

Co-ordination and Review of Budgets:-

As the individual budgets move up the organizational hierarchy in the negotiation process, they must be examined in relation to each other. This examination may indicate that some budgets are out of balance with other budgets and need modifying so that they will be compatible with other conditions, constraints and plans that are beyond a manager's knowledge or control. For example, a plant manager may include equipment replacement in his or her budget when funds are simply not available. The accountant must identify such inconsistencies and bring them to the attention of the appropriate manager. Any changes in the budgets should be made by the responsible managers, and this may require that the budgets be recycled from the bottom to the top for a second or even a third time until all the budgets are coordinated and are acceptable to all the parties involved. During the coordination process, a budgeted profit and loss account, a balance sheet and a cash flow statement should be prepared to ensure that all the parts combine to produce an acceptable whole. Otherwise, further adjustments and budget recycling will be necessary until the budgeted profit and loss account, the balance sheet and the cash flow statement prove to be acceptable.

Final Acceptance of the Budgets:-

When the entire budgets are in harmony with each other, they are summarized into a master Budget consisting of a budgeted profit and loss account, a balance sheet and a cash flow statement. After the master budget has been approved, the budgets are then passed down through the organization to the appropriate responsibility centers. The approval of the master budget is the authority for the manager of each responsibility centre to carry out the plans contained in each budget.

Budget Review:-

The budget process should not stop when the budgets have been agreed. Periodically, the actual results should be compared with the budgeted results. These comparisons should be made on a monthly basis and a report sent to the appropriate budgeters in the first week of the following month, so that it has the maximum motivational impact. This will enable management to identify the items that are not proceeding according to plan and to investigate the reasons for the differences. If these differences are within the control of management, corrective action can be taken to avoid similar inefficiencies occurring again in the future. However, the difference may be due to the fact that the budget was unrealistic to begin with, or that the actual conditions during the budget year were different from those anticipated; the budget for the remainder of the year would then be invalid. During the budget year, the budget committee should periodically evaluate the actual performance and reappraise the company's future plans. If there are any changes in the actual conditions from those originally expected, this would normally mean that the budget plans should be adjusted. This budget then represents a revised statement of formal operating plans for the remaining portion of the budget period. The important point to note is the budgetary process does not end for the current year once the budget period has begun; budgeting should be seen as a continuous and dynamic process.

2.1.7 Importance and Limitation Of PPC

2.1.7.1 Importance

"PPC can be adapted to any (profit) or non-profit service or manufacturing)

Regardless of size, special circumstances or conditions. Profit planning is very important to emphasize on developing positive reinforcement, improving motivation, developing goals, coping with the effect of budgetary pressure, resolving budget padding problems and budget for control. Some of the major points for profit planning and control that shows the importance of profit planning and control are:

1. It forces early consideration of basic policies.
2. It requires adequate and sound organization structure; that is there must be definite assignment of responsibility for each function of the enterprise.
3. It compels all members of management, from the top down to participate in the establishment of goals and plans.
4. It compels department managers to make plans in harmony with the plans of other departments and of the entire enterprise.
5. It requires that management put down in figures what is necessary for satisfactory performance.
6. It requires adequate and appropriate historical accounting.
7. It compels management to plan for the most economics use of labour, material, and capital.
8. It instills at levels of management the habit of time careful and adequate consideration of the relevant factors before reaching important decisions.
9. It reduces cost by increasing the span of control because fewer supervisors are needed.
10. It frees executive from many day-to-day internal problems through predetermined polices and clear-cut authority relationships. It hereby provides more executive time for planning and creative thinking.

11. It tends to remove the cloud of uncertainty that exists in many organizations, especially among lower levels of management relative to basic policies and enterprise objectives
12. It pinpoints efficiency and inefficiency.
13. It promotes understanding among members of management of their co-workers problems.
14. It forces management to give adequate attention to the effect of general business conditions.
15. It forces a periodic self-analysis of the company.
16. It aids in obtaining bank credit, banks commonly require a projection future operation and cash flows to support large loans.
17. It checks progress or lack of progress toward the objective of enterprise.
18. It forces recognition and corrective action (including regards)
19. It rewards high performance and seeks to correct unfavorable performance.
20. It forces management to consider expected future trends and conditions.

2.1.7.2 Limitations

The following main limitations in profit plan are:

1. It is difficult, if not impossible, to estimate revenues and express in out company realistically.
2. Our management has not interest in all the estimates and schedules. Our strictly informational system is better and works well.
3. It is not realistic to write out and distributes our goals, policies and guideline to all the supervisors.
4. Budgeting places too great demand on management time, especially to revise budget constantly, too much paper work is required.
5. It takes away management flexibility.
6. It creates all the kinds of behavioral problems.
7. It places the management in a strait jacket.
8. It adds a level of complexity that is not needed.

9. It is too costly, aside from the management time.
10. The managers, supervisors and other employees hate budgets.

2.1.8 Application of PPC to Various Types of Organizations

Some people say that comprehensive profit planning and control is applicable only to large and complex organization. Also a not unusual comment is that “Comprehensive budgeting is a fine idea for most business, but ours is different,” or “it is impossible to project our revenues and expenses,” and so on. Sometimes specific industries are viewed as not amenable to profit planning and control. These views are common regarding non-manufacturing enterprises-service companies, financial institutions, hospital, certain retail business, construction companies and real-estate enterprises. To the contrary, profit planning and control can be adapted to any organization (profit or non-profit, service or manufacturing), regardless of size, special circumstances or critical problems is frequently a good reason for the adoption of certain profit planning and control procedures. In respect to size, when operations are extensive enough to require more than one or two supervisory personnel, there may be a need for profit planning and control applications. The smallest company certainly has different needs in this respect than a large one. As with accounting, a single profit planning and control system that is appropriate for all enterprises cannot be designed. A profit planning and control system must be tailored to fit the particular enterprises, and it must be continually adopted as the enterprise and its environmental change. (*Welsch, Hilton & Gordon, 2006:P59*)

2.1.9 Budgeting

A budget is a comprehensive and coordinated plan expressed in financial terms, for the operations and resources of an enterprise for some specified period of future. Budgets basically, are forecasted financial statements form, expression of management plans, they are targets that encompass all phase of operations sales, production and financial. A budget is a written plan for future consists many functional budgets, include a sales budget, a production budget, a purchase budget,

a labor budgets, and cash budget once all of these budgets are completed, the master budget for the entire firm is prepared.

The process of preparing and using budgets to achieve management objective is called budgeting. In other words, the entire process of preparing the budgets is known as budgeting. Nowadays, profit planning and control is viewed in a comprehensive way. Profit planning is a new modified or holistic term of traditional budgeting. Traditional budgeting is mainly viewed with mathematical model but comprehensive budgeting or PPC views mathematical as well as management model developed by organization or experts or scholars. Comprehensive PPC is new modified and broad term and form of traditional budgeting.

2.1.10 Sales Budgeting

Sales budget is one of the operating budgets. It is a starting point in the budgeting procedure. It is a forecast of total sales of all the product or services expressed in term of physical quantities and values in respect of each product of a future budget period. The process of preparing and using sales budget to achieve sales objectives is called sales budgeting. In other sense, the entire process of preparing sales budget is known as sales budgeting. Sales budget deals with sales volume, sales revenue and sales expenses. It covers sales forecast, marketing plan, sales expenses or promotion expenses plan. All budgets are affected by sales budget and all budgets expect sales budget are related with cost. Therefore sales budget is the foundation of all other budgets.

The sales planning process is an essential part of profit plan and control because it provides for the basic management decisions about marketing and based on these decisions, it is an organized approach for developing a comprehensive sales plan. If sales plan is not realistic and relevant, most if not all of the other parts of overall profit plan are also not realistic. Therefore, if the management believes that a realistic sales plan cannot be developed; there is little justification for PPC.

The sales plan is the foundation for periodic planning in the firm because practically all other enterprise's planning is built on it. A comprehensive sales plan includes two separate, but related plans- the strategic and the tactical sales plans. Both strategic and tactical sales plans must be developed in harmony with comprehensive profit plan. A comprehensive sales plan incorporates such management decision as objectives, goals, strategic and premises. These translate into planning decisions about planned volume of goods and services, prices, promotion, and selling efforts.

The primary purposes of sales plan are as follows:

- a. To reduce uncertainty about future revenues
- b. To incorporate management judgments and decisions into the planning process (i.e. 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, 2006:P172*)

2.1.10.1 Sales Planning and Sales Forecasting

Sales planning and forecasting are not the same. Although related, they have distinctly different purposes. A forecasting is not a plan, rather it is a statement and/or a quantified assessment of future conditions about a particular subject based on one or more explicit assumptions. A forecast should always state the assumption upon which it is based. A forecast should be viewed as only one input into the development of a sales plan. The management of a company may accept, modify, or reject the forecast. In contrast, a sales plan incorporates management decisions that are based on the forecast, other inputs, and management judgments about such related items as sales volume, prices, sales efforts, production, and financing. Therefore all sales budgets are sales forecasts but all sales forecast are not sales budgets.

A sales forecast is converted to a sales plan when management has brought to bear management judgment, planned strategies, commitments of resources, and the managerial commitment to aggressive action to attain the sales goals. In contrast sales forecasting is technical staff function.

It is important to make a distinction between the sales forecast and the sales plan primarily because the internal technical staff should not be expected or permitted to make the fundamental management decisions and judgments implicit in every sales plan.

The short term sales forecast provide the basis for the current year's sales plan and finished goods inventory plan. At the same time the influence of the long-term sales forecast is reflected to the capital expenditure plan and in the finished goods inventory plan. The long- term sales forecast issues at what might be called another and of the finished goods inventory plan.

More difference between sales forecast and sales budget are as follows:

- a. The sales forecast is merely the initial estimate of future sales, where as sales plan is the projection approved by the budget committee that describes expected sales in unit and rupees.
- b. Sales forecast is merely well educated estimate of future expected demand of a specific product whereas sales budget is the quantitative expression of business plan and policies to be pursued in future.
- c. A sales plan provide standard for comparison with the result actually achieved, thus it is an important control device of management, where as forecasting represents merely a probable events over which no control can be exercised.
- d. Sales plan begins where and when sales forecast end. Sales forecast is the input to sales plan, sales plan is the foundation to profit planning and control. (*Goet, Bhattarai and Gautam, 2005:P 22*)

2.1.10.2 Strategic and Tactical Sales Plan

A comprehensive sales plan includes two separate but related plans the strategic and the tactical sales plan. The strategic sales plan is long-term sales and it covers usual case to five or ten years and tactical sales plan is short term sales plan which covers one year period.

1. Strategic Sales Plan

Strategic sales plan as one of the first step in the overall planning process. It is long-range sales plan of an enterprise. Usually it is five or ten years. It is board and general. It is usually developed by year and annual amount. The long term sales plan uses board groupings of product (product lines) with separate consideration of major and new products and services. Long-term sales plans usually involve in depth analysis of future market potentials, which may be built up from a basic foundation such as population changes, state of the economy, industry projections, and finally company objectives. Long term managerial strategies would affect such areas as long- term pricing policy, development of new products and innovations of present products, new directions in marketing efforts, expansion or changes in distribution channels, and cost patterns.

2. Tactical Sales Plan

Tactical sales plan is short- range sales plan. It is developed for a short period of time usually by quarters and by months for the first quarter. The tactical sales plan includes a detailed plan for each major product and for grouping of minor products. Tactical sales plans are usually developed in terms of physical units and in sales rupees. Short term sales plans must also be structured by marketing responsibility for planning and control purpose. Short-term sales plans may involve the application of technical analysis; however, managerial judgment plays a large part in their determination. The amount of detail in a tactical sales plan is a function of the company's environment and characteristics. A short range sales plan should include considerable detail, whereas a long range sales plan should be in board terms.

2.1.10.3 Component of Comprehensive Sales Planning

A comprehensive sales plan should satisfy the requirement of and be consistent with, the overall managerial budgeting program. The components of comprehensive sales planning are as follows:

(A) Component of the foundation for comprehensive sales planning:

1. External variable identified and evaluated
2. Broad enterprise objectives and goals formulated
3. Strategies for the company developed
4. Planning premises specified

(B) Component of comprehensive sales plan

1. Managerial policies and assumption
2. Marketing plan (sales and services revenues)
3. Advertising and promotion plan
4. Distribution (selling) expenses plan

(Welsch, Hilton and Gordon, 2006:P175)

2.1.10.4 Developing a Comprehensive Sales Plan

For the development of comprehensive sales plan, Welsch, Hilton and Gordon suggested these steps for developing a comprehensive sales plan:

Step 1: Develop management guidelines specific to sales planning including the sales planning process and planning responsibilities.

Step 2: Prepare one (or more) sales (market) forecasts consistent with specified forecasting guidelines including assumption.

Step 3: Assemble all the other data will be relevant in developing a comprehensive sales plan.

Step 4: Base on above steps applies management evaluation and judgment to develop a comprehensive sales plan.

Step 5: Secure managerial commitment to attain the goals specified in the comprehensive sales plan.

2.1.10.5 Consideration of Alternatives in Developing a Realistic Sales Plan

Developing a realistic sales plan involves consideration of numerous policies and related alternatives and a final choice by executive management among many possible courses of action. Important decision must be made about such issues as new products, discontinuance of present products, pricing, expansion or contraction of sales areas, size of sales forces, new distribution channels, distribution cost limitations, and advertising and other promotional policies.

For illustrative purpose, we will consider two pervasive sales planning problems:

1) Price-Cost-Volume Consideration in Sales Planning

Price-cost-volume strategy is a vital part of sales planning. In a competitive market, price and sales volume are mutually interdependent. Because sales volume and price are so closely tied together, a complicated problem is posed for the management of almost every company. Thus two related basic relationships involving the sales plan must be considered:

- i. Estimation of demand curve, i.e. the extent to sales volume varies at different offering process.
- ii. The unit cost curve, which varies with the level of productive output.

2) Product-Line Consideration in Sales Planning

Determination of the number and variety of products that a company will plan sales is crucial in the development of a sales plan. Both the strategic and tactical sales plan includes tentative decisions about new product lines to be introduced, old product line to be dropped, innovation, and product mix while preparing sales

plan. To develop sales plan, top management must make decisions about product line development and marketing activities.

2.1.10.6 Method of Sales Projection

There are various methods to project sales but here some major methods of sales projections are briefly described as under:

1) Personal Judgmental method

This method of sales projection is also known as participatory method. Under this method, sales projection will be made on the basis of personal observation without using mathematical formulas. This method includes:

- a) Sales force composites method
- b) Sales department composites method
- c) Chief executive composites method

2) Statistical or Mathematical Method

Following are some of the types of statistical or mathematical method of sales forecasting.

- a) Economic rhythm method
- b) Cyclical sequence (Correlation method)
- c) Historical analogical method

3) Specific purpose Method

This method is meant for specific types of industry. Different combination of mathematical are used to compute the sales under this method.

- a) Industrial analysis method
- b) Product line analysis
- c) End use analysis

2.1.11 Production Plan or Budget

2.1.11.1 Production Budgeting

Production budget is the initial step in budgeting of manufacturing operations. The production budget is an estimation of planned quantity of goods to be manufactured during budget period. Production budget is based on estimated sales volume and desired inventory level. Production must be planned to allow sufficient time to manufacture the products before the estimated data of sales. It is prepared in the basis of sales budget, plan capacity, opening inventory of finished goods, required closing stock of finished goods and policy of management.

The production budget specifies the planned quantity of goods to be manufactured during the budget period. To develop the production budget, the first step is to establish policies for inventory levels. The next step is to plan the total quantity of each product that is to be manufactured during the budget period. The third step is to schedule this production by interim periods. A complete production plan should show budget data classified by (a) products to be manufactured, (b) interim time periods and (c) activities of each responsibility center in the manufacturing process. In addition to the production budget, three other principle budgets are relevant to manufacturing:

- a) The direct material and purchased components budget, which specifies the planned material and components requirements.
- b) The labor budget, which shows the planned quantity and cost of direct labor, and
- c) The manufacturing expenses or factory overhead budget, which includes the plans for all factory costs other than direct material and direct labor.

The production plan is important tool of planning, co-ordination and control in a manufacturing organization. Development of a production plan requires the conversion of sales plan into production program. It interlinks the activities such as material planning, labor planning, overhead planning, etc. By preparing the production budget as a planning tool, it establishes the foundation for planning all

aspects of such factory operations as raw material needs, and factory labor needs, supervisory needs, factory overhead, plant capacity, and factory service activities. The co-ordination between sales plans, inventory policies, and production requirements comes into focus and is resolved in the production plan. It is also an important factor in the overall coordination of such functional activities as cash flow planning, financing, research and development, engineering, and capital additions. It establishes the basis for control of production inventories, production cost and labor in the factory. Thus production budget can be represented in this way:

Production requirement = Sales volume + Finished goods inventory change

2.1.11.2 Responsibility for Production Planning

After receiving the complete marketing plan, the manufacturing executive translates it into a production program consistent with managerial policies and subject to certain constraints. Planning, scheduling, and dispatching of the actual production throughout the year are function of the production department, therefore, it is essential that the responsibility for the planning and control of these functions be performed by production executives. These executives have firsthand knowledge of the plant and personnel capacities, availability of materials, and the production situation. Although responsibility rests directly upon the production executives, top management policies must be considered in such matters as inventory levels, stability of production, and capital additions. Responsibility of preparing production plan goes to the various managers such as chief executive, sales manager, production manager, production supervisor, administrative manager, and financial manager.

With respect to production planning, the managers must plan an optimum coordination between sales, inventory, and production levels. An efficient and coordinated production plan is necessary for economical manufacturing. Lower production costs usually result from standardization of products and stable production levels.

2.1.11.3 General Consideration in Planning Production and Inventory Levels

The production does not aim to set the precise amounts and timing of actual production during the budget period. Rather, the production plan represents the implications of planned sales volume for planned production volume as a basis for planning the various aspects of the manufacturing function-plant capacity requirements, direct material and components requirements, timing of purchases, direct labor requirements and costs, and factory overhead. The following factor should be considered in production planning.

- a) Total production requirements (by product) for the budget period
- b) Inventory policies about levels of finished goods, work in process, and the cost of carrying inventory
- c) Plant capacity policies, such as the limits of permissible departures from a stable production level throughout the year
- d) Adequacy of manufacturing facilities (expansion or contraction of plant capacity)
- e) Availability of direct materials, purchased components, and labor.
- f) Length of the processing time
- g) Economic lots or runs
- h) Timing of production throughout the budget period, by product and by responsibility centers. (*Welsch, Hilton and Gordon, 2006:P214*)

2.1.11.4 Developing the Production Plan

Production managers must translate sales budget into unit production requirement for the budget period for each product while considering the management's inventory policies. Basically there are three major steps to be followed while developing a production plan:

1. Formulate policies relative to inventory levels, and /or production levels
2. Determine the total quantity of each product that is to be manufactured during the budget period
3. Schedule this production by interim periods.

Symbolically, the following formula is generally used to determine the production planned:

Required for sales unit	XXXX
Add planned ending inventory level of finished goods	<u>XXXX</u>
Total required	XXXX
Less: beginning inventory of finished goods	<u>XXXX</u>
Planned production for year	XXXX

When the budgeted production for the budget period has been determined, the next problem is prorating this production by interim period during the budget year. Interim production must be planned to (1) provide sufficient goods to meet interim sales requirements, (2) keep interim inventory levels within policy constraints and (3) manufacture the goods as economically as possible.

2) Previous Theses

The review of literature is a crucial aspect of the planning of the study. The main purpose of the literature review is find out what works have been done in the area of the research. Problem under the study and what has not been done in the field of the research study being undertaken.

Power plays significant role for the sustainable development of an economy that drives a society towards the path of modernization. Nepal being one of the rich countries in hydropower sector. Very important literature is available in this field. Some of the notable literature relevant to the study is reviewed in this study to identify the relevance of the present study.

Suman Acharay

Acharya has submitted his research report on the topic of profit planning in public utility under taking of Nepal taking a case study in NEA. Covering the time period of FY 2051/052 to 055/056, he tried to solve these objectives which are as follows:

1. To see how far the public utility undertakings are participating to contribute the national development and
2. To find out the major problems in developing and implementing profit planning in NEA.

After research and analysis of various functions budget he found following findings.

1. NEA's goals and objectives are not communicated to lower level staff there is the absence of M.B.O. principles of participative management and not any system of M.I.S. report.
2. Top level executives are only involved in planning and decision making.
3. Financial position is not satisfactory because it is in operating loss and they show net profit and year after the adjustment of revaluation surplus.
4. NEA is suffering from power loss which is 24% of production which is varying remarkably in profit planning.
5. The main problem of public utility undertakings is whether it aims to maximize profit or to maximize social service is not clearly distinguished.
6. There is a problem of autonomy, government directly interferes to the public enterprises. Any decision like about pricing, service, personnel should be approved by the H.M.G.

Conclusion:-

After research, he concluded following points:

1. There is a problem of A/C receivable which is in increasing trend each year.
2. The another remarkable problem is lying idle of cash and bank balance in NEA which take major portion of current assets.

3. Power losses by technical and non technical cause are one of the remarkable problems of NEA. It is main cause of reducing the operating profit.
4. NEA has not prepared accounts in a scientific and systematic manner. All expenses of NEA are named operation and maintenance of expenses.
5. Increasing cost in each year is another remarkable problem of NEA and they have not adopted the cost control program.
6. NET there is not able to maintain proper co-ordination between department to department and top level management to lower level management.
7. There is not any clear-cut classification of fixed and variable cost which creates problem in profit planning.
8. The statistical tool shows the positive relationship between budgeted sales and actual sale and between budgeted production and actual production.
9. Profit centre established by NEA is big step in profit planning. If NEA mobilize profit centre to achieve their objectives, NEA certainly rise up its present financial situation.

Recommendation:-

On the basis of the study he gave some major recommendation to improve the formulation and implementation of profit planning system of NEA.

1. NEW should introduce programs and action plan for the reduction of transmission loss, technical and non technical. It can improve its efficiency in the metering device instantly either by changing old meters or efficient meter reader or by improving its transmission system. Non technical loss can be reduce by adopting effective managerial, social legal and other measure.

Mr. Badri Prasad Uprety

Mr. Badri Prasad Uprety (2006) has submitted his research work entitled “*Sales budgeting as the tools of profit planning in public enterprises: A case study of Nepal Electricity Authority*”. This research of Mr.Badri was mainly centered with sales budgeting and its effect on profitability in NEA. The main objectives and finding of his study are as follows.

Main Objectives

1. To analyze the sales budgeting and practices adopted by NEA.
2. To examine sales trend of NEA.
3. To analyze the relation between budgeted sales and its effect on profitability of NEA.
4. To provide recommendation and suitable suggestion to the NEA.

Major Finding

1. NEA has a practice of preparing both strategic (long range) and tactical (short range) profit plan. But the strategic plan is limited only to the top level executives.
2. The NEA’s sales achievement has neither touched nor crossed the target sales during the study period. The sales achievement during five fiscal year is about 93% of target sales in average and the sales is increasing every year.
3. There is a high degree of positive correlation between planned sales and actual sales i.e. 0.99 approximately, it means actual sales changes in the same direction and in about the same speed of the planned sales.
4. The C.V and S.D of actual sales are more than these of planned sales. It indicates that actual sales are more variable than the budgeted sales.
5. NEA has been suffering from loss since last half decade. It’s loss is in increasing trend in the first two fiscal years, than decreased in third fiscal year and again, it is increasing in last two fiscal years taken for the study.
6. The actual profit of NEA has a very high degree of negative correlation with actual sales i.e. -0.86 approximately, therefore an increase in sales

decrease in profit of authority. The reason may be due to inability and insufficiency of NEA to increase the efficiency of costs by considering forthcoming risks, power leakage, wastage etc.

7. The actual profit of NEA has also very opposite relation with its target profit due to improper cost and profit budgeting system and policy.
8. NEA exports and imports electricity only from India and only to India. The export of electricity is less than the import of electricity and the export tariff rate is also less than the tariff rate of electricity.
9. NEA is paying more than 60% of its revenue only for purchase price of electricity from foreign invested power sectors, interest and royalty expenses.
10. Power loss in NEA is about one-fourth of its total power available. This power loss is about 10% more than normal acceptance.

Mr. Shashti Kumar Shrestha

Mr. Shashti Kumar Shrestha (2006) had conducted a research on the topic “*A study on the role of sales planning in profit planning in Nepalese public enterprises: A case study of Nepal Electricity Authority.*” In this study Mr. Shashti Kumar Shrestha has pointed out following objectives and finding:

Main Objectives

1. To analyze the variance of annual budgeted sales and actual sales.
2. To analyze the relationship between sales and production.
3. To analyze the interrelationship between sales and profit.
4. To study the trend of sales and problems of NEA.
5. To interpret the sales related ratios.
6. To analyze the relationship between sales revenue and total costs
7. To provide a package of recommendations and suggestion on the basis of findings for solving the problems connected with budgeting and profit planning.

Major Finding

1. Actual sales are more variable than budgeted sales.
2. There is positive and a perfect correlation between budgeted sales and actual achievement of sales. The value of correlation between budgeted and actual sales is 0.9915.
3. Actual sales are less than the actual production. It indicates remarkable loss of power in NEA
4. There is perfect correlation between actual sales and actual production because the correlation between is 0.99.
5. Power loss is significantly high in NEA. This is due to theft, leakage, outage and unsystematic distribution channel. The average power loss is 23.91% of actual production which is out of normal loss. But the actual loss of the years is nearest to the average loss.
6. The profit of NEA has a very high degree of negative correlation with actual sales. So, an increase in sales has resulted in a decrease in the profit of authority.
7. The Net Profit Margin of NEA is very much poor. It has a negative margin during the study period.

Mr. Mahendra Rai

Mr. Mahendra Rai (2004) had conducted a research on the topic of “*profit planning in public utilities sector of Nepal: A case study of Nepal Electricity Authority*”. The prime main objective is to analyze and examine the profit planning system of NEA and the specific objectives and core findings of this study are as follows:

Main Objectives

- 1) To examine profit planning system applied by Nepal Electricity Authority.
- 2) To analyze the financial performance of NEA by using various financial tools.
- 3) To observe the various functional budget of NEA associated with comprehensive profit planning.
- 4) To evaluate budgeted and actual achievement of NEA

Major Finding

- 1) Budgeted sales are more variable than actual sales.
- 2) Budgeted production is more fluctuating than actual production.
- 3) Actual sales and actual production are significantly inconsistent.
- 4) NEA has been running at a loss.
- 5) NEA has been paying a large amount of interest on long term loan.
- 6) Power leakage is significantly high in NEA.

Mr. Geha Nath Koirala

Mr. Geha Nath Koirala (2004) had conducted a research on the topic of “*Managerial budgeting as a tool of increasing efficiency of public enterprises*”. Some remarkable main objectives and findings pointed out by Geha Nath Koirala are as follows.

Main Objectives

The general objectives of this study are to evaluate the profitability in power center with the following specific objectives.

1. To analyze the various functional budget of NEA.
2. To, analyze the true picture of managerial budgeting adopted by NEA.
3. To analyze the variance between budget and actual achievements of the authority.
4. To, point out the major shortcomings and recommend suggestive measures.

Major Finding

1. NEA has been suffering from loss for the FY2057/058 to 2061/62.
2. NEA has been paying huge amount of interest on long term loan.
3. There are perfect correlations between budgeted and actual sales and budgeted and actual production.
4. Actual sales are always less than actual production due to power loss which is a main problem of NEA, which affects its profit.
5. Overhead are not classified systematically which create differently to analysis expenses effectively.
6. NEA has no practice of cost segregation
7. NEA was unable to meet its BEP sales therefore it was at loss every year.
8. NEA liquidity ratio was not satisfactory and profitability ratios were not satisfactory.
9. NEA has high fixed cost which was the main cause of loss.

CHAPTER – THREE

RESEARCH METHODOLOGY

Introduction

Research methodology is the way to solve the research problem systematically. It helps to analyze various aspects of research work such as sales and production planning.

This study had intense relation with the application of profit planning in a non manufacturing concern, regarding the objective to analyze, examine and interpret the application of profit planning in NEA. Therefore, it requires appropriate research methodology. The evaluation of justification for the establishment of public enterprises has become essential in the light of their performance. For the achievement of objective the research methodology includes. Research designing, nature and source of data, period cover, research variables, tools used and research question. In this way research methodology is the method to solve the various research problems.

3.1 Research Design

To make any type of research a well set research design is necessary, which fulfills the objective of the study. Generally research design means definite procedure and techniques of the study. The present work is mainly related with the quantitative plans and account of NEA so analytical approach has been considerably adopted to present the data. But the qualitative aspects of the research such as: effectiveness of profit planning problem of formulating and implementing the profit plans, view of top personnel of this enterprises and theoretical prescriptions are explained in words, where ever necessary, therefore, the present study has followed both analytical as well as descriptive approaches of research design.

3.3. Nature of Sources of Data

In this study, mainly secondary data will be used to fulfill the objective of the study. The secondary data have been collected from the following main sources.

- i. Journals and Newspapers
- ii. Published and Unpublished articles
- iii. Previous studied made in this field
- iv. Annual reports of Nepal Electricity Authority
- v. Budget sheet of NEA
- vi. Profiles and magazines of NEA
- vii. Media

3.4. Period Covered

The study period covers the time period of five years from FY2061/062 to FY2065/066 B.S. for the purpose of analysis of short-range sales and production budgeting and its affect on profitability.

3.5. Research Variables

The research variable of the study area mainly related with sales budget, production budget and profit of NEA. Budgeted and actual sales unit, budgeted and actual production unit and budgeted and actual profit are the research variables of this study.

3.6. Research Tools Used

Data collection from various sources are arranged and presented in proper tables, figures, format, graphs etc. To analyze the collected data statistical and financial tools such as mean, standard deviation, correlation, co-efficient of variation (CV).

CHAPTER – FOUR

DATA PRESENTATION AND ANALYSIS

4.1. Introduction

The main purpose of this study is to analyze the budgeted sales and production, actual sales and production and their impact on profitability of public enterprises. Nepal Electricity Authority has been selected as Sample Corporation for this purpose. To accomplish these objectives, this chapter will analyze the various aspects of sales and production budget and their achievement and their impact on profitability of the Authority.

Profit is the ultimate goal of every business enterprises. Everybody involves in business for making profit. Profit can not be achieved automatically. Business should be managed with better managerial skills. So the profit is planned and controlled output of efficient management. Profit planning is the planning of revenue (i.e. increase the revenue), and planning of cost (i.e. increase the efficiency of cost). Generally two types of profit plan are formulated to achieve the organizational objectives. One is long range (strategic) profit plan and the other is short-range (tactical) profit plan. Profit planning and control is an overall plan of operations, providing guidelines to management and acting as signal light for the management. It uses in planning, organizing and controlling, all the financial and operating activities of the firm in the forth coming period or for a specified future period of time. PPC consists of three main budgets are as follows:

- Operational Budget: Budget related with revenue and expenses, such as sale budget, production budget, purchase budget, etc.
- Financial Budget: Budget related with financial statements, such as balance sheet, income statement, etc.
- Appropriation Budget: Budget related with advertising and publicity expenditure, research etc.

Among of all budgets, sales budget is one of the operation or revenue budget. It is the primary step in developing the overall budget procedure and it is the primary sources of cash and all other functional budgets are prepared on the basis of sales budget. Profit planning or budgeting starts with planning the sales budget, which is a formalized estimation of future sales revenue and sales volume. Sales budget should be in realistic ground. If sales budget is not realistic and relevant, most if not all of the other parts of overall profit plan are also not be realistic. Mainly, two type of sales budget are developed to achieve an enterprises sales objective. One is strategic (long-range) sales plan and the other is tactical (short-range) sales plan. But the main focus of the study is about the tactical sales plan of Authority due to the resources and time constraint.

Production budget is also an operational budget, which is the second step in formulation of profit planning. It is based on sales plan. It is an estimation of planned quantity of goods to be manufactured during budget period. After sales budget has been prepared, the production requirements for the forth-coming budget period are determined and organized in the form of a production budget.

The main objective of this study is to analyze budgeted sales and actual sales, budgeted production and actual production in unit, its variation and impact of sales and production on profitability of the authority. This study covers the period of five years from the fiscal year 2061/062 to 2065/066.

4.2. Sales Budget of Nepal Electricity Authority

Sales budget is related to operational budget. It is starting point for developing overall budget procedure, which displays the projected sales in units and rupees. It is prepared by product, time and territory. On the basis of sales budget, production budget is formulated. And all other functional budgets are prepared on the basis of production budget; therefore sales budget is the corner stone of the other budgets and a prime tool for profit planning in every type of enterprises. If sales budget is wrongly prepared all other budgets will be wrong. So sales budget needs the broad knowledge of various aspects related with that budget. NEA has long experience

of preparing budgets since its establishment. First of all, NEA prepares strategic or corporate sales plan and then tactical sales plan. Strategic sales plan is limited only in top level management and therefore this study only focuses tactical sales plan of the authority.

4.2.1. Sales Budget and Achievement

A comprehensive sales plan includes two separate but related plans- the strategic and the tactical sales plans. Strategic sales plan is generally for more than one year detailing by annual sales and tactical sales plan is used to plan sales for 12 months by quarter and by months for the first quarter. NEA has a practice of preparing both strategic and tactical sales plan. Strategic sales plan is limited only in top level management and this study only focuses tactical sales plan of the Authority. Sales budget is prepared by NEA on the basis of the nature of consumer. Consumers are domestic, commercial, non-commercial, industrial, and so on.

Following is the analysis of the NEA's previous sales performance and their achievement. Following table 4.1 shows the budgeted sales and the actual sales achievement in units as well as rupees from the fiscal year 2061/062 to 2065/066.

Table 4.1
Sales Budget and Achievement
From FY 2061/062 to 2065/066

Fiscal Year	Unit in million			Rs. In million		
	Budgeted	Actual	Achievement	Budgeted	Actual	Achievement
2061/062	1988.85	1918.355	96.46	13275.388	12885.977	97.07
2062/063	2145.48	2028.51	94.55	14260.33	13672.71	95.88
2063/064	2362.34	2202.94	93.25	15638.12	14777.26	94.50
2064/065	2421.04	2310.23	95.42	16220.94	15391.97	94.89
2065/066	2720.69	2204.59	81.03	18234.55	14741.13	80.84
Average	2327.68	2132.92	92.14	15525.86	14293.81	92.63

Source: Annual report and Budget book of NEA

The table no 4.1 shows the actual sales achievement of NEA is highly consistent with budgeted sales. In F/Y 2061/062 the budgeted sales of NEA was 1988.85

units in million and gradually increase up to 2720.698 units in million in FY 2065/066. On the other hand the actual sales was 1918.35 unit in million in FY2 061/062 which was 96.46% achievements. It decreases & fall into 2204.592 units million in FY 2065/066 and achievement is 81.03%. Average achievement is 92.142% for the total study period. It is concluded that actual sales units is lower than the budgeted or targeted sales units during the study period.

In the same way, budgeted sales revenue was Rs. 13275.383 million in FY 2061/062. It began to increase and reached to Rs.18234.55 million in FY 2065/066. In other hand the actual sales of electricity was Rs.12885.974 million in FY 2061/062 and it was the 97.07% achievement. The actual sales revenue began to increase and reached to Rs.14741.132 million in FY 2065/066 and the achievement is 80.84%. Average achievement is 92.636% for the total study period. The highest achievement among the above mentioned data is 97.07% of FY 2061/062. It concluded that the actual sales revenue is less than budgeted sales revenue.

This table also shows that sales units achievements and sales revenue achievements are not always fully proportionate with each other due to changes in tariff rate, different voltage used, category-wise sales shares and so on. The budgeted sales and actual sales can be presented in the following graphical form.

Figure 4.1
Budgeted Sales and Actual Sales Unit of NEA from FY 2061/062 to 2065/066

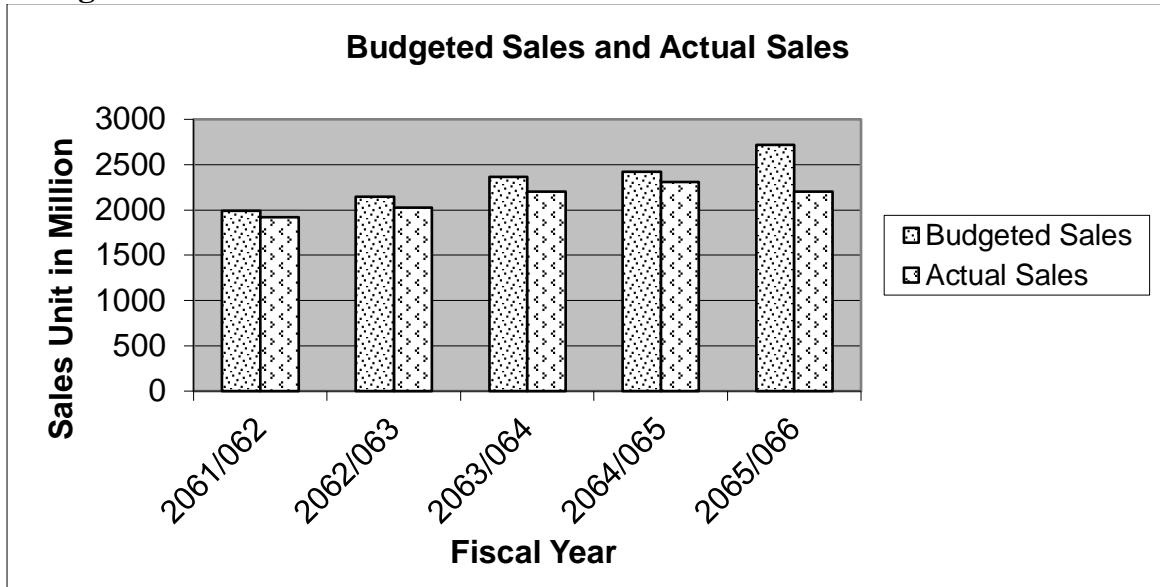
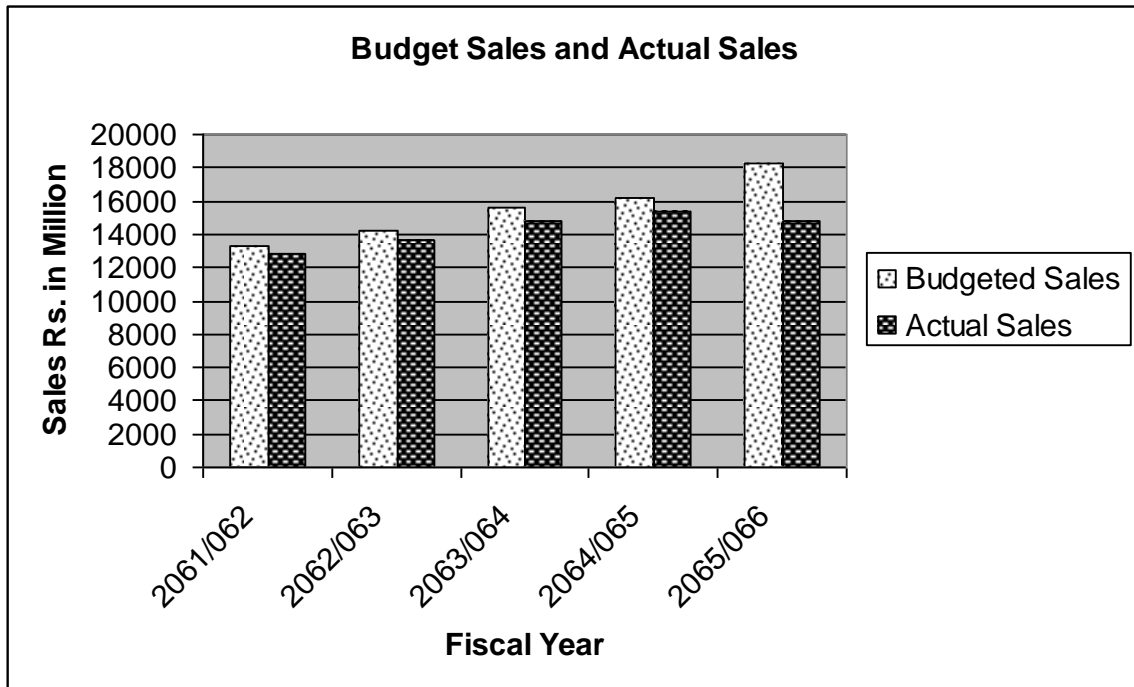


Figure No. 4.2
Budgeted Sales and Actual Sales Revenue of NEA from FY2061/062 to 2065/066



The above graphical presentation shows the gradual increment of budgeted sales as well as actual sales during the period. It also present actual sales are always less than budgeted sales.

Now, it is necessary to calculate the arithmetic mean, standard deviation and coefficient of variation of the budgeted and actual sales figure of NEA in order to find out the nature of variability of sales budget and actual sales of NEA for five years from FY2061/062 to 2065/066. The detail calculations of these statistical tools are presented in appendix 1. The summarized results are presented below.

Table 4.2
Relationship between Budgeted and Actual Sales Unit

Statistical tools	Budgeted sales (x) Units in million	Actual sales (y) Units in million
Mean	2327.6836	2132.926
S.D	249.95	140.30
C.V	10.74	6.58

Sources: Appendix 1

The above table 4.2 shows that the mean of actual sales is lower than budgeted sales (i.e. 2132.926 unit in million < 2327.6836 unit million). The table shows budgeted sales are more variable than actual sales. The standard deviation and coefficient of variation of budgeted sales is higher than actual sales. Higher coefficient of variation (CV) is the indication of more variable or less consistency and vice-versa. Therefore above result show those actual sales are more consistent and homogeneous than budgeted sales. And the budgeted sales of NEA are more variable than actual sales.

Another statistical tool to analyze the relationship between actual and budgeted sales is correlation of coefficient. It can be found with the help of Karl Pearson Coefficient of Correlation and is denoted by (r). The coefficient of correlation measures the degree of association between budgeted and actual figure. If an actual sale is as like as budgeted, it is proved that there is positive correlation and vice versa. To find out of the value of (r), the budgeted sales is to be assumed as independent (X) and actual sales as dependent variable (Y).

The calculated value of correlation (r_{ay}) is 0.7920 percent (See Appendix-1). It proves that there is highly positive correlation between independent and dependent variable. It means that both the actual and budgeted sales are correlated with each other by more than 79 percent. The significant correlation indicates that the actual condition and the budgeted condition of NEA are signification.

4.2.2. Sales Trend Line by Regression Analysis

Another statistical tool is regression analysis, which determines the nature of relationship among budgeted and actual sales and makes the estimate from that on that base. It can help to estimate or forecast the future sales. For this purpose, actual sales figures is to be known as dependent variable and denoted by (Y), likewise budgeted sale is to be known as independent variable, which is denoted by (X). The regression line of actual sales on budgeted sales (Y on X) is as below:

$$Y - \bar{Y} = r \frac{\sigma_y}{\sigma_x} (X - \bar{X})$$

We have the following value as calculated above

Statistical tool	Budgeted Sales(X) Unit in million	Actual sales (Y) Unit in million
Mean	2327.6836	2132.926
S.D.(σ)	249.95	140.30
r_{xy}	0.7920	

Sources: Appendix 1

$$Y - 2132.926 = 0.7920 \times \frac{140.30}{249.95} (X - 2327.6836)$$

$$Y = 0.4446X + 1098.1326$$

This regression equation shows that actual sale is increasing trend but the increment in actual sales is less than that of budgeted sales. And 0.4446 represent the change in value of dependent variable (Y), when the value of independent variable (X) changes by one unit.

By the help of regression equation, we can estimate the expected sales achievement with given value of budgeted sales (X). We have the budgeted sales

(X) for the FY 2066/67 is 3038.724 unit in million. The expected sales achievement for the FY 2066/067 can be calculated by using above equation.

Then, The expected sales achievement,

$$\begin{aligned}
 Y &= 0.4446X + 1098.1326 \\
 &= 0.4446 \times 3038.724 + 1098.1326 \\
 &= 2449.15
 \end{aligned}$$

If the relationship between budgeted and actual sales remain same as previous year, the actual sales for the FY 2066/067 will be 2449.15 unit in million as stated by the above regression equation.

Likewise, another important tool is least square method. It is also known as time series analysis and an important tool for the study of trend of actual sales. A straight-line trend will show the relationship between year and actual sales of the relevant year. To fit this straight-line trend, the time factor should be considered as an independent factor and actual sales as a dependent factor for the time. The formula can be expressed in the following way:

$$Y_c = a + bX$$

Where, Y= actual sales

X= time

b = slope of trend line or annual rate of growth

a = y-intercept

Table 4.3
Fitting Straight Line Trend by Least Square Method

Fiscal Year	Actual Sales (Y)	X	X ²	XY
2061/062	1918.35	-2	4	-3836.7
2062/063	2028.51	-1	1	-2028.51
2063/064	2202.94	0	0	0
2064/065	2310.238	1	1	2310.238
2065/066	2204.592	2	4	4409.184
Total	∑Y=10664.63	∑X=0	∑X ² =10	∑X Y=854.212

Sources: Annual report of NEA

FY 2063/064 is assumed as the base year. Therefore the value of X or mid time is zero in the FY 2063/064 and negative before the base year and positive after the base year.

Substituting the value in straight line equation is

$$Y_c = a + bX$$

Where,

$$a = \frac{\sum Y}{n} = 10664.63 / 5 = 2132.926$$

$$b = \frac{\sum XY}{\sum X^2} = 854.212 / 10 = 85.42$$

$$\therefore Y_c = 2132.926 + 85.42 X$$

The trend line shows the positive sales figure for future. The sales will be increase by 85.42 million units every year if the same sales trend of the past year continuous in the future.

By the help of this trend line equation, we can estimate the actual sales for FY 2066/67. The value of X in the base year is FY2063/64.

Then,

$$\begin{aligned} Y_c &= 2132.926 + 85.42 \times 3 \\ &= 2389.186 \end{aligned}$$

By the result, if the trend does not change, the positive sales for the FY2066/067 will be 2389.186 million units.

4.2.3. Comparative Analysis between Budgeted Sales and Actual Sales

In order to compare the nature of variability of budgeted and actual sales of different years, it is needed to calculate the arithmetic mean, standard deviation and co-efficient of variation of budgeted and actual figures of NEA for recent five years from FY 2061/062 to 2065/066 and previous five year from FY 2054/055 to

2058/059. The detail calculation of these statistical tools are presented appendix 1.

The summarized of results from appendix 1 are as follows:

Table 4.4
Comparative Mean, Standard Deviation and Coefficient of Variation of Budgeted Sales between FY 2054/055 to 2058/059 and FY 2061/062 to 2065/066

Statistical tools	Budgeted sales (x) Units in million FY 2054/055 to 2058/059	Budgeted sales (x) Units in million FY 2061/062 to 2065/066	Increase or decrease in percentage
Mean	1309.800	2327.6836	43.73
S.D	240.876	249.95	3.63
C.V	18.39	10.74	-71.23

Sources: Appendix 1 and previous thesis report

Table 4.5
Comparative Mean, Standard Deviation and Coefficient of Variation of Actual Sales between FY 2054/055 to 2058/059 and FY 2061/062 to 2065/066

Statistical tools	Actual sales (y) Units in million FY 2054/055 to 2058/059	Actual sales (y) Units in million FY 2060/061 to 2064/065	Increase or decrease in percentage
Mean	1274.900	2132.926	40.23
S.D	201.676	140.30	-43.745
C.V	15.82	6.58	-140.43

Sources: Appendix 1 and previous thesis report

The above table 4.4 and 4.5 shows the comparison between budgeted sales and actual sales of the available data of recent five year and previous five. The results show that the mean of budgeted and actual sales is increased by 43.73% and 40.23% in FY 2061/062 to 2065/066 compared to FY 2054/055 to 2058/059 respectively. The standard deviation of budgeted and actual sales is decreased slightly in compare to previous five year. Whereas coefficient of variance (C.V) is decreased rapidly to 71.23% and 140.43% of budgeted and actual sales in FY 2061/062 to 2065/066 compared to FY 2054/055 to 2058/059 respectively. Which indicate less variability or more consistency of budgeted and actual sales of NEA in recent period? The consistency of data may be due to constant production or due

to long load shedding and no change in household application or may be high price demand of electricity in period of FY 2061/062-2065/066 than in period of FY2054/55-2058/59 regarding the sales. This can also be shown in graphical form as below;

Figure 4.3
Mean of Budgeted and Actual Sales Units of NEA

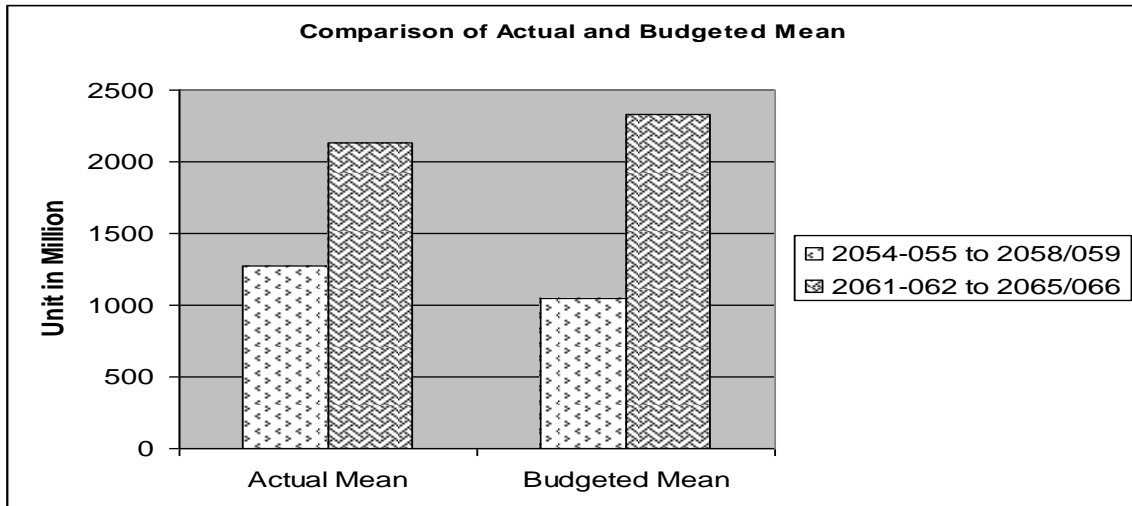


Figure 4.4
Standard Deviation of Budgeted and Actual Sales Units of NEA

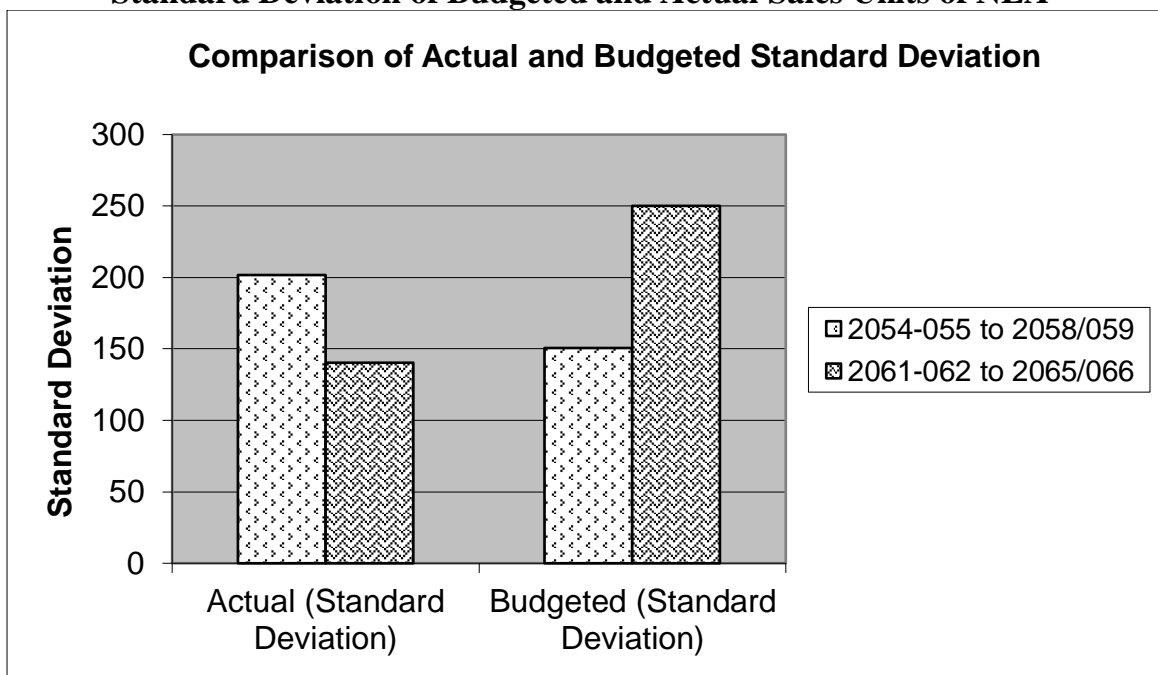


Figure 4.5
Coefficient of Variance of Budgeted and Actual Sales Units of NEA from FY 2061/062 to 2065/066

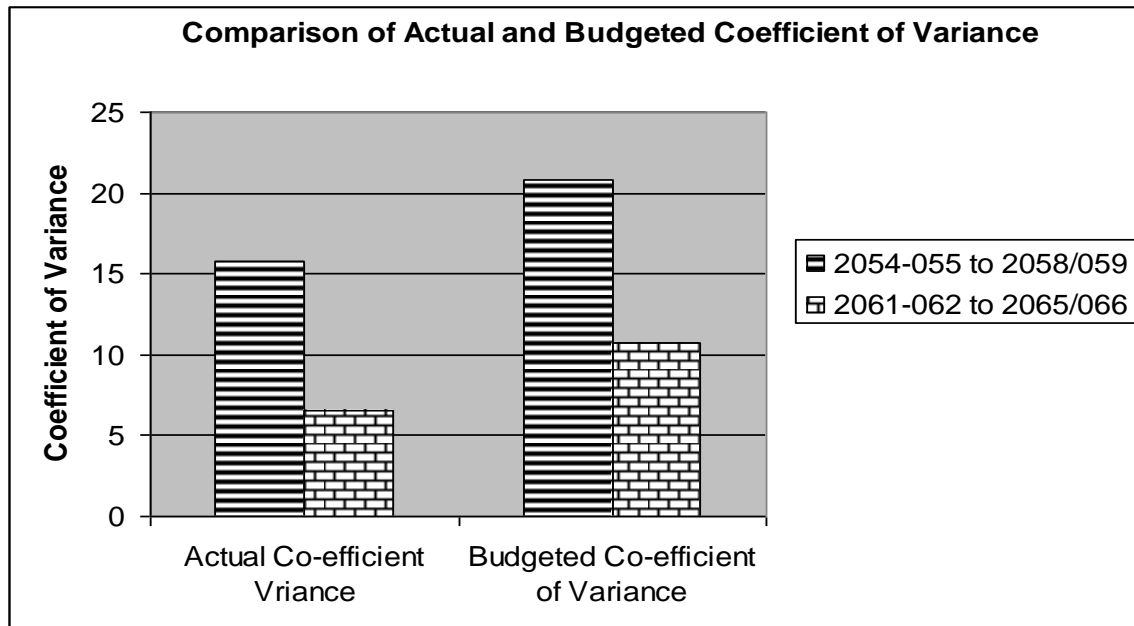


Figure 4.3 shows that the actual and budgeted sales mean is appreciably increased in FY 2061/062 to 2065/066 compared to FY 2054/055 to 2058/059. But on the other hand in figure 4.4, the standard deviation is slightly decreased in FY 2061/062 to 2065/066 compared to FY 2054/055 to 2058/059 and standard deviation is more decreased in budgeted sales than actual sales. In the same way in figure 4.5, the coefficient of variation is rapidly decreased in FY 2061/062 to 2065/066 compared to FY 2054/055 to 2058/059. The CV for budgeted sales is increased than actual sales in FY 2054/055 to 2058/059 but on the other hand CV is nearly equal for actual and budgeted in FY 2061/062 to 2065/66.

Distribution System & TARIFF Rates Of Electricity:-

Nepal Electricity Authority is distributing electricity to it's customers by classifying them in various categories under different TARIFF RATES. NEA is distributing electricity to its customers has been classified into twelve categories & they are as follows;

- | | |
|-------------------|-------------------------|
| 1. Domestic | 7. Street Light |
| 2. Commercial | 8. Temporary Supply |
| 3. Non-commercial | 9. Transport |
| 4. Industrial | 10. Temples |
| 5. Water-Supply | 11. Community supply |
| 6. Irrigation | 12. Bulk supply (India) |

While preparing sales plan to achieve target sales and target profit, the emphasis needs to be given to the sales of electricity for different categories of customers because NEA imposes different Tariff rate based on different categories and different voltage level. Generally, Tariff rate are high in low voltage level and low in High voltage level. In case of category, expensive Tariff rate is imposed in domestic, industrial, commercial, non-commercial, temporary supply categories and it is cheap in water supply, irrigation, community sales and bulk supply (India) categories. The Tariff rate in temporary supply's the highest of all categories i.e. Rs.13.50 per unit and in irrigation is the least of all i.e. Rs.3.45 per unit. Tariff rates are in 'Domestic' Rs.4.00 to Rs.9.90 per unit, in 'Industrial' Rs.5.45 per unit, in 'Commercial' Rs.7.40 to Rs.7.70 per unit and in 'Non-Commercial' Rs.7.80 to Rs.8.25 per unit. The summarizing sales shares (in GWh) of each category are tabulated as below:

Energy Available and Peak Demand
Table

Particulars	2061	2062	2063	2064	2065	2066
Peak Demand (MW)	515.24	557.53	603.28	648.39	721.73	812.50
Available Energy (GWh)	2380.89	2642.75	2780.92	3051.82	3185.95	3130.79
1. NEA Hydro	1345.46	1522.9	1568.55	1747.42	1793.14	1839.53
2. NEA Thermal	9.92	13.669	16.1	13.31	9.17	9.06
3. Purchase (Total)	1025.519	1106.184	1196.27	1291.09	1383.64	1282.20
India (purchase)	186.675	241.389	266.23	328.83	425.22	356.46
Nepal (IPP)	838.844	864.795	930.04	962.26	958.42	925.74

Note: - Peak demand is for all are covered by integrated system including supply to India Provisional figures; Subject to final audit.

Growth of Consumers
Table

Particulars	2061	2062	2063	2064	2065	2066
Domestic	10,10,719	11,13,740	12,27,295	13,39,253	14,50,254	15,95,015
Non-Commercial	9,865	9,950	10,215	10,215	10,556	10,518
Commercial	5,454	6,000	6,170	6,000	6,052	7,305
Industrial	21,374	22,500	23,020	24,089	25,548	28,559
Water supply	352	370	380	414	434	584
Irrigation	2,557	3,400	6,450	13,183	18,14	22,335
Street Light	1,437	1,500	1,550	1,608	1,961	2,339
Temporary supply	150	155	165	210	300	403
Transport	48	50	54	39	38	42
Temple	1,959	2,150	2,290	2,628	2,746	2,911
Community sales	15	35	58	169	375	594
Total (Internal Sales)	10,53,930	11,59,850	12,77,442	13,97,808	15,16,878	16,70,605
Bulk supply (India)	5	5	5	5	5	5
Grand Total	10,53,935	11,59,855	12,77,447	13,97,813	15,16,883	16,70,610

Provisional figures; Subject to final audit.

4.6 Electricity Sales

(GWH)Table

Category	2061	2062	2063	2064	2065	2066
Domestic	670.78	758.19	805.72	893.27	931.35	908.67
Non-Commercial	83.01	100.54	95.29	100.52	109.93	98.89
Commercial	108.12	19.31	120.30	141.63	154.38	146.29
Industrial	689.80	764.00	785.55	849.13	901.09	845.68
Water supply Irrigation	31.67	49.98	45.50	47.96	46.86	48.14
Street Light	55.20	54.86	63.24	66.90	70.26	67.51
Temporary supply	0.25	0.39	0.87	1.26	0.70	1.04
Transport	5.47	5.80	5.65	6.31	5.88	5.22
Temple	4.11	4.58	4.77	4.78	5.12	4.76
Community sales	5.58	6.03	9.18	15.51	24.65	32.01
Total (Internal Sales)	1654.00	1853.69	1936.07	2127.33	2250.22	2158.21
Bulk supply (India)	141.23	110.70	96.55	76.87	60.10	46.38
Grand Total	1795.23	1964.39	2032.62	2204.20	2310.32	2204.59

Note:- Provisional figures; Subject to final audit.

4.7 Electricity Sales

Revenue Table

Category	2061	2062	2063	2064	2065	2066
Domestic	4701.07	4987.04	5405.12	6021.40	6297.65	6100.65
Non-Commercial	816.03	862.37	881.73	940.20	982.08	900.75
Commercial	986.32	1012.66	1081.26	1288.05	1399.51	1384.67
Industrial	4380.89	4799.74	4978.69	5300.91	5544.80	5264.33
Water supply & Irrigation	154.91	171.57	197.96	214.18	204.67	215.62
Street Light	329.31	354.10	422.35	454.85	467.31	445.96
Temporary supply	3.46	5.06	11.18	17.36	10.51	12.20
Transport	28.92	30.72	29.78	31.65	33.70	26.95
Temple	26.38	29.17	24.42	26.03	26.38	24.41
Community sales	20.09	24.03	23.94	53.70	64.22	70.10
Total (Internal Sales)	11447.39	12276.46	13056.43	14348.33	15030.83	14445.64
Bulk supply	673.93	609.51	579.33	428.93	361.14	295.49
Gross Revenue	12121.32	12885.97	13635.76	14777.26	15391.97	14741.13
Net Income from other services	424.75	336.70	335.09	689.08	584.18	1601.66
Total Revenue	12546.07	13222.67	13971.85	15466.34	15976.15	16342.79

Note:- Provisional figures; Subject to final audit.

TARIFF RATES

Table

1:	DOMESTIC CONSUMERS		
A	Minim Monthly Charge : METER CHPACITY	Minimum Charge Rs.	Exempt (kwh)
	Up to 5 Ampere	80.00	20
	15 Ampere	299.00	50
	30 Ampere	664.00	100
	60 Ampere	1394.00	200
	Three phase supply	3244.00	400
B	Energy Charge :		
	Up to 20 units	Rs. 4.00 Per unit	
	21-25020 units	Rs. 7.30 Per unit	
	Over 205 units	Rs. 9.90 Per unit	
2:	TEMPLES		
	Energy Charge	Rs. 5.10 Per unit	
3:	STREET LIGHTS		
A		Rs. 5.10 Per unit	
B		Rs. 1860.00 Per kVA	
4:	TEMPORARY SUPPLY		
	Energy Charge	Rs. 13.50 Per unit	
5:	COMMUNITY WHOLESALE CONSUMER		
	Energy Charge	Rs. 3.50 Per Unit	
6:	INDUSTRIAL		Energy Charge
A	Low Voltage (400/230 volt)		
	(a) Rural and Cottage		45.00 5.45
	(b) Small Industry		90.00 6.60
B	Medium Voltage (11 kV)		190.00 5.90
C	Medium Voltage (33 kV)		190.00 5.80
D	High Voltage (66 kV)		175.00 7.60
7:	COMMERCIAL		
A	Low Voltage (400/230 Volt)		225.00 7.70
B	Medium Voltage (11 kV)		216.00 7.60
C	Medium Voltage (33 kV)		216.00 7.40
8:	NON-COMMERCIAL		
A	Low Voltage (400/230 Volt)		160.00 8.25
B	Medium Voltage (11 kV)		180.00 7.90
C	Medium Voltage (33 kV)		180.00 7.80
9:	IRRIGATION		
A	Low Voltage (400/230 Volt)		-
B	Medium Voltage (11 kV)		47.00 3.60
C	Medium Voltage (33 kV)		47.00 3.50
10:	WATER SUPPLY		
A	Low Voltage (400/230 Volt)		140.00 3.45
B	Medium Voltage (11 kV)		150.00 4.30
C	Medium Voltage (33 kV)		150.00 4.15
11:	TRANSPORTATION		
A	Medium Voltage (11 kV)		180.00 4.30
B	Medium Voltage (33 kV)		180.00 4.25

TIME OF DAY (TOD) TARIFF RATES

Table

Consumer Category and Supply level		Monthly Demand Charge(Rs./kV)	Energy charge (Rs./unit)		
			Peak Time 18:00-23:00	Off-Peak 23:00-6:00	Normal 6:00-18.00
A:	High Voltage (66 kV and Above)				
	1 Industrial	175.00	5.20	3.15	4.55
B:	Medium Voltage (33 kV)				
	1 Industrial	190.00	6.55	4.00	5.75
	2 Commercial	216.00	8.50	5.15	7.35
	3 Non-Commercial	180.00	8.85	5.35	7.70
	4 Irrigation	47.00	3.85	2.35	3.40
	5 Water Supply	150.00	4.55	2.75	3.95
	6 Transportation	180.00	4.70	2.95	4.15
	7 Street Light	52.00	5.70	1.90	2.85
C:	Medium Voltage (11 kV)				
	1 Industrial	190.00	6.70	4.10	5.85
	2 Commercial	216.00	8.65	5.25	7.55
	3 Non-Commercial	180.00	9.00	5.45	7.85
	4 Irrigation	47.00	3.95	2.40	3.45
	5 Water Supply	150.00	4.60	2.80	4.10
	6 Transportation	180.00	4.80	3.00	4.25
	7 Street Light	52.00	6.00	2.00	3.00

Note:

- a) If demand meter reads kilowatts (kW) then kVA = kW/0.8
- b) 10% discount in the total bill amount will be given to the Government of Nepal approved industrial District
- c) 25% discount in the total bill amount will be given to the Nepal Government Hospital and Health Centers (except residential complex)

In the above table 4.6 shows summary of category-wise electricity sales (in GWH) and percentage in different period. According to table, the average sales share of domestic and industrial category is almost equal of about 39% which is the largest of all categories and the least is for temporary supply category. The demand of electricity for domestic supply is increasing on increase of year whereas for

industrial category it remains constant in the passage of time. This may be due to population growth, political instability, insurgency etc. in our country. The sales shares of commercial, bulk supply (India), non commercial, street light, water supply and irrigation, community sales, transport and temple are third, fourth, fifth, sixth, seventh, eighth, ninth respectively. The sales of domestic, commercial, water supply are increasing and sales of remaining others categories are fluctuating during the study period. Category-wise sales revenue (in Rs.) is more significant than category-wise sales unit (in GWH).

The above table 4.7 shows the sales revenue of each category for the study period. The table shows that total sales revenue is increasing during the study period. The share of domestic category's sales revenue is the highest of all i.e. 40% in average due to its higher sales units and higher tariff rate. The industrial sales revenue is in second position i.e. 36% in average. And the least is the temporary supply i.e. 0.1% in average and it is in fluctuating trend. The sales revenue from remaining other categories is generally in increasing trend. By the result of above analysis, it can be concluded that large sales share supply with high tariff rate can create the high revenue.

In conclusion, from the above study, the characteristics of sales figure (budgeted and actual) of NEA, the following points can be pointed out on conclusion.

1. NEA has followed tactical as well as strategic sales plan. It prepares the tactical (short-range) sales plan on the basis of the type of consumers but it does not prepare the strategic (long-range) sales plan in detail.
2. There is highly positive correlation between budgeted sales and actual sales.
3. The regression equation shows that there is positive relationship between budgeted and actual sales.
4. The straight line trend shows the positive figure of sales for future.
5. Actual sales are more consistency than budgeted sales.
6. In compared to FY 2054/55-2058/59 the actual and budgeted sales are more consistent and less variable in FY 2060/61-2064/065.

7. Category-wise sales analysis of NEA shows that the sales share (in GWH) of electricity of domestic, industrial, bulk supply(India) and commercial categories is high and sales share (in GWH) of community sales, temporary supply is low. The sales revenue of electricity (in Rs.) of domestic category is highest and the least is in the temporary supply category.
8. NEA's sales budget is prepared on scientific and systematic to more extent which is known from the result of the above analysis.

4.3. Production Budget of NEA

Production budget is the second step for the development of profit plan. Without preparing the production budget, the overall profit plan will not assume to be completed. It is prepared on the basis of sales budget that mean the sales budget determines the volume of the production budget. In that respect, at first, sales budget needs to be much more realistic. NEA is a public utility concern. It generates the power as well as purchases it. For which they have to prepare purchase budget instead of preparing a production budget. In terms of hydropower production, such a company cannot hold opening and closing inventory as all of we know that the power cannot be stored at any cost. NEA prepares its production budget and estimate the future load forecast. It has the practice of preparing production budget for generation and for purchase for each fiscal year. Production budget of NEA is prepared by production directorate in co-ordination with planning directorate. In respect of the production, existing power projects and projects near about of completion are adjusted and government's policy is also considered by NEA while preparing its production budget.

4.3.1. Budgeted and Actual Production Achievement

Following are the analysis showing production trend of NEA. Based upon historical trend future plan be prepared for production. So past trend of production is so important. Therefore, the following table shows the detailed budgeted production and actual production and achievement in percentage of NEA from FY 2061/062 to 2065/066:

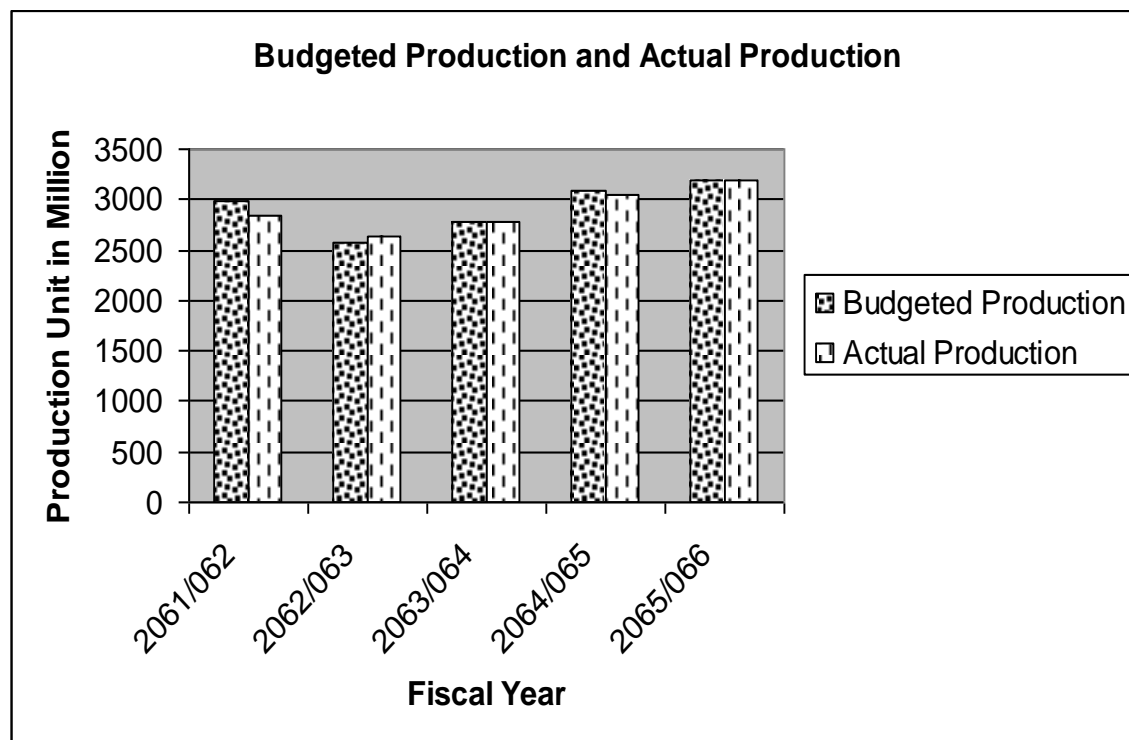
Table 4.8
Budgeted and Actual Production Achievement
from 2061/062 to 2065/066

Fiscal Year	Budgeted Production	Actual Production	Achievement %
2061/062	2986.39	2837.978	95.03
2062/063	2565.806	2642.753	103.00
2063/064	2784.8	2780.923	99.86
2064/065	3094.6	3051.825	98.62
2065/066	3191.108	3181.645	99.70

Sources: Annual report and Budget book of NEA

The table no 4.8 shows the overall production budget and the actual achievement. This table shows that actual production is below in the first year and last three years. In the FY2062/063 actual production is more than budgeted production and achievement is 103% which is favorable for the authority. In the FY 2061/062, the budgeted production was 2986.39million units where as the actual production was 2837.978million units. In the FY 2061/062 the whole achievement of NEA was 95.03%. Like wise in the FY 2063/064 budgeted production was 2784.8million units and the actual production was 2780.923million units, which was 99.86%. In FY 2064/065 and FY 2065/066, the actual achievement was only 98.62% and 99.70 respectively. The lower achievement is 95.03% in FY 2061/062 for the total study period either due to system error or over ambitious budget it-self and thus it scan be taken seriously. Such a fluctuation shows an inefficiency of the entire company in the place of budgeting as well as performance. In spite of the fact, the actual and the budgeted production volume of NEA is increasing continuously that can be taken as a positive part. The budgeted production and actual production can be presented in the following graphical form.

Figure 4.6
Budgeted Production and Actual Production Units of NEA from FY2061/062 to 2065/066



The graphical presentation of the above data has shown the volume of actual and budgeted production, which is increasing continuously.

To find out the nature of variability of budgeted and actual production of different years, it is necessary to find out the different statistical calculations such as arithmetic mean, standard deviation and co-efficient of variance of actual and planned production figure of NEA for the period covered by the study i.e. five years. The detail results of those statistical tools are presented in Appendix 2. The summaries of those results are as follows;

Table 4.9
Relationship between Budgeted and Actual Production

Statistical tools	Budgeted production (x) Units in million	Actual production (y) Units in million
Mean	2924.5408	2899.0248
S.D	224.5090	193.1693
C.V	7.67	6.66

Sources: Appendix 2

The table no 4.9 shows the average budgeted production and the average actual production of NEA. According to the above table, the average budgeted and the average actual production is 2924.5408 million units and 2899.0248 million units respectively. Standard deviation (S.D) of budgeted is higher than actual production. Co-efficient of variation of budgeted production is 7.67 percent and the actual production is 6.66 percent. Which means co-efficient of variation (CV) of budgeted production is higher than the C.V of actual production. It indicates that budgeted production is more variable than actual production. And actual production unit is less variable and more consistency than budgeted production. The relation between dependent and independent variable is positive. The value of r is 0.9499 (App.2). It means that the budgeted and the actual production figure have the positive correlation of 94.99 percent. The obtained positive correlation has 0.02945 probable error (PEr) and it indicates a minor error between to figures.

4.3.2. Production Trend Line by Regression Analysis

Another statistical tool is regression analysis, which determines the nature of relationship among budgeted and actual production and makes the estimate from that on that base. It can help to estimate or forecast the future production. For this purpose, actual production figures is to be known as dependent variable and denoted by (Y), likewise budgeted production is to be known as independent variable, which is denoted by (X). The regression line of actual production on budgeted sales (Y on X) is as below: -

$$Y - \bar{Y} = r \frac{\sigma_y}{\sigma_x} (X - \bar{X})$$

We have the following value as calculated above

Statistical tool	Budgeted production(X) Unit in million	Actual production (Y) Unit in million
Mean	2924.5408	2899.0248
S.D.(σ)	224.5090	193.1693
r _{xy}		0.949928

Sources: Appendix2

$$Y - 2899.0248 = 0.949928 \times \frac{193.1693}{224.5090} (X - 2924.5408)$$

$$Y = 0.8173X + 508.797$$

In regression equation 0.8173 represent the change in value of dependent variable (Y), when the value of independent variable (X) changes by one unit.

By the help of regression equation, we can estimate the expected production achievement with given value of budgeted production (X). We have the budgeted production (X) for the FY 2066/067 is 3565.234 unit in million. The expected production achievement for the FY 2066/067 can be calculated by using above equation. Then,

The expected production achievement,

$$\begin{aligned} Y &= 0.8173x+508.797 \\ &= 0.8173x 3565.234+508.79 \\ &= 3422.66 \end{aligned}$$

If the relationship between budgeted and actual production remain same as previous year, the actual production for the FY 2066/067 will be 3422.66 unit in million as stated by the above regression equation.

Likewise, another important tool is least square method. It is also known as time series analysis and an important tool for the study of trend of actual sales. A straight-line trend will show the relationship between year and actual sales of the relevant year. To fit this straight-line trend, the time factor should be considered as an independent factor and sales as a dependent factor for the time. The formula can be expressed in the following way:

$$Y_c = a + bX$$

Where, Y= actual sales

X= time

b = slope of trend line or annual rate of growth

a = y-intercept

Table 4.10
Fitting Straight –Line Trend by Least Square Method

Fiscal Year	Actual Production Unit in million ‘Y’	X	X ²	XY
2061/062	2837.978	-2	4	-5675.96
2062/063	2642.753	-1	1	-2642.75
2063/064	2780.923	0	0	0
2064/065	3051.825	1	1	3051.825
2065/066	3181.645	2	4	6363.29
Total	$\sum y=14495.124$	$\sum X=0$	$\sum X^2=10$	$\sum X Y= 1096.406$

Sources: Annual report of NEA

FY 2063/064 is assumed as the base year. Therefore the value of X or mid time is zero in the FY 2063/64 and negative before the base year and positive after the base year.

Substituting the value in straight line equation is

$$Y_c = a + bX$$

Where,

$$a = \frac{\sum Y}{n} = 14495.124 / 5 = 2899.024$$

$$b = \sum XY / \sum X^2 = 1096.406 / 10 = 109.6404$$

$$\therefore Y_c = 2899.024 + 109.6404X$$

The trend line shows the positive production figure for future. The production will be increase by 109.6404million unit every year if the same sales trend of the past year continuous in the future.

By the help of this trend line equation, we can estimate the actual production for FY 2066/067. The value of X in the base year is FY2063/064.

Then,

$$\begin{aligned} Y_c &= 2899.024 + 109.6404 \times 3 \\ &= 3227.9466 \end{aligned}$$

By the result, if the trend does not change, the positive production for the FY2066/067 will be 3227.9466 million units.

4.3.3. Comparative Analysis between Budgeted and Actual Production

In order to compare the nature of variability of budgeted and actual production of different years, it is needed to calculate the arithmetic mean, standard deviation and co-efficient of variation of budgeted and actual figures of NEA for recent five years from FY 2061/062 to 2065/066 and previous five year from FY 2054/055 to 2058/059. The detail calculation of these statistical tools are presented appendix 2. The summarized of results from appendix 2 are as follows:

Table 4.11
Comparative Mean, Standard Deviation and Coefficient of Variation of Budgeted Production between FY 2054/055 to 2058/059 and FY 2061/062 to 2065/066

Statistical tools	Budgeted production (x) Units in million FY 2054/055 to 2058/059	Budgeted production (x) Units in million FY 2061/062 to 2065/066	Increase or decrease in percentage
Mean	1770.032	2924.5408	39.477
S.D	362.300	224.5090	-61.374
C.V	20.47	7.67	-166.68

Sources: Appendix 2 and previous thesis report

Table 4.12
Comparative Mean, Standard Deviation and Coefficient of Variation of Actual Production between FY 2054/055 to 2058/059 and FY 2061/062 to 2065/066

Statistical tools	Actual production (x) Units in million FY 2054/055 to 2058/059	Actual production (x) Units in million FY 2061/062 to 2065/066	Increase or decrease in percentage
Mean	1716.729	2899.0248	40.783
S.D	283.267	193.1693	-46.642
C.V	16.50	6.66	-147.75

Sources: Appendix 2 and previous thesis report

The above table 4.11 and 4.12 are the comparison between budgeted production and actual production of the available data of recent five year and previous five. Both average actual mean and budgeted mean are drastically increased to about 40 percent in period of FY 2061/62-2064/66 than in period of FY 2065/55-2058/59. On the other hand, both standard deviation and coefficient of variation are decreased drastically to about 50 percent and 150 percent respectively in period of FY 2061/62 -2065/66 than in period of FY 2054/55-2058/59. The result from analysis indicate that there is increase in mean and decrease in S.D. and C.V. which resemble less variability and more consistency of the actual and budgeted production in recent five year. This may be due to political unrest, lack of commitment, insurgency, which resulted in a substantial change in production in period of FY 2061/62-2065/66 than in period of FY 2054/55-2058/59. This can also be shown in graphical form as below:

Figure 4.7
Mean and Budgeted and Actual Production Units of NEA

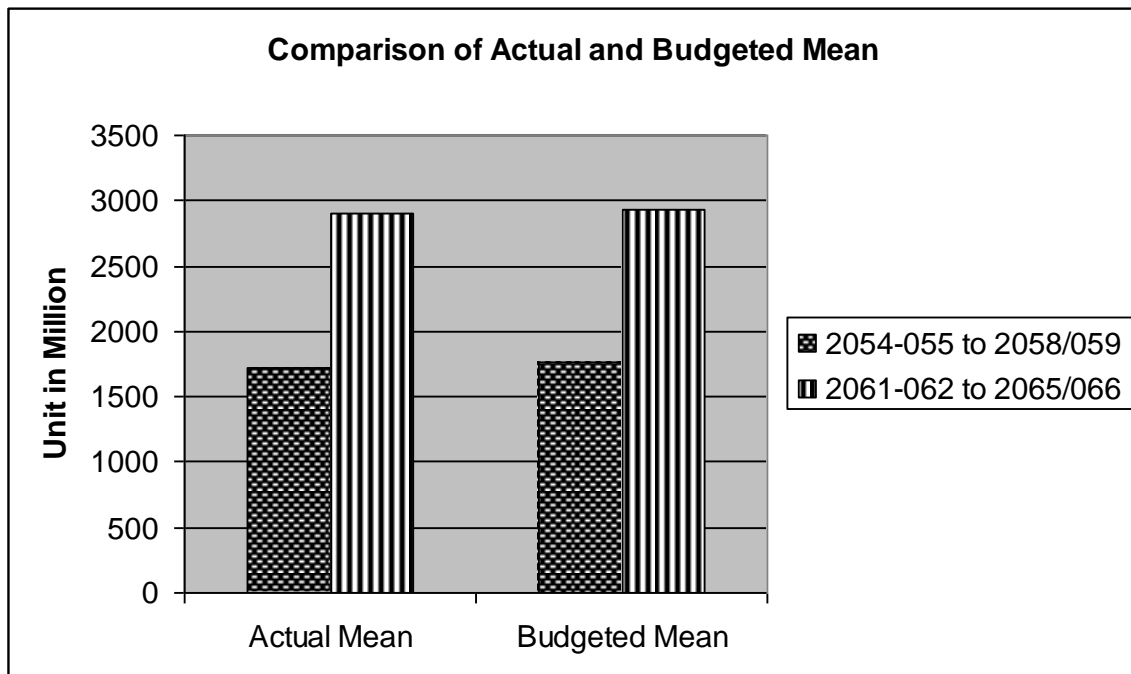
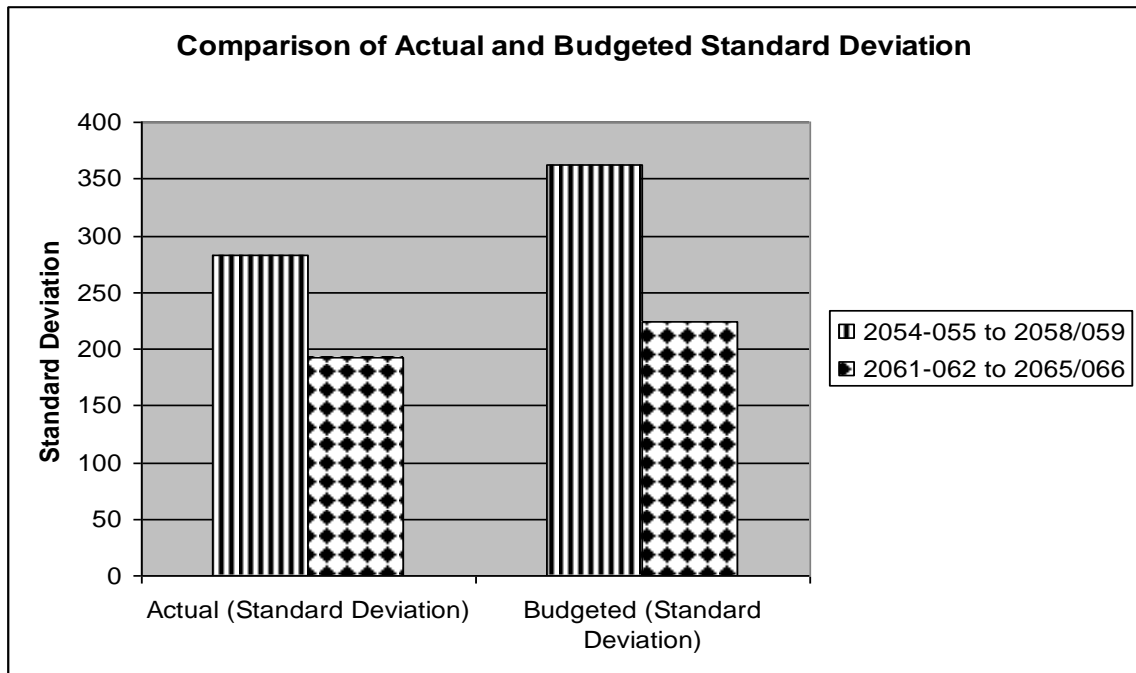


Figure 4.8
Standard Deviation of Budgeted and Actual production Units of NEA



Source: 4.11 and 4.12

Figure 4.9
Co-efficient of Variation of Budgeted and Actual Sales Units of NEA

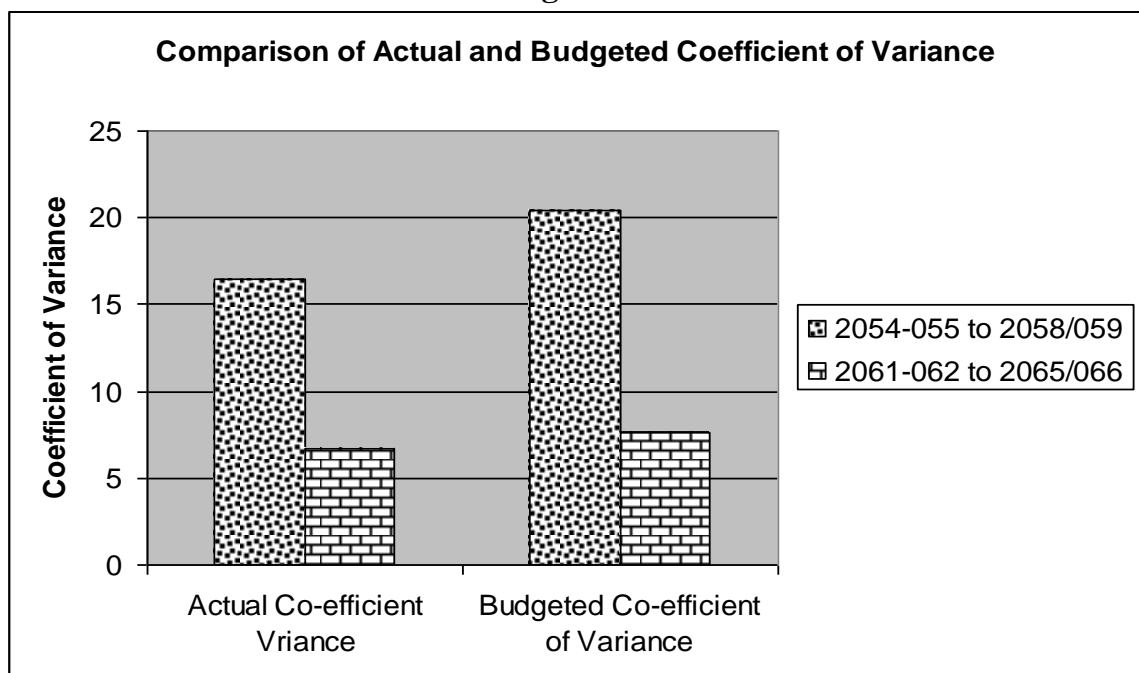


Figure 4.7 shows that the actual and budgeted production mean is appreciably increased in FY 2061/062 to 2065/066 compared to FY 2054/055 to 2058/059. But on the other hand in figure 4.8, the standard deviation is slightly decreased in FY

2061/062 to 2065/066 compared to FY 2054/055 to 2058/059 and standard deviation is more decreased in budgeted production than actual production. In the same way in figure 4.9, the coefficient of variation is rapidly decreased in FY 2061/062 to 2065/066 compared to FY 2054/055 to 2058/059. The CV for budgeted production is increased than actual production in FY 2054/055 to 2058/059 but on the other hand CV is nearly equal for actual and budgeted production in FY 2061/062 to 2065/066.

4.3.4. Actual Sales and Actual Production Unit of NEA

Production budget always depends upon the sales budget. Production should be enough to meet the market demand to which we call sales. In this regard, whether the production volume meets the required sales volume or not should be studied seriously. Following is the comparative presentation table between actual sales and the production:

Table 4.13
Actual Sales and Actual Production unit of NEA
from 2061/062 to 2065/066 (unit in million)

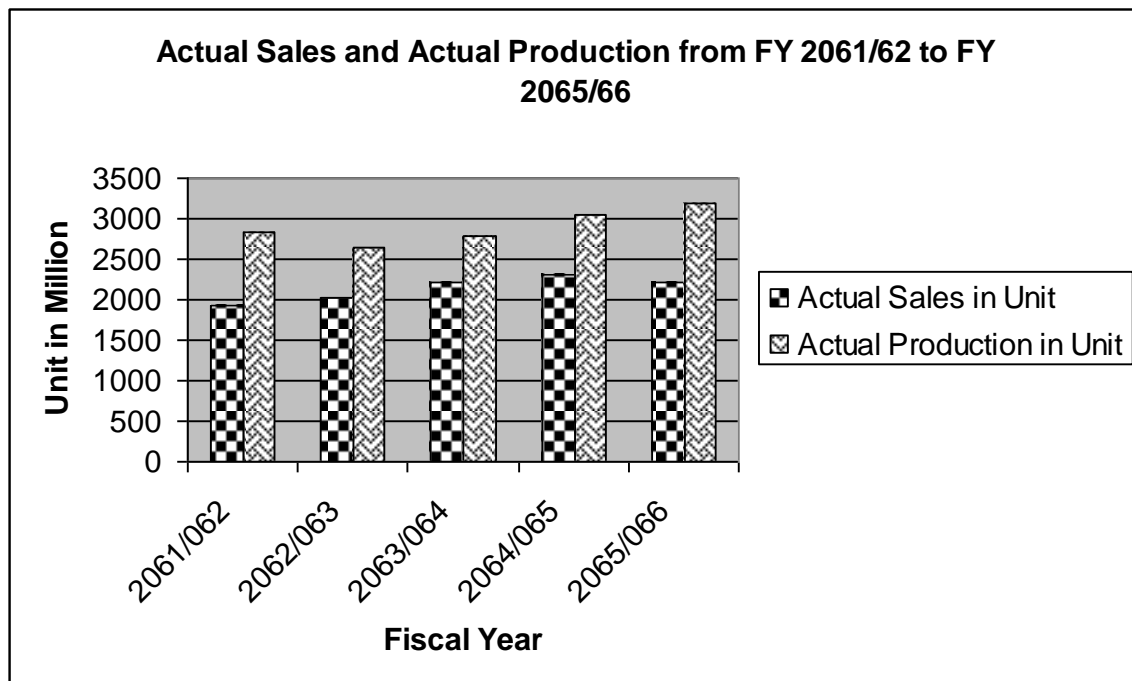
Fiscal Year	Actual sales (X)	Actual production(Y)	Loss %
2061/062	1918.35	2837.978	32.40
2062/063	2028.51	2642.753	23.24
2063/064	2202.94	2780.923	20.78
2064/065	2310.238	3051.825	24.30
2065/066	2204.592	3181.645	30.70
total	10664.63	14495.124	26.28

Sources: Annual report of NEA

This table no. 4.13 signifies the actual sales and actual production of NEA. In the FY 2061/62, the actual production was 2837.978 million units out of which actual sales were 1918.35 million units. In the same way in the FY 2062/063, the actual production was 2642.753 million units but actual sales were 2028.51 units. Likewise, in the FY 2063/064 actual production units and actual sales were 2780.923 million units and 2202.94 million units respectively. In the FY 2064/065 actual production was 3051.825 and actual sales were 2310.238 million units. In the last fiscal year of study period, the actual production was 3181.645 million

units where as actual sales was only 2204.591 million units. According to the assumption, there must be actual production equal to actual sales but here were seemed to be vast difference due to the power leakage. The gap between actual production and actual sales is very large. There is the loss of power in every year. The trend of power loss is remarkable in every year. In FY 2061/62, the power loss was 32.40 of production, 23.24 percent in the FY 2062/63, 20.78 in the FY 2063/64, 24.30 percent in FY 2064/065 and 30.70 percent in the FY 2065/066. The large gap between actual production and actual sales is the result of the loss and it is increasing trend.

Figure 4.10
Actual Sales and Actual Production from FY 2061/062 to FY 2065/066



This figure shows that the actual production is always greater than actual sales. Normally, production shall always be equal to sales. But within the period covered by the study, there is vast difference between the two figures due to the power leakage. On the other hand, actual sales and actual production is increasing every year.

In order to find out the nature of variability of actual production and actual sales of different years, we shall use different statistical tools such as arithmetic mean,

standard deviation and co-efficient of variance of actual sales and actual production figure of NEA for the five year from FY 2061/062 to 2065/066. The detail calculations of these statistical tools are presented in Appendix 3. The summaries of those results are given below:

Table 4.14
Relationship between Actual Sales and Actual Production

Statistical tools	Actual sales (x) Units in million	Actual production (y) Units in million
Mean	2132.926	2899.0248
S.D	140.30	193.1693
C.V	6.58	6.66

Sources: Appendix 3

The table no 4.14 shows the averages of actual sales and actual production. Average actual sales of the study period was 2132.926 and average actual production was 2899.0248 units in million. Greater scatterness of data from mean occurred on actual production than that of actual sales, as standard deviation of actual sales is less than actual production. Covariance of actual sales unites is 6.58 percent and actual production is 6.66 percent. It shows that actual production are more variable since the co efficient of variation of actual production is greater than that of actual sales. The correlation value is 0.7045(Appendix 3) which means 70.45 percent of both variables are related positively.

In conclusion, from the above study in relation to the production budget of NEA, we can trace out the following points: -

1. NEA prepares both short term and long term production plan and it is entirely based on sales budget. Long-term plan is always ruled by the government acts.
2. Small PEr item denotes the positive correlation between budgeted and actual production.
3. The regression analysis shows the positive relationship between budget and actual production.
4. Actual sales are less than actual production. It indicates that there are power

losses because of not having an efficient controlling system or an entity within the authority.

5. There is positive correlation between actual production and actual sales.
6. In compared to FY 2054/55-2058/59 the actual and budgeted production is more consistent and less variable in FY 2061/062-2065/066.

4.4. Profit and Loss Account of NEA

The profit and loss account of the company can be referred to as a final account which summarizes the incomes and gains earned and expenses incurred during the financial year. Therefore, the profit and loss account is prepared to ascertain the operating results of a company in terms of net profit or loss. The profit and loss account determines net income or loss by matching incomes and expenses that occurred during a particular financial year. NEA is also preparing a profit and loss account at the end of every fiscal year. It shows the final conclusion of the operation of the fiscal year.

4.4.1. Profit and Loss of NEA

The following table shows the profit and loss account of NEA for the FY 2061/062 to FY 2065/066.

Table 4.15
Profit and Loss of NEA
from FY 2061/062 to 2065/066 (Rs. in million)

Fiscal Year	Net profit after tax
2061/062	-1312.80
2062/063	-1267.80
2063/064	-329.26
2063/064	-2315.47
2065/066	-5093.22

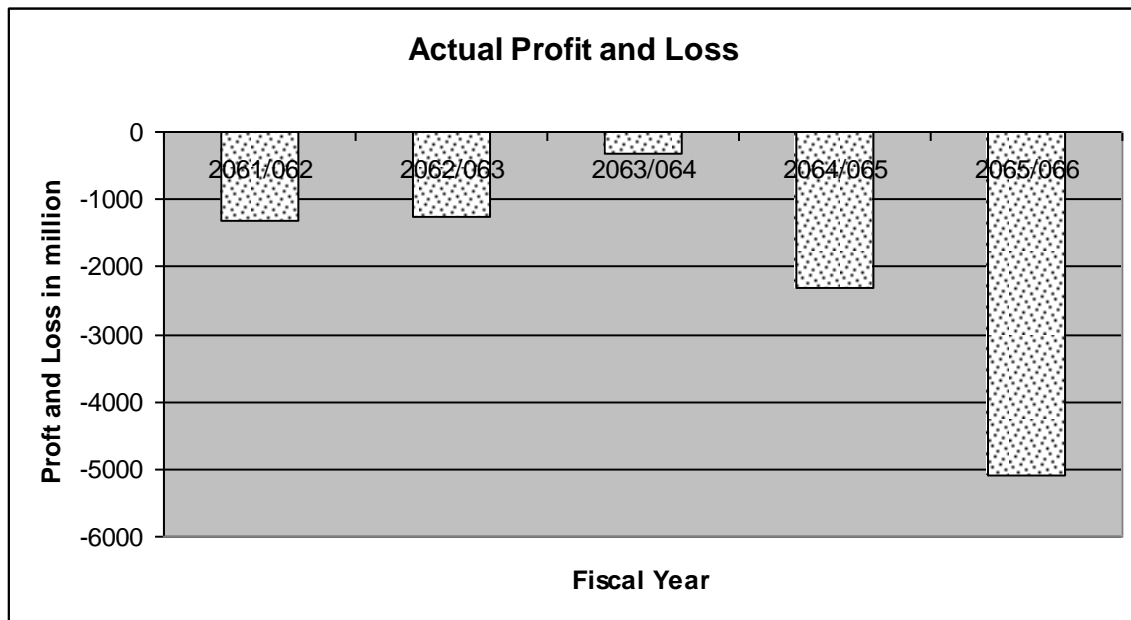
Sources: Annual report of NEA

The table no 4.15 shows the profit and loss account, which is negative for the total study period. It tells us the unfavorable economic condition of NEA. It was seen to Rs. 5093.22 million losses in fiscal year 2065/066. As it is a public

enterprise, it is facing the political interference from the day of its formation. As system of corruption has grown strongly and overall system such as record keeping, authority delegation is based on tradition or say till now on those sectors, no scientific system has been introduced. It's property such as vehicle and other electronic devices are using by the personnel for personal use and it can be called as misuse of property. All of the above stated and many other are the reasons for generating loss year after year despite of having totally monopoly market.

The net profit after tax from FY2061/062 to FY2065/066 is presented by following graphical form.

Figure 4.11
Actual Profit and Loss
from FY2061/062 to FY 2065/066



The above graphical presentation shows the net profit after tax is always negative during the study period.

4.4.2. Net Profit and Loss Trend Line by Analysis of Regression

In order to analyze the trend of net profit after tax and to estimate the possible future net profit and loss after tax, we can use statistical tool, least square method. This shows the relationship between time or year and net profit and loss of the relevant year. To fit the straight line trend, the time factor is considered as

independent and profit and loss is considered as dependent factor upon time. Then, the straight line trend of net profit after tax 'Y' upon time 'X' is expressed by:

$$Y_c = a + bX$$

Where, Y= actual sales

X= time

b = slope of trend line or annual rate of growth

a = y-intercept

Table 4.16
Fitting Straight Line Trend by Least Square Method

Fiscal Year	Net Profit after tax 'Y'	X	X ²	XY
2061/062	-1312.8	-2	4	2625.6
2062/063	-1267.8	-1	1	1267.8
2063/064	-329.26	0	0	0
2064/065	-2315.47	1	1	-2315.47
2065/066	-5093.22	2	4	-10186.22
Total	$\sum Y = -10318.55$	$\sum X = 0$	$\sum X^2 = 10$	$\sum XY = -8608.51$

Sources: Annual report of NEA

FY 2063/064 is assumed as the base year. Therefore the value of X or mid time is zero in the FY 2063/064 and negative before the base year and positive after the base year.

Substituting the value in straight line equation is

$$Y_c = a + bX$$

Where,

$$a = \frac{\sum Y}{n} = -10318.55 / 5 = -2063.71$$

$$b = \frac{\sum XY}{\sum X^2} = -8608.51 / 10 = -860.851$$

$$Y_c = -2063.71 + (-860.851 X)$$

The trend line shows that the profit after tax will be increase by -860.851 million every year if the same trend of the past year continuous in the future. Otherwise it is not possible.

By the help of this trend line equation, we can estimate the net profit after tax for FY 2066/067. The value of X in the base year is FY2063/064.

Then,

$$Y_c = -2063.71 + (-860.851 \times 3) \\ = -4646.263$$

By the result, if the trend does not change, the net profit after tax for FY2066/067 will be - 4646.263Rs in million.

4.4.3. Relation between Actual Sales and Actual Profit

Profit is the excess of revenue over its costs. To increase the profit means to increase the revenue or reduce the cost by not cutting down the cost rather to increase the efficiency of costs. To earn maximum profit with optimum resource utilization is the main objective of any organization. An appropriate systematic and scientific planned sales and profit helps to predict the actual sales and profit and assists to avoid the forthcoming risks and obstacles. In spite of so, actually actual profit can be only obtained from actual sales. So profit is generally highly depends upon the sales turnover. The actual sales and actual profit (loss) of NEA is tabulated and analyzed as hereunder:

Table 4.17
Actual Sales and Actual Profit
From FY 2061/062 to FY 2065/066

Fiscal Year	Actual sales unit in million (X)	Actual profit Rs. in million (Y)
2061/062	1918.35	-1312.80
2062/063	2028.51	-1267.80
2063/064	2202.94	-329.26
2064/065	2310.238	-2315.47
2065/066	2204.592	-5093.22
total	10664.63	-10318.55

Sources: Annual report of NEA

The above table shows relation between actual sales and actual profit from FY 2061/062 to FY 2065/066. This table shows that the relation of actual sales unit and profit is not satisfactory at all. Actual sales unit are increasing during the whole study period but the authority has felt in loss during for these all period. In first three year, actual loss is increased and in forth fiscal year, actual loss in decreased and after that loss has begun to increase. As a whole, actual sales and actual profit is in opposite relation, it means the correlation coefficient between actual sales and actual profit of NEA of the study period is $r_{xy} = -0.334$ (approximately) in Appendix 4. Therefore there is very less correlation coefficient between actual sales and actual profit of the NEA.

Another statistical tool, coefficient of variation, is used to know about the variability or consistency between two variables here actual sales and actual profit as mentioned in Appendix 4 The summarized result are presented below.

Table 4.18
Relationship between Actual Sales and Profit

Statistical tools	Actual sales (x) Units in million	Actual profit (y) Rs in million
Mean	2132.926	-2063.71
S.D	140.30	1639.94
C.V	6.57	(79.46)

Sources: Appendix 4

The above table no 4.18 shows mean standard deviation and coefficient of variation (CV) of actual sales and actual profit. Here average mean of actual sales and actual profit are 2132.926 unit million and -2063.71Rs in million respectively. Then standard deviation of actual sales and profit are 140.30 and 1639.94 respectively. Coefficient of variation (CV) of actual sales is 6.57% and CV of actual profit is 79.46%. Higher CV is said to be higher variable or less consistent and less CV is more consistent or less variable. Therefore, CV of actual loss is more variable than CV of actual sales due to higher fluctuation of actual profit and loss than that of actual sales of every study years.

Next statistical tool, a regression analysis, can also be fitted to show the degree of relationship between actual sales and profit/loss of the authority that helps to forecast the possible profit/loss from the actual sales. Here, profit/loss is assumed as dependent on actual sales. For this purpose, actual profit and loss figures is to be known as dependent variable and denoted by (Y), likewise actual sales is to be known as independent variable, which is denoted by (X). The regression line of actual profit and loss on actual sales (Y on X) is as below: -

We have,

$$Y - \bar{Y} = r \frac{\sigma_y}{\sigma_x} (X - \bar{X})$$

We have the following value as calculated above

Statistical tool	Actual sales(X) Unit in million	Actual profit (Y) Rs. in million
Mean	2132.926	-2063.71
S.D.(σ)	140.30	1639.94
r_{xy}		-0.334

Sources: Appendix 4

$$Y - (-2063.71) = -0.334 \times 1639.94 (x - 2132.926) / 140.30$$

$$Y + 2063.71 = -0.334 \times 1639.94 (x - 2132.926) / 140.30$$

$$Y = -3.90X + 6254.7$$

In regression equation -3.90 represent the change in value of dependent variable (Y), when the value of independent variable (X) changes by one unit.

By the help of regression equation, we can estimate the expected profit with given value of actual sales (X). We have the actual sales (X) for the FY 2066/067 is 2449.15 unit in million. The expected profit for the FY 2066/067 can be calculated by using above equation. Then,

The expected profit achievement,

$$\begin{aligned} Y &= -3.90X + 6254.7 \\ &= -3.90 \times 2449.15 + 6254.7 \\ &= -3296.99 \end{aligned}$$

If the relationship between actual sales and actual profit remain same as previous year, the actual profit for the FY 2066/067 will be -3296.99 Rs. in million as stated by the above regression equation.

4.4.4. Relation between Actual Production and Actual Profit

Profit is the ultimate goal of every business enterprises. Profit is the difference of revenue and cost. Profit plan thus refer to the planning of revenue (i.e. increase the revenues) and planning of cost (i.e. increase the efficiency of cost). And production budget is and estimate of the quantity of goods to be manufactured during the budget period. An appropriate systematic and scientific planned production and profit helps to predict the actual production and profit and assists to avoid the forthcoming risks. In spite of so, profit can be only obtained from actual production. Therefore to analyze the relationship between actual production and actual profit should be more emphasized here:

Table 4.19
Actual Production and Actual Profit
from FY2060/61 to2064/65

Fiscal Year	Actual Production (X)	Actual Profit (Y)
2061/062	2837.98	-1312.80
2062/063	2642.75	-1267.80
2063/064	2780.92	-329.26
2064/065	3051.83	-2315.47
2065/066	3181.65	-5093.22
total	14495.12	-10318.55

Sources: Annual report of NEA

The above table shows relation between actual production and actual profit from FY 2061/062 to FY 2065/066. This table shows that the relation of actual production unit and profit is not satisfactory at all. Actual production unit are increasing during the whole study period but the authority has felt in loss during for these all period. In first three year, actual loss is increased and in forth fiscal year, actual loss in decreased and after that loss has begun to increase. As a whole, actual production and actual profit is in opposite relation, it means the correlation

coefficient between actual production and actual profit of NEA of the study period is $r_{xy} = -0.85188$ (approximately) in Appendix 5. Therefore there is very less correlation coefficient between actual production and actual profit of the NEA.

Another statistical tool, coefficient of variation, is used to know about the variability or consistency between two variables here actual production and actual profit as mentioned in Appendix 5 The summarized result are presented below.

Table 4.20
Relationship between Actual Production and Profit

Statistical tools	Actual Production (x) Units in million	Actual Profit (y) Rs in million
Mean	2899.024	-2063.71
S.D	193.1693	1639.94
C.V	6.66%	-79.47

Sources: Appendix 5

The above table no 4.18 shows mean standard deviation and coefficient of variation (CV) of actual sales and actual profit. Here average means of actual production and actual profit is 2899.024 unit million and -2063.71Rs in million respectively. Then standard deviation of actual production and profit are 193.1693 and 1639.94 respectively. Coefficient of variation (CV) of actual production is 6.66% and CV of actual profit is -79.47%. Higher CV is said to be higher variable or less consistent and less CV is more consistent or less variable. Therefore, CV of actual loss is more variable than CV of actual production due to higher fluctuation of actual profit and loss than that of actual production of every study years.

Next statistical tool, a regression analysis, can also be fitted to show the degree of relationship between actual production and profit/loss of the authority that helps to forecast the possible profit/loss from the actual production. Here, profit/loss is assumed as dependent on actual sales. For this purpose, actual profit and loss figures is to be known as dependent variable and denoted by (Y), like wise actual production is to be known as independent variable, which is denoted by (X). The regression line of actual profit and loss on actual production (Y on X) is as below:-

We have,

$$Y - \bar{Y} = r \frac{\sigma_y}{\sigma_x} (X - \bar{X})$$

We have the following value as calculated above

Statistical tool	Actual production(X) Unit in million	Actual profit (Y) Rs. in million
Mean	2899.024	-2063.71
S.D.(σ)	193.1693	1639.94
r _{xy}		-0.85188

Sources: Appendix 5

$$Y - (-2063.71) = -0.85188 \times 1639.94 (X - 2899.024) / 193.1693$$

$$Y + 2063.71 = -0.85188 \times 1639.94 (X - 2899.024) / 193.1693$$

$$Y = -7.2321X + 18902.51$$

In regression equation -7.2321 represent the change in value of dependent variable (Y), when the value of independent variable (X) changes by one unit.

By the help of regression equation, we can estimate the expected profit with given value of actual production (X). We have the actual production(X) for the FY 2066/067 is 3422.66 unit in million. The expected profit for the FY 2066/067 can be calculated by using above equation. Then,

The expected profit achievement,

$$Y = -7.2321X + 18902.51$$

$$= -7.2321 \times 3422.66 + 18902.51$$

$$= -5850.51$$

If the relationship between actual production and actual profit remain same as previous year, the actual profit for the FY 2066/067 will be -5850.51 Rs. in million as stated by the above regression equation.

4.5. Analysis of Power Loss of NEA

Power loss of NEA has become a very serious problem from the very beginning. This problem is one of the various causes for the decreasing profit or increasing losses. Power loss in NEA has two types: one is technical power loss (leakage) and another is non technical power loss. Technical loss arises due to inappropriate and unsystematic installation of power points, plants, stations, transmission and distribution lines etc. and non- technical losses are created due to theft, meter damaging etc. Normally, power loss is considered up to 15% in developing countries where as the system loss of NEA is abnormally about to 25% of total gross generation. Hence technical power loss is about to 10% of total gross generation and reminding 15% is non technical loss. The major reasons of power loss in NEA are undeveloped, unsystematic and damaged distribution system, theft, and misuses, which have increased the volume of power loss. The following table shows the power loss scenario of NEA.

Table 4.21
Analysis of Power Loss of NEA
from FY 2061/062 to 2065/066 (unit in million)

FY	Total power available	Power loss	% of loss in total power available
2061/062	2837.98	678.28	23.90
2062/063	2642.75	656.20	24.83
2063/064	2780.92	698.57	25.12
2064/065	3051.83	761.13	24.94
2065/066	3181.65	828.50	26.04

Sources: Annual report of NEA

This table shows that power loss and percentage of loss in total power available of NEA. Power loss percentage is increasing trend during the whole study period expect FY 2061/062. In FY 2061/062 total power loss is 678.28 million unit and in FY 2065/066 its reach 828.50 million unit. By this analysis, it can be observed that the power loss is in climbing trend which has been losing it's a huge amount of operating profit for every year due to wastage of power. It concludes that NEA is not successful to distribution power.

4.6 Major Findings

From the above analysis of some accounting and financing data, observation and informal discussion, it can be said that NEA is suffering from the various problems in formulating and implementing profit plans, by analyzing the various functional budgets, their achievements and the analysis of financial position of NEA.

The major findings of the study on the basis of collection and analysis of data are presented as below.

- 1) Achievement of authority for actual sales is more variable than the budgeted sales but actual production is less variable than budgeted production.
- 2) NEA prepares various functional budgets to implement profit planning system in some extent.
- 3) There is high rate of power losses in NEA, because sales are below than the production.
- 4) NEA has a practice of preparing both strategic and tactical managerial budgeting but tactical short range plan is prepared for external purpose and strategic plan is prepared for internal purpose.
- 5) There is high degree of correlation between budgeted and actual sales i.e. 0.7920 approximately.
- 6) The coefficient of variation and standard deviation of actual sales are less than budgeted sales. It indicates that budgeted sales are more variable than actual sales.
- 7) The NEA sales achievement has neither touched nor crossed the target sales during the study period. The sales achievement during fiscal five year is increasing every year.
- 8) Tariff rate of electricity is high in domestic, industrial, commercial, non-commercial and temporary supply but it is low in water supply, irrigation, community sales, transportations and bulk supply (India) categories.
- 9) The tariff rate of electricity is imposed on the basis of different category and voltage level.
- 10) Category wise sales analysis of NEA shows that the sales share in (GWH) of electricity of domestic, industrial, bulk supply (India) and commercial categories is high and sales share in (GWH) of community sales, temporary supply is low. The

sales revenue of electricity in (Rs.) of domestic categories is the highest and the least is the temporary supply category.

- 11) In compared to FY 2054/055 to FY 2058/059 the actual and budgeted sales and production are more consistent and less variable than actual production.
- 12) The trend line of actual sales and production is increasing but on the other hand trend line of actual profit is decreasing.
- 13) Actual sales are less than actual production. It indicates that there are power losses in NEA.
- 14) There is positive correlation between actual production and actual sales as correlation coefficient is 0.7045. Actual sales are more variable than actual production.
- 15) NEA has been suffering from loss since one decade. Its loss is in increasing trend in the first three fiscal years, than decreased in forth Fiscal year and again, it is increasing in last fiscal years taken for the study period.
- 16) Higher standard deviation and coefficient of variation of actual profit than actual sales and actual production indicate higher variability and less consistency of actual profit.
- 17) The regression analysis of actual sales and profit, and actual production and profit shows negative figure of expected profit achievement.
- 18) Power loss is significantly high is NEA due to theft, leakage, outage and unsystematic distribution channel. The average power loss is about 25% of actual production which is out of normal loss. But the actual loss of the year is nearest to the average loss.
- 19) NEA has reduced the no. of unnecessary employers like in daily wages, labours and contracted personnel. It is the good sign for the authority because that type of employees creates over staffing and they are expensive for performance evaluation.
- 20) There is lack of proper co-ordination between the various responsible departments and only and only top level executives are involved in planning and decision making process and lower level participation is not encouraged.

CHAPTER – FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

Public enterprises play a vital role in the developing countries. The role of public enterprises differs from country to country basically due to political philosophy of existing government. They come into existence either by the way of deliberating policy of the government to bring certain activities under strict government control by creating new institution or by nationalizing them from private sector. In Nepal, the purpose of establishing Public enterprises was to make control over economy and to generate revenue to the government by providing basic goods services that are neglected by the private sector, to the citizens. They are found to be success in their goals basically up to the government launched the policy of free economy. So, the role of PEs in developing countries like Nepal is the most important for socio-economic development of people, enterprises and the nation. No nation the world is without public enterprises.

Profit planning and control is the important tool of business operation. It helps to achieve objectives and goals to the enterprise. Profit is the excess of revenue over its cost. To increase the profit means, to increase the revenue or reduce the cost. Profit is the essential part of every business organization. In absence of profit, organization cannot achieve its objectives within the time span. To maximize the profit with the use of optimum resources is the basic objectives of any enterprises. Profit planning and control is the only latest management technique, which can be used to achieve the targeted objectives and to run management efficiently. It is the systematic and continuous process to attain the objectives of the enterprises for certain period of time. Organization cannot achieve its objectives effectively, efficiently and economically in absence of profit planning. Profit plans can be divided into two categories. One is strategic or long term profit plan which covers the period 5 to 10 or more years. And another is tactical or short-term profit plan which covers the one fiscal year.

Profit planning and control consists of three main budgets i.e. Operational budget, financial budget, and Appropriation budget. Operational budget includes sales budget, production budget, purchase budget etc. Financial budget includes cash budget, capital expenditure budget budgeted balance sheet, budgeted income statement, etc. Appropriation budget related with advertising and publicity expenditure, research etc.

Out of three main budgets, sales and production budgets are related with operational budget. Profit planning or budgeting techniques start with planning the sales and production budgeting, that is an estimation of the future sales and production volume. All budgets are affected by sales budget and all budgets expect sales budgets are related with cost. Therefore sales budget is the foundation of all other budgets. On the basis of sales budget, production budget or planning is made. And all their functional budgets are prepared on the basis of the production budget. Therefore sales and production planning process is an essential part of profit planning and control in every type of business enterprises including public enterprises.

Nepal Electricity Authority is the largest public utility enterprise and also a full government owned enterprises with monopoly market in Nepal, was formed on 1st Bhadra 2042 B.S. The main purpose of NEA is to provide electricity service to its customers at an affordable price. It is also responsible for making, generation, transmission and distribution of electricity throughout the kingdom of Nepal. Now a days NEA has been suffering from loss since last half decade due to the various problems like unscientific and inappropriate budgeting practices, system, policies, over load of high purchase price, interest, repair and maintenance expenses, power loss and wastage, improper utilization of assets, and other expenses. So NEA must consider about past trends and experiences, present condition, future possibilities and obstacles to plan the forthcoming sales, production, cost and profit. Without proper plan, targeted sales revenue, targeted production volume, and desired profit of NEA can not be secured. Therefore, sales and production budgets are prepared

by considering all relevant factors.

The present study has mainly focused on sales and production budgeting system, practice, trend and these affect on profitability in public enterprises with fully reference to NEA. The study has tried to analyze the relationship between sales and profit, production and profit, sales and production and sales, production and profit. This study has also tried to analyze the category-wise sales share, comparative study between previous five year and recent five year, power loss and wastage and cost volume profit analysis.

The study has been organized in five main chapters consisting of introduction, review of literature, research methodology, data presentation and analysis, and summary, conclusion and recommendation.

5.2 Conclusion

As per objectives and analysis of the study following conclusion have been drawn.

1. Sales Pattern

- i) NEA's total sales volume and sales revenue is in the below point in BEP volume, which shows that NEA is suffering loss in every fiscal year.
- ii) There is much more differences between actual and budgeted sales. Actual sales is always less than budgeted sales.

2. Production Pattern

- i) In compared of FY 2054/55-2058/59 the actual production and budgeted production is more consistent and less variable in FY 2061/62-2065/66.
- ii) In compared to FY 2054/55-2058/59 the actual and budgeted sales are more consistent and less variable in FY 2061/062-2065/066.
- iii) After study we conclude that in actual production and budgeted production we get deviation between them.
- iv) Actual production is always less than budgeted production.
- v) There is high degree of correlation between budgeted and actual production i.e. 0.9499 approximately.

3. Distribution System

- i) Tariff rate is high in temporary supply, domestic industrial, commercial, non-commercial category of customer and low is water supply, irrigation, community sales' and bulk supply to Indian categories.
- ii) Category-wise sales analysis of NEA shows that the sales share (in GWH) of electricity of domestic, industrial bulk supply (India) and commercial categories is high and sales share (in GWH) of community sales, temporary supply is low. The sales revenues of electricity (in Rs.) of domestic category is highest and the least is in the temporary supply category.

4. Comparison among the Sales Budget, Production Budget and Profit of NEA

- i) The statistical tool shows that there is perfect correlation between budgeted and actual sales as well as actual production with budgeted production.
- ii) C.V. and S.D. of actual sales and production are less than the budgeted sales and production. It indicates that budgeted sales and production is more variable and less consistent than actual sales and production.
- iii) Another statistical tools regression equation and least square line of sales and production will be positive and high is future if the present sales and production trend continues in the future.
- iv) NEA has vast gap between actual sales and actual production. It indicates that NEA is suffering from huge power loss annually.
- v) The regression analysis of actual sales and profit and actual production and profit shows the negative figure of expected profit achievement.
- vi) Higher standard deviation and coefficient of variation of actual profit than actual sales and actual production indicate higher variability and less consistency of actual profit.
- vii) NEA has been drastically running under a huge loss annually.
- viii) The communication system of NEA is not effective. The goals and objectives of NEA are not so far in far informed to the lower level staffs. So, there is not

contribution of lower level staffs in the process of planning, decision making process. There is a lack of proper co-ordination among various directorates and departments. It also, fails to maintain its periodic performance report systematically.

5.3. Recommendation

Based on research study on topic of “Impact of sales and production budgeting on profitability of public enterprises: A case study of NEA” the following suggestions are recommended in this part to develop the mechanism of sales and production budgeting as a part of profit planning, to improve the budgeting system and practices of revenue and cost, also may help to the NEA to get ride of long series of losses and also assist to generate reasonable profit.

1. NEA should be prepared sales budget on the realistic ground. Sales forecasting should be made after analyzing all variable that affect the sales of NEA. NEA should consider demand determinants such as family income, price of electricity, cost of alternative power, cost of auto generation of electricity and reliability of NEA service. And there should be effective management in generation and distribution of electricity to meet target sales.
2. NEA should try to increase the sales volume and should reduce the power wastage and leakage. It can be done reducing power leakage and wastage, establishing new plants and increasing the capacity utilization.
3. Power leakage and loss of electricity should be properly controlled. For this purpose, meter reading and joining system, transmission and distribution line should be refurbished and modernized. Good incentives and motivational factors should be given to the technicians and staffs, also awareness about loss and leakage reduction should be launched and economical and punishable measures also can be induced to reduce the losses which may increase profits by controlling the losses.
4. NEA should prepare monthly sales budget which help to estimated sales revenue rightly a year budget.
5. NEA should maximize its operating profit so as to survive in the future. Because authority operating under huge loss annually can not be afforded by government.

6. NEA should effort to supply more electricity to the high revenue or more profit generating categories such as domestic, industrial, temporary supply, commercial and non-commercial. Tariff rate for water supply and irrigation, transport service, street light, bulk supply to India, temples should be revised in such a way by which NEA could cover operating cost at least.
7. NEA is enjoying monopoly market in power sector in Nepal. It is a good sign for the authority as the sale of electricity is increasing every year in satisfied manner. In this context, NEA could have sufficient profit but unfortunately, it is suffering from huge loss due to over cost on unnecessary heads. So it needs to work hard to maintain the unnecessary cost.
8. NEA should be considered cost volume profit relationship while developing the sales plan and strategy. To maintain BEP, NEA should be control its high fixed cost and variable cost and increase its sales revenue.
9. Load shedding is a big issue in Nepal. The authority should try to avoid load shedding which help to increase its profit.
10. NEA should have proper co-ordination between budget formulation implementation and evaluation of achievement.
11. NEA should be implemented managerial budgeting efficiently and strictly to increase the sales and manage the costs to minimum level with a view to increased the profit.
12. Finally NEA should practice the approach of PPC scientifically and systematically only after considering, evaluating and analyzing relevant variables, factors, environments like PPC's all aspects, internal strength and weakness, external threats and opportunities, and only then sales and production budgeting becomes a reliable tool of profit planning and control in all public enterprises including NEA

BIBLIOGRAPHY

Books:

- Fago, G. (2003). *Profit Planning and Control*, Kathmandu: Buddha Academic, Publisher and Distributers Pvt. Ltd.
- Goet, J.Bhattacharai, I and Gautam, A (2005). *Budgeting: Profit Planning & Control*, Kathmandu: Asmita Books Publishers and Distributors.
- Goyal, S.N and Manmohan (1993). *Management Accounting*. Agra: Shahitya Bhawan Publication.
- Horngreen Charles (1977) T. *Cost Accounting a Managerial Emphasis* 4th edition prentice hall of India. Pvt. Ltd, New Delti.
- Joshi, Shyam (1999). *Public Enterprises Management*, Kathmandu: Taleju publication
- Joshi, Shyam (2002). *Managerial Economics*, Kathmandu: Taleju Prakashan.
- K.C Fatta Bahadur (2062 B.S). *Principle of Management*, Kathmandu: Sukund Pustak Bhawan.
- Manandhar, Narayan (1987). *Issues in Public Enterprise Management*, Kathmandu Mathur, B.P (1994). *Public Enterprises Management*, Mac Millon Ltd.
- Matz and usury Milton F. cost accounting of control, 6th edition.
- Narayan, Laxmi (1992). *Principle and Practice of Public Enterprises Management*. India: Sultan Chad & Company.
- Pandey, I.M. (1999). *Financial Management*. New Delhi: Vikash Publishing House.
- Pandey, I.M (1994). *Management Accounting*. New Delhi: Vikash Publishing House.
- Pandey, R., Shrestha,B. P., Singh, Y.M., Shrama,N. & Ojha, K. (2004). *Accounting for Financial Analysis and Planning*. Kathmandu: Buddha Academic Publishers and Distributions Pvt. Ltd.
- Sharma P.K. and Chauudhary, A. K. (2003). *Statial Methods*. Minbhawan, Kathmandu: Khanal Books & Stationery.
- Sharma, R.K.and Gupta, S.K. (1982). *Management Accounting*. New Delhi: Kalyani Publisher.

Van Horne, James C. (1998). *Financial Management*. New Delhi: Prentice Hall of India Pvt. Ltd.

Welsch, G.A. Hilton, R.W and Gordon, P.N. (2006). *Budgeting: Profit Planning and Control*. New Delhi: Prentice Hall of India Pvt. Ltd.

Wolf, H.K. and Pant, P.R. (2002). *Social Science Research and Thesis Writing*. Kathmandu: Buddha Academic Publishers and Distributions Pvt. Ltd.

Unpublished Master Level Thesis:

Koirala, Geha Nath. (2004). *Managerial Budgeting as a Tool of Increasing Efficiency of Public Enterprises*: Submitted to Shanker Dev Campus, Kathmandu

Niraula, Damodhar. (2008). *Impact of Budgeting in Profitability of Nepalese Public Enterprises: A case study of Nepal Electricity Authority*: Submitted to Shanker Dev Campus, Kathmandu

Rai, Mahendra (2004). *Profit Planning in Public Sector of Nepal: A case study of Nepal Electricity Authority*: Submitted to Shanker Dev Campus, Kathmandu

Shrestha, Shashti Kumar. (2006). *A Study on the role of Sales Planning in Nepalese Public Enterprises: A case study of Nepal Electricity Authority*: Submitted to Shanker Dev Campus, Kathmandu.

Uprety, Badri Prashad (2006). *Sales Budgeting as Tool of Profit Planning in Public Enterprises: A case study of Nepal Electricity Authority*: Submitted to Shanker Dev Campus, Kathmandu.

Journals, Reports and Magazines:

Kantiipur Daily, Kathmandu: Kantipur Publication Pvt. Ltd.

NEA, A Year in Review-2005/06. Hattiban, Lalitpur: Millennium Publication (P) Ltd.

NEA, A Year in Review-2006/07. Kathmandu: Dolphin Offset Press.

Vidhyut Patrika, Half yearly, Vol.Year:19 Vol.1, (2065 B.S). Kathmandu: NEA Head office.

Websites:

www.google.com

www.nea.org

APPENDICES

Appendix 1

Calculation of Mean, Standard Deviation, Co-efficient of Variation and Correlation Co-efficient of Budgeted Sales and Actual Sales in Units

Fiscal Year	Unit in million		U=X-X'	V=Y-Y'	U ²	V ²	UV
	Budgeted (X)	Actual (Y)					
2061/062	1988.85	1918.35	-338.83	-214.57	114808.21	46042.86	72705.56
2062/063	2145.48	2028.51	-182.20	-104.41	33198.15	10902.70	19024.97
2063/064	2362.64	2202.94	34.65	70.01	1201.20	4901.96	2426.57
2064/065	2421.048	2310.238	93.36	177.31	8716.91	31439.55	16554.62
2065/066	2720.69	2204.592	393.01	71.66	154460.32	5135.87	28165.38
Total	$\sum X =$ 11638.41	$\sum Y =$ 10664.63	$\sum U =$ 0.00	$\sum V =$ 0.00	$\sum U^2 =$ 312384.79	$\sum V^2 =$ 98422.94	$\sum UV =$ 138877.11

Suppose, X is the budgeted sales and Y is the actual sales

We have,

$$\text{Mean } \bar{X} = \frac{\sum X}{n}$$

For Budgeted Sales (X)

$$\begin{aligned} \text{Mean } \bar{X} &= \frac{\sum x}{n} \\ &= \frac{11638.418}{5} \\ &= 2327.6836 \text{ units in million} \end{aligned}$$

$$\begin{aligned} \text{S.D. } (\sigma) &= \sqrt{\frac{1}{n} \sum (x - \bar{X})^2} \\ &= \sqrt{\frac{1}{5} \times 312384.79} \\ &= 249.95 \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation (C.V.)} &= \frac{\sigma}{\bar{x}} \times 100\% \\ &= \frac{249.95}{2327.683} \times 100\% \\ &= 10.74\% \end{aligned}$$

For Actual Sales Y

$$\begin{aligned} \text{Mean } \bar{Y} &= \frac{\sum y}{n} \\ &= \frac{10664.63}{5} \\ &= 2132.926 \text{ units in million} \end{aligned}$$

$$\begin{aligned} \text{S.D.}(\sigma) &= \sqrt{\frac{1}{n} \sum (y - \bar{Y})^2} \\ &= \sqrt{\frac{1}{5} \times 98422.94} \\ &= 140.30 \text{ unit in million} \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation (C.V.)} &= \frac{\sigma}{y} \times 100\% \\ &= 140.30 / 2132.926 \\ &= 6.58 \end{aligned}$$

Calculation of correlation co-efficient (r) between 'x' and 'y' variable is given by:

$$\begin{aligned} r_{xy} &= \frac{\sum uv}{\sqrt{\sum u^2 \sum v^2}} \\ &= \frac{138877.11}{\sqrt{(312384.79 \times 98422.94)}} \\ &= 0.7920225 \\ r_{xy} &= 0.7920 \end{aligned}$$

Appendix 2
Calculation of Mean, Standard Deviation, Co-efficient of Variation and
Correlation Co-efficient of Budgeted Production and Actual Production in
Units

Fiscal Year	Budgeted Production (X)	Actual Production (Y)	U=X-X'	V= Y-Y'	U ²	V ²	UV
2061/062	2986.39	2837.98	61.85	-61.05	3825.32	3726.71	-3775.70
2062/063	2565.81	2642.75	-358.73	-256.27	128690.66	65675.24	91933.61
2063/064	2784.80	2780.92	-139.74	-118.10	19527.49	13948.04	16503.64
2064/065	3094.60	3051.83	170.06	152.80	28920.13	23347.90	25985.08
2065/066	3191.11	3181.65	266.57	282.62	71058.07	79874.18	75337.28
Total	$\sum X =$ 14622.70	$\sum Y =$ 14495.12	$\sum U =$ 0.00	$\sum V =$ 0.00	$\sum U^2 =$ 252021.68	$\sum V^2 =$ 186572.06	$\sum UV =$ 205983.91

Suppose, X is the budgeted production and Y is the actual production

We have,

$$\text{Mean } \bar{X} = \frac{\sum X}{n}$$

$$\text{Standard deviation } (\sigma) = \sqrt{\frac{1}{n} \sum (X - \bar{X})^2}$$

$$\text{Co- efficient of Variation (C.V)} = \frac{\sigma}{\bar{X}} \times 100\%$$

Let, 'X' be the budgeted production and 'Y' be the actual production

For budgeted production (X)

$$\begin{aligned} \text{Mean } \bar{X} &= \frac{\sum X}{n} \\ &= \frac{14622.70}{5} \\ &= 2924.54 \text{ units in million} \end{aligned}$$

$$\begin{aligned} \text{S .D } (\sigma) &= \sqrt{\frac{1}{n} \sum (X - \bar{X})^2} \\ &= \sqrt{\frac{1}{5} \times 252021.68} \\ &= 224.509 \text{ units in million} \end{aligned}$$

$$\begin{aligned} \text{Co- efficient of variation (C.V)} &= \frac{\sigma}{\bar{X}} \times 100\% \\ &= \frac{224.509}{2924.540} \times 100\% \\ &= 7.67\% \end{aligned}$$

For actual production (Y)

$$\text{Mean } \bar{Y} = \frac{\sum Y}{n} = \frac{14495.12}{5} \\ = 2899.024 \text{ units in million}$$

$$\text{Standard deviation } (\sigma) = \sqrt{\frac{1}{n} \sum (Y - \bar{Y})^2} \\ = \sqrt{\frac{1}{5} \times 186572.06} \\ = 193.16 \text{ units in million}$$

$$\text{Co-efficient of variation (C.V)} = \frac{\sigma}{\bar{Y}} \times 100\% \\ = \frac{193.16}{2899.024} \\ = 6.66\%$$

Calculation of correlation co-efficient (r) between 'X' and 'Y' variable is given by:

$$r_{xy} = \frac{\sum uv}{\sum u.^2 \sum v.^2} \\ = \frac{205983.91}{252021.68 \times 186572.06} \\ = 0.9499 \\ r_{xy} = 0.9499$$

Appendix 3
Calculation of Mean, Standard Deviation, Co-efficient of Variation and Correlation Co-efficient of Actual Sales and Actual Production in Units

Fiscal Year	Actual sales (X)	Actual production (Y)	U=X-X'	V=Y-Y'	U ²	V ²	UV
2061/062	1918.35	2837.98	-214.576	-61.05	46042.86	3726.71	13099.86
2062/063	2028.51	2642.75	-104.416	-256.27	10902.70	65675.24	26758.69
2063/064	2202.94	2780.92	70.014	-118.10	4901.96	13948.04	-8268.65
2064/065	2310.238	3051.83	177.312	152.80	31439.54	23347.90	27093.27
2065/066	2204.592	3181.65	271.666	282.62	5136.01	79874.18	76778.24
Total	ΣX= 10664.63	ΣY= 14495.12	ΣU= 0.00	ΣV= 0.00	ΣU ² = 98423.06	ΣV ² = 186572.06	ΣUV= 135461.41

Suppose, X is the actual sales and Y is the actual production

We have,

$$\text{Mean } \bar{X} = \frac{\sum X}{n}$$

$$\text{Standard deviation } (\sigma) = \sqrt{\frac{1}{n} \sum (X - \bar{X})^2}$$

$$\text{Co-efficient of Variation (C.V)} = \frac{\sigma}{\bar{X}} \times 100\%$$

Let, 'X' be the actual sales and 'Y' be the actual production
 For Actual Sales (X)

$$\begin{aligned} \text{Mean } \bar{X} &= \frac{\sum x}{n} \\ &= \frac{10664.63}{5} \\ &= 2132.926 \text{ units in million} \end{aligned}$$

$$\begin{aligned} S.D.(\sigma) &= \sqrt{\frac{1}{n} \sum (x - \bar{X})^2} \\ &= \sqrt{\frac{1}{5} \times 98423.06} \\ &= 140.30 \text{ units in million} \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation (C.V.)} &= \frac{\sigma}{\bar{x}} \times 100\% \\ &= \frac{140.30}{2132.926} \times 100\% \\ &= 6.58\% \end{aligned}$$

For Actual Production Y

$$\begin{aligned}\text{Mean } \bar{Y} &= \frac{\sum y}{n} \\ &= \frac{14495.12}{5} \\ &= 2899.024 \text{ units in million}\end{aligned}$$

$$\begin{aligned}\text{S.D. } (\sigma) &= \sqrt{\frac{1}{n} \sum (y - \bar{Y})^2} \\ &= \sqrt{\frac{1}{5} \times 186572.06} \\ &= 193.16 \text{ unit in million}\end{aligned}$$

$$\begin{aligned}\text{Co-efficient of Variation (C.V.)} &= \frac{\sigma}{y} \times 100\% \\ &= \frac{193.16}{2899.024} \\ &= 6.66\%\end{aligned}$$

Calculation of correlation co-efficient (r) between 'x' and 'y' variable is given by:

$$\begin{aligned}r_{xy} &= \frac{\sum uv}{\sqrt{\sum u^2 \sum v^2}} \\ &= 135461.41 / \sqrt{(98423.06 \times 186572.06)} \\ &= 0.7045 \\ r_{xy} &= 0.7045\end{aligned}$$

Appendix 4

Calculation of Mean, Standard Deviation, Co-efficient of Variation and Correlation Co-efficient of Actual Sales and Actual Profit in Units

Fiscal Year	Actual sales (X)	Actual profit (Y)	U=X-X'	V=Y-Y'	U ²	V ²	UV
2061/062	1918.35	-1312.80	-214.576	750.91	46042.85	563865.82	-161127.26
2062/063	2028.51	-1267.80	-104.416	795.91	10902.70	633472.72	-83105.73
2063/064	2202.94	-329.26	70.014	1734.45	4901.96	3008316.80	121435.78
2064/065	2310.238	-2315.47	177.312	-251.76	31439.54	63383.09	-44640.07
2065/066	2204.592	-5093.22	71.66	-3029.51	5135.16	9177930.84	-217094.69
Total	$\Sigma X =$ 10664.63	$\Sigma Y =$ -10318.5	$\Sigma U =$ 0.00	$\Sigma V =$ 0.00	$\Sigma U^2 =$ 98422.21	$\Sigma V^2 =$ 13446969.27	$\Sigma UV =$ -384531.97

Suppose, X is the actual sales and Y is the actual profit

We have,

$$\text{Mean } \bar{X} = \frac{\sum X}{n}$$

$$\text{Standard deviation } (\sigma) = \sqrt{\frac{1}{n} \sum (X - \bar{X})^2}$$

$$\text{Co-efficient of Variation (C.V)} = \frac{\sigma}{\bar{X}} \times 100\%$$

Let, 'X' be the actual sales and 'Y' be the actual profit

For Actual Sales (X)

$$\begin{aligned} \text{Mean } \bar{X} &= \frac{\sum x}{n} \\ &= \frac{10664.63}{5} \\ &= 2132.926 \text{ units in million} \end{aligned}$$

$$\begin{aligned} \text{S.D. } (\sigma) &= \sqrt{\frac{1}{n} \sum (x - \bar{X})^2} \\ &= \sqrt{\frac{1}{5} \times 98422.21} \\ &= 140.30 \text{ units in million} \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation (C.V.)} &= \frac{\sigma}{\bar{x}} \times 100\% \\ &= \frac{140.30}{2132.926} \times 100\% \\ &= 6.57\% \end{aligned}$$

For Actual Profit Y

$$\begin{aligned} \text{Mean } \bar{Y} &= \frac{\sum y}{n} \\ &= \frac{-10318.55}{5} \\ &= -2063.71 \text{ Rs. in million} \end{aligned}$$

$$\begin{aligned} \text{S.D. } (\sigma) &= \sqrt{\frac{1}{n} \sum (y - \bar{Y})^2} \\ &= \sqrt{\frac{1}{5} \times 13446969.27} \\ &= 1639.94 \text{ Rs. in million} \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation (C.V.)} &= \frac{\sigma}{y} \times 100\% \\ &= \frac{1639.94}{-2063.9284} \\ &= -79.46\% \end{aligned}$$

Calculation of correlation co-efficient (r) between 'x' and 'y' variable is given by:

$$\begin{aligned} r_{xy} &= \frac{\sum uv}{\sqrt{\sum u^2 \sum v^2}} \\ &= \frac{-384531.97}{\sqrt{(98422.21 \times 13446969.27)}} \\ &= -0.334 \\ r_{xy} &= -0.334 \end{aligned}$$

Appendix 5
Calculation of Mean, Standard Deviation, Co-efficient of Variation and
Correlation Co-efficient of Actual Production and Actual Profit in Units

Fiscal Year	Actual production (X)	Actual profit (Y)	U=X-X'	V=Y-Y'	U ²	V ²	UV
2061/062	2837.98	-1312.80	-61.05	750.91	3726.71	563865.83	-45843.06
2062/063	2642.75	-1267.80	-256.27	795.91	65675.24	633472.73	-203967.86
2063/064	2780.92	-329.26	-118.10	1734.45	13948.04	3008316.80	-204838.55
2064/065	3051.83	-2315.47	152.80	-251.76	23347.90	63383.09	-38468.93
2065/066	3181.65	-5093.22	282.62	-3029.51	79874.18	9177930.84	-856200.12
total	$\Sigma X =$ 14495.12	$\Sigma Y =$ -10318.5	$\Sigma U =$ 0.00	$\Sigma V =$ 0.00	$\Sigma U^2 =$ 186572.06	$\Sigma V^2 =$ 13446969.23	$\Sigma UV =$ -1349318.52

Suppose, X is the actual production and Y is the actual profit

We have,

$$\text{Mean } \bar{X} = \frac{\sum X}{n}$$

$$\text{Standard deviation } (\sigma) = \sqrt{\frac{1}{n} \sum (X - \bar{X})^2}$$

$$\text{Co-efficient of Variation (C.V)} = \frac{\sigma}{\bar{X}} \times 100\%$$

Let, 'X' be the actual production and 'Y' be the actual profit

For Actual Production (X)

$$\begin{aligned} \text{Mean } \bar{X} &= \frac{\sum x}{n} \\ &= \frac{14495.12}{5} \\ &= 2899.024 \text{ units in million} \end{aligned}$$

$$\begin{aligned} \text{S.D.}(\sigma) &= \sqrt{\frac{1}{n} \sum (x - \bar{X})^2} \\ &= \sqrt{\frac{1}{5} \times 186572.06} \\ &= 193.169 \text{ units in million} \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation (C.V.)} &= \frac{\sigma}{\bar{x}} \times 100\% \\ &= \frac{193.169}{2899.024} \times 100\% \\ &= 6.6\% \end{aligned}$$

For Actual Profit (Y)

$$\begin{aligned} \text{Mean } \bar{Y} &= \frac{\sum y}{n} \\ &= \frac{-10318.55}{5} \\ &= -2063.71 \text{ Rs. in million} \end{aligned}$$

$$\begin{aligned} S.D. (\sigma) &= \sqrt{\frac{1}{n} \sum (y - \bar{Y})^2} \\ &= \sqrt{\frac{1}{5} \times 13446969.23} \\ &= 1639.94 \text{ Rs. in million} \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation (C.V.)} &= \frac{\sigma}{y} \times 100\% \\ &= \frac{1639.94}{-2063.71} \\ &= -79.47\% \end{aligned}$$

Calculation of correlation co- and 'y' variable is efficient (r) between 'x' given by:

$$\begin{aligned} r_{xy} &= \frac{\sum uv}{\sqrt{\sum u^2 \sum v^2}} \\ &= \frac{-1349318.52}{\sqrt{(186572.06 \times 13446969.23)}} \\ &= -0.8518 \\ r_{xy} &= -0.85188 \end{aligned}$$