

# CHAPTER – I

## INTRODUCTION

### **1.1 Background of the Study:**

Nepal is predominantly a land locked agricultural country. Agriculture, fisheries and forestry altogether account for some 39% of the country's GDP. During the last decade the average growth in the GDP was around 5%. However, the last year (FY 2005/06) GDP growth was 2.3 percent. The overall growth rate depends primarily on the growth rate of agriculture sector. The growth in other sectors of the economy is constrained by the small domestic market, poor physical infrastructure, inadequate human and financial resources, land-lockedness of the country, the political instability and the topography of the country. In later years the insecurity caused by moist insurgency though currently resolved has also become a major factor to limit the overall economic development of the country.

Poverty is one of the most pressing problems in Nepal. Gross national income per capita per annum is 250 US dollars. Over 50 per cent of adults are illiterate. Infant and maternal mortality rates are high. According to the Human Development Index (HDI), Nepal ranks 138th of 177 countries. More than ten years of political conflict had created an adverse effect on economy. Economic growth has been between 2 and 4 per cent in recent years and has not been sufficient to reduce the level of poverty.

Nepal has few industrially usable raw materials. Consequently, alongside its agriculture, the country is forced to specialize in processing and services, where it faces strong competition from its neighbors, India and China. Since the domestic Nepalese market is small and purchasing power low, it is difficult to attract foreign investors. Nepal's export-based sectors are weak, with only carpets and textiles being internationally competitive. Remittances from migrant workers are becoming increasingly important for the economy and poverty reduction.

Besides India, Nepalese migrant workers are to be found above all in the Gulf States, Malaysia, and Hong Kong. Ninety per cent of enterprises are small. While they make an important contribution to job creation, these enterprises generate only four per cent of gross domestic product. Large public enterprises which are subsidized by the state continue to represent an obstacle to free competition.

The study is concentrated in analyzing the cash management system in Nepalese public enterprises. For this reason Nepal Electricity Authority is taken for the purpose of the study.

### **1.1.1 A brief introduction to Public Enterprises:**

Public enterprises is an institution operating a services of an economic or social character on behalf of the government, but as independent legal entity, largely autonomous in its management, through responsible to the public, through government and parliament and subject to some direction by the government, equipped on the other hand with

independent and separate funds of its own legal and commercial attributer of a commercial enterprise.

The term of PE has two directions namely 'public' and 'enterprise'. The term public considered as 'public ownership' implies that major decision would rest on distinctive social criteria to the exclusion of any personnel interest. Likewise, the term 'Enterprises' as business enterprises implies that the government expects a return on the capital invested in public enterprises and the goods and services are made available for a price, which may be adjusted from time to time to cover the cost of inputs. The business character is more likely to be found in the area of economic activity such as industrial, trading, services, social, utilities, financial etc.

### **1.1.2 Public Enterprises in Nepal**

"Public enterprise can be define as an activity of the government whether central, state or local, involving manufacturing or production of goods, including agricultural or making available services for a price. Such activities being managed either directly, that is, departmentally or through an autonomous body with the government having a major ownership, which is more than 50 percent of equity."

On the basis of analysis and evaluation of the roles and performance of public enterprises in the national economy, the government that ruled after reintroduction of multiparty democracy system. The conclusion that the economic condition and financial efficiency of Government Corporation were not satisfactory. The lack of basic elements contributing to the development of a professional culture in their inherent structure and

operating procedures was signed out as the main cause for their poor performance. Public enterprise faced with various problems and difficulties such as lack of managerial, autonomy, inefficient use of means and resources, short sightedness and weakness on the part of political leadership, production of low quality goods and services, uncontrolled administrative expenses, lack of competitive ability, lack of motivation inefficient human resources, adoption of old technology and minimum use of professionalism, which brought about a progressive decline in their results and made the large amount of government, investment unproductive. Static's also show that the overall economic condition of public enterprise particularly those involved in industry and trade sector in very poor. Likewise, the performance of the public enterprise involved in social sector is also not satisfactory. Even through the overall state of public enterprise concerned service, public utility and finance sector is found comparatively better; it does not seem to be satisfactory.

Public enterprises are established for rapid socio-economic development of the country. Public enterprises in Nepal constitute a vital instrument for socio-economic development. It enjoys a strategic and crucial position in our mixed economy. They have been established in many sectors for the overall development of the country with different goals and objectives. Public enterprises can be classified as follows:

- a) Manufacturing enterprises
- b) Commercial enterprises
- c) Financial enterprises

- d) Public enterprises engaged in social services
- e) Development or services enterprises
- f) Trading enterprise

## 1.2 **Background of Nepal Electricity Authority**

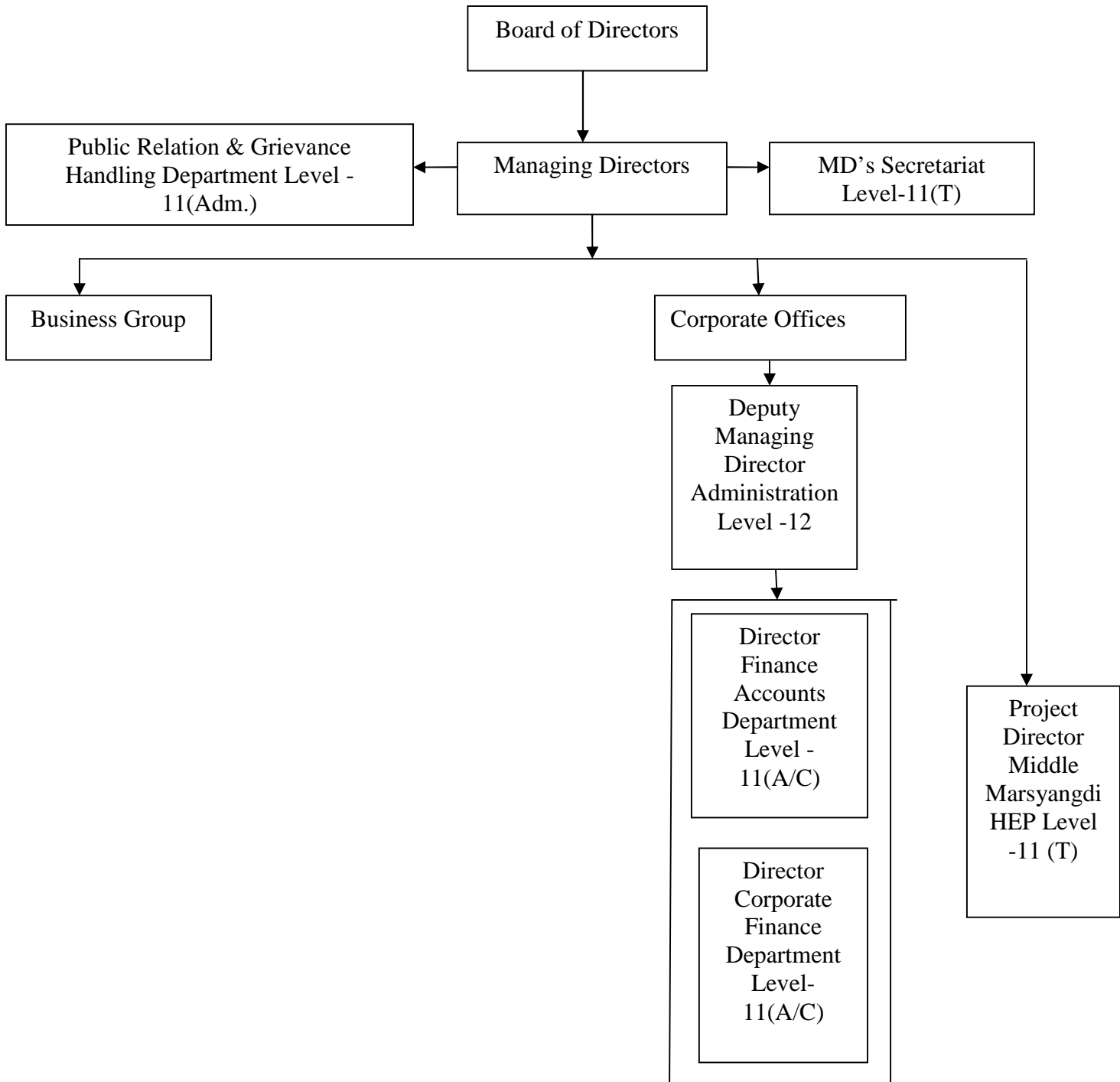
Nepal Electricity Authority (NEA) was established under the NEA Act 2041. NEA started its operations on 17th August 1985. NEA is responsible to generate and supply of electricity securely, efficiently, economically, and legally at reasonable price for the development of the nation.

The objectives of NEA are:

- ) Planning
- ) Construction
- ) Operation and
- ) Maintenance of the electric power sub sector

The Corporate Structure of NEA is as follows:

Corporate Structure of NEA



### **1.3 Cash Management Practice of Nepal Electricity Authority**

Cash is the most important current assets for the operation of the business firm. It is an idle and non-earning asset. Cash is the money, which the firm can disburse immediately without any restriction. The term cash includes coins currency and cheques held by the firm and balance in its bank accounts. Sometimes near cash items, such as marketable securities is also included in cash. Managing cash flows is an extremely important task for financial managers, because the primary goal of a financial manager is to maximize firm's value and is based on cash flows. The financial manager's task is to determining how much cash a firm should have on hand at any time to ensure normal business operations continue without interruption. If a firm holds more cash than it needs, share holder's returns will not be maximized. Therefore, for its smooth running and maximum profitability, proper and effective cash management in business is of paramount importance. So, the management of current assets and current liabilities of the business, which is necessary for day to day operation. It is concerned with the decision regarding the short-term funds influencing overall profitability and risk involving in the firm. Thus, management of cash has been regarded as one of the conditioning factors in the decision-making.

The cash management practice of NEA through the effort of various departments, financial performance; Loans, tariff level etc. are as follows:

### **1.3.1 Finance and Accounts Department**

NEA's net revalued fixed asset as of end of FY 2003/04 reached NRs.57, 597.67 million in comparison to NRs.56, 948.95 million as of end of FY 2002/03. Total revenue in FY 2003/04 was NRs.12, 384.621 million as compared to NRs.11, 525.13 million of FY 2002/03, which is an increase of 7.46 percent. Total operating expenses under generation, transmission, distribution and administration are NRs.6, 518.17, NRs. 208.40, NRs. 1,352.92, and NRs. 368.51 million respectively for FY 2003/04 and NRs. 5,235.51, NRs. 173.27, NRs. 1,258.97 and NRs. 525.01 million respectively for FY 2002/03. NEA suffered a net loss of NRs.1, 778.9 million this year. NEA's financial performance has not been encouraging and is suffering a loss for the fourth year in row.

In FY 2003/04, NEA invested NRs. 11,775.05 in capital works and projects. Out of which NRs. 1,030.1 million comprised of HMG equity, NRs. 4,258.24 million as HMG loan and NRs.6486.71 million as NEA's own internal resources. NEA's total borrowing stood at NRs. 49,542.0 as of end of FY 2003/04. In FY 2003/04, NEA contributed a total sum of NRs. 3744.17 million to the national treasury. Out of this, NRs. 1348.99 million is interest payment, NRs. 962.70 million loan repayment, NRs. 700.74 million royalty and NRs. 731.74 million towards corporate tax. The financial audit for FY 2002/03 carried out by M/s TR Upadhaya and Co. was completed within six months after the conclusion of the fiscal year. The tax audit for the fiscal year 2002/03, completed with in six months after end of fiscal year 2002/03, were submitted.

NEA has successfully computerized its financial accounts and inventory management system in the 72 branch office out of 126 operational level offices. This will help to prepare financial account in due course of time and it will facilitate to complete the financial and tax audit at stipulated time. It will help financial reporting system of NEA and also help to comply the loan covenants of donor agencies.

### **1.3.2 Financial Performance**

NEA's overall financial performance has not improved and failed to meet the expectations in FY 2003/04. There was a decrease in operating surplus by more than Rs 400 million over previous year resulting in a net loss of Rs 1780 million in FY 2003/04. NEA's revenue stream was not to the expectation due to slow growth in demand of industrial and commercial sector due to lower economic activities.

NEA registered a growth of 10.9 percent in internal sales, slightly higher than the forecast. However, export to India decreased by 20 % in 2003/04. Total revenue grew by 7.3 percent. Revenue from internal sales increased by 9.2 percent, where as sales revenue from export decreased by 16.7 percent over the same period.

NEA's revalued net fixed assets and historical fixed assets amounted to 58963 million and 52264.5 million rupees respectively at the end of FY 2003/2004. NEA invested Rs 5191 million in capital works, which is 7 percent more than the previous year's investment on capital works. Of the total investment, 3368 million was financed through

borrowings and the rest Rs 1823 million was funded from HMG/N and NEA resources. At the end of FY 2003/04, NEA's long-term loan amounted to Rs 45252 million rupees.

The total expenditure in FY 2003/04 was Rs 13628.3 million, including rebate to consumer and foreign exchange loss. A total of 5415.63 million rupees (previous year 4087.02 million) were spent on power purchase, which is equivalent to 45.6 percent of net sale revenue in FY 2003/04. Interest and depreciation (historical) are other major expense items and together constitute 39.4 percent of net sales revenue

### **1.3.3. NEA Tariff and Financial Covenants**

The main internal source of NEA is the amount received through electricity sales that remains with it after deducting the cash expenses. Out of the total amount, provision has to be made for working capital requirement. The balance amount remaining thereafter becomes available for NEA investments. In order to suffice the investments, NEA tariff level should be at a level sufficient to generate sales revenue covering cash operating expenses, working capital requirement, debt servicing as well as financing requirement of the investment program. Furthermore, it also has to achieve desired level of return on its investment to attain operational efficiency. Besides, NEA is also required to achieve desired level of Debt Service Coverage ratio to satisfy covenants of lending agencies. In line with these objectives, three basic financial covenants have been agreed between NEA and Donor agencies specially ADB, KFW and the World Bank. These covenants are:

Self Financing Ratio (SFR) Covenant

Rate of Return (ROR) Covenant

Debt Service Coverage Ratio

However, covenant agreed with IDA in recent financing agreement for proposed power development project does not include SFR as a binding covenant.

## **1.4 Statement of Problem**

Nepal Electricity Authority is one of the public enterprises established in 2042 B.S. The NEA is suffering from many problems which are as follows

- High cost of production which compel the Nepalese consumer to purchase electricity at high rate.
- Unfair agreement to purchase power generated from private sector due to lack of proper planning system and political interference.
- The accumulated amount of account receivable which is being increased year by year shows the poor performance of NEA.

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

The present study has been conducted to examine cash management of public service enterprises of Nepal, on the basis of the case study of Nepal Electricity Authority.

It focuses on the investment decision of the company and in particular the cash management in short run business operation of the firms, i.e. management of the individual current assets like; cash and bank balance, receivable and inventory in the short-run.

- ) To examine the cash management practices in Nepal Electricity Authority through ratio analysis.
- ) To examine and analyze the liquidity position of Nepal Electricity Authority.
- ) To analyze the profitability position of NEA.
- ) To examine the cash flow statement of Nepal Electricity Authority.

### **1.6 Scope and Limitation of the Study:**

In the dynamic environment, nothing is free from limitations. So, this study is also no exception. Although, the effort has been made to minimize the limitations to the best possible extent, yet it suffers from the below mentioned limitations. The scope of the study is subject to various limitations, which are as follows:

- 1) The study assumes that the impact of political factors of the country such as; change in government, any sort of political involvement in the in the firm, if prevalent, has insignificant or no effect upon the financial decisions.
- 2) Unavailability of secondary data is the other limitation, which could limit the scope of the study.

- 3) The study covers the analysis of NEA performance of only 7 years i.e. from F.Y 2001 to F.Y.2008.
- 4) The study is limited only to cash management and its analysis i.e. Concerns only with managerial, financial and accounting aspects.
- 5) This study will be done for the partial fulfillment of Masters in Business studies program of Tribhuvan University.

### **1.7 Organization of the study:**

The structure of the thesis report comprises a total of five chapters which have been organized as follows:

#### **Chapter I: Introduction**

This section includes a brief introduction to public enterprises in Nepal, role and objectives of public enterprises in Nepalese economy. Proceeding through an updated information and introduction to Nepal Electricity Nepal has also been included in this chapter. Likewise, the statement of the problem, objectives of the study comes next followed by scope and limitation of the study.

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

This chapter includes the reviews of relevant previous writing and studies to find the existing gap. Review of dissertations/ theses has been included.

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

Research design, sample selection, source of data, data collection procedure, tools for analysis of the study, and limitation of the methodology have been included in this chapter.

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

This chapter is the one of the most important and core of the thesis. Since, it consists of systematic presentation and analysis of financial statements employing financial and statistical tools. This presentation and analysis helps to come to the ultimate conclusion of the study.

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

In this chapter, the summary of the entire study has been comprises. This chapter further describes the major findings of the study. Conclusions of the study have also

been included in this chapter. As well as, possible and viable recommendations has also been presented in this chapter.

In the bibliography list of published and unpublished books, articles, theses/dissertations etc, has been included which have been the sources information and used as references. At last in the appendices part relevant materials, which are, however, not much worth mentioning in the main body of the report are included. It includes balance sheets and income statement.

## Chapter - II

# REVIEW OF LITERATURE

This chapter highlights upon the available literature on theoretical and applied aspects of the related field. It is also a way to avoid duplication of the research works already conducted by the past researchers. For this, several books, dissertation, reports, and articles published in journals are reviewed. This chapter has been planned in the following manner.

- ) Conceptual framework
- ) Review of Thesis

### **2.1 Conceptual Framework:**

#### **2.1.1 Meaning of Cash Management:**

“Cash is the common purchasing power or medium of exchange. As such it forms the most important component of working capital. Not only that it largely upholds, under given condition, the quantum of other ingredients of working capital viz. inventories & debtors, that may be needed for a given scale and type of operation” (*Banarjee; 1985:1*)

Cash is regarded as both input and output of a business operation. Cash serves as input of a sense that all business activities are carried on without any obstruction with the availability of cash. All business works begin with the provision of sufficient cash to do

business. Some items of cash whereas, other items such as Treasury bills, commercial papers and other marketable securities are readily convertible in to cash. The financial manager must ensure that there is sufficient cash in the business. If there is excessive cash, the financial manager must seek to invest a low-risk highly liquid money market instruments that are conveniently convertible into cash. If there is inadequate cash the financial manager must manage it to avoid payment problems.

Cash as a means and ends of business operation must be held in sufficient quantity. Holding of cash both in excess and insufficient amount may lead a firm to problems shortage of cash puts obstruction in the production process whereas excessive cash then requirement contributes nothing to the profitability of the firm as idle cash earn nothing Therefore, a financial manager faces a challenge of maintaining optimum level of cash, which bypass the risk and also does not put negative impact on firm's profitability. The basic issue in cash management is to maintain the investment in cash as low as possible while still keeping the firm operating efficiently and effectively.

Therefore, for its smooth running and maximum profitability, proper and effective cash management in business is of paramount importance. So, the management of current assets and current liabilities of the business, which is necessary for day to day operation. It is concerned with the decision regarding the short-term funds influencing overall profitability and risk involving in the firm. Thus, management of cash has been regarded as one of the conditioning factors in the decision-making.

### **2.1.2. Significance of Cash Management**

Cash management is concerned with management of cash in such a way as to achieve the generally accepted objectives of the firm maximum profitability consistent with maximum liquidity of the firm. It is the management's ability to recognize cash problems before they arise, to solve them when they arise and having made solution available to delegate someone to carry them out.

“Cash management is one of key areas of ‘working capital management’. Apart from the fact that it is the most liquid current assets, cash is the common denominator to which all current assets, can be reduced because the other major liquid assets i.e., receivables and inventory get eventually converted in cash.”(*Khan & Jain; 2005:12.1*) This underlines the significance of cash management.

Cash management involves three major decision areas:

- ) Determining appropriate cash balance.
- ) Investing ideal cash
- ) Managing collections & disbursement

Emphasizing studies show that average holding of cash by firm differs significantly. A notable study conducted on Nepalese non finance sectors enterprises emphasizes that cash management is great significance of the size of investment of the form of canuy by Nepalese enterprises is not negligible. Average cash holding of Nepalese non finance sector's firm constitute 4to6 percent of total assets investment. With such a relatively

high quantum of cash investment proves the significance role of cash management in Nepalese enterprises as well.

An effective and efficient cash management is considered to be significant for the following reasons;

- a. It ensures that the firm has sufficient cash during peak times for purchases and for other purpose.
- b. It helps to meet obligatory cash out flows when they fall due.
- c. It assists in planning capital expenditure s projects.
- d. It helps to arrange for outside financing at favorable conditions, if necessary.
- e. It helps to allow the firm to take advantage of discounts, special purchases and business opportunities.
- f. It helps to invest to surplus cash for short or long term periods to keep the idle funds fully employed.

### **2.1.3 Objectives of Cash Management:**

There are mainly two objectives of cash management which are conflicting and mutually contradictory and the task of cash management is to reconcile them.

(a) Meeting Payment Schedule:

In the normal course of business, firms have to make payment of cash on a continuous and regular basis to suppliers of goods, employees and so on. At the same time, there is a

constant inflow of cash through collations from debtors. To meet the payment schedules, a firm should maintain an adequate amount of cash balance. The advantages of maintaining adequate cash balances are:

- ) It helps to take trade discounts and cash discount.
- ) It helps the firm maintaining its credit rating by keeping its current and acid test ratio.
- ) It is useful for taking advantages of favorable business opportunities
- ) It helps to meet such emergencies as strikes, fires or competitors marketing campaigns.

(b) Minimizing funds committed to cash balances:

The second objective of cash management is to minimize cash balances. In minimizing the cash balances, two conflicting aspects have to be reconciled. A high level of cash balances will, as shown above, ensure prompt payment together with all the advantages. But it also implies that large funds will remain idle, as cash is a non-earning asset and the firm will have to forego profits. A low level of cash balances, on the other hand, may mean failure to meet the payment schedule. The aim of cash management, therefore, should be to have an optimal amount of cash balances.

## **2.1.4 Different Techniques of Cash Management:**

### **(1) Cash Budget:**

The cash budget shows the firm's projected cash inflows and outflows over some specified period. It is the most significant device to plan for and control cash receipt and payment. It provides much more detailed information concerning a firm's future cash flows. It is the most important tool for managing cash. It is useful in determining when cash surpluses or shortages will occur. Plans can then be made to borrow to cover shortages or to invest surpluses.

### **(2) Cash Planning:**

Cash planning can help anticipate future cash flows and needs of the firm and reduces the possibility of idle cash. Cash planning is a technique to plan for and control the use of cash. The forecasts may be based on the present operation or anticipated future operation. Cash plans are very crucial in developing the overall operation plans of the firm. Cash planning may be done on daily, weekly or monthly basis. It depends upon the size of the firm and philosophy of management. *(Pandey; 1999:843)*

### **(3) Long-term Cash Forecasting:**

Long-term cash forecasting are prepared to give an idea of the company's financial requirement of distant future. Once a company has developed long term cash forecast, it can be used to evaluate the impact of say new product development on the firm financial condition three, five or more years in future. The major uses of the long-term cash

forecast are company's future financial needs, especially for its working capital requirements, to evaluate proposed capital projects and it help to improve corporate planning. Long term cash forecasting not only reflects more accurately the impact of any recent acquisitions but also foreshadows financing problems, these new additional may past for the company.

#### **(4) Short-term Cash Forecasting:**

There are most two common used methods of short-term cash forecasting are as follows:

##### **a. Receipt and Disbursement Forecasting:**

The prime aim of receipt and disbursement forecasts is to summarize these flows during a predetermined period. In case of those companies where cash items of income and expenses involve flow of cash; this method is favored to keep a close control over cash.

##### **b. Adjusted Net Income Method:**

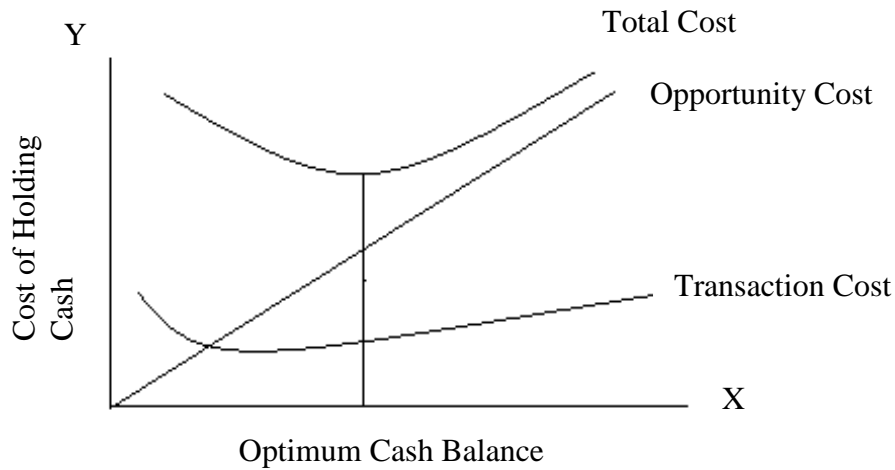
This method of cash forecasting involves the tracing of working capital flows. Sometime, it is also called the sources and uses approach. Two objectives of this method are; to project the company's need for cash at some future date and to show whether the company can generate this money internally or not, how much give will either borrow or rise in the capital market.

### **2.1.5 Determining the Optimum Cash Balance:**

Financial manager responsibilities are to maintain a sound liquidity position of the firm, so that dues may be settled in time. The firms need cash not only to purchase raw materials and pay wages but also for payment of dividend, interest, taxes and countless other purposes. The test of liquidity is really the availability of cash to meet the firm obligations when they become due. Thus, the cash balance is maintained for transaction purpose and an additional amount may be maintained as a safety stock. The financial manager should determine the appropriate amounts of cash balance, a trade-off between risk and return influences such a decision. If the firm maintains a small cash balance, its liquidity position becomes weak and suffers from a scarcity of cash to make payment. But investing released funds in some profitable opportunities can attain a higher profitability. If the firm maintains a high level of cash balance it will have a sound liquidity position but forego the opportunity to earn interests. Thus, the firm should maintain an optimum cash balance to find out the optimum cash balance the transaction costs and risk of too small a balance should be matched with the opportunity costs of too large a balance.

**Figure: 2.1**

**Determination of Optimum Cash Balance**



(Source: *Banerjee; 2005:215*)

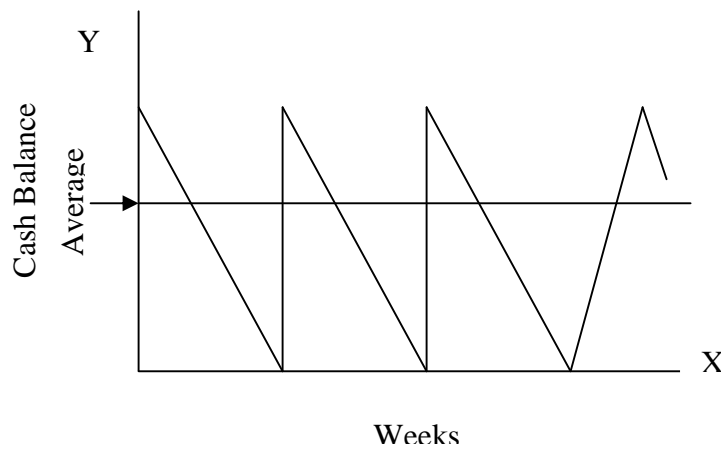
**2.1.5.1 Optimum Cash Balance Under Certainty; Baumol's Model:**

In view of minimizing the opportunity cost of holding cash and maximizing the return on the available funds, the cash balance should be maintained at a minimum level and the funds not required for immediate use be invested in the marketable securities. Baumol model is one of the methods that can be used for this purpose. Baumol model is based on the assumptions that;

1. The cash is used at a constant rate,
2. The periodic cash requirements is more or less and
3. There are some costs such as opportunity costs that increase and other costs such as transaction costs that decrease as cash balance increase (*Baumol, extract from Khan and Jain;1986: 136* )

Because of the assumption (1) and (2) the graphical representation of cash position looks like as follows:

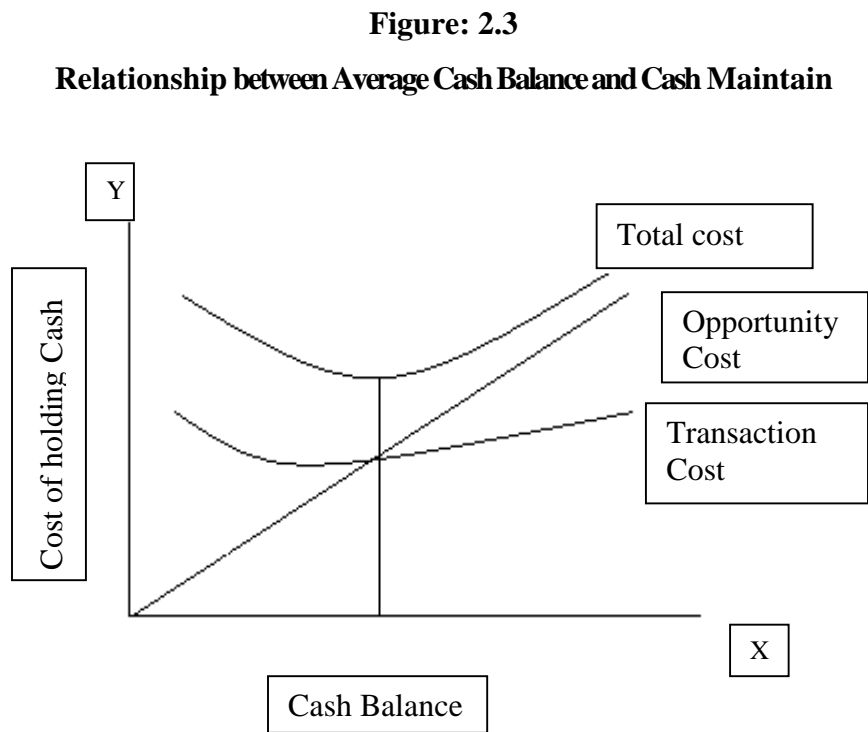
**Figure: 2.2**  
**Cash Balance Under the Baumol Cash Management Model**



(Source: *Baker & Powell; 2005:166*)

Given its assumptions, the model prescribes an optimal size of cash balance and the optimal size of account or borrowing. What matter for a firm is the total of opportunity cost and the transaction cost? Therefore, the objective of this model is to minimize the total cost.

The figure below shows the relationship between the average size of cash balance and various costs associated with the cash maintenance



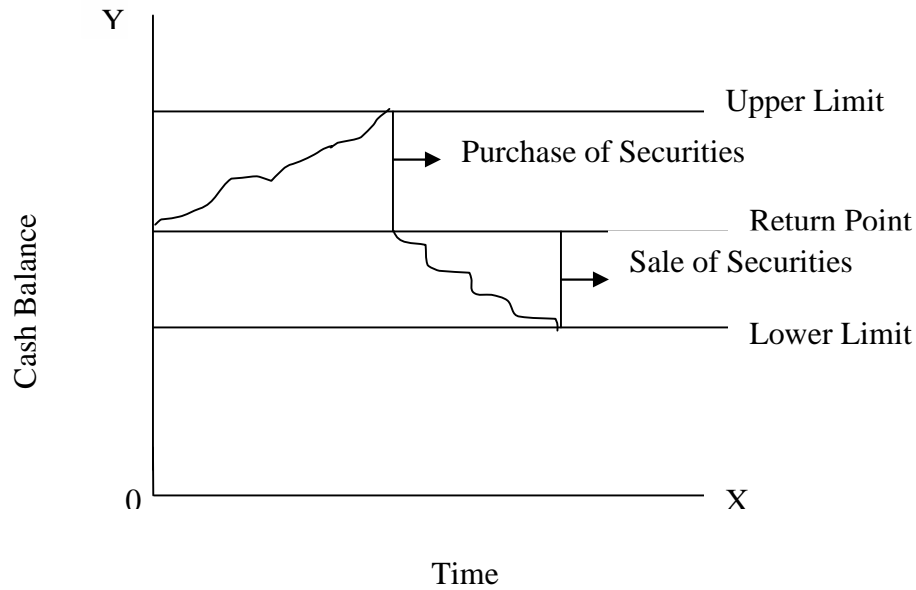
(Source: *Baker & Powell; 2005: 167*)

Under this method only selling of marketable securities is possible. Whenever the optimal cash balance becomes zero, the company can sell the marketable securities of economic conversion size, xx times for next month and company make conversion every xx days in month.

#### **2.1.5.2 Optimum Cash Balance under Uncertainty; The Miller-Orr Model:**

The limitation of the Baumol model is that it does not allow the cash flows to fluctuate. Firms in practice do not use their cash balance uniformly nor are they able to predict daily cash inflows and outflows. The Miller-Orr model cash flow variation. It assumes that net cash flows are normally distributed with a zero value of mean and a standard deviation. As shown in figure below, the Miller-Orr model provides for two control limits- the upper control limit as well as lower control limit and return point. If the firm's cash flows fluctuate randomly and hit the upper limit, then it buys sufficient marketable securities to come back to a normal level of cash balance (the return point). Similarly, when the firm's cash flows wander and hit the lower limit, it sells sufficient marketable securities to bring the cash balance back to the normal level (the return point). (*Miller M.H & Orr; 1966:413-35*)

**Figure: 2.4**  
**The Miller-Orr Cash Management Model**



(Source: *Miller M.H & Orr D.LXY; 1966: 413-35*)

### **2.1.6 Motives for Holding Cash:**

The motives for holding cash specific advantage of adequate cash, synchronization of cash flows, expending collection and cheque clearing, using float, cost of cash management determining the minimum cash balance, compensating balances overdraft system cash management, management of account receivable credit policy, evaluating changes in credit policy. There are three possible motives for holding cash and they are:

### **1 Transaction motives:**

“The requirement of cash balance to meet routine cash needs is known as transaction motive and such motive refers to the holding of cash to meet anticipated obligations whose timing is not perfectly synchronized with cash receipts”. (*Khan & Jain; 2002:12.2*)

Firms need cash to meet their transactions needs. The principle motive for holding cash is to conduct day to day operations. A cash balance associated with routine payments and collections like purchase of raw material, payment of wages, salaries, interest, dividend, taxes etc.

### **2 Precautionary Motives:**

“The cash balance held in reserve for such random & unforeseen fluctuations in cash flows are called as precautionary motives” (*Khan & Jain; 2002:12.2*)

There may be some uncertainty about the magnitude and timing of cash inflows from sales of goods and services, sales of assets, and issuance of securities. Likewise, there may be uncertainty about cash outflows on account of purchase and other obligation. To protect it against such uncertainties, a firm may require some cash balance.

### **3 Speculative Motives:**

“It refers to the desire of a firm to take advantage of opportunities which present themselves at unexpected moments and which are typically outside the normal course of business.”(*Khan & Jain; 2002:12.2*)

This motive is related to the holding of cash for investing in profit making opportunities as and when they arise. Firms would like to tap profit making opportunities arising from fluctuations in commodity prices, security prices, interest rate and foreign exchange rates.

#### **4 Compensating Balance/Compensative Motives:**

A cash balance that a firm must maintain with a bank to compensate the bank for services rendered or for granting a loan. Firm often maintains bank balance in excess of transactions needs as a means of compensating for the various services. These balance are called compensating balance. Bank provides various services to the firm like; payment of check information of credit, loan etc.

Out of the four motives for holding cash, the most important ones are the transaction motive and the compensation motive. This is because precautionary balance can be met by short-term borrowings and business firms normally do not speculate and thus doesn't require speculative balances.

## **2.2 Review of Thesis:**

In this section the review of thesis relating to cash have been considered. There are many thesis/dissertations written on cash when browsed through computer records of theses reports presented earlier in Tribhuvan University Central Library as well as in Shanker Dev Campus. Nevertheless, there are plenty of dissertations, which were closely related to cash management. For instance, working capital management, inventory management and profit planning are the topics, which are some way related to cash management. The topics are given below,

Bajacharya, (1990), has conducted his Master's thesis on "*A Study of Cash Management in Nepalese Public Enterprise*", with the following objectives:

- a) To critically review the cash management techniques practice by Nepalese public enterprise.
- b) To examine the demand for cash in the case of Nepalese public enterprise.
- c) To suggest appropriate cash management policy for the future.

The findings of the study are:

- ) Cash management in public enterprises is primarily based on the traditional practices. Lacking in a specific approach, more serious aspects of cash management has been the any formalized system of cash planning and cash budgeting in many of enterprises, although the executive of some enterprises do have the practices of forecasting cash requirements on a formal basis.

- ) Modern practices with respect to debt collection, monitoring the payment, behavior of customers and relevant banking arrangement in connection with collection of receivables have been virtually ignored in many enterprises.
- ) Majority of the enterprises didn't face any serious liquidity problem. However, this was not because of the effectiveness of cash planning and budgeting. The problem of liquidity actually didn't arise due to the coincidence of delay in payment to creditors.
- ) By and large most enterprises have periodic accumulation of surplus cash and corresponding cash shortage from time to time. However, one of the enterprises considered the implication of holding idle cash balance and few took on to account the potential benefit of investing surplus in marketable securities. These which failed to consider the cost of administering such investments.
- ) There had been wide variations over the time in the state of financial health of enterprises in terms of the composition of current assets to current liabilities as revealed by the relevant financial ratios.

Neither interest rate nor the rate of inflation had any effect on the cash balance. Further there was very little evidence of effect on the cash balance holding in most case.

Pradhan, (1997), has conducted his Master's thesis on "*A Study of Cash Management of Salt Trading Corporation Ltd*" with the following objectives:

- ) To analyze the collection period of trade credit of Salt Trading Corporation Ltd.
- ) To examine liquidity position of Salt Trading Corporation Ltd.
- ) To analyze the allocation and expenditure of cash of Salt Trading Corporation Ltd.

) To recommend viable suggestion to cope up with cash management short coming in Salt Trading Corporation Ltd

The major finding of his study has been presented as under;

- a. Salt trading corporation Ltd could not make the best use of available cash balance prudently.
- b. The cash collection efficiency in this corporation is very low.
- c. The collection of trade credit in the corporation is low during the three years of the study period.
- d. Management has taken liberal credit policy to sales of goods. Hence the cash and bank balance of the study period is minimum of account receivables.
- e. No optimum cash balance is maintained.

Acharya, (2003), has conducted his Master's thesis on "*Cash Management Practices of Manufacturing Companies in Nepal*" with the following objectives:

- a. Determining the structure and utilization of cash.
- b. Estimate of demand for cash from slope of regression.
- c. Reviewing the cash management practiced by manufacturing companies.

- d. Determining the average level of cash holding of the manufacturing companies.

The major findings of his study has been presented as under

- ) The average size of cash is higher in government enterprises than non government manufacturing enterprises.
- ) From the result of structure and position of cash, non-government sector has more efficient practice on cash management than government manufacturing enterprises.
- ) Lower ratios on cash to quick assets, cash to current liabilities on non-government sector which refers efficient cash management.
- ) Average collection period is lower for government than non-government manufacturing enterprises.
- ) Cash conversion cycle is favorable for non-government manufacturing enterprises because of lower time takes to cash cycle.

Sainiju, (2003), has conducted his Master's thesis on "*Cash Management in Nepalese Public Enterprises, A case study of Royal Drugs Limited,*" with the following objectives:

- ) To examine and critically analyze the cash estimation practice in RDL.
- ) To examine the liquidity position of RDL

Major findings of his research work were;

- a. Company doesn't have any definite policy regarding how much of cash balance to hold each fiscal year.
- b. Company has not been forecasting cash balance taking into consideration the sales volume.
- c. Company fails to maintain an adequate proportion of cash in its current assets.
- d. Cross analyses revealed that company fails to collect receivables from its sundry debtors timely.
- e. Company has not been precisely meeting its current liabilities payment.

Bhandari, (2004), has conducted his Master's thesis on "*Profit Planning in Royal Drugs Limited*" with the following objectives:

- ) To Measure the Profitability of the RDL.
- ) To measure the Liquidity position of the RDL.
- ) To examine the cash flow statement of the RDL

The findings of the study are as follows:

- ) The management of RDL is incapable of controlling its overflowing expenses as a result the expenses are increasing year to year.
- ) RDL has been suffering from operating loss. The main cause of loss is low contribution margin ratio, burden of high fixed costs, under capacity utilization.

- ) RDL has improper cash position. The cash flow statement shows the negative cash flow operation due to increase in operating expenses and improper cash management.
- ) The balance sheet of RDL shows that the financial structure of RDL is not satisfactory. The total assets of RDL are financed by the equity capital. No long-term debts are taken. So RDL has no financial leverage and insolvency risk. Only some current assets are financed by current liabilities.
- ) Liquidity position of RDL is poor. One major cause of poor operation and under utilization of capacity is its inadequate liquidity.

Joshi, (2004), has conducted his Master's thesis on "*Revenue Planning and Cash Management of Nepal Electricity Authority*" with the following objectives:

- a. To examine revenue planning, policies and practice of NEA.
- b. To analyze the relationship between sales and production.
- c. To evaluate financial performance.
- d. To review cash flow from operating, financing and investing activities.

The major findings of his study are

- NEA has not succeed in expansion of the sales unit in internal and external market, due to in- actual forecast of demand and lack of capital.
- Target sales revenue is increased by small figure but the actual sales revenue is highly increased than budgeted both internal and external sales market in FY

2056/57.

- Profitability ratio indicates that the higher operating expenses, as a result of operating profit and Net profit are not sufficient.
- Cash position of NEA shows that the cash from operating activities is in decreasing trend. The cash from investing activities is in highly increased up to 2057/58. There after decreased, but its return is very poor. The cash from financing activities is highly increased in FY 2056/57. Thereafter it has decreased.

Banarjee, (2005), has conducted his Master's thesis on "*Inventory Management of Manufacturing Public Enterprises in Nepal*" with the following objectives:

- ) To calculate inventory values and compared with the actual quantity of inventory of the firm.
- ) To calculate the Economic Order Quantity (EOQ) of the firm.
- ) To calculate the Reorder Level of the Firm.
- ) To calculate the profitability position of the firm.

The findings were carried on the basis of inventory management formulae such as Economic Order Quantity and Re-order Level. Mr. Banarjee had computed inventory values theoretically and compared it with actual quantity of inventory in the firm in relation with other factors such as time, working days, and so on. The deviations from the theory suggested the condition of actual inventory management practice of the firm. In spite of the approach to analysis being different from the general tools of analysis, only a

portion of cash management, i.e. only the inventory management aspect has been analyzed; the analysis being based only on three types of raw materials purchased.

Koirala, (2006), has conducted his Master's thesis on, "*Cash Management of Nepal Telecom*" with the following objectives:

- ) To examine the liquidity position of Nepal Telecom.
- ) To examine the profitability of Nepal Telecom.
- ) To analyze the allocation and expenditure of cash of Nepal Telecom.

The major findings are that the company was able to collect more cash from different sources than it targeted in the budget. It shows good position of actual cash collection of the company. On the other hand, company did not spend cash as targeted. Due to these facts, there was enough surplus cash in hand every year. But company could not manage the surplus in the productive sector. The study shows that the company has high liquidity which adversely affects profitability of the company. The company has also taken external loan from foreign institution which was not required to borrow. It was able to meet its expenses of budget by its own source. There are strict provisions regarding cash control practices like procedure of running bank account, central collection policy, authority and responsibility for expenses, etc. in NTC Strict and lengthy procedure of business activities hamper in decision making which may cause to suffer for not getting business opportunity.

Dhungana, (2008), has conducted her Master's thesis on "*A study of Cash Management in Nepalese Public Enterprises, A Case Study of Nepal Electricity Authority*" with the following objectives:

- To examine the cash management practices in Nepal Electricity Authority through ratio analysis.
- To examine and analyze the liquidity position of Nepal Electricity Authority.
- To analyze the profitability position of NEA.
- To examine the cash flow statement of Nepal Electricity Authority.
- To recommend viable suggestions to cope up with cash management short comings in Nepal Electricity Authority.

The major findings of the study are that NEA's cash management is very poor. Liquidity position is dissatisfactory, Negative profitability of the company adds much to the worsening financial position of the company. The accumulated amount of account receivable which is increasing year by year denotes the inefficiency of the authority to collect its revenue in time. There is the absence of effective utilization of capital employed and liquidity position is also not satisfactory. Because of the absence of the competitors, authority has become monopolistic and, hence, it is not alert towards its possible threats and opportunities. Different statistical tools show the positives relationship with two variables like cash and sales, cash and account receivable, current assets and cash, current liabilities and cash.

## **Chapter - III**

# **RESEARCH METHODOLOGY**

### **3.1 Introduction:**

This chapter looks into the research design, nature and source of data, data collection procedure and tools & technique of analysis. For the purpose of achieving the objectives of the study, the applied methodology is used. It thereby helps to highlight and recommend the useful and meaningful points so that all concerned can achieve something from this study. The research methodology used in the present study is briefly mentioned below.

### **3.2 Research Design:**

A well settled research design is necessary to fulfill the objective of the study. This study mainly concerned with historical research. But generally, to show the cash management of Nepal Electricity Authority, past historical data are used. The relevant and needed data has been collected from various publications such as annual report of Nepal Electricity authority, website of National Planning Commission, Ministry of Finance etc.

### **3.3 Data Collection Procedure:**

Collecting data is the connecting link to the world of reality for the researcher. The data collection activity consists of taking ordered information from reality and transferring it into some recording system so that it can later be examined and analyzed for patterns. Research as a media can be interpreted as having a content of data and process of methodology.

#### **3.3.1 The Population and Sample:**

The research topic is about cash management practices of public enterprises, all the manufacturing enterprise, commercial enterprises, financial enterprises, public enterprises engaged in social service, service enterprises and trading enterprises are included in the population of the study and among all of them Nepal Electricity Authority is taken for research purpose. Due to unavailability of data from all sectors, only service enterprise is chosen for study. So precisely saying Nepal Electricity Authority is chosen for the study.

### **3.4 Sources of Data and Collection Procedure:**

For this study, secondary data are used. These secondary data are collected from published sources like annual report, prospectus, balance sheet, newspaper, journal, Internet and other sources of NEA.

### **3.5. Data Analysis Tools**

The following financial and statistical tools will be used for the analysis of the research study.

#### **3.5.1 Financial Tools for Data Analysis**

##### **1) Ratio Analysis**

Ratio analysis is one of the strongest tools to measure the financial health of an organization. This tool is used to judge various aspects of the financial condition of the organization by comparing it with standard ratios. The following ratios will be used in this research:

##### **a) Analysis of Cash Turnover:**

The cash turnover Ratio explains how quickly the cash is received from the sales; or in words it measures the speed with which cash move through an enterprise's operation

Cash turnover ratio is obtained by the following formula:

$$\text{Cash turnover ratio} = \frac{\text{Sales}}{\text{Cash in hand and bank}}$$

**b) Analysis of current Ratio or current assets to Current Liabilities:**

It is the test of liquidity. It evaluates short term debt paying ability of the firm. It measures the availability of current assets for meeting current liabilities. The ideal current ratio is 2:1; however for a public enterprises, the ratio tend to be little lower than 2:1 as these enterprise general require very little current assets. But nevertheless any company should maintain this ratio above 1:1, since ratio lower than this definitely indicates poor liquidity position.

This ratio computed as follows:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current liabilities}}$$

**c) Analysis of Quick Ratio or Acid Test Ratio:**

It measures the short term liquidity of the firm. This ratio is superior to Current ratio, for it excludes inventory (which is the least liquid current asset) from the net current assets and compares it with current liabilities. Comparing this ratio with current ratio gives a clearer idea as to if current assets have been tied-up inventory or not. Though current

ratio of a firm is satisfactory on the other hand if quick ratio is not convincing, the situation suggest current assets being tied-up in unassailable inventory. The ideal Quick ratio is 1.1 Formula for computing quick ratio is given by:

$$\text{Quick Ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}}$$

(Quick Assets = current assets- Inventory)

**d) Receivables/ Debtors Turnover ratio:**

Receivables turnover ratio gives an idea as to how quickly receivables are converted into sales. The ratio can be computed as follows:

$$\text{Receivable turnover in time} = \frac{\text{Total Sales}}{\text{Receivable}}$$

With computation of this ratio, average collection period of receivables is also calculated. Shorter average collection period suggests that the company has a very rigid credit policy and thus sales curtail would be he consequence as the sales transaction is only target to parties marking payments promptly.

Average collection period is calculated to know the average number of days/month for which a firm has to wait before trade debtors are converted into cash. The average collection period can be calculated as follows:

$$\text{Average collection Period} = \frac{\text{Days in a year}}{\text{Receivable Turnover in times}}$$

**e) Inventory (or Stock) turnover Ratio:**

Every business organization has to maintain a certain level of stock for fulfillment the requirement of the business. Inventory turnover ratio indicates whether the investment in inventory is efficiently used or not. It checks the efficiency of inventory management.

The ratio is calculated as:

$$\text{Inventory Turnover Ratio or Stock turn over ratio} = \frac{\text{Sales}}{\text{Inventory}}$$

**f) Cash and Bank Balance to Account Receivable:**

This ratio measures the cash and Bank Balance in relation with Accounts receivables (or sundry debtors) of the firm. Higher ratio refers to sound liquidity position and vice versa. However, too high ratio is indicative of the fact that the business dealings are restricted to only those parties making quick payments. There by limiting its scope of sales volume. It is computed by:

$$\text{Cash Balance to Account Receivable} = \frac{\text{Cash and Bankbalances}}{\text{Account Receivable}}$$

**g) Cash and bank balance to Current Assets:**

This ratio is also supportive to analysis the liquidity position of the firm. It measures the proportion of cash and bank balance, the most liquid current asset in the total current assets. Higher ratio implies sound liquidity position and vice versa. It is complies as follows:

$$\text{Cash and Bank Balance to Current Assets} = \frac{\text{Cash and bank balances}}{\text{Current Assets}}$$

**h) Cash and Bank Balance to Current Liabilities:**

It calculates the cash balance available with the firm in meeting payments of current liabilities. Moderately higher ratio indicates good liquidity too high and too low ratio are unfavorable for the firm since too high indicates excess cash balance held idle and too low ratio means the firm unable to meet current liabilities. It is calculated as follows:

$$\text{Cash and bank balances to Current Liabilities} = \frac{\text{Cash and Bank balances}}{\text{Current Liabilities}}$$

**i) Net Profit Margin Ratio:**

This ratio establishes a relationship a relationship between net profits to net sales and shows the efficiency of management to earn net profit through sales. This ratio helps to

determine the operational efficiency of the management. Higher the ratio shows the higher efficiency of the management and lower the ratio shows the lower efficiency of the management. The formula of net profit ratio is:

$$\text{Net profit margin ratio} = \frac{\text{Net Profit After Tax}}{\text{Sales}}$$

**j) Return on Working Capital Ratio:**

This is yet another ratio to examine profitability of a firm. The ratio is aimed at analyzing the proportion of current assets employed to earn the profit amount. Higher ratio is favorable and vice versa. This ratio is calculated by employing the formula below:

$$\text{Return on working capital ratio} = \frac{\text{Net Profit After Tax}}{\text{Current Assets}}$$

**k) Return on working After Tax Quick Assets Ratio:**

This ratio also examines profitability of a firm; analyses proportion of Quick assets (i.e. current Assets- Inventory) in earning the profit amount. It is calculated by using the formula below:

$$\text{Net profit After Tax to Quick Assets} = \frac{\text{Net Profit After Tax}}{\text{Quick Assets}}$$

### 3.5.2 Statistical Tools for Data Analysis

#### a) The least Square Method, Straight line trend,

$$y_c = a + bx$$

This is one of the time series analyses. Which forecasts future events of variables over a regular interval of time based on the past trend of the variables? In this method a trend line,  $y_c = a + bx$  is fitted to the given data such that

$$(y - y_c) = 0 \text{ and } (y - y_c)^2 \text{ is least.}$$

Where,

$y$  = Actual values of Y

$y_c$  = Computed values of Y

$a$  = Constant which is the computed Y- value when

$b$  = Constant which is the change in Y

$X = 0$  corresponding to the change in X by one unit.

$X$  = Time in case of time series analysis d

The value of 'a' and 'b' can be found out by solving the following normal equation:

$$Y = Na + b \sum x$$

$$Y = a \sum X + b \sum X^2$$

Where

N is the number of years or any period for which the data are given.

The normal equations are obtained by using above two conditions and some mathematical manipulations. To simplify the calculation the mid point in time is taken as origin, so that  $X=0$ . Then the above two normal equations will be reduce to:

$$Y = Na$$

$$\dots a = \frac{Y}{N}$$

$$\dots b = \frac{XY}{X^2}$$

**b) Karl Pearson's Coefficient of Correlation,  $(r) = \frac{uv}{u^2 v^2}$**

If two variables (say X and Y) were such that change in one accompanies the change in other, then these two variables are said to be correlated. Such correlations are said to be positively correlated if increase in X results increase in Y and decrease in X follows decrease in Y. Likewise, such correlations are said to be negatively correlated if increase in Y results decrease in X and decrease in X follows increase in Y.

Correlation analysis refers to the statistical technique, which measures the degree of relationship or association between the variables. To put it differently, it helps in analyzing the co variation of two or more variables.

It is to be noted that a high degree of correlation between two variables doesn't always necessary imply that change in one variation cause change in the other, i.e. correlation doesn't necessarily imply causation while causation always implies correlation. Out of

several methods of computing correlation, Karl Pearson's Coefficient of Correlation is one of the best and popular methods. Karl Pearson's coefficient of correlation ( $r$ ) measures the degree of association between the variable supposes X and Y, given by:

$$r = \frac{uv}{u^2 v^2}$$

Where,

$r$  = Karl Pearson's Coefficient of Correlation between X and Y

$u$  =  $X - \bar{X}$

$v$  =  $Y - \bar{Y}$

and

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

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

Where,

$N$  = No, of years/time period.

However, in this thesis work, computing correlation coefficient, the above formula has been used only manually. For rest of the computations, Microsoft excel worksheet tool has been employed directly from the computer.

The value of r lies between +1.00 to -1.00.

Value of +1.00 refers to highly positive correlation between the variables, i.e. one variable is directly proportional to another, or in other words. Increase in one variable leads to increase in another and vice-versa. Value of -1.00 refers to highly negative correlation between the variables; i.e. one variable is indirectly proportional to another, or in other words, increase in one variable leads to decrease in another variable and vice-versa. Likewise, value nearing to zero "0" refers to existence of no correlation between the variables, i.e. increase or decrease in one variable result no impact on another variable and vice-versa. Together with Karl Pearson's Coefficient of Correlation, probable error (P.E.) of the correlation coefficient is also computed. This probable error of the correlation coefficient is the basis for the interpretation of its value. It is given by:

$$P.E = \frac{(1-r^2)}{N} \times .6745$$

Where,

P.E = Probable error of correlation coefficient

N = Number of pair of observations.

r = correlation Coefficient

- ) When  $r < P.E$ , the value of r is not statistically significant at all; i.e. there is no evidence of correlation.
- ) When  $r > 6(P.E)$ , the value of r is significant; i.e. practically the correlation is certain.
- ) When  $P.E. < r < 6(P.E)$ , the value of r is inconclusive as to statistically significant/insignificant correlation.

) By adding and subtracting the value of probable error from the coefficient of correlation we get the upper and lower limits respectively within which correlation in the population can be expected to lie. Symbolically, correlation in the population =  $r \pm P.E.$

For instance, if r is calculated as  $r = -0.5$ , then

$$|r| = 0.5$$

This positive value of r is compared with P.E and 6(P.E.) to derive to a conclusion of practically significant/insignificant correlation.

b) **Standard Deviation (S.D)**

$$S.D. = \left( \frac{\sum x^2}{N} \right)$$

Or

$$S. D = \left( \frac{\sum d^2}{n} - \frac{d^2}{N} \right)$$

Standard Deviation (S.D) measure scatter, spread, or variation, and provides idea of homogeneity (compactness) or heterogeneity (scatter) of the distribution. Out of various methods of studying dispersion such as Range, I interquartile range and Quartile deviation, Mean deviation, Standard deviation and Variance, Lorenz curve, the most popular method is the standard deviation and variance method.

Standard deviation is represented by the symbol sign 'σ' and given by,

$$S.D. (\sigma) = \frac{\sum x^2}{N}$$

Where,

$$x = X - \bar{X}$$

N= Number of years/observations/time periods.

It can be also be computed as follows:

$$\text{S.D. (0)} = \left( \frac{d^2}{N} - \frac{d}{N^2} \right)$$

Where,

$$d = X - A$$

and

A=Assumed means

In this thesis work, however, while computing standard deviations, the above formula has been employed only once manually. For rest of the computations, Microsoft excels worksheet tools have been employed directly from computer.

In conjunction with standard deviation, coefficient of variation (C.V) is also computed which is the relative measure based on standard deviation and is defined as the ratio of the standard deviation to the mean expressed in percent. Coefficient of Variation (C.V) is given by

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

The ratio  $\frac{\sigma}{\bar{x}}$  is called the coefficient of Standard deviation, C.V has no units, Distribution with lower C.V. is said to be less variable (or more consistent or more uniform) and the distribution with higher C.V is indicative of more Variable (or less consistent or less

uniform) The limitation of using C.V. is that when the distribution being compared have negative observation, it provides unreliable way to compare variability across data sets.

**c) Regression Analysis and Regression line:**

In correlation analysis, the closeness of relationship between two variables is established. In regression analysis the nature of relationship between two variables is established and the unknown variable is established on the basis of other known variable. Thus regression analysis is the statistical method for determining the nature of relationship that exists among two or more variables and then using that relationship to make estimates or predictions. The closer the relationship between the two variables, the more accurate the estimated value is the unknown variable to be estimated is called dependent variable (or explained variable) and the known variable is called independent variable (or explanatory variable).

Noteworthy here is that correlation analysis indicates to what degree the variable are related and regression analysis indicates how the variables are related.

Regression line of X variable (X) on Y variable (Y) given by:

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

Where,

$\bar{X}$  = Mean of X variable

$\bar{Y}$  = Mean of Y variable

$\sigma_x$  = Standard Deviation of X variable

$\sigma_y$  = Standard Deviation of Y variable

$r$  = Karl Pearson's Coefficient of Correlation

Likewise, the regression line of Y variable ( $y$ ) on X variable ( $X$ ) is given by,

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

#### d) **Lorenz Curve Analysis**

Lorenz curve is a graphic method of studying dispersion in a distribution Dr. Lorenz introduced for the first time this method of measuring dispersion. He used this method to measure inequalities in the distribution of income and wealth between different countries for different time periods. Lorenz curve is obtained by plotting the cumulative percents of variables value (e.g. wealth profits etc) on Y- axis and the cumulative percents of the corresponding frequencies on X-axis. Thus the Lorenz curve is the cumulative percentage curve.

#### e) **Diagrams**

Diagrams are the effective way of presenting and analyzing data. Diagram can be of various types such as bar diagram, trend line e.t.c. the bar diagram will be used

extensively to analyze the data. The bar diagram represent the data by bars of equal width. The length of the bar represents the given figures and width may be of any size.

## **CHAPTER - IV**

### **DATA PRESENTATION AND ANALYSIS**

The basic objective of this study as stated in chapter one is to have true insight into “cash management” of Nepal Electricity Authority (NEA). This is the section where, the filtered data are presented and analyzed. In this chapter, the relevant data and information necessary for the study are presented and analyzed keeping the objectives set in mind. To make our study effective and precise as well as easily understandable, this chapter is categorized in three parts; presentation, analysis and interpretation. In presentation section data are presented in terms of table, graph chart of figures, according to need. The presented data are then analyzed using different statistical tools mentioned in chapter three. At last the results of analysis are interpreted. Similarly it is also noted that almost all data used for analysis are of secondary type.

#### **4.1. Analysis of the Data by “Financial Tools”:**

#### 4.1.1. Analysis of Cash and Bank Balance:

Holding of optimum cash and bank balance is the rational cash management practice of a business firm. Management of cash plays a significant role in current assets of NEA. Total cash balance refers to the cash in hand, cash at bank, and cash in transit, near cash assets such as; marketable securities and time deposit in bank.

The amount of cash and bank balance of NEA during the period under study is shown in the below Table-4.1.

**Table: 4.1**

#### **Analysis of Cash and Bank Balance:**

(Rs in million)

Fiscal Year	Cash and Bank	Increase (decrease)%
2001	1039.30	-
2002	664.60	(36.05)
2003	1076.15	61.92
2004	1036.42	(3.70)
2005	1322.60	27.61
2006	1258.60	(4.84)
2007	1447.58	15.01
2008	820.34	(43.33)

Total	8665.59	16.62
-------	---------	-------

Note: Figures within brackets ( ) indicates negative amount.

(Source: Appendix I)

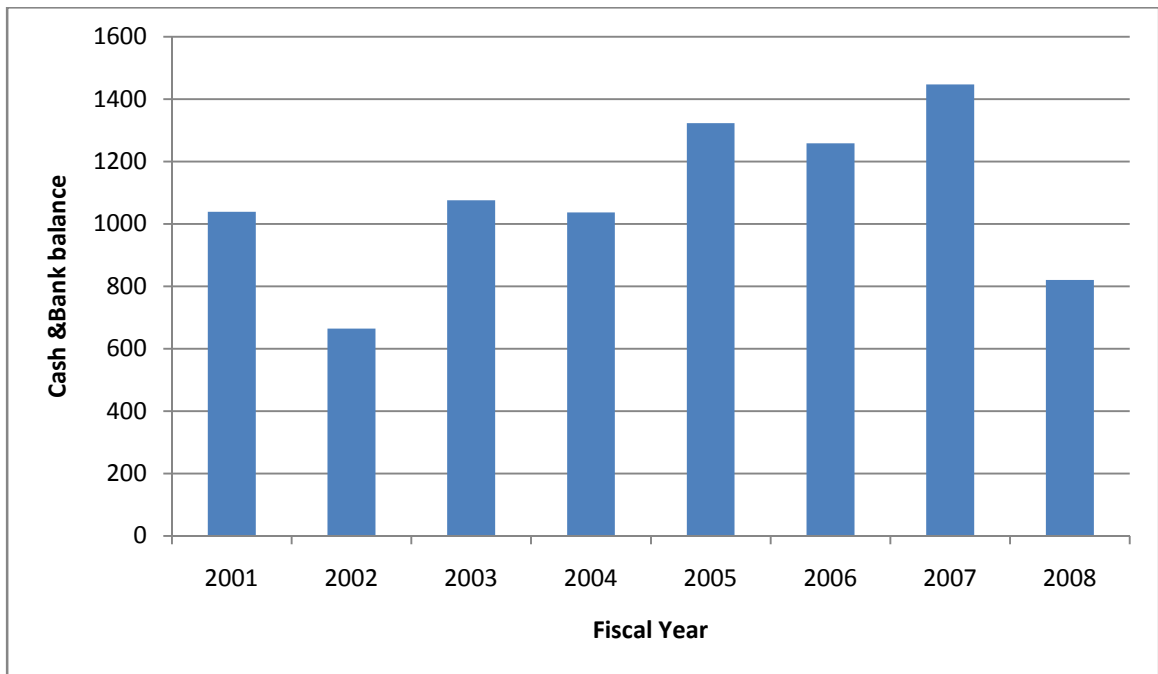
In fiscal year 2001, the cash balance of the company was Rs 1039.3million, which is decrease by 36.05% to Rs 664.6 million, in the following year. However, it sharply increased by 61.92% in fiscal year 2003 like wise; it declined in the fiscal year 2004. In the fiscal year 2005 increased by 27.61% In the fiscal year 2006 and 2007 the cash balance of the company were Rs. 1258.6 and Rs 1447.58 million, which decreased by 4.84% and again increase by 15.01%. At last in the fiscal year 2008 the cash balance was Rs 820.34 which decreased by 43.33% as compared to previous year.

However, sharpest deviation in increments of cash balance occurred in fiscal year 2003 when the company held cash balance of Rs1076.15 million compared to Rs 664.6 million only in the previous year.

It can be presented with the help of graph to show the variation in cash balance held at the end of each fiscal year.

**Figure: 4.1**

**Cash and Bank Balance (FY 2001-2008)**



The figure suggested that the cash balance held is quite consistent in nature except in FY 2002 which has drastically decreased from 1039.3 to 664.6.

The major finding of analysis of cash and bank balance is that the company has to some extent been following a definite policy regarding the amount of cash to hold in each fiscal year end.

**4.1.2. Analysis of Cash Turnover Ratio:**

The cash balance of the company should be optimum to meet its current obligations in course of daily business transaction. The cash turnover ratio represents how quickly the cash is received from its sale be formulated to find out. Higher turnover is the signal of good liquidity and vice-versa. However, too high ratio indicates excess cash balance being held idle.

**Table: 4.2**

**Analysis of Cash Turnover Ratio:**

(Rs in Million)

Fiscal year	Sales	Cash and Bank	(Times)Ratio	Cash conversion days
2001	8160.80	1039.30	7.85	46.48
2002	9476.20	664.60	14.26	25.60
2003	11012.60	1076.15	10.23	35.67
2004	11874.70	1036.42	11.46	31.86
2005	12605.20	1322.60	9.53	38.30
2006	13331.90	1258.60	10.59	34.46
2007	14449.73	1447.58	9.98	36.57
2008	15405.03	820.34	18.78	19.44
Total	96316.16	8665.59	11.11	32.85
Average	12039.52	1083.20	1.39	4.11

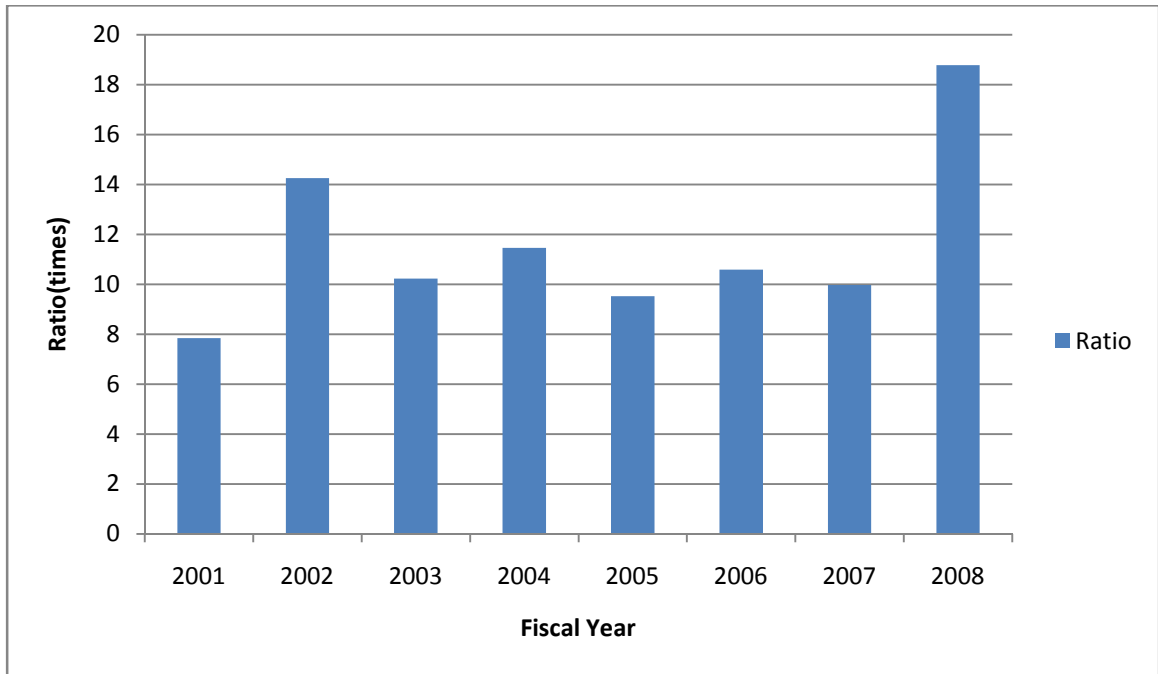
(Source: Appendix I & II)

From the above table medium fluctuations have been observed in cash turnover analysis. Above table shows that the highest ratio of 18.78 times has been observed in FY 2008. Likewise, the lowest ratio of 7.85 has been observed in FY 2001. Overall average ratio has been calculated 1.39 times. Likewise the average cash turnover cycle has been found 4.11 days. However due to the unavailability of information regarding credit policy of the company the credit days allowed its debtors was not known. So, no peruse analysis could be carried out for cash turnover cycle.

It can be presented with the help of graph to show the cash turnover ratio in relation with sales and cash balance.

**Figure: 4.2**

**Cash Turnover Ratio (FY2001 to 2008)**



From the above figure we can conclude that the lowest cash turnover ratio is in 2001 and the highest cash turnover ratio is in last year i.e. 2008.

#### **4.1.3. Analysis of Current Ratio:**

One of the reliable methods to examine liquidity position of an enterprise is by means of current ratio. The standard ratio that the company should maintain is 2:1. However, depending upon the nature of the company, the development of capital market and availability of long-term funds to finance current assets; the satisfactory ratio varies. So, satisfactory ratio for NEA, a public enterprise is therefore between 2:1 and higher than 1.5:1. But in general, ratio less than 1:1 is certainly undesirable for any enterprise.

**Table: 4.3**  
**Analysis of Current Ratio**

(Rs in Million)

Fiscal year	Current Assets	Current Liabilities	Ratio (times)
2001	6313.60	5070.8	1.25
2002	7322	4703.9	1.56
2003	7690.48	7444.8	1.03
2004	7883.41	9707.7	0.81
2005	8491.60	12619.8	0.67
2006	8995.30	14995.5	0.60
2007	10322.97	17970.11	0.57
2008	11391.46	21468.82	0.53
Total	68410.82	93981.43	7.02
Average	8012.6	11747.68	0.88

(Source: Appendix I)

The above figure shows that the current ratio varies from 1.56:1 in the FY2002 to 0.53:1 in the FY 2008 indicating low fluctuations. Observing the figure, the ratios in FY 2001, 2002 and 2003 are near about 2:1 which are satisfactory and in 2004, 2005, 2006, and

2007 all of the ratios are below 1:1 which indicates that the NEA does not have a sound or satisfactory liquidity position. The most favorable current ratio was observed in FY 2002 when the when the ratio is 1.56:1.

The finding of analysis of current ratio is that company has not been able to maintain satisfactory current ratio in most of the FYs.

#### **4.1.4 Analysis of Quick Ratio:**

The ratio conveys the most precise information on liquidity position of a firm, since; it excludes the inventory, the least liquid asset from the current assets and compares it with current liabilities. Inventory when excluded from current assets is called quick assets. Current assets are composed of cash and bank balance, Short- time marketable securities, receivable and inventory. However, inventory is not capable of readily converting into cash and therefore it is the less liquid compared to other composition of the current assets. Thus this quick ratio is more reliable measure of liquidity than current ratio. Quick ratio is so called because it measures the capacity of a firm to convert its current assets quickly into cash in order to meet its current liabilities.

**Table: 4.4**  
**Analysis of Quick Ratio**

(Rs in Million)

Fiscal year	Quick Assets	Current Liabilities	Ratio (times)
2001	5352.7	5070.8	1.06
2002	6263.9	4703.9	1.33
2003	6673.26	7444.8	0.90
2004	6835.4	9707.7	0.70
2005	7118.9	12619.8	0.56
2006	7640.5	14995.5	0.51
2007	8824.52	17970.11	0.49
2008	9873.01	21468.82	0.46
Total	58582.19	93981.43	6.01
Average	7322.77	11747.68	0.75

(Source: Appendix I)

The standard quick ratio to be maintained by the company is 1:1. From the above table, in FY 2001 and 2002 the ratios obtained are 1.06:1 and 1.33:1 respectively which are satisfactory for the company but in FY 2003, 2004, 2005, 2006, 2007 and 2008, the ratios are 0.90:1, 0.70:1, 0.56:1, 0.51:1, 0.49:1 and 0.46:1 respectively which are below the standard ratio and unsatisfactory for the company.

A note worthy point of observation here is, in the FY 2002 where the current ratio is 1.56:1 suggested liquidity position to be satisfactory. On the contrary, the quick ratio calculated for the same FY that is 1.33:1 which is satisfactory. So, it is clear that NEA does not have sound or satisfactory liquidity position.

#### **4.1.5. Analysis of Receivables Turnover Ratio:**

This ratio shows how quickly receivables are converted into cash. The ratio shows how well the debtors have been handled by the company. In connection with this ratio, average collection period is also calculated. Higher ratio and shorter average collection period indicates better trade credit management and better liquidity of debtors, and consequently better liquidity of the enterprise. Likewise, lower ratio and longer average collection period signals delayed payments by the debtor.

**Table: 4.5**

#### **Analysis of Receivables Turnover Ratio**

(Rs in million)

Fiscal year	Sales	Receivables	Ratio (times)	Average Collection days
2001	8160.80	1678.50	4.86	75
2002	9476.20	2284.90	4.15	88
2003	11012.60	3380.20	3.26	112
2004	11874.70	3735.71	3.18	115

2005	12605.20	3697.70	3.41	107
2006	13331.90	4088	3.26	112
2007	14449.73	5151.41	2.81	130
2008	15405.03	6776.70	2.27	161
Total	96316.16	30793.12	27.2	900
Average	12039.52	3849.14	3.4	113

(Source: Appendix I & II)

From the above table shows that the ratios are having low fluctuating and very from the lowest of 2.27 times to the highest of 4.86 times and average collection days vary far from 75 days to 161 days and overall, the average ratio is 3.4 and the average collection period is 113 days. Here the lowest ratio is 2.27 but the average collection days are 113. It shows that the credit management of NEA is not satisfactory. But it's depend upon with the nature of debtors.

However, it should be noted that too short average collection days doesn't necessarily imply that the firm is functioning well, for it indicates a very restrictive credit and collection policy thereby restricting its sales only to those debtors whose financial conditions are sound and who make their payments readily. Such restrictive policy would definitely avoid bad debts but the sales volume is likely to be curtailed by large proportion. Consequently, the overall profitability of the firm goes down.

#### 4.1.6. Analysis of Inventory Turnover Ratio:

This ratio is yet another way of analyzing the liquidity of an enterprise. This ratio shows how effectively a firm is managing its assets and whether or not the level of those assets is properly related to the level of operations as measured by sales. High inventory turnover ratio signals better inventory management and vice-versa. However, very high inventory turnover ratio is indicative of under-investment or very low level of inventory; and as such implies that the firm has not been meeting customer demand. So, a firm should go for an optimum inventory turnover ratio, which signifies sound inventory management.

**Table: 4.6**

#### **Analysis of Inventory Turnover Ratio**

(Rs in Million)

Fiscal year	Sales	Inventory	Ratio (times)
2001	8160.80	960.9	8.49
2002	9476.20	1058.1	8.96
2003	11012.60	1017.22	10.83
2004	11874.70	1048.01	11.33
2005	12605.20	1372.7	9.18
2006	13331.90	1354.8	9.84
2007	14449.73	1498.45	9.64
2008	15405.03	1518.45	10.14

Total	96316.16	9828.63	9.80
Average	12039.52	1228.58	1.22

(Source: Appendix I & II)

The ratio 11.33 for the fiscal year 2004 is highest of all ratios, has definitely suggested that during the period, either the company should have undergone underinvestment or the inventory held was comparatively lower. The inventory ratio is 8.49 in FY 2001; in FY 2002 the ratio is 8.96 which is increase. In FY 2003 and 2004 the ratios are 10.83 and 11.33 which are increase compare to previous year but in FY 2005 it decrease by 9.18 .In FY 2006 increase to 9.84 and in FY 2007 it decrease by 9.64 and in the last FY 2008 it increase to 10.14.

#### **4.1.7. Analysis of Cash and bank Balance to Account Receivable:**

This ratio measures the relationship between the cash balance on hand to account receivable. The higher ratio indicates better liquidity position and vice-versa. However, too high ratio indicates excessive cash balances are held idle and that the transactions are limited only to parties making prompt payments.

**Table: 4.7**

#### **Analysis of Cash and Bank Balance to Account Receivable**

(Rs in Million)

Fiscal year	Cash & Bank	Account Receivable (AR)	Percentage of A.R.
-------------	-------------	-------------------------	--------------------

2001	1039.30	1678.50	61.92
2002	664.60	2284.90	29.09
2003	1076.15	3380.20	31.84
2004	1036.42	3735.71	27.74
2005	1322.60	3697.70	35.77
2006	1258.60	4088	30.79
2007	1447.58	5151.41	28.10
2008	820.34	6776.70	12.10
Total	8665.59	30793.12	257.35
Average	1083.20	3849.14	32.17

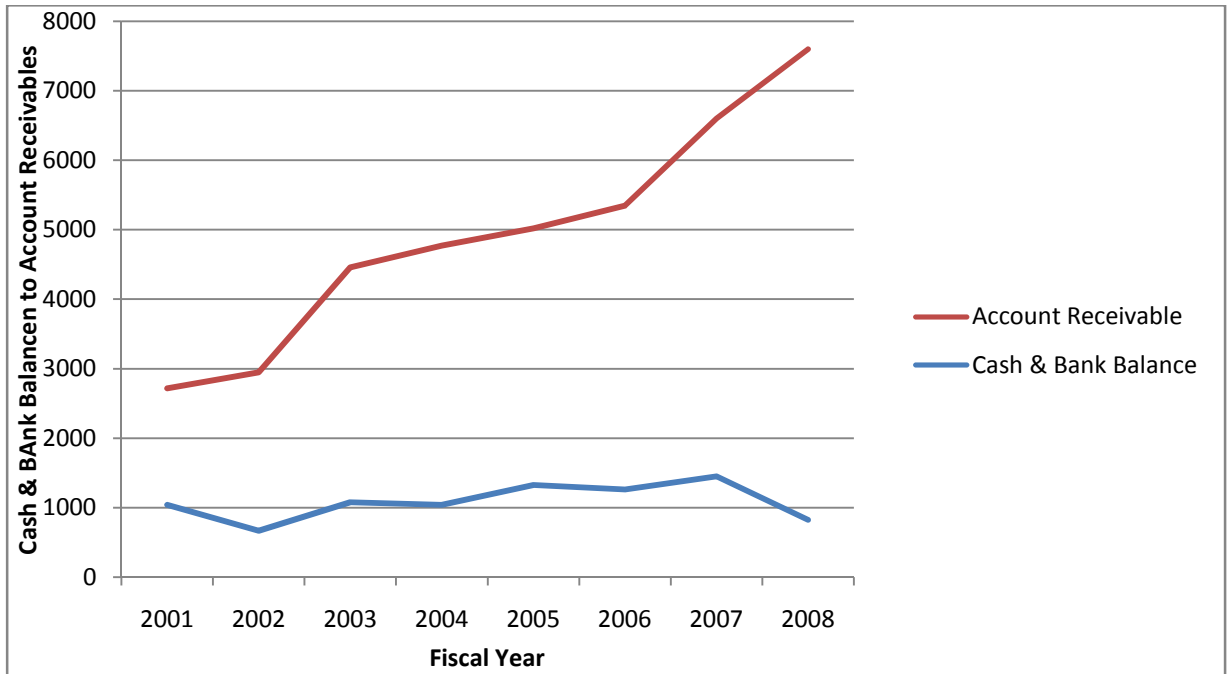
(Source: Appendix I)

Above table shows the ratio or percentage of account receivable fluctuates from 12.10% to 61.92 %. The percentage of account receivable is highest in FY 2001 (61.92%). This shows that the liquidity position is good in FY 2001. But the % of A/C receivable in 2008 is 12.10 which is lowest percent, this shows the liquidity position is not good for FY 2008 in comparison to other FYs.

It can be presented with the help of graph to show the relationship between cash and bank balance and account receivable.

**Figure 4.3**

**Cash and Bank Balance to Account Receivable**



#### 4.1.8. Analysis of Cash and Bank Balance to Current Assets:

The ratio of cash and Bank to current assets indicate the proportion of cash balance in the current assets. Stable pattern of ratio for different fiscal years indicate that the company has been following a systematic policy regarding how much cash balances to hold at the fiscal year end.

**Table: 4.8**

#### **Analysis of Cash and Bank Balance to Current Assets**

(Rs. in million)

Fiscal year	Cash & Bank	Current Assets	Ratio of cash and bank to current Assets	Difference Ratio

2001	1039.30	6313.60	16.46	-
2002	664.60	7322	9.08	(7.38)
2003	1076.15	7690.48	13.99	4.92
2004	1036.42	7883.41	13.15	(0.85)
2005	1322.60	8491.60	15.58	2.43
2006	1258.60	8995.30	13.99	(1.58)
2007	1447.58	10322.97	14.02	0.03
2008	820.34	11391.46	7.20	(6.82)
Total	8665.59	68410.82	12.67	0.69
Average	1083.20	8551.35	1.58	0.00

Note: Figures within brackets ( ) indicates negative amount.

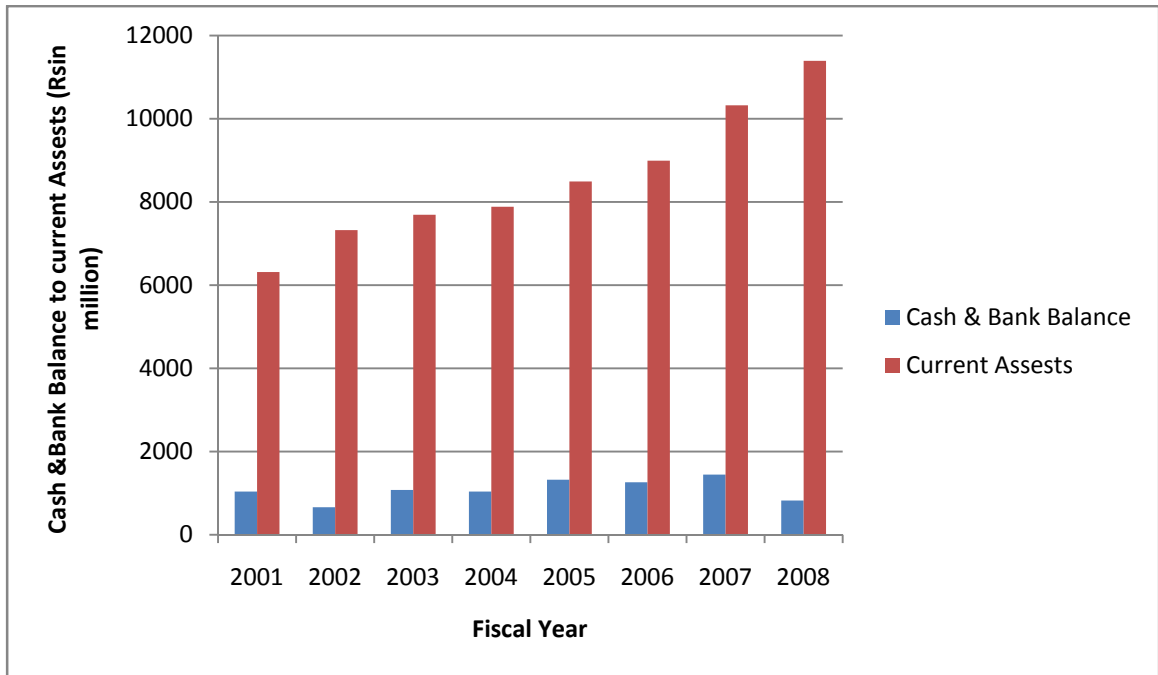
(Source: Appendix I)

Above table indicate that the cash and bank balance with respect to C.A has fluctuating trend. During the study period the % of cash and bank balance to C.A range from the lowest of 7.20 to the highest of 16.46 in the FY 2008 and 2001. In FY 2001 the ratio is 16.46 which decrease in FY 2002 i.e. 9.08, however in FY 2003 increase to 13.99. In FY 2004 decrease in to 13.15 But in FY 2005 increase in to 15.58. In FY 2006 and 2007 decrease in to 13.99 and 14.02 respectively. On an average the projection of cash and Bank Balance to C.A for the study period is 1.58.

It can be presented with the help of graph to show the relationship between cash and bank balance and C.A.

**Figure: 4.4**

**Cash and Bank Balance to Current Assets**



**4.1.9. Analysis of Cash and Bank Balance to Current Liabilities:**

Among the technique of measuring corporate liquidity, the ratio of cash and Bank Balance to current liabilities may also be used as index of cash management. This ratio indicates the amount of cash (in percentage) available to pay the current obligation of the firm. A moderate ratio is considered satisfactory, too high ratio indicates excess cash balance held idle and too low ratio is indicative of company being unable to meet its payment of current liabilities in time.

**Table: 4.9**

**Analysis of Cash and Bank Balance to Current Liabilities**

(Rs in million)

Fiscal year	Cash & Bank	Current Liabilities	Ratio (%)
2001	1039.30	5070.8	20.50
2002	664.60	4703.9	14.13
2003	1076.15	7444.8	14.46
2004	1036.42	9707.7	10.68
2005	1322.60	12619.8	10.48
2006	1258.60	14995.5	8.39
2007	1447.58	17970.11	8.05
2008	820.34	21468.82	3.82
Total	8665.59	93981.43	90..51
Average	1083.20	11747.68	11.31

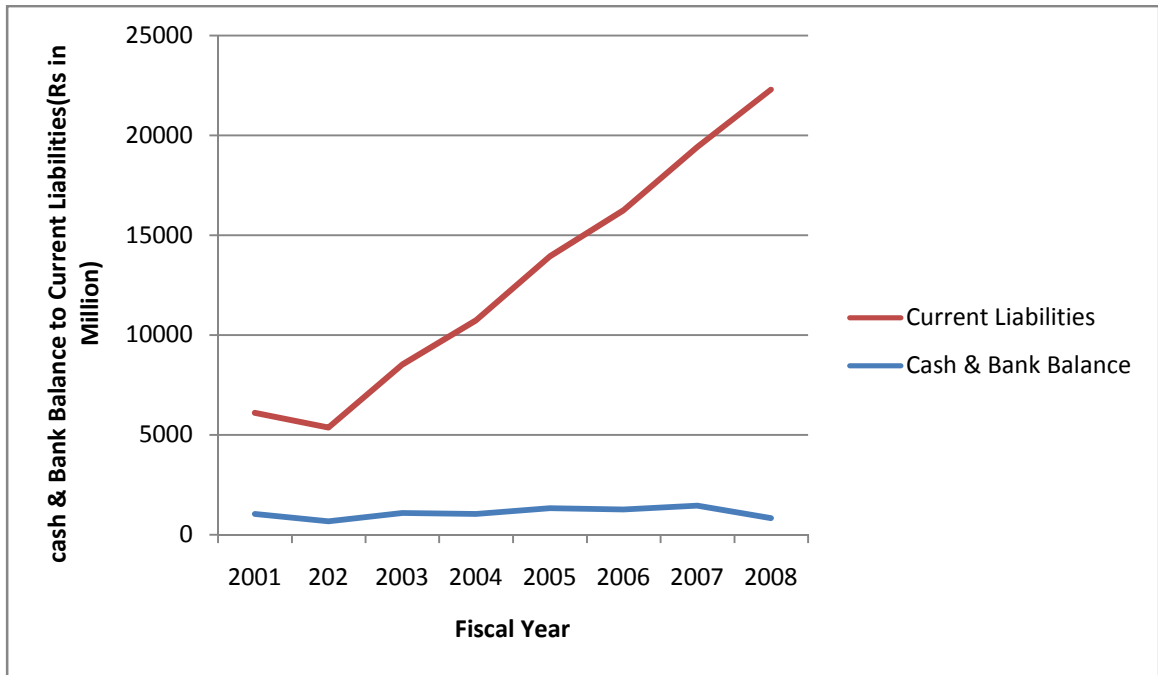
(Source: Appendix I)

Above table shows that the ratios fluctuate from the lowest of 3.82 % to the highest of 20.50 % in FY 2007 and 2008. The ratio in FY 2001 is 20.50% and the rest are in decreasing trend i.e. 14.13%, 14.16%, 10.68%, 10.48%, 8.39%, 8.05% in 2002, 2003, 2004, 2005, 2006 and 2007 respectively. The above table has clearly indicated that the company hasn't been following a systematic cash management practice. It shows that the company has been unable to meet its payment of current liabilities in time. The average ratio has been found calculated 11.31. It can also be presented with the help of graph to show the relationship between cash and Bank Balance and C.L.

It can also be presented with the help of graph to show the relationship between cash and Bank Balance and current liabilities.

**Figure: 4.5**

### Cash and Bank Balance to Current Liabilities



#### 4.1.10. Analysis of Net Profit Margin Ratio:

Net profit Margin ratio measures the relationship between net profits and sales of a firm. A high profit margin indicates adequate return to the firm and thus enables in with standing in adverse economic situations when sales price is declining, cost of production is rising and demand for the product is falling.

**Table: 4.10**

#### **Analysis of Net profit Margin Ratio**

(Rs in million)

Fiscal year	Net profit After Tax (loss)	Sales	Ratio (%)
2001	(51)	8160.80	(0.62)
2002	(860.7)	9476.20	(9.08)
2003	(1953.7)	11012.60	(17.74)
2004	(1760.3)	11874.70	(14.82)
2005	(1312.8)	12605.20	(10.41)
2006	(1267.8)	13331.90	(9.51)
2007	314.9	14449.73	2.18
2008	(1312.16)	15405.03	(8.52)
Total	(8203.56)	96316.16	(68.52)
Average	(1025.45)	12039.52	(8.56)

Note: Figures within brackets ( ) indicates negative amount.

(Source: Appendix I

Above table shows that the company has been operating under loss in all of the FYs. except in FY 2008. The net profit margin ratio observed in FY 2001 to 2008 is -0.62, -9.08, -17.74, -14.82, -10.41, -9.51, 2.18 and -8.52 respectively. Overall the company has been operating under loss. The average net profitability margin has been calculated (8.56).The sales amount are in increasing trend but the company bearing loss in all FY which is not meet to theory .

#### **4.1.11. Analysis of Return on working capital:**

This is yet another ratio to examine profitability of a firm. The ratio is aimed at analyzing the proportion of current assets employed to earn the profit amount. Higher ratio is favorable and vice-versa.

**Table: 4.11**

**Analysis of Return on Working Capital**

(Rs in million)

Fiscal year	Net profit After Tax (loss)	Current Assets	Ratio (%)
2001	(51)	6313.60	(0.8077)
2002	(860.7)	7322	(11.75)
2003	(1953.7)	7690.48	(25.40)
2004	(1760.3)	7883.41	(22.32)
2005	(1312.8)	8491.60	(15.45)
2006	(1267.8)	8995.30	(14.09)
2007	314.9	10322.97	3.05
2008	(1312.16)	11391.46	(11.52)
Total	(8203.56)	68410.82	(98.29)
Average	(1025.45)	8551.35	(12.29)

Note: Figures within brackets ( ) indicates negative amount.

(Source: Appendix I & II)

Above table shows that the company has not been utilizing its C.A effectively in earning profit. Besides the overall ratio is also dissatisfying indicating loss in 2001 to 2008. Overall, the return on working capital is disappointing indicating down fall of the company. The average return of working capital has calculated as (12.29).

#### **4.1.12. Analysis of Net Profit after Tax to Quick Assets:**

This ratio also examines profitability of a firm; analyses proportion of quick assets in earning the profit amount. Higher ratio indicates higher utilization of quick assets in earning profit and vice-versa.

**Table: 4.12**

#### **Analysis of Net Profit After Tax to Quick Assets**

(Rs in million)

Fiscal year	Net Profit After Tax (loss)	Quick Assets	Ratio (%)
2001	(51)	5352.7	(0.95)
2002	(860.7)	6263.9	(13.74)
2003	(1953.7)	6673.26	(29.28)
2004	(1760.3)	6835.4	(25.75)
2005	(1312.8)	7118.9	(18.44)
2006	(1267.8)	7640.5	(16.59)
2007	314.9	8824.52	3.57

2008	(1312.16)	9873.01	(13.29)
Total	(8203.56)	58582.19	(114.47)
Average	(1025.45)	7322.77	(14.31)

Note: Figures within brackets ( ) indicates negative amount.

(Source: Appendix I & II)

Above table shows that the ratio has been found dissatisfactory. The figures clearly indicate that utilized quick assets have not been earning profit in average rather incurring average loss of 1025.45 million.

All FYs ratio is of negative value except in 2008 ranging from the lowest of 0.95 to the highest of 29.28.

## 4.2 Analysis of the Data by "Statistical Tools":

### 4.2.1. Analysis of Dispersion in Cash and Bank Balance

In the below table 13 the dispersion in the cash balances at the year ends under study is shown. 'Standard deviation' is the measures of dispersion used for the analysis.

**Table: 4.13**

#### **Analysis of Dispersion in Cash and Bank Balance**

(Rs in million)

Fiscal year	Cash and Bank (X)	$(X - \bar{X})$	$(X - \bar{X})^2$
2001	1039.30	(43.9)	1927.21

2002	664.60	(418.6)	175225.96
2003	1076.15	(7.05)	49.70
2004	1036.42	(46.78)	2188.37
2005	1322.60	239.4	57312.36
2006	1258.60	175.4	40332.69
2007	1447.58	364.38	30765.16
2008	820.34	(262.86)	69095.38
Total	8665.59		376896.83
N=8	1083.20		

(Source: Appendix I)

$$\text{Mean } (\bar{X}) = \frac{\sum X}{N} = \frac{8665.59}{8} = 1083.20$$

$$\text{Standard Deviation} = \sqrt{\frac{1}{N} \sum (X - \bar{X})^2}$$

$$= \sqrt{\frac{376896.83}{8}}$$

$$= \text{Rs. } 217.05 \text{ million}$$

**Interpretation:**

Computed standard deviation has been found Rs 217.05 million, which indicates high degree of uniformity in holding cash balance in the fiscal year end.

Calculation of coefficient of variation (C.V) further shows that the uniformity of cash balances held is high.

$$\begin{aligned} \text{Coefficient of variation (C.V.)} &= \frac{s}{\bar{X}} \\ &= \frac{217.05}{1083.20} \times 100 \\ &= 20.04\% \end{aligned}$$

**Interpretation:**

Lower C.V. indicates higher consistency or highly stable cash balance where as higher C.V. indicates just the opposite. C.V. of 20.04% definitely signifies that holding cash balance is highly consistence and stable.

#### **4.2.2. Fitting the straight line trend by least square method for variations in cash and bank balance:**

This is one of the time series analyses, where future events of a variable (s) are forecasted over a regular interval of time based on the past events of the variables (s). Here, an effort has been made to forecast cash balance of NEA in future fiscal years, based on its past trend.

**Table: 4.14**

#### **Fitting the straight line trend by least square method for variations in Cash Balance**

(Rs in million)

Fiscal year	(Y) Cash and Bank	Deviation from (2004) (X)	XY	X <sup>2</sup>
2001	1039.30	-3	(3117.9)	9
2002	664.60	-2	(1329.2)	4
2003	1076.15	-1	(1076.15)	1
2004	1036.42	0	0	0
2005	1322.60	1	9	1
2006	1258.60	2	2517.2	4
2007	1447.58	3	4342.74	9

2008	820.34	4	3281.36	16
Total	8665.59	4	5940.65	44

(Source: Appendix I)

The equation of straight line trend is given by  $Y_c = a + bx$

$$\text{Here, } a = \frac{\sum Y}{N} = \frac{8665.59}{4} = 1083.20$$

$$b = \frac{\sum XY}{\sum X^2} = \frac{5940.65}{44} = 135.01$$

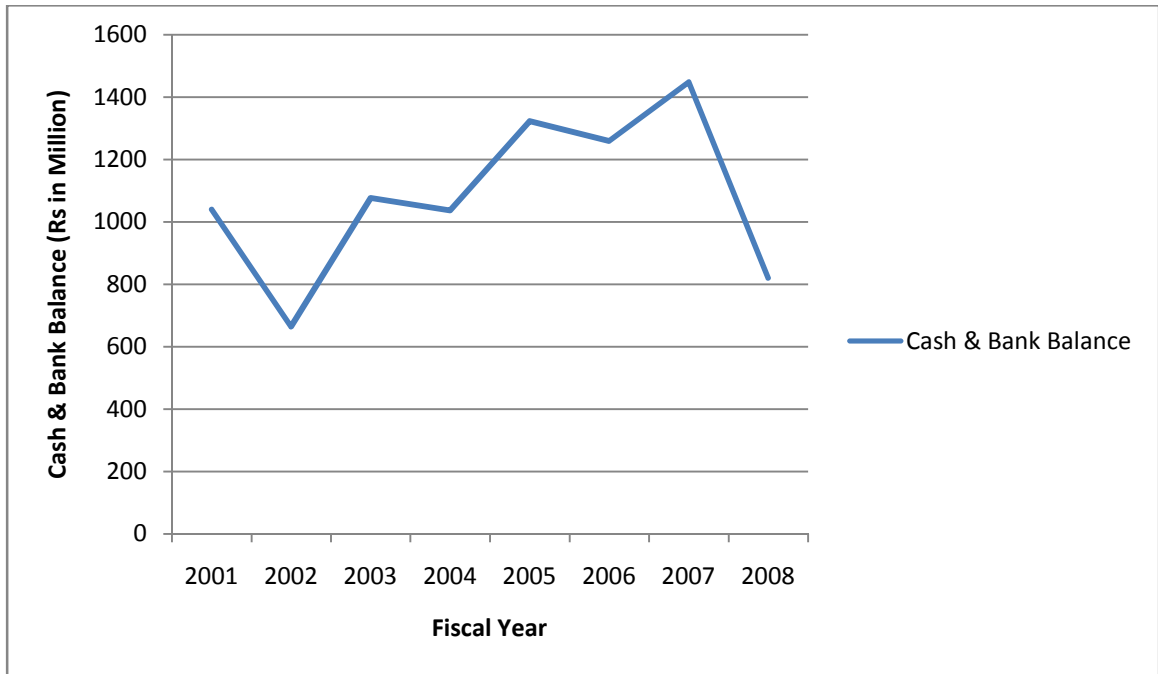
$$\begin{aligned} Y_c &= a + bx \\ &= 1083.20 + 135.01 X \end{aligned}$$

**Interpretation:**

The trend line shows positive figure of cash balance in future. The annual rate of cash balance has been calculated Rs  $135.01 \times 1000,000 = \text{Rs}135010000$

**Figure: 4.6**

**Trend Line for the variation in Cash Balance**



**4.2.3. (A) Analysis of Karl Pearson's coefficient of correlation (r) between Sales and Cash Balance:**

To find correlation between sales and cash balance, Karl Pearson's coefficient of correlation (r) is determined. For this purpose sales (x) are assumed to be dependence variables and cash balance (Y) are assumed to be independent variables. At first it is assumed that actual sales will increase as cash balance will increase and vice-versa. It means there should be positive correlation between cash balance and sales. The significance of correlation 'r' is rested with probable error (P.E.).

**Table 4.15**  
**Analysis of Karl Pearson's Coefficient of Correlation (r) between Sales and Cash Balance**

(Rs in Million)

Fiscal year	Sales (x)	Cash Balance (Y)	$(x - \bar{X}) (\mu)$	$(y - \bar{Y}) (v)$	$\mu v$	$\mu^2$	$v^2$
2001	8160.80	1039.30	(3878.72)	(43.9)	170275.81	15044468.84	1927.21
2002	9476.20	664.60	(2563.32)	(418.6)	1073005.75	6570609.42	175225.96
2003	11012.60	1076.15	(1026.92)	(7.05)	7239.79	1054564.69	49.70
2004	11874.70	1036.42	(164.82)	(46.78)	7710.28	27165.63	2188.37
2005	12605.20	1322.60	565.68	239.4	135423.79	319993.86	57312.36
2006	13331.90	1258.60	1292.38	175.4	226683.45	1670246.06	30765.16
2007	14449.73	1447.58	2410.21	364.38	878232.32	5809112.24	132772.78
2008	15405.03	820.34	3365.51	(262.86)	(884657.96)	11326657.56	69095.38
Total	96316.16	8665.59	0	(0.01)	1613913.23	41822818.30	469336.92

$$\text{Mean}(\bar{X}) = \frac{\sum X}{N} = \frac{96316.16}{8} = 12039.52$$

$$\text{Mean}(\bar{Y}) = \frac{\sum Y}{N} = \frac{8665.59}{8} = 1083.20$$

$$\begin{aligned} \text{Karl Pearson's Correlation (r)} &= \frac{\sum \mu v}{\sqrt{\sum \mu^2 \cdot \sum v^2}} \\ &= \frac{1613913.23}{\sqrt{(41822818.30)(469336.92)}} \\ &= 0.3643 \end{aligned}$$

This shows that there exists positive correlation between sales volume and cash balance.

The correlation should be statistically significant to ascertain that there practically exists correlation between the two variables. For this purpose, probable error has been calculated as follows:

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

$$= \frac{0.6745(1 \pm 0.3643^2)}{\sqrt{8}}$$

$$= 0.2068$$

$$6 \times (\text{P.E.}) = 6 \times 0.2068 = 1.2408$$

Now, if  $r > 6 (\text{P.E.})$ , it is indicative of statistically significant positive correlation.

Likewise, if  $r < 6 (\text{P.E.})$ , it is indicative of statistically insignificant positive correlation.

But in this case,  $\text{P.E.} < r < 6 (\text{P.E.})$ . i.e.  $0.2068 < 0.3643 < 1.2408$ . this implies, though there exists positive correlation between the two, no conclusion could be derived as to statistically significant/ insignificant. This shows that the company has not been practically following the general rule of higher sales volume, higher cash balance and vice-versa.

The upper and lower limits within which the correlation coefficient is expected to lie are given by;

$$r + \text{P.E.} = 0.3643 + 0.2068 = 0.5711 \text{ (upper limit)}$$

$$r - \text{P.E.} = 0.3643 - 0.2068 = 0.1574 \text{ (lower limit)}$$

So, the coefficient of correlation is expected to lie between 0.5711 and 0.1574 of sales and cash balance

#### **4.2.3. (B) Regression Analysis:**

A regression line can also be fitted to show the degree of relationship value of sales. For this purpose, cash balance and sales have been assumed interrelated economic variables.

The regression line of sales (X) on cash balance (Y) is given by,

$$(X - \bar{X}) X r \cdot \frac{\sum X}{\sum Y} (Y - \bar{Y})$$

Where,

$$\bar{X} = \text{Mean sales} = 96316.16$$

$$\bar{Y} = \text{Mean cash balance} = 8665.59$$

$\sigma_x$  = standard deviation of sales

$\sigma_y$  = Standard deviation of cash.

$r$  = Karl Pearson's coefficient of correlation = 0.3643

$$X = 8417.57 + 3.4390Y \text{ (From Appendix III)}$$

This equation shows that sales are estimated to increase by 3.4390 per unit increase in cash balance.

Likewise, the regression line of cash balance (Y) on sales (X) can be computed as follows.

$$(Y - \bar{Y}) Y r \cdot \frac{\sum Y}{\sum X} (X - \bar{X})$$

$$Y = 625.7 + 0.038X \text{ (From Appendix III)}$$

This shows that cash balance is estimated to increase by 0.038 units per increase in sales.

#### **4.2.4. (A) Analysis of Karl Pearson's coefficient of correlation (r) between Account Receivables and Cash Balance:**

To find out the correlation between account receivables and cash balance, Karl Pearson's coefficient of correlation (r) is determined. For this purpose account receivables and cash

balance are assumed to be interrelated economic variables. Let us assume receivables as 'X' are dependent variables and cash balance 'Y' are independent variables.

**Table: 4.16**  
**Analysis of Karl Pearson's Coefficient of Correlation between Account Receivables and Cash Balance**

(Rs in million)

Fiscal year	Receivables(X)	Cash Balance (Y)	(x- $\bar{X}$ ) ( $\mu$ )	(y- $\bar{Y}$ ) (v)	$\mu v$	$\mu^2$	$v^2$
2001	1678.50	1039.30	(2170.64)	(43.9)	95291.10	4711678.01	1927.21
2002	2284.90	664.60	(1564.24)	(418.6)	654790.86	2446846.78	175226
2003	3380.20	1076.15	(468.94)	(7.05)	3306.03	219904.72	49.70
2004	3735.71	1036.42	(113.43)	(46.78)	5306.25	12866.36	2188.37
2005	3697.70	1322.60	(151.44)	239.4	(36254.74)	22934.07	57312.36
2006	4088	1258.60	238.86	175.4	41896.04	57054.10	30765.16
2007	5151.41	1447.58	1302.27	364.38	474521.14	1695907.15	132772.78
2008	6776.70	820.34	2927.56	(262.86)	(769538.42)	8570607.55	69095.38
Total	30793.12	8665.59	0	(0.01)	469318.27	17737798.74	469336.96

$$\text{Mean } (\bar{X}) = \frac{X}{N} = \frac{30793.12}{8} = 3849.14$$

$$\text{Mean } (\bar{Y}) = \frac{Y}{N} = \frac{8665.59}{8} = 1083.20$$

$$\begin{aligned} \dots \text{ Karl Pearson's Correlation (r)} &= \frac{\sum \mu v}{\sqrt{\sum \mu^2 \cdot \sum v^2}} \\ &= \frac{469318.27}{\sqrt{(17737798.74)(469336.96)}} \\ &= 0.163 \end{aligned}$$

This shows that there exists positive correlation between account receivable and cash balance.

Since, correlation r is positive in order to compare it with probable error r has been calculated as follows.

$$r = 0.163$$

Now,

Calculation of probable error (P.E.)

$$\begin{aligned} \text{P.E.} &= \frac{0.6745(1 Z r^2)}{\sqrt{N}} \\ &= \frac{0.6745(1 Z 0.163^2)}{\sqrt{8}} \\ &= 0.232 \\ 6(\text{P.E.}) &= 6 \mid 0.232 \\ &= 1.392 \end{aligned}$$

Now, if  $r > 6$  (P.E), it is indicative of statistically significant positive correlation.

Likewise, if  $r < 6$  (P.E), it is indicative of statistically insignificant positive correlation.

Here,  $r < 6$  (P.E), so there is a statistically insignificant positive correlation between Account receivables and cash & bank balance.

The upper and lower limits within which the correlation coefficient is expected to lie are given by;

$$r + \text{P.E} = 0.163 + 0.232 = 0.395 \text{ (Upper Limit)}$$

$$r - \text{P.E} = 0.163 - 0.232 = -0.069 \text{ (Lower Limit)}$$

So, the correlation coefficient is expected to lie between 0.163 and 0.395.

#### 4.2.4. (B): Regression Analysis:

A regression line can also be fitted to show the degree relationship between account receivables and cash balance.

The regression line of receivable (X) on cash balance (Y) is given by,

$$(X - \bar{X}) = r \cdot \frac{\uparrow X}{\uparrow Y} (Y - \bar{Y})$$

Where,

$$\bar{X} = \text{Mean receivables} = 3849.14$$

$$\bar{Y} = \text{Mean Cash balance} = 1083.20$$

$\uparrow x$  = standard deviation of receivables

$\uparrow y$  = Standard deviation of cash balance

$r$  = Karl Pearson's coefficient of correlation = 0.163

Now,

$$(X - \bar{X}) = r \cdot \frac{\uparrow x}{\uparrow y} (Y - \bar{Y})$$

$$\dots X = 2763.77 + 1.002Y \quad (\text{From Appendix IV})$$

This equation shows that receivables are estimated to increase by 1.002 per unit increase in cash balance.

Likewise, the regression line of cash balance (Y) on receivables (X) can be computed as follows.

$$(Y - \bar{Y}) = r \cdot \frac{\uparrow y}{\uparrow x} (X - \bar{X})$$

$$\dots Y = 0.0265X + 981.2 \quad (\text{From Appendix IV})$$

This shows that cash balance is estimated to increase by 0.0265 per unit increase in receivable.

**4.2.5. Analysis of Karl Pearson’s coefficient of correlation (r) between “Current Assets and Cash Balance”:**

To find out the correlation between current assets and cash balance, Karl Pearson’s coefficient of correlation (r) is determined. For this purpose current assets and cash balance are assumed to be interrelated economic variables. Let us assume current assets as ‘X’ are dependent variables and cash balance ‘Y’ are independent variables.

**Table: 4.17**  
**Analysis of Karl Pearson’s Coefficient of Correlation (r) between Current Assets and Cash Balance**

(Rs in million)

Fiscal Year	Current assets(X)	Cash Balance (Y)	$(x - \bar{X}) (\mu)$	$(y - \bar{Y}) (v)$	uv	$u^2$	$v^2$
2001	6313.60	1039.30	(2237.75)	(43.9)	98237.22	5007525.06	1927.21
2002	7322	664.60	(1229.35)	(418.6)	514605.91	1511301.42	175225.96
2003	7690.48	1076.15	(860.87)	(7.05)	6069.13	741097.16	49.70
2004	7883.41	1036.42	(667.94)	(46.78)	31246.23	446143.84	2188.37
2005	8491.60	1322.60	(59.75)	239.4	(14304.15)	3570.06	57312.36
2006	8995.30	1258.60	443.95	175.4	77868.83	197091.60	30765.16
2007	10322.97	1447.58	1771.62	364.38	645542.90	3138637.42	132772.78
2008	11391.46	820.34	2840.11	(262.86)	(746551.31)	8066224.81	69095.38
Total	68410.82	8665.59	0.02	(0.01)	612714.76	19111591.37	469336.92

$$\text{Mean } (\bar{X}) = \frac{X}{N} = \frac{68410.82}{8} = 8551.35$$

$$\text{Mean } (\bar{Y}) = \frac{Y}{N} = \frac{8665.59}{8} = 1083.20$$

$$\dots \text{ Karl Pearson's Correlation (r)} = \frac{\sum uv}{\sqrt{\sum u^2 \cdot \sum v^2}}$$

$$\begin{aligned}
&= \frac{612714.76}{\sqrt{(19111591.37) * (469336.92)}} \\
&= 0.2046
\end{aligned}$$

This shows that there exists positive correlation between current assets and cash balance. But according to the theory increase in current asset should be followed by a decrease in cash balance and vice –versa. So, the above calculation of NEA is not applicable according to the theory. The correlation should be statistically significant to ascertain that there practically exists correlation between the two variables. For this purpose, probable error has been calculated as follows.

$$\begin{aligned}
\text{Probable Error (P.E)} &= \frac{0.6745(1 Z r^2)}{\sqrt{N}} \\
&= \frac{0.6745(1 Z 0.2046^2)}{\sqrt{8}} \\
&= 0.2285 \\
6 \times (\text{P.E}) &= 6 * 0.285 = 1.371
\end{aligned}$$

Now, If  $r > 6 (\text{P.E})$ , it is indicative of statistically significant positive correlation.

Likewise, If  $r < (\text{P.E})$ , it is indicative of statistically insignificant positive correlation.

Here,  $r < (\text{P.E})$ , which shows that there exist an insignificant positive correlation between current assets and cash & bank balance.

The upper and lower limits within which the correlation coefficient is expected to lie are given by,

$$r + \text{P. E} = 0.2046 + 0.2285 = 0.4331 \text{ (Upper Limit)}$$

$$r - \text{P. E} = 0.2046 - 0.2285 = -0.0239 \text{ (Lower Limit)}$$

So, the coefficient of correlation is expected to lie between 0.4331 and -0.0239.

#### 4.2.6. Analysis of Karl Pearson's Coefficient of Correlation (r) between “Current Liabilities and Cash Balance”:

To find-out the correlation between current liabilities and cash balance, Karl Pearson's coefficient of correlation (r) is determined. For this purpose current liabilities and cash balance are assumed to be interrelated economic variables. Let us assumed current liabilities as ‘X’ are dependent variables and cash balance ‘Y’ are independent variables.

**Table: 4.18**  
**Analysis of Karl Pearson's Coefficient of Correlation (r) between Current Liabilities and Cash Balance**

(Rs in Million)

Fiscal year	Current Liabilities (X)	Cash (Y)	$(x - \bar{X}) (\mu)$	$(y - \bar{Y}) (v)$	$\mu v$	$\mu^2$	$v^2$
2001	5070.8	1039.30	(6676.88)	(43.9)	293115.03	44580726.53	1927.21
2002	4703.9	664.60	(7043.78)	(418.6)	2948526.31	49614836.69	175225.96
2003	7444.8	1076.15	(4302.88)	(7.05)	30335.30	18514776.29	49.70
2004	9707.7	1036.42	(2039.98)	(46.78)	95430.26	4161518.4	2188.37
2005	12619.8	1322.60	872.12	239.4	208785.53	760593.29	57312.36
2006	14995.5	1258.60	3247.82	175.4	569667.63	10548334.75	30765.16
2007	17970.11	1447.58	6222.43	364.38	2267329.04	38718635.1	132772.78
2008	21468.82	820.34	9721.14	(262.86)	(2555298.86)	94500562.9	69095.38
Total	93981.43	8665.59	(0.01)	(0.01)	3857890.24	261399984	469336.92

$$\text{Mean } (\bar{X}) = \frac{\sum X}{N} = \frac{93981.43}{8} = 11747.68$$

$$\text{Mean } (\bar{Y}) = \frac{\sum Y}{N} = \frac{8665.59}{8} = 1083.20$$

$$\begin{aligned}
 \dots \text{Karl Pearson's Correlation (r)} &= \frac{\sum xy}{\sqrt{\sum x^2 \cdot \sum y^2}} \\
 &= \frac{3857890.24}{\sqrt{(261399984 * 469336.92)}} \\
 &= 0.3483
 \end{aligned}$$

Since, correlation coefficient is positive, it indicates that there exists positive correlation between current liabilities and cash balance.

As correlation r is positive, in order to compare it with probable error (P.E), r has been calculated as follows.

$$r = 0.3483$$

Calculation of probable error (P.E)

$$\begin{aligned}
 \text{Probable Error (P.E)} &= \frac{0.6745(1 Z r^2)}{\sqrt{N}} \\
 &= \frac{0.6745(1 Z 0.3483^2)}{\sqrt{8}} \\
 &= 0.2095
 \end{aligned}$$

$$6 \times (\text{P.E}) = 6 * 0.2095 = 1.257$$

Now, if  $r > 6(\text{P.E})$ , it is indicative of statistically significant positive correlation. Likewise, if  $r < 6(\text{P.E})$ , it is indicative of statistically insignificant positive correlation.

But in this case,  $\text{P.E} < r < 6(\text{P.E})$  i.e.  $0.2095 < 0.3483 < 1.257$ . This implies, though there exists positive correlation between the two, no conclusion could be derived as to statistically significant/insignificant.

Upper and lower limit within which the correlation coefficient is expected to lie is given by.

$$r + P.E = 0.3483 + 0.2095 = 0.5578 \text{ (Upper Limit)}$$

$$r - P.E = 0.3483 - 0.2095 = - 0.1388 \text{ (Lower Limit)}$$

Hence, the correlation coefficient is expected to lie between 0.5578 and 0.1388.

**4.2.7. Analysis of Karl Pearson's Coefficient of Correlation (r) between “Net profit After Tax and Cash Balance”:**

To find-out the correlation between net profit after tax and cash balance, Karl Pearson’s coefficient of correlation (r) is determined. For this purpose, Net profits after tax and cash balance are assumed to be interrelated economic variables. Let us assumed Net profit after tax as ‘X’ are dependent variables and cash balance ‘Y’ are independent variables.

**Table: 4.19**  
**Analysis of Karl Pearson's Coefficient of Correlation (r) between Net profit After Tax and Cash Balance**

(Rs in million)

Fiscal Year	Net Profit After Tax(X)	Cash Balance (Y)	(X-X) (u)	(y-Y) (v)	uv	u <sup>2</sup>	v <sup>2</sup>
2001	(51)	1039.30	974.44	(43.9)	(42777.92)	949533.31	1927.21
2002	(860.7)	664.60	164.745	(418.6)	(68962.26)	27140.91	175225.96
2003	(1953.7)	1076.15	(928.25)	(7.05)	6544.16	861648.06	49.70
2004	(1760.3)	1036.42	(734.85)	(46.78)	34376.28	540004.52	2188.37
2005	(1312.8)	1322.60	(287.35)	239.4	(68791.59)	82570.02	57312.36
2006	(1267.8)	1258.60	(242.35)	175.4	(42508.19)	58733.52	30765.16
2007	314.9	1447.58	1340.35	364.38	488396.73	1796538.12	132772.78
2008	(1312.16)	820.34	(286.71)	(262.86)	75364.59	82202.62	69095.38
Total	(8203.56)	8665.59	0.025	(0.01)	(211226.32)	4398371.08	469336.92

$$\text{Mean } (\bar{X}) = \frac{\sum X}{N} = \frac{8203.56}{8} = 1025.45$$

$$\text{Mean } (\bar{Y}) = \frac{Y}{N} \times \frac{8665.59}{8} \times 1083.20$$

$$\begin{aligned} \dots \text{ Karl Pearson's Correlation } (r) &= \frac{\sum xy}{\sqrt{\sum x^2 \cdot \sum y^2}} \\ &= \frac{(211226.32)}{\sqrt{4398371.08 * 469336.92}} \\ &= -0.1470 \end{aligned}$$

Since, correlation coefficient is negative, it indicates that there exists negative correlation between net profit after tax and cash balance.

As correlation (r) is negative, in order to compare it with probable error (P.E), |r| has been calculated as follows.

$$|r| = |-0.1470| = 0.1470$$

$$\begin{aligned} \text{Probable Error (P.E)} &= \frac{0.6745(1 Z r^2)}{\sqrt{N}} \\ &= \frac{0.6745(1 Z 0.1470^2)}{\sqrt{8}} \\ &= 0.2333 \end{aligned}$$

$$6 \times (\text{P.E}) = 6 \times 0.2333 = 1.400$$

Since, |r| = 0.1470, which is lower than probable error (P.E) = 0.2333, i.e. |r| < P.E, it indicates that negative correlation between these two variables is not practically significant. In other words, when cash balances held decrease, the net profit after tax increase, and vice-versa.

The upper and lower limits within which the correlation coefficient is expected to lie are given by;

$$r + P.E = -0.1470 + 0.2333 = 0.0863 \text{ (Upper Limit)}$$

$$r - P. E = -0.1470 - 0.2333 = -0.3803 \text{ (Lower Limit)}$$

So, the coefficient of correlation is expected to lie between 0.0863 and -0.3

### **4.3 Major Finding of the Study:**

Basically, in this research work, all data has been obtained from secondary sources. Data has been analyzed by using financial & statistical tools. The study mainly focuses on two objectives. First one is to determine the liquidity position. Similarly, second objective is to determine profitability of NEA. The major finding of the study derived from the analysis of financial and statistical tools of NEA are given below:

#### **(1) Liquidity position of NEA**

- The cash and bank balance shows greater fluctuation in FY 2001, 2002 and 2003 but after FY 2003, fluctuation was quite low in comparison to the previous FYs. And again in the last year there is a great fluctuation. Holding of optimum cash and bank balance is the rational cash management practice of a business firm. There is lower coefficient of variation of NEA which signifies that holding cash balance is highly consistence and stable. The trend line shows positive figure of cash balance in future.

- In case of cash turnover ratio, due to the unavailability of information regarding credit policy of the company the credit days allowed its debtors was not known. So, no peruse analysis could be carried out for cash turnover cycle. Karl Pearson's Correlation shows that there exists positive correlation between the two i.e. cash or sales. But according to PE, no conclusion could be derived as to statistically significant/ insignificant.
- In case of current ratio, the ratios in FY 2001, 2002 and 2003 are near about 2:1 which are satisfactory and in 2004, 2005, 2006, 2007 and 2008 all of the ratios are below 1:1 which indicates that the NEA does not have a sound or satisfactory liquidity position.
- In case of quick ratio, in FY 2001 and 2002 the ratios are satisfactory for the company but in FY 2003, 2004,2005, 2006,2007 and 2008 the ratios are below the standard ratio and unsatisfactory for the company
- In case of receivable turnover ratio, Since the information regarding credit days extended to customers are not available, and moreover, such credit days are likely to vary depending upon the nature of debtors, there is no absolute means of comparison available to compare the average collection days.

➤ In case of inventory turnover ratio, the highest ratio is in FY 2004 which indicates better inventory management and better liquidity position. Similarly, in FY 2003 and 2008 also the ratios are high which indicate the better liquidity position. The lowest ratio is in FY 2001 which indicates poor inventory management and poor liquidity position.

:

➤ In case of analysis of cash and bank balance to account receivable ratio .The percentage of account receivable is highest in FY 2001 (61.92%).This shows that the liquidity position is good in FY 2001. But the % of A/C receivable in 2008 is 12.10 which is the lowest percent, this shows the liquidity position is not good. Analysis of Karl Pearson's coefficient of correlation between Account receivables and cash balance shows there is positive relation. But according to PE, no conclusion could be derived as to statistically significant/ insignificant.

➤ In case of analysis of cash and bank balance to current assets, the company has undergone cash scarcity to meet short-term payments during the all FY. Analysis of Karl Pearson's coefficient of correlation ( $r$ ) between current Assets and cash balance shows positive correlation. But according to PE, no conclusion could be derived as to statistically significant/ insignificant. This shows that the company has not been practically following the general rule of higher current-assets, higher cash balance and vice-versa.

- In case of analysis of cash and bank balance to current liabilities the company is unable to meet its payment of current liabilities in time. Analysis of Karl Pearson's coefficient of correlation (r) between 'current liabilities and cash balance shows the positive correlation. But according to PE, no conclusion could be derived as to statistically significant/insignificant.

**(2) Profitability position of NEA.**

- Analysis of net profit margin which shows the relation between net profit and sales. The ratios are all negative except in one FY i.e. in 2007 which indicate the company has been operating under loss in all of the FYs. Analysis of Karl Pearson's coefficient of correlation (r) between Net profit of tax and cash balance shows positive correlation. But according to PE, no conclusion could be derived as to statistically significant / insignificant.
- Analysis of return on working capital, all the ratios are in negative figure in every FY except in one FY i.e. in 2007. The company has not been utilizing its current assets effectively in earning profit. Overall, the return on working capital is disappointing indicating down fall of the company.

- Analysis of net profit after tax to quick assets, from FY 2001 to 2008 all ratios are negative except in FY 2008. The figures clearly indicate that utilized quick assets have not been earning profit in average rather incurring average loss.

## **Chapter V**

### **SUMMARY, CONCLUSION**

### **& RECOMMENDATION**

This is the final chapter that involves summary, conclusion and recommendation of the research work. The fact and findings from secondary data analysis are presented in this chapter. Beside summarizing and concluding research work, recommendations are made to concerned persons and organization.

#### **5.1 Summary**

The perception of the government and its role in public welfare has helped to establish public enterprises engaged in public utilities. Role of the government owned enterprises is supposed to be undermined in the present context of worldwide privatization, liberalization and globalization. But in developing country like Nepal where private sector is not strong

and in sound position to provide public utilities to the people, public utility concern's role can not be undermined.

Though Nepal is rich in water resources, we Nepalese people are in the condition of "shadow under light". There is consensus that development of its abundant water resources could largely benefit the nation. Though hydro-electric potentiality of Nepal is 83000 M.W, only about 544 M electricity is generated including from diesel and multifuel plant. Many changes are taking place in the power sector in the concept of competition, choice in the process of commercialization and management are being changed. In such situation, the proper utilization and management of our available water resources is essential for the all round development of the nation. In this regard, Nepal electricity authority is only an institution engaged for the development of power sector of our country. Sound and effective management of NEA is essential for the better utilization of available water resources of the country.

NEA has a challenge to operate in a manner that improves the key business processes, maximizes the revenue generation and profitability of the organization. The commercial goals of NEA should also be financially viable, fully autonomous, and accountable and majority owned government business entity. In this sense, this study is conducted to identify whether some of the theories of cash management are applicable or not in the Nepalese public enterprise. For this reason brief introduction about public enterprises, public enterprises in Nepal, role and objectives of PEs, historical background of NEA, cash management which is the most important part of company, statement of problem,

objectives , scope and limitation of the study, plan of study and so on are made in first chapter.

In second chapter, theoretical review as well as review of previous research has been made. And so on are reviewed on that chapter .Different views about cash management, function of cash management, efficiency, different techniques, of cash management And so on are reviewed on that chapter. Determining the optimum cash balance, motives for holding cash where precautionary motives, transaction motives, speculative motives are reviewed. And lastly Government publications are also reviewed.

In third chapter, there is research methodology which will be helpful for the fourth chapter in data presentation and analysis. Out of the total financial system one service Enterprise is chosen for a research purpose, mainly financial tools & statistical tools are set for the analysis.

Lastly on fourth chapter, collected data are presented in tabular and graphic form and analyzed using various financial tools like Cash & Bank Balance, Cash Turnover Ratio, Current Ratio, Quick Ratio, Receivable Turnover Ratio, Cash & Bank Balance to Account Receivable, Cash & Bank Balance to Current Assets and Current Liabilities, Inventory Turnover Ratio, Return on Working Capital Ratio, Net Profit Margin Ratio, Net profit after Tax to Quick Assets and statistical tools like Mean ,Standard Deviation, Correlation Coefficient, Covariance, Probable Error. These all are analyzed whether or

not the relationship between variables matches with the theories that have been studied on literature review part.

## **5.2 Conclusion**

Based on the above summary and findings of the research, following conclusion can be point out after detail analysis of cash management. In conclusion, it can be said that cash management is an important part of the financial decision making variable. Many factors or determinants such as nature of business, level of sales, credit terms, quality of customers, economic condition etc have to be considered in cash management. Apart from the level of purchase, method of creating cash management, establish of credit terms, types of credit policy, motives for holding cash, efficiency of cash management, different technique of cash management etc. are to be considered.

- ❖ The cash and bank balance shows greater fluctuation in FY 2001, 2002, 2003 and 2008 but in other remaining FY, fluctuation was quite low in comparison to the previous FYs. Holding of optimum cash and bank balance is the rational cash management practice of a business firm. There is lower coefficient of variation of NEA which signifies that holding cash balance is highly consistence and stable. The trend line shows positive figure of cash balance in future.

- ❖ In case of cash turnover ratio, the highest cash turnover ratio is 18.78 where the cash conversion period is 19.44 days. And the lowest cash turnover ratio is 7.85 where the cash conversion day is 46.48. Due to the unavailability of information regarding credit policy of the company the credit days allowed its debtors was not known. So, no peruse analysis could be carried out for cash turnover cycle. Analysis of Karl Pearson's Correlation shows that there exists positive correlation between the two i.e. cash or sales. But according to PE, no conclusion could be derived as to statistically significant/ insignificant. Correlation coefficient between cash and bank balance and sales being positive of 0.3643 and the relation  $P.E < r < 6$  (P.E), suggested statistically inconclusive positive correlation as to significant/ insignificant, showing little complicity of cash and bank balance with sales variable.
  
- ❖ In case of current ratio, the ratios in FY 2001, 2002 and 2003 are near about 2:1 which are satisfactory and in 2004, 2005, 2006, 2007 and 2008 all of the ratios are below 1:1 which indicates that the NEA does not have a sound or satisfactory liquidity position.
  
- ❖ In case of analysis of cash and bank balance to account receivable ratio .The percentage of account receivable is highest in FY 2001 (61.92%).This shows that the liquidity position is good in FY 2001. But the % of A/C receivable in 2008 is 12.10 which is lowest percent, this

shows the liquidity position is not good. Analysis of Karl Pearson's coefficient of correlation between Account receivables and cash balance shows there is positive relation i.e. 0.163 which suggests increase in Cash and Bank balance follows increase in Account receivable and vice versa which is theoretically not match . It proves that in practical theory in not apply. But according to PE, no conclusion could be derived as to statistically significant/ insignificant.

- ❖ Proportion of Cash and Bank balance in its current assets is very small and the cash balance held shown positive relation to the amount of current assets of RDL. Average ratio of Cash and Bank to Current Assets is 1.58%, which is very small portion of cash in current assets. Correlation coefficient between the two is 0.2046
  
- ❖ NEA has not been precisely meeting its current liabilities payment: In case of analysis of cash and bank balance to current liabilities, The company being unable to meet its payment of current liabilities in time. This is yet another indication of mismanagement of cash. The highest ratio of cash and bank to current liabilities is 20.50% excess cash and bank balance compared to current liabilities in FY 2001 and the lowest ratio 3.82 in FY 2008. Analysis of Karl Pearson's coefficient of correlation (r) between current liabilities and cash balance is 0.3483 shows the positive

correlation. But according to PE i.e. 0.2095 and 6PE is 1.257 which indicate  $PE < r < 6PE$ , no conclusion could be derived as to statistically significant/insignificant.

- ❖ A large portion of NEA's current assets has been tied-up in the most illiquid asset; i.e. inventory:
  
- ❖ The cross examination of the liquidity position suggested that current assets have been tied-up in slow moving and unsalable inventories. Analyses show that the average current ratio was found to be dissatisfying and calculated to be 0.88:1, which is lower than the conventionally accepted current ratio of 2:1. The average quick ratio was also found to be dissatisfying and calculated to be 0.75:1, which is lower than the conventionally accepted quick ratio of 1:1. This indicated the possibility of current assets being tied-up in slow moving and unsalable inventories.
  
- ❖ Current assets and Quick assets are not being maintained accordance with current liabilities: Current assets are not maintained in the accepted pattern of i.e. increase in current assets following increase in current liabilities and vice-versa. Likewise, neither the quick assets has been maintained in the accepted pattern of i.e., increase in quick assets followed by increase in current liabilities and vice-versa.

- ❖ Profitability of NEA being in worsening trend, liquidity does not practically increase with increase in profitability and vice-versa: Average Net profit Margin Ratio i.e. average ratio of Net profit after tax to sales in – 8.56%; Average ratio of Net profit after tax to current assets is -12.29%; and Average ratio of Net profit after tax to Quick assets is – 14.31%. These analyses indicate that profitability position of NEA is worsening in an alarming rate

Conclusively, it can be stated that NEA's cash management is very poor. Liquidity position is dissatisfactory, Negative profitability of the company adds much to the worsening financial position of the company. The accumulated amount of account receivable which is increasing year by year denotes the inefficiency of the authority to collect its revenue in time. There is the absence of effective utilization of capital employed and liquidity position is also not satisfactory. The authority fails to analyze its strength and weaknesses in depth. Because of the absence of the competitors, authority has become monopolistic and, hence, it is not alert towards its possible threats and opportunities. Different statistical tools show the positives relationship with two variables like cash and sales, cash and account receivable, current assets and cash, current liabilities and cash. The authority is not able to maintain a proper co-ordination among various directorates in regards of the goals, objectives and strategies of the organization. The authority has been facing some problems in cash management. Management has the lack of adequate knowledge about the following facts nature and content of cash management. So, there is the necessity of change in the management system of the

authority. Besides, cash management being one of the important elements in financial function, there are other numerous aspects of finance involved in the overall financial performance of the company. In addition to this, the overall performance of the company counts for other managerial aspects such as; human resource management, organizational structure, markets management etc. However, above all disappointing down-falling trend of the financial position is indicative of the fact that NEA should immediately seek for drastic change in its managerial structure. So far cash management is concerned, the recommendations suggested above could, to a greater extent, uplift NEA's cash management situation.

### **5.3 Recommendation**

Suggestion is the output of the whole study. It helps to take corrective action in their activities in future. Different analysis were done till arrive this step. On the basis of above analysis, findings of the study, summary and conclusion, following suggestions may be referred to overcome weakness, inefficiency. The following suggestions are recommended to improve the formulation and implementation of cash management system of NEA.

- ❖ NEA must follow the definite policy regarding the amount of cash to hold each fiscal year.
  
- ❖ The liquidity position is not satisfactory. So it should be corrected.

- ❖ NEA should develop efficient system of revenue collection. It should make well defined rules and regulations in regard of revenue collection and if the customer of any category delays or denies, it should be charged penalty. In revenue collection, any kind of pressure and biases should strictly be undermined. Huge amount of account receivable especially of Municipality, metropolis, sub-metropolis consumed in street lights should be managed and receivable can be collected by imposing its expenditures to the neighboring community people.
  
- ❖ The enterprise should be well familiar with its strengths and weaknesses and it should not be indifferent about its competitors. Because of the liberalized economic policy of the government. That's why the enterprise should be aware of effective corporate planning system and strategic management. Hence, a systematic approach should be developed towards comprehensive cash management. This can considerable contribute to increase the profitability of the NEA
  
- ❖ The company should have suitable credit policy to handle the cash management effectively. It should adopt liberal credit policy to increase the sales. Next, it should adopt strength credit policy especially for its staffs and workers for effective credit and collection performance as low

total receivable. One of the reasons of lower turnover and high collection period arise due to more advances to company's employees.

- ❖ NEA should try to maximize its operating profit. For this, cost control program can be launched in one respect and the alternative for the replacement of long term loans should be searched.
- ❖ The installed capacity of NEA should be utilized fully. If it utilizes its full capacity, the operating expenses will down.
- ❖ Highly qualified, dynamic, energetic and skilled manpower inventory should be made available by the authority and staffs should be property and unwisely trained and motivated.
- ❖ There is inadequate electricity in the time of peak demand which creates the problem of load shedding and there is surplus of electricity in the rainy season due to the sufficient flow of water which helps to generate more. It is due to the lack of proper management and planning. This problem can be solved timely.
- ❖ Tariff rate for internal sales and external sales should be made equal so that all types of consumer can be benefited.

- ❖ There should be timely evaluation of strengths and weaknesses. Different aspects such as managerial involvement, organizational adoption, responsibility accounting, full communication, realistic expectations, time dimensions, flexible application, behavioral point of view and follow up programs should be made more effective, productive and result oriented for the successful operation of the organization.

## BIBLIOGRAPHY

### Books:

Banarjee, Bhabatosh, (1982) “*A Practical Approach*”, Kolkata: The world Press

Chaudhary, Arun Kumar and Pant, G.D, (2053) “*Statistical Methods*”, Kathmandu: Nepal Sahitya Prakashan Kendra.

Fred, J.and Copeland, Thomas E, (2002) “*Corporate Managerial Finance*”, U.S.A: A Harcourt Brace Jovanovich College Publisher.

Khan, M.Y and Jain, P.K, (1986) “*Financial Management*”, New Delhi: Tata McGraw –Hill Publishing Company Limited.

Khan, M.Y and Jain, P.K, (2006) “*Cost Accounting & Financial Management*”: 2<sup>nd</sup> edition, New Delhi: Tata McGraw –Hill Publishing Company Limited.

Levin, Richard I and Rubin, David S, (2002) “*Statistical for Management*”:7<sup>th</sup> edition, New Delhi: Prentice Hall of India

Pandey, I.M, (1999) “*Financial Management*”, New Delhi: Vikash Publication.

Shrestha, Purneshwor, (1990) “*Public Enterprises Management in Nepal*”, Kathmandu: Ratna Pustak Bhandar

Shrestha, M. K, (1980) “*Financial Management: Theory and Practices*”, Kathmandu: T.U.

Van Horne, James.C, (1974),”*Corporate Financial Management*”, New Delhi: Prentice Hall of India Pvt.Ltd.

-----, (1974).”*Financial Management Policy*”, New Delhi: Prentice Hall of India Pvt. Ltd.

Weston, J. Fred and Copland, Thomas E, (1992) “*Managerial Finance*”, U.S.A: A Harcourt Brace Jovanovich College Publisher.

Wolff, Howard K. and Pant, P.R, (2002) “*Social Science Research and Thesis Writing*”, Kathmandu: Buddha Academic Enterprises Pvt. Ltd.

### **Journals, Report and Articles**

Baumol, W.J. (1952) “*The Transaction Demand for Cash: An Inventory Theoretic Approach*”, *Quarterly Journal of Economics* .New Delhi: Prentice Hall of India LXV: 545-556

Miller, M.H. and Orr, D, (1966) “*Model of the Demand for Money in Firm*”, *Quarterly Journal of Economics*. U.K: Oxford University Press.LXY: 413-35

### **Thesis**

- Acharya, Yagna Prasad, (2003) “*Cash Management Practices of Manufacturing Companies in Nepal*”, Kathmandu: Tribhuvan University.
- Bajracharya, Subarna Lal, (1990) “*Cash Management in Nepalese Public Enterprises*”, Delhi-110007: University of Delhi.
- Banarjee, Manoj Kumar, (2005) “*Inventory Management of Manufacturing Public Enterprises in Nepal*”, Kathmandu: Tribhuvan University.
- Dhungana, Puja, (2008) “*A study of cash management in Nepalese public Enterprises, A case study of Nepal Electricity Authority*”, Kathmandu: Tribhuvan University.
- Joshi, Kamal Raj, (2004) “*Revenue Planning and Cash Management of Nepal Electricity Authority*”, Kathmandu: Tribhuvan University.
- Kunwar, Naresh, (2000) ‘*A Study on Working Capital Management of Pharmaceutical Industry of Nepal with Special Reference to Royal Drugs*’, Kathmandu: Tribhuvan University
- Koirala, Pradeep, (2006) “*Cash Management of Nepal Telecom Limited*”, Kathmandu: Tribhuvan University.
- Pradhan, Bijay, (1997) “*A Study of Cash Management of Salt Trading Corporation Limited*”, Kathmandu: Tribhuvan University.
- Pradhan, R.S and Koirala, (1982) “*Aspect of Working Capital Management and Nepalese Corporation*”, Kathmandu: Tribhuvan University.

Sainju, Sabin Prakash, (2003) “*Cash Management in Nepalese Public Enterprises, A case study of Royal Drugs Limited*”, Kathmandu: Tribhuvan University.

## **Websites**

[www.nea.org.np](http://www.nea.org.np) (28 September, 2009)

Appendix I

BALANCE SHEET AS ON JULY 15, 2008

(NRs in Million)

<b>Particulars</b>	<b>2008*</b>	<b>2007</b>	<b>2006</b>	<b>2005</b>	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>
Capital & Liabilities								
Capital & Reserve								
Share Capital	28414.99	26382.18	23113.10	20161.80	18215.85	16976.87	16601.30	15360.30
Reserve & Accumulated profit	(6114.88)	(4802.72)	(5545.32)	(4294.14)	(2997.69)	(1269.87)	696.51	1626.96
Secured long term loan	52762.18	47616.15	46487.91	44537.51	41103.14	39637.11	37325.61	36707.50
<b>Grand Total</b>	<b>75062.29</b>	<b>69195.61</b>	<b>64055.69</b>	<b>60405.17</b>	<b>56321.30</b>	<b>55344.11</b>	<b>54623.42</b>	<b>53694.76</b>
<b>Assets</b>								
Property, Plant & Equipment	52294.10	51781.76	51743.38	52166.56	51415.14	50094.75	51080.91	28238.26
capital Work in Progress	35930.74	29145.19	21991.50	16060.40	10619.55	8655.48	4837.80	23640
Investment	1602.05	882.05	819.90	777	731.01	613.01	553	517.10
<b>Sub Total</b>	<b>89826.89</b>	<b>81809</b>	<b>74554.78</b>	<b>69003.96</b>	<b>62747.70</b>	<b>59363.24</b>	<b>56471.71</b>	<b>52395.36</b>
<b>Current Assets</b>								

Inventories	1518.45	1498.45	1354.80	1372.70	1048.01	1017.22	1058.10	960.90
Sundry Debtors & Other Receivables	6776.70	5151.41	4088	3697.70	3735.71	3380.20	2284.90	1678.50
Cash & Bank Balance	820.84	1447.58	1258.60	1322.60	1036.42	1076.15	664.60	1039.30
Prepaid, Advances, Loan & Deposits	2275.47	2225.53	2293.90	2098.60	2063.27	2216.91	3314.40	2634.90
<b>Total Current Assets</b>	<b>11391.46</b>	<b>10322.97</b>	<b>8995.30</b>	<b>8491.60</b>	<b>7883.41</b>	<b>7690.48</b>	<b>7322</b>	<b>6363.60</b>
<b>Less: Current Liabilities &amp; Provision</b>								
Sundry Creditors & Payables	25617.71	2219	19144.39	16768.69	13856.61	11593.69	8852.79	5070.80
Provision	813.13	693.13	709.80	697.70	681.48	753.31	1244.20	1042.90
<b>Total Current Liabilities &amp; Provision</b>	<b>26430.84</b>	<b>22812.13</b>	<b>19854.19</b>	<b>17466.39</b>	<b>14538.09</b>	<b>1247</b>	<b>10096.99</b>	<b>6113.70</b>
<b>Net Current Assets</b>	<b>(15039.38)</b>	<b>(12489.16)</b>	<b>(10858.89)</b>	<b>(8974.79)</b>	<b>(6654.68)</b>	<b>(4656.52)</b>	<b>(2774.99)</b>	<b>199.90</b>
Deferred Expenditure To be Written Off	60	130.94	32.40	126.70	250.01	506.82	916.50	978.60
Per Unit Balance(Net)	214.78	(255.17)	327.40	249.30	(21.73)	130.57	10.20	120.90
<b>Total Def. Exp&amp; Income</b>	<b>274.78</b>	<b>(124.23)</b>	<b>359.80</b>	<b>376</b>	<b>228.28</b>	<b>637.39</b>	<b>926.70</b>	<b>1099.50</b>
<b>Grand Total</b>	<b>75062.29</b>	<b>69195.61</b>	<b>64055.69</b>	<b>60405.17</b>	<b>56321.30</b>	<b>55344.11</b>	<b>54623.42</b>	<b>53694.76</b>

\*Provisional

- Notes: (1) NEA has dropped the practice of revaluation of property, plant & equipment and entire assets are presented at historical cost.
- (2) Interest during the Construction (IDC) period amounting to NRs 4,146.80 million has been adjusted from long term loan to current liabilities.

Appendix II

INCOME STATEMENT FOR THE FY ENDING JULY15, 2008

(NRs in million)

Particulars	2008*	2007	2006	2005	2004	2003	2002	2001
Sales	15405.03	14449.73	13331.90	12605.20	11874.70	11012.60	9476.20	8160.80
<b>Cost of Sales</b>	9929.85	9034.56	8332.70	7462.40	6765.40	5348	5886.70	4480.70
Generation (inc power	9625.57	8793.68	8100.60	7246.50	6565.90	5169.40	5728.70	4343.40
Transmission	304.28	240.88	232.10	215.90	199.50	178.60	158	137.30
<b>Gross Profit</b>	<b>5475.18</b>	<b>5415.17</b>	<b>4999.20</b>	<b>5142.80</b>	<b>5109.30</b>	<b>5664.60</b>	<b>3589.50</b>	<b>3680.10</b>
Other income	655.24	1016.61	639.90	617.50	671.40	512.60	459.60	593.10
Distribution Expenses	1947.42	1834.39	1703.70	1484.20	1376.10	1308.60	1174.40	982.22
Administrative expenses	576.14	479.59	419.50	622.40	489.10	536.10	447.40	850.08
<b>Profit From operation</b>	<b>3606.86</b>	<b>4117.80</b>	<b>3515.90</b>	<b>3653.70</b>	<b>3915.50</b>	<b>4332.40</b>	<b>2427.30</b>	<b>2440.90</b>
Interest	2368.41	2385.41	3050.90	3079.80	2991.50	2973.40	1395.50	1188.20

Depreciation	1920	1856.47	1816.90	1733.50	1686	1656.70	1420.10	1119.30
(profit) loss on Foreign Exchange	480.61	(493.39)	42.70	(230)	59.10	-	271.60	-
Provision for Losses or Property plant & equipment	30	60	65	40	-	191.50	37	-
Deferred revenue expenditure written off	70	42.56	105.40	123.30	320.10	411.10	512.50	426.90
<b>Sub Total</b>	<b>4869.02</b>	<b>3851.05</b>	<b>5080.90</b>	<b>4746.60</b>	<b>5056.70</b>	<b>5232.70</b>	<b>3636.70</b>	<b>2734.40</b>
<b>Profit (Loss) from Operation in the current year</b>	<b>(1262.16)</b>	<b>266.75</b>	<b>(1565)</b>	<b>(1092.90)</b>	<b>(1141.20)</b>	<b>(900.30)</b>	<b>(1209.40)</b>	<b>(293.50)</b>
Prior years(Income) Expenses	50	(47.44)	(297.20)	219.90	344.90	444.40	492	291.60
<b>Net profit(Loss) before Tax</b>	<b>(1312.16)</b>	<b>314.19</b>	<b>(1267.80)</b>	<b>(1312.80)</b>	<b>(1486.10)</b>	<b>(455.90)</b>	<b>(717.40)</b>	<b>(1.90)</b>
Provision for Tax	-	-	-	-	(274.20)	1497.80	43.30	49.10
<b>Net profit(loss) after Tax</b>	<b>(1312.16)</b>	<b>314.19</b>	<b>(1267.80)</b>	<b>(1312.80)</b>	<b>(1760.30)</b>	<b>(1953.70)</b>	<b>(860.70)</b>	<b>(51)</b>
Balance of profit as per last account	5801.61	(6095.80)	(4808)	(3475.20)	(1694.90)	278.90	1159.60	1230.60
Total Profit available for appropriation	(7113.77)	(5781.61)	(6075.80)	(4788)	(3455.20)	(1674.90)	298.90	1179.60
Insurance Fund	20	20	20	20	20	20	20	20
Profit(Loss) transferred to balance sheet	(7133.77)	(5801.61)	(6095.80)	(4808)	(3475.20)	(1674.90)	278.90	1159.60

) Provisional

### Appendix III

The regression line of sales (X) on cash balance (Y) is given by,

$$(X - \bar{X}) = r \frac{\sum(X - \bar{X})(Y - \bar{Y})}{\sum(Y - \bar{Y})^2} (Y - \bar{Y})$$

Where,

$$\bar{X} = \text{Mean sales} = 96316.16$$

$$\bar{Y} = \text{Mean cash balance} = 8665.59$$

$\sigma_x$  = standard deviation of sales

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

$$= \sqrt{\frac{41822818.30}{8}}$$

$$= \text{Rs. } 2286.45 \text{ million}$$

$\sigma_y$  = Standard deviation of cash.

$$= \sqrt{\frac{\sum(Y - \bar{Y})^2}{N}}$$

$$= \sqrt{\frac{469336.92}{8}}$$

=Rs. 242.21 million.

r = Karl Pearson's coefficient of correlation = 0.3643

Now,

$$(X - \bar{X}) X r = \frac{\sum XY}{\sum Y} (Y - \bar{Y})$$

$$\text{Or, } (X - 12039.52) = 0.3643 \frac{2286.45}{242.21} (Y - 1083.20)$$

$$\text{Or, } (X - 12039.52) = 3.4390(Y - 1053.20)$$

$$\text{Or, } X - 12039.52 = 3.4390Y - 3621.95$$

$$X = 12039.52 - 3621.95 + 3.4390Y$$

$$X = 8417.57 + 3.4390Y$$

The regression line of cash balance (Y) on sales (X) can be computed as follows.

$$(Y - \bar{Y}) Y r = \frac{\sum XY}{\sum X} (X - \bar{X})$$

$$\text{or, } (Y - 1083.20) = 0.3643 \left| \frac{242.21}{2286.45} \right| (X - 12039.52)$$

$$\text{or, } Y - 1083.20 = 0.038 (X - 12039.52)$$

$$\text{or, } Y - 1083.20 = 0.038X - 457.50$$

$$Y = 1083.20 - 457.50 + 0.038X$$

$$Y = 625.7 + 0.038X$$

#### Appendix IV

The regression line of receivable (X) on cash balance (Y) is given by,

$$(X - \bar{X}) = r \cdot \frac{\uparrow X}{\uparrow Y} (Y - \bar{Y})$$

Where,

$$\bar{X} = \text{Mean receivables} = 3849.14$$

$$\bar{Y} = \text{Mean Cash balance} = 1083.20$$

$\uparrow x$  = standard deviation of receivables

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

$$= \sqrt{\frac{17737798.74}{8}}$$

$$= \text{Rs. 1489.03 million}$$

$\uparrow y$  = Standard deviation of cash balance

$$= \sqrt{\frac{(Y - \bar{Y})^2}{N}}$$

$$= \sqrt{\frac{469336.96}{8}}$$

$$= \text{Rs. 242.21 million}$$

$r$  = Karl Pearson's coefficient of correlation = 0.163

Now,

$$(X - \bar{X}) X r \frac{\sum x}{\sum y} (Y - \bar{Y})$$

$$\text{or, } (X-3849.14) = 0.163 \frac{1489.03}{242.21} (Y-1083.20)$$

$$\text{or, } (X-3849.14) = 1.002 (Y-1083.20)$$

$$\text{or, } X - 3849.14 = 1.002Y - 1085.37$$

$$\text{or, } X = 3849.14 + 1.002Y - 1085.37$$

$$\dots X = 2763.77 + 1.002Y$$

This equation shows that receivables are estimated to increase by 1.002 per unit increase in cash balance.

Likewise, the regression line of cash balance (Y) on receivables (X) can be computed as follows.

$$(Y - \bar{Y}) Y r \frac{\sum y}{\sum x} (X - \bar{X})$$

$$\text{or, } (Y-1083.20) = 0.163 \times \frac{242.21}{1489.03} (X-3849.14)$$

$$\text{or, } (Y-1083.20) = 0.0265(X-3849.14)$$

$$\text{or, } Y - 1083.20 = 0.0265X - 102.00$$

$$\text{or, } Y = 1083.20 + 0.0265X - 102.00$$

$$\dots Y = 0.0265X + 981.2$$

The regression line of cash balance (Y) on receivables (X) can be computed as follows.

$$(\bar{Y} - Z\bar{Y}) Xr \cdot \frac{\dagger y}{\dagger x} (\bar{X} - Z\bar{X})$$

or,  $(Y-1083.20) = 0.163 \times \frac{242.21}{1489.03} (X-3849.14)$

or,  $(Y-1083.20) = 0.0265(X-3849.14)$

or  $Y-1083.20 = 0.0265X-102.00$

or,  $Y = 1083.20+0.0265X-102.00$

... $Y=0.0265X+981.2$