

# CHAPTER – I

## INTRODUCTION

### 1.1 Background of the Study

Nepal is a Himalayan kingdom, situated along the southern slopes of the Himalayas. It is situated about 500 km from the nearest sea and located between 26<sup>0</sup>22' North and 30<sup>0</sup>27' North Latitude and between 80<sup>0</sup>4' east and 88<sup>0</sup>12' east longitude. It has a territory of 147,181 square kilometers. It has an average length of 885 kilometer east to west. The north south width is not uniform. Its width is 241 kilometer in maximum and 145 kilometer in minimum. Seen in term of its physical size the country appears dwarfed between its two big neighbors- the two emerging economic power in Asia - India on the south, east west and by the Tibet region of china on the north. It covers some 0.03% land of Asia, and 0.003% of land in the world.

Nepal is least developed, landlocked, geographically placed, and economically vulnerable nation of enormous ecological, cultural and ethnic diversity. With an asset of more than 20 million population, 6000 rivers and rivulets, 5000 species of vascular plants. 175 of butterflies, with more than 1310 identified peaks about 75.5% of its area consists of mountains and hills including river and basins and tars. It is as low as 70 meters in terai to as high as 8848 meters in the Himalayan.

Nepal is known for its water resource. Approximately, 225 billion cubic meters of water flows in its four major river systems every year. The country also has abundant underground water resources. The available hydropower potential is over 80,000 MW out of which about 25,000 MW are economically feasible. This vast resource of bountiful nature, if tapped properly, can meet all the needs of Nepal for water and power, and there exists a high potential for power export as well.

Hydropower has been recognized as a sustainable source of energy with almost zero input cost. Its benefits are that it is non-polluting in the sense that it releases no heat or noxious gases, it has low operating and hydropower stations have increased efficiencies along with long life. Nepal's hung potential in hydropower is still untapped. Though Nepal has not yet been able to tap even

one percent of its potential electricity capacity and 60 percent of Nepal's population is still deprived of electricity, it is fascinating to note that Nepal's start in 1911 in the hydropower generation almost dates back to a century. As a cheap, renewable source of energy with negligible environmental impacts, small hydropower has an important role to play in Nepal's future energy supply. Accordingly, micro-hydro system is becoming increasingly popular as an energy source in rural Nepal. Use of environmentally friendly technologies and implementation of sound legal and institutional issues are critical to improve the reach of the population to hydropower. To make the plan targets in the power sector a reality, directing more resources to the power projects focusing on rural population remains the pre-requisite. The major strategies of the power sector have generation and distribution, integrating rural electrification with rural economic development programs, and strengthening power infrastructure. The immense role of the power sector in contributing to the generation of broad-bases, sustainable and high level of economic growth as well as improving the relative competitiveness of the economy both on a regional and global basis makes it imperative that the programs and activities on power sector development as visualized in the plans and policies be given the utmost urgency, priority and focus.

Hydro Power Company is fully owned by the government. Its main objective is to fulfill the social benefits rather than earning profit. Otherwise the enterprise can't exist for long time and shall be a constant burden to society. Among the 46 PEs in Nepal, Hydro Power Company has been selected for the purpose of our analysis. Hydro Power Company supplies electricity, drinking water, and irrigation of water at a reasonable price on a regular basis. The survival and growth of Hydro-power is in the long-term interest of the country. In other words, as one of the important PEs of our country, Hydro-power should achieve financial viability by generating surplus for its own expansion and diversification as well as to contribute to the government's treasury.

Working capital is a controlling nerve of center of every business organization because no business can run smoothly without the proper control upon it. Thus, it plays the crucial role in the success and failure of the organization. As the management of current assets and current liabilities of the business organization is necessary for day-to-day operations, it plays the key role in the success and failure of the organization not only in the short run, in the long run also. In the concern of the management of working capital there have been made number of studies from different management experts and students in various enterprises.

The management of working capital plays a vital role for exiting of any public enterprises successfully while studies it. It is the centers on the routine day-to-day administration of current assets and current liabilities. Therefore working capital management in public enterprises is very important mainly for four reasons. Firstly, public enterprises must need to determine the adequacy of investment in current assets otherwise it could seriously erode their liquidity base. Secondly, they must select the type of current assets, suitable for investment so as to raise their operational efficiency. Thirdly they are required to ascertain the turnover of current assets, which determine profitability of the concerns. Lastly, they must find out the appropriate source of funds of finance current assets.

### **1.1.1 Introduction of Hydropower**

It is now not a new knowledge that flowing water creates energy that can be captured and turned into electricity called hydropower. Hydro comes from the Greek word 'hydra', meaning water. It is the electricity produced by the movement of fresh water from rivers and lakes. Also called hydropower, it is a renewable energy source dependent upon the hydrologic cycle of water, which involves evaporation, precipitation and the flow of water due to gravity. Gravity causes water to flow downwards and this downward motion of water contains kinetic energy that can be converted into mechanical energy, and then from mechanical energy into electrical energy. At a good site, hydropower can generate very cost effective electricity. The history of conversion of kinetic energy into mechanical energy dated back to two thousand years ago in ancient Greece when wooden waterwheels were used. Hydropower represents an important source of energy, accounting for one-fifth of the world's electricity supply. Most of the technically and economically feasible hydropower potential has been exploited in the developed countries and the developing countries, too, realizing the significance of this source of power for the higher sustained economic growth and development of their respective economies, have been embarking on the various phases of the hydropower development process.

Hydropower projects have number of benefits. The prominent among them are that these projects have low energy production cost considering the long effective lifetime of the plants among with the low operation and maintenance cost, greater efficiency than of all the major types of plans using non-renewable and renewable energy resources, almost complete absence of greenhouse gas

emission, possibility of multi-purpose water use and water management such as irrigation and regulation of river flows both during flood season and low flow periods, independence of fluctuating fuel prices and supply distribution, efficient output regulation, rapid response capacity to variable energy demand, reliable, proven mature technology with known positive and negative influences, a renewable energy source, save consumption of fossil, fuel, or firewood which constitute classic energy sources that contribute to the greenhouse effects or atmospheric pollution as the hydropower plants make use of artificial fall of the river, the hydraulic conveyance circuit that can be integrated in other components for multiple purposes such as irrigation, water supply systems, fisheries water-tourism, etc. the most important benefit is that hydropower plants produce electricity without consuming power.

Hydropower provides a reliable, efficient, safe and economic source of power for increasing effectiveness of the decentralized industries system. The use of water to produce hydropower has the advantage of absent of carbon-dioxide, sulphur-dioxide, nitrous-oxide and solid or liquid waste production. Thus, the water sources should contribute to a substantial reduction in emission of carbon-dioxide and other harmful gases responsible for greenhouse effects. The water will continue to fall downhill and will continue to be a resource for men and environment needs as a part of the natural hydrologic cycle. However, it has some disadvantages like high investment along with long lead-time for project realization, long gestation period, and environmental and social problems, mainly due to inundation of affected areas by large water reservoirs causing possible destruction of unique biotypes and endemic species. Some other disadvantages include possible destruction of human habitat, high cost for the necessary resettlements and fallouts related to social and political implications.

Regarding the presentation of the analysis, this first section outlines the introduction. The second covers the History of the electricity development with reference to Nepal. The third section on Operations of hydropower stations and the fourth section on the small Scale hydropower describe, in short, the operational skill of the station operations. The fifth section on development of hydropower in Nepal describes the decade wise growth of hydropower and the sixth section on small hydro-plants in Nepal analysis the distribution of smaller hydro-plants. While the seventh section covers the hydropower policy, the eight section deals with the Challenges before arriving at the conclusion which is given in the last or the ninth section.

### **1.1.2 Operations of Hydropower Stations**

The most common type of hydropower plant uses a dam on river to store water in a reservoir. Water released from the reservoir flows through a turbine, spinning it, which, in turn, activates a generator to produce electricity. But hydropower doesn't necessarily require a large dam. Some hydropower plants just use a small canal to channel the river water through turbine. Another type of hydropower plant- called a pumped storage plant – can even store power. The power is sent from a power grid into the electric generators. The generators then spin the turbines backward, which causes the turbines to pump water from a river or lower reservoir to an upper reservoir, where the power is stored. To use the power, the water is released from the upper reservoir back down into the river or lower reservoir. This spins the turbines forward, activating the generators to produce electricity.

Thus, the main components of hydropower facility are the dam, the powerhouse that contains the mechanical and electrical equipment, and the waterways. Water is released from the dam to turn turbines. The turbines drive generators that produce electricity. The purpose of the dam is to create height for the water to fall and to provide storage. However, the dam must also be provided with a spillway that can accommodate and pass high flows or flood water without overtopping the dam or reducing its safety. The flood water comes from heavy rain or rapid snowmelt of the upstream part of the basin. If it is proposed to utilize not only the head at the dam but also the fall in the river downstream, a canal, penstock or tunnel are needed to carry the water to the powerhouse. A canal may also be needed to carry water from the powerhouse back to the river.

The amount of electrical energy that can be generated from a water source depends primarily on two things: the distance the water has to fall and the quantity of water flowing. Hydropower stations are, therefore, situated where they can take advantage of the greatest fall of a large quantity of water: at the bottom of a deep and steep-sided valley or gorge, or near the base of a dam. Water is collected and stored in the dam above the station for use when it is required. Some dams create big reservoirs to store water by raising the levels of rivers to increase their capacity. Other dams simply arrest the flow of rivers and divert the water down to the power station through pipelines. The amount of energy available from water depends on both the quantity of water available and its pressure at the turbine. The pressure is referred to the head, and is

measured as the height that the surface of the water is above the turbine. The greater the height (or head) of the water above the turbine, the more energy each cubic meter of water can impart to spin a turbine which, in turn, drives a generator. The greater the quantity of water, the greater the number and size of turbines that may be spun, and the greater the power output of the generators. It may be relevant to mention that current hydropower technology, while essentially emission-free, can have undesirable environmental effects, such as fish injury and mortality from passage through turbines, as well as detrimental effects on the quality of downstream water. A variety of mitigation techniques are in use now, and environmentally friendly turbines are under development.

## **1.2. Brief Profile of Selected Company**

### **1.2.1 Profile of Butwal Power Company Limited**

Butwal Power Company limited (BPC) was established in 2022 (1996) as a private limited company registered under the Company Act 2021 (1965) by the United Mission to Nepal, his Majesty's Government of Nepal (HMGN), Nepal Electricity Authority (NEA), and NIDC. Its aim was to develop hydropower projects using appropriate training, technology transfer and human resources development. This pioneering firm developed by the 1-MW Tinau, the 5.1 MW Adhikhola, and the 12-MW Jhimruk hydropower projects and it is one of the sponsors of the 60-MW Khimti hydropower project. In 2049 (1993), BPC was converted into a limited company and in 2059 (2003) it was privatized. Its main shareholders are Shangri-La Energy Limited (SEL), Interkraft AS, Norway (IKN), Government of Nepal and General Public.

#### **Vision**

- ) BPC is a pioneering, responsible and profitable private electric utility that provides quality and competitive services to its customers.

#### **Mission**

- ) BPC will supply electricity within its distribution area in Nepal.
- ) BPC will expand its distribution area as is feasible.
- ) BPC will plan, build, acquire, own and operate electric power plants as well as purchase electricity to meet its electricity needs.
- ) BPC will make strategic investments to support its interests.

- ) BPC will sell or export its excess electricity.
- ) BPC will render professional services in its areas of expertise.

**Values:**

- ) We take timely decisions and act proactively.
- ) We do clean business.
- ) We are innovative.
- ) We have a long-term commitment.
- ) We are trustworthy.
- ) We are a modern company which honours the best of traditional values.

BPC are committed to enhance customer satisfaction by generating and providing environment friendly cost effective power and engineering solutions.

Ongoing endeavor of BPC shall be:

- To Promote natural resources conservation
- To Customer satisfaction enhancement
- To Generate awareness amongst employee & associates
- To Undertake waste minimization
- To Focus on sustainable development & continual improvement
- To Prevent pollution
- To Comply with legal requirements

We shall follow an effective management system based on the guiding principles of ISO 14001:1996 & ISO 9001:2000 through innovation, mutual respect and teamwork.

### **1.2.2 Profile of Chilime Hydropower Company Ltd.**

Chilime Hydropower Company Ltd. was registered on 14 Kattrik, 2052 under the Company Act. Chilime Hydro-power Company Ltd. commenced on 2053/10/13, which is located at Rasuwa District, covered three VDC. The Company need to be constructing, operate and transmitter in co-ordination with construction of transmission line by Nepal Electricity Authority. Chilime Hydro-power Plant became operational when the Chilime Hydropower Electric Project was handed over for commercial operation on 2060 Bhadra 8 (24 august 2003). On Bhadra 8, 2062, it launched its two projects.

The Saanjen Khola (Upper reaches of Chilime Khola from existing Chilime headworks) originates from eastern slope of Salasungi Himal, a part of the Himalayan range in the highland area and joins with Chhovar Khola, then after it is called Chilime Khola. The Chilime Khola is a tributary of Bhote Koshi (Trishuli) river located between latitudes  $28^{\circ}20'$  to  $28^{\circ}11'$  North and Longitude  $85^{\circ}29'$  East. It flows almost Eastward in the upper reaches and South-East Down to the confluence with Bemdang Khola. It continues to flow Almost East to join Bhote Koshi River. The length of Chilime Khola upto Bemdang Khola confluence is about 22 Km and the total length upto Bhote Koshi river is about 26 km. The total drainage area of Chilime Khola is about 27 km at weir site of existing Chilime Hydropower Plant. The stream flows with an average gradient of about 1 in 9.

The stretch of Chilime Khola from the weir site of existing power plant to 1.5 km upstream from the confluence of Sanjen Khola and Chhovar Khol is about 6 km long having total head of 600m. Thus the river gradient at this stretch of the river is about 1 in 10. This stretch is found suitable for the development of another Hydropower Plant(s). The upstream of this stretch is also suitable for hydropower development in the future.

In the year 2059 B.S., a preliminary study revealed that a hydropower plant can be developed in the stretch between the confluence of Sanjen and Chhovar Khola and the weir site of existing power plant. A licence for feasibility study was received for the study of Sanjen (Upper Chilime) Hydroelectric Project. However, during field studies in the year 2060 B.S. a site for construction of peaking pondage was identified at about 1.5 km upstream from the confluence of Sanjen and Chhovar Khola. This stretch of about 1.5 km was studied with respect to the development of another power plant.

The whole stretch of 6 km long of the river was conceptualized to develop, two hydropower plants in cascade utilizing deasander and peaking pondage of the upper scheme. This concept was further refined with the possibility of using stored water to the existing Chilime Hydropower Plant as well. Thus the board of Chilime Hydropower Company Limited decided to develop these two schemes separately and a license for the feasibility study of Sanjen (Upper) Hydroelectric Project was received on Chaitra 31, 2061. Therefore, it is planned to carryout feasibility study of these cascade hydropower schemes with capacity of 10 MW and 30 MW.

The planning and development of master schedule of both the schemes is prepared. A total of 24 km long access road needs to construct for the



construction of both the schemes. Lower scheme named Sanjen (Upper Chilime) Hydroelectric Project required a total of 17 km long road and the upper scheme named Sanjen (upper) Hydroelectric Project required additional 8 km. long road.

In consideration to the completion of the access road and availability of retained earnings with the company, the construction works of the lower scheme with a capacity of 30 MW can be started earlier than upper scheme (10 MW), however, generation from the lower scheme cannot be initiated without bringing the upper scheme into operation. Hence, the generation date of both the schemes needs to be same or upper one should be earlier.

The existing transmission line can transmit additional 10 MW and this facilitates to construct and operate the upper scheme (10 MW) little earlier than the 30 MW lower schemes. Therefore both the projects need to be constructed, operated and transmitted in co-ordination with construction of transmission line by Nepal Electricity Authority.

In the project of Chilime hydro-power has been worked 62 employees on contract basis from Nepal Electricity Authority. This project electricity has covered all of areas where to supply a total peak energy capacity of 62 MW to support the peak load demand of the Nepal Electricity Authority.

Total shares of Chilime Hydropower Company Ltd. are subscribed as follows:

Nepal Electricity Authority	= 51%
Company and Staff Nepal Electricity Authority	= 25%
Nepalese Public	<u>= 24%</u>
Total Share	= 100%

Capital Structure of Chilime Hydropower Company as on 2062/2063 as follow:

Authorized Capital	Rs.1500 million
Issued Capital	Rs.1400 million

### **1.3 Statement of the Problems**

Proper financial management is the great importance for every business organization from the point of view of achieving success. In this respect working capital plays a significant role in every aspect of the business activities. Lack of knowledge about managing working capital properly results finally to the liquidation of an organization. Neither excess working capital nor

less working capital is good for the company. So it has to be managed in such a way that it will be just adequate for maintaining solvency and continuing business. Adequate working capital brings security and confidence with numerous advantages such as better terms of goods purchased, cash discount, bank loan on lower interest rate. There would be steady work and thereby raises the employees morale, efficiency and creation of sound goodwill and prospect of the company. With the adequacy of working capital a quick and steady returns to the investors would be possible and also the raise in the management morale. In most organization the management of working capital has been misunderstood as the 'management of money' and the managers are found over conscious about the boarding of money rather than its efficient utilization. Regarding the management of working capital sources, most of public enterprises have never thought seriously. They are usually found to be dependent upon HMG ever for overcoming the shortages of working capital in spite of trying to manage working capital needs from their own resources. Some public enterprises have used depreciation fund and utilized surplus to overcome the poverty of working capital. Working capital management has been the most intricate and challenging area of modern corporate finance is as much as the management always faces trade-off between the liquidity and profitability of the firm.

The deficiency of working capital practices, administrative negligence in day-to-day operations, negative rate of return, inappropriate finance policy, higher production and operation expenses and poor collection payable policy are the major problems of Nepalese public enterprises. Moreover various factors have been identified for the low economic performance.

Working capital management can be evaluated by how to manage the assets and capital fund, which is the best sector to invest and how to run the hydro-power sector. The present study will try to analyze and examine the liquidity, profitability, debt management with financial performance in these hydro-powers. Without proper working capital management of any business cannot run in right way. They cannot achieve their objectives.

In this study, following issues are to be dealt for the purpose of this study:-

1. How the sources of funds created and mobilized in share capital, assets, loan and marketable securities?
2. What is the comparative (year-wise) working capital position of selected hydro-powers?

3. Whether the size, liquidity, efficiency and profitability of working capital in selected hydro-powers is adequate or not?
4. Whether the hydro-powers have developed and applied short term and long-term objectives in hydro-powers sectors?

#### **1.4 Objective of the Study**

The basic objectives of the present study are to highlight the working capital management and its effectiveness in hydro-power especially in both selected hydro-powers. The present research will try to fulfill the following specific objectives.

- a) To see working capital management of the hydro-power companies and analyzes their assets structure and their implications.
- b) To see the position of working capital of selected hydropower company.
- c) To see the policy on creation and mobilization of fund in BPC and CHPC.
- d) To evaluate the credit policy of BPC and CHPC and its effectiveness.

#### **1.5 Significance of the Study**

Working capital is regarded as the life blood for any enterprise because it is needed for sustaining the enterprise in day operation. The purpose of working capital management is likely to become management is to manage the firm's current's assets and current liabilities in such a way that a satisfactory level of working is maintained. "Survey indicates that the largest portion of most financial managers' time is devoted to the day to day internal operations of the firm which fall under the heading of working capital management." Very few studies have been performed on the financial performance of BPC and CHPC but no one has studied typically on its working capital management. Different researchers have written their dissertations on working capital management, however almost all of them are related to financial sectors and does not address the real situation of service sector public enterprises like BPC and CHPC. It is thus clear that no full-fledged academic research study on working capital management in selected hydro-power companies i.e. Butwal Power Company and Chilime Hydro-power Company have been carried out. The present study, therefore, bridges this long felt gap in the field or research. This is only a beginning and it could be further developed continued research in this field.

## **1.6 Limitation of the Study**

Although there are several hydro-power companies in Nepal but the study has been confined to Butwal Power Company and Chilime Hydro-power Company, only the main limitation of the study is as follows.

- i. The study concerns the analysis of only 5 years data.
- ii. The study is only concentrated in working capital management and their financial performance of the selected hydro-power companies.
- iii. The study is based on secondary data. Therefore, the accuracy of the result depends on the accuracy of the data provided by the selected hydro-power companies.
- iv. Time and resource constrains may limit the areas covered by the study.
- v. The limit time available to submit the thesis for the partial fulfillment of MBS in the main constraints of the study.

## **1.7 Organization of the Study**

The whole study is divided into five main chapters. The first chapter presents of introduction, statement of the problems, and objective of the study, scope of the study and limitation of the study.

The second chapter presents of review of literature. Review of related material like previous thesis, browser booklets, journals, articles and report, magazines etc will be done

The third chapter presents of research design, nature and source of data, method of data collection and method of analysis under research methodology.

The fourth chapter presents the collected data will be tabulated and analyzed by using various financial tools, mathematical and statistical tools under data presentation and analysis.

The fifth chapter presents of the brief summary of whole research report and conclusions. Its also provides some useful suggestion and recommendations to concerned parties.

## **CHAPTER - II**

### **REVIEW OF LITERATURE**

This chapter is basically concerned with review of literature relevant to the topic “Working Capital Management of Hydropower in Nepal.” Every study is very much based on past knowledge. The previous study cannot be ignored because they provide the foundation to the present study. There must be continuity in research. This continuity in research is ensured by linking the present study with past research studies. This chapter highlights the literature that is available in concerned subject as to my knowledge, research work, and relevant study on this topic, review of journals and articles and review of thesis work performed previously.

#### **2.1. Working Capital Management**

Working capital is refers to the firm, short-term current assets and liabilities. Working capital is defined as all short-term asset used in daily operation. They consist primarily of cash, marketable securities, account receivable and inventories. Working capital is characterized by asset with a life span that is less than one year. Cash, marketable securities, account receivables and inventory have a life span of less than one year. It is also characterized by its nearness to cash or liquidity the finished good, inventory when sold is converted in to account receivable. Receivable on collection are transferred into cash the level of investment in working capital is affected by sales volume, production policies and collection polices.

Working capital is a controlling nerve of center of every business organization because no business can run smoothly without the proper control upon it. Thus, it plays the crucial role in the success and failure of the organization. As the management of current assets and current liabilities of the business organization is necessary for day-to-day operations, it plays the key role in the success and failure of the organization not only in the short run, in the long run also. In the concern of the management of working capital there have been

made number of studies from different management experts and students in various enterprises. (Pandey, 1996: 325)

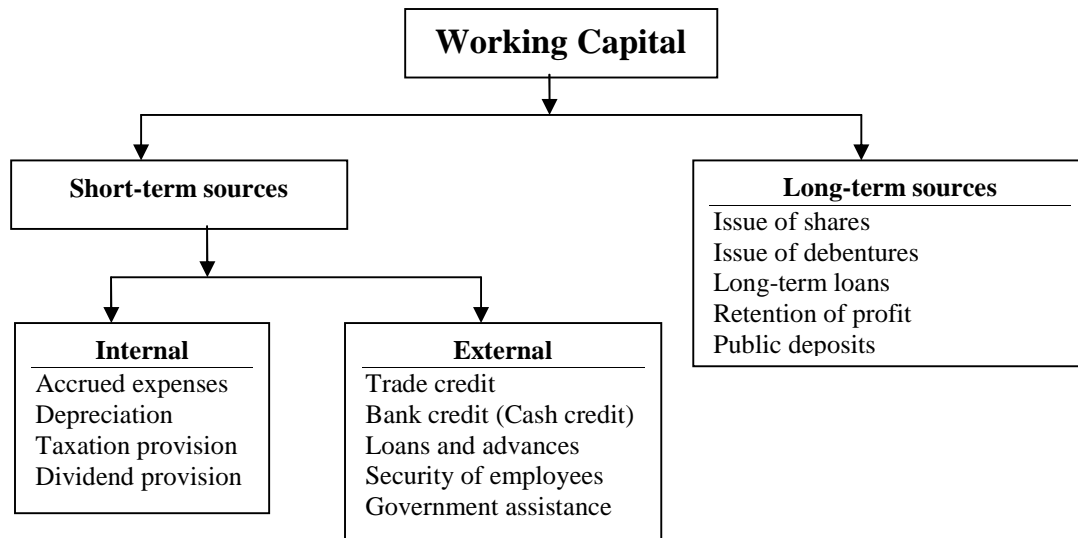
The management of the funds of business can be described as financial management. Financial management is mainly concerned with two aspects. Firstly, fixed assets and fixed liabilities, in other words, long-term investment and sources of funds, secondly, current uses and sources of funds. Both of these types of funds play a vital role in business finance. Normally, the finance function can be divided policy decision. But the most important decision for business is investment decision it include the long-term assets management and short term assets management i.e. working capital management.

Types of working capital on the basis of time required for holding current assets and liabilities:

- 1. Permanent, fixed, constant working capital:** The capital required to be employed constantly in current asset and current liabilities is called permanent working capital. The sustainable level of activities of an enterprise reflects such amount of working capital. Thus the regular production and sales volumes determine the amount of permanent working capital. The permanent working capital should not fall below the radius defined.
- 2. Variable, fluctuating, temporary working capital:** An enterprise may be required to meet special orders or seasonal demands of customers besides regular production and sales volumes. The working capital needed to meet the current assets and current liabilities for such extra and fluctuating operations is termed as variable working capital.

### **Figure - 2.1**

#### **Sources of Working Capital**



(Smith, 1974:5)

The term working management is closely related with short term financing and it is concerned with collection and allocation of resources. Working Capital management is related to the problems that arise in attempting to manage the current assets, the current liabilities and the interrelationships that exist between them. (Smith, 1974:5)

Working capital refers to the resources of the firm that are used to conduct operations of day to day work that makes the business successful. Without cash, bills cannot be paid, without receivable the firm can not allow timing different between delivering goods to services and collecting the money to pay for them, without inventories the firm cannot engage in production nor can it stock goods to provide immediate deliveries. As a result of the critical nature of current assets the management of working capital is one of the most important areas in determining whether a firm will be successful. The term working capital refers to the current assets of the firm's those items that can be converted into cash with in the year. Net working capital is defined as the difference between current assets and current liabilities. (Hampton & Wagner, 1989:3-4)

The goal of working capital management is to support the long-term operation and financial goals of the business. In effect, this involves recognizing the relationship between risk and return. Three elements must have included in analyzing the trade off between risk and return when managing working capital. (i) Insolvency: this condition occurs when a firm can no longer pay its bills and must default on obligations and possibility declares bankruptcy. A firm without adequate level of working capital may have to face this risk. (ii)

Profitability of assets: Different level of current assets will have varied effects on profits. A high level of inventory will require high carrying cost. At the same time, the firm will have a wide range of goods to sell and may be able to generate higher sales and profit. Each decision on the level of cash, receivables and inventory should consider the effects to different level. (iii) Cost of financing: When interest rates are high, it costs more to carry inventory than when rates are low. Large cash balance may not earn the return that is possible if the cash is converted into operating assets. The cost of debt and the opportunity costs of alternative investments are items to consider when evaluating working capital level. (Hampton & Wagner, 1989:10)

There are two concepts of working capital gross concept and net concept. The gross working capital, simply called as working capital refers to the firm's investment in current assets. Current assets are the assets which can be converted into cash within accounting year (or operating cycle) and include cash, short-term securities, debtors, bill receivable and stocks. The term net working capital refers to the difference between current assets and current liabilities. Current liabilities are those claims of outsiders, which are expected to mature for payment within an accounting year and include creditors, bills payable and outstanding expenses. Net working capital can be positive or negative. A positive net working capital will arise when current assets exceed current liabilities and a negative net working capital occurs when current liabilities are in excess of current assets. He also added that net working capital concept also covers the question of judicious mix of long-term and short term funds for financing current assets. (Pandey, 1996: 796-797)

$$\text{Net working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

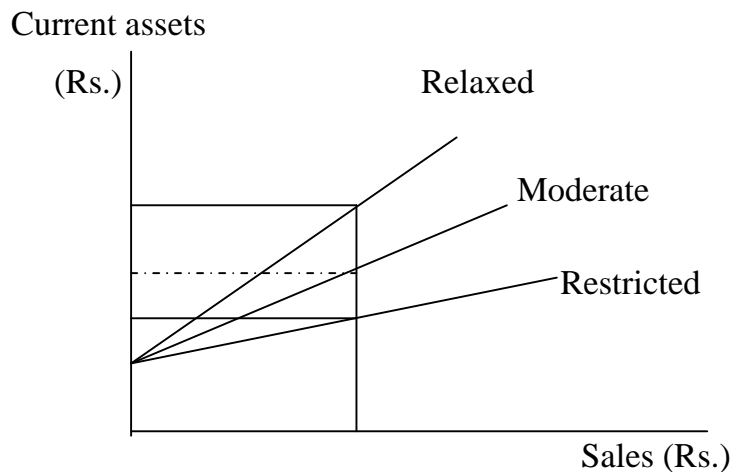
By analyzing the above concept about working capital, we concluded that, all the corporations, whether public or private, manufacturing or non-manufacturing have just adequate working capital to serve in competitive market. It is because excessive or inadequate working capital is dangerous from the firm's point of view. Excessive investment on working capital affects a firm's profitability just as idle investment, yields nothing. In the same way, inadequate investment on working capital affects the liquidity position of the company and leads to financial embarrassment and failure of the company.

It is therefore, a recognized fact any mistake made in management of working capital can lead to adverse effects in business and reduces the liquidity, turnover and profitability and increases the cost of financing of the enterprises.



### 2.1.1 Working Capital Investment and Financing Policies

- a) **Conservative policy / Relaxed policy:** Conservative current assets policy carry high levels of current assets to sales, conservative current assets financing invest lower on short-term financing and higher on long-term financing therefore conservative policy lower risk and lower profitability.
- b) **Aggressive policy / Tight policy:** Aggressive current assets policies carry a low level of current assets to sales. Aggressive policies invest more on short term financing and less on long term financing therefore aggressive policy increase the risk and increase the profitability.
- c) **Moderate policy / Average policy:** Moderate current assets policy carries a moderate level of current assets to sales. Moderate policy invests average on short term financing and long term financing. Therefore the moderate policy results in mid rang risk and return.



(Weston, Basely, and Brigham 2004:345)

### 2.2. Concept and Meaning of Hydropower

Hydropower (hydro means water) is energy that comes from the force of moving water. The movement of water between the Earth and the atmosphere is part of a continuous cycle. The sun draws moisture up from the oceans and rivers, and this moisture condenses into clouds. The moisture is released from the clouds as rain or snow. The oceans and rivers are replenished with moisture, and the cycle starts again. Gravity causes the water on the Earth to move from places of high ground to places of low ground. The force of moving water can be very powerful.

Hydro-power is the capture of the energy (by means of waterwheels or hydraulic turbines) of moving water (falling or flowing water) to generate electric power. This falling of water can be from a natural falling source or

from a dam. The falling water is used to turn waterwheels or modern turbine blades which are used to power a generator to produce electricity. A water turbine, for example, captures the energy in the falling water and converts the hydraulic energy into mechanical energy at the turbine shaft. The turbine then powers an alternator which converts mechanical energy into electrical energy. The water power is used to generate electric power. This electricity produced by hydro-power is called Hydroelectricity.

Hydro-power system (hydroelectric power) is a clean source of energy systems that can neither pollute or be consumed during its operation. It eliminates the cost of fuel, making it immune to price increases for fossil fuels. The same applies to nuclear power which generates very dangerous nuclear waste. Hydropower is called a renewable energy source because it is replenished by snow and rainfall. As long as the sun shines and the rain falls, we won't run out of this energy source.

### **2.2.1 History of Hydropower**

Water has been used as a source of energy for centuries. The Greeks used water wheels to grind wheat into flour more than 2,000 years ago. In the early 1800s, American and European factories used water wheels to power machines. The water wheel is a simple machine. The wheel picks up water in buckets located around the wheel. The weight of the water causes the wheel to turn. Water wheels convert the energy of the moving water into useful energy to grind grain; drive sawmills, or pumps water.

In the late 19th century, hydropower was first used on the Fox River in Appleton, WI to generate electricity. The first hydroelectric plant was built in 1882. In the years that followed, many more hydropower dams were built. By the 1940s, most of the best sites in the United States for large dams had been developed. At about the same time, fossil fuel power plants began to be popular. These plants could make electricity more cheaply than hydropower plants. It wasn't until the price of oil skyrocketed in the 1970s that people became interested in hydropower again.

In the modern days, it was only in 1882 that the first hydropower plant was built in Wisconsin, USA. This plant made use of a fast flowing river as its source. Some years later, dams were constructed to create artificial water storage area at the most convenient locations. These dams also controlled the

water flow rate to the power station turbines. Pharping small hydro-plant (500 KW) is the first hydropower plant of Nepal construction in 1911A.D. Though some 60 percent of Nepal's population remains deprived of electricity while the capital city continues to thirst for drinking water and suffers from regular load shedding even at the present, it is fascinating to note that Nepal had such an early start in the hydropower generation. The first hydropower plant in India was established in 1898 in Darjeeling and the first hydropower plant in china was established in 1912. Originally, hydropower stations were of a small size set up at waterfalls in the vicinity of towns because it was not possible at that time to transmit electrical energy over long distance. The main reason why there has been large-scale use of hydropower is because it cannot be transmitted inexpensively over hundreds of Kms, where it is required, and Making hydropower economically viable. Transmission over long distances is carried out by means of high voltage, through overhead power lines called transmission lines. The electricity can be transmitted as either alternating current (AC) or direct current (DC). Unlike conventional power stations, which take hours to start up, hydropower stations can begin generating electricity very quickly. This makes them particularly useful for responding to sudden increases in demand for electricity by customers, i.e., peak demand. Hydro-stations need only a small staff to operate and maintain them. No fuel is needed to operate, such as; fuel prices do not become a problem. Also, hydropower scheme uses a renewable source of energy that does not pollute the environment. However, the construction of dams to enable hydropower generation may cause significant environmental damage. In the world today, the highest producers of hydropower are Canada, United States, Brazil, China, Russia, and Norway. Among the various countries, Canada ranks first in the production of hydropower as it has abundant water resources and a geography that provides many opportunities to produce low-cost energy. In fact, accessing the energy from flowing water has played an important role in the economic and social development of Canada for the past three centuries. (Economic survey 2007: 26)

### **2.2.2 Hydropower Development in Nepal**

Hydropower has been recognized as a sustainable source of energy with almost zero input cost. Its benefits are that it is non-polluting in the sense that it releases no heat or noxious gases, it has low operating cost and hydropower

stations have increased efficiencies along with long life. Nepal's huge potential in hydropower is still untapped. Though Nepal has not yet been able to tap even one percent of its potential electricity capacity and 60 percent of Nepal's population is still deprived of electricity, it is fascinating to note that Nepal's start in 1911 in the hydropower generation almost dates back to a century. As a cheap, renewable source of energy with negligible environmental impacts, small hydropower has an important role to play in Nepal's future energy supply. Accordingly, micro-hydro system is becoming increasingly popular as an energy source in rural Nepal. Use of environmentally friendly technologies and implementation of sound legal and institutional issues are critical to improve the reach of the population to hydropower. To make the plan targets in the power sector a reality, directing more resources to the power projects focusing on rural population remains the pre-requisite. The major strategies of the power sector are generation and distribution, integrating rural electrification with rural economic development programs, and strengthening power infrastructure. The immense role of the power sector in contributing to the generation of broad-based, sustainable and high level of economic growth as well as improving the relative competitiveness of the economy both on a regional and global basis makes it imperative that the programs and activities on power sector development as visualized in the plans and policies be given the utmost urgency, priority and focus. (Economic survey 2007: 28)

The estimated theoretical power potential is approximately 83000 MW. However, the economically feasible potential has been evaluated at approximately 43000 MW. After the establishment of the first hydropower plant (500MW) which is in 1911, the second hydropower plant (640 KW) was established at Sundarijal in 1936. Similarly the Morang hydropower Company, established in 1939, built 677 KW Sikarbas Hydro plant at Chisang Khola in 1942 though this plant was destroyed by landslide in the 1960s. The development of hydropower was institutionalized after the initiation of the development planning process. The First five-year Plan (1956-61) targeted to add 20 MW of hydropower. However, the target was unmet. During the Second Three-year Plan (1962-65), some progress was achieved. Till 1962, the Electricity Department of HMG was responsible for the generation, transmission and distribution of electricity. In 1962, Nepal Electricity Corporation (NEC) was established and was given the responsibility for the task of electricity generation. After a long gap since the establishment of the Chisang Hydro plant, the hydropower generation capacity of the country

expanded with the construction of the Panauti Hydro plant (2400 KW) in 1965 and the Trishuli Hydro plant (21000 KW) in 1967. A series of hydropower projects are then followed. The Eastern Electricity Corporation was established in 1974, in 1977, small Hydropower Development board was established. Institution restructuring took place again in 1985, when the merging of the Electricity Department, of Nepal Electricity Corporation and all the development boards (except the Marshyangdi Hydropower Development Board) resulted in the creation of Nepal Electricity Authority (NEA). Since this arrangement, the NEA has public sector institutions involved in the hydropower sector include Water and Energy Commission and its Secretariat constituted in 1976, the policymaking body established in 1981, and the Department of Electricity Development. Of late, the private sector is also emerging as an important factor in the hydropower development. In depended Power Producers (IPPs) has been the ongoing institutional innovation in the power sector of Nepal, with the IPPs signing power purchase agreements (PPA) with the NEA to sell electricity. At present, the total hydropower generation has reached 556.8 MW or just 0.7 percent of the potential. Of the total energy consumption in Nepal, traditional energy like fuel-wood, agriculture residues and animal dung comprises 88 percent and commercial energy like petroleum, hydropower and solar energy constitutes 12 percent. Hydropower accounts for hydropower took place during 2001-2005 whereas 195.3 MW (35.1 percent of the total) was produced followed by the decades of 1981-90 and 1991-2000 decades which saw the production of 180.3 MW (32.4 percent of the total”) and 125.9 MW (22.6 percent of the total), implying that only 55.3 MW (9.9 percent of the total) was produced during the entire period of 1911-1980. (Economic survey 2007: 29)

### **2.3. Review of Related Studies**

In this section an attempt has been made to review some books on financial management, which deal with the management of working capital.

“There are specially two concepts of working capital: Gross concept and net concept. The gross working capital simply called as working capital refers to the firm’s investment on current assets. Current assets are those assets which can be converted in to cash with in an according year and included cash, short term securities, debtors, bill receivable, stock, inventories and pre-paid expenses. The term net working capital refers to the differences between current assets and current liabilities. Current liabilities are those claims of

outsiders which can be expected to mature for payment within an accounting year and includes creditors, bills payable, Bank overdraft and outstanding expenses or accrued income. Net working capital can be negative or positive. A negative net working capital occurs when current liabilities are in excess of current assets.” (Pandey, 1996; 794)

As per the theoretical concepts of the working capital from James C Van Horne: “Working capital management is usually described as involving the administration of these assets namely cash, marketable securities, receivables, inventory and the administration with the problem that arises in attempting to manage the current assets. The current liabilities and the inter-relationship that exist between them.” (Van Horne, 2000:337)

“Working capital management is the effective life blood of any business. Hence the management of working capital plays a vital role for exiting of any public enterprises successfully while studies it. It is the centers on the routine day-to-day administration of current assets and current liabilities. Therefore working capital management in public enterprises is very important mainly for four reasons. Firstly, public enterprises must need to determine the adequacy of investment in current assets otherwise it could seriously erode their liquidity base. Secondly, they must select the type of current assets, suitable for investment so as to raise their operational efficiency. Thirdly they are required to ascertain the turnover of current assets, which determine profitability of the concerns. Lastly, they must find out the appropriate source of funds of finance current assets.” (Agrawal; 1998; 246)

Weston and Brigham have given some theoretical insights into working capital management after their various research studies on it. The broad conceptual findings of their study provide sound knowledge and guidance for the further study on the field of management working capital in any enterprises and naturally to this study as well. They explain in the beginning, the importance of working capital, the use of short term versus long-term debt, relationship between current assets to fixed assets. The components of working capital they have deal with current assets, which are, cash, marketable securities, receivable and inventory. For the efficient management of cash, they have explained the different cash management model. They have also explained the major sources and form of short-term financing. (Weston and Brigham, 1997; 572)

“Proper management of working capital must ensure, adequate amount of working capital as per need of business firms. It should be in good health and

efficiency circulated. To have adequate healthy and efficient circulation of working capital it is necessary that working capital be properly determined and allocated to its various segments, effectively controlled and regularly reviewed.” (Agrawal; 1998; 248)

There are two concepts of thoughts working capital. One school of thought says that working capital is meant for the current assets only. Another school thought argued that working capital is the excess of current assets over current liabilities.

The first school of thought under the sponsorship of Mead, Baker, Malts and Field, relates with gross working capital and the second school of thought under the leadership of Lincoln, Doris, Stevens and Sailors, relates with net working capital. The gross working capital refers to the firms’ investment in current assets which includes the management of cash, inventories and account receivable of the firm while, net working capital refers to difference between current assets and current liabilities.

From the management point of view, gross working capital deals with the problem of managing individual current assets in the day-to-day operation. But having a long run view of working capital, we have to concentrate on the net value of current assets, i.e. the operation of current assets, which is constant in short run analysis and decision making but variable and manageable in long run operation. The net concepts of working capital help the management to look for permanent source for its financing since working capital under this approach does not increase with increase in short term borrowing. (Kuchal, 1996; 187)

“Working capital consists broadly at the portion of the assets of the business used in, or related to, current operational and represented at any one time of the operating cycle by such items as account receivables, inventories of raw materials, stores, work-in-progress and finished goods, bill receivables and cash. Assets of this type are relatively temporary nature, since the invested names are normally capable of being recovered or of being change in form within a short period of time and the time element of ultimate recovery depends on the manufacturing cycle as well as sales and collection cycle.” (Agrawal; 1998; 249)

“Working capital management is usually described as involving the administration of these assets namely cash, marketable securities, receivable and inventories and the administration of current liabilities. It means the

working capital management is concerned with the problems that arise in attempting to manage the assets, current liabilities and the inter-relationship that exist between them.” (Smith, 1974; 16)

Working capital management is the process of planning and controlling the level and mix of the current assets of the firm as well as financing these assets. Specially, working capital management requires financial manager to decide what quantities of cash, other liquid assets account receivables and inventory the firm will hold at any point in time. In addition, financial managers must decide now their current assets are to be financed.

In this section the review of journal/ articles, various published articles by different management experts relating to Working Capital Management.

In this regard, Monohar K. Shrestha, (2047) in an article ‘*working capital management in Public Enterprises: A study on financial results and constraints*’ has considered ten selected PEs and studied the working capital management in those PEs. He has focused on the liquidity, turnover and profitability position of those enterprises. In this analysis he found that four PEs had maintained adequate liquidity position. Two had excessive and the remaining four had failed to maintain desirable liquidity position. On the turnover side, two PEs had negative working capital, four adequate turnover, one had high turnover and remaining three had not satisfactory turnover on net working capital. He had also found that out of ten PEs six Public Enterprises were operating at losses while only four were getting some percentage of profits. With reference to those findings he had brought certain policy issues such as a lack of suitable financial planning, negligence of working capital management, deviation between liquidity and turnover and return on net working capital. To end he had made some suggestive measures to overcome from the above policy issues, identification of needs funds, regular checks of accounts, development of management information system, positive attitude towards risk and profit and determination of right combination of short-term and long term sources of funds to finance working capital needs.

Another observation of twelve selected PEs have been conducted by Monohar K. Shrestha (2047). In this article ‘*working capital management in selected Public Enterprises*’ he has described the conceptual setting sources of working capital and types of working capital. From the analysis he found that the liquidity position of the selected PEs differ widely in view of the differences in their nature of business. These were also above



normal acid-test ratio. While analyzing the turnover of those selected PEs showed wide deviation. Based on the sales value four out of seven PEs had normal inventory turnover, the other three had not been satisfactorily maintained and in some of them inventory had exceeded sales. The collection period relating to the selected PEs exhibited market difference ranging from 32 days to 755 days, the profitability position was analyzed through return on net working capital was positive for eight PEs, negative for two PEs, and rest two had not any return, since they were in establishment phase.

During the analysis the observed some problem like the lack of far sighted liquidity adjustment strategy in most of the PEs no guiding criteria to ascertain the satisfactory malignances of acid-test ratio and working capital needs. Large blocking of capital in inventories and low capacity utilization. All these were due to efficient management of working capital in those PEs.

The next article '*problems and impediment in the management of working capital in Nepalese enterprises*' published by K. Acharya. He has described the two major problems operational problems and organizational problems regards the working capital management in Nepalese PEs. The operational problem he found listed in the first part are: increase of current liabilities than current assets, not allowing the current ratio relation 2:1 and slow turnover of inventory. Similarly, change in working capital in relation to fixed capital had very low impacts over the profitability, thin transmutation of capital employed to sales, absent to apathetic management information system, break even analysis, funds flow analysis and ratio analysis were either undone or ineffective for performance evaluation. Finally monitoring of the proper functioning of working capital management had never been considered a managerial job.

In the second part he has listed the organizational problems in the PEs. In most of the PEs there is lack of regular internal and external audit system as well as evaluation of financial results. Similarly very few PEs have been able to present their capital requirement, functioning of finance department is not satisfactory and some PEs are even facing the under utilization of capacity.

To make an efficient use of funds for minimizing the risk of the loss to attain profit objectives, he has made some suggestion. The PEs should avoid the system of crisis decision which prevailed frequently in their operation, avoid fictitious holding of assets, the finance staff should be acquainted with the modern scientific tools for the presentation analysis of data and lastly. He has suggested optimizing its level of investment as a point of time. The

management of an enterprise desires neither over nor under investment in working capital because both of these situation will erode the efficiency of the concern.

An article relating to working capital is by R.S. Pradhan. He studied on “*The Demand for Working Capital by Nepalese Corporations.*” For the analysis nine manufacturing public corporations were selected with the 12 years data from 1973-1984. for the analysis the regression equation has been adopted. From the study he concluded that: The earlier studies concerning the demand for cash and inventories by business firms did not report unanimous findings. A lot of controversies exists with respect to the presence of economics of scale, rate of capital cost, and capacity utilization rates, and the speed with which actual cash and inventories are adjusted rates to describe cash and inventories respectively. The pooled regression result show the presence of economics of scale with respect to the demand for working capital and its various components. The regression results, suggests strongly that the demand for working capital and its components is a function of both sales and their capital costs. The estimated results shows that the inclusion of capacity utilization variable in the modern seems to have contributed to the demand functions of cash and net working capital only. The effects of capacity utilization on the demand for inventories, receivables and gross working capital are doubtful.

The basic goal of working capital management is to manage the firms current assets and current liabilities in such in away that a satisfactory level of working capital is maintained. Neither over nor under investment in working capital is desire by the management of on enterprise because both of these situations on will erode the efficiency of the concern.

Joshi Arjun Lal (Joshi, 1986) in his study seeks to have true insight into “*The working capital management in Biratnagar Jute Mill*”. The study is concerned with management of current assets and covers five years period (2036/37 to 2040/41). The study has embodied various financial ratios for measuring Biratnagar Jute Mill’s financial viability. The study is based on secondary data with opinion survey method and limited to gross concept of working capital. The study has indicted mismanagement of inventory, no proper policy of cash holding and heavy dependence on short term bank credit. He has recommended for effective working capital management of the mill by planning realistic turnover target specimen, designing effective inventory management program. Following productive investments approach preparing effective sales plan and exhaustive market research program, using short-term bank credit up to certain

reasonable limit, maintaining optimum cash balance and making proper utilization of accumulated collection debts.

Giri Rajendra (Giri, 1986) in his study has attempted to evaluate “*Working Capital Management of Balaju Textile Industry Limited.*” The major findings of his study are no significant improvement in working capital during study period. Increased working capital was financed by sales of fixed assets or sources of shares capital; Current assets was financed by long-term financing and high level of sluggish inventory’s amount to unnecessary tied-up of funds, impairment of profit and increased costs.

He has suggested for efficient working capital management of BTIL. It is better to fix a minimum target rate of return, make regular check to identify both excess and deficient current assets to avoid risk in management of working capital , financing current assets from the appropriate combination of short term and long term sources to preserve liquidity and maintain stability; take necessary actions for disposing a huge inventory with tied up working capital, involved huge carrying cost risk of losses; sick position and working inefficiency or corporation should improve.

He set only three research questions to analyze working capital management of BTIL, which is insufficient. He has used ratio analysis as a research tools. But he has not done analysis to evaluate the relationship of current asset components with total current assets. Similarly, he has set null hypothesis but has not tested it through appropriate tools to finds out whether null hypothesis is accepted or rejected. So we can say it is not fully analytical type of research.

Shrestha Susil Chandra (Shrestha, 1988), in his study has attempted “*An Analytical Study of Working Capital Management in Public Sector Brick Factory*”. He tried to make a comparative assessment of working capital management of public sector brick factories in Nepal. He has analyzed various components of working capital like cash, inventory, receivable and current liabilities. The study is based on two government brick factories. Harisiddhi and Bhaktapur brick factory. He found that there is no proper relation between liquidity turnover and profitability of two brick factories. There is no combination between fixed capital and working capital. The analysis indicates that the working capital portion is totally neglected. He has suggested using financing tools to forecast the working capital. The factories have to keep the record up to date according to stand format. The management must have to be serious regarding working capital management.

His study is basically comparative type. He has analyzed various working capital components through ratio analysis to compare between two bricks factories. He has no used hypothesis test to verify the significance of working capital components between two factors.

Bhandari Anir Raj (Bhandari, 1990) in his thesis entitled “*Working Capital Management (A Case Study of Nepal Bank Limited)*” has done research work for the ten years period, 2034 to 2043 B.S. He has drawn some major findings from his study were as follows: the bank has heavy liquid assets that reflect the improper utilization of the banks fund due to heavy growth in deposit and other borrowed capital; the volume of share capital became insufficient. Rate of return on shareholders investment is considered insufficient; the bank could not fully utilize its fund and not paid attention to the portfolio management in investment.

Shrestha Sunity Dr. (1993) has conducted in her research study on “*Investment Planning of Commercial Bank in Nepal*”

The research findings of the study are summarized as :

- The general trend of commercial banks assets holdings ids growing. A deposit has been a major of fund. The excess reserve level of the banks allows ideal money and loss of opportunity. Debt equality ratios are high, greater than 100%.
- The return ratios are on the average higher for foreign JVBS that for Nepalese bank but return are on the statistically some. Risk taking attitude is higher in foreign JBVS. The total management achievement index is higher in case of for foreign banks in comparison the Nepalese bank.
- The hypothesis that the commercial banks have nonprofessional style of decision making in investment has been acted. The investment of commercial banks in shares and securities are normal and not found to have strategic decision towards investment in shares and securities. Yield from the securities has been found to be satisfactory.
- Investment in various economic sectors shows industrial and commercial sector taking higher share of loan till 1990.
- Investment in various sectors has a positive impact on the national from their respective sectors.

- Lending in priority sector showed cottage and small industry sector sharing higher loans.

The major findings of her study were as follows:

All the selected firms have not successfully been mobilization their deposits but the finance companies have mobilize their deposits smoothly in comparison with JVBS .

- The profitability position of all finance companies was better than of JVBS.
- The liquidity position of JVBS is comparatively better than that of finance companies.
- There is significant relationship between deposit and loan and advances of BOKL. Similarly, there is significant relationship between deposit and total investment, total assets and net profit of Kathmandu finance company.
- The trend value of total deposit, loan and advances, net profit and total investment were in increasing trend.
- The JVBs have less interest risk and capital risk in comparison to finance companies.

Shrestha Prem Kumar (Shrestha, 1994) in his study on “*Working Capital Management in Bhrikuti Paper Mills Ltd.*”, considered the financial statement of this organization for the five fiscal years from 2044/45 to 2048/49 B.S. He has drawn some conclusion from the study. The major components of currents are cash and bank balance, inventories and receivables. Among them cash and bank balance holds the largest portion and has fluctuating trend. Due to the lack of definite credit and collection policy the receivables are increasing year after year. Various turnovers are decreasing which indicate that current assets are not property utilized in the mill. The liquidity position of mill is not bad; it is due to decrease trend of current liabilities. Although, mill is earning profits, its profitability position is not encouraging one because it return on total assets is not high enough.

K.C. Niraj (K.C., 2000) in his thesis entitled “*Comparative Study of Working Capital Management of NBL and NABIL Ltd.*” He has examined the management of working capital in NBL and NABIL. The specific objectives undertaken in his study are:

- ) To study the current assets and current liabilities and their impact and relationship to each other of NBL and NABIL.
- ) To analyze the comparative study of working capital management of NBL and NABIL.
- ) Recommendation and suggestions for the improvement of working capital management NBL & NABIL in the future.

Study has mentioned the following findings:

- ) The average cash and bank balance and loans and advances are higher on NABIL than NBL. Management of loans and advances is more problematic in NBL than NABIL
- ) Interest income of NBL is better than NABIL.
- ) Liquidity management policies of these two banks are significantly different.
- ) NABIL has the better utilization of deposits in income generating activity than NBL. It also shows that NABIL has better investment efficiency in loan and advances.
- ) Due to more conservative working capital policy risk of insolvency is lesser but cost of fund is higher on NBL than NABIL.
- ) Profitability position of NABIL is far better although NBL earned higher interest than NABIL.

Rana Sajana (2004) has conducted thesis research on *"An Investment Policy of Joint Venture Banks in Nepal"*

The major findings are as follows :

- ) The mean ratio of investment of government securities to current assets of NB has been found lower than that of the other banks. Whereas, SCBNL has highest mean ratio in comparison with other banks. Likewise, NB's ratios are less homogenous.
- ) The mean ratio of total investment to total deposit/ ratio of SBI has lowest than other on the other hand SCBNL has the highest mean ratio. Moreover Everest bank ratios are more consistent.
- ) Investment on government securities to total financial investment ratios of NB has lowest mean ratio and SBNL has highest meant ratio. SBI'S ratios are homogenous and NB has less homogenous.
- ) The mean ratio of investment on shares/debentures to total investment ratios of SCBNL has quite lowest ratio and NB highest. NB less homogenous ratio and NABIL has more homogenous ratio.
- ) The trend value of all JVBs has an increasing trend. It means if other things remaining same, JVBs will increase their investment in future.

Lamsal (2004) has conducted research study on “*A comparative study of working capital management of NABIL and SCBNL*”. The main objectives are:

1. To study the current assets and current liabilities and their impact on liquidity and profitability.
2. To analyze the liquidity, assets utilization, long term solvency and profitability position of both banks.
3. To analyze the comparative study of working capital management between NABIL and SCBNL.

Based on his finding, the standard chartered bank should seriously adjust its policy of investment on loan and advances with collected funds and increase their proportion of loan and advances in total current assets. Fixed deposit and saving deposit turnover position are also not satisfactory on both banks. Therefore, NABIL as well as SCBNL and NABIL should give proper attention on collection of over dated loan and advances and utilization of idle fund as well as loan and advances.

The major findings of his study were:

1. The major components of current asset in NABIL and SCBNL are cash and bank balance, loan and advance and government securities.
2. The liquidity position of SCBNL is better than NABIL.
3. The turnover position of NABIL has better than SCBNL. The NABIL has better utilization of depositions ion income generating activity than SCBNL.
4. Long term debt to net worth ratio of NABIL is always higher than SCBNL on that study period.

Sthapit Sushma (2005) has conducted the study on “*Financial Performance of Nepalese Commercial Banks in Nepal*”.

The research findings of the study are as follows:

- ◆ The liquidity position of SCBL has better than other five banks NABIL, BOK, Nepal SBI Bank, NIBL and HBL in respect of current ratio standard should be 2:1. Although, this standard can not be maintained by all commercial banks. HBL has lower current ratio than other five banks.



- ◆ Nepal SBI Bank has better position than other five banks in the case of cash and bank balance with respect to total deposits. In contrast, a high ratio of cash and bank balance may indicate the bank's inability. Thus, in case of NABIL, HBL, NSBI, NIBL and BOK have invested their deposits fund in more productive sector like short-term investment, marketable securities etc. for improving their profitability.
- ◆ Cash and bank balance position with respect to deposits (excluding fixed deposit) in the case of NSBI has better performance against the readiness to serve its customer deposits than other five banks.
- ◆ NSBI has a high ratio of cash and bank balance percentage in respect of current assets. But other remaining five banks have low ratio than NSBI. NSBI's yearly average (19.44%) is higher than composite average (11.11%). Although, yearly average of BOK and NIBL have also covered more than composite average. In contrast, it is clearly seen that cash and bank balance percentage is lowest in case of SCBNL in comparison with other banks.
- ◆ Investment on government securities percentage in respect to current assets, in the case of SCBNL has certainly registered better than other five banks. In the case of NABIL, it has very low ratio with respect of current assets among the six banks.
- ◆ Net profit to total assets ratio in the case of SCBNL has registered better performance by utilizing its overall resources than other five banks. NSBI has low percentage ratio than the other five banks.
- ◆ In the case of SCBNL, it has registered more percentage in respect of net profit to total deposits ratio than other banks i.e. NABIL, BOK, NIBL, NSBI and HBL. Comparatively, SCBNL could earn more profit over the deposit amount than other five banks.
- ◆ SCBNL has appeared better achievement by mobilizing on resources of shareholders' equity than other five banks. This ratio reflects the profitability of the owner's investment of commercial banks. NSBI is not able to mobilizing shareholders equity than other five banks.
- ◆ Return on loan and advances in the case of SCBNL have appeared better achievement by mobilizing their loan and advances.

- ◆ Market price per share of SCBNL has occupied better performance in the competitive open market of investor expectation than other five banks, i.e. NABIL, HBL, NSBI, NIBL and BOK.
- ◆ In case of EPS, SCBNL has earned more profit to its shareholders last fifth year than other five banks. It has registered increasing trend of EPS during the study period.
- ◆ Price-earning ratio of commercial banks is generally fluctuating trend over the different fiscal years. NSBI has occupied better position with the respect to higher P/E ratio over the study period than other five banks. Therefore, NSBI reflects to the investors for confidence to their investment.
- ◆ Market prices to book value ratio of commercial banks are fluctuating trend over the last five different fiscal years. In the case of SCBNL has recorded highest position by securing high yearly average in the comparison of other five banks.
- ◆ Market rate of return of BOK is better than other five banks i.e. NABIL, SCBNL, HBL, NSBI and NIBL.
- ◆ The degree of relationship between deposits and loan and advances of the commercial banks are positive. Moreover, the coefficient of determination of BOK has registered higher value than other five banks.
- ◆ The degree of relationship between loan and advances and net profit of the all commercial banks are positive. Moreover, by considering the coefficient of determination of SCBNL has registered higher value than other five banks.

Shrestha Gita (2008) has conducted thesis research on *"Working capital management of Nepalese Commercial Banks"*

The present research will try to fulfill the following specific objectives.

- a) To evaluate working capital of the banks and analyze their assets structure and their implications.
- b) To analyze of working capital trend position of selected Bank.
- c) To analyze the financial position of these selected banks by using different tools and techniques.

- d) To shed light on creation and mobilization of fund in EBL and SCBNL.

The major conclusions are as follows :

- a) The mean ( $\bar{X}$ ) of cash reserve ratio of EBL and SCBNL are 11.93 and 7.42 respectively. Standard deviation of cash reserve ratio of EBL and SCBNL are 3.066 and 1.546 respectively. Coefficient of variation of EBL is 25.70% and SCBNL is 20.84%.
- b) SCBNL is maintaining adequate liquidity position regarding cash reserve ratio than EBL. Too low ratios are also not preferable bank should meet its obligations any time when necessary.
- c) The mean ( $\bar{X}$ ) of loans and advances to current assets ratio of EBL and SCBNL are 55.414, 64.078 and 32.756 respectively The loans and advances to current assets ratio of EBL and SCBNL is fluctuated.
- d) The debt to total assets ratio of the banks are fluctuating. Comparatively, SCBNL is more at riskier position of debt financing than other two banks because of higher average (mean).
- e) EBL has emerged as having a large volume of banking operations, mainly its deposits and lending in the light of its greater deposits and greater credits compared to SCBNL.
- f) The profitability ratios of the selected banks are fluctuating over the study period. To make bank's profitability and return from loans and advances is satisfactory; the banks should really make an effort in loans and advances efficiently to generate adequate level of return.
- g) T-test between two variables of EBL and SCBNL is greater than the tabulated value of t for 8 degree of freedom at 5% level of significance for two variables test so that, it is significant.

Sharma Subedi Kali Prasad (2010) has conducted thesis research on "*Analysis of working capital management of Joint Venture Banks in Nepal*"

He tries to fulfill the following specific objectives.

- a) To evaluate working capital of the banks and analyze their assets structure and their implications.
- b) To analyze of working capital trend position of selected Bank.

- c) To shed light on creation and mobilization of fund in EBL, NABIL and SCBNL.

The major conclusions are as follows :

- a) The mean ( $\bar{X}$ ) of current ratio of EBL is 1.05:1 as well as SCBNL is 1.068:1. This is lesser than the standard current ratio 2:1. The banks are unable to maintain the current ratio in accordance with standard.
- b) SCBNL is maintaining adequate liquidity position regarding cash reserve ratio than EBL. Too low ratios are also not preferable bank should meet its obligations any time when necessary.
- c) EBL has emerged as having a large volume of banking operations, mainly its deposits and lending in the light of its greater deposits and greater credits compared to SCBNL.
- d) The profitability ratios of the selected banks are fluctuating over the study period. To make bank's profitability and return from loans and advances is satisfactory; the banks should really make an effort in loans and advances efficiently to generate adequate level of return.
- e) The coefficient of correlation between two variables (i.e. current assets and current liabilities, total deposit and net profit and total deposit and loans & advances) of the selected banks is nearly 1 so, high degree of positive correlation between these two variables. It also reveals that relationship between two variables of the selected banks is closer to perfect correlation. Correlation of coefficient (r) is greater than 6P.E. Therefore it reveals that relationship between two variables is significant.

Ukyab Datala (2011) has conducted thesis research on "*working capital management of Commercial Banks*". The main objectives were:

- a) To evaluate working capital of the sample banks and analyze their assets structure and their implications.
- b) To analyze of working capital trend position of selected bank.
- c) To evaluate the financial position of these selected banks by different tools and techniques.
- d) To shed light on creation and mobilization of fund in EBL and SCBNL.

Major findings of the study:

- i) The major components of current assets of EBL and SCBNL are cash and bank balance, loan and advance, government securities and miscellaneous current assets and current liabilities are deposit liabilities, bills payables, income tax liabilities, dividend liabilities and other current liabilities. The leveled of current assets and current liabilities are in increasing trend over the study period.
- ii) The liquidity positions of EBL and SCBNL is not very poor but the rule of thumb the standard ratio should be 2:1. The banks are unable to maintain the current ratio in accordance with standard.
- iii) The trend of current assets of EBL is increasing each year but SCBNL increasing up to year 2065/66 and decrease in 2066/67. A total current asset of EBL is less than the SCBNL up to 2064/65, after that current assets of EBL is more than the SCBNL. In 2066/67 the difference of current assets between EBL and SCBNL is 10530.81 million.
- iv) The level of net working capital of EBL is in increasing trend over the period of time. During the study period of 5 years from 2063/64 to 2066/67, the highest amount of net working capital is Rs.11177.9 million in 2066/67 and that of lowest amount is Rs.4467.56 million in 2062/63. The working capital position of SCBNL is negative in first two years and then increasing.
- v) The highest debt –assets ratio of SCBNL is 93.19 percentage in 2062/63 and that of lowest is 91.62 percentage in 2066/67. The highest debt equity ratio is 45.64 percentage in 2063/64 and that of lowest is 43.75 percentage in 2062/63. Over the study period the debt assets ratio and debt-equity ratio of SCBNL is in fluctuating trend.
- vi) The highest loan and advance to total deposit ratio od SCBNL is 45.35 percentage in 2066/67 and that of lowest is 38.70 percentage in 2065/66. The highest net working capital to total assets ratio is 10 percentages in 2066/67 and that of lowest is -3.65 percentages in 2063/64. Over the study period the loan and advance to total deposit ratio and working capital to total assets ratio of EBL is in fluctuating trend.

- vii) The coefficient of correlation between current ratio and quick ratio of EBL is 0.709 i.e. there is high degree of positive correlation between two variables. It means correlation co-efficient between current ratio and quick ratio of EBL is perfect correlation.
- viii) The coefficient of correlation between current ratio and quick ratio of SCBNL is 0.10 i.e. there is positive correlation between two variables. It means correlation co-efficient between current ratio and quick ratio of SCBNL is positive correlation.

Basnet Chhetri Sumita (2011) has conducted thesis research on “*A study on working capital management of Bottlers Nepal Terai (Ltd.)*”. The main objectives were:

- a) To analyze the current assets and current liabilities with the working capital practices of BN(T)L and their impact and relationship to each other.
- b) To evaluate the liquidity, long term solvency, assets utilization and profitability position of BN(T)L.
- c) To analyze the past and future trend and growth position of variable in relation to working capital.
- d) To provide appropriate suggestions.

The major findings are as follows:

- i) The major components of working capital are inventories. Sundry debtors, cash and bank balance. The average inventory is 127.80 million which is 35.22% of total current assets. The average debtors is 70.40 million which is 15.89% of total current assets. The average cash and bank balance is 26.20 million which is 7.001% of total current assets and last the average prepaid, advance, loan and deposit is 161.80 million which is 41.89% of total current assets.
- ii) The prepaid, advance, loan and deposits hold the highest portion i.e. 41.89% and cash and bank balance hold lowest portion i.e. 7.01% of total current assets.
- iii) The average sales volume of the company for the study period is 433.20 million, where SD is 54.26 million and CV is 0.13.
- iv) The average CA of the company for the study period is 386.6 million, where SD and CV is 145.85 million and 0.38 respectively. The CA is

highest than sales in first two years. The average portion of CA on sales is 87.85%.

- v) The average fixed asset for the study period is 191.6 million. The average portion of CA on FA is 239.53%, where the SD and CV is 76.03 million and 0.40 respectively.
- vi) The average total asset for the study period is 578.20 million. The average portion of CA on TA is 65.49%, where the SD and CV is 14.50 million and 0.22 respectively.
- vii) The average of net profit for the study period is 15.16 million where 24.77 million SD and CV 1.59. There is net loss of 26 million in the year 2065/65. The average NPM is 3.08%, where SD is 6.08 and CV is 1.97.
- viii) The correlation coefficient of inventory and sales is positive. It means the sales volume of the company is changed in the direction of the volume of inventories changed.
- ix) The correlation coefficient of receivable and sales is positive. It means the company easily can think of credit sales.
- x) The correlation coefficient of current and total assets with gross profit is positive. It means the company can increase in investment of CA and TA to increase the gross profit.

## **2.4 Research Gap**

The above review of literature from various books, journals and articles related to the working capital management show that the one of the major problem in Nepalese organizations behind unhealthy and unsound situation improper management of working capital. Since the success and failure of any organizations is heavily dependent upon the efficiency management of working capital and being a service oriented organization established in Nepal, the efficiency in the management of working capital of Hydropower Company should be analyzed. So this study attempts to analyze the working capital management in Hydropower Company. By taking 5 years data for observation and other available information with the help of methodology as described in the following chapter.

# CHAPTER - III

## RESEARCH METHODOLOGY

### 3.1 Introduction

The process of searching again and again is known as research. The process of investigation involves services of well-thorough activities of gathering, recording, analyzing and interpreting the data with the purpose of finding answer problem. Thus the entire process by which we attempt to solve problems or search answer of question is called research.

Research methodology may be defined as “a systematic process that is adopted by the researcher in studying problem with certain objective and view”. In other word, research methodology describes the methods and process applied in the entire aspect of the study focus of data, data gathering instrument and procedure, data tabulating and processing and methods of analysis. It is really a method of critical thinking by defined and redefining the problems, formulating hypothesis or suggested solution and collecting and organizing and evaluating data, making deduction and making conclusions.

“Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. In this study, the various steps are generally adopted by a researcher in studying his/her research problem along with the logic behind them.” (Kothari, 1990; 10)

Research methodology is a way to systematically solve the research problem. We study the various steps that are generally adopted by a researcher, studying his/her research, problem among with the logic behind them.

The basic objective of this study is to evaluate working capital management two hydropower’s namely Chilime Hydropower Company Limited and Butwal Power Company Limited. The context refers to the approach of the research process from theoretical foundation to the collection and analysis of the data. This study used the descriptive part based on both technical aspect and logical aspect on the basis of secondary data.

### 3.2 Research Design

Research design is the plan, structure and strategy of the investigation conceived so as to obtain answer to research question and to control variable.



By research design means the overall framework or plan for the collection and analysis of data. The research design service as a framework for the study, guiding the collection and analysis of the data then focuses on the data collection methods, the research instruments utilized and the sampling plan to be followed. To achieve desired end descriptive cum analytical research methodology.

### **3.3 Population and Sample**

Population refers to the entire group of people events or things of interest that the researcher wishes to investigate. When some of the elements are selected with the intention of finding out something about the population from which they are taken, that group of elements is referred as a sample and the process of selection is called sampling. Simply, speaking the method of selection a portion of the universe with a view to draw conclusions about the universe under study is known as sampling population of study is all the companies listed in NEPSE has been considered as the population of the study. But for this study, overall a listed common stock has been considered as the population and samples are the common stock of two listed hydropower companies.

### **3.4 Sources of Data**

Secondary data defined as data collection earlier for a purpose other than the one currently being focused. This study heavily depends upon secondary sources of data, which had been used and published on books, booklet, Internet and magazines. Most of the data are taken from the annual reports, trading reports and financial statements of CHPCL and BPCL published by respective companies and also from the NEPSE.

### **3.5 Method of Data Collection**

It indicates the sources of data and how they collected. In this study data are collected through primary source (questionnaires) and secondary source. They were collected from the correspondent offices and their respective websites.

The annual reports of CHPC for the period of five years were obtained from the field visit of its Human Resources Department at its head office located at

Dillibazar, the annual reports of BPC for the period of five years were obtained from the field visit of its head office at New Baneshwor. The data regarding the profile of CHPC and BPC and other related documents were collected from internet websites. Unpublished master's thesis, books, research papers, articles, journals have been collected mainly from Centre Library of Tribhuvan University, library of Shanker Dev Campus, Public Youth Campus and Magazines and newspapers were from concerned authorities.

After collecting data, as necessarily required, they were separated and analyzed. Presentation and analysis of the collected data is the main theme of the research work. Collected raw data were first presented in systematic manner in tabular forms and then analyzed by applying different financial and statistical tools to achieve the research objectives. Besides these, some graph, charts and tables have been presented to analyze and interpret the finding of the study. Hypothesis is also made and tested.

### **3.6 Method of Data Analysis**

Various financial and statistical tools will be used to complete the research study such as ratio analysis, standard deviation, coefficient of variance, coefficient of correlation, t-statistics etc. For presentation purpose, different types of tables, charts, figures and graphs are used as per necessary.

#### **3.6.1 Financial Tools**

Financial analysis is the process of identifying the financial strengths and weaknesses of the organization by properly establishing relationships between the items of the balance sheet and the profit and loss account.

Ratio analysis is a powerful tool of financial analysis. A ratio is designed as "the indicated quotient of two mathematical expressions" and as "the relationship between two or more things". In financial analysis, ratio is used as a yardstick for evaluating the financial position and performance of a firm.

Several ratios, calculated from the accounting data, can be grouped into various classes according to the financial activity and function to be evaluated.

### 3.6.1.1 Liquidity Ratios

Liquidity ratios are used to judge the ability of hydropower companies to meet its short term liabilities those are likely to mature in the short period. With the help of liquidity ratios much insight can be obtained into present cash solvency of the hydropower companies and its ability to remain solvent in the event of adversities, it is the measurement of speed with which a hydropower company's assets can be converted into cash to meet other current obligations.

The following ratios are evaluated under liquidity ratios:

- a) **Current Ratio:** This ratio indicates the ability of the hydropower company to meet its current obligation. This is the main important tool to measures the liquidity position of the company.

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

- b) **Quick Ratio:** Cash and bank balance are the most liquid current assets. This ratio measures the quick assets of the hydropower company to current liabilities. Quick assets mean current assets minus stock and prepaid expenses. It is computed as follows:

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

### 3.6.1.2 Turnover Ratios

Activity ratios measure the effectiveness with which a firm uses its available resources. These ratios help in commenting on the efficiency of the enterprise in managing its assets. These ratios are also called 'Turnover Ratios' since they indicate the speed with which the resources are being turned (or converted) into sales. Usually the following turnover ratios are calculated:

- a) **Stock Turnover Ratio:** This ratio indicates the relationship between the cost of goods sold during the year and average stock kept during the year. This ratio indicates whether stock has been efficiently used or not. It shows the speed with which the stock is rotated into sales or the number of times the stock is turned into sales during the year. The higher the ratio, the better it is, since it indicates that stock is selling quickly.

$$\text{Inventory or Stock Turnover Ratio} = \frac{\text{Net Sales}}{\text{Closing Inventory or Stock}}$$

- b) **Debtors or Receivable Turnover Ratio:** This ratio indicates the relationship between credit sales and average debtors during the year. Actually, this ratio shows that the period within which the average receivables or debtors are collected. It indicates the credit policy of the company and its ability to collect the receivables. The debtors or receivables turnover ratio is calculated by dividing net credit sales by average debtors or receivables. The higher the ratio, the better it is, since it indicates that amount from debtors is being collected more quickly. If the amount of credit sales is not given in the question, the ratio may be calculated by taking the figure of total sales.

$$\text{Debtors Turnover Ratio} = \frac{\text{Net Sales}}{\text{Debtors \& Receivables}}$$

- c) **Fixed Assets Turnover Ratio:** This ratio establishes a relationship between net sales and fixed assets. The objective of computing this ratio is to determine the efficiency with which the fixed assets are utilized. Higher ratio indicates more efficient the management and utilization of fixed asset and vice-versa. The following formula is used for measurement of the ratio.

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Net Sales or Cost of Goods sold}}{\text{Net Fixed Assets}}$$

- d) **Total Assets Turnover Ratio:** It indicates the firm's ability to generate sales due to the investment in total assets. Total assets are used in the business for producing goods to be sold. The effective utilization of total asset will result in increased production and reduced cost. Higher ratio indicates more efficient the management and utilization of total asset and vice-versa. The formula is used for calculation of this ratio is:

$$\text{Total Assets Turnover Ratio} = \frac{\text{Net Sales}}{\text{Total Assets}}$$

- e) **Capital Employed Turnover Ratio:** This ratio measures the efficiency of capital employed is being used in the business. It shows how many times the capital is rotated into sales. This ratio is significant, because it informs to the management how capital employed are used to generate its sales revenue. It indicates the firm's ability to generate sales per rupee of capital employed. Higher ratio indicates more efficient the management and utilization of capital employed and vice versa. The formula is used for calculation of this ratio is:

$$\text{Capital Employed Turnover Ratio} = \frac{\text{Net Sales}}{\text{Capital Employed}}$$

### 3.6.1.3 Profitability Ratios

"A company should earn profit to survive and grow over a long period of time Profits are essential, but it would be wrong to assume that every action initiated by management to company should be aimed at maximizing profits."

Profitability ratios indicate the degree of success in achieving desired profit. Various profitability ratios are calculated to measure the operating efficiency of business enterprises. Through profitability ratio the lenders and investors want to decide whether to invest in a particular business or not.

- a) **Return on Total Assets:** This ratio is measured the rate of return earned by the firm as a whole for all its investors. It is calculated by dividing net profit by total assets. A higher ratio indicates the efficiency of overall financial resources to invest. So that, the higher ratio, the better will be the performance. Return on total assets in computed by using the following formula.

$$\text{Return on Total Assets} = \frac{\text{Net profit after tax}}{\text{Total Assets}}$$

- b) **Return on Shareholder's Equity:** This ratio is measure of profitability of the firm in respect of the utilization of total shareholders fund. It is calculated by dividing net profit by total shareholder's equity. The shareholder's equity includes paid up capital, general reserves, and retained earnings of surplus & general loan loss provision. It reflects whether the corporation has earned a satisfactory return for its equity-holders of not. So, higher ratio is favorable of the stockholders.

$$\text{Return on Total shareholder} = \frac{\text{Net profit after tax}}{\text{Total shareholder's equity}} \times 100\%$$

- c) **Return on Capital Employed:** This ratio establishes a relationship between the total earnings available to all the investors and permanent capital. It shows how well the firm has used the economic resources received from all the investors to earn profit. This ratio is calculated as:

$$\text{Return on Capital Employed} = \frac{\text{NPAT}}{\text{Capital Employed}}$$

### **3.6.1.4 Net Working Capital**

Net Working Capital refers to the difference between current assets and current liabilities. The need for this concept arises because the gross concept fails to consider current liabilities. The current liabilities are those liabilities, which can be claimed by outsiders /suppliers within a year. It includes account payable, bills payable and outstanding expenses. The concept of net working capital helps the management to look for permanent sources for its financing since working capital under this approach, does not increase with increases in short term borrowing. Net working capital can be positive and negative. A negative net working capital occurs when current liabilities are in excess of current assets.

$$\text{Net Working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

### **3.6.1.5 Inventory conversion period (ICP)**

The inventory conversion period is the average length of time required to convert material into finished goods and then to sell those goods. Inventory conversion period is calculated by dividing inventory by the cost of goods sold per day.

$$\text{Inventory Conversion Period (ICP)} = \frac{\text{Inventory}}{\frac{\text{cost of goods sold}}{360 \text{ days}}}$$

### **3.6.1.6 Receivable conversion period (RCP)**

The receivable conversion period is the average length of time required to convert the firm's receivable into cash. It is also called day's sale outstanding (DSO) and it is calculated by dividing account receivable by the average credit sales per day.

$$\text{Receivable Conversion Period (RCP)} = \frac{\text{receivable}}{\text{Average credit sale per day}}$$

### 3.6.1.7 Payable deferred period (PDP)

The payable deferred period is the average length of time between the purchase of raw material and labour and payment of cash for them. It is computed by dividing account payable by the daily credit purchases.

$$\text{Payable Deferral Period (PDP)} = \frac{\text{Account payable}}{\text{Credit purchase per day}}$$

### 3.6.1.8 Cash Conversion Cycle (CCC)

The cash conversion cycle is the average length of time between payment for the purchase of labour and raw materials to manufacture a product until the collection of the account receivable associated with the sales of the product. The cash conversion cycle determine using the following equation:

$$\text{Cash Conversion Cycle (CCC)} = \text{ICP} + \text{RCP} - \text{PDP}$$

## 3.6.2 Statistical Tools

In this study, some important statistical tools have been used to present and analyze the data for achieving the objectives. Such as coefficient of correlation between different variables has been used, which are presented below:

- i) Karl Pearson's of Coefficient of Correlation Analysis
- ii) Coefficient of Variation (C.V)
- iii) Standard Deviation (S.D)
- iv) Probable Error (P.E)

### 3.6.2.1 Mean

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

n = Number of Year

X = Sum of X series

### 3.6.2.2 Standard Deviation

$$\text{Standard Deviation } (\Xi) = \sqrt{\frac{\phi d^2}{n} - \frac{\phi d}{n}^2}$$

Where,  $d = X - \bar{X}$

### 3.6.2.3 Coefficient of Variance

$$\text{Coefficient of Variance (CV)} = \frac{\Xi}{\bar{X}}$$

### 3.6.2.4 Coefficient of Correlation

$$\text{Coefficient of Correlation (r)} = \frac{\phi d_1 \cdot d_2}{\sqrt{\phi d_1^2 \cdot \phi d_2^2}}$$

Where,  $d_1 = X_1 - \bar{X}_1$

$$d_2 = X_2 - \bar{X}_2$$

Under this topic, Karl Pearson's correlation coefficient is used to measure the degree of relationship between the following variables:

- a) Coefficient of correlation between Current assets and Current Liabilities
- b) Coefficient of correlation between Net Working Capital and Net Profit

### 3.6.2.5 Probable Error (P.E)

Probable error is measured for testing the reliability of an observed value of correlation coefficient. It is computed to find the extent to which it is dependable. If correlation coefficient is greater than 6 times P.E the observed value of  $r$  is said to be significant, otherwise nothing can be concluded with certainty. But if the calculated ( $r$ ) is less than the P.E correlation is not at all significant. It is calculated by using following formula:

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

Where,

P.E. = Probable error of correlation coefficient

$r$  = Correlation coefficient



n = Number of observations

### 3.6.2.6 Trend Analysis

Trend analysis is a sequence of observation of a variable made at a regular points or intervals of time and arranged in chronological order. The trend analysis shows the future train of any variables based on the historical information. The expectation and growth situation of financial information can be made by the trend analysis. There are many method of trend analysis, among them only least square method is used to study purpose. The least square method is used to study purpose. The least square method is used to fit a straight line trend to forecast trend the trend value of future. The straight line trend is represented by the equation.

$$Y_c = a + bx$$

Where,

$Y_c$  = Trend value of Y variables

Y = Financial variables of BPCL & CHCL

b = Slope of trend line

X = Time i.e independent variable

a = Y interceptor computed trend figure of Y variable

When X = 0,

The Following two simultaneous equation to be solved to find out the value of a & b then estimate trend equation.

If  $X = 0$

Then,  $a = Y/Y$

$b = XY/ X$

In this study trend analysis of cash and bank balance, loan and advances, stock and receivables are analyzed.

# CHAPTER - IV

## PRESENTATION AND ANALYSIS OF DATA

### 4.1 Introduction

The main objective of this chapter is to present data and analyze them with the helps of various financial and statistical tools. This chapter consists of analysis and presentation of empirical data. The important variables are very sensitive and taken into consideration. So this chapter will present the analysis of components of working capital of selected hydropower companies listed in Nepal Stock Exchange. The major ratios for the study are liquidity ratios, turnover ratios, profitability ratios and composition of working capital. The variables of the ratios indicated above are also tried to study in details. Firstly it is attempted to deal about the working capital policies followed by listed hydropower companies and then financial position of success/failure companies has been analyzed applying various methods.

### 4.2 Working Capital Policy and Trend Analysis

Working capital policy can be categorized into three categories viz. aggressive, moderate and conservative policy. Hydropower companies listed in NEPSE have also followed the above mentioned types of working capital policies. The firms use to adopt different working capital policies according to the financial managers' attitude towards the risk return. One of the most important decisions of financial manager is how much current liabilities should be used to finance current assets. Hence, it is tried to analyze on the basis of various variables and ratios of the selected hydropower companies taking five years data to indicate working capital policy followed by them. The analysis is done company wise as well as period wise.

#### 4.2.1 Analysis of Composition of Current Assets

Every company has to maintain the appropriate level of current assets to run the business smoothly because the success/failure of any company depends upon the proper management of current assets. The level of current assets is analyzed as hydropower company-wise and year-wise respectively.

##### 4.2.1.1 Various Components of Current Assets

The main components of current assets at BPCL and CHCL are cash and bank balance, loan and advances, stock and receivables are also the components of it.

**Table 4.1**

#### ***Components of Current Assets of BPCL***

(Rs. in '000)

Year	Cash & Bank	Loan &	Stock	Receivable	Total Current
------	-------------	--------	-------	------------	---------------

	Balance	Advances			Assets
2064/65	457035	72564	58896	58918	647416
2065/66	412635	170447	74647	88407	746136
2066/67	291687	188068	92723	171359	743837
2067/68	234888	218398	104543	93690	651519
2068/69	44902	287936	83413	184140	600391
Average	818229.4	187482.6	188864.4	119302.8	677859.8

*Source: Annual Reports of BPCL (Appendix –I)*

Above table 4.1 shows the components of current assets of the company are Cash & Bank Balance, Loan & Advances, stock and receivables. BPCL has the highest level of current assets of Rs. 746136 thousand in the year 2065/66 and the lowest level of current assets of Rs. 600391 thousand in the year 2068/69. On average it holds the level of current assets of Rs. 677859.8 thousand.

BPCL has the highest level of Cash & Bank Balance in 2064/65 and lowest level in 2068/69. Similarly it has highest level of Loan & Advances, stock and receivables in 2068/69, 2067/68 and 2068/69 respectively but it has lowest level of Loan & Advances, stock and receivables in 2064/65, 2064/65 and 2064/65 respectively.

The components of current assets of the company are Cash & Bank Balance, Loan & Advances, stock and receivables whose average amount in five years are Rs.818229.4, Rs.187482.6, Rs.188864.4 and Rs.119302.8 thousand respectively.

**Table 4.2****Components of Current Assets of CHCL****(Rs. in '000)**

Year	Cash & Bank Balance	Loan & Advances	Stock	Receivable	Total Current Assets
2064/65	34228	11519	12094	183961	241801
2065/66	277110	157107	22322	189692	646231
2066/67	248471	601054	36894	108656	995075
2067/68	44129	1165578	30902	209483	1450093
2068/69	73456	1714204	53455	205170	2046285
Average	135478.7	729892.5	31133.3	179392.4	1075896.9

Source: Annual Reports of CHCL (Appendix –I)

Above table 4.2 shows the components of current assets of the company are Cash & Bank Balance, Loan & Advances, stock and receivables. CHCL has the highest level of current assets of Rs. 2046285 thousand in the year 2068/69 and the lowest level of current assets of Rs. 241801 thousand in the year 2064/65. On average it holds the level of current assets of Rs. 1075896.9 thousand.

CHCL has the highest level of Cash & Bank Balance in 2065/66 and lowest level in 2064/65. Similarly it has highest level of Loan & Advances, stock and receivables in 2068/69, 2068/69 and 2067/68 respectively but it has lowest level of Loan & Advances, stock and receivables in 2064/65, 2064/65 and 2066/67 respectively.

The components of current assets of the company are Cash & Bank Balance, Loan & Advances, stock and receivables whose average amount in five years are Rs.135478.7, Rs.729892.5, Rs.31133.3 and Rs.179392.4 thousand respectively.

**Table 4.3****Components of Current Assets of BPCL (Percentage)**

Year	Cash & Bank Balance	Loan & Advances	Stock	Receivable	Total Current Assets
2064/65	70.59	11.21	9.10	9.10	100.00
2065/66	55.30	22.84	10.00	11.85	100.00
2066/67	39.21	25.28	12.47	23.04	100.00
2067/68	36.05	33.52	16.05	14.38	100.00
2068/69	7.48	47.96	13.89	30.67	100.00
Average	42.52	27.66	12.22	17.60	100.00

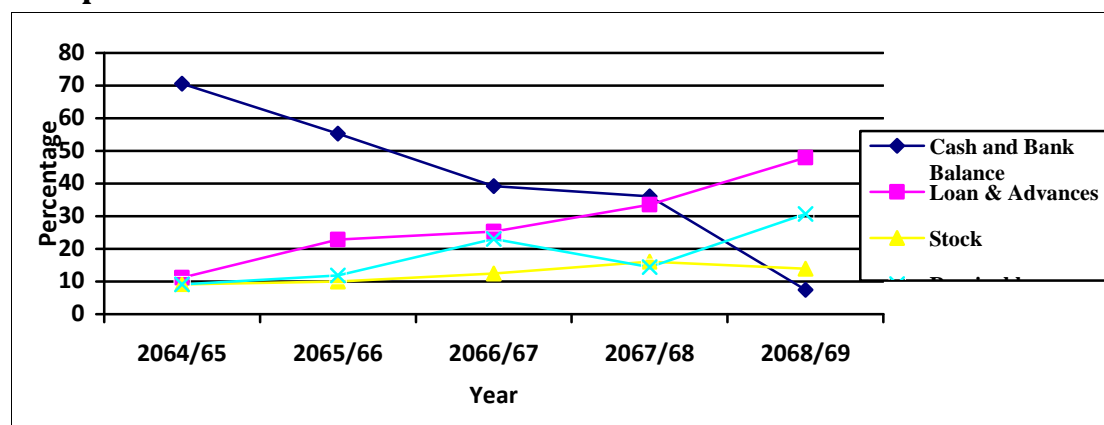
Above table 4.3 and the below graph 4.1 shows that BPCL has the highest level of Cash & Bank Balance in current assets of 70.59 percentages in the year 2064/65 and the lowest level of it in current assets of 7.48 percentages in the year 2068/69. It holds average percentages 42.52 in five years. The level of Loan & Advances is highest in

2068/69 and that of lowest in 2064/65. It holds average percentages 27.66 in five years.

The level of stock in current asset is highest in 2067/68 and that of lowest in 2064/65. The company holds the level of it in current assets of 12.22 percentages on average. Similarly the level of receivables is highest in 2068/69 and that of lowest in 2064/65. The company holds the level of it in current assets of 17.60 percentages on average.

**Graph 4.1**

**Components of Current Assets of BPCL**



**Table 4.4**

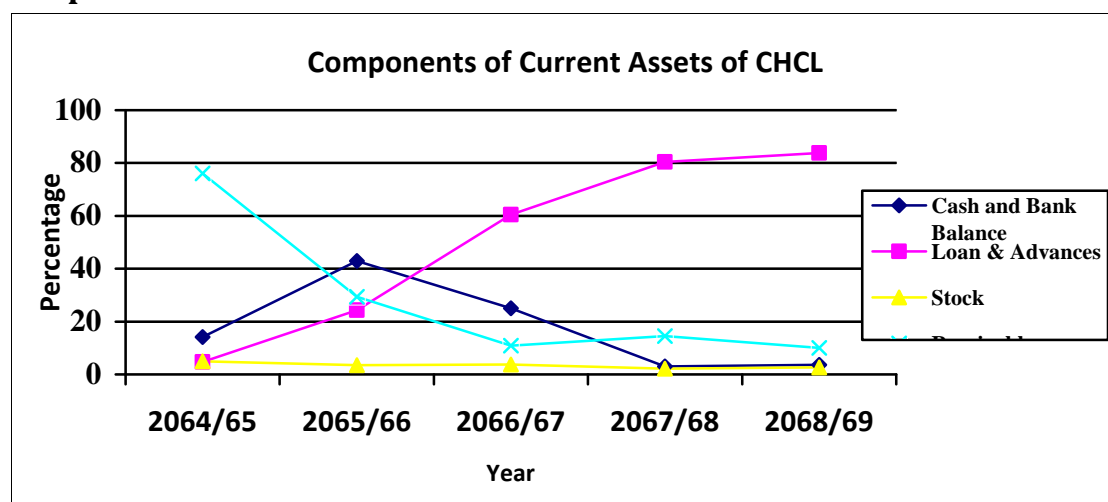
**Components of Current Assets of CHCL (Percentage)**

Year	Cash & Bank Balance	Loan & Advances	Stock	Receivable	Total Current Assets
2064/65	14.16	4.76	5.00	76.08	100
2065/66	42.88	24.31	3.45	29.35	100
2066/67	24.97	60.40	3.71	10.92	100
2067/68	3.04	80.38	2.13	14.45	100
2068/69	3.59	83.77	2.61	10.03	100
Average	12.59	67.84	2.89	16.67	100

Above table 4.4 and the below graph 4.2 shows that CHCL has the highest level of Cash & Bank Balance in current assets of 42.88 percentages in the year 2065/66 and the lowest level of it in current assets of 3.04 percentages in the year 2067/68. It holds average percentages 12.59 in five years. The level of Loan & Advances is highest in 2068/69 and that of lowest in 2064/65. It holds average percentages 67.84 in five years.

The level of stock in current asset is highest in 2064/65 and that of lowest in 2067/68. The company holds the level of it in current assets of 2.89 percentages on average. Similarly the level of receivables is highest in 2064/65 and that of lowest in 2068/69. The company holds the level of it in current assets of 16.67 percentages on average.

**Graph 4.2**



### 4.2.1.2 Trend of Cash and Bank Balance

Cash and bank balance is one of the major components of current assets of the companies. Cash and bank balance of BPCL is decreased over the study period. The level of it is highest with 70.59 percentages in the current assets of the company in the year 2064/65 of the period where as it coverage the lowest percentages of 7.48 in the year 2068/69 of the study period. The average level of cash and bank balance of the company in current assets is 42.52 percentages.

But, cash and bank balance of CHCL is fluctuated over the study period. The level of it is highest with 42.88 percentages in the current assets of the company in the year 2065/66 of the period where as it coverage the lowest percentages of 3.04 in the year 2067/68 of the study period. The average level of cash and bank balance of the company in current assets is 12.59 percentages.

The study shows that the average level of cash and bank balance i.e. 42.52 percentages of BPCL is higher than that of CHCL i.e. 12.59 percentages during the study period. It is plot in the trend line which is as follows:

**Table 4.5**

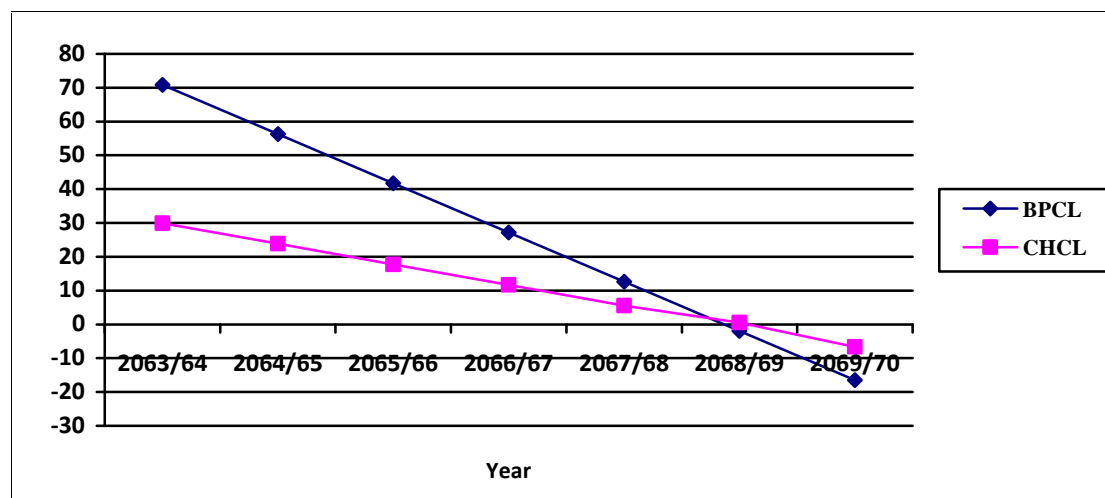
#### *The trend line of cash and bank of the selected company*

Company \ Year	2063/64	2064/65	2065/66	2066/67	2067/68	2068/69	2069/70
BPCL	70.82	56.273	41.726	27.179	12.632	-1.915	-16.462
CHCL	29.924	23.826	17.728	11.63	5.532	0.566	-6.664

Source: (Appendix –XX)

**Graph 4.3**

**Trend line of cash and bank of BPCL & CHCL**



The above graph shows the trend line of cash and bank of the selected hydropower company. The trend line of cash and bank is gradually decreased in every year. BPCL is decreased from 70.82 to -16.462 and CHCL is also decreased from 29.924 to -6.664.

#### 4.2.1.3 Trend of Loan and Advances

Loan and advance is the another major components of current assets of the companies. Loan and advance of BPCL is increased over the study period. The level of it is highest with 47.96 percentages in the current assets of the company in the year 2068/69 of the period where as it coverage the lowest percentages of 11.21 in the year 2064/65 of the study period. The average level of loan and advance of the company in current assets is 27.66 percentages.

Similarly, loan and advance of CHCL is also increased over the study period. The level of it is highest with 83.77 percentages in the current assets of the company in the year 2068/69 of the period where as it coverage the lowest percentages of 4.76 in the year 2064/65 of the study period. The average level of loan and advance of the company in current assets is 67.84 percentages.

The study show that the average level of loan and advances i.e. 67.84 percentages of CHCL is higher than that of BPCL i.e.27.66 percentages during the study period. It is plot in the trend line which is as follows:

**Table 4.6**

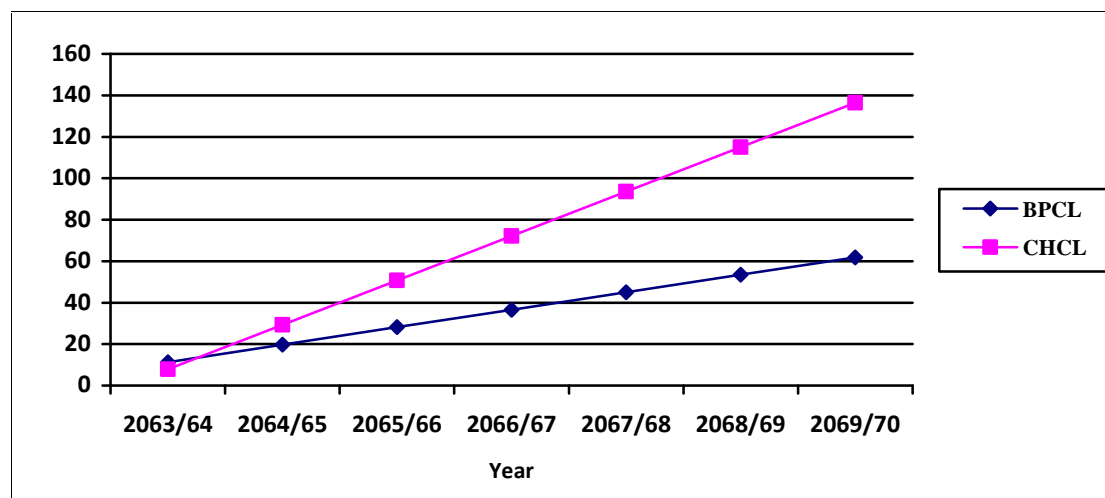
**The trend line of loan and advances of the selected company**

Company \ Year	2063/64	2064/65	2065/66	2066/67	2067/68	2068/69	2069/70
BPCL	11.326	19.744	28.162	36.58	44.998	53.416	61.834
CHCL	7.906	29.315	50.724	72.133	93.542	114.951	136.36

Source: (Appendix –XXI)

**Graph 4.4**

**Trend line of loan and advances of BPCL and CHCL**



The above graph shows the trend line of loan and advances of the selected hydropower company. The trend line of loan and advances is gradually increased in every year. BPCL is covered from 11.32 to 61.834 and CHCL covered from 7.90 to 136.36.

#### 4.2.1.4 Trend of Stock

The stock is the next major component of current assets of the companies. The stock of BPCL is increased except 2068/69 over the study period. The level of it is highest with 16.05 percentages in the current assets of the company in the year 2067/68 of the period where as it coverage lowest percentages of 9.10 in year 2064/65 of the study period. The average level of stock of the company in current assets is 12.22 percentages.

But, the stock of CHCL is also fluctuated over the study period. The level of it is highest with 5 percentages in the current assets of the company in the year 2064/65 of the period where as it coverage lowest percentages of 2.13 in year 2067/68 of the study period. The average level of stock of the company in current assets is 2.89 percentages.

The study shows that the average level of stock i.e. 12.22 percentages of BPCL is higher than that of CHCL i.e. 2.89 percentages during the study period. It is plot in the trend line which is as follows:

**Table 4.7**

**The trend line of stock of the selected company**

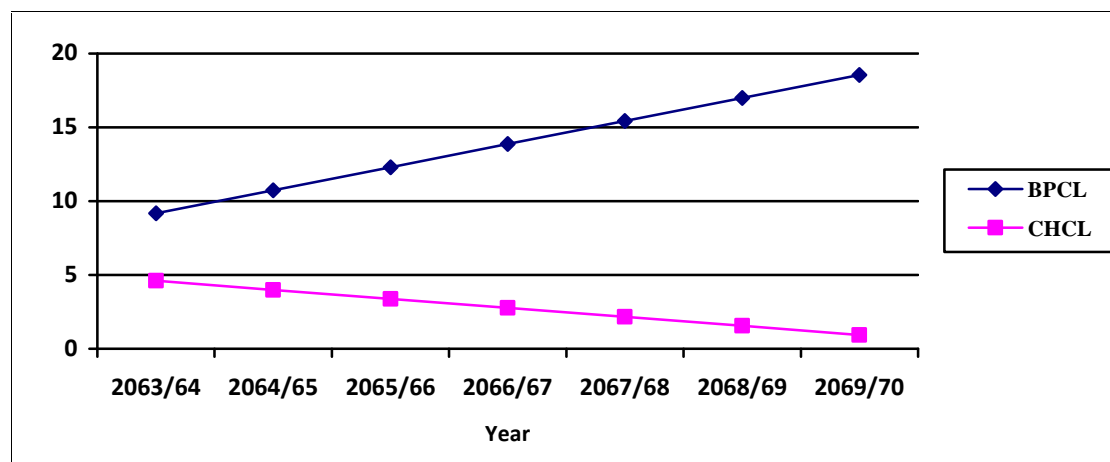
Year \ Company	2063/64	2064/65	2065/66	2066/67	2067/68	2068/69	2069/70
BPCL	9.176	10.739	12.302	13.865	15.428	16.991	18.554
CHCL	4.6	3.99	3.38	2.77	2.16	1.55	0.94

Source: (Appendix –XXII)



**Graph 4.5**

**Trend Line of Stock of the BPCL and CHCL**



The above graph shows the trend line of stock of the selected hydropower company. The trend line of stock of BPCL has gradually increased in every year but the trend line of stock of CHCL has slightly decreased in every year. BPCL is increased from 9.17 to 18.554 and CHCL decreased from 4.6 to 0.94. Trend line of stock of BPCL is just opposite of CHCL’s trend line of stock.

#### **4.2.1.5 Trend of Debtors or Receivables**

The receivables is the next another component of current assets of the companies. The receivables of BPCL are fluctuated over the study period. The level of it is highest with 30.67 percentages in the current assets of the company in the year 2068/69 of the period where as it coverage lowest percentages of 9.10 in year 2064/65 of the study period. The average level of receivable of the company in current assets is 17.60 percentages.

But, the receivables of CHCL are decreased except 2067/68 over the study period. The level of it is highest with 76.08 percentages in the current assets of the company in the year 2064/65 of the period where as it coverage lowest percentages of 10.03 in year 2068/69 of the study period. The average level of receivable of the company in current assets is 16.67 percentages.

The study shows that the average level of receivable i.e. 17.60 percentages of BPCL is higher than that of CHCL i.e. 16.67 percentages during the study period. It is plot in the trend line which is as follows:

**Table 4.8**

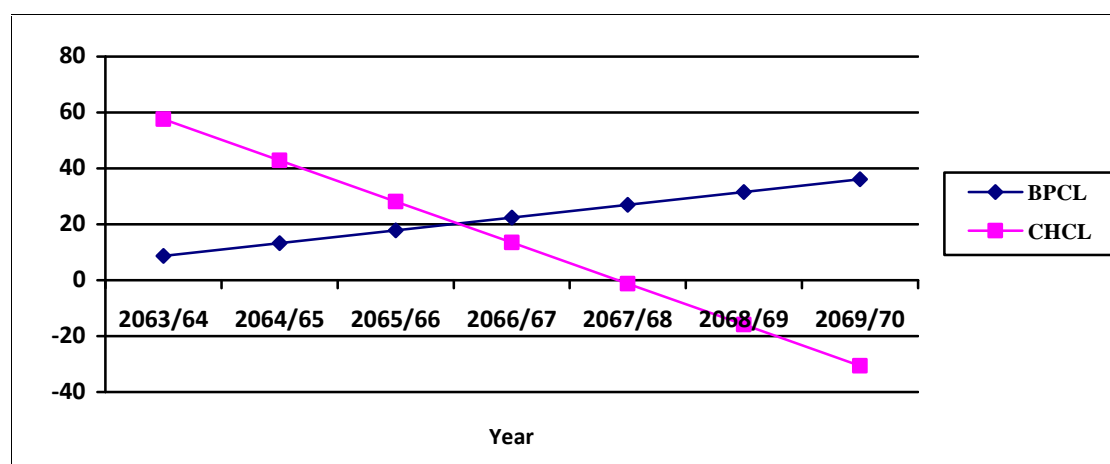
**The trend line of receivables of the selected company**

Company \ Year	2063/64	2064/65	2065/66	2066/67	2067/68	2068/69	2069/70
BPCL	8.674	13.241	17.808	22.375	26.942	31.509	36.076
CHCL	57.566	42.866	28.166	13.466	-1.234	-15.934	-30.634

*Source: (Appendix –XXIII)*

**Graph 4.6**

**Trend Line of Receivables of BPCL and CHCL**



The above graph shows the trend line of debtors or receivables of the selected hydropower company. The trend line of receivables of BPCL has gradually increased in every year but the trend line of stock of CHCL has slightly decreased in every year. BPCL is increased from 8.674 to 36.076 and CHCL decreased from 57.566 to -30.634. Trend line of stock of BPCL is just opposite of CHCL's trend line of stock.

### 4.3 Net Working Capital

Net Working Capital refers to the difference between current assets and current liabilities. The need for this concept arises because the gross concept fails to consider current liabilities. The current liabilities are those liabilities, which can be claimed by outsiders /suppliers within a year. It includes account payable, bills payable and outstanding expenses. The concept of net working capital helps the management to look for permanent sources for its financing since working capital under this approach, does not increase with increases in short term borrowing. Net working capital can be positive and negative. A negative net working capital occurs when current liabilities are in excess of current assets.

$$\text{Net Working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

Net working capital is that portion of firms' current assets, which is financed with long term fund. NWC is the difference between the current assets and current liabilities. This positive difference in the amount of working capital is financed by long term fund. This concept is also known as qualitative concept of working capital; it shows liquidity of business enterprises this concept helps to determine optimum mixture of short term and long term capital of business enterprises. This concept is useful to running business, which is running in the present. It can analyze profitability, liquidity position, and risk return position of business enterprise.

**Table 4.9**

#### **Net Working Capital of BPCL**

(Rs. in '000)

Year	Current Assets	Current Liabilities	Net Working Capital	% change in NWC
2064/65	647416	568510	78906	-
2065/66	746136	570323	175813	55.12
2066/67	743837	624543	119294	-47.38
2067/68	651519	566569	84950	-40.43
2068/69	600391	328979	271412	68.70
Average	677859.8	531784.8	146075	7.20

*Source: Annual Reports of BPCL (Appendix –VI)*

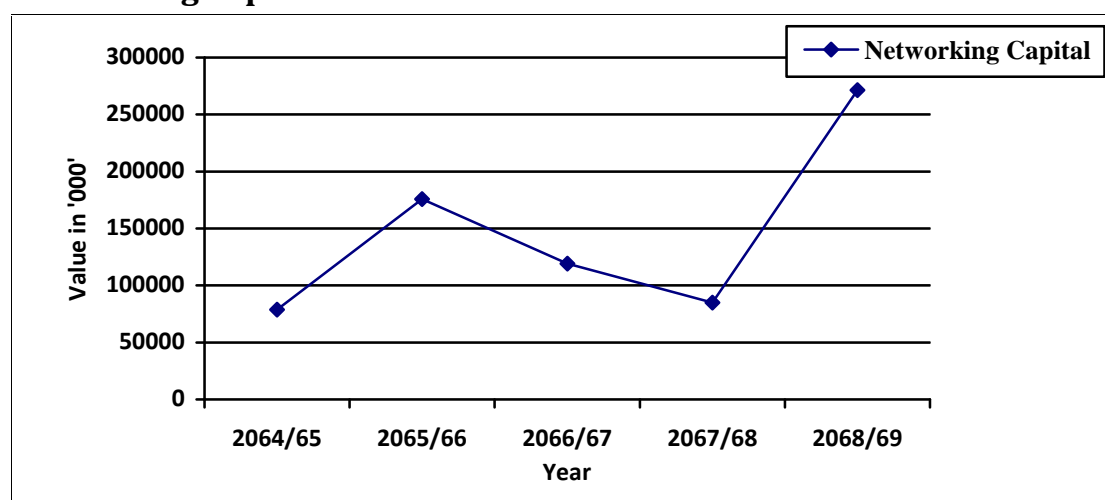
The above table 4.5 and below graph 4.7 shows that the level of net working capital of BPCL is fluctuated over the study period. During the study period of 5 years from 2064/65 to 2068/69, the highest amount of net working capital is Rs. 175813 thousand in 2065/66 and that of lowest amount is Rs. 78906 thousand in 2064/65.

The average level of current assets of the company is Rs 677859.8 thousand and that of current liabilities is Rs 531784.8 thousand. The company has the average of net working capital of Rs 146075 thousand.

The highest level of change in net working capital is by 68.70 percentages in 2068/69 and that of lowest level of change in net working capital is by -47.38 percentages in 2066/67. On average the level of net working capital is changed by 7.20 percentages.

**Graph 4.7**

**Networking Capital of BPCL**



**Table 4.10**

**Net Working Capital of CHCL**

(Rs. in '000)

Year	Current Assets	Current Liabilities	Net Working Capital	% change in NWC
2064/65	241801	268560	-26759	-
2065/66	646231	504089	142142	118.83
2066/67	995075	364893	630182	77.44
2067/68	1450093	102700	1347393	53.23
2068/69	2046285	107385	1938900	30.51
Average	1075896.9	269525.4	806371.6	56.0

Source: Annual Reports of CHCL (Appendix –VI)

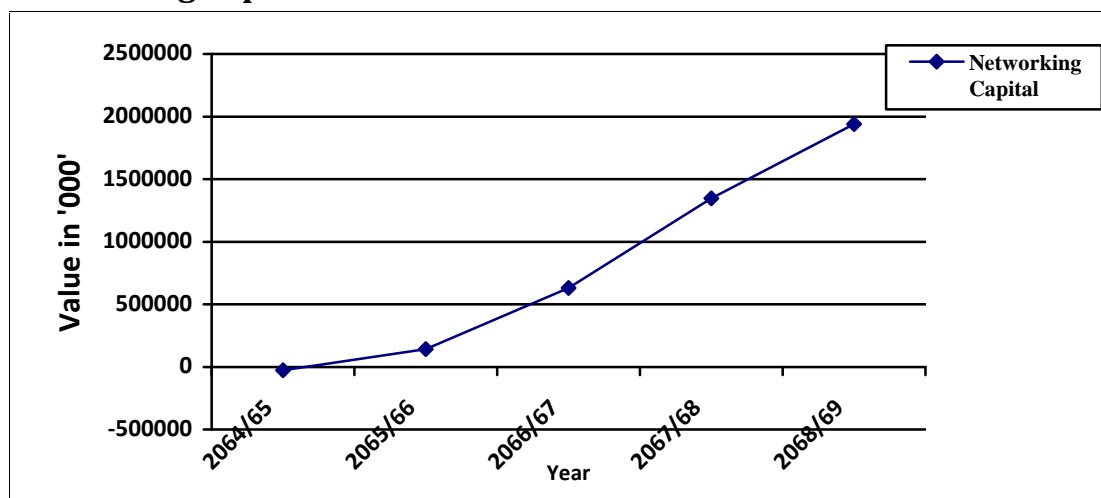
The above table and below graph show that the level of net working capital of CHCL is fluctuated over the study period. The highest amount of net working capital is Rs. 1938900 thousand in 2068/69 and that of lowest amount is - Rs. 26759 thousand in 2064/65.

The average level of current assets of the company is Rs 1075896.9 thousand and that of current liabilities is Rs 269525.4 thousand. The company has the average of net working capital of Rs 806371.6 thousand.

The highest level of change in net working capital is by 118.83 percentages in 2065/66 and that of lowest level of change in net working capital is by 30.51 percentages in 2068/69. On average the level of net working capital is changed by 56 percentages.

**Graph 4.8**

**Networking Capital of CHCL**



**4.4 The Relationship between Net Working Capital and Net Profit**

Working capital management is the management of all short term assets used in daily operations. Profitability indicates the degree of success in achieving desired profit. Success and failure of the company depends upon its profitability showing how efficiently it is utilizing its deposit.

**Table 4.11**

**The Relationship between Net Working Capital and Net Profit of BPCL**

(Rs. in '000)

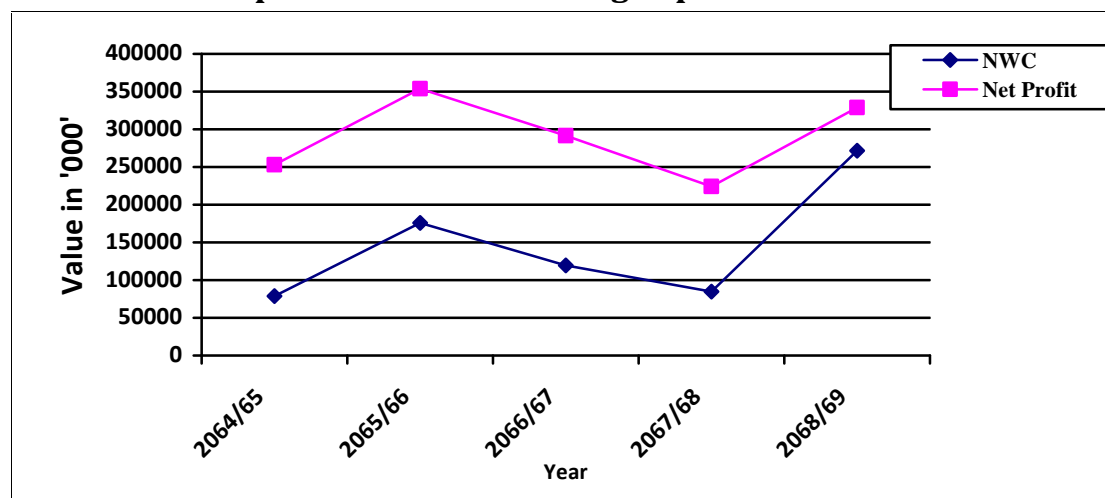
Year	2064/65	2065/66	2066/67	2067/68	2068/69	Average
Company						
NWC	78906	175813	119294	84950	271412	146075
Net Profit	252840	353879	291592	224233	328970	290302.8

Source: Annual Reports of BPCL (Appendix –VII)

From the above table and graph clearly show that the relationship between NWC and net profit. The net profit and net working capital of the BPCL is fluctuating trend which clearly shown in table 4.7. The highest net profit during the study period is Rs.353879 thousand of BPCL in 2065/66 and the lowest net profit during the study period is Rs.224233 thousand of BPCL in 2067/68. The highest net working capital during the study period is Rs.271412 thousand of BPCL in 2068/69 and the lowest net working capital during the study period is Rs.78906 thousand of BPCL in 2064/65. The BPCL has average of net profit and net working capital are 290302.8 thousand and 146075 thousand respectively.

**Graph 4.9**

**The relationship between Net Working Capital and Net Profit of BPCL**



**Table 4.12**

**The Relationship between Net Working Capital and Net Profit of CHCL**

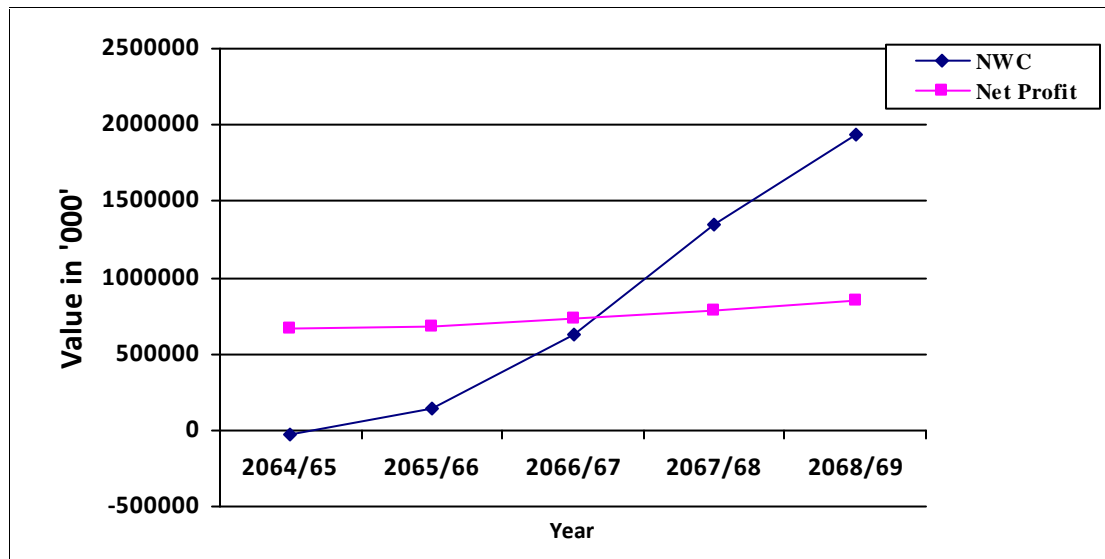
		(Rs. in '000)				
Year \ Company	2064/65	2065/66	2066/67	2067/68	2068/69	Average
NWC	-26759	142142	630182	1347393	1938900	806371.62
Net Profit	667477	679372	735361	777432	843139	740556.20

Source: Annual Reports of CHCL (Appendix –VII)

From the above graph clearly show that the relationship between NWC and net profit of CHCL. The net profit and net working capital of the CHCL are extremely increasing trend which clearly shown in table 4.9. The highest net profit during the study period is Rs.843139 thousand of CHCL in 2068/69 and the lowest net profit during the study period is Rs.667477 thousand of CHCL in 2064/65. The highest net working capital during the study period is Rs.1938900 thousand of CHCL in 2068/69 and the lowest net working capital during the study period is -Rs.26759 thousand of CHCL in 2064/65. The CHCL has average of net profit and net working capital are 740556.2 thousand and 806371.62 thousand respectively.

**Graph 4.10**

**The Relationship between Net Working Capital and Net Profit of CHCL**



#### 4.5 Analysis Based on Liquidity Ratios

Liquidity position is one of the crucial factors that make firm's day to day operation easier. It indicates the ability to pay its short term obligations. Liquidity position on the firm depends on its working capital policy. If the firm follows aggressive policy, it has low liquidity position while conservative policy has high liquidity position. To the extent how much manufacturing companies enjoy liquidity position determine their working capital requirement. Liquidity denotes the ability for payment of short-term liabilities. Liquidity position of any organization is directly related with net working capital or current assets and current liabilities. One of the main objectives of working capital management is to keep good liquidity position. Ratio analysis is one of the powerful tools to measure the financial performance of any companies. Different factors can be taken into consideration using this analysis likewise there are many factors that determine the working capital needs. Hence, liquidity position of selected manufacturing companies is analyzed with the help of following ratios.

##### 4.5.1 Current Ratio

Current ratio measures the short-term solvency of the firm. This is the crude measurement of liquidity position of the firm. This ratio is calculated by dividing current assets by current liabilities. Higher the liquidity position, the lesser the need for additional working capital, since it will be better for them to have the best use of existing liquidity position. On the other hand, manufacturing companies having lower liquidity position must raise the amount of working capital to save themselves from serious future liquidity crises. The current ratio explain that how much current asset is hence as against each rupee of current liabilities.

**Table 4.13**

##### **Current Ratio (In times)**

Year	BPCL	CHCL	Company Average Ratio
------	------	------	-----------------------



2064/65	1.14	0.90	1.02
2065/66	1.31	1.28	1.29
2066/67	1.19	2.73	1.96
2067/68	1.15	14.12	7.64
2068/69	1.83	19.06	10.45
Yearly Average Ratio	1.32	7.62	4.47

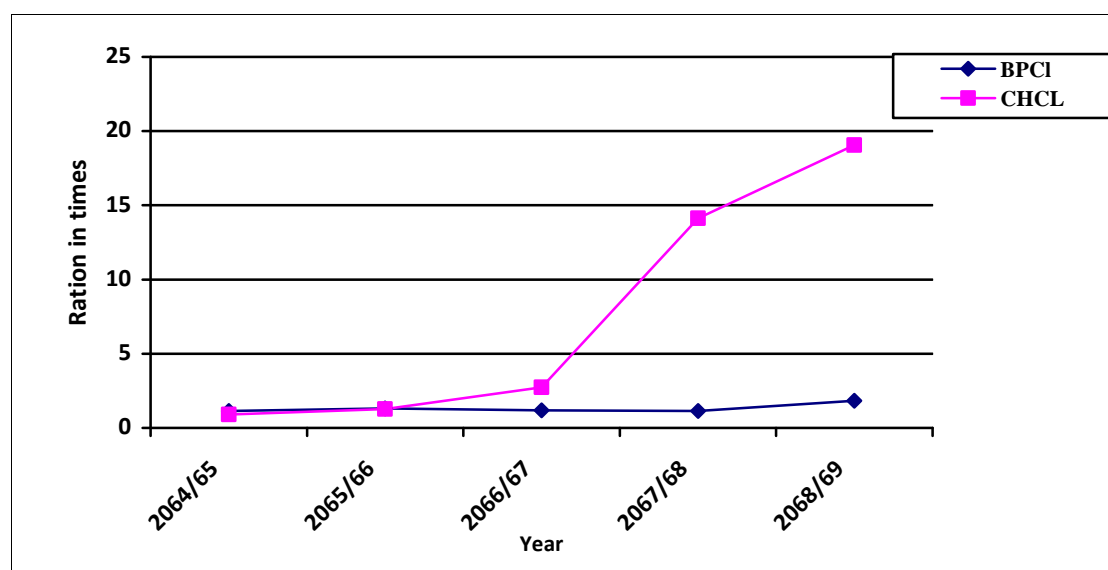
*Source: (Appendix –VIII)*

Above table and the below graph shows the overall yearly average current ratio are 1.32:1 and 7.62:1 of BPCL and CHCL respectively but the overall company average current ratio 4.47:1. This is higher than the standard current ratio 2:1. BPCL has not maintained the standard ratio but CHCL has maintained the standard ratio in several years of study period.

The trend of current ratio of BPCL is fluctuating trend but CHCL is increasing trend. In the above it can be seen that the overall Company average current ratio of 4.47:1. The highest company average current ratio is 10.45:1 in 2068/69 and that of lowest is 1.02:1 in 2064/65.

**Graph 4.11**

**Actual Lines of Current Ratio of BPCL and CHCL**



#### 4.5.2 Quick/Acid-test Ratio

Quick ratio establishes a relationship between quick or liquid assets and current liabilities. Quick asset are obtained after deducting inventories from CA. Cash is the most liquid asset. An asset is said to be liquid if it can be converted into cash immediately or reasonably without a loss of value of cash. Other assets which are considered to be relatively liquid are book debts and marketable securities.

**Table 4.14**

#### **Quick Ratio (In times)**

Year	BPCL	CHCL	Company Average Ratio
2064/65	1.04	0.86	0.95
2065/66	1.18	1.24	1.21
2066/67	1.04	2.63	1.84
2067/68	0.97	13.82	7.39
2068/69	1.57	18.56	10.06
Yearly Average Ratio	1.16	7.42	4.29

*Source: (Appendix –V)*

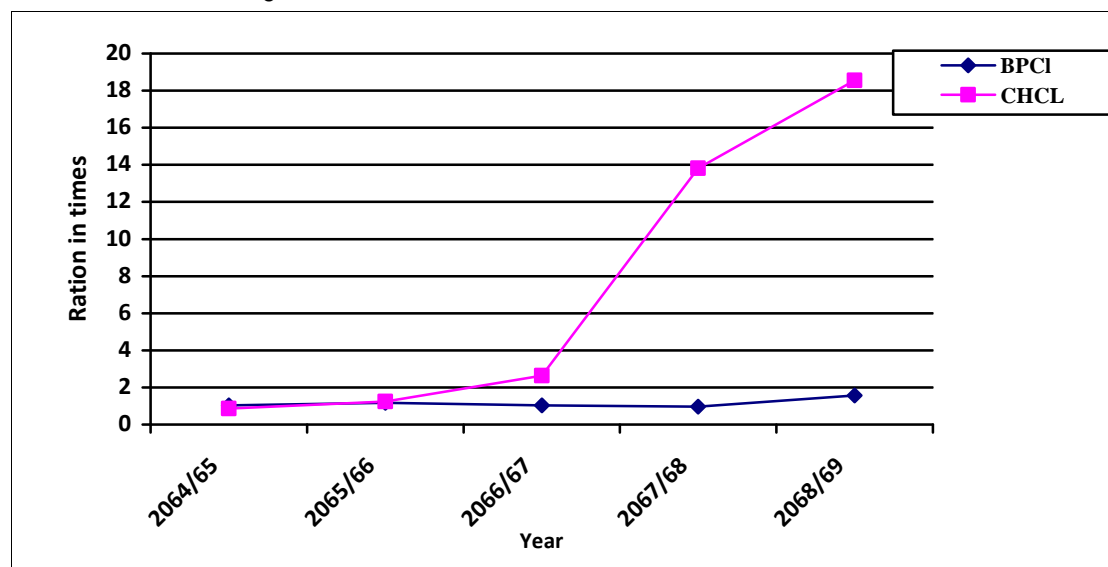
Above table and the below graph shows the overall yearly average quick ratio are 1.16:1 and 7.42:1 of BPCL and CHCL respectively but the overall company average current ratio 4.29:1. This is higher than the standard quick ratio 1:1. BPCL and CHCL have maintained the standard ratio.

The trend of quick ratio of BPCL is fluctuating trend but CHCL is increasing trend. In the above it can be seen that the overall company average quick ratio of 4.29:1. The

highest company average quick ratio is 10.06:1 in 2068/69 and that of lowest is 0.95:1 in 2064/65.

**Graph 4.12**

**Actual Lines of Quick Ratio of BPCL and CHCL**



## 4.6 Activity/Turnover Position

Activity or turnover ratios are used to evaluate the efficiency and speed with which assets are being converted into cash. The behavior of working capital utilization and improvement can be analyzed with the help of turnover ratios. This reflects the speed and rapidity, with which assets are converted into sales that results the efficiency of the enterprise. This ratio measures the degree of effectiveness in use of resources or funds by an enterprise. Though there is no standard of ideal turnover, generally, a greater turnover is regarded as efficient utilization of the assets.

### 4.6.1 Current Assets to Total Assets

Total assets include the total of fixed assets and total current assets. The need of assets highly depends upon the nature of business. Generally current assets are required to meet the need of working capital for fulfilling the requirement of daily business. The percentage of current assets to total assets has been analyzed with the help of cross section analysis method under following:

**Table 4.15**

**Current Assets to Total Assets Ratio (In times)**

Year	BPCL	CHCL	Company Average Ratio
2064/65	0.47	0.10	0.29
2065/66	0.51	0.23	0.37
2066/67	0.49	0.32	0.41
2067/68	0.45	0.41	0.43

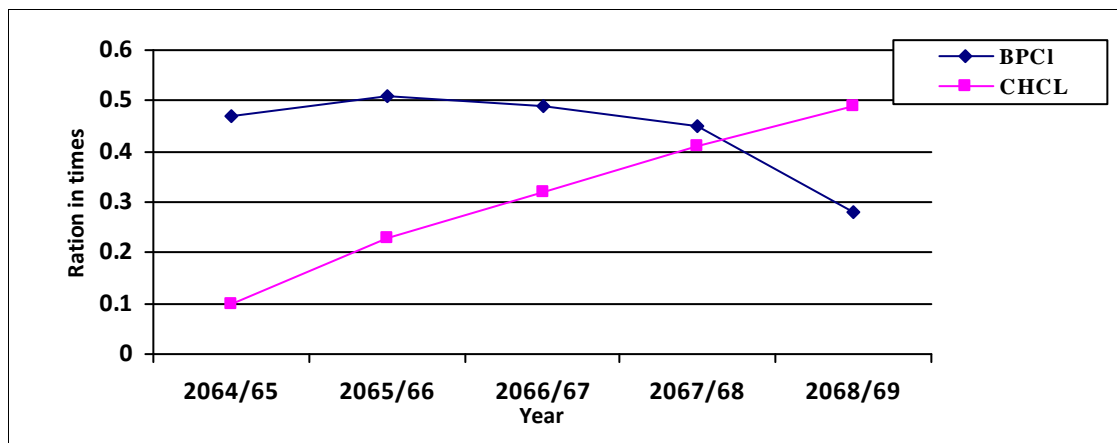
2068/69	0.28	0.49	0.38
Yearly Average Ratio	0.44	0.31	0.36

Source: (Appendix –VI)

Above table and the below graph shows the current asset total assets ratio. Overall company average ratio is 0.36: 1 and the overall yearly average ratio of BPCL is 0.44:1 and CHCL is 0.31:1. BPCL and CHCL is lower than the standard ratio 1:1. Both companies are unable to maintain this ratio in accordance with standard. The trend of current asset to total asset ratio of BPCL is decreasing trend but just opposite CHCL is increasing trend with lower than the standard ratio which shows that the companies are using aggressive policy regarding the working capital in the recent years. In the above it can be seen that highest company average ratio is 0.43:1 in 2067/68 and that of lowest is 0.29:1 in 2064/65.

### Graph 4.13

#### Actual Lines of Current Ratio to Total Assets ratio of BPCL and CHCL



### 4.6.2 Net Working Capital to Total Assets

Working capital management is the management of all short term assets used in daily operations. Investing in raw materials, inventories, work-in-progress, account receivables are all known as working capital investment. The proper management of a firm's working capital is very much crucial to the financial manager in the competitive scenario. Furthermore, the total investment in the current assets that can be converted into cash within one year is called gross working capital but the difference between current assets and current liabilities is known as net working capital. The percentage of NWC to total assets of different manufacturing companies has been analyzed with the help of cross section analysis as follow:

**Table 4.16**

#### **Net Working Capital to Total Assets Ratio (In times)**

Year	BPCL	CHCL	Company Average Ratio
2064/65	0.06	-0.01	0.025
2065/66	0.12	0.05	0.085

2066/67	0.08	0.20	0.140
2067/68	0.06	0.38	0.220
2068/69	0.13	0.46	0.295
Yearly Average Ratio	0.09	0.22	0.153

Source: (Appendix –VII)

Above table and the below graph shows the overall yearly average net working capital to total assets ratio 0.153: 1 and the overall company average net working capital to total assets ratio of BPCL is 0.09:1 as well as that of CHCL is 0.22:1. This is lesser than the standard net working capital to total assets ratio 1:1. Both the companies are unable to maintain the net working capital to total assets ratio in accordance with standard.

The trend of net working capital to total assets ratio of BPCL is in fluctuating order and ratio of CHCL is increasing order with lower than the standard ratio which shows that the companies are using aggressive policy regarding the working capital in the recent years. In the above it can be seen that the overall yearly average net working capital to total assets ratio of 0.153:1. The highest company average net working capital to total assets ratio is 0.295:1 in 2068/69 and that of lowest is 0.025:1 in 2064/65.

#### 4.6.3 Stock Turnover Ratio

This ratio indicates the relationship between the cost of goods sold during the year and average stock kept during the year. This ratio indicates whether stock has been efficiently used or not. It shows the speed with which the stock is rotated into sales or the number of times the stock is turned into sales during the year. The higher the ratio, the better it is, since it indicates that stock is selling quickly.

**Table 4.17**

#### **Stock Turnover Ratio (in times)**

Year	BPCL	CHCL	Company Average Ratio
2064/65	6.45	74.71	40.58
2065/66	5.65	38.98	22.32
2066/67	4.68	23.95	14.32
2067/68	4.34	28.69	16.52
2068/69	5.80	16.56	11.18
Yearly Average Ratio	5.38	36.58	20.98

Source: (Appendix –VIII)

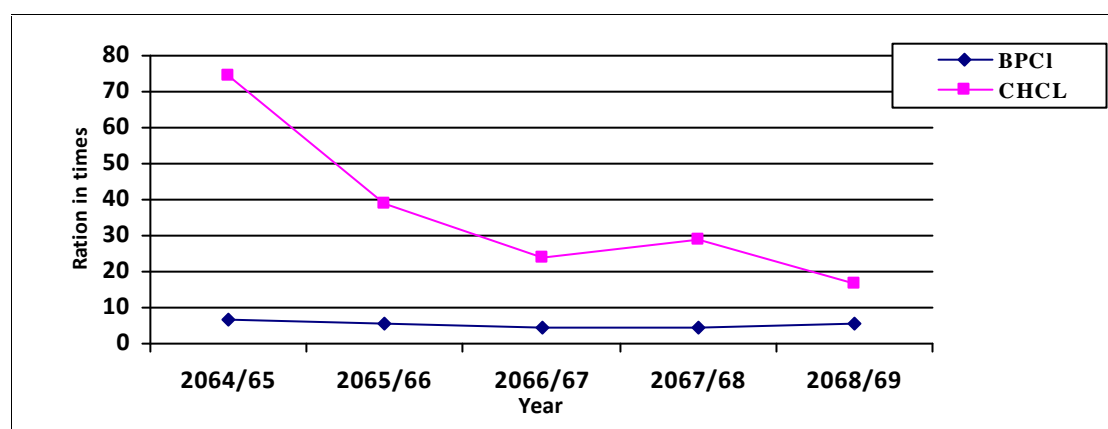
Above table and below graph shows the stock turnover ratio of the companies. Overall company average ratio is 20.98 times and the overall yearly average ratio of BPCL is 5.38 times and CHCL is 36.58 times respectively. BPCL is lower than CHCL ratio.

The trend of stock turnover ratio of BPCL is decreasing trend except 2068/69, similarly CHCL is also decreasing trend. CHCL has higher ratio than company

average ratio but BPCL has lower. In the above it can be seen that highest company average ratio is 40.58 times in 2064/65 and that of lowest is 11.18 in 2068/69.

**Graph 4.14**

**Actual Lines of Stock Turnover Ratio of BPCL and CHCL**



#### 4.6.4 Debtors or Receivable Turnover Ratio

This ratio indicates the relationship between credit sales and average debtors during the year. Actually, this ratio shows that the period within which the average receivables or debtors are collected. It indicates the credit policy of the company and its ability to collect the receivables. The debtors or receivables turnover ratio is calculated by dividing net credit sales by average debtors or receivables. The higher the ratio, the better it is, since it indicates that amount from debtors is being collected more quickly.

**Table 4.18**

#### **Debtors Turnover Ratio (in times)**

Year	BPCL	CHCL	Company Average Ratio
2064/65	6.45	4.91	5.68
2065/66	4.77	4.59	4.68
2066/67	2.53	8.13	5.33
2067/68	4.84	4.23	4.54
2068/69	2.63	4.31	3.47
Yearly Average Ratio	4.24	5.23	4.74

*Source: (Appendix –IX)*

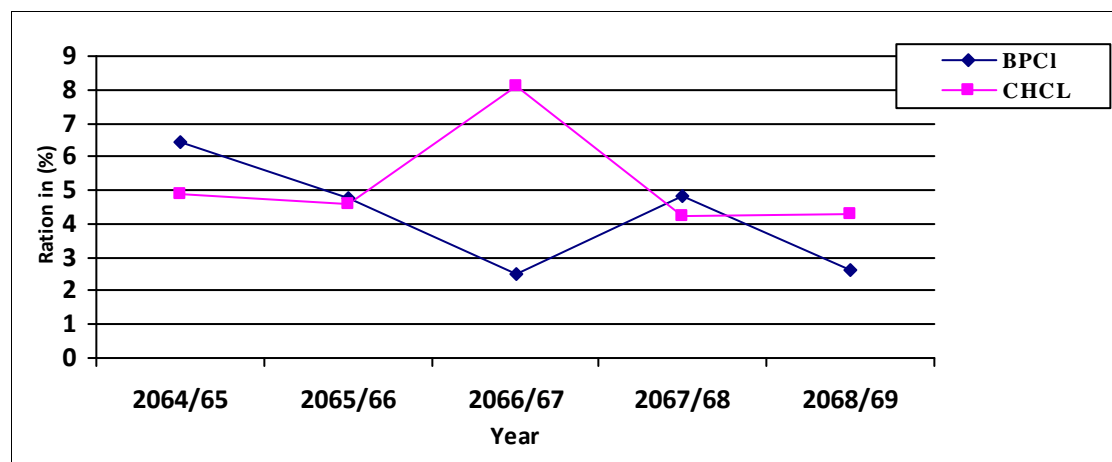
Above table and below graph shows the debtors turnover ratio of the companies. Overall company average ratio is 4.74 times and the overall yearly average ratio of BPCL is 4.24 times and CHCL is 5.23 times respectively.

The trend of debtors' turnover ratio of BPCL is fluctuating trend; similarly CHCL is also same trend. CHCL has nearly maintained company average ratio

but BPCL has maintained only three year's company average ratio. In the above it can be seen that highest company average ratio is 5.68 times in 2064/65 and that of lowest is 3.47 in 2068/69.

#### Graph 4.15

**Actual Lines of Debtors Turnover Ratio of BPCL and CHCL**



#### 4.6.5 Fixed Assets Turnover Ratio

This ratio establishes a relationship between net sales and fixed assets. The objective of computing this ratio is to determine the efficiency with which the fixed assets are utilized. Higher ratio indicates more efficient the management and utilization of fixed asset and vice-versa.

**Table 4.19**

#### **Fixed Assets Turnover Ratio (in times)**

Year	BPCL	CHCL	Company Average Ratio
2064/65	0.51	0.42	0.47
2065/66	0.58	0.39	0.49
2066/67	0.57	0.41	0.49
2067/68	0.58	0.42	0.50
2068/69	0.32	0.41	0.37
Yearly Average Ratio	0.51	0.41	0.46

Source: (Appendix –X)

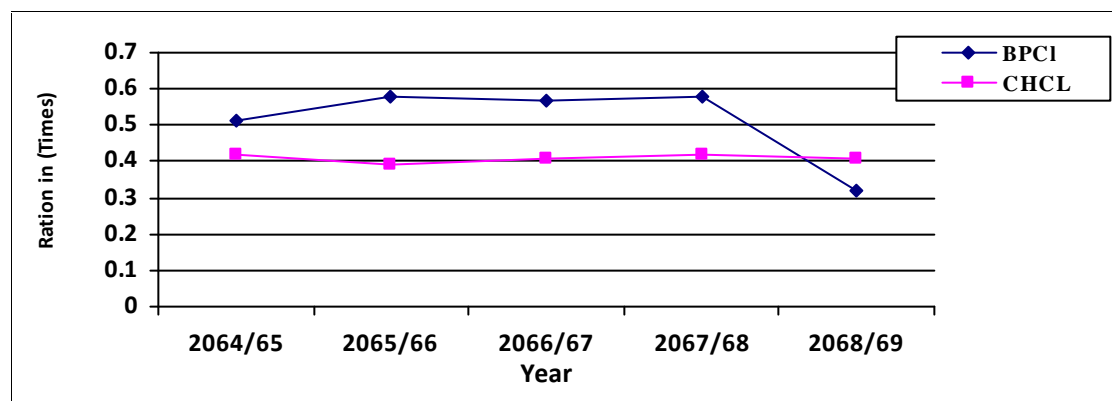
Above table and below graph shows the fixed assets turnover ratio of the companies. Overall company average ratio is 0.46 times and the overall yearly average ratio of BPCL is 0.51 times and CHCL is 0.41 times respectively. BPCL is higher than CHCL's fixed assets turnover ratio.

The trend of fixed assets turnover ratio of BPCL is fluctuating trend, similarly CHCL is also same. BPCL has higher ratio than company average ratio but CHCL has lower. In the above it can be seen that highest company average ratio is 0.50 times in 2067/68 and that of lowest is 0.37 in 2068/69.



**Graph 4.16**

**Actual Lines of Fixed Assets Turnover Ratio of BPCL and CHCL**



**4.6.6 Total Assets Turnover Ratio**

It indicates the firm’s ability to generate sales due to the investment in total assets. Total assets are used in the business for producing goods to be sold. The effective utilization of total asset will result in increased production and reduced cost. Higher ratio indicates more efficient the management and utilization of total asset and vice-versa.

**Table 4.20**

**Total Assets Turnover Ratio (in times)**

Year	BPCL	CHCL	Company Average Ratio
2064/65	0.27	0.38	0.33
2065/66	0.29	0.30	0.30
2066/67	0.29	0.28	0.29
2067/68	0.32	0.25	0.29
2068/69	0.23	0.21	0.22
Yearly Average Ratio	0.28	0.28	0.28

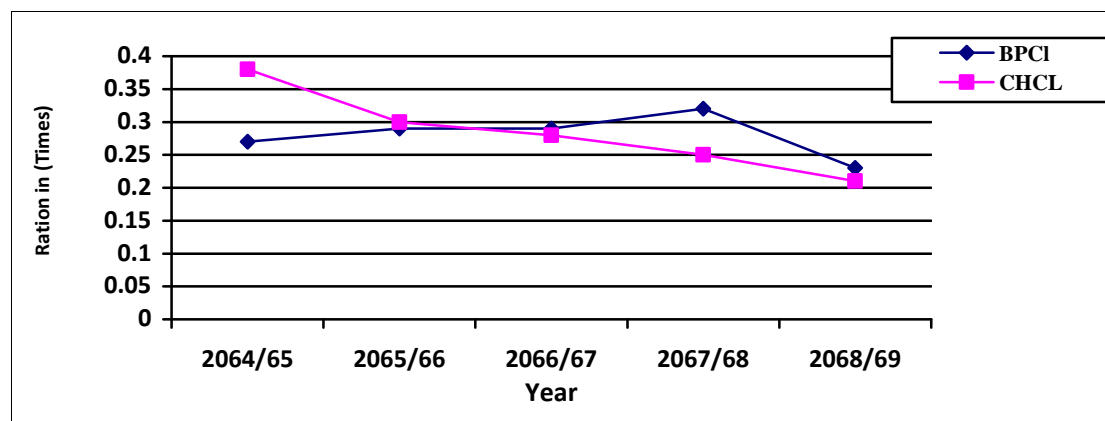
Source: (Appendix –XI)

Above table and below graph shows the total assets turnover ratio of the companies. Overall company average ratio is 0.28 times and the overall yearly average ratio of BPCL is 0.28 times and CHCL is 0.28 times respectively. Both companies have maintained their company average ratio.

The trend of total assets turnover ratio of BPCL is increasing trend, but just opposite CHCL is decreasing trend. BPCL and CHCL has same yearly average ratio in the study period. In the above it can be seen that highest company average ratio is 0.33 times in 2064/65 and that of lowest is 0.22 in 2068/69.

**Graph 4.17**

**Actual Lines of Total Assets Turnover Ratio of BPCL and CHCL**



**4.6.7 Capital Employed Turnover Ratio**

This ratio measures the efficiency of capital employed is being used in the business. It shows how many times the capital is rotated into sales. This ratio is significant, because it informs to the management how capital employed are used to generate its sales revenue. It indicates the firm’s ability to generate sales per rupee of capital employed. Higher ratio indicates more efficient the management and utilization of capital employed and vice versa.

**Table 4.21**

**Capital Employed Turnover Ratio (in times)**

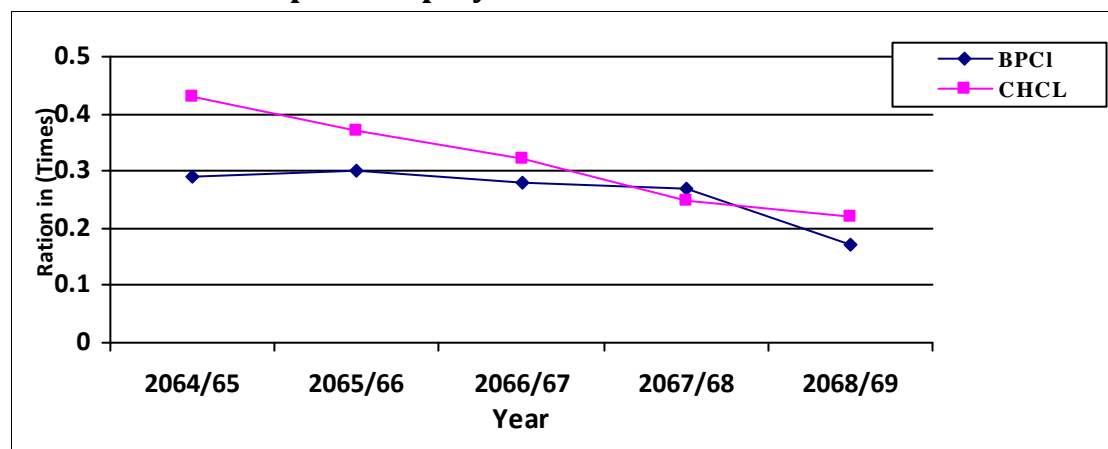
Year	BPCL	CHCL	Company Average Ratio
2064/65	0.29	0.43	0.36
2065/66	0.30	0.37	0.34
2066/67	0.28	0.32	0.30
2067/68	0.27	0.25	0.26
2068/69	0.17	0.22	0.20
Yearly Average Ratio	0.26	0.32	0.29

*Source: (Appendix –XII)*

Above table and below graph shows the capital employed turnover ratio of the companies. Overall company average ratio is 0.29 times and the overall yearly average ratio of BPCL is 0.26 times and CHCL is 0.32 times respectively. Both companies have nearly maintained their company average ratio. The trend of capital employed turnover ratio of BPCL is decreasing trend except 2065/66, but CHCL is decreasing trend in every study period. In the above it can be seen that highest company average ratio is 0.36 times in 2064/65 and that of lowest is 0.20 in 2068/69.

**Graph 4.18**

**Actual Lines of Capital Employed Turnover Ratio of BPCL and CHCL**



**4.7 Profitability Position**

Every organization has the motive of maximizing the profit. Profit is the excess of revenues over expenses within a period of time. A company should earn to survive and grow over a period. Profit is a basic long-term objective of commercial enterprises. Profitability is a measure of operating efficiency and the search for it provides an incentive to achieve efficiency. The profitability of a firm can be measured by its net profit and profitability ratios.

**4.7.1 Size of Net Profit**

Profit is the most essential factor for smooth operation and growth of every company. All of the business enterprises are established with the main objective of profit maximization. Profit can be categorized into two types viz. gross and net profit. Gross profit can be obtained by subtracting cost of goods sold from sales and net profit is the difference between gross profit and other expenses including taxes. For the sake of convenience, the analysis is divided into following two categories.

**Table 4.22**

**Net Profit (Rs. in '000)**

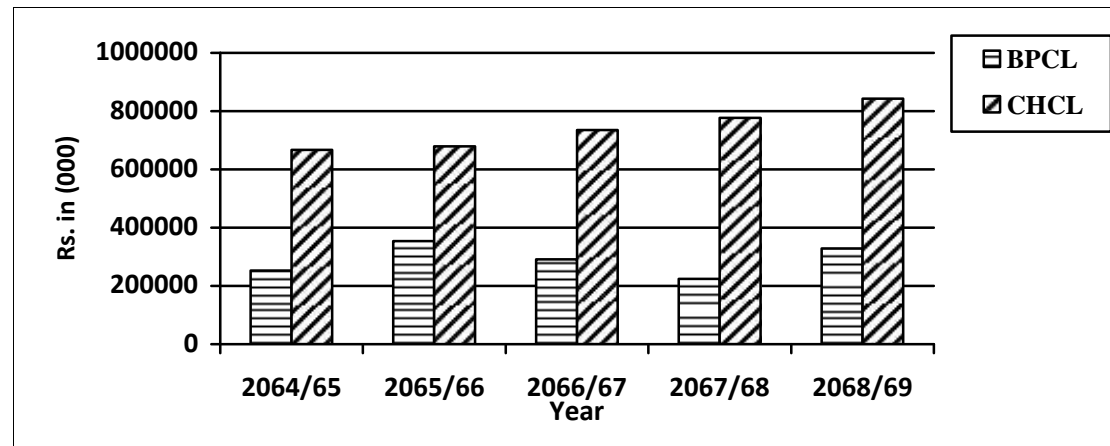
Year \ Company	2064/65	2065/66	2066/67	2067/68	2068/69	Total	Average
BPCL	252840	353879	291592	224233	328970	1451514	290302.8
CHCL	667477	679372	735361	777432	843139	3702781	740556.2
Total	920317	1033251	1026953	1001665	1172109	5154295	1030859
Average	460159	516626	513476.5	500832.5	586054.5	2577148	515430

*Source: Annual Reports*

The net profit of the companies is clearly shown in above table and below graph. The net profit of CHCL has gradually increased but BPCL has fluctuated. The highest profit yielded/earned during the study period is Rs.353879 thousand of BPCL in 2065/66 whereas the highest profit yielded/earned during the study period is Rs.843139 thousand of CHCL in 2068/69. The companies have positive profit with regards to company average. The yearly average ratio of net profit is 290302.8 thousand and 740556.2 thousand of BPCL and CHCL respectively.

**Graph 4.19**

**Graphical Presentation of Net Profit of BPCL and CHCL**



Above table and graph clearly show that the hydropower companies have positive net profit. Positive net profit is the indicator of better financial position. The net profit of BPCL has been decreased except in year 2065/66 and 2068/69. The net profit of CHCL is always increased which is greater than BPCL. The yearly average net profit of BPCL is lower than CHCL average in five years. Positive profitability of the company shows that the financial position is sound.

#### 4.7.2 Return on Total Assets

This ratio measures the profitability of the firm by establishing the relationship between net profit after taxes and total assets. This ratio also helps to understand the utilization of assets of the enterprise. It measures profitability of all financial resources invested in the firm's assets. It gives the earning power of the firm from utilizing its total investment. The average return on total assets is presented below.

**Table 4.23**

**Return on Total Assets (In percentage)**

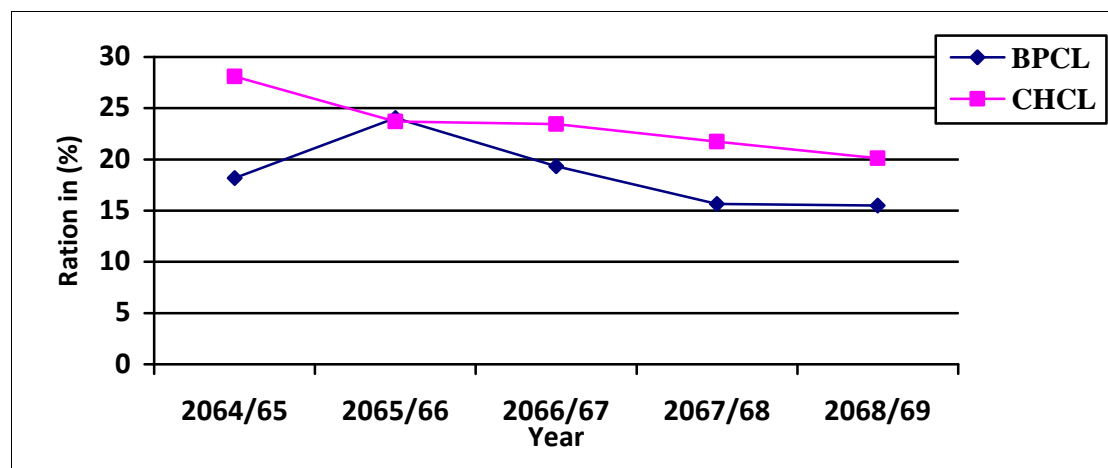
Year \ Company	2064/65	2065/66	2066/67	2067/68	2068/69	Total	Average
BPCL	18.17	24.04	19.32	15.65	15.50	92.68	18.54
CHCL	28.10	23.71	23.46	21.73	20.10	117.1	23.42
Total	46.27	47.75	42.78	37.38	35.6	209.78	41.96
Average	23.135	23.875	21.39	18.69	17.8	104.89	20.98

Source: (Appendix –XIII)

The return on total assets of selected companies has been shown in table 4.26. The overall company average of ROA for the study period is 20.98%. The highest company average ROA is 23.87% and lowest company average ROA is 17.8% of the companies. The trend of company average of return on assets is decreasing in nature.

#### Graph 4.20

##### Return on Total Assets of BPCL and CHCL



The above table and graph clearly show that the trend of yearly average of ROA where BPCL is fluctuated and CHCL is extremely increased. The overall yearly average of ROA is 18.54% of BPCL and 23.42% of CHCL. During the study period, the highest average ROA of BPCL and CHCL are 24.04% and 28.10% respectively but lowest average ROA of BPCL and CHCL are 15.50% and 20.10% respectively.

#### 4.7.3 Return on Shareholder's Equity

This ratio is measure of profitability of the firm in respect of the utilization of total shareholders fund. It is calculated by dividing net profit by total shareholder's equity. The shareholder's equity includes paid up capital, general reserves, and retained earnings of surplus & general loan loss provision. It reflects whether the corporation has earned a satisfactory return for its equity-holders of not. So, higher ratio is favorable of the stockholders. Return on shareholder's equity ratio of CHCL and BPCL are presented below in the table.

**Table 4.24**

##### Return on Shareholder's Equity (in %)

Year	2064/65	2065/66	2066/67	2067/68	2068/69	Total	Average
Company							
BPCL	19.53	25.35	18.86	13.76	12.13	89.63	17.93
CHCL	34.37	28.71	26.52	22.35	20.58	132.53	26.51
Total	53.9	54.06	45.38	36.11	32.71	222.16	44.44
Average	26.95	27.03	22.69	18.055	16.355	111.08	22.22

Source: (Appendix –XIV)

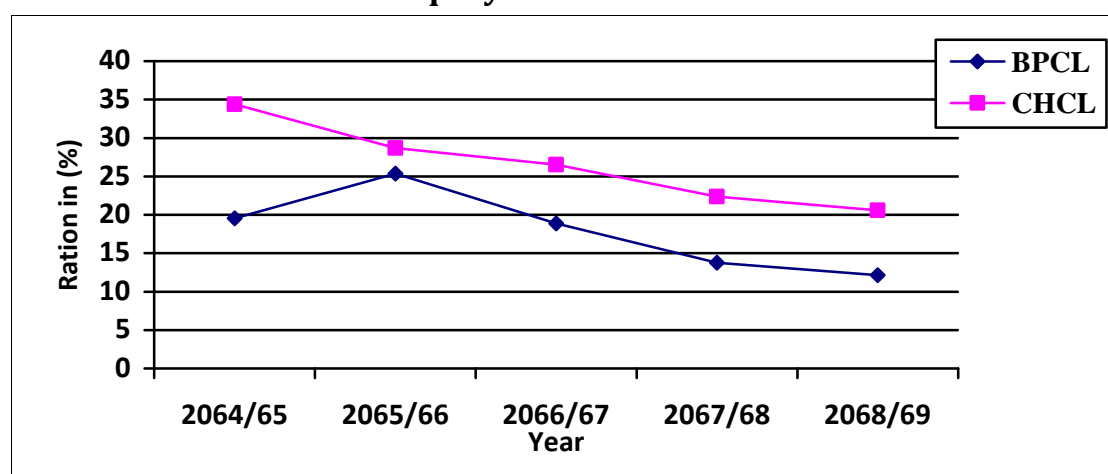
Above table and graph depicts the return on shareholder's equity of the selected companies. The average of return on shareholder's equity of CHCL and BPCL are 26.51% and 17.93% respectively.

The return on shareholder's equity of the companies is decreasing over the study period. The highest return on shareholder's equity of CHCL is 34.37 percent and lowest ratio is 20.58 percent as well as BPCL's highest return on shareholder's equity is 25.35 percent and lowest ratio is 12.13 percent.

To make companies profitability and return on shareholder's equity is satisfactory; the companies should really make an effort in shareholder's equity efficiently to generate adequate level of return.

#### Graph 4.21

##### Return on Shareholders Equity of BPCL and CHCL



#### 4.7.4 Return on Capital Employed

This ratio establishes a relationship between the total earnings available to all the investors and permanent capital. It shows how well the firm has used the economic resources received from all the investors to earn profit.

**Table 4.25**

##### Return on Capital Employed (In percentage)

Year \ Company	2064/65	2065/66	2066/67	2067/68	2068/69	Total	Average
BPCL	19.53	25.35	18.54	13.29	11.63	88.34	17.67
CHCL	31.62	28.71	26.52	22.35	20.58	129.78	25.96
Total	51.15	54.06	45.06	35.64	32.21	218.12	43.63
Average	25.575	27.03	22.53	17.82	16.105	109.06	21.815

Source: (Appendix –XV)

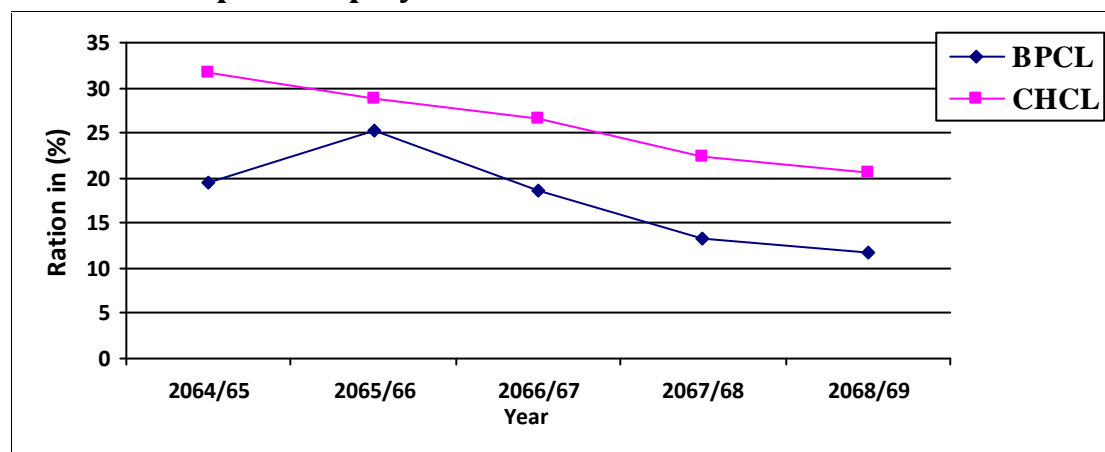
Above table and graph depicts the return on capital employed of the selected companies. The average of return on capital employed of CHCL and BPCL are 25.96% and 17.67% respectively.

The return on capital employed of the companies is decreasing over the study period. The highest return on capital employed of CHCL is 31.62 percent and lowest ratio is 20.58 percent as well as BPCL's highest return on capital employed is 25.35 percent and lowest ratio is 11.63 percent.

To make companies profitability and return on capital employed is satisfactory; the companies should really make an effort in capital employed efficiently to generate adequate level of return.

**Graph 4.22**

**Return on Capital Employed of BPCL and CHCL**



#### 4.7.5 Inventory conversion period (ICP)

The inventory conversion period is the average length of time required to convert material into finished goods and then to sell those goods. Inventory conversion period is calculated by dividing inventory by the net sales per day.

**Table 4.26**

**Inventory Conversion Period (In days)**

Year \ Company	2064/65	2065/66	2066/67	2067/68	2068/69	Average
BPCL	56	64	77	83	62	68
CHCL	5	9	15	13	22	13

Source: (Appendix –XVI)

Above table depicts the inventory conversion period of the selected companies. The average of inventory conversion period (ICP) of CHCL and BPCL are 13 days and 68 days respectively. BPCL's Inventory conversion period is higher than CHCL's inventory conversion period over the study period.

#### 4.7.6 Receivable conversion period (RCP)

The receivable conversion period is the average length of time required to convert the firm's receivable into cash. It is also called day's sale outstanding (DSO) and it is calculated by dividing account receivable by the average credit sales per day.

**Table 4.27**

**Receivable Conversion Period (In days)**

Year \ Company	2064/65	2065/66	2066/67	2067/68	2068/69	Average
BPCL	56	75	142	74	137	97
CHCL	73	78	44	85	83	73

Source: (Appendix –XVII)

Above table depicts the receivable conversion period of the selected companies. The average of receivable conversion period (RCP) of BPCL and CHCL are 97 days and 73 days respectively. BPCL’s average receivable conversion period is higher than CHCL’s receivable conversion period over the study period. Receivable conversion period is fluctuating trend in overall five years period of selected companies.

**4.7.7 Payable deferred period (PDP)**

The payable deferred period is the average length of time between the purchase of raw material and labour and payment of cash for them. It is computed by dividing account payable by the daily credit purchases.

$$\text{Payable Deferral Period (PDP)} = \frac{\text{Account payable}}{\text{Credit purchase per day}}$$

**Table 4.28**

**Payable Deferred Period (In days)**

Year \ Company	2064/65	2065/66	2066/67	2067/68	2068/69	Average
BPCL	36	91	59	26	46	52
CHCL	22	39	42	35	36	35

Source: (Appendix –XVIII)

Above table depicts the payable deferred period of the selected companies. The average of payable deferred period (PDP) of BPCL and CHCL are 52 days and 35 days respectively. BPCL’s payable deferred period is higher than CHCL’s payable deferred period over the study period. Payable deferred period of BPCL is fluctuated but CHCL is slightly increased in overall five years period.

**4.7.8 Cash Conversion Cycle (CCC)**

The cash conversion cycle is the average length of time between payment for the purchase of labour and raw materials to manufacture a product until the collection of the account receivable associated with the sales of the product. The cash conversion cycle determine using the following equation:

$$\text{Cash Conversion Cycle (CCC)} = \text{ICP} + \text{RCP} - \text{PDP}$$



**Table 4.29**

**Cash Conversion Cycle (In days)**

Year \ Company	2064/65	2065/66	2066/67	2067/68	2068/69	Average
BPCL	76	48	160	131	153	114
CHCL	56	48	17	63	69	51

Above table depicts the cash conversion period of the selected companies. The average of cash conversion period (PDP) of BPCL and CHCL are 114 days and 51 days respectively. BPCL’s cash conversion period is higher than CHCL’s cash conversion period over the study period. Cash conversion period of BPCL is fluctuated but CHCL is slightly increased in overall five years period.

**4.8 Co-efficient of Correlation**

This analysis interprets and identifies the relationship between two or more variables. In the case of highly correlated, the effects on one variable may have an effect on other correlated variables. Under this topic, this study tries to find out the relationship between the following variables:

- a) Coefficient of Correlation between Net working capital and Net Profit
- b) Coefficient of Correlation between Current Assets and Current Liabilities

The above analysis tools analyze the relationship between these relevant variables and help the companies to make sound policies regarding working capital and profit maximization.

The following formula is used to find out the relationships:

$$\text{Coefficient of Correlation (r)} = \frac{d_1 \cdot d_2}{\sqrt{\phi d_1^2 \cdot \phi d_2^2}}$$

Where,

$$d_1 = X_1 - \bar{X}_1$$

$$d_2 = X_2 - \bar{X}_2$$

For the purpose of decision-making, interpretation is based on the following terms:

- When  $r = 1$ , there is perfect positive correlation.
- When  $r = -1$ , there is perfect negative correlation.
- When  $r = 0$ , there is no correlation.
- Nearer the value of  $r$  to  $+1$ , closer will be the relationship between two variables and nearer the value of  $r$  to  $0$ , lesser will be the relationship.

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

Where,

P.E. = Probable error of correlation coefficient

$r$  = Correlation coefficient

$n$  = Number of observations

#### **4.8.1 Coefficient of Correlation between Net Working Capital and Net Profit**

The following table describes the relationship between NWC and net profit of CHCL and BPCL with comparative under five years study period. In the following case, NWC is independent variables ( $X_1$ ) and net profit is dependent variables ( $X_2$ ).

**Table 4.30**

**Correlation Coefficient between NWC and Net Profit**

Companies	BPCL	CHCL
Coefficient of correlation (r)	0.991	0.954
P.E.	0.006	0.027
6 P.E.	0.036	0.163

From the above table, it is found that coefficient of correlation between NWC and net profit of BPCL, coefficient of correlation between NWC and net profit is 0.991 i.e. there is high degree of positive correlation between two variables. It means correlation of coefficient between NWC and net profit of BPCL is perfect correlation. Similarly, probable error (P.E.) is 0.006 and 6P.E. is 0.036 which shows that 'r' is greater than 6P.E. Therefore it reveals that relationship between NWC and net profit is significant.

Similarly, it is found that coefficient of correlation between NWC and net profit of CHCL is 0.954 i.e. high degree of positive correlation between these two variables. It also reveals that relationship between NWC and net profit is closer to perfect correlation. Similarly, probable error (P.E.) is 0.027 and 6P.E. is 0.163 which shows that 'r' is greater than 6P.E. Therefore it reveals that relationship between NWC and net profit is significant.

**4.8.2 Coefficient of Correlation between Current Assets and Current Liabilities**

The following table describes the relationship between current assets and current liabilities of CHCL and BPCL with comparatively over five years study period. In the following case, current assets are independent variables ( $X_1$ ) and current liabilities are dependent variables ( $X_2$ ).

**Table 4.31**

**Correlation Coefficient between Current Assets and Current Liabilities**

Companies	BPCL	CHCL
Coefficient of correlation (r)	0.9996	0.9991
P.E.	0.00022	0.0011
6 P.E.	0.0013	0.0066

From the above table, it is found that coefficient of correlation between current assets and current liabilities of

Likewise in case of BPCL, coefficient of correlation between current assets and current liabilities is 0.9996 i.e. there is high degree of positive correlation between two variables. It means correlation of coefficient between current assets and current liabilities of BPCL is perfect correlation. Similarly, probable error (P.E.) is 0.00022 and 6P.E. is 0.0013 which shows that 'r' is greater than 6P.E. Therefore it reveals that relationship between current assets and current liabilities is significant.

Similarly, it is found that coefficient of correlation between current assets and current liabilities of CHCL are 0.9991 i.e. high degree of positive correlation between these

two variables. It also reveals that relationship between current assets and current liabilities is perfect correlation. Similarly, probable error (P.E.) is 0.0011 and 6P.E. is 0.0066 which shows that 'r' is greater than 6P.E. Therefore it reveals that relationship between current assets and current liabilities is significant.

# CHAPTER - V

## SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter includes summary conclusion & recommendation of the basic of main findings. The final and most important task of the researchers is to enlist fact findings of the study and give suggestion for further improvement. The analysis is performed with the help of financial tools and statistical tools. The analysis is associated with comparison and interpretation. Under financial analysis, various financial ratios related to the working capital management are used and under statistical analysis some relevant statistical tools are used.

### 5.1 Summary

Nepal is a rich country of water resources but Nepalese people do not take any benefit by the water resources. Most of the water has been going wastage in our country. If we utilized the water resources in proper way like pure clean drinking water, irrigation site, hydro-power etc. we would get lot of beneficiary in our life, not only life, government also get various benefit. In Nepalese context, hydro power is an important thing. It is necessary in many places, now, hydropower is demanded all over.

Hydropower means flowing water creates energy that can be captured and turned into electricity. Hydro comes from the Greek word 'hydra', meaning water. It is the electricity produced by the movement of fresh water from rivers and lakes.

Hydropower provides a reliable, efficient, safe and economic source of power for increasing effectiveness of the decentralized industries system. The use of water to produce hydropower has the advantage of absent of carbon-dioxide, sulphur-dioxide, nitrous-oxide and solid or liquid waste production. Thus, the water sources should contribute to a substantial reduction in emission of carbon-dioxide and other harmful gases responsible for greenhouse effects. The water will continue to fall downhill and will continue to be a resource for men and environment needs as a part of the natural hydrologic cycle. However, it has some disadvantages like high investment along with long lead-time for project realization, long gestation period, and environmental and social problems, mainly due to inundation of affected areas by large water reservoirs causing possible destruction of unique biotypes and endemic species. Some other disadvantages include possible destruction of human habitat, high cost for the necessary resettlements and fallouts related to social and political implications.

Hydropower projects are more capital intensive and most of the existing hydropower plants owned and operated by NEA have mainly come up through bilateral donor financing in combination with soft loan financing from multilateral development financing institutions. The low per-capita consumption of energy in Nepal is not attributed to lack of demand but to the supply bottleneck resulting from financial constraints and inherent delay in hydropower project development. The existing hydropower projects are expensive due to heavy reliance on bilateral and multilateral financing agencies, costly foreign consultants and contractors, limited manufacturing capability of power generation, transmission, and distribution-related equipment, inefficient management and high cost of preparatory work as well as unfavorable geological condition. High cost of project development together with initially expensive power purchase agreement with IPPS, transmission and distribution losses, non-payments or payments in arrears from the public sector consumers and wastage

of surplus power contribute to high electricity tariffs, thereby making adverse impact on industrial use and export purposes.

For the implementation of plan and achieving the targets relating to the hydropower, development of cost effective small and medium-sized projects to meet domestic demand at affordable price, encouragement of private sectors investment in hydropower development and power distribution on competitive basis, acceleration of rural electrification attracting investment from community and private entrepreneurs, improvement in the integration of social and environment mechanism into power development process, encouragement of the power-based industries and transportation systems to create market for existing surplus energy and future energy growth are extremely important. Besides, facilitating the flow of funds from domestic financial sector to the hydropower sector and the institutional set-up for the power export, promoting hydropower research and development (R&D) center to assist in preparation of national power system and improve NEA as a commercially viable remain the other challenges.

In this study, primary and secondary data are used. Mainly secondary data, financial data and statistical tools have used to present, analyze and interpret the data.

## **5.2 Conclusions**

The hydropower potential of Nepal is huge and the sustainable hydropower development becomes the key to make Nepal's economic growth scenario brighter, gaining deep inroads into the national goal and priority of poverty reduction.

Hydropower has a number of benefits: (a) it is a continuously renewable electrical energy source; (b) it is non-polluting, i.e., no heat or noxious gases are released; (c) it has no fuel cost and, with low operating and malignances cost, is essentially inflation-proof; (d) hydropower technology is a proven technology that offers reliable and flexible operation, (e) hydropower stations have a long life and many existing stations have been in operation for more than half a century and are still operating efficiently; (f) hydropower station efficiencies of over 90 percent have been achieved making it the most efficient of the energy conversion technologies.

Hydropower offers a means of responding within seconds to charges in load demand. Fortunately, Nepal is rich in hydro-resources, with one of the highest per capita hydropower potentials in the world. However, at present, the total hydropower generation has been 556.8 MW, merely 0.7 percent of the potential, with connection to 40 percent of the people. It is notable to mention that, by the end of the Tenth Plan (2002-2007), 55 percent of the population will have connection to the electricity. Use of environment-friendly technologies and implementation of sound legal and institutional issues are critical to improve the reach of the population to the hydropower. Putting into place a favorable environment for increasing investments in cost effective projects would definitely contribute to make this target a reality. As a cheap, renewable source of energy with negligible environmental impacts, small hydropower has an important role to play in Nepal's future energy supply. Micro-hydro systems are particularly suitable for power supplies in rural and isolated communities, as an economic alternative to extending the electricity grid. These systems provide a source of cheap, independent and continuous power, without degrading the environment, so essential for a mountainous and environmentally fragile country like Nepal. To make this outcome a reality, directing more resources to the power projects focusing on rural population remains the pre-requisite. The Acts and regulations should be made to support the environment as well as the hydropower development efforts so that the environment and development go together, especially

when it comes to the most important natural resources development endeavors of the nation. The major strategies of the power sector have been appropriately identified as promoting private sector participation in power in power generation and distribution, unbundling the activities of the NEA as well as improving its financial viability, integrating rural electrification with rural economic development programs, and strengthening power infrastructure. In the present global scenario where the oil prices are remaining higher and future provides an uncertain outlook with respect to oil, optimal utilization of the abundant natural endowment, viz., hydropower, would reduce Nepal's import cost substantially, contribute in improving the relative competitiveness of the economy both on a regional and global basis, and fulfill the desire of double-digit sustainable growth in the coming decades.

After conducting the working capital management of CHCL and BPCL, covering the study period of 2059/60 to 2064/65, the following conclusions can be drawn from the study:

- a) The mean ( $\bar{X}$ ) of current ratio of CHCL is 7.62:1 as well as BPCL is 1.32:1. BPCL's ratio is lesser than the standard current ratio 2:1 but CHCL's ratio is higher than the standard current ratio. The companies are maintain the current ratio in accordance with standard.
- b) CHCL is maintaining adequate liquidity position regarding quick ratio than BPCL. Too low ratios are also not preferable company should meet its obligations any time when necessary.
- c) The profitability ratios of the selected companies are fluctuating over the study period. To make company's profitability and return from loans and advances is satisfactory; the companies should really make an effort in loans and advances efficiently to generate adequate level of return.
- d) The average of cash conversion period (PDP) of BPCL and CHCL are 114 days and 51 days respectively. BPCL's cash conversion period is higher than CHCL's cash conversion period over the study period. Cash conversion period of BPCL is fluctuated but CHCL is slightly increased in overall five years period.
- e) The coefficient of correlation between two variables (i.e. current assets and current liabilities, NWC and net profit) of the selected companies is nearly 1 so, high degree of positive correlation between these two variables. It also reveals that relationship between two variables of the selected companies is closer to perfect correlation. Correlation of coefficient (r) is greater than 6P.E. Therefore it reveals that relationship between two variables is significant.

### 5.3 Recommendations

On the basis of major finding of the study, some important recommendations have been forwarded. Although these companies have more than 12 years of commercial experiences in the Nepalese Hydropower sector, with a competent managerial team, some weaknesses have come into light through the study. The sampled companies may use it as a remedial measure. The recommendations have been the following:

- i) BPCL is suggested to improve its profitability position, and to improve its overall efficiency and returns to its shareholders.
- ii) Although the current asset total assets ratio of the companies is decreasing over the study period, the company's performances haven't maintain the level.
- iii) BPCL has been suggested to improve its receivable conversion period to collect its amount.

- iv) The studied companies are suggested to invest in deprived sectors in order to contribute to the overall development of the country.
- v) The companies should maintain positive relationship between current assets and current liabilities.
- vi) Since the economy of the country has become weaker since the last decade, the studied companies are advised to concentrate more on risk free securities and low risk loans.
- viii) Last, but not the least the companies should keep in peace with the changing technologies, improve organizational structure, provide quality services to its customers and actively participate in social welfare programmes.  
Organizational culture that acquires, develops, utilizes and maintains the employees in a high morale is preferred.



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Appendix

Appendix - I  
Components of Current Assets

(Rs. in '000)

Year	BPCL					CHCL				
	Cash & Bank Balance	Loan & Advances	Stock	Receivable	Total Current Assets	Cash & Bank Balance	Loan & Advances	Stock	Receivable	Total Current Assets
2064/65	457035	72564	58896	58918	647416	34228	11519	12094	183961	241801
2065/66	412635	170447	74647	88407	746136	277110	157107	22322	189692	646231
2066/67	291687	188068	92723	171359	743837	248471	601054	36894	108656	995075
2067/68	234888	218398	104543	93690	651519	44129	1165578	30902	209483	1450093
2068/69	44902	287936	83413	184140	600391	73456	1714204	53455	205170	2046285
Average	818229.4	187482.6	188864.4	119302.8	677859.8	135478.7	729892.5	31133.3	179392.4	1075896.9

Appendix - II  
Net Working Capital

(Rs. in '000)

Year	BPCL				CHCL			
	Current Assets	Current Liabilities	Net Working Capital	% change in NWC	Current Assets	Current Liabilities	Net Working Capital	% change in NWC
2064/65	647416	568510	78906	-	241801	268560	-26759	-
2065/66	746136	570323	175813	55.12	646231	504089	142142	118.83
2066/67	743837	624543	119294	-47.38	995075	364893	630182	77.44
2067/68	651519	566569	84950	-40.43	1450093	102700	1347393	53.23
2068/69	600391	328979	271412	68.70	2046285	107385	1938900	30.51
Average	677859.8	531784.8	146075	7.20	1075896.9	269525.4	806371.6	56.0

Appendix - III  
The Relationship between Net Working Capital and Net Profit

(Rs. in '000)

Year	BPCL		CHCL	
	Net Working Capital	Net Profit	Net Working Capital	Net Profit
2064/65	78906	252840	-26759	667477
2065/66	175813	353879	142142	679372
2066/67	119294	291592	630182	735361
2067/68	84950	224233	1347393	777432
2068/69	271412	328970	1938900	843139
Average	146075	290302.8	806371.62	740556.20

Appendix - IV  
Current ratio (times)

(Rs. in '000)

Year	BPCL			CHCL		
	Current Assets	Current Liabilities	Ratio	Current Assets	Current Liabilities	Ratio
2064/65	241801	268560	1.14	241801	268560	0.90
2065/66	646231	504089	1.31	646231	504089	1.28
2066/67	995075	364893	1.19	995075	364893	2.73
2067/68	1450093	102700	1.15	1450093	102700	14.12
2068/69	2046285	107385	1.83	2046285	107385	19.06
Average	1075896.9	269525.4	1.32	1075896.9	269525.4	7.62

Appendix - V  
Quick ratio of BPCL

(Rs. in '000)

Year	BPCL			CHCL		
	Quick Assets	Current Liabilities	Ratio	Quick Assets	Current Liabilities	Ratio
2064/65	588520	268560	1.04	229708	268560	0.86
2065/66	671489	504089	1.18	623909	504089	1.24
2066/67	651114	364893	1.04	958180	364893	2.63
2067/68	546976	102700	0.97	1419191	102700	13.82
2068/69	516978	107385	1.57	1992830	107385	18.56
Average	595015.4	269525.4	1.16	1044763.63	269525.4	7.42

Appendix - VI  
Current assets to total assets ratio

(Rs. in '000)

Year	BPCL			CHCL		
	Current Assets	Total Assets	Ratio	Current Assets	Total Assets	Ratio
2064/65	241801	1391309	0.47	241801.43	2375736.13	0.10
2065/66	646231	1471878	0.51	646230.51	2865714.13	0.23
2066/67	995075	1509176	0.49	995074.76	3134868.99	0.32
2067/68	1450093	1433185	0.45	1450092.99	3577424.91	0.41
2068/69	2046285	2121927	0.28	2046285.11	4195007.6	0.49
Average	1075896.9	1585495	0.44	1075896.96	3229750.352	0.31

Appendix - VII  
NWC to Total assets ratio

(Rs. in '000)

Year	BPCL			CHCL		
	NWC	Total Assets	Ratio	NWC	Total Assets	Ratio
2064/65	78906	1391309	0.06	-26759	2375736	-0.01
2065/66	175813	1471878	0.12	142142	2865714	0.05
2066/67	119294	1509176	0.08	630182	3134869	0.20
2067/68	84950	1433185	0.06	1347393	3577425	0.38
2068/69	271412	2121927	0.13	1938900	4195008	0.46
Average	146075	1585495	0.09	806372	3229750	0.22

Appendix - VIII  
Stock turnover ratio

(Rs. in '000)

Year	BPCL			CHCL		
	Net sales	Stock	Ratio	Net sales	Stock	Ratio
2064/65	379769	58896	6.45	903541	12094	74.71
2065/66	421687	74647	5.65	870015	22322	38.98
2066/67	433800	92723	4.68	883446	36894	23.95
2067/68	453431	104543	4.34	886565	30902	28.69
2068/69	483787	83413	5.80	885046	53455	16.56
Average	434494.80	82844.40	5.38	885723	31133	36.58

Appendix - IX  
Debtors' turnover ratio

(Rs. in '000)

Year	BPCL			CHCL		
	Net sales	Debtors	Ratio	Net sales	Debtors	Ratio
2064/65	379769	58918	6.45	903541	183961	4.91
2065/66	421687	88407	4.77	870015	189692	4.59
2066/67	433800	171359	2.53	883446	108656	8.13
2067/68	453431	93690	4.84	886565	209483	4.23
2068/69	483787	184140	2.63	885046	205170	4.31
Average	434494.80	119302.80	4.24	885723	179392	5.23

Appendix - X  
Fixed assets turnover ratio

(Rs. in '000)

Year	BPCL			CHCL		
	Net sales	Fixed assets	Ratio	Net sales	Fixed assets	Ratio
2064/65	379769	743893	0.51	903541	2133935	0.42
2065/66	421687	725742	0.58	870015	2219484	0.39
2066/67	433800	765339	0.57	883446	2139794	0.41
2067/68	453431	781666	0.58	886565	2127332	0.42
2068/69	483787	1521536	0.32	885046	2148722	0.41
Average	434494.80	907635.20	0.51	885723	2153853.40	0.41

Appendix - XI  
Total asset turnover ratio

(Rs. in '000)

Year	BPCL			CHCL		
	Net sales	Total assets	Ratio	Net sales	Total assets	Ratio
2064/65	379769	1391309	0.27	903541	2375736	0.38
2065/66	421687	1471878	0.29	870015	2865714	0.30
2066/67	433800	1509176	0.29	883446	3134869	0.28
2067/68	453431	1433185	0.32	886565	3577425	0.25
2068/69	483787	2121927	0.23	885046	4195008	0.21
Average	434494.80	1585495.00	0.28	885723	3229750	0.28

Appendix - XII  
Capital employed turnover ratio

(Rs. in '000)

Year	BPCL			CHCL		
	Net sales	Capital employed	Ratio	Net sales	Capital employed	Ratio
2064/65	379769	1294863	0.29	903541	2110746	0.43
2065/66	421687	1395820	0.30	870015	2366279	0.37
2066/67	433800	1572997	0.28	883446	2773340	0.32
2067/68	453431	1687772	0.27	886565	3478088	0.25
2068/69	483787	2829053	0.17	885046	4096353	0.22
Average	434494.80	1756101.00	0.26	885723	2964961.20	0.32

Appendix - XIII  
Return on Total assets

(Rs. in '000)

Year	BPCL			CHCL		
	NPAT	Total asset	Ratio	NPAT	Total asset	Ratio
2064/65	252840	1391309	18.17	667477	2375736	28.10
2065/66	353879	1471878	24.04	679372	2865714	23.71
2066/67	291592	1509176	19.32	735361	3134869	23.46
2067/68	224233	1433185	15.65	777432	3577425	21.73
2068/69	328970	2121927	15.50	843139	4195008	20.10
Average	290302.80	1585495.00	18.54	740556.20	3229750	23.42

Appendix - XIV  
Return on Shareholder's equity

(Rs. in '000)

Year	BPCL			CHCL		
	NPAT	Shareholder's equity	Ratio	NPAT	Shareholder's equity	Ratio
2064/65	252840	1294863	19.53	667477	1942246	34.37
2065/66	353879	1395820	25.35	679372	2366279	28.71
2066/67	291592	1546268	18.86	735361	2773340	26.52
2067/68	224233	1629802	13.76	777432	3478088	22.35
2068/69	328970	2710942	12.13	843139	4096353	20.58
Average	290302.80	1715539.00	17.93	740556.20	2931261.20	26.51

Appendix - XV  
Return on Capital employed

(Rs. in '000)

Year	BPCL			CHCL		
	NPAT	Capital employed	Ratio	NPAT	Capital employed	Ratio
2064/65	252840	1294863	19.53	667477	2110746	31.62
2065/66	353879	1395820	25.35	679372	2366279	28.71
2066/67	291592	1572997	18.54	735361	2773340	26.52
2067/68	224233	1687772	13.29	777432	3478088	22.35
2068/69	328970	2829053	11.63	843139	4096353	20.58
Average	290302.80	1756101.00	17.67	740556.20	2964961.20	25.96

Appendix - XVI  
Inventory Conversion Period (in days)

(Rs. in '000)

Year	BPCL			CHCL		
	Stock	Average Net Sales	ICP	Stock	Average Net Sales	ICP
2064/65	58896	1054.91	56	12094	2509.84	5
2065/66	74647	1171.35	64	22322	2416.71	9
2066/67	92723	1205.00	77	36894	2454.02	15
2067/68	104543	1259.53	83	30902	2462.68	13
2068/69	83413	1343.85	62	53455	2458.46	22
Average	82844.40	1206.93	68	31133.33	2460.34	13

Appendix - XVII  
Receivable Conversion Period (in days)

(Rs. in '000)

Year	BPCL			CHCL		
	Debtors	Average Net Sales	RCP	Debtors	Average Net Sales	RCP
2064/65	58918	1054.91	56	183961	2509.84	73
2065/66	88407	1171.35	75	189692	2416.71	78
2066/67	171359	1205.00	142	108656	2454.02	44
2067/68	93690	1259.53	74	209483	2462.68	85
2068/69	184140	1343.85	137	205170	2458.46	83
Average	119302.80	1206.93	97	179392.43	2460.34	73

Appendix - XVIII  
Payable Deferred Period (in days)

(Rs. in '000)

Year	BPCL			CHCL		
	A/c Payable	Average Purchase	PDP	A/c Payable	Average Purchase	PDP
2064/65	7461	207.13	36	3282	150.25	22
2065/66	20796	229.21	91	6743	173.01	39
2066/67	14506	245.81	59	6727	161.48	42
2067/68	10118	382.89	26	7171	202.04	35
2068/69	18335	401.38	46	7470	205.83	36
Average	14243.20	293.28167	51.57	6278.60	178.52	34.85

Appendix - XIX  
Cash Conversion Cycles (in days)

(Rs. in '000)

Year	BPCL				CHCL			
	ICP	RCP	PDP	CCC	ICP	RCP	PDP	CCC
2064/65	56	56	36	76	5	73	22	56
2065/66	64	75	91	48	9	78	39	48
2066/67	77	142	59	160	15	44	42	17
2067/68	83	74	26	131	13	85	35	63
2068/69	62	137	46	153	22	83	36	69

**Cash Conversion Cycle (CCC) = ICP + RCP - PDP**

Appendix - XX  
Trend line of Cash and bank of BPCL

Year (x)	Cash & bank (y)	x = (x-2066/67)	x <sup>2</sup>	xy	yc
2064/65	70.59	-2	4	-141.18	70.82
2065/66	55.3	-1	1	-55.3	56.273
2066/67	39.21	0	0	0	41.726
2067/68	36.05	1	1	36.05	27.179
2068/69	7.48	2	4	14.96	12.632
Total	208.63	0	10	-145.47	

$$Y = a + bx$$

$$\text{Here, } a = \frac{\sum y}{n} = \frac{208.63}{5} = 41.726$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{-145.47}{10} = -14.547$$

$$Y(2064/65) = 41.726 + (-14.547)(-2) = 70.82$$

$$Y(2065/66) = 41.726 + (-14.547)(-1) = 56.273$$

$$Y(2066/67) = 41.726 + (-14.547) \times 0 = 41.726$$

$$Y(2067/68) = 41.726 + (-14.547)(1) = 27.179$$

$$Y(2068/69) = 41.726 + (-14.547)(2) = 12.632$$

$$Y(2069/70) = 41.726 + (-14.547)(3) = -1.915$$

$$Y(2070/71) = 41.726 + (-14.547)(4) = -16.462$$

Trend line of Cash and bank of CHCL

Year (x)	Cash & bank (y)	x = (x-2066/67)	x <sup>2</sup>	xy	yc
2064/65	14.16	-2	4	-28.32	29.924
2065/66	42.88	-1	1	-42.88	23.826
2066/67	24.97	0	0	0	17.728
2067/68	3.04	1	1	3.04	11.63
2068/69	3.59	2	4	7.18	5.532
Total	88.64	0	10	-60.98	

$$Y = a + bx$$

$$\text{Here, } a = \frac{\sum y}{n} = \frac{88.64}{5} = 17.728$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{-60.98}{10} = -6.098$$

$$Y(2064/65) = 17.728 + (-6.098)(-2) = 29.924$$

$$Y(2065/66) = 17.728 + (-6.098)(-1) = 23.826$$

$$Y(2066/67) = 17.728 + (-6.098) \times 0 = 17.728$$

$$Y(2067/68) = 17.728 + (-6.098)(1) = 11.63$$

$$Y(2068/69) = 17.728 + (-6.098)(2) = 5.532$$

$$Y(2069/70) = 17.728 + (-6.098)(3) = 0.566$$

$$Y(2070/71) = 17.728 + (-6.098)(4) = -6.664$$

Appendix - XXI

Trend line of loan and advances of BPCL

Year (x)	loan and advances (y)	x = (x-2066/67)	x <sup>2</sup>	xy	yc
2064/65	11.21	-2	4	-22.42	11.326
2065/66	22.84	-1	1	-22.84	19.744
2066/67	25.28	0	0	0	28.162
2067/68	33.52	1	1	33.52	36.58
2068/69	47.96	2	4	95.92	44.998
Total	140.81	0	10	84.18	

$$Y = a + bx$$

$$\text{Here, } a = \frac{\sum y}{n} = \frac{140.81}{5} = 28.162$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{84.18}{10} = 8.418$$

$$Y(2064/65) = 28.162 + 8.418(-2) = 11.326$$

$$Y(2065/66) = 28.162 + 8.418(-1) = 19.744$$

$$Y(2066/67) = 28.162 + 8.418 \times 0 = 28.162$$

$$Y(2067/68) = 28.162 + 8.418(1) = 36.58$$

$$Y(2068/69) = 28.162 + 8.418(2) = 44.998$$

$$Y(2068/69) = 28.162 + 8.418(3) = 53.416$$

$$Y(2069/70) = 28.162 + 8.418(4) = 61.834$$

Trend line of loan and advances of CHCL

Year (x)	loan and advances (y)	x = (x-2066/67)	x <sup>2</sup>	xy	yc
2064/65	4.76	-2	4	-9.52	7.906
2065/66	24.31	-1	1	-24.31	29.315
2066/67	60.4	0	0	0	50.724
2067/68	80.38	1	1	80.38	72.133
2068/69	83.77	2	4	167.54	93.542
Total	253.62	0	10	214.09	

$$Y = a + bx$$

$$\text{Here, } a = \frac{\sum y}{n} = \frac{253.62}{5} = 50.724$$



$$b = \frac{\sum xy}{\sum x^2} = \frac{214.09}{10} = 21.409$$

$$Y(2064/65) = 50.724 + 21.409 (-2) = 7.906$$

$$Y(2065/66) = 50.724 + 21.409 (-1) = 29.315$$

$$Y(2066/67) = 50.724 + 21.409 \times 0 = 50.724$$

$$Y(2067/68) = 50.724 + 21.409 (1) = 72.133$$

$$Y(2068/69) = 50.724 + 21.409 (2) = 93.542$$

$$Y(2069/70) = 50.724 + 21.409 (3) = 114.951$$

$$Y(2070/71) = 50.724 + 21.409 (4) = 136.36$$

Appendix - XXII  
Trend line of stock of BPCL

Year (x)	Stock (y)	x = (x-2066/67)	x <sup>2</sup>	xy	yc
2064/65	9.1	-2	4	-18.2	9.176
2065/66	10	-1	1	-10	10.739
2066/67	12.47	0	0	0	12.302
2067/68	16.05	1	1	16.05	13.865
2068/69	13.89	2	4	27.78	15.428
Total	61.51	0	10	15.63	

$$Y = a + bx$$

$$\text{Here, } a = \frac{\sum y}{n} = \frac{61.51}{5} = 12.302$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{15.63}{10} = 1.563$$

$$Y(2064/65) = 12.302 + 1.563 (-2) = 9.176$$

$$Y(2065/66) = 12.302 + 1.563 (-1) = 10.739$$

$$Y(2066/67) = 12.302 + 1.563 \times 0 = 12.302$$

$$Y(2067/68) = 12.302 + 1.563 (1) = 13.865$$

$$Y(2068/69) = 12.302 + 1.563 (2) = 15.428$$

$$Y(2069/70) = 12.302 + 1.563 (3) = 16.991$$

$$Y(2070/71) = 12.302 + 1.563 (4) = 18.554$$

Trend line of stock of CHCL

Year (x)	Stock (y)	x = (x-2066/67)	x <sup>2</sup>	xy	yc
2064/65	5	-2	4	-10	4.6
2065/66	3.45	-1	1	-3.45	3.99
2066/67	3.71	0	0	0	3.38
2067/68	2.13	1	1	2.13	2.77
2068/69	2.61	2	4	5.22	2.16
Total	16.9	0	10	-6.1	

$$Y = a + bx$$

$$\text{Here, } a = \frac{\sum y}{n} = \frac{16.9}{5} = 3.38$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{-6.1}{10} = -0.61$$

$$Y(2064/65) = 3.38 + (-0.61) (-2) = 4.6$$

$$Y(2065/66) = 3.38 + (-0.61) (-1) = 3.99$$

$$Y(2066/67) = 3.38 + (-0.61) \times 0 = 3.38$$

$$Y(2067/68) = 3.38 + (-0.61) (1) = 2.77$$

$$Y(2068/69) = 3.38 + (-0.61) (2) = 2.16$$

$$Y(2069/70) = 3.38 + (-0.61) (3) = 1.55$$

$$Y(2070/71) = 3.38 + (-0.61) (4) = 0.94$$

Appendix - XXIII  
Trend line of receivables of BPCL

Year (x)	Receivables (y)	$x = (x-2066/67)$	$x^2$	$xy$	$yc$
2064/65	9.1	-2	4	-18.2	8.674
2065/66	11.85	-1	1	-11.85	13.241
2066/67	23.04	0	0	0	17.808
2067/68	14.38	1	1	14.38	22.375
2068/69	30.67	2	4	61.34	26.942
Total	89.04	0	10	45.67	

$$Y = a + bx$$

$$\text{Here, } a = \frac{\sum y}{n} = \frac{89.04}{5} = 17.808$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{45.67}{10} = 4.567$$

$$Y(2064/65) = 17.808 + 4.567 (-2) = 8.674$$

$$Y(2065/66) = 17.808 + 4.567 (-1) = 13.241$$

$$Y(2066/67) = 17.808 + 4.567 \times 0 = 17.808$$

$$Y(2067/68) = 17.808 + 4.567 (1) = 22.375$$

$$Y(2068/69) = 17.808 + 4.567 (2) = 26.942$$

$$Y(2069/70) = 17.808 + 4.567 (3) = 31.509$$

$$Y(2070/71) = 17.808 + 4.567 (4) = 36.076$$

Trend line of receivables of CHCL

Year (x)	Receivables (y)	$x = (x-2066/67)$	$x^2$	$xy$	$yc$
2064/65	76.08	-2	4	-152.16	57.566
2065/66	29.35	-1	1	-29.35	42.866
2066/67	10.92	0	0	0	28.166
2067/68	14.45	1	1	14.45	13.466
2068/69	10.03	2	4	20.06	-1.234
Total	140.83	0	10	-14.7	

$$Y = a + bx$$

$$\text{Here, } a = \frac{\sum y}{n} = \frac{140.83}{5} = 28.166$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{-147}{10} = -14.7$$

$$Y(2064/65) = 28.166 + (-14.7) (-2) = 57.566$$

$$Y(2065/66) = 28.166 + (-14.7) (-1) = 42.866$$

$$Y(2066/67) = 28.166 + (-14.7) \times 0 = 28.166$$

$$Y(2067/68) = 28.166 + (-14.7) (1) = 13.466$$

$$Y(2068/69) = 28.166 + (-14.7) (2) = -1.234$$

$$Y(2069/70) = 28.166 + (-14.7) (2) = -15.934$$

$$Y(2070/71) = 28.166 + (-14.7) (2) = -30.634$$

Appendix - XXIV

Calculation of Correlation of coefficient between NWC and Net Profit of BPCL

(Rs. in million)

Year	NWC (X <sub>1</sub> )	Net Profit (X <sub>2</sub> )	$d_1 = X_1 - 11369.04$	$d_2 = X_2 - 189.37$	$d_1 \cdot d_2$	$d_1^2$	$d_2^2$
2064/65	789.06	2528.4	-671.69	-374.63	251633.88	451167.46	140346.14
2065/66	1758.13	3538.79	297.38	635.76	189062.90	88434.86	404193.32
2066/67	1192.94	2915.92	-267.81	12.89	-3452.61	71722.20	166.20
2067/68	849.5	2242.33	-611.25	-660.70	403851.65	373626.56	436521.85
2068/69	2714.12	3289.7	1253.37	386.67	484643.08	1570936.36	149515.24
	$\sum X_1 = 7303.75$	$\sum X_2 = 14515.14$	0.00	0.00	$\sum d_1 d_2 = 1325738.92$	$\sum d_1^2 = 2555887.44$	$\sum d_2^2 = 1130742.75$

Here,

n = Number of years

X<sub>1</sub> = Total deposit

X<sub>2</sub> = Net profit

$\bar{X}_1$  = Mean of total deposit

$\bar{X}_2$  = Mean of net profit

$$\bar{X}_1 = \frac{\sum X_1}{n} = \frac{7303.75}{5} = 1460.75$$

$$\bar{X}_2 = \frac{\sum X_2}{n} = \frac{14515.14}{5} = 2903.028$$

$$r = \frac{d_1 \cdot d_2}{\sqrt{\sum d_1^2 \cdot \sum d_2^2}} = \frac{1325738.92}{\sqrt{2555887.44 \times 1130742.75}} = 0.991$$

Positive correlation

$$P.E. = \frac{0.6745(1 - r^2)}{\sqrt{n}} = \frac{0.6745(1 - 0.99^2)}{\sqrt{5}} = 0.006$$

$$6P.E. = 6 \times 0.006 = 0.036$$

r > 6P.E. we conclude that r is highly significant

#### Appendix – XXV

Calculation of Correlation of coefficient between NWC and Net Profit of CHCL

(Rs. in million)

Year	NWC (X <sub>1</sub> )	Net Profit (X <sub>2</sub> )	d <sub>1</sub> = X <sub>1</sub> - 8063.72	d <sub>2</sub> = X <sub>2</sub> - 7405.56	d <sub>1</sub> ·d <sub>2</sub>	d <sub>1</sub> <sup>2</sup>	d <sub>2</sub> <sup>2</sup>
2064/65	-267.59	6674.77	-8331.31	-730.79	6088451.77	69410659.67	534056.95
2065/66	1421.42	6793.72	-6642.30	-611.84	4064035.67	44120096.15	374350.63
2066/67	6301.82	7353.61	-1761.90	-51.95	91534.02	3104277.51	2699.01
2067/68	13473.93	7774.32	5410.21	368.76	1995059.69	29270415.53	135982.46
2068/69	19389	8431.39	11325.28	1025.83	11617793.44	128262057.68	1052323.09
	$\sum X_1 = 40318.58$	$\sum X_2 = 37027.81$	0.00	0.00	$\sum d_1 d_2 = 23856874.59$	$\sum d_1^2 = 274167506.54$	$\sum d_2^2 = 2099412.14$

Here,

n = Number of years

X<sub>1</sub> = Total deposit

X<sub>2</sub> = Net profit

$\bar{X}_1$  = Mean of total deposit

$\bar{X}_2$  = Mean of net profit

$$\bar{X}_1 = \frac{\sum X_1}{n} = \frac{40318.58}{5} = 8063.716$$

$$\bar{X}_2 = \frac{\sum X_2}{n} = \frac{37027.81}{5} = 7405.562$$

$$r = \frac{d_1 \cdot d_2}{\sqrt{\sum d_1^2 \cdot \sum d_2^2}} = \frac{23856874.59}{\sqrt{274167506.54 \times 2099412.14}} = 0.954$$

Positive correlation

$$P.E. = \frac{0.6745(1 - r^2)}{\sqrt{n}} = \frac{0.6745(1 - 0.954^2)}{\sqrt{5}} = 0.027$$

$$6P.E. = 6 \times 0.027 = 0.163$$

$r > 6P.E.$  we conclude that  $r$  is highly significant

#### Appendix - XXVI

Calculation of Correlation of coefficient between Current Assets and Current Liabilities of BPCL

(Rs. in million)

Year	Current Assets ( $X_1$ )	Current Liabilities ( $X_2$ )	$d_1 = X_1 - 6778.60$	$d_2 = X_2 - 5317.85$	$d_1 \cdot d_2$	$d_1^2$	$d_2^2$
2064/65	6474.16	5685.1	-304.44	367.25	-111805.46	92682.50	134874.03
2065/66	7461.36	5703.23	682.76	385.38	263124.19	466163.95	148519.29
2066/67	7438.37	6245.43	659.77	927.58	611992.63	435299.09	860408.37
2067/68	6515.19	5665.69	-263.41	347.84	-91624.37	69383.77	120994.06
2068/69	6003.91	3289.79	-774.69	-2028.06	1571112.20	600141.50	4113019.25
	$\Sigma X_1 =$ 33892.99	$\Sigma X_2 =$ 26589.24			$\Sigma d_1 \cdot d_2 =$ 2242799.18	$\Sigma d_1^2 =$ 1663670.81	$\Sigma d_2^2 =$ 5377814.99

Here,

$n$  = Number of Year

$X_1$  = Current assets

$X_2$  = Current liabilities

$\bar{X}_1$  = Mean of current assets

$\bar{X}_2$  = Mean of current liabilities

$$\bar{X}_1 = \frac{\Sigma X_1}{n} = \frac{33892.99}{5} = 6778.60$$

$$\bar{X}_2 = \frac{\Sigma X_2}{n} = \frac{26589.24}{5} = 5317.85$$

$$r = \frac{d_1 \cdot d_2}{\sqrt{\sum d_1^2 \cdot \sum d_2^2}} = \frac{2242799.18}{\sqrt{1663670.81 \times 5377814.99}} = 0.9991$$

Positive correlation

$$P.E. = \frac{0.6745(1 - r^2)}{\sqrt{n}} = \frac{0.6745(1 - 0.9991^2)}{\sqrt{5}} = 0.0011$$

$$6P.E. = 6 \times 0.0011 = 0.0066$$

$r > 6P.E.$  we conclude that  $r$  is highly significant

Appendix - XXVII

Calculation of Correlation of coefficient between Current Assets and Current Liabilities of CHCL

(Rs. in million)

Year	Current Assets (X <sub>1</sub> )	Current Liabilities (X <sub>2</sub> )	d <sub>1</sub> = X <sub>1</sub> - 10758.97	d <sub>2</sub> = X <sub>2</sub> - 2695.25	d <sub>1</sub> .d <sub>2</sub>	d <sub>1</sub> <sup>2</sup>	d <sub>2</sub> <sup>2</sup>
2064/65	2418.01	2685.6	-8340.96	-9.65	80523.63	69571613.72	93.20
2065/66	6462.31	5040.89	-4296.66	2345.64	-10078400.38	18461287.16	5502008.24
2066/67	9950.75	3648.93	-808.22	953.68	-770780.02	653219.57	909497.91
2067/68	14500.93	1027	3741.96	-1668.25	-6242539.74	14002264.64	2783071.41
2068/69	20462.85	1073.85	9703.88	-1621.40	-15733909.85	94165287.05	2628950.93
	ΣX <sub>1</sub> = 53794.85	ΣX <sub>2</sub> = 13476.27	0.00	0.00	Σd <sub>1</sub> d <sub>2</sub> = - 32745106.35	Σd <sub>1</sub> <sup>2</sup> = 196853672.14	Σd <sub>2</sub> <sup>2</sup> = 11823621.70

Here,

n = Number of Year

X<sub>1</sub> = Current assets

X<sub>2</sub> = Current liabilities

$\bar{X}_1$  = Mean of current assets

$\bar{X}_2$  = Mean of current liabilities

$$\bar{X}_1 = \frac{\Sigma X_1}{n} = \frac{53794.85}{5} = 10758.97$$

$$\bar{X}_2 = \frac{\Sigma X_2}{n} = \frac{13476.27}{5} = 2695.25$$

$$r = \frac{d_1 \cdot d_2}{\sqrt{\Sigma d_1^2 \cdot \Sigma d_2^2}} = \frac{32745106.35}{\sqrt{196853672.14 \times 11823621.70}} = 0.9991$$

Positive correlation

$$P.E. = \frac{0.6745(1 - r^2)}{\sqrt{n}} = \frac{0.6745(1 - 0.9991^2)}{\sqrt{5}} = 0.0011$$

$$6P.E. = 6 \times 0.0011 = 0.0066$$

r > 6P.E. we conclude that r is highly significant