



Saurashtra University

Re – Accredited Grade 'B' by NAAC
(CGPA 2.93)

Popat, Pravin H., 2011, “*A Study on Working Capital Management and its Impact on Profitability of Selected Fertilizer Units of Gujarat State*”, thesis PhD, Saurashtra University

<http://etheses.saurashtrauniversity.edu/id/eprint/614>

Copyright and moral rights for this thesis are retained by the author

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge.

This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from the Author.

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the Author

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given.

Saurashtra University Theses Service
<http://etheses.saurashtrauniversity.edu>
repository@sauuni.ernet.in

THE THESIS
ON
"A STUDY ON WORKING CAPITAL MANAGEMENT AND
ITS IMPACT ON PROFITABILITY OF SELECTED
FERTILIZER UNITS OF GUJARAT STATE"

SUBMITTED BY
MR. PRAVIN H. POPAT
LECTURER,
SHRI V. N. MEHTA ARTS AND COMMERCE COLLEGE,
JAMNAGAR

FOR
Ph.D. DEGREE IN COMMERCE
UNDER THE FACULTY OF COMMERCE
SAURASHTRA UNIVERSITY,
RAJKOT

UNDER THE GUIDANCE OF
Dr. SHAILESH J. PARMAR
Associate Professor
DEPARTMENT OF COMMERCE AND BUSINESS ADMINISTRATION,
SAURASHTRA UNIVERSITY,
RAJKOT

AUGUST- 2011

Registration No:4138

Department of Commerce & Business Administration
Saurashtra University
Rajkot

~~~~~

**CERTIFICATE**

This is to certify that **Mr. PRAVIN H. POPAT** has carried out the Research Work presented in this thesis on “**A Study on Working Capital Management and Its Impact on Profitability of Selected Fertilizer Units of Gujarat State**” under my guidance and supervision.

I also certify that this is his original work.

Date: <sup>th</sup> August, 2011

Place: Rajkot

**Dr. Shailesh J. Parmar**

Associate Professor,  
Department of Commerce &  
Business Administration,  
Saurashtra University,  
Rajkot.

## **DECLARATION**

I, the undersigned hereby declare that the Research Work presented in this thesis on “**A Study on Working Capital Management and Its Impact on Profitability of Selected Fertilizer Units of Gujarat State**” is my original work and being prepared as per the guidance given by my guide.

I also declare that the research work has not been previously submitted to this or any other university for any degree or award.

Date: <sup>th</sup> August, 2011

Place: Rajkot

**MR. PRAVIN H. POPAT**

Lecturer,

Shri V. N. Mehta Arts and

Commerce College,

Jamnagar.

## **ACKNOWLEDGEMENT**

It is a matter of great pleasure for me; to get this opportunity of expressing deepens sincere gratitude to my guide, Dr. S. J. Parmar, who has evident in my research work. I am greatly thankful to him for the inspiration, guidance, support and encouragement given to me for the successful completion of the dissertation.

I am also thankful to teaching and non-teaching staff of Department of commerce and Business Administration.

I am also thankful to the Principal, teaching staff and non-teaching staff of my college for giving me moral support during the course of my research work. I would also like to express my heartfelt thanks to my friends for moral support.

I am thankful to the General Managers, Accounts Department Staff and Retailers of GSFC and GNFC for providing me the required data and important information for this present study, without which the research work could not have been completed.

I am extending heartfelt thanks to Bihag Oza for giving my research work in the shape of this thesis in time.

I find no words to express my deep sense of gratitude for unending motivation and support given by my parents, Father –Shri Haridasbhai Popat - my loving mother – Smt. Hemlataben Popat- for being constant and unfailing sources of strength. I am thankful to my venerable brother-Shri Natavarlal Popat for giving encouragement to undertake this research work.

Last but not least I am very grateful to my son - Deval, my daughter - Shivani, and my beloved wife- Pooja for forgoing their spare-time without my presence.

Date :  
Place : Rajkot

**MR. PRAVIN H. POPAT**  
**Research Scholar**

This Thesis is dedicated to.....

My Father Shri Haridasbhai Popat

&

My Mother Smt. Hemlataben Popat

# **PREFACE**

The concept of working capital has changed a lot with the evolution of business. From the theoretical foundation of working capital it presents that if the finance manager does not properly estimate the working capital, the enterprise will have to face severe problems in connection with the production as well as meeting daily requirements. In this backdrop the researcher has undertaken the study of Working Capital Management of Gujarat State Fertilizer Company (GSFC) and Gujarat Narmada Valley Fertilizer Company (GNFC) with the overall objective through different types of ratios based on the financial information of the company. The Indian fertilizer industry has come a long way since the setting up of the manufacturing unit of Single Super Phosphate (SSP) near Chennai in 1906. The Indian fertilizer industry has helped in the growth of the Indian economy. The India government has devised policies conducive to the manufacture and consumption of fertilizers. The dramatic development of the fertilizer industry and the rise in its production capacity has largely been attributed to the favorable policies. This has resulted in large scale investment in all three sector viz. public, private and co-operative. At present there are 57 large scale fertilizer units. There are also about 12 medium and small scale industries in operation.

Through present research study, the researcher tries to measure Working Capital Management and Its Impact on Profitability of Selected GNFC. The fertilizer sector by enhancing the agriculture productivity has in turn resulted in providing a major support to the farmers who are primarily depend on agriculture. Fertilizers have played a pivotal role in Indian food security. This research work is based on secondary data. And information has been collected from the published Annual Reports of the selected units. The other secondary data collected from books, Journals related to the subject matter- Working Capital Management- and related to Fertilizer Industry.

This research work has been divided into five chapters. The first chapter includes Introduction of Fertilizer Industry. In second chapter Conceptual Frame Work of Working Capital Management has been discussed. And in third chapter Research Methodology used for the study has been shown. In fourth chapter the analysis and interpretation of Working capital have been made. In the fifth chapter Summary, Findings & Suggestions has been presented.

**MR. PRAVIN H. POPAT**  
**Research Scholar**

## INDEX

| <b>Chapter No.</b> | <b>Content</b>                                 | <b>Page no.</b> |
|--------------------|------------------------------------------------|-----------------|
| ~                  | ACKNOWLEDGEMENT                                | iv              |
| ~                  | PREFACE                                        | vi              |
| ~                  | List of Abbreviations                          | viii            |
| ~                  | List of Tables                                 | x               |
| 1.                 | INTRODUCTION OF FERTILIZER INDUSTRY            | 1 to 47         |
| 2.                 | CONCEPTUAL FRAME WORK OF WORKING CAPITAL       | 48 to 77        |
| 3.                 | RESEARCH METHODOLOGY                           | 78 to 88        |
| 4.                 | ANALYSIS AND INTERPRETATION OF WORKING CAPITAL | 89 to 155       |
| 5.                 | SUMMARY, FINDINGS AND SUGGESTIONS              | 156 to 165      |
| ~                  | Bibliography                                   | 166 to 168      |
| ~                  | Appendix                                       | 169 to 171      |



## List of Abbreviations

|               |   |                                               |
|---------------|---|-----------------------------------------------|
| W.C.          | : | Working capital                               |
| C.A.          | : | Current Assets                                |
| C.L.          | : | Current Liabilities                           |
| NBRI          | : | National Botanical Research Institute         |
| GAU           | : | Gujarat Agricultural University               |
| 4 P, Plan     | : | Package at plastics for Productivity          |
| A & N Island  | : | Andaman & Nicobar Island                      |
| A, Pradesh    | : | Andhra Pradesh                                |
| Ar, Pradesh   | : | Arunachal Pradesh                             |
| AS            | : | Admiration Suphate                            |
| ASP           | : | Ammonium Soleplate Phosphate                  |
| C'S GARM      | : | Chhattisgarh                                  |
| CAN           | : | Calcium Ammonium Nitrate                      |
| P & N Heavily | : | Dadra & Nagar Heavily                         |
| DAR           | : | Di-Ammonium Phosphate                         |
| FAI           | : | Fertilizer Associates of India                |
| FAO           | : | Food and Agricultural Organization            |
| FGP           | : | Farm Gate Price                               |
| FYM           | : | Farm Yard Manuals                             |
| GDP           | : | Groups Domestic Protect                       |
| GNFC          | : | Gujarat Narmdavelly Fertilizer Company        |
| GSFC          | : | Gujarat State Fertilizers & Chemicals Limited |
| Guj.          | : | Gujarat                                       |
| H. Pradesh    | : | Himachal Pradesh                              |
| HPC           | : | High Powered Committed                        |
| IDBI          | : | Industries Development Bank of India          |
| IFA           | : | Irrational Fertilizer Association             |

|                               |   |                                       |
|-------------------------------|---|---------------------------------------|
| IFFCO                         | : | Indian Farmers Co-operative Limited   |
| IMPP                          | : | Irrupts Parity Price                  |
| IT                            | : | Intimation Technology                 |
| J & K                         | : | Jammu & Kashmir                       |
| K <sub>2</sub> O              | : | Potosi's Fertilizer                   |
| KRTBTICO                      | : | Krushak Bharti Co-operative           |
| KTK                           | : | Karnataka                             |
| LSHS                          | : | Lanes Sulphar Heavy Steak             |
| MAH                           | : | Maharashtra                           |
| MOP                           | : | Merited of Potash                     |
| MP                            | : | Madhya Pradesh                        |
| MT                            | : | Metric Ton                            |
| Mu <sub>3</sub>               | : | Mega Used                             |
| NF                            | : | Nitrogenous Fertilizer                |
| NBRI                          | : | Nutiorial Botanical Pradesh Institute |
| NGO                           | : | Non Government Organization           |
| NKSK                          | : | Narmada Khedut Sahaj Kendra           |
| NKP                           | : | Narmda Kishan Pariwar                 |
| NPK                           | : | Nitrogen Phosphate & Potash           |
| P <sub>2</sub> O <sub>5</sub> | : | Phosphates Fertilizer                 |
| PB                            | : | Punjab                                |
| Raj                           | : | Rajasthan                             |
| SSP                           | : | Single Super Phosphate                |
| STL                           | : | Soil Testing Laboratory               |
| UP                            | : | Uttar Pradesh                         |
| W. Bengal                     | : | West Bengal                           |

## List of Tables

| Table No.          | Title of Table                                                      | Page No. |
|--------------------|---------------------------------------------------------------------|----------|
| <b>Chapter- 1</b>  |                                                                     |          |
| 1.1                | Installed Capacity                                                  | 3        |
| 1.2                | Table Growth of Fertilizer Production                               | 4        |
| 1.3                | Percentage of Nutrient Elements of Food                             | 16       |
| 1.4                | Proportion of Nutrients and Main Elements of Nitrogenous Fertilizer | 17       |
| 1.5                | Nutrients and Main Elements of Potassic Fertilizer                  | 20       |
| 1.6                | Proportion of Nutrients & Main Elements of Mixed Fertilizer         | 22       |
| 1.7                | Financial Performance of GSFC                                       | 34       |
| 1.8                | Proposition to Fertilizer Products Segment and Industrial Products  | 35       |
| 1.9                | Ratio of Operating profit to Net Sales                              | 37       |
| 1.10               | Sales of GNFC                                                       | 39       |
| 1.11               | GSFC Fertilizer Marketing Network (2005-06)                         | 41       |
| 1.12               | Farm Youth Training Programmes conducted by GSFC                    | 44       |
| <b>Chapter – 4</b> |                                                                     |          |
| 4.1                | Formulas of Various Type of Ratios                                  | 118      |
| 4.2                | Current Ratio of the selected unit GSFC and GNFC                    | 125      |
| 4.3                | Analysis of test in GSFC                                            | 127      |
| 4.4                | Quick Ratio of selected units GSFC and GNFC                         | 129      |
| 4.5                | Analysis of 't' test in GSFC and GNFC                               | 130      |
| 4.6                | Current Assets to Total Assets Ratio of GSFC and GNFC               | 132      |
| 4.7                | Analysis of 't' test in GSFC and GNFC                               | 133      |
| 4.8                | Working Capital Sales Ratio of GSFC and GNFC                        | 135      |
| 4.9                | Analysis of 't' test GSFC and GNFC                                  | 136      |
| 4.10               | Inventory Turnover in GSFC and GNFC                                 | 139      |
| 4.11               | Analysis of 't' test in GSFC and GNFC                               | 140      |
| 4.12               | Debtors Turnover Ratio of selected units under study                | 143      |
| 4.13               | Analysis of 't' test in GSFC and GNFC                               | 144      |
| 4.14               | Creditors' Turnover ratio of GSFC and GNFC                          | 146      |
| 4.15               | Analysis of 't' test in GSFC and GNFC                               | 147      |
| 4.16               | Cash turnover ratio of selected unit under study                    | 150      |
| 4.17               | Analysis of 't' test in GSFC and GNFC                               | 151      |
| 4.18               | Net working to total working capital                                | 153      |
| 4.19               | Average C.L to C.A ratio in GSFC and GNFC                           | 154      |

# **CHAPTER - 1**

## **INTRODUCTION OF FERTILIZER INDUSTRY**

- 1.1 Introduction
- 1.2 List of Fertilizer Industry in India
- 1.3 Need for fertilizers in India
- 1.4 Growth of Indian fertilizer industries in India
- 1.5 Meaning and Types of Fertilizer
- 1.6 Natural Fertilizers
- 1.7 Chemical Fertilizer
- 1.8 Characteristics of Phosphate Fertilizer
- 1.9 Challenges Before Indian Fertilizer Industry
- 1.10 India's Current Government Policies for Fertilizer Industry
- 1.11 Packing, Storage and Distribution System of Fertilizer
- 1.12 Development of Fertilizer Industry in Gujarat
- 1.13 History and Development of GSFC
- 1.14 History and Growth of GNFC
- 1.15 Marketing Network of GSFC

## 1.1 Introduction

Indian Fertilizer Industry is one industry with immense scopes in future. India is primarily agriculture oriented country and its economy is highly based on the agrarian produce the agricultural sector and its other associated spheres provide employment to a large section at the country's population and share about 25% to the GDP. The Indian fertilizer industry is one of the allied sectors of the agricultural sphere. India has emerged as the third largest producer of nitrogenous fertilizers. The adoption of book to break five year plan has paved the way for self sufficiency in the production of food grains. In recently production has gone up to an extent that there is scope for the export at food reins. The surplus has been foliated by the way of chemical fertilizers. The large scale use of chemical fertilizers has been instrumental in bringing about the green revolution in India. The fertilizer industry in India began its journey way back in 1906. During this period the first single super phosphate factory was established in Ranipat in Chennai. In the pre and post independence era a couple of large scale fertilizer units like as the Fertilizer Corporation of India in Sindri, Bihar and the Fertilizer and Chemical Travancore of India in Cochin, Kerala were established. At present there are 57 large scale fertilizer units. The units manufacture an extensive range of phosphate, nitrogenous and complex fertilizers 29 at these 57 units are engaged in the manufacturing of urea while is of them produce calcium ammonium nitrate and Ammonium Suphate. The remaining 20 fertilizer plants produce complex fertilizer and DAP. There is also a member of medium and small scale industries in operation.

As per government of India records as on 31-1-2007 the Indian Fertilizer Industry has made a production at 120.61 MT of nitrogen (N) and 56.59 MT of phosphate (P) nutrient. The installed capacity of urban India is estimated to be 210 .61 MT. These successes in the production

by fertilizer companies of India have groaned India, the 3<sup>rd</sup> largest fertilizer producer in the world.

The installed capacity of each sector private, public and co-operative sector is as follows:

**Table 1.1**  
**Installed Capacity**

| Sr. No. | Sector       | Capacity (MT) |       | Percentage share |        |
|---------|--------------|---------------|-------|------------------|--------|
|         |              | N             | P     |                  |        |
| 1       | Private      | 53.94         | 35.13 | 44.73            | 62.08  |
| 2       | Public       | 34.98         | 5.00  | 28.27            | 7.64   |
| 3       | Co-operative | 32.00         | 18.00 | 27.00            | 30.28  |
|         | Total        | 120.92        | 58.13 | 100.00           | 100.00 |

Agriculture is the back bone at Indian Economy. It earns about 14% of the India's foreign exchange.<sup>1</sup> And its contribution is about 21% of GDP, and 65% of the population agriculture employs.

The development of industry, trade, commerce, infrastructure, transportation communication etc depends upon agriculture. Fertilizer plays an important role for increasing agricultural production and productivity of land. After green revolution the use of chemical fertilizer and insecticides are increased.

Indian economy is based on five year plan and the government gave adequate emphasis in all five year plan in the area of agriculture. The tenth plan has assessed that agriculture production in world grows at the rate of 4% but in the next 3 year of plan the country was able to ensure about 1.5% rate of growth.<sup>2</sup> The use of chemical fertilizer is considered as the basic tool to increase the agricultural production.

Comparing the hector vise agricultural production of India with other developed nation is very low. The use of chemical fertilizer is necessary to increase the productivity. For the purpose the central and

state government declared various scheme for the development of Indian agricultural production.

Due to Indian government highly support there is significant increase in production of chemical fertilizer

The following table-1.2 shows the increase of the use fertilizer production during the period 2003-04 to 2007-08.<sup>3</sup>

**TABLE: 1.2**

**Table Growth of Fertilizer Production**

| <b>Year</b> | <b>MTS</b> |
|-------------|------------|
| 2003-04     | 1275764    |
| 2004-05     | 1392018    |
| 2005-06     | 1528265    |
| 2006-07     | 1778070    |
| 2007-08     | 1594703    |

Sources 46<sup>th</sup> annual report of 2007-08 (GSFC)

To analyze the above table 1.2 it seems 9.11%, 19.79%, 39.37% and 24.99% rise respectively during the period of 2005-06 to 2007-08. It shows the growth rate of production of fertilizers in the GSFC.

In the year 2004-05 the production of chemical fertilizer of all the fertilizer companies in Gujarat was 33947.9 thousand tones which increased to 34969.3 thousand tones in 2005-06. The rate of increase in the production of chemical fertilizer was nearly 3% in which two corporate units named GSPC and GNFC's contribution is more.<sup>4</sup> In the production of chemical Industries IFFCO and KIBHCO are working in co-operative sector in Gujarat

The Indian fertilizer industry has helped in the growth of the Indian economy. The fertilizer sector by enhancing the agriculture productivity has in turn resulted in providing a major support to the farmers who are primarily depend on agriculture. Fertilizers have played a pivotal role in Indian food security.

## **1.2 List of Fertilizer Industry in India**

|         |                                                              |
|---------|--------------------------------------------------------------|
| CFL     | : Coromandal Fertilizer Limited                              |
| DMCC    | : Dharmasi Morarji Chemicals Company Limited                 |
| FACT    | : Fertilizers and chemical Travancore Limited                |
| FCI     | : Fertilizer Corporation of India Limited                    |
| GFC     | : Godavari Fertilizers and Chemical                          |
| GNFC    | : Gujarat Narmada Valley Fertilizer Company Limited          |
| GSPC    | : Gujarat State Fertilizer Company Limited                   |
| HCL     | : Hindustan Copper Limited                                   |
| HFCL    | : Hindustan Fertilizer Corporation Limited                   |
| IFFCO   | : Indian Farmers Fertilizer Co-operation Limited             |
| IISCO   | : Indian Iron steel Company Limited                          |
| JCF     | : Jayshree Chemicals and Fertilizers                         |
| KKIBHCO | : Krishak Bharti Co-operative Limited                        |
| MCFL    | : Mangalore Chemical and Fertilizer Limited                  |
| MFL     | : Madras Fertilizer Limited                                  |
| MMTC    | : Minerals and Metals Trading Corporation                    |
| NFL     | : National Fertilizers Limited                               |
| RCFL    | : Rashtriya Chemical and Fertilizers Limited                 |
| SAIL    | : Steel Authority of India Limited                           |
| SFC     | : Shriram Fertilizers and Chemical                           |
| SPIC    | : Southern Petrochemicals Industries Co-operative<br>Limited |
| TISCO   | : Tata Iron and Steel Company Limited                        |
| JAEL    | : Juari Agro Chemicals Limited                               |

## **1.3 Need for fertilizers in India:**

Fertilizer is a substance to soil to improve plants' growth and yield. First used by ancient farmers fertilizer technology developed significantly as the chemical needs of growing plants were discovered. Modern synthetic fertilizers are composed mainly of nitrogen,



phosphorous and potassium compounds as the secondary nutrients added. The use of synthetic fertilizers has significantly improved the quality and quantity of the food available today but their long term use is debated by environmentalists.

Following points show the need for fertilizers in India:

- (1) It is universally accepted that the use of chemical fertilizer is an integral part of the package of practices for raising agricultural production to a higher level. Studies conducted by the Food and Agricultural Organization of the United Nations (FAO) have established beyond doubt that there is a close relationship between the crop yields and fertilizer consumption level. Moreover, the nutritional requirements of different crops could not be fully met with the use of organic manures like FYM and other bulky organic manures like neem cake, castor cake, groundnut cake etc. due to their unavailability in adequate quantities.
- (2) Increasing agricultural production in India by area expansion is no longer possible as cultivable land left over is only marginal. Further, a considerable amount of cultivable land is being diverted year after year for housing and industrial purposes etc. Hence, self-sufficiency in food lies in increasing the yield per unit area per unit time through the adoption of modern agricultural technology.
- (3) Fertilizers have the advantages of smaller bulk, easy transport, relatively quick availability at the place of application, and the facility of their application in proportion suited to the actual requirements of crops and soils.
- (4) There is a need for an efficient use of fertilizers as a major plant nutrient resource in enhancing farm productivity.
- (5) Other sources of plant nutrients like organic manures, bio-fertilizers etc. should also be integrated to get the maximum agricultural output from every kilogram of applied nutrient in the form of fertilizers.

(6) To improve our agriculture output India needs more fertilizers.

#### **1.4 Growth of Indian fertilizer industries in India**

The Indian fertilizer industry has come a long way since the setting up of the manufacturing unit of Single Super Phosphate (SSP) near Chennai in 1906. A new impetus to the growth of Indian fertilizer Industry was provided by the set up the two fertilizer plants -Fertilizer and Chemicals Travancore of Indian Limited (FACT) in Kerala and the Fertilizer Corporation of India (FCI) in Bihar. This was during the forties and the fifties. The aim was to create an Industrial base that would provide India with self reliability in food grains.

With the effect from 25<sup>th</sup> July 1991, the government implemented three major policy decisions (1) decontrol of Ammonium Sulphate CAN and ammonium chloride (2) Increase in the selling prices of all other fertilizer by 40% and (3) Introduction of a subsidy ceiling on SSP. However within a span of three weeks, the government revised the extent of the price like to 30% with effect from 14<sup>th</sup> august 1991 and exempted the small and marginal farmers from it completely.

With effect from 25<sup>th</sup> August 1952, the government decontrolled all phosphate and potassic fertilizers and abolished the RPS covering the farmers brought back ammonium sulphate. An ammonium chloride with the purview of the control and subsidy and rescued the selling price of urea by 10% while returning this under control of the RPS. These policy changes were expected to achieve (1) Reduction in subsidy (2) Continued growth in food grain production and (3) keeping healthy soil intact. Unfortunately none of these could be achieved.

India witnessed significant growth of the fertilizer Industry during the sixties and the seventies. By 2003, India has an installed capacity of 12.11 million MT of nitrogen and 5.36 million MT of phosphate. Today with 57 large sized fertilizer plants manufacturing a wide variety of the nitrogen, complex phosphate. Fertilizers the India fertilizer industry is

the 3<sup>rd</sup> largest producer in the world. One of the major factors that have led to the rapid increase in the production capacity of fertilizers in India is the policy environment. With the formulation and implementation of investor friendly policies large investment poured in to the private public and co-operative sector's and this and this propelled the growth of the Indian fertilizer industry.

Reports showed the total installed capacity of fertilizer production in 2004 to be 119.60 LMT of nitrogen and 53.60 LMT of phosphate. These figures went up to 120.61 LMT of nitrogen and 56.59 LMT of phosphate in 2007. The production of fertilizers was 113.54 LMT of nitrogen and 42.21 LMT of phosphate during 2005-06. The target of production for 2006-07 was set of 114.48 LMT of nitrogen and 48.20 LMT of phosphate. Though the target production was not met, there was a growth in production during 2006-07 as compared to the production during 2005-06. Indian fertilizer has reached international levels of capacity utilization by adopting various strategies for increasing the productions of fertilizers. These includes as under:

- Expansion and increase in efficiency through modernization and revamping of existing fertilizer units.
- Using alternative source such as coal or liquefied natural gas for the production of fertilizer especially urea.
- Reviving some of the closed fertilizers plants.
- Establishing joint venture projects with companies in countries.

In order to meet the demand for gas this is one of the prime requirement for the production of nitrogenous fertilizers. India has entered into joint ventures with foreign companies in number of countries. Joint ventures have also been established for the supply of phosphoric acid. Indian fertilizer manufacturing companies has joined hands with companies in Senegal Oman, Jordan, Morocco, Egypt, Tunisia and other countries. It is there fore evident that the Indian

fertilizer industry has witnessed extensive growth and development in a short span of time. With such extensive growth it is not surprising that the India ranks Germany, the leading fertilizer manufacturing countries of the world.

The India government has devised policies conducive to the manufacture and consumption of fertilizers. Numerous committees have been formed by the Indian government to formulate and determine fertilizer policies. The dramatic development of the fertilizer industry and the rise in its production capacity has largely been attributed to the favorable policies. This has resulted in large scale investment in all three sector viz. public, private and co-operative.

At present there are 57 large scale fertilizer units. These manufacture an extensive range of phosphates, nitrogenous and complex fertilizers. 29 of these 57 units are engaged in the manufacturing of urea, while 13 of them produce calcium ammonium nitrate and ammonium sulphate. The remaining 20 fertilizer plants manufacture complex fertilizer and DAP. There are also about 12 medium and small scale industries in operation.

The department of fertilizer is responsible for the planning promotion and development of the fertilizer industry. It also takes into account the import and distribution of the fertilizer and also the financial aspect. There are four main divisions of the department. These include fertilizer imports, movement and distribution, finance and accounts fertilizers projects and planning and administration and vigilance. It makes an assessment of the individual requirements of the States and Union Territories and those lays out an elaborate supply plan. Though the soil of India is rich soil, it lacks chief plant nutrients like potassium nitrogen and phosphate. The increase in the production of fertilizer and its consumption acts as a major contributor to overall agricultural development.

The Indian fertilizer industry started operating in a big scale since 1940, when the Fertilizer and Chemical Travancore of India Limited and the Fertilizer Corporation of India were set up in Kerala and Bihar respectively. The fertilizers industry in India increased to a considerable extent in 1970 and 1980 after the emergence of the green revolution in the late sixties.

India has reached self reliance in the food-grain production. The country also generates surpluses to an extent that it can export. This massive production owes largely to the public sector as well as the co-operative sector of the fertilizer industry. Under the administrative control of the department of fertilizers there are 9 public sector undertakings. The co-operative societies count two in number. The private sector has also contributed to the Indian fertilizer industry. Some of the notable private companies to contribute to the production are Chambal Fertilizer and Chemicals Limited and Tata Chemical Limited. The private sector produced 44.73% of nitrogenous fertilizers and 62.08% of phosphate fertilizers in 2006-07.

The Indian large size fertilizer units manufacture wide varieties of nitrogenous and phosphate complex fertilizers. In 2005-06 large fertilizer units were 56. In addition to the nitrogenous and phosphates complex fertilizers the large scale units produce urea and ammonium Sulphate as by product. The single super phosphate is produced in India by 9 units. These are 72 small and medium scale fertilizer units. These units operate mainly to produce SSP. The production of urea in India has reached near self-sufficiency. The requirement of the nitrogenous fertilizers is met through the indigenous industry. In the case of phosphate fertilizer the raw materials and intermediates are imported in large scale. With the aid of the imported raw material prophetic fertilizers are produced to meet the requirements for the domestic market. The requirement of potash (K) is met entirely through imports. No fertilizer unit of India has any reserve of potash. The growth

of the fertilizer industry was at its peak in the 1970s and 1980s. The growth was a bit stagnant in the last decade of the 20<sup>th</sup> century. With many radical steps been taken by the government of India the industry is expected to grow again.

## **1.5 Meaning and Types of Fertilizer**

### **1.5.1 Meaning of Fertilizer**

Any one of large number of natural and synthetic material including manure and compounds containing nitrogen, phosphorus and potassium spread on or worked into soil to increase its capacity to support plant growth synthetic fertilizer can greatly increase the productivity of soil but have high energy costs since fossil fuels are required as a source of hydrogen which is necessary to fix Nitrogen Ammonia Fertilizer.<sup>5</sup>

Any substance such as manure added to soil to increase its productivity is called fertilizer<sup>6</sup>.

### **1.5.2. Types of Fertilizer**

Indian agriculture is based on rain because irrigation facility is very limited so the farmers have to use fertilizers. This fertilizer can be distributed mainly on two bases.

### **1.5.3 Fertilizer on the Basis of Consumption (Use)**

#### **(I) Direct Fertilizer:**

The direct fertilizers are those which the green plants directly absorb from the land like nitrogen phosphorous etc. the green plants may take all nutrients from those fertilizers.

#### **(II) Indirect Fertilizers:**

The indirect fertilizers provides not only necessary nutrients to land but also it provides the fertilizer which increases the fertility of land

by mixing potash and hydrogen inside the land and it is necessary for the development of plant. That type of fertilizers is termed as indirect fertilizer. Line, silicone and boron are main examples of these fertilizers.

**(III) Complete Fertilizer:**

The fertilizer which provides necessary every elements like Carbon, Hydrogen, Oxygen etc for the healthy development of plants is termed as complete fertilizer.

**(IV) Incomplete Fertilizer:**

The fertilizer which consist only one of two necessary nutrients elements is called incomplete fertilizers. Ammonia phosphate is one of the best examples of this fertilizer.

**1.5.4 Fertilizer on the Basis of Source:**

The fertilizers which are used in the farming are included in this type there are mainly two types of fertilizers as below:

**(I) Natural Fertilizes:**

It is also called traditional fertilizers. This fertilizer is obtained normally by the way of naturally. In which human beings and animal dung and urine is used. Besides this oil cake fertilizer, fish fertilizers chilly salt fertilizers and potassium fertilizers are also included. In this fertilizers chemical are not added.

**(II) Artificial (Chemical) Fertilizer:**

In this fertilizer many chemical are included. This fertilizer mainly created in factories. Many material combines together to form mix fertilizers. But in practice the fertilizer contain nitrogen phosphorus and potash used widely.

## **1.8 Natural Fertilizers:**

In this manure no chemicals are added. It consists of waste product of human being and animal. In natural fertilizer substances are less fertile than artificial fertilizers. Natural fertilizers can be used in abundant quality. These fertilizers increase fertility and physical condition of land. Natural fertilizers are divided into two sub-divisions viz organic fertilizers and inorganic fertilizers<sup>7</sup>.

The explanation of various types of natural fertilizers and its sub-parts are as under:

### **1. Organic Fertilizers:**

It is home-made fertilizers. The use of this fertilizer does not affect the structure of land. These fertilizers are needed in excess quantity and it takes five to six months to mix with land. This fertilizer induces all types of organic elements which hold the fertility of the land for a longer period of time. This fertilizer is also called the complete fertilizer. This fertilizer includes cow dung, manure of human being, urine, manure of various types of cake, fish manure, bone meal, manure and bio-fertilizer.

### **2. Inorganic Fertilizer:**

The fertilizer which obtains as a mineral from the land and which obtains from the wooden ash is called as inorganic fertilizer. It is insoluble in water. So it can be used directly into the land. The main benefit of this fertilizer is that, after using these fertilizers there is no need of giving water to land so it is used extensively in Gujarat and other States of India where there is always an irrigation problem. This fertilizer includes Chile squat, pitter rock phosphate, manure of wooden ash and potassium squat.



### **1.8.1 Benefits of Natural Fertilizers:**

Natural fertilizer is counted golden or complete fertilizer. The merits of these fertilizers are given as under:

1. It is receptively cheaper than chemical fertilizer.
2. There is no side effect of this fertilizer.
3. Fertility and productive capacity of soil will increase.
4. Natural fertilizer is easily available there is no requirement of large investment.
5. Plant holds nutrients for the longer period of time.
6. It increases the structure of the land.
7. Moisture holding capacity of the soil increase.
8. The effect of natural fertilizer remains for longer time. It has not to be used frequently.
9. Plant holds nutrients for the longer period of time.

### **1.6.2 Limitations of Natural Fertilizer:**

Natural fertilizer counted as complete fertilizer but it has me limitations. Natural fertilizer must be used in accepts quantity. The hector wise production is less by using the fertilizer. Development of plants is remains low. The resistance power is also remains low. Cow dung and other wastage are used in this fertilizer. The chemical fertilizer may be in solid liquid or grouse form. It is not enough to give chemical fertilizer only for better growth of plants as well as better productivity of land but it is equally necessary to protect plants by using insecticides into to field.

### **1.6.3 Characteristics of Chemical Fertilizer:**

Chemical fertilizers are those which add chemical elements into the land. By using this fertilizer into the land both productivity and fertility can be increased. Minerals are the basic elements for al type of chemical fertilizer. There is also classification in the use of chemical

fertilizer. Some of the chemical fertilizer used before the plantation and others must be used little growth of plants there are as many as 60 types of chemical elements needed for better production.

It will increase fly and mosquitoes and there is a chance for epidemic. Green plant does not get necessary all nutrients from this fertilizer. The plant does not get nutrients at proper time because it takes time to mix with land. Yet there are some limitations of this natural fertilizer. So many farmers used this in their farms.

## **1.9 Chemical Fertilizer:**

In the ancient time the farmers were totally depends only on natural fertilizer. But today is the time of mass production so the farmer has to use chemical fertilizer along with natural fertilizer. The chemical fertilizer is also called the man-made or artificial fertilizer. After the green revaluation the use of chemical fertilizer would be increased. After the industrial revolution the development of chemical fertilizer industry increased.

### **1.7.1 Meaning of Chemical Fertilizer:**

Green plants are considered as living beings as they prepare their food in the presence of sun light and it grows day by day. For the healthy development of plants farmers have to give proper fertilizer in appropriate quantity. By providing proper fertilizer the soil can hold its nutrients and the growth of green plants is relatively faster. All chemical fertilizers are not good for the land and plants. Main key elements which a plant takes while preparing food are given in the following table:

**Table 1.3**

**Percentage of Nutrient Elements of Food**

| <b>Sr. No.</b> | <b>Percentage</b> | <b>Nutrients elements</b>                   |
|----------------|-------------------|---------------------------------------------|
| 1              | 90% food          | Carbon oxygen, hydrogen, phosphorus, potash |
| 2              | 8 to 9 % food     | Magnesium, Sulphar calcium                  |
| 3              | 1 to 2 % food     | Boron, iron, copper mannose, chlorine etc   |

(Source: Elements of Farming -2 by Rodya Misal)

Above given table 1.3 shows percentage of nutrients elements in food. It reveals that nutrients elements like carbon oxygen hydrogen phosphorus and potash acquire 90% in the food. Elements like magnesium sulphate and calcium acquire 8 to 9% in the food. While elements like boron irons copper, manganese and chlorine has acquire the least portion in food. And it is to 2% only. In this way above given all elements combine together to produce food for plants and ultimately growth and development of plant becomes possible.

**1.7.2 Types of Chemical Fertilizer:**

Four types of chemical fertilizers available in the market chemical fertilizer include elements like nitrogen, phosphorus and potash. They are used to increase the productivity of land. For better growth and development mixed fertilizer are prepared. Nitrogen fertilizer, phosphate fertilizer, potassium fertilizer and mixed fertilizer are chemical fertilizer. Brief explanation about these fertilizers is as under:

**(1) Nitrogenous Fertilizer:**

This fertilizer is used to meet the deficiency of nitrogen in the land. For the plant this is the most useful fertilizer. It will provide nutrients to both land and plants.

There are mainly two types of nitrogen fertilizer viz in organic fertilizer and organic fertilizer. The in organic nitrogenous fertilizer divided into sub parts. They are nitrate containing ammonia and mixed

nitrate and ammonia contribution. The nitrate containing fertilizer includes nitrate of soda, nitrate of potash and calcium nitrate. The ammonia containing nitrogenous fertilizer includes ammonium sulphate, ammonium phosphate aqueous chloride mixed nitrate and ammonia containing fertilizer includes ammonium nitrate calcium ammonium nitrate and ammonium sulphate nitrate.

The organic nitrogenous fertilizer is also divided into sub group viz; animal and vegetables source and synthetic or amide contains. The animal and vegetable sources included dried blood, meat, meal, horn and hoof slaughter house waste bone meal and oil cakes while synthetic or amide containing fertilizer includes calcium cyanide and urea. Proportion of nutrients and main elements nitrogenous fertilizer are shown in the below table<sup>8</sup>:

**Table 1.4**

**Proportion of Nutrients and Main Elements of Nitrogenous Fertilizer**

| <b>Name of Fertilizer</b> | <b>Proportion of Nutrients (in %)</b> | <b>Main Elements</b>                           |
|---------------------------|---------------------------------------|------------------------------------------------|
| Urea                      | 40 to 46.5                            | $(\text{NH}_2)_2 \text{CO}$                    |
| Urea Formula derail       | 33 to 42                              | $\text{NH}_2 \text{CONHCH}_2$                  |
| Liquid Ammonia            | 82.3                                  | $\text{NH}_3$                                  |
| Aqueous Ammonia           | 16.5 to 20.5                          | $\text{NH}_2 \text{NO}_3$                      |
| Ammonium Nitrate          | 32 to 35                              | $\text{NH}_4 \text{NO}_3$                      |
| Sodium Nitrate            | 15 to 16                              | $\text{NaNO}_3$                                |
| Calcium Nitrate           | 13 to 15                              | $\text{Ca} (\text{Nae})_2 3\text{H}_2\text{O}$ |
| Ammonium Soleplate        | 19.9 to 21                            | $(\text{NH}_4) \text{SO}_4$                    |

Source: Fertilizer Manufactures Porin M.E. P-16

It is seen from the above table that Liquid Ammonia contains highest nutrients 82.3% Aqueous Ammonia contains 16.5 to 20.5% nutrients Ammonium nitrate contains 32 to 35% nutrients. Ammonium

sulphate contains 19.9 to 21% nutrients sodium nitrate contains 15 to 16% nutrients calcium nitrate contains the least nutrients and it is 13 to 15% urea contains 46 to 46.5% nutrients and urea formulairaid contains 33 to 42% nutrients. Though all nitrogenous fertilizer have nutrients in different proportions, they all are useful for the better productivity and production.

### **1.7.3 Elements of Nitrogenous Fertilizer:**

- (A) The effectiveness of ammonium sulphate is some what more than urea due to its wastage at the primary level.
- (B) Nitric Nitrogen fertilizer is found to be more effective when applied as top dressing during the commencement of reproductive phase of paddy plant.
- (C) The paddy plant can absorb 30-35% of total nitrogen when the land is ploughed after application of ammonium nitrogen. But the nutrient becomes more available when the fertilizers are applied at a depth of 5-10 cm.
- (D) In acid soil or calcium deficient soil continuous use of ammonium sulphate urea ammonium chloride and ammonium sulphate nitrate should be avoided as they are acid forming fertilizers or lime should be applied at least 15 days before the sowing of the crop to reclaim the acidity of the soil.
- (E) The nitrogenous fertilizer is easily soluble in water and move rapidly in all directions from the place of its application. The nitrogenous fertilizer should be applied as per the demand of the crop.
- (F) All nitrogenous fertilizers are equally effective in rainy season. The nitrogenous fertilizers should be selected on the basis of cost availability and easier in application.
- (G) The nitrogen should be applied in more quantity as TOP dressing in long duration variety of paddy.

## **Phosphate Fertilizer:**

Phosphate fertilizer is an essential fertilizer for the land. The need of this fertilizer is low in comparison to nitrogenous fertilizer. In the early age of plant this fertilizer is used for the health of green plants. There are three sub types of phosphate fertilizer viz: Water Soluble Phosphoric Acid, Citric Acid Soluble Phosphoric Acid and Insoluble in Water or Citric Acid. Super phosphate is the main example of water soluble phosphates acid. Di-calcium phosphate is the main example of citric acid soluble phosphoric acid. The main examples of insoluble phosphoric fertilizer in water are rock phosphate raw Bone meal, steamed bone meal and by product of basic slag.

### **1.8 Characteristics of Phosphate Fertilizer:**

- (A) Jointly use of nitrogenous and phosphate fertilizer increases the uptake capacity of the plant.
- (B) Rock phosphate basic slag phosphates fertilizer is most suitable for application in acidic soils.
- (C) Low paddy shorts considerable less response to phosphate fertilizers.
- (D) The phosphate fertilizer like as superphosphate should be applied near the  $r_{oo} +$  zone of the crop or in soil layer.
- (E) The phosphate fertilizer namely super phosphate should be used in neutral to alkaline soil.
- (F) The phosphate fertilizer should be placed deep with deep cultivator in fruit trees like guava, citrus, apple etc.

#### **1.8.1 Proportion of Nutrients & Elements of Phosphate Fertilizer:**

Common super phosphate, Triple calcium phosphate, Di-calcium phosphate, Ground phosphate rock, Phosphate Slag, Diphosphoric phosphate are the phosphate fertilizer. Its main elements are  $\text{Ca}(\text{H}_2\text{PO}_4) \cdot \text{H}_2\text{O} + \text{H}_3\text{PO}_4 + \text{CaSO}_4$ ,  $\text{Ca}(\text{H}_2\text{PO}_4) \cdot \text{H}_2\text{O} + \text{H}_3\text{PO}_4$ ,  $\text{CaHPO}_4$

$2\text{H}_2\text{O}$ ,  $\text{Ca}_5\text{F}(\text{PO}_4)_3$ ,  $4\text{CaO}$ ,  $\text{P}_2\text{O}_5 + 5\text{CaO}$ ,  $\text{P}_2\text{O}_5 + \text{SiO}_2$ ,  $3\text{CaO}$ ,  $\text{P}_2\text{O}_5 + 3\text{CaO}$ ,  $\text{P}_2\text{O}_5$  respectively. And proportion of nutrients (in%) are respectively 14 to 21% 40 to 52, 27 to 40, 16 to 35, 14 to 20 and 20 to 38 It is seen that triple calcium phosphate fertilizer contains highest nutrients and it is 40 to 52 % while phosphate slag contains the least nutrients and it is 14 to 20%<sup>9</sup>.

### 1.8.2 Potassic Fertilizer:

Potassium Sulphate is a potassic fertilizer. It is very essential for the healthy development of plants. With the help of potassium preparation of carbohydrate in the plants is possible. It increases resistance power of green plants. Classification of Potassic fertilizer is divided in two way viz, pouts and chloride from and potash in non-chloride from. Marinade of potash is the best example of potash in chloride from and sulphate of potash is the only example of potash in non-chloride nature.

#### 1.8.3.1 Proportion of nutrients and main elements of potassic Fertilizer is as under:

**Table 1.5**  
**Nutrients and Main Elements of Potassic Fertilizer**

| Name of fertilizer   | Proportion of Nutrient (in %) | Main Elements           |
|----------------------|-------------------------------|-------------------------|
| Potassium chloride M | 50 to 62                      | KCL                     |
| Mix potassium salt   | 30 to 42                      | KCL + NaCL              |
| Sulfuric of Potash   | 48 to 52                      | $\text{K}_2\text{SO}_4$ |

It is seen from the above table that out of all potassic fertilizer potassium chloride contains the highest nutrients and it is 50 to 62% mix potassium salt, the least nutrients and it is 30 to 42 % sulphate of potash contains 48 to 52% nutrients.

### **1.8.3.2 Characteristics of Potassic Fertilizer:**

- (A) It can be used for all crops and for all types of soils.
- (B) In potassic fertilizer named potassium sulphate is better than nitrate of potash for crops like tobacco, potatoes, fruit trees etc.
- (C) Now a days the application of potassic fertilizer namely potassium chloride or nitrate of potash as top dressing is considered good as nitrogenous fertilizer.
- (D) The potassic fertilizer are water soluble but not hygroscopic in nature and potassium is readily available to plant.
- (E) On application of potassic fertilizer it dissociates to  $K^+$  ions and get absorbed in the soil and absorbed by growing plant.

### **1.8.4 Mixed Fertilizer:**

In mixed fertilizer nitrogen, potash and phosphorus are included. All types of mixed fertilizer:

- (A) Open Formula Fertilizer Mixture.
- (B) Closed Formula Fertilizer Mixture.

#### **(A) Open Formula Fertilizer Mixture:**

The ingredients mixed in this type of fertilizer mixture in forms of kinds and quantity is disclosed by the manufacturer. This will be helpful for the cultivators to know the ingredients of fertilizer for the use of the same in particular crop in suitable amounts.

#### **(B) Closed Formula Fertilizer Mixture:**

The ingredients or straight fertilizer used in these fertilizer mixtures are not disclosed. It is called as a trade secret of the industry. So it is not possible for farmers to know the type and quantity of ingredients used in this fertilizer mixture. The farmer cannot select a correct mixture for their use in production of crops.



Some of mixed chemical fertilizer main elements and proportion of nutrients are under:

**Table 1.6**  
**Proportion of Nutrients & Main Elements of Mixed Fertilizer**

| <b>Sr. No.</b> | <b>Name of Fertilizers</b>           | <b>Main Elements</b>                                                                               | <b>Proportion of Nutrients (in %)</b>                             |
|----------------|--------------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1              | Ammonium Super Phosphate             | $\text{CaHPO}_4 + \text{NH}_4\text{H}_2\text{PO}_4 + \text{CaCO}_3$                                | 1.5 to 3 Nitrogen<br>19 to Phosphorus                             |
| 2              | Ammonium Phosphate                   | $\text{NH}_4 \text{H}_2\text{PO}_4 + (\text{NH}_4)_2\text{HPO}_4$                                  | 11 to 4 Nitrogen<br>46 to 55 Phosphorus                           |
| 3              | Di-Ammonium Phosphate                | $(\text{NH}_4)_2 \text{HPO}_4 + \text{NH}_4 \text{H}_2 \text{PO}_4$                                | 16 to 18 Nitrogen<br>46 to 48 Phosphorus                          |
| 4              | Ammonium Phosphate Nitrate           | $\text{NH}_4 \text{NO}_3 + \text{NH}_4 \text{H}_2 \text{PO}_4$                                     | 21 to 25 Nitrogen<br>20 to Phosphorus                             |
| 5              | Potassium Nitrate                    | $\text{KNO}_3$                                                                                     | 13.5 Nitrogen<br>46.5 Potash                                      |
| 6              | Ammonium Potassium Phosphate         | $(\text{NH}_4)_2 \text{HPO}_4 + (\text{NH}_4)_2 \text{SO}_4 + \text{KNO}_3 + \text{NH}_4\text{Cl}$ | 8 to 12 Nitrogen<br>10 to 24 Phosphorus<br>15 to 24 Potash        |
| 7              | Ammonium Potassium Phosphate Nitrate | $\text{NH}_4 \text{NO}_3 + \text{NH}_4\text{H}_2\text{PO}_4 + \text{KNO}_3 + \text{NH}_4\text{Cl}$ | 17 to 18.5 Nitrogen<br>17 to 18.5 Phosphorus<br>17 to 18.5 Potash |
| 8              | Urea Potassium Ammonium Phosphate    | $(\text{NH}_2)_2\text{CO} + (\text{NH}_4)_2\text{HPO}_4 + \text{KNO}_3 + \text{NH}_4\text{Cl}$     | 18 to 20 Nitrogen<br>18 to 20 Phosphorus<br>18 to 20 Potash       |

| Sr. No. | Name of Fertilizers          | Main Elements                                                                                                                                                                                                       | Proportion of Nutrients (in %)                             |
|---------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| 9       | Potassium Nitrate Phosphate  | $\text{NH}_4\text{NO}_3 + \text{CaHPO}_4 + \text{KnO}_3 + \text{NH}_4\text{Cl}$ or $(\text{NH}_4)_2\text{HPO}_4$ or $\text{NH}_2\text{H}_2\text{PO}_4 + \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ or $\text{CaCO}_3$ | 11 to 20 Nitrogen<br>8 to 16 Phosphorus<br>10 to 21 Potash |
| 10      | Magnesium Ammonium Phosphate | $\text{MgNH}_4\text{PO}_4 \cdot \text{H}_2\text{O}$                                                                                                                                                                 | 34 to 36 Phosphorus<br>17 to 19 Magnesium                  |
| 11      | Ammonium Meta Phosphate      | $(\text{NH}_4\text{PO}_3)^n$                                                                                                                                                                                        | 17 Nitrogen<br>80 Phosphorus                               |
| 12      | Ammonium Poly Phosphate      | $(\text{NH}_4)_3\text{P}_3\text{O}_{10} + (\text{NH}_4)_4\text{P}_2\text{O}_7 + (\text{NH}_3)_3\text{HP}_2\text{O} + \text{NH}_4\text{H}_2\text{PO}_4$                                                              | 12 to 25 Nitrogen<br>53 to 61 Phosphorus                   |

Source: Fertilizer Manufactures Porin M.F. P. 19

By annualizing of above table it is seen that the proportion of nutrients and main elements of mixed chemical fertilizer. The elements like nitrogen phosphorus and potash are the main chemical elements of mixed fertilizer and land receives most of nutrients from it and it is also seen that proportion of nitrogen is relatively higher than other chemical in the fertilizer. Only mixed fertilizer which does not consists nitrogen is magnesium ammonium phosphate. Phosphate is available in all mixed chemical fertilizer except potassium nitrate proportion of phosphate is reactively less than nitrogen. Potash is not available in mixed chemical fertilizer proportion of potash is as the proportion of nitrogen and phosphorus in some mixed fertilizer.

The mixed fertilizer like Ammonium, Potassium Phosphate, Ammonium Potassium Nitrate, Urea Potassium Phosphate consist nitrogen phosphorous and Potash in equal proportion. Chemical fertilizer as like Ammoniated Super Phosphate, Ammonium Phosphate,

Di- Ammonium Phosphate and Ammonium Phosphate Nitrate did not contain Potash.

#### **1.8.5 Advantages of Chemical Fertilizer:**

To gain lands' fertility back chemical fertilizer are used. Land losses its fertility due to more crops are cultivated during the year. The soils become more fertilizer and development speed of plants is increase by using chemical fertilizer. Advantages of chemical fertilizer are as under<sup>10</sup>:

- 1) The resistance power to plants will increase.
- 2) The hector wise production will increase.
- 3) Qualitative crop will be produced.
- 4) The growth of plant becomes faster / speedy.
- 5) Plants get all nutrients in equal proportion from chemical fertilizer.
- 6) Growth of plant and development of plant become accurate.
- 7) The soil absorbs chemical fertilizer easily as it is soluble in water.
- 8) The chemical fertilizer does not contain unnecessary element.

#### **1.8.6 Disadvantages of Chemical Fertilizer:**

The excess use of chemical fertilizer will become harmful for the plants and soil. It will increase nitrate pollution. The main disadvantages are as under:

1. Some elements of the artificial fertilizer damage the soil.
2. For small farmers artificial fertilizers become more expensive.
3. Growth of crops is not proper so the production of crop decrease.
4. Some times crop gets destroyed especially in regions of less rain fall due to in sufficient supply of water.
5. When the nitrogen fertilizer is used in the field nitrate will convert into nitrate by the bacteria presented in the land.
6. The constitution of the soil spoils as they do not contain the organic substance.

7. On the expensive use of Artificial fertilizer, organisms like earthworm which make the soil fertile get destroyed.
8. The nitrogen fertilizer is harmful for the both human being and also animals.

### **1.9 Challenges Before Indian Fertilizer Industry:**

Indian fertilizer industry is facing so many overhanging challenges now a day. Growth and development of agriculture in India derives a significant motivation from the fertilizer industry. Agricultural yield in India could be jeopardized by the uncertainties in the fertilizer industry.

The government is faced with the piquant situation, which demands a balance between the requirement of farmers and the manufacturers of the fertilizer. The challenges before the India fertilizer industry relate to the uncertainty in the supply of fertilizers. There has been a surge in the requirement for fertilizers in the past few years. Good monsoonal showers have led to the growth in agriculture inadvertently increasing the consumption rate of fertilizers.

The healthy growth in consumption propensity has not been met with the required surge in fertilizer production. This situation has widened the gap between the demand and supply of fertilizer which has led to an increase in the dependence of the country on imports. Another very important key factor that led to the stunted growth of the fertilizer industry is the rise in prices of the feedstock. The fertilizer industry is based on gas for the production of urea and phosphoric acid for the production of phosphoric fertilizer and DAP. The country imports its inputs from other countries. The overseas suppliers of raw materials realize the predicament of the Indian fertilizer industry and have started exploiting the shortage through clever pricing. In recent years, some of the private companies, dedicated to the production of fertilizer have effectively taken stakes in the overseas sources of raw materials. This

has helped the industry and it has been unable to reduce the government's burden of subsidizing the rates.

The fertilizer industry is remained protected under the umbrella of the retention pricing scheme of the Indian government. The government has farmed policies to decontrol the prices but delayed the implementation of the parameters that have not augured in favor of the industry. As a result, fertilizer subsidies continue to mount and are expected to cross 125 crore in the year 2008.

The pricing of the fertilizers are also based on the freight charges. A small size of the older plants and the low efficiency of the public sectors pose as drawbacks of the industry. Now a day's present policies of the government are directed towards revamping of these industries and restoring them to health. The fertilizer industry is facing with other challenges like as the uncertainties in government policies.

The delay in decision making and obscurity in setting parameters are among some of the major draw backs of the policies of government against the industry. For the healthy growth of the fertilizer industry long term realistic policies is needed and that would help the industry to overcome the challenges and survive the fertilizer industry.

#### **1.10 India's Current Government Policies for Fertilizer Industry:**

Production growth and consumption of fertilizer industry are directly based on the government policies. The government policies for the fertilizer industry are devised to ensure a sustainable growth and development direction in one of the most intensive sectors of the Indian fertilizer. From the fertilizer industry for production of food grain and its growth in India derives the main stimulus.

The policies farmed by the government are devised in response the recommend action of the high powered committees of the country<sup>11</sup>.

The Sivaraman Committee Report – 1966 highlighted the significant of the balanced use of fertilizers along with providing

adequate credit support for its distribution and usage. The committee also provided inputs for realizing the importance of liberation of fertilizer marketing that would promote the output of the domestic companies. Marathe Committee gave the Retention Price Scheme (RPS) and latter government introduced the scheme. This would enable to maintain prices of the fertilizers during the crisis time.

The first decontrol policies of the government were adopted in 1992 on the recommendation of the Joint Parliamentary Committee (JPC). The government decontrolled the phosphoric and potassic fertilizer industries and under subsidized rates the urea. Industry is continued to produce the urea after the modification of the 1998, Farritt Commission. The complex fertilizer industries were subdivided in to two categories. Group I: Comprised of imported ammonia or industrial units using gas while group II: Includes industries using naphtha or fuel oil. Other Committee provided its recommendation on the methods of promotional marketing distribution and pricing of the fertilizers in India. Change in government policies is often responsible for hampering new investment in the fertilizer industry. Due to government motivational policies the investment in this area was Rs. 20,667 crore in 2007.

The present objective of the government polices is to develop a long term program that would protect the interests of the domestic producers and reduce the dependence on foreign imports. The health of the fertilizer industry can be restored with more realistic policy adopted by the government.

At present the government has unlauted a New Pricing Scheme (NPS) replacing the RPS. The fertilizer industry of India is not same in terms of stock. To reduced them from being divers and inoperable under the NPS scheme. The NPS has been modified, promoting further investment in the Indian fertilizer sectors.

On an overall basis some salient feature policies should be the following:

- (1) The close relationship of the crop produce and the fertilizer should form the very basis of all fertilizer policies, particularly because this relationship is long lasting and neither temporary nor referable. A ratio based on low input and low output prices is preferable over the same ratio derived from high input and low output. Price pattern considering that significant proportion of population is below the subsistence level and the vast majority of farmers are resource poor.
- (2) The general ratio of procurement price of food grains of fertilizer nutrients should be such that not more than 3 kg cereals and millets are needed to pay for 1 kg nutrient wider than this ratio have been observed to lower the growth rates in fertilizer consumption as in the case of N application on wheat.
- (3) Balanced fertilizer use should extend beyond N.P.K. and cover all those nutrients which are deficient and whose application is necessary for sustaining agriculture production at requisite levels. The ideal nutrient consumption ratio for the country if one figure is needed at all should come out of ratios determined for each ecological zone taking into account the natural soil fertilizer.
- (4) The goal of self – sufficiency in fertilizers in the case of N should be such that there is no more than one million tone gap between long term demand and supply. In the case of phosphate this aim can be to produce 85% of the quantities required within the country.
- (5) In order to promote fertilizer use on dry land food grains, particularly sorghum and millets the minimum support price for coarse grains should be on par with paddy, which was the use in the mid 1970.
- (6) The phosphate issue is more complex and in many ways similar to potash than to N. Barring the 5-6% contribution made by indigenous phosphate rock the remainder 94-95% of the

requirement has to be imported either as phosphate rock, phosphoric acid and or finished phosphate future phosphate policy should have three faults: (i) Maximization of the use of indigenous rock both as raw material and for direct application (ii) importing part of the phosphate requirement in the form of reactive rocks specially for direct application without any further treatment except grinding to the required size for the substantial area under acid soil much of which is done the last and closer to parts (iii) Participation in joint ventures for the production of phosphoric acid and or DAP in countries having phosphate rock and increasing captive phosphoric acid capacity based on imported rock phosphate and Sulphur a route which has been formal to entail the least out of foreign exchange.

- (7) In the interest of balanced fertilizer use and sustained crop productivity, the production and distribution of micronutrients should be brought into the mainstream of fertilizer use. If nothing else, this will safeguard improve the efficiency of 18-20 M.T. of  $N+P_{2O_5}+K_2O$  which the country is planning to use manually by the turn of the century. All fertilizers once they enter the FCO should receive uniform all India treatment whether these are products containing major nutrients or micronutrients.
- (8) In the dry lands, fertilizer distribution outlets should essentially be developed into composite input distribution and advisory centers. Prototypes such service centers should be developed in the form of bankable enter prices to be offered to agricultural graduates. Such centers should receive a certain incentive for operating in interior area and also for some promotional activities.
- (9) Fertilizer allocation plans should be gradually start using the information on the extent of nutrient deficiencies in different areas and the fertilizer basket allocated for an area should be fully capable of taking care of all major nutrient deficiency in that area.



This will be a positive step forwards and in all probability will lead to judicious and efficient use of fertilizers.

### **1.11 Packing, Storage and Distribution System of Fertilizer<sup>12</sup>:**

#### **(i) Packing of Fertilizer :**

Gunny bag polyphone begs having limning with pitch are the materials used for packing of fertilizer. As per kind of fertilized types of container is also used for fertilizer packing. Hygroscopic fertilizer is packed in the gunny bag. For packing of super phosphate the polythene bag is used. For packing marinate of potash gunny bag is used. Due to increasing gunny bag now alloys polythene bag is used for packing of fertilizer.

For straight fertilizer name of the manufactures trade link, name of fertilizer, nutrient percentage and not weight in kilogram is Indicated and for mix fertilizer packing registered name of fertilizer producer, trade name, general name, total organic and inorganic nitrogen water soluble phosphate amount of water soluble potassium name of the crop suitable for fertilizer and gross net weight in kilogram is shown.

#### **(ii) Storage of Fertilizer**

The fertilizer should be stored in cool drag and damp proof go down. The bays used for fertilizer should not be piled together in a raw of 8-10 bags. And it should not touch the weight of the go dawn. For convenience of listing the fertilizer proper space should be allowed between two groups of piled fertilizer. Hygroscopic type's fertilizer like as urea ammonium nitrate, ammonium sulphate nitrate and calcium ammonium nitrate must be stored in water proof bag and in on lot the entre bag should be used. The wooden roofs should be used for pilling the fertilizer bags. The rain water must not get entered in the go down where fertilizer is stored. And go dawn should have proper ventilation for regulating for exit at the gases from the storage. Five hazardous type of fertilizer like as Ammonium sulphate must be stored carefully.

Fertilizers such as nitrogenous phosphatic and potassic fertilizer should not be piled together. Home mixed fertilizer should be used promptly after mixing of various fertilizers. Prolonged storage of fertilizer should be avoided.

**(iii) Distribution of Fertilizer:**

By the way of railways wagon truck and container the fertilizer are taken in different places. Marketing of fertilizer is controlled as per the prescribed rules and regulations of central government. To supply the fertilizer among the farmers at a reasonable price in all parts of the country, To increase the balanced use of fertilizers, to distribute the fertilizer in all places of the country as per the essential commodities act of the government and to develop suitable measure for the distribution of the fertilizer are the main principles of distribution of fertilizers.

For the benefit of distribution of fertilizer country have been divided into four regions like as eastern region, western region, north region and southern region. In Eastern region states includes Assam, Arunachal, Andaman and Nicobar island, Bihar, Meghalaya, Manipur, Mizoram, Nagaland, Orissa, Sikkim, Tripura, West Bengal etc. In Western region Dadra and Nagar Haveli, Gujarat, Goa, Madhya Pradesh, Maharashtra, Rajasthan are included. Chandigarh, Delhi, Haryana, Himachal Pradesh, Uttar Pradesh etc states are included in Northern region for the purpose of distribution of fertilizer. In Southern region Andhra, Karnataka, Kerala, Pondicherry, Tamil Nadu is included.

**1.12 Development of Fertilizer Industry in Gujarat:**

There are main four companies which produce chemical fertilizer in Gujarat. Out of them the Gujarat State Fertilizer Chemical Limited established the first ever chemical fertilizer factory in Gujarat at Baroda in 1967. GSFC was first joint sector industrial unit in India with equity capital of State government 49% and public 51%. It was also first unit to manufacture DAP. Fertilizer in India them in nine years later, in 1976

the Gujarat Narmada Valley Fertilizer Company Limited popularly known as GNFC established a chemical fertilizer factory at Barouche. GNFC promoted by the government of Gujarat and GSFC.

After the establishment of these two companies in Gujarat, in 1975 Indian Farmers Fertilizer Co-operative Limited (IFFCO) set up its plants at Kalol and Kandla in Gujarat.

Krushak Bharti Co-operative Limited (KRIBHCO) established its manufacturing unit in Gujarat. First used by ancient farmers fertilizer technology developed significantly as the chemical needs of growing plants were discovered. The use of synthetic fertilizer has significantly improved the quality and quantity of the food available today. Their long term use is harmful the environmentalists.

### **1.13 History and Development of GSFC**

GSFC has its vast network of plants and infrastructure which took its first step in 1967 with the setting up of six plants with the beginning investment of Rs. 40 Corers. These six nitrogenous and phosphatic fertilizer plants for the production of Ammonia Urea, Ammonium Sulphate, Di-Ammonium Phosphate (DAP), Sulphar Acid and Phosphoric Acid.

The expansion of ammonia and urea production began with phase – II- in 1969 and an investment of Rs. 23 crores was made to meet the increase demand for nitrogenous fertilizer. Phase – III- began in 1974 when diversification of product occurred plants to manufacture Melamine Nylon-6, Oleum-50 and Oxon. Synthesis Gas unit and pure Gas recovery unit were set up with phase – III. GFC become India's first and only melamine producer. This provided the boost for further diversification to Nylons, Fibers, Melamine and industrial Gases like Argon Gas and Oxon Synthesis Gas.

In 1989 GSFC began more expansion and diversification Phase – IV- which saw the company increasing its self reliance while also

conserving energy needs. Three co-generation unit using LSHS and Natural Gas were set up. Further expansion of Ammonium coprol actum production was initiated. Diversification into Fibers Nylons and Acrylic were complete and DAP plant was also setup.

GSFC is in the area of 1600 acres of land which spread four various locations at Baroda known as Fertilizernagar, Sikka, Kosamba and Nandesari with 34% i.e. 543 acres of green belt, with 30 different plants 20 different products, 170 farm information centers cum depots and 32 regional and are office through out India to provide sales support services with capital investment of Rs. 2874 crores and turnover of Rs. 2001 crores. GSFC is a symbol of culture heritage and development with its deep strong roots and well defined branches to serve the mother land better.

The following table of financial highlights of ten years shows the development GSFC:

**Table: 1.7**  
**Financial Performance of GSFC**

**(Rs. In cores)**

| <b>Particular</b>                       | <b>1998-99</b> | <b>99-00</b> | <b>200-01</b> | <b>2001-02</b> | <b>2002-03</b> | <b>2003-04</b> | <b>2004-05</b> | <b>2005-06</b> | <b>2006-07</b> | <b>2007-08</b> |
|-----------------------------------------|----------------|--------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Gross Income                            | 1986           | 2074         | 2111          | 2002           | 1887           | 2182           | 2670           | 2940           | 3413           | 3638           |
| Gross Profit                            | 232            | 111          | 138           | 49             | (86)           | 187            | 395            | 579            | 496            | 500            |
| Depreciation                            | 85             | 88           | 132           | 137            | 142            | 145            | 143            | 142            | 143            | 142            |
| Profit(loss) Before tax                 | 147            | 23           | 6             | (88)           | (228)          | 42             | 252            | 437            | 353            | 358            |
| Tax                                     | 15             | 3            | -             | -              | -              | 13             | 114            | 143            | 86             | 120            |
| PAT                                     | 132            | 20           | 6             | (88)           | (228)          | 29             | 138            | 294            | 267            | 238            |
| Exceptional Items                       | -              | -            | -             | (19)           | (163)          | -              | -              | -              | -              | -              |
| PAT/ Loss after Tax & Exceptional Items | 132            | 20           | 6             | (107)          | (391)          | 29             | 138            | 294            | 267            | 238            |
| Dividend                                | 36             | 4            | -             | -              | -              | -              | 12             | 36             | 36             | 36             |
| Retained Earnings                       | 92             | 16           | 6             | (107)          | (391)          | 29             | 126            | 258            | 231            | 202            |

Source 46<sup>th</sup> Annual Report of GSFC -2007-08

Above table 1.7 presents the financial highlights of GSFC during the period of 1998-99 to 2007-08. During the year 1998-99 to 2007-08, it can be seen from the above table that there is positive profit after tax and exceptional items. In comparison to 1998-99 it seems the increase of 80.30% in the year 2007-08. Retaining earning of the GSFC is also presents significant increase during the last four years.

The company is exporting mainly MFN oxeye and coprolite. During the year 2007-08 export of coprolite was only 12 MTs as against 4014 MTs in 2006-07. This was manly due to higher sales in the domestic market coupled with better realization. MEK-Oxeye has been

exported to 40 countries and has registered 7 % increase in the export quantity from 3574 MTs during FY 2006-07 to 3831 MTS during FY 2007-08.

Net sales of the company also increase during the period of 2003-04 to 2007-08. Company's net sales (in crores) are respectively 2106, 2607, 2831, 3319 and 3558, in comparison to base year 2003-04. Percentage increase in net sales is 23.78%, 34.42% 57.59% and 68.94% respectively.

In the year 2007-08 net sales turnover of the company including trading activities was Rs. 3557.69 crores as against Rs. 3318.72 crores in 2006-07 thus registering an increase of Rs. 238.97 crores. The sale of fertilizer was higher by Rs. 229.74 Crores. For industrial products the company has registered net sales of Rs. 1117.64 crores in 2007-08 as compared to Rs. 1188.40 crores in the previous year.

The following table depicts the proposition to fertilizer products segment and industrial products segment in the net sales of the company during the last two year.

**Table 1.8**

**Proposition to Fertilizer Products Segment and Industrial Products**

| Particular                 | 2006-07    |        | 2007-08    |        |
|----------------------------|------------|--------|------------|--------|
|                            | Rs. Crores | %      | Rs. Crores | %      |
| Fertilizer segment         | 213.32     | 64.19  | 236.06     | 66.34  |
| Industrial product segment | 1188.40    | 35.81  | 1197.64    | 33.66  |
| Total                      | 3318.72    | 100.00 | 3557.70    | 100.00 |

(Source: Annual Report of GSFC – 2007-08)

The Company continues to give priority to safety health and environment the company has been awarded certificate of merit for continuous two million accident free man hours without any lost time accident for the year 2006. This award is given jointly by Gujarat Safety Council and Directorate of Industrial Safety and Health, Gujarat State.

GSFC holds consolidated consent and authorization from Gujarat Pollution Control Board which has validity up to 30<sup>th</sup> May 2011. The company has received the environment clearance for 1500 MT per annum urea phosphate project on March 2008 from Ministry of Environment & Forest (MOEF) New Delhi. The company has received the Gold Award in fertilizer sector for outstanding performance in environment achievement (Greentech Environment Excellence Award 2007) from Greentech Foundation New Delhi.

For the best performance, GSFC is given various types of award and certificate. In the year 2005-06, an award is given by FAI for best production performance complex (P205) fertilizer plant. An award in the field to production promotion and marketing of Bio - Fertilizer is also given in the year 2005-06 by FAI. An award is also given the 2005-06 for increase in fertilizer use efficiency through micro irrigation system by FAI. In 2006 National Award for the best employers of disabled persons is given. National Productivity Council Award for second best productivity performance in Bio-Fertilizer producers sectors for 2005-06 is given. IEWAL third best National Award for excellence in management is given in the year 2006. International Safety Award 2007, Greentech Award in 2007 and ISO 9001 for Quality Certificate are given to GSFC. Certificate for Environment by ISO 14001 is also given to the company Gujarat safety council of Baroda has given certificate of honor in 2004. s

**Table 1.9**  
**Ratio of operating profit to Net Sales**

| Year    | Net Sales (crores) | Op. Profit (EBITA) in Rs. | Ratio of OP. profit to (In %) net sales |
|---------|--------------------|---------------------------|-----------------------------------------|
| 2003-04 | 2106               | 329                       | 15.62                                   |
| 2004-05 | 2007               | 502                       | 19.25                                   |
| 2005-06 | 2831               | 661                       | 23.34                                   |
| 2006-07 | 3319               | 581                       | 17.50                                   |
| 2007-08 | 3538               | 543                       | 15.26                                   |

Source: 46<sup>th</sup> Annual Report of 2007-08

Table No: 1.9 shows that, during the period of 2003-04 to 2007-08, company's operating profit (EBIDT) 329 crores, 502 crores, 661 crores, 581 Crores, and 543 crores respectively. Company's operational efficiency is also increased in 2003-04, 2004-05 and 2005-06. Ratio of operating profit to net sales is 15.62% 19.25 % and 23.34%. It seems significant decline in the efficiency during the last two year 2006-07 and 2007-08 as the ratio of operating profit to net sales is declined. It was of 17.5% and 15.26% during this year.

#### **1.14 History and Growth of GNFC**

Gujarat Narmada valley Fertilizer Company Limited (GNFC) was promoted by the government of Gujarat and Gujarat State Fertilizer and Chemicals Limited and was launched on 10<sup>th</sup> May, 1976.

GNFC created history in 1981 by issuing a share capital of Rs. 436.1 million of 4.89000 shareholders, majority of them individual farmers from Gujarat. The company established in fuel oil based ammonia and urea plant along with offsite facilities of Barouche a backward district of South Gujarat. GNFC has used the best available and the world renewed process technologies for all its plants.



The capacity of Ammonia and Urea plants is 4, 45,000 tones and 6, 36,000 tones respectively. Subsequently the commissioning of the Ammonia – Urea complex in early 80s. Company has been active from 1985 and onwards for a major diversification into industrial chemicals such as methanol. Formic Acid, Acetic Acid, Weak Nitric Acid, Concentrated Nitric Acid etc. The company also worked on the revamp cool expansion of capacities for high demand Chemical Methanol Concentrated Nitric Acid and Acetic Acid. Company also established fertilizers such as Ammonium Nitro Phosphate and Calcium Ammonium Nitrates having capacity of 1,42, 800 tones each plant.

The company has its own 50 MV captive power plant. GNFC also markets its intermediate products such as Liquid Ammonia Methyl Formal Ammonium Nitrate and other products by best utilizing the waste gaseous and liquid effluents. Company also diversified its functions in the field of information technology. Its functions include international gateway. Internet service provider and complete infrastructure facilities required by IT companies of Govt. into tower. GNFC has recently started the activity of digital signature certificate along with required application development for the secured business. There for GNFC is growth nucleus for the country.

GNFC in addition to marketing of its own three fertilizer Narmada Urea Narmada Phos and Narmada Can is also engaged in marketing of traded fertilizers like Single Super Phosphate (SSP), Di- Ammonium Phosphate (DAP) and import fertilizer like Muriatic of Potash, DAP and Urea through 9 network of regional officers and 20 urea officers spread all over the country.

State wise portion on sales of manufactured fertilizer in 2004-05 reveals that GNFC sold 48.9% manufactured fertilizer in Gujarat, sold 9.7% fertilizer in Maharashtra, sold 9.2% fertilizer in Madhya Pradesh and Chhattisgarh, sold 8.2% fertilizer in Uttar Pradesh, sold 6.8% fertilizer in Rajasthan, sold 6% fertilizer in Punjab, sold 5.8% fertilizer in

Andhra Pradesh, sold 2.9% fertilizer in Haryana and sold 2.4% fertilizer in Karnataka. Above percentage of selling shows that GNFC sold its most of fertilizer in Gujarat and sold the least fertilizer in Karnataka.

GNFC undertakes various integrated rural development programs like fertilizer demonstration farmers meeting, crop seminars, veterinary camps and distribution of fruit tree grafts, women welfare programmes, school children motivational programmes and distribution of sports items to them. These education programmes helps the farmers in there day to day activities. These activities are carried out in 18 villages of Barouche district every year.

The company has 57 Narmada Khedut Sahay Kendra spread all over the Gujarat manned by agriculture graduates. There is considerable increase in the sales of GNFC during the study period except the year 2002-03. This positive trend can be shown with the following table as under:

**Table 1.10**  
**Sales of GNFC (in crores)**

| Year    | Sales |
|---------|-------|
| 2003-04 | 1553  |
| 2004-05 | 1936  |
| 2005-06 | 2281  |
| 2006-07 | 2739  |
| 2007-08 | 3434  |

Source: Published Annual Report - 2003-04 to 2007-08

From the above table it is seen that net sales of GNFC was Rs. 1553 crores in 2003-04 and after the year there was continuous increasing trend in net sales of GNFC. It was Rs. 1936 crores in 2004-05 it increases in 2005-06. And reached at Rs. 2281 crores and in the year 2006-07 there was increasing trend in net sales of GNFC. It was

Rs. 2739 Crores in 2006-07 and finally it reached its highest level of Rs. 3434 Crores in 2007-08.

GNFC received various types of award and reorganization during the study period of 2003-04 to 2007-08. In the year 2003-04 the company won the Golden Peacock Eco-innovation Award - 2003 from the World Environment Foundation Hyderabad for CATSOL, the first indigenous technology developed by company for H<sub>2</sub> S removal. In 2005 GSFC won the FAI Golden Jubilee Award for best work done in the field of transfer of improved farm technologies.

In the year 2002-03 the company has won the prestigious award from FAI for the best Overall Performance in the country for and operating at P<sub>2</sub>O<sub>5</sub> in complex fertilizer category. FAI awarded for Production Performance Award for Nitrogen in 2002.

### **1.15 Marketing Network of GSFC**

The company is marketing area as DAP, ASP and Gypsum since 1967. Recently by taking into account the need for potash along with N and P, GSFC has introduced 12-32-16 (mixed chemical fertilizer). The company has on extensive marketing net work to promoted use of fertilizer. In several states company field force conducts various types of promotional programs at the grass roots level not only to promoted use of fertilizer but also package of scientific agricultural practices to boost up agricultural production. GSFC is one of the major supplies of fertilizer in the state of Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Punjab, Haryana, Uttar Pradesh, Andhra Pradesh and Karnataka. The following given table indicates the marketing network of GSFC:

**Table: 1.11**

**GSFC Fertilizer Marketing Network (2005-06)**

|                                           |     |
|-------------------------------------------|-----|
| Regional Offices                          | 11  |
| Area Offices                              | 19  |
| Company Operated Retail Points in Gujarat | 33  |
| Number of Dealers                         | 571 |
| Number of Agri. Personal                  | 275 |

Source: Mahiti Pustika of GSFC, 2006

**Agricultural Development and Agro Services:**

To promote the fertilizer use and bring the technology from lab to field GSFC has setup separate department called Agricultural Development and Agro Service where by the farmers are provided with the latest agricultural know – how. This division formulates action oriented plans and programmes to achieve the short term as well as long term objectives in term of the national imperatives such as generation and promotion of scientific agro technologies, orientation of farmers training farm youths, raising their standard of living and enriching their lives with meaning full future. In the implementation of these agro promotional programmes development of farming community is achieved on a full scale with the ultimate objective of creating confidence in them for absorbing the impact of transfer of modern and high tech agricultural technology. GSFC motto is “Nourish the land and Harish the future”. Major activities of agricultural services are as under:

1. Guidance on Agri. – Business.
2. Farm Management Practices.
3. Promoting activities of Agri. Development and input usage.
4. Training Farm Youths.
5. Research and development of Hybrid Seeds.
6. Publication of Magazine Krishi Jivan.

7. Trading of Seeds.
8. Crop Demonstrations.
9. Social Welfare and Health Care Programmes.
10. Soil and Water Sample Testing.
11. Bio- Fertilizer Supplementing.

Nutritional needs of soil, other subsidiary activities like as micro irrigation system production and marketing of Banana Tissue Culture production and marketing of bio-pesticides and marketing of micro mix and water soluble fertilizer etc. are the area of these activities.

### **GSFC's Contribution Toward Rural Development**

GSFC adopted the slogan, "GSFC progress with rural prospect". Its marketing is backed with strong rural and agricultural programmes designed with the sole concept of modern farming disseminating technical know-how and undertaking various plans and programmes for ensnaring rural prospering to popularize the use of fertilizer among farming communication to educate these rural folk on scientific agriculture by adopting package of practices. GSFC started the unique channel of distribution namely form information centers cum depots. GSFC progressively established nearly 230 such centers, practical one of each taluka in Gujarat state. Today GSFC has about 133 depots which are manned by agricultural graduates who work as friends and philosophy of farming community. The depots sell seeds pesticides bio-fertilizers water soluble fertilizers, banana tissue etc.

#### **(ii) 4P Scheme**

During the year 1970 – 71 GSFC introduced 4 Plan- Package of Practices for Productivity and Prosperity in the district like; Kheda, Banaskatha and Baroda for potato and for control crops. This project provide agricultural inputs besides pays attention that they are applied

scientifically under the supervision of experienced technical field staff to improve the fertilizer use efficiency and hence higher productivity.

**(iv) Crop Insurance Project**

This project was undertaken from the year 1972-73 to 1975 – 76 in various cotton growing districts of Gujarat under different climatic conditions. The insurance was provided to them with minor insurance premium by 2 to 3 % of cost of cultivation.

**(v) Dry Farming Project**

For developing dry land areas GSFC launched Dry Farming Project in 7 villages of Lakhtar and Vadhavan taluka of Surendranagar district from the year 1985 on 393 farmers' field. In project area the average increase in the field of cotton was by 42% as compared to the non project areas which accepted the local practices. Latter the project was extended to Bhavnagar and Rajkot district in Gujarat, Dhar district in Madhya Pradesh and Dungarpur in Rajasthan state from 1987.

**(vi) Bio- Fertilizer**

GSFC is one of the leading companies in India producing bio-fertilizer after isolation and experimentation for 3 years. GSFC has commercialized bio- fertilizer under the brand name of Sardar, way back in 1984. GSFC is having about 135 different bacterial clusters which are checked for their efficiency in every season. 66 strains are of our own isolated while remaining has been procured from remounted institutions.

**(V) From Youth Training Programme**

GSFC is conducting the farm youth training programmes four times in a year since 1986 to train the youth farmers regarding the latest agro techniques and to expedite their hidden potential.

In collaboration with Gujarat Agricultural University, GSFC has conducted 74 programmes and covered 2317 participants bellowing to 2125 villages. For ex- participants the refresher programmes is also conducted after going in their village. Therefore, youths from Sukh Club (Sardar Yuva Krishak Harmayee) for undertaking overall development of their village this can be shown in following table:

**Table 1.12**

**Farm Youth Training Programmes conducted by GSFC**

|                                                   |      |
|---------------------------------------------------|------|
| Number of programmes conducted till January- 2006 | 74   |
| Number of Farm Youth Trained                      | 2317 |
| Number of Villages Covered                        | 2125 |
| Number of Reorientation Programmes conducted      | 10   |
| Number of Active Club                             | 44   |

Source: Indian Journal of Fertilizer, April- 2006

**(VI) Bio- Technology Product**

In order to promote organic farming GSFC has also entered into marketing of bio- pesticides. To save the farming community GSFC is coming with Sardar Ecogreen a bio-fungicide with control the soil born diseases caused by fungal pathogens. The know- how has been obtained from National Botanical Research Institute (NBRI) with a view to keep pace the with latest development in bio-technology field and to serve the farming community by providing them the latest available products. GSFC has started to procure various bio-tech products like Gibberalic Acid, Sardar Neem Protein product from suppliers. It has also been planned to produce Hydrolysis etc at GSFC.

## **(VII) Leap Forward Project**

To uplift the rural and backward Adivasi farmers of Chhota Udepur taluka GSFC started leap forward project in the year 1972-73. The Rathwa Tribal farmers of this taluka used to do their farming by age old methods. GSFC provided those fertilizers and inputs free of cost in the first year with technical know – how which enhanced their yield by four times. This project covered over 500 farmers belonging to 100 villages. This project has a social economic impact also. Their living of standard improved significantly and the number of school going children also increased. Fertilizer consumption increased from 260 tons in 1972-73 to 2500 tons in the year 1984-85.

### **Conclusions:**

Fertilizer industry is one of the key industries in India. It plays a very important role in the national economy. India's fertilizer industry is the third largest in the world. The production and consumption of fertilizer to large extent indicates a country's progress. In a developing country like India the need for a well established fertilizer industry is of paramount importance. It is also important from the point of view of employment generation and revenues to the government in the form of taxes and duties.

When the Indian economic reforms programmes were launched in 1991 the liberalization and macro economic stabilization was high on the government agenda. The fertilizer sector was also affected because of reforms which resulted in increase prices of fertilizers.

The first ever fertilizer factory in Gujarat state was established in 1967 by Gujarat State Fertilizer and Chemical Limited at Baroda. GSFC was the first joint sector industrial complex in India having equity capital of State government 49 % and public 51%. The performance of the company on production front was increasing during the period of the



study. Sales of the GSFC also showed continuous increasing every year. The operating profit of GSFC before three year it was continuously increased and then after it decreased. Gujarat Narmada valley Fertilizer Company Limited (GNFC) promoted by the government of Gujarat and GSFC was formed on 10<sup>th</sup> May, 1976. GNFC sold its fertilizers in 9 states of India. The company has its own 50 MV captive power plant. The sales of GNFC recorded constant increasing during the study time. The operating profits (EBIDT) of GNFC also recorded an increasing trend during the study period.

**References:**

1. Annual Report of GSFC-2007-08.
2. The Economics Times Daily News Paper.
3. Indian Journal of Fertilizer- April 2006.
4. 46<sup>th</sup> Annual Report of GSFC.
5. Indian Journal of Fertilizer Vol.2 April 2006.
6. WWW. google.com.
7. Farming in Salty Land by Golkiya B.A.
8. Fertilizer Manufacturing Prolim M.E. MIR Publishers Mosco P. 16.
9. Fertilizer Manufactures Porin M.E. M.R.I. Publisher Mosco p. 17.
10. Fertilizer Future po zin M.E.
11. Business Environment by Joshi Mahesh.
12. Report of the Working Group on Fertilizer for the 8<sup>th</sup> plan (1990-95) government of India New Delhi.

## **CHAPTER-2**

### **CONCEPTUAL FRAMEWORK OF WORKING CAPITAL**

- 2.1 INTRODUCTION**
- 2.2 CONCEPT OF WORKING CAPITAL**
- 2.3 DEFINITIONS OF WORKING CAPITAL**
- 2.4 IMPORTANCE OF WORKING CAPITAL**
- 2.5 OBJECTIVES OF WORKING CAPITAL**
- 2.6 TYPES OF WORKING CAPITAL**
- 2.7 CIRCULATION SYSTEM OF WORKING CAPITAL**
- 2.8 WORKING CAPITAL CYCLE**
- 2.9 CHARACTERISTICS OF WORKING CAPITAL**
- 2.10 FACTORS AFFECTING TO WORKING CAPITAL**
- 2.11 WORKING CAPITAL BUDGET**
- 2.12 SOURCE OF WORKING CAPITAL**
- 2.13 THE PERTINENT ASPECT OF WORKING CAPITAL**
- 2.14 FINANCING OF WORKING CAPITAL**
- 2.15 PRINCIPLES OF WORKING CAPITAL MANAGEMENT**

## 2.1 INTRODUCTION

The funds required by every business organization can broadly classify into fixed capital and Working Capital. Fixed capital is needed for the acquisition of fixed asset. Fixed assets constitute of basic tools of the means of production. Investment in fixed assets by itself is dead investment and the funds so locked up do not circulate continuously. Every business organization requires some funds to carry on its operations and to produce goods for sale to earn profit. These funds which are represented by the current capital used through the various steps of production and distribution and are invested in C.A..

The management of Working Capital is by no means an easy task but presents stimulating challenges to the financial executive. It requires his constant attention and exercise of skill and judgment through knowledge of business on awareness of economic trends and familiarity with the money market.<sup>1</sup>

The management of Working Capital calls for careful shortage cash flow budgeting based on sound operating budgets variance analysis at regular intervals, careful control of credit and collection period the proper handling of inventory. It also calls for judicious handing of funds not otherwise employed and proper use of banks advances to finance seasonal requirements of the business or for its expansion planning. The study of Working Capital management occupies an important place in financial management. It has never received so much attention as in recent years. Working Capital management is an integral part of overall financial management Working Capital management has been looked as the driving seat of a financial manager.<sup>2</sup>

Reserve bank of India has made a survey of 1930 companies during 1996 and 1997 and presented its conclusion. As per to its study average 45% of the total capital investment of these companies is in Working Capital. In the industries like Tea, Rubber, Coffee etc. the

average ratio of Working Capital is around 60% to 80% and in the Electricity and Engineering industries this ratio is around 40%. According to the view point of financial decision Working Capital is said to be an important aspect.

## **2.2 CONCEPT OF WORKING CAPITAL**

Working Capital management defined as the management of C.A. and the sources of their financing. An enterprise needs not only fixed capital but also Working Capital. The Working Capital is the capital needed to conduct the day to day operations of a business. Working Capital is a border term, therefore in the financial and accounting world the term Working Capital is often misunderstood. There seems to be no unanimity in the concept of Working Capital amongst its users. It either lacks correct understanding or perhaps the users, lack of uniformity in the application of this term. This is an established fact because Working Capital is not shown in account form in the financial statement. Due to the disagreement some financial experts are of the view that it better to avoid the expansion of Working Capital all together.<sup>3</sup>

According to several experts in the field of finance accept that the term Working Capital may be defined on the basis of two concepts as follows:

- (1) Net Working Capital.
- (2) Gross Working Capital.

Net Working Capital is the difference between C.A. and current liabilities, while gross Working Capital is the amount of funds invested in C.A. that are employed in the business process

As per Prof S. C. Kuchhal, "The Net Working Capital concept is a long run view the operation of C.A. which is constant in short run analysis and decision making but variable and manageable in long run operation."<sup>4</sup>

From the management of view 'Gross Working Capital' is of paramount interest as it not only shows firm's credit worthiness but is based on going concern concept. It is these assets that financial managers are concerned with if they are to bring productivity from other assets and to realize the greatest return on investment. Management has to pay attention to the total amount of C.A. and their profit earning capacity so that it is higher than cost of borrowings.<sup>5</sup>

Net Working Capital means the difference between book value of C.A. and current liabilities. Cash, bank balance, securities easily salable debtors, bills receivables, loans deposits etc are C.A.. Creditors, bills payables, expenses required to be paid, short term loan, income received in advance, bank loan, overdrafts etc are the current liabilities.

It can be concluded that both the concepts are useful and are applied keeping in view the purpose of the users.

By nature Working Capital is short term capital because essentially it meets the short – term financial requirements of a business enterprise. Normally this capital is hardly retained longer than a year. As opposed to fixed capital the amount invested in it is not permanently blocked but the investment changes in form and substance during the normal business operations, so money invested in it is circulating or floating.<sup>6</sup>

The main arguments in favor of the concept of gross Working Capital are as under:

- (1) There are two types of assets of a company fixed assets and C.A.. Similarly there are two types of capital; fixed capital and Working Capital. Fixed assets constitute the fixed capital of a company. Hence logic demands that C.A. should be considered as the Working Capital of the company.
- (2) Use of the amount of loan is mostly made for the purchase of C.A. and loan is treated as source of short term Working Capital.

- (3) For keeping fixed assets in working condition, C.A. are required. Therefore calculation of C.A. is very important.
- (4) Every management is interested in the total C.A. as it has to continue smoothly the operation of the enterprise. They are not much interested in the sources of capital. Total of C.A. is a more useful concept for them.
- (5) No special changes take place in company's fixed assets. But to keep the accounts of the C.A. is very important because often changes take place in C.A..

According to the Net Working Capital thought advocated by such authorities as Lincoln, Stevens and Saliers are as under:

Working Capital = C.A. -- Current Liabilities.

The arguments of this school of thought, regarding Working Capital as the excess of C.A. over current liabilities are as follows:

- (1) This definition of Working Capital is in use since long.
- (2) This concept of Working Capital is most useful in times of emergency. Any concern can successfully tide over the period of emergency with the help of its surplus of C.A. which are not to be repaid.
- (3) This concept gives an idea of the extent of protection afforded to the share holders and creditors. It also enable them to judge the financial soundness of the concern.
- (4) This concept is of great use in comparing the financial position of two companies with an equal total amount of C.A..

To avoid the confusion involved in the interpretation of Working Capital, it is suggested that total C.A. should be described as gross Working Capital, while excess of total C.A. over total current liabilities should be designated as net Working Capital.

It is with the help of Working Capital that fixed assets are utilized without it they remain idle. It is again measure of solvency a firm. An analytical study of liquidity can be made with the help it. Further unlike

fixed assets it is not specialized and does not diminish in value. The control of Working Capital required deep study in cash flows and fund flows.

Working Capital is related with liquidity. Liquidity and profitability are two important and major aspect of business life. No firm can survive, if it has no liquidity. A firm may exist without making profits but cannot survive without liquidity. A firm not making profit may be treated as sick but one having no liquidity may soon meet with its downfall and ultimately die. So there is need of close relationship between liquidity and profitability. But they should be separately recognized and be managed.

The most desirable and least desirable situations for companies to be in are illustrated clearly; the strongest companies will be located in cell 1, where both profitability and liquidity are being achieved. The companies located in cell 4 are unsuccessful and corporate failure is imminent enterprise cannot survive when they are unprofitable and illiquid. Companies die by going in to liquidation and it is worth nothing that this is not necessarily a voluntary action. A question does arise as to whether it is preferable to be located in cell 2 or cell 3. In general the answer is that being located in cell 2 poses a more serious threat to the enterprise. Thus if the company is liquid though unprofitable it will generally be in a position to revise its strategy. If the company is profitable but illiquid that may find that it is forced out of business before it gets the chance to correct the problem. So Working Capital Management has thus become a basic and broad measure of judging the performance of a business firm.

Working Capital is as essential as fixed capital in the successful operation of a production unit. In the past only the problems of the management of fixed capital were considered in the study of financial management but now the problem of Working Capital management are also given the same importance. Some authors go to the extent of



saying that financial management means Working Capital management. Even if this extreme view is geared an unacceptable there is no doubts that a large part of a financial manager's find and energy is usual up in attending to the problems of Working Capital management.

### **2.3 DEFINITIONS OF WORKING CAPITAL**

Definitions of Working Capital, as per various management experts are as under:

“Working Capital is the excess of C.A. over current liabilities.”

- **Prof. Hanny G, Guthmann and Herbert E. Dougall**

“Working Capital is descriptive of that capital which is not fixed. But the more common use of the Working Capital is to consider it as the difference between the book value of the C.A. and current liabilities.”

- **Hoagland.**

“Working Capital represents the excess of C.A. over current liabilities”

- **J.L. Brown and L.R. Housard.**

“Working Capital represents only the current capital assets.”

- **Meal Baker Malott and Field.**

“Working Capital means a sum of C.A..”

- **J.S. Mill.**

“Working Capital to a firm's investment in short term assets cash short-term securities, accounts, receivables and inventories.

-**Weston the Brigham**

“A Working Capital deficit exists if current liabilities exceed C.A..”

-**Prof. C.W. Gerstoberg.**

“Working Capital equals the aggregate value of C.A. minus aggregate value of current liabilities”

**- Lincoln.**

“Gross Working Capital may be used to refer to total C.A. and net working capital refers to the surplus of C.A. over current liabilities”

**- Prof. S.C. Kuchhal**

## **2.4 IMPORTANCE OF WORKING CAPITAL**

To satisfy the daily needs of an industrial unit, management should think seriously about Working Capital. Working Capital is such of capital that with the help of which a business remains in working condition. It remains live for any business units, Working Capital can be said to be its life. If there is any error in the estimation of Working Capital there will be risk on production continuity in an industrial unit. It will be difficult to launch a product in time and as a result a company would have to lose the market. On the other hand a company will not be able to make payment to workers and trades in time. Dissatisfaction of workers will increase which will create legal problems for management. Working Capital is also known as Circulating capital or Floating capital.

Working Capital constitutes as large portion of total investment in assets. It is estimated, that about 60% of total net assets of the public sector companies in India is in the form of C.A.. This underlines the importance of Working Capital management.

Working Capital management is more important for the small firm. In the small unit investment in such C.A. as cash, inventories and receivables tends to be larger than investment in fixed assets. It is more difficult for is small units to raise enough long term capital for the C.A..

Working Capital management has acquired important position and great significance in the recent past. It is reflected by the fact that financial manager spend a great deal of time in managing C.A. and

current liabilities. Arranging short term financing, negotiating favorable credit terms, controlling the movement of cash, administering accounts receivables and monitoring the investment in inventories consume a great of their time. “It has been found that the largest portion of financial manager’s time is utilized in the management of Working Capital.”<sup>7</sup>

**Weston and Brigham** have rightly stated that, “There are many aspects of Working Capital management which make it an important function of the financial manager. On the one hand it maintains proper liquidity while on the other hands it helps in increasing the profitability to the concern.”<sup>8</sup>

Inadequacy or mismanagement of Working Capital is the leading cause of business failure. The Working Capital of a firm is the lifeblood which flows through the veins and arteries of the structure. Working Capital engages every part of the structure, gives courage and moral strength to management and personnel, digests to the best degree the raw material used by its constant and regular flow and return to the cash flow for another journey and so when Working Capital is lacking or slows down, the financial bodies have value just as much as junk.

## **2.5 OBJECTIVES OF WORKING CAPITAL**

The goal of Working Capital management is to manage the concern’s C.A. and current liabilities in such a way that an adequate Working Capital is maintained. Business can get operational flexibility with the help of adequate level of Working Capital. The main objective of Working Capital management is to balance liquidity and profitability. Other objectives of Working Capital management are concerned with the problems that arise in attempting to manage the C.A., the current liabilities and the inter relation ship that exists between them. The objectives of Working Capital management are as under:

1. To maintain smooth and rapid flow of funds in order to increase the efficiency of Working Capital:

When Working Capital is applied to fixed capital a flow of funds results. As Working Capital moves from one process to another, it changes from cash to inventories to receivable and back to cash. The smoother and more rapid the flow of funds, the more efficient is each rupee of Working Capital. It is because when the flow of Working Capital is smooth and rapid, the amount of Working Capital required to produce a given output is less than when interruptions occur, which cause the flow to slow down.

2. Availability of ample funds at the times of need:

As a matter of fact, a business cannot survive in the absence of a satisfactory ratio between its C.A. and current liabilities. Furthermore, its ability to prosper will be largely determined by the composition of the C.A. pool.

3. The maintenance of current ratio between Working Capital and fixed capital:

The management should have as its general financial objective the employment of capital in whatever proportion necessary to maximize productivity and profit. Capital of the business enterprise consists of fixed and Working Capital, and the firm's profitability is determined by the ratio of Working Capital and fixed capital. Other things remaining the same, when Working Capital is increased, the firm's profitability declines.

## **2.6 TYPES OF WORKING CAPITAL**

Working Capital can be classified either on the basis of its concept or on the basis of periodicity of its requirements, which is as follows:

**(A) ON THE BASIS OF CONCEPT:**

On the basis of its concept, it may be either gross Working Capital or net Working Capital. Gross Working Capital is represented by the

total C.A.. The net Working Capital is the excess of C.A. over current liabilities.

- (1) Gross Working Capital = Total C.A..
- (2) Net Working Capital = C.A. – Current Liabilities.

## **(B) ON THE BASIS OF REQUIREMENT**

According to **Gerstein Bergh**, the Working Capital can be divided into two categories on the basis of time and requirement:

### **(1) Permanent Working Capital**

It refers to the minimum amount of investment which should always be there in the fixed or minimum C.A. like inventory, accounts receivable or cash balance etc, in order to carry out business smoothly. The investment is of a regular or permanent type and as the size of the firm expands the requirement of permanent Working Capital also increases. **Tondon Committee** has referred to this of Working Capital as 'Hard Core Working Capital.'

### **(2) Variable Working Capital**

The excess of the amount of Working Capital over permanent Working Capital is known as variable Working Capital. The amount of such Working Capital keeps on fluctuating from time to time on the basis of business activities. It may again be sub-divided into seasonal and special Working Capital. Seasonal Working Capital is required to meet the seasonal demand of busy periods occurring at stated intervals. On the other hand special Working Capital is required to meet extraordinary needs for contingencies. Events like strike fire, unexpected competition, rising price tendencies or a big advertisement campaign require such capital.

Working Capital cycle indicates the length of time between firms's paying for materials entering into stock and receiving the cash from sale

of finished goods. In a manufacturing concern the duration of time required to complete the sequence of events is called operating cycle.

According to **Hunt William & Donaldson**, "The Working Capital is required because of the time gap between the sales and their actual realization in cash. This time gap is technically termed as operating cycle of the business."

## **2.7 Circulation system of Working Capital**

The Working Capital plays the same role in the business as the role of heart in human body. Just like heart gets blood and circulates the same in the body, in the same way Working Capital funds are generated and these funds are circulated in the business. Thus Working Capital is also known as current capital or circulating capital.

**Kulkarni** has remarked that, "The use of the term circulating capital intends of Working Capital indicates that its flow is circular in nature."<sup>9</sup>

The funds in a business are obtained from the issue of shares the issue of debentures other long term agreement and from operation of business.

A huge part of generated funds is used to acquire fixed assets; viz plant and machinery, land and building and some other fixed assets, while the remaining part of the generated funds is used for day to day operations of the business. E. g. to pay wages and overhead expenses for the raw material processed. This makes possible the stocking of finished goods by whose sales either accounts receivable are created or cash is received. In this process profits are generated. A part of the profit is used to pay tax, interest and dividends, while the remaining part is ploughed back in the business this cycle goes on constantly throughout the life of business. This cycle continues throughout the life of business.

## **2.8 Working Capital Cycle**

The duration of time required to complete the sequences of events right from purchase of raw material / goods for cash to the realization of sales in cash is called the operating cycle, Working Capital cycle or cash cycle. This cycle can be said to be at the heart of the need for Working Capital. In the words of **O.M. Joy**, the Working Capital cycle refers to the length of time necessary to complete the following cycle of events:

- 1) Conversion of cash into raw material.
- 2) Conversion of raw material into working progress.
- 3) Conversion of work-in-progress into finished goods.
- 4) Conversion of finished goods into debtors or bills receivable through sale.
- 5) Conversion of debtors or bills receivable into cash

The cycle will repeat again and again over the period depending upon the nature of the business and type of product etc. The Working Capital cycle relates to a manufacturing firm, where cash is needed to purchase raw materials and convert raw material into work-in-progress and then work-in-process is converted into finished goods. Finished goods will be sold for cash or credit and ultimately debtors will be realized.

## **2.9 CHARACTERISTICS OF WORKING CAPITAL**

The features of Working Capital distinguishing it from the fixed capital are as follows:

- 1) Short term needs.
- 2) Circular movement.
- 3) An element of permanency.
- 4) An element of fluctuation.
- 5) Liquidity.
- 6) Less risky.

- 7) Special accounting system not needed.
- 8) Different proportion for each industry.

### **1) Short-Term Needs**

Working Capital used to acquire C.A. which get converted into cash in a short time. In this respect it differs from fixed capital which represents funds locked in long term assets. The duration of Working Capital depends on the length of production process. The time that elapses in the sale and the waiting time of the cash receipt.

### **2) Circular Movement**

Working Capital is constantly converted into cash which again turns into Working Capital. This process of conversion goes on continuously. The cash is used to purchase C.A. and when the goods are produced and sold out those C.A. is transformed into cash.

### **3) An element of Permanency**

Though Working Capital is a short term capital, it is required always and forever. As stated above, Working Capital is necessary to continue the productive activity of the enterprise. Hence so long as production continues, the enterprise will constantly remain in need of Working Capital.

### **4) An Element of Fluctuation**

Though the requirement of Working Capital is felt permanently, its requirement fluctuates more widely than that of fixed capital. The requirement of Working Capital varies directly with the level of production. It varies with the variation of the purchase and sale policy price level and the level of demand also. The portion of Working Capital that changes with production sale price etc. is called variable Working Capital.

### **5) Liquidity**

Working Capital is more liquid than fixed capital. If need arises Working Capital can be converted into cash within a short period and



without much losses.

#### **6) Less Risky**

Funds invested in fixed assets get locked up for a long period of time and cannot be recovered easily. There is also a danger of fixed assets like machinery getting obsolete due to technological innovations. Investment in fixed capital is comparatively more risky. Investment in C.A. is less risky as it is a short term investment. Working Capital includes more of physical risk only and that too is limited. Working Capital involves financial or economic risk to much less extent because the variations of product prices are less severing generally. Working Capital gets converted into cash again and again. It is free from the risk arising out of technological changes.

#### **7) Special Accounting System Not Needed**

Fixed capital is invested in long term assets; it becomes necessary to adopt various systems of estimating depreciation. On the other hand working capital is invested in short term assets which last for one year only. So it is not necessary to adopt special accounting system for them.

#### **8) Different Proportion for Each Industry**

In every industry proportion of working capital is different as per type of business and nature of business e.g. In Building or Ship Building Industry proportion of Working Capital is high while in Public Utility Units where services are sold speedily the proportion of Working Capital is less. The proportion of Working Capital changes from industry to industry.

### **2.10 FACTORS AFFECTING TO WORKING CAPITAL**

There are a number of features which determine the amount of Working Capital requirement in business. It is not possible to give general principles applicable to all enterprises equally. These factors appraisal is helpful to the management in formulating its sound Working

Capital policies and estimating its needs. Important factors which determine Working Capital are as given below:

1. Nature of Business.
2. Production Time.
3. Production Policies
4. Turnover of Circulating Capital.
5. Terms of Purchase and Sales.
6. Growth and Expansion of Business.
7. Rapidity of Turnover.
8. Condition of Supply.
9. Requirement of Cash.
10. Dividend policy of Concern.

The working capital of the business is decided on the basis of types of business, industry, trade or circulative of the sources is considered. Hence finance is to be obtained at a high rate and it will make company's financial position weaker. To prevent this situation following factors should be taken into account.

### **(1) Nature of Business**

According to various form of business, requirement of Working Capital goes on changing. In comparison of manufacturing unit, trade and commerce concern require more Working Capital. Public services like electricity and railway required less Working Capital. Unit engaged in manufactures of luxurious product like air-conditioners required more Working Capital because it has a long operating cycle and which sells largely on credit.<sup>10</sup> as per view of **Husband and Dockery**, "The Working Capital position is affected more by business condition and trends than by the nature or the size of the company."

## **(2) Production Time : Time of Production Process**

The level of Working Capital depends upon the time required to manufacture goods. If the time is longer the size of working capital is great more over the amount of working capital depends upon inventory turnover and the unit cost of the goods that are sold. The greater this cost the bigger is the amount of Working Capital Plastic Industry, Bakery Industry Dairy Industry etc. required less Working Capital because the production process is short and less.

## **(3) Production Policies**

The nature of production policy also exercises its input on capital needs. Strong seasonal movements have special Working Capital problems and requirements. High level production plan also includes higher investment in Working Capital.

## **(4) Turnover of Circulating Capital**

The period required for conversion from goods into cash is known as turnover of capital. It has adverse relation with Working Capital. If the turnover rate of capital is more, less Working Capital will be required and vice-versa. The speed with which the circulating capital completes its round i.e. conversion of cash into inventory of raw material and stores inventory of raw material into inventory of finished goods. Inventory of finished goods into book debts or accounts receivable and book debts into cash accounts plays an important and decisive role in the judging the adequacy of Working Capital.

## **(5) Terms of Purchase and Sales**

The place given to credits by a company in its dealing with creditors and debtors affects considerably the amount of Working Capital. Business unit making purchase on credit basis and selling its finished products on cash basis will require a lower amount of Working Capital on the contrary.

Concern having no credit facilities and at the same time forced to grant credit to its customers, may find itself in a tight position. The discretion of management in setting credit terms is affected prevailing trade practices as well as by changing economic conditions.

#### **(6) Growth and Expansion of Business**

As company grows it is logical to expect that the larger amount of Working Capital will be required. Growing concerns require more Working Capital than those that are static. The requirement of Working Capital also varies with economic circumstances and corporate practices.

#### **(7) Rapidity of Turnover**

Turnover represents the speed with which the Working Capital is recovered by the sale of goods. In certain business sales are made quickly so that stocks are soon exhausted and new purchases have to be made. In this manner a small sum of money invested in stocks will result in sales of a much larger amount. It will reduce the requirement of more Working Capital.

#### **(8) Condition of Supply**

The inventory of raw material, spares and stores depends on the condition of supply. If the supply is prompt and adequate the firm can manage with small inventory hence the lower requirements of Working Capital. However, if the supply is unpredictable and scant than the firm, to ensure continuity of production, would have to acquire stocks as and when they are available and carry longer inventory on an average. A similar policy may have to be followed when the raw material is available only seasonally and production operations are carried out round the year.<sup>11</sup> In this case the Working Capital requirement of the concern will be higher.

### **(9) Requirement of Cash**

The Working Capital requirements of a company are also influenced by the amount of cash required by it. For various purposes, the greater the requirement of cash, the higher will be the Working Capital needs of the company.

### **(10) Dividend Policy of the Firm**

If a conservative dividend policy is followed by the management the needs of Working Capital can be met with the retained earnings. Often variations are needed of Working Capital to bring about an adjustment in dividend policy. The relationship between dividend policy and Working Capital is well established and most companies declare dividend after a careful study of their cash requirements.

In addition to scope of business components of Working Capital, demand of products, time between order and delivery, reduction in price of stock, transportation facilities, conversion of C.A. into cash, channels of distribution, wage policy, efficiency of management and miscellaneous factors as the affecting factors of Working Capital.

## **2.11 WORKING CAPITAL BUDGET**

Efficiency in the use of Working Capital is a very important aspect of Working Capital management. The use of budgets to promote it is very necessary in view of the fact that many concerns suffer from too little Working Capital rather than from too much. In preparing the budgets including the requirement of Working Capital, determinants of quantum of Working Capital are taken into consideration.

The conservation of Working Capital which is essential would be affected by the following factors:

1. Better correlation of production and distribution of products.
2. Purchase may be standardized in such a manner as to make the use of existing Working Capital more effective.

3. Economy may be effected in predicting selling and administrative.
4. Adequate maintenance policies may be imitated to conserve Working Capital, to avoid costly delays due to break dawns.
5. Discarded assets may sometimes, he redeemed and slugged.
6. Improvements in selecting credit risked and speeding up collecting decreases the demand for Working Capital from these sources.

## **2.12 SOURCE OF WORKING CAPITAL**

From which source Working Capital is to be obtained can be decided after considering the types of Working Capital. A prudent financial manager is always interested in obtaining the correct amount of Working Capital at the right time, at a reasonable cost and at the best possible favorable terms. To adopt the right source, it is very necessary for him to have a thorough understanding of the firms short – terms funds needs. Market for short term funds required level of liquidity in funds and risk assumption. A firm interested to obtain short – term funds cash has a choice of securing finance from alternative sources – internal as well as external. In making and final choice as regards to sources of Working Capital the relative cost of financing dependability upon the source and flexibility in financial planning must be given due weight age.

### **Long Term Sources**

Requirements of initial Working Capital and the regular Working Capital includes the long term Working Capital. In addition to the minimum level of investment in various C.A. also determines the requirements of long term Working Capital. The regular fixed or permanent part of Working Capital could be financed from borrowed or owned sources. An owned source involves all type of share capital, accumulated reserves and surpluses, depreciation reserves and sales

of idle assets. Borrowed sources include debentures, bonds, long term and the medium term loans.

**A. Owned Source:**

**1. Share Capital**

A new company has to show the amount of Working Capital required for advertisement. Estimate of Working Capital is fixed. While deciding minimum subscription initial Working Capital is obtained by issuing shares. It is not required to be repaid after fixed period like debentures. There is no liability of paying interest at decided rate of percentage. No mortgage of assets at the company is created. Capital in future can be obtained easily.

**2. Accumulated Reserves and Surpluses**

This represents the part of profit not distributed among the share holders. The visionary top level management of the corporate unit allocates some portion of the earnings of the corporate unit.

**3. Depreciation Reserves**

It constitutes a part of the cost of business operations and consequently represents an expense that is changeable against earnings.

**4. Sales of Idle Fixed Assets**

Any idle fixed assets can be sold out and sale proceeds can be utilized for financing the Working Capital needs.

**B. Borrowed Sources:**

**1. Debentures and Bonds**

For the permanent Working Capital the funds can also be obtained through the issue of debentures. But there is limit beyond which issue of debentures is not desirable. Obtaining capital through debentures is also useful in trading on equity. The main drawback of this method is that as the debentures are required to be redeemed after definite number of years. Management has to make provision for its

repayment every year. In India, public limited companies are allowed to raise debts capital through debenture after they have obtained the certificate of commencement of business.

## **2. Long Term and Medium Term Loans**

Some national and international financial institution also provides long – term loans. There are two main institutional sources are of long – term loans:

1. Commercial Banks and
2. Specialized Financial Institutions.

### **Short Term Sources:**

The conventional generalizations on the financing of Working Capital suggest that the variable temporary or seasonal Working Capital should be financed from short – term sources. Short – term source comprise trade credit, banks loans and other sources. The size of these sources and the time for which a concern could place its reliance upon them depends upon factors such as trade customers or local practice, credit standing of the firm and the regularity in making payments.

#### **A. Bank Loans:**

##### **1. Secured Loans**

Secured loans are the loans protected by pledge of certain securities. The pledged securities are mostly inventories.

##### **2. Un Secured Loans**

Unsecured loans are usually taken by means of unsecured promissory notes generally for 90 to 180 days.

##### **3. Bank Over Drafts**

The establishment of over credit facilities with commercial banks enables a firm to obtain seasonal variable or temporary Working Capital from banks.



#### **4. Bank Credit**

Commercial banks are also principle sources of Working Capital. Commercial banks provide Working Capital in a number of ways like as overdrafts, cash credit, line of credit, term loans etc. This is the most flexible source in comparison to other methods of borrowing when the debt is no longer needed it can be promptly and early reduced. It is also comparatively cheap.

#### **B. Trade Loans**

Trade creditors are composed of trade payable bills and notes payable, current credit accounts and customer credit. These usually arise out of the delivery of goods or providing of services and have to be liquidated normally within a year. Trade creditors have an important place among the different sources of financing the seasonal variable or temporary Working Capital, and could finance the requirements of these types of Working Capital to a very large extent. The customers are often asked to make some advance payment in cash in view of a contract to purchase. This advance can be utilized in purchasing raw material paying wages and overhead expenses

#### **C. Other Source:**

##### **1. Public Deposits:**

The attitude of using public deposits for obtaining long term and short term capital is increasing today. Public deposits are term deposits made by public with companies of 1/2 or 3 years. The general public is invited to deposit their savings with the company for varying periods or rates of interest which are higher than those allowed by commercial banks. Companies generally get public deposits for different period ranging from 6 month to 3 years. It is not advisable to obtain more finance by this method because when any rumor spreads about the company the depositors withdraw their deposits. Hence company is put

into difficulties. According to control of RBI no company can accept public deposit more than 25% of its paid up capital and general reserves.

## **2. Private Loans**

Such loans strengthen the faith of creditors of a business enterprise. Their size happens to be quite inadequate to fulfill the needs to temporary seasonal or variable Working Capital.

## **3. Government Assistance**

Sometimes Central and State government also provide short – term finance on easy terms.

## **4. Loans from Directors**

An enterprise can also obtain loans from its officers, directors managing directors etc. These loans are often obtained of almost negligible rates of interest. Sometimes no interest is charged on term loans can also be obtain from other fellows companies working within the scale group.

## **5. Security of Employees**

If employers are required to make deposits with their employer companies such companies can utilize those amount in meeting their Working Capital needs.

## **6. Credit Papers**

Bills of exchange and promissory notes of shorter duration varying between a month and 5 months are used. These papers are discounted with a bank and capital can be arranged. Accommodation bills are an important method of such finance.

### **2.13 THE PERTINENT ASPECT OF WORKING CAPITAL**

The pertinent aspect of working capital may be narrated as under:

#### **1. Total Amount of Working Capital**

That is total investment in total C.A.. This should be neither excess nor inefficient, so that proper profitability and liquidity maintain.

This can be attempted in terms of fixed capital as well as total profitability and sales activity.

## **2. Quality Aspect of Working Capital**

That is investment in net Working Capital. Net working capital means C.A. less current liabilities. In order to know the strength of liquidity and to examine the risk, this analysis is necessary.

## **3. Investment in the Important Components**

In working capital the funds of a business unit is interested in the important components. These are:

- (1) Cash and Marketable Securities.
- (2) Investment and Store Items.
- (3) Receivables.

## **4. Financing of Working Capital**

This is to be examining in term of the periodicity of income and the period of availability of funds. So there has been mismatching and to encore the least cost for raising force of Working Capital.

### **2.14 FINANCING OF WORKING CAPITAL**

Financing of Working Capital depends upon the nature of Working Capital. Nature wise there are two kinds of Working Capital, viz; permanent and temporary. Permanent Working Capital is required to finance the minimum requirement of inventories raw material working in progress and cash. These assets defector treated as fixed assets because investments in these assets are as permanents as fixed assets. Investment in other assets are treated as temporary Working Capital which is required for seasonal fluctuations and variations. Both the permanent and temporary Working Capital may either be financed through internal sources or through external sources or both.

As per **I.M. Pandey**, for both Working Capitals, "The need of C.A. (Current Assets) arises because of the operating cycle. The operating cycle is a continuous process and therefore the need of C.A. is felt

constantly. But the magnitude of C.A. needed is not always the same. It increases and decreases over time. However there is always a minimum level of C.A. which is continuously required by the firm to carry on its business operations. This minimum level of C.A. is referred to permanent or fixed Working Capital. It is permanent in the same way as the firm's fixed assets are. Depending upon changes in production and sales the need for Working Capital over and above the permanent Working Capital will fluctuate."<sup>12</sup>

One of the important tasks of the financial manager is to select an assortment of appropriate source of finance for the C.A. As per **S.S. Sahay**, the total Working Capital needs of a firm are financed by various components of its C.L. (Current Liabilities) and apart from the permanent funds in the firm. To keep operational efficiency as well as reduction in the cost of financing should be the guiding criteria in the choice of the forms of financing. Normally C.A. of a concern is supported by a combination of long term and short source of financing. The sources of long term financing are shares, debentures, retained earnings and loans from specialized financial institutions. The long term source of finance provides support for a small part of C.A. need which is called the Working Capital margin. The sources of short – term financing are short – term bank loans, O.D., cash credit facilities etc. The short – term sources of finance referred to also as C.L. which provides the major support for C.A. The real choice of financing lies between short – term and long term financing. For that purpose in practice the matching approach or hedging approach is applied. When the concern follows matching approach long-term financing will be used to finance fixed assets and permanent C.A. Short-term financing to finance temporary or variable C.A. The following figure indicates the concern's investment and financing patterns over time under a matching plan. As the firm's fixed assets and permanent C.A. level increase the long term financing level also increases. When temporary C.A. levels

increases short – term negotiated financing increases and when the concern has no temporary C.A. it also has no short term negotiated financing.

When the concern follows matching approach long – term financing should be used to finance fixed assets and permanent C.A. The justification for this sort of financing is that since the object of financing is to pay for assets, the financing should be relinquished when the asset is expected to be relinquished. Using long-term financing for short – term assets is expensive. Since it would involve payment of interest during the period the funds are not utilized. Financing permanent C.A. with short term source will be inconvenient and costly. Since arrangements for the new short –term financing will have to be made on continuing basis. It may of times prove risky. At times the firm may not be able to raise funds and its operations may be disrupted or else to save disruption it may have to borrow funds at very inconvenient rates. This short-term financing is less costly than long – term financing. But the former is more risky than later. The choice should naturally involve a tradeoff between risk and return.<sup>13</sup>

## **2.15 Principles of Working Capital Management**

### **1. Follows Principles of Cost of Capital**

Sources of procurement of Working Capital are various. Each source has a separate cost of capital. Cost of capital is directly related with risk.

### **2. Principles of Equality Position**

As per this principle Working Capital is required to be invested in such a way that it creates equality in every component of Working Capital. E.g. position of raw material is satisfactory but there is shortage of cash this situation is not proper. Use of working capital must be made in such a way that it increases the net value of the firm.

### **3. Principles of Maturity of Payment**

On the date of maturity the company must make the payment of its liabilities. By doing this maximum utilization of units funds will be made. For payment of short term debts special arrangement is required to be made. For this purpose investment in quick convertible securities into cash should be made.

### **4. Principles of Optimization**

The financial management should utilize Working Capital in such a percentage that maximum return can be obtained on investment. Factors affecting to the Working Capital should be taken into consideration for that purpose. Percentage of Working Capital should be decided on the basis of return on Working Capital and risk. If risk is more return also will be more and vice – versa.

## **CONCLUSIONS**

In the present study of Working Capital management the researcher has studied various type of aspect of working capital management. In this chapter researcher studied meaning of Working Capital, types of Working Capital, importance of working capital, objectives of Working Capital, circulation systems of Working Capital, factors affecting Working Capital, source of Working Capital, financing of Working Capital, characteristics of Working Capital etc. For any concern working capital can be said to be its life. If there is any mistake in the estimation of this type of capital there will be risk on production continuity in an industrial unit. Working Capital consists of raw material, cash on hand, readymade material resalable securities, bills of receivables, debtors etc. **John Stewert** calls Working Capital as a circulating capital or floating capital. In addition Working Capital is needed to meet the day to day expenses on wages, salaries, power etc. According to **Hoagland** Working Capital is descriptive of that capital which is not fixed but the more common use of the Working Capital is to

consider it as the difference between the book value of the C.A. and current liabilities.

## **References**

1. Ashim K. Mukherajee, 'Management of Working Capital in Public Enterprises' Vohra Publishers and Distributors Allahabad, page – 2.
2. P.V. Kulkarni, 'Financial Management' Himalya Publishing House 1983 page – 399.
3. Ashim K. Mukherajee, 'Management of Working Capital in Public Enterprises' Vohra Publishers and Distributors Allahabad, page – 2.
4. Kuchhal S.C. 'Financial Management' Himalya Publishing House, page -155
5. Kuchhal S.C. 'Financial Management' Himalya Publishing House, page -155
6. J.H. Bonville and L. B. Dewang, 'Organizing and Financing Business' New York, Prentice Hall, 1956 page - 211
7. Add eli-Motal and M.H., ' Working Capital: its Role in Short run Liquidity Policy of Industrial Concern : Accounting Research' vol. 1956, page - 266
8. J. Fred Weston and F. Rugence Brigham, 'Managerial Finance'
9. P.V. Kulkarni, 'Financial Management: A Conceptual Approach' Himalay Publishing house, Bombay- 1983.
10. Prasanna Chandra, 'Financial Management: Theory and Practice' Tata Mcgraw Hill Publishing Company , New Delhi- 1989, Page-262
11. Prasanna Chandra, 'Financial Management: Theory and Practice' Tata Mcgraw Hill Publishing Company , New Delhi- 1989, Page-265
12. Pandey I. M, 'Financial Management' page - 238
13. Wessed H. Robrt op cit page - 95



# **CHAPTER - 3**

## **RESEARCH METHODOLOGY**

- 3.1 INTRODUCTION**
- 3.2 TITLE OF THE PROBLEM**
- 3.3 PERIOD OF THE STUDY**
- 3.4 NATURE OF THE STUDY**
- 3.5 TOOLS AND TECHNIQUES**
- 3.6 SCOPE OF THE STUDY**
- 3.7 REVIEW OF LITERATURE**
- 3.8 BROADER HYPOTHESIS:**
- 3.9 OBJECTIVES OF THE STUDY**
- 3.10 METHOD OF DATA COLLECTION**
- 3.11 METHOD OF ANALYSIS AND INTERPRETATION  
OF DATA**
- 3.12 CHAPTER SCHEME**
- 3.13 LIMITATIONS OF THE STUDY**

### 3.1 INTRODUCTION

Working Capital Management always affects marketing, production, personal and other areas of management. No areas of business unit are so ultimately reported to its other areas as the area of Working Capital Management. For the success of every business and concern not only fair capitalization is required, but the management of capital especially working capital is very much important concern and its profitable operations.

Every functions of the business unit or everything that happens in the business is related to the functional area of business as well as reported to other disciplines. It draws helpful concepts and techniques particularly from discipline, like economics and accounting.

Capital is the nucleus around which the entire corporate sector relates and receives nourishment. In the area of economics capital is often calculated as a capital goods consisting of machines, plants, buildings, raw materials, goods in process etc. According to the one of the **Economist, Irving Fishier**, "Capital is concerned as a sketch of wealth at an instant of time<sup>1</sup>".

Working Capital Management is concern with the problems that arise in attempting to manage the current assets- currents liabilities and the integration ship that exist between them. The concept of working capital was first endowed by **Karl Marx** in a different form and using the term variable capital. In his views, the variable capital means the outlays for payroll is advanced to worker to spend now before the goods they work on are complete. The variable capital is nothing but usage fund which remains blocked in work-in-progress along with other operating expenses until it is realized though the sale of finished goods. The concept of working capital has changed a lot, with the evolution of business.

From the above indicated theoretical foundation of working capital, it presents that if the finance manager does not properly

estimate the working capital, the enterprise will have to face severe problems in connection with the production as well as meeting daily requirements.

In this backdrop the researcher has decided to study the working capital management of Gujarat State Fertilizer Company (GSFC) and Gujarat Narmada valley Fertilizer Company (GNFC) with the overall objective of studying working capital management through different types of ratios based on the financial information of these companies.

Translation GSFC's philosophy is its vast net work of plants that make its possible. This infrastructure took its first step in 1967 with the setting up of 6 plants with an initial investment of Rs. 40 crores.

Gujarat Narmada valley Fertilizer Company Limited popularly known as GNFC was promoted by the government of Gujarat and GSFC and was incorporated on 10<sup>th</sup> May, 1976 and created history in 1981 by issuing a share capital of Rs. 436.1 million. Most of the share holders in GNFC were farmers from Gujarat state. Having their long existence and wide production capacity in the area of fertilizer, both the company GSFC and GNFC is selected for the study.

As India is an agricultural country. Fertilizer plays the most important role in the development of agricultural production and productivity of land. So the fertilizer industry is the key industry in the development of Indian economy. In fertilizer industry working capital management is major problem. For the first time the researcher has tried to emphasize on Working Capital Management in Gujarat with reference to GSFC and GNFC.

### **3.2 TITLE OF THE PROBLEM**

The subject of this study is as follows:

**"A Study on Working Capital Management and its Impact on Profitability of Selected Fertilizer Units of Gujarat State"**

The fertilizer industry plays a vital role in the growth and development of a country. It provides required infrastructure for economic development of the country. This study proposes to present working capital management in fertilizer industry with specific reference to the Gujarat State Fertilizer Company (GSFC) and Gujarat Narmada valley Fertilizer Company (GNFC). For the purpose of the study the units are having all infrastructural facility. This topic has been selected keeping in view the availability of time and ability of the researcher. After going through the existing literature and sound discussion with the experts in the subject, the researcher has selected the topic.

### **3.3 PERIOD OF THE STUDY**

The present study is undertaken for a period of five accounting year starting from 2003-04 to 2007-08. The researcher has selected the base year 2003-04 because this year is normal for the purpose of analysis and evolution.

### **3.4 NATURE OF THE STUDY**

This study is based on the secondary data, derived from annual published reports of selected units - GSFC and GNFC. Various researches have been conducted under Commerce Faculty of Saurashtra University; however no research has been conducted on working capital management and its impact on profitability of fertilizer units of Gujarat state (with reference to GSFC and GNFC). Thus this study would be an original contribution as the problem of the study is unique in every respect. It is a functional study and focuses on the functional aspect of the industry. No sampling technique is needed as the research wants to take a census for the study.

### **3.5 TOOLS AND TECHNIQUES**

Accounting techniques and statistical techniques have been used in the present study. For the analysis the accounting technique - Ratio Analysis is used. Ratio analysis is considered as the best tool for performance evaluation an organization. Ratio is quotient of two numbers and the relation expressed between two figures. The ratio analysis concentrates on the interrelationship among the figures appearing in the financial statements – Profit & Loss Account and Balance Sheet. The strengths and weakness can be measured properly by the ratio analysis.

By using appropriate and relevant statistical techniques, the collected data is edited and tabulated. For that purpose of testing hypothesis framed during the course of research, the researcher used parametric and non - parametric tests. With the help of average, percentage, correlation and co-efficient of association, the data has been presented. Hypotheses have been tested by 5% level of significance by using F-test and t-test as per requirement of the study.<sup>2</sup>

### **3.6 SCOPE OF THE STUDY**

The study covers a period of five year beginning from 2003-04 to 2007-08. In this study overall working capital, its broader components and their management have been discussed.

The fertilizer industry in Gujarat state has witness radical changes in the last decade. Existing units have expanded their production. The study is based only on the fertilizer corporate sector of Gujarat. There are mainly two corporate units working in Gujarat. They are GSFC and GNFC. While in the co-operative sector of Gujarat - IFFCO and KRIBHCO are working which are not included in the present study. The study covers the evaluation of credit efficiency, quick ratio efficiency, inventory efficiency, current efficiency, working capital to sales efficiency, productivity selected units. The study is limited to only

working capital management covering various ratios related to working capital. The tool for appraisal of working capital management is ratio analysis. So the scope of the study is restricted to working capital management as functional scope and fertilizer corporate sector of Gujarat as geographical scope.

### **3.7 REVIEW OF LITERATURE**

There is a sizable literature on fertilizer industry in conforming to its long history and economic importance. A good deal of and analytical literature exists at board levels like problems associated with productivity, size and technology, capacity utilization, financial performance, manpower and plant location etc. Relevant existing studies and literature have been discussed as under:

Dutts S.K. has written an article on Indian Tea Industry, an appraisal which was published in management in March – 1992. He analyzed the financial efficiency, profitability and liquidity by using different ratios.

In the year 1998 a study was made by S.J. Parmar on profitability analysis of Cement Industry in Gujarat State for the period from 1988-89 to 1994–95. He had made an attempt to analyze financial strength, liquidity, profitability, cost and sales trend and social welfare trend by using various ratio, common size analysis and value added analysis. He made several suggestions for the importance of profitability of Cement Industry. In his analysis he indicates various reasons for the higher cost, low profitability and inefficient use of internal resources.

Karva and Suberamanium published an article on the financial performance of 10 units relating to the period form 1972 to 1979 which mainly observed liquidity, profitability, financial performance, financial structure and overall performance. For this study they used conventional ratio analysis.

Smt. Priti K. Ganatra made her Ph. D. research on analysis of liquidity of fertilizer industry. It was a comparative study of GSFC and GNFC. The study period of this research was 1991-92 to 200-01.

### **3.8 BROADER HYPOTHESIS:**

The broader hypothesis of the study is that the GSFC's and GNFC's working capital management is efficient and helpful for improving profitability over the period of study.

### **3.9 OBJECTIVES OF THE STUDY**

The overall objective of the study is to find out the trends of working capital and to know liquid position. The main objectives are as under:

1. To study the trend of working capital in Gujarat State Fertilizer Company and Gujarat Narmada Valley Fertilizer Company during the study period.
2. To measure the efficiency of working capital management.
3. To analyze the components of working capital e.g. cash, receivable and inventory.
4. To assess and comment on the liquidity position of selected units.
5. To make suggestions for the better working capital management for selected units.

### **3.10 METHOD OF DATA COLLECTION**

The main source of data, used for the study is secondary drawn from the annual profit and loss account and balance sheet figures as found in the annual reports of the selected units. The selected data was complemented through direct personal unstructured investigation of general managers, senior personnel of accounts department of selected units. The main information and data have been collected from head offices of the selected units. Opening expressed in commercial journals

magazines, news papers accounting literature, various journals and magazines on fertilizer industry have also been used in this study.

### **3.11 METHOD OF ANALYSIS AND INTERPRETATION OF DATA**

The study is based on secondary data taken the annual reports of the selected unit for the period from 2003-04 to 2007-08. Unstructured personal interviews have been taken for secondary data and understand the internal and external factors affecting the working capital management of the units. The data obtained have been duly classified edited and tabulated under various groups as per requirements of the study<sup>3</sup>. An analytical tool like ratio, percentages trends, regression analysis and co-efficient of co-relation were used for objective analysis and for drawings for meaningful conclusions.

### **3.12 CHAPTER SCHEME**

The research report has been presented as per the following chapter scheme:

#### **Chapter: 1**

##### **Introduction of Fertilizer Industry**

This chapter discussion has been made the points like; Introduction, need for fertilizer in India, types of fertilizer - natural fertilizer and chemical fertilizer, development and growth of Indian fertilizer industry at global level, size of Indian fertilizer industry, development of fertilizer industry in Gujarat and government policy in Gujarat, history of GSFC and GNFC and conclusions of the chapter.

#### **Chapter: 2**

##### **Conceptual Framework of Working Capital Management**

This chapter explains introduction of working capital, concept of working capital, Definitions of working capital, importable of working capital, objectives of working capital, types of working capital, circulation



system of working capital, characteristics of working capital, factors affecting working capital, working capital budget sources of working capital, the pertinent aspect of working capital, financing of working capital, principles of working capital and conductions.

### **Chapter: 3**

#### **Research Methodology**

In this chapter of Research methodology narration has been made in relation to various components of research methodology like: introduction, title of the study, review of literature, data collection, period of the study, scope of the study, objectives of the study, nature of the study, tools and techniques used in the study, hypothesis of the study, chapter scheme of the study and limitations of the study.

### **Chapter: 4**

#### **Analyses and Interpretation**

It covers the aspects like; major trends of working capital in GSFC and GNFC, current assets turnover, current assets to total fixed assets ratio, comparative study between current assets turnover ratio and profit margin. Net working capital, analysis with net working capital turnover ratio, financing of current assets with matching approach, liquidity position of GSFC and GNFC, components of working capital – cash, inventory and receivables management, working capital and profitability analysis with the help of profit margin and overall profitability (Return on investments).

### **Chapter: 5**

#### **Summary Findings and Suggestions**

In this chapter summary of various chapters of the study, major findings of the study and suggestions of study have been shown.

### **3.13 LIMITATIONS OF THE STUDY**

The main limitations of the study are as follows:

1. The study is limited to five year - 2003-04 to 2007-08 only.
2. The study is related to corporate fertilizer sector of Gujarat only.
3. This study is based on secondary data derived from published annual reports of the selected units. The reliability and finding are largely depending on the data published in annual reports.
4. This study is restricted to only two units as compared to population the sample size is too small. Hence it becomes the limitation of the study.
5. The ratio analysis has its own limitations. The same also applies to the present study.
6. There are many approaches to the performance measurement. There is no uniformity among experts.
7. The calculation of working capital has many practical difficulties there are different methods to calculate the working capital of an industry.

### **References**

1. Reeta Mathur, "Indian Financial System", Sub line Publication – (2002), Jaipur.
2. C.R. Kothari, "Research Methodology", New Age International Publication, New-Delhi.
3. S.P.Gupta, "Fundamentals of Statistics", Himalaya Publishing House (1982), New-Delhi.

# **CHAPTER - 4**

## **ANALYSIS AND INTERPRETATION OF WORKING CAPITAL**

- 4.1 Introduction
- 4.2 Meaning of Ratios.
- 4.3 Utility of Ratio Analysis
- 4.4 Limitations of ratios
- 4.5 Classification of Ratios
- 4.6 Components of Working Capital
- 4.7 Used Ratios in Present Study
- 4.8 Current Ratios
- 4.9 Financing of Current Assets
- 4.10 Conclusion

#### **4.1 INTRODUCTION**

The role of working capital in business is akin to that of a heart in the human body. Funds are the life blood of business body. Just as the heart circulates the blood to various organs of body, funds are rotated to various business activities through proper working capital management and any obstruction in the smooth rotation of funds, may cause serious problem in business operations. Funds may be generated from issue of shares long term and short term borrowings and ploughing back of the earning of business and may be utilized to pay for purchase of raw material wages and overheads etc.

A specialty of utilization of funds is that they are of recurring nature, so efficient working capital management requires a proper balance of generation and circulation of these funds without which either scarcity of funds will cause obstruction in the smooth functioning of the organization or excess funds will prevent the organization from conducting its business efficiently.

To analyze and interpretation of working capital various financial tools are available here researches used ratio analysis for the purpose of the study.

Ratio analysis is one of the powerful tools of financial analysis. It indicates a qualitative relationship between the figure and group of figures which are used for evaluation and decision making. Ratio analysis is a very powerful analytical tool useful for increasing performance of an organization. The ratio analysis concentrates on the inter – relationship among the figures appearing in the financial statements. The ratio analysis helps the management to analyze the past performance of the firm and to make further projections.

Ratio analysis is a process of comparison of one figure against another which make a ratio and the appraisal of the ratio to make proper analysis about the strengths and weaknesses of the firm's operations. The circulation of ratio is a relatively easy and simple task

but the proper analysis and interpretation of the ratio can be made only by the skilled analyst. Ratio analysis is extremely helpful in providing valuable insight into a company's financial picture. Ratio normally pinpoints a business strengths and weakness in two ways. One ratio provide easy way to compare present performance with past. Second ratio depicts the areas in which particular business is competitively advantaged of disadvantaged through company ratio to those of other business or the same size within the same Industry<sup>1</sup>.

The data obtained have been duly classified edited and tabulated under various groups as per requirements of the study and analytical tools like ratios, percentages trends regression analysis and t-test were used for objective analysis the drawings for meaningful conclusions.

#### **4.2 MEANING OF RATIO**

Ratio is a simple mathematical expression of relationship between two related items in quantitative form. It may be a number expressed in terms of another number. The relationship between two figures may be expressed as quotient or a rate of percentage i.e. say 2:1 or 2 times or 200%

A ratio is a mathematical relationship between two quantities. It is of major importance, for financial analysis. It engages qualitative measurement and precisely how adequate is one key item in relation to another<sup>2</sup>.

The use of ratios has become increasing popular during last few years. Originally the bankers used the current ratio to judge the capacity of the borrowing business enterprises to repay the loan and make regular interest payments. Today it has assumed such an importance that anybody connected with the business turns to ratios for measuring the financial strength and earning capacity of the business. A supplier of funds in the form of share capital would like to analyze the accounts to ascertain its earning capacity and future prospects. A bankers or other

creditor will measure the repaying capacity and financial strength on the basis of accounting ratio.

The financial statements as prepared and presented annually are of little use for guidance of prospective investors, creditors and even management. If relationships between various related items in these financial statements are established they can provide useful clues to gauge accurately the financial health and ability of business to make profit. This relation between two related items of financial statements is known as ratio. Accounting ratio is an important tool in the hands of management for control purposes.

The relation between two items of financial statement like profit and loss account and balance sheet gives a good account of profitability, liquidity, capital structure and short term as well as long term solvency of business.

#### **4.3 UTILITY OF RATIO ANALYSIS**

The use of ratios was started by banks for ascertaining the liquidity and profitability of companies business for the object of advancing loans to them. It gradually became popular and other creditors began to use them profitably. The investors calculate ratios from the published accounts of the company in order to have an idea about the solvency and profitability of the company before investing their savings. The ratio analysis provides useful information to the decision maker or management which would help them in taking important policy decisions. Diverse group of people make use of ratios to determine a particular aspect of the financial position of the company in which they are interested.

Importance of ratio analysis is as under:

##### **(A) Profitability:**

Useful data about the trend of profitability is available from profitability ratios. The gross profit ratio, net profit ratio and ratio of

return on investment give a good idea of the profitability of business. On the basis of these ratios management gets an idea about the efficiency of managers and bank as well as other creditors to draw useful conclusions about repaying capacity of the borrowers.

**(B) Liquidity:**

In fact, the use of ratios was made initially to ascertain the liquidity of business. The current ratio, liquid ratio and acid-test ratio will tell whether the business will be able to meet its current liabilities as and when they mature. Banks and other lenders will be able to conclude from these ratios whether the firm will be able to pay regularly the interest and loan installments.

**(C) Indicate Trends:**

The ratios of the last three to five years will indicate the trend in the respective fields. For example the current ratio of a firm is lower than the industry average but if the ratios of the last five years show an improving trend it is an encouraging trend. Reverse may also be true. A particular ratio of a company for one year may compare favorably with industry average but its trends may show a deteriorating position, which is not desirable. Only ratio analysis will provide this data

**(D) Useful for Decision – Making:**

Ratio guides the management in making some of the important decisions. Suppose the liquidity ratio show an unsatisfactory position the management may decide to get additional liquid funds. For capital expenditure decisions the ratios of return on investment (ROI) will help the management. The efficiency of various departments can be judged on the basis of their profitability ratios and efficiency of each department can be determined.



**(E) Efficiency:**

The turnover ratios are guides to measure the efficiency of managers. For example the stock turnover will indicate how efficiently the sale is being made. The debtors' turnover will show the efficiency of collection department and assets turnover shows the efficiency with which the assets are used in business.

**(F) Inter Firm Comparison:**

The absolute ratios of a firm are not of much use unless they are compared with similar ratio of other firms belonging to the same industry. This is inter firm comparison which shows the strength and weaknesses of the firm as compared of other firms and will show corrective measures.

**(G) Useful For Budgetary Control:**

Regular budgetary reports are makes in a company where the system of budgetary control is in use if various ratios are presented in these reports it will give a fairly good idea about various aspects of financial position.

Ratio analysis is relevant in assessing the performance of firm in respect of the various assets like as liquidity position long term solvency, operating efficiency, overall profitability, inter firm comparison and trend analysis etc. As a tool of financial management ratio are of crucial importance. The various activity ratios measure the types of operational efficiency.

#### **4.4 LIMITATIONS OF THE RATIOS:**

Ratio analysis is widely used tool of financial analysis. Yet it suffers from various limitations. The operational implication of this is that while using ratio the conclusions should not be taken on their face value. Some of the limitations which characterize ratio analysis are as follows:

##### **1. Difficulty in Comparison:**

One serious limitation of ratio analysis arises out of the difficulty associated with their comparability. One technique that is employed is inter-firm comparison. But such comparison are vitiated by different procedures adopted by various firms. The difference may relate to

- Differences in the basis of inventory valuation
- Different depreciation methods (i.e. straight line v/s Written down basis)
- Estimated working life of assets particularly of plant and equipment
- Amortization of intangible assets like goodwill, patents and so on
- Amortization of deferred revenue expenditure such as preliminary expenditure and discount on issue of shares
- Capitalization of lease
- Treatment of extraordinary items of income and expenditure and so on.
- Secondly, apart from different accounting procedures, companies may have different accounting periods implying differences in the composition of the assets particularly current assets. For these reasons the ratio of two firm may not be strictly comparable

Another basis of comparison is the Industry Average. This presupposes the availability on a comprehensive scale of various ratios for each industry group over a period of time, if however as is likely

such information is not compiled and available the utility of ratio analysis would be limited.

## **2. Impact of Inflation:**

The second major limitation of the ratio analysis as a tool of financial analysis is associated with price level changes. This in fact is a weakness of the traditional financial statements which is based on historical costs. An implication of this feature of the financial statements as regards ratio analysis is that assets acquired at different periods are in effect shown at different prices in the balance sheet as they are not adjusted for changes in the price level. As a result ratio analysis will not yield strictly comparable and therefore dependable results to illustrate there are two firms which have identical rates of returns on investment say 15 per cent. But one of these had acquired its fixed assets when prices were relatively low while the other one had purchased them when prices were high. As a result the book value of the fixed assets of the former type of firm would be lower while that of the latter higher from the point of view of profitability the return on the investment of the firm with a lower book value would be over stated. Obviously identical rates of returns on investments are not indicative of equal profitability of the two firms. This is a limitation of ratio.

## **3. Conceptual Diversity:**

Yet another factor which influences the usefulness of ratios is that there is difference of opinion regarding the various concepts used to compute the ratios. There is always room for diversity of opinion as to what constitutes shareholders equity debt, assets, profit and so on. Different firms may use these terms in different senses or the same firm may use them to mean different things at different times.

Finally ratios are only post mortem analysis of what has happened between two balance sheet dates for one thing the position in

the interim period is not revealed by ratio analysis. Moreover, they give no clue about the facture.

In short ratio analysis suffers from some serious limitations. The analyst should not be carried away by its over simplified nature easy competition with a high degree of precision. The reliability and significance attached to ratios will largely depend upon the quality of information on which they are based. They are as good as the data itself. Nevertheless they are an important tool of financial analysis.

#### **4.5 CLASSIFICATION OF RATIO:**

Ratios are generally classified on the basis of (A) statements prepared (B) Tests satisfied (C) Accounting significance of importance:

(A) On the Basis of Statements prepared

(i. e. Traditional Classification)

This classification is based on the financial statements prepared, i.e. P&L A/c and balance sheet calculation ratio. The ratios under this classification are grouped into three categories, namely

##### **Balance sheet Ratio:**

Those entire ratios which are calculated to established relationship between two balance sheet items, they are:

- a) Current Ratio
- b) Liquid Ratio
- c) Proprietary Ratio
- d) debt-Equity Ratio
- e) Capital Gearing Ratio

Those ratio which calculated to established relationship between two P & L A/c. items. They are

- a) Gross profit ratio
- b) Operating Ratio
- c) Operating Profit Ratio
- d) Net Profit Ratio

- e) Interest Coverage Ratio

**Composite Ratio:**

- a) Inventory turnover ratio
- b) Debtors turnover ratio
- c) Creditors turnover ratio
- d) Working capital turnover ratio
- e) Fixed assets turnover ratio
- f) Return on equity ratio
- g) Return on capital employed ratio

**(B) On the Basis of Tests Satisfied**

(i.e. functional Classification)

This classification is based on the function or tests satisfied i.e, to serve the need of different parties interested in knowing the financial condition of a business concern. The ratios under this classification are:

**Liquidity Ratio**

This ratio is computed to measure the ability of a firm to meet its current or short – term obligations. The various liquidity ratios are:

- 1) Current ratio
- 2) Acid – Test Ratio
- 3) Absolute Liquid Ratio

**Leverage Ratio:**

The ratio is calculated to measure the firm's ability to meet its interest costs and repayment of its long-term obligations. The various leverage ratios are:

- 1) Debt-equity ratio
- 2) Interest coverage ratio
- 3) Capital Gearing Ratio
- 4) Debt to total capital ratio

### **Activity or Efficiency Ratio**

This ratio is also known as turnover ratio. This ratio is computed to measure the efficiency with which resources of a firm have been utilized the various activity ratios are:

- 1) Inventory turnover ratio
- 2) Debtors turnover ratio
- 3) Creditors turnover ratio
- 4) Working capital turnover ratio
- 5) Fixed assets turnover ratio
- 6) Current assets turnover ratio

### **Profitability Ratio**

- 1) Gross profit ratio
- 2) Operating ratio
- 3) Operating profit ratio
- 4) Expense ratio
- 5) Net-Profit ratio
- 6) Return on investment
- 7) Return on equity
- 8) Return on capital employed
- 9) Earnings per share
- 10) Price earnings ratio

### **(C) On the Basis of Importance:**

This classification is based on the significance with which the ratio are calculated. For the object of analysis and interpretation of financial statements some ratio are more important than others.

The British Institute of Management has recommended this classification. Inter firm comparison may be done based on the classification of ratio as primary ratio and secondary ratios. The success or otherwise of any business concern is based on its profit earning in

relation to capital employed is termed as primary ratio. The other ratio which explain the primary ratio are called secondary ratio e.g. operating profit ratio

As mention above the various ratio are discussed as under:

- 1) Liquidity ratio
- 2) Deficiency or Activity ratio
- 3) Profitability ratio
- 4) Solvency ratio

### **(I) Liquidity Ratios:**

A class of financial metrics that is used to determine a company's ability to pay off its short-term debts obligations. Generally the higher the value of ratio, the larger the margin of safety that the company possesses to cover short-term debts.

Common liquidity ratio includes the current ratio, the quick ratio and the operating cash flow ratio. Different analysis an side different assets to be relevant in calculating liquidity. Some analysts will calculate only the sum of cash and equivalents divided by current liabilities because they feel that they are the most liquid assets and would be the most likely to be used to cover short term debts in an emergency.

A company's ability to turn short term assets into cash to cover debts is of the almost importance when creditors are seeking payment, bank raptly analysts and mortgage originators frequently use the liquidity ratio to determine whether a company will be able to continue as a going concern. **Christy and Roden** defines the Liquidity of an assets as moneyless the liquidity ratio include the following:

#### **(1) Current Ratio:**

Current ratio is also called working capital ratio it is calculated to establish relationship between the current assets and current liabilities. Its is also called banker's ratio. The difference between current assets

and current liabilities is called as working capital. It measures the firm's utility to meet its short term obligations or it indicates it a firm has enough short – term assets to cover its immediate liabilities. If the ratio is less than one then they have negative working capital. A high working capital ratio isn't always a good thing it could indicate that they have too much inventory or they are not investing their excess cash.

This ratio indicates whether a company has enough short term assets to cover its short term debt. Anything below 1 indicate negative w/c. while anything over 2 means that the company is not investing excess assets. Most believe that a ratio between 1.2 and 2.0 is sufficient,

Current ratio is shown as

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

The current ratio is a popular financial ratio used to test a company's liquidity by deriving the proportion of current assets available to cover current liabilities

The concept behind this ratio is to ascertain whether a company's short term assets cash equivalents, marketable securities, receivables and inventory are readily available to pay of its short term liabilities notes payable current expensed and taxes. In theory, the higher the current ratio the better

In interpreting the current ratio the composite of current assets must not be over looked. A firm with a high proportion of current assets in the form of cash and accounts receivable is more liquid than one with a high proportion of current assets in the form of inventories, even though both have the same current ratio:

$$\text{Current ratio} = \frac{\text{C.A.}}{\text{C.L.}}$$



### **Commentary:**

The current ratio is used extensively in financial reporting however, while easy to Understand, it can be misleading in both a positive and negative sense i.e. a high current ratio is not necessarily good and a low current ratio is not necessarily bad (see chart below) Here's why : contrary to popular perception the ubiquitous current ratio as an indicator of liquidity is flawed because its conceptually based on the liquidation of all of a company's current assets to meet all of its current liabilities in reality this is not likely to occur investors have to look a company as a going concern. It's the time it takes to convert a company's working capital assets into cash to pay its current obligations that is the key to its liquidity in a word the current ratio can be misleading

A simplistic but accurate comparison of two companies current position will illustrate the weakness of repaying on the current ratio or a working capital number (Current assets minus current liabilities) as a sole indicator of liquidity

|                     | <b>Company ABC</b> | <b>Company XYZ</b> |
|---------------------|--------------------|--------------------|
| Current Assets      | 600                | 300                |
| Current Liabilities | 300                | 300                |
| Working Capital     | 300                | 0                  |
| Current Ratio       | 2.00               | 1.00               |

Company ABC looks like an easy winner in a liquidity contest. It has an ample margin of current assets over current liabilities a seemingly good current ratio and working capital of 300 Company XYZ Ltd no current asset / liability margin of safety a weak current ratio and no working capital.

However to prove the point what if (i) both companies' current liabilities have an average payment period of 30 days (2) company ABC

needs six months (180 days) to collect its account receivables and its inventory turns over just once a year (365 days) and (3) company XYZ is paid cash by its customers and its inventory turns over 24 times a year (every 15 days) in this contrived example company ABC is very illiquid and would not be able to operate under the conditions described. Its bills are coming due fastest than its generation of cash. You can't pay bills with working capital you pay bill with cash company's XYZ's seemingly tight current position is in effect much more liquid because of its quicker cash conversion.

When looking at the current ratio it is important that a company's current asset can cover its current liabilities however investors should be aware that this is not the whole story on company liquidity try to understand the types of current assets the company has and how quickly these can be converted into cash to meet current liabilities. This important perspective can be seemed through the cash conversion cycle. By digging deeper into the current assets you will gain a greater understanding of a company's true liquidity

## **2. Acid-test ratio (Liquid ratio)**

A Stringent test that indicates whether a firm has enough short term assets to cover its immediate liabilities without selling inventory. The acid – test ratio is for more strenuous than the working capital ratio primarily because the working capital ratio allows for the inclusion of inventory assets. Liquid assets are those assets which are readily converted into cash and include all the components of current assets except stock and prepaid expense.

### **Calculated by:**

Cash + Accounts receivable + short term Investment

Companies with ratios of less than 1 cannot pay their current liabilities and should be looked at with extreme caution. Further more if

the acid test ratio is much lower than the working capital ratio it means current assets are highly dependent on inventory retail stores are examples of this type of business.

This ratio assesses how liquid the firm would be. If the business operations come to an abrupt halt. This is the most meaningful and perhaps the only accurate measure of liquidity

What does a current liability mean

A Company's debts or obligations that are due within one year. Current liabilities appear on the company's balance sheet and include short term debt accounts payable, accrued liabilities and other debts essentially these are bills that are due to creditors and suppliers within a short period of time. Normally companies will draw or cash current assets in order to pay their current liabilities

Analysts and creditors will often use the current ratio which divides current assets by liabilities or the quick ratio which divides current assets minus inventories by current liabilities to determine whether a company has the ability to pay off its current liabilities

This ratio assesses how liquid the firm would be if the business operations come to an abrupt halt. This is the most meaningful and perhaps the only accurate measure of liquidity

### **3. Absolute liquid ratio:**

In firms receivables are more liquid than inventories but there may be doubt regarding their reliability in time. Hence only absolute liquid assets such as cash in hand cash at bank marketable securities are taken into consideration 1:2 is considered as ideal ratio

This ratio shows as

$$\text{Absolute Liquid ratio} = \frac{\text{Absolute liquid}}{\text{Current Liabilities}}$$

Absolute liquid ratio is an indicator of a company's short term liquidity. It is also known as a quick ratio. The quick ratio measures a

company's ability to meet its short – term obligations with its most liquid assets. The higher the quick ratio the better the position of the company

The quick ratio is calculated as:

$$\text{Quick ratio} = \frac{\text{Current Asset}}{\text{Current Liabilities}}$$

Acid test ration is also known as quick assets ratio

The quick ratio is more conservative than the current ratio a more well known liquidity measure because it exclude inventory form current assets. Inventory is excluded because some companies have difficulty turning their inventory into cash. In the event that short term obligations need to be paid off immediately there are situations in which the current ratio would overestimate a company's short term financial strength

## **II Activity / Efficiency Ratio:**

To Measure the operational efficiency of a business concern the efficiency / activity ratios are calculated. The operation efficiency a company is judged based on its profit earning capacity and the optimum utilization of its available resource in accordance with financial policies relating to its operation these ratio are also called as performance ratio turnover ratio or current assets movement ratio because they measure the speed with which the assets are converted into sales. A number of turnovers ratio can be calculated such as

### **(1) Inventory / Stock turnover Ratio :-**

Its is calculated by dividing the cost of goods sold by the average inventory thus:

$$\text{Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average Inventory}}$$

Inventory means the raw materials work in process goods and completely finished goods that are considered to be the portion of business assets that are ready or will be ready for sale. Inventory

represents one the most important assets that most business possess because the turnover of inventory represents one of the primary sources of revenue generation and subsequent earnings for the company's shareholders / owners

Possessing a high amount of inventory for long periods of time is not usually good for a business because of inventory storage obsolescence and spoilage cost. However possessing too little inventory isn't good either because the business runs the risk of losing out on potential sales and potential market share as well inventory management for ecasts and strategies such as a just – in – time inventory system can help minimize inventory costs because good are created or received as inventory only when needed.

The days in the period can than be divided by the inventory turnover formula to calculate the days it takes to sell the inventory on hand or inventory turnover days

To minimize seasonal factors average inventory may be used instead of the ending inventory level

This ratio should be compared against industry average. A low turnover implies poor sales and therefore excess inventory. A high ratio implies either strange sales or ineffective buying high inventory levels are unhealthy because they represent an investment with a rate of return of zero. It also opens the company up to trouble should prices begin to fall.

The inventory turnover ratio is deemed to reflect the efficiency of inventory management. The higher the ratio the more efficient the management of inventories and vice versa however this is always be true A high ratio may be caused by a lower level of inventory trading to frequent stock outs lass of sales and customer goodwill the cost of goods sold means sales minus gross profit. The ratio indicates how fast inventory is sold.

**(2) Receivable / Debtors turnover ratio :**

Debtors constitute an important constituent of current asset and therefore the quality of debtors to a great extent determines a firm's liquidity. This ratio shows the relationship between net sales and debtors of a concern. This ratio helps to judge the adequacy of working capital. Debtors are expected to be converted in to cash over a short period and therefore are included in current assets. It is expressed as follows:

$$\text{Debtors turnover ratio} = \frac{\text{Total Sales}}{\text{Sundry Debtors}}$$

It is also determined by dividing the net credit sales by average debtors outstanding during the year. Thus

$$\text{Debtors turnover ratio} = \frac{\text{Net Credit Sales}}{\text{Average Debtors}}$$

Net credit sales consist of gross credit sales minus return if any from customers. Average debtors are the simple average of debtors at the beginning and the end of year. The analysis of the debtors turnover ratio supplements the information regarding the liquidity of one item of current assets of the firm. The ratio measure how rapidly debts are collected. A high ratio is indicated of shorter time lag between credit sales and cash sales collection a low ratio shows that debts are not being collected rapidly. The objective of the comparison of the debts turnover ratio is to judge how old the accounts are and to know how fast cash will flow from collection. The debtor's turnover ratio has been calculated by dividing the net sales by the debtors at the end of the year. The following aspect are to be consider while using this ratio

- (A) Amount of the sales is taken for the whole accounting year while the amount of debtors does not represent one accounting year
- (B) The sale includes both cash and credit sales. A high ratio is indicative or shorter time lag between credit sales and cash

collection. A low ratio show that debts are not being collected rapidly. This ratio is also known as receivables turnover ratio

### **(3) Creditors / Payable turnover Ratio**

It is a ratio between net credit purchase and the average amount of creditors outstanding during the year it is computed as under

$$\text{Credit turnover ratio} = \frac{\text{Net Credit Sales}}{\text{Average Creditors}}$$

Average creditors = Average of creditors outstanding at the beginning at the end of the year

The creditors turnover ratio is an vital tool of analysis as a company or concern can reduce its requirement of current assets by relying on suppliers credit. The extent to which trade creditors are willing to wait for payment can be approximated by the creditors turnover ratio. A low turnover ratio reflected liberal credit terms granted by suppliers while a high ratio shows that accounts are to be settled rapidly.

### **(4) Working Capital Turnover ratio :**

Working capital turnover provides some useful information as to how effectively a company is using its working capital to generate sales. Working capital turnover is a measurement comparing the depletion of working capital to the generation of sales over a given period.

A company uses working capital (C.A. – C.L) to fund operations and purchase inventory. These operations and inventory are the converted into sales revenue for the company. The working capital turnover ratio is used to analyze the relationship between the money used to fund operation and the sales generated from this operation. In a general sense the higher the working capital turnover the better because it means that the company is generating a lot of sales compared to the money it uses to fund the sales. For example it a

company has current assets of 10 million and current liabilities of 9 million its working capital is \$ 1 million when compared to sales of 15 million the working capital turnover ratio for the period is 15 (15 m / 1m) when used in fundamental analysis this ratio can be compared to that of similar companies or to the company's own historical working capital turnover.

Working capital is measure of both a company's efficiency and its short – term financial health. The working capital turnover ratio is also called as net current assets turnover. This ratio is shown as

$$\text{Working Capital ratio} = \frac{\text{Cost of good sold}}{\text{Average working capital}}$$

It is the most widely used ratio for judging liquidity of business when establishes the relation between current assets and current liabilities. It measures the short term debt paying ability of a business. A good working capital means good umbrella for short – term creditors against raining season. A working capital ratio of 2:1 shows a highly solvent position. Whereas industries a minimum of 1.33 : 1 for allowing working capital finance.

Positive working capital means that the company is able to pay off its short – term liabilities negative working capital means that a company currently is unable to meet its short term liabilities with its current assets (cash, accounts receivable and inventory). Working capital is also known as net working capital or the working capital ratio

If a company's current assets do not exceed its current liabilities then it may run into trouble paying back creditors in the short term. The worst – case scenario is bankruptcy. A defining working capital ratio over a longer time period could also be a red flag that warrants further analysis for example it could be that the company's sales volumes are decreasing and as a result its account receivables number continues to get smaller and smaller.



Working capital also gives investors an idea of the company's under buying operational efficiency. Money that is tied up in inventory or money that customers still owe to the company cannot be used to pay off any of the company's obligations. so if a company is not operating in the most efficient manner (slow collection) it will show up as an increase in the working capital. This can be seen by company the working capital from one period to another slow collection may signal an under buying problem in the company's operations..

**(5) Fixed Assets turnover ratio :**

This ratio is very important for the manufacturing concern high ratio shows efficiency in work performance low ratio indicates inadequate investment in fixed assets. This ratio is calculated as under

$$\text{Fixed assets turnover ratio} = \frac{\text{Cost of good sold/sales}}{\text{net fixed assets}}$$

**(iii) Profitability ratio**

The profitability of a fertilizer industry can easily be measured by its profitability ratios. Profitability ratios are the most important and appropriate indicators for the evaluation of the financial performance. These ratio shows overall managerial efficiency profitability ratio serve as an important measurement of the efficiency with which the operations of the fertilizer industry is going on. These are two types of profitability ratios. Profit margin ratio and rate of return ratios. The former indicates the relationship between profit and sales. The two popular profit margin ratio are gross profit margin ratio and net profits margin ratio. The rate of return ratio on the other hand shows the relationship between profit and investment. The important measures in this category are net income to total assets ratio return on investment and return on equity the analysis of profitability ratio is very useful to management for the ultimate success of the unit to share holders for

regular and adequate return and the growth of industry. The profitability ratios are as under

**(1) Gross profit ratio :**

Gross profit ratio is computed as under

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net sales}} \times 100$$

The difference between net sales and cost of goods sold is the gross profit ratio. This ratio shows the margin left after meeting manufacturing costs it measures the efficiency of production as well as pricing to analyze factors under buying the variation in gross profit margin the proportion of various elements of cost to sales may be studied in detail

**(2) Net profit ratio :**

This ratio is also known as net margin or net profit margin. It is a good indicator of the efficiency of a firm.

According to **Van Horne** this ratio tells us the relative efficiency of the firm after taking into account all expenses and income taxes but not extraordinary charges

Net profit ratio is determined by relating net income after taxes to net sales. This ratio measures the relationship between net profit and sales of a firm. Net profit is the excess of revenue over expenses during a particular accounting period

The net profit ratio is determined by dividing the net profit by sales and expressed as percentage

This ratio can be calculated in three ways

(A) Net profit ratio =  $\frac{\text{EBIT}^*}{\text{Net Sales}} \times 100$

(B) Net profit ratio =  $\frac{\text{EBT}^*}{\text{Net Sales}} \times 100$

(C) 
$$\text{Net profit ratio} = \frac{\text{EAT}^*}{\text{Net Sales}} \times 100$$

\* EBIT = Earnings before interest and taxes

\* EBT = Earnings before taxes

\* EAT = Earning after interest and taxes

When this ratio is computed for measuring the managerial efficiency net profit before tax will be used and if calculated for owners object or comparing two firms net profit after tax will be considered. This ratio shows overall profitability and efficiency of the business. A low net profit ratio would indicate inadequate returns to the owners. A high net profit ratio would means adequate return to the owners. It also enables a firm to stand in cut – throat competition when the selling price is declining or cost of production is rising.

For comparing two units net profit after interest and taxes taken as net profit and as business operations sales are considered the formula for calculating the ratio is

$$\text{Net profit ratio} = \frac{\text{Net Profit}}{\text{Business operations/sales}} \times 100$$

**(3) Operating Ratio:**

This ratio revels relationship between cost (cost i.e. cost of goods sold + operating expense) and sales. This ratio is usually expressed as percentage. It is computed as.

$$\text{Operating ratio} = \frac{\text{Operating cost}}{\text{Net sales}} \times 100$$

**(4) Expense ratio :**

There ratios are calculated to establish relationship between the various expenses incurred by a business unit and its sales. The important expense ratio are

- (i) Cost of good sold ratio =  $\frac{\text{Cost of Good Sold}}{\text{Net sales}} \times 100$
- (ii) Administrative and office expenses ratio =  $\frac{\text{Administrative office expenses}}{\text{Net sales}} \times 100$
- (iii) Selling and distributing ratio =  $\frac{\text{Selling \& Distributing expenses}}{\text{Net sales}} \times 100$

**(5) Operating profit ratio :**

This ratio shows relationship between operating profit and sales it is calculated as under

$$\text{Operating profit ratio} = \frac{\text{Operating profit}}{\text{Sales}} \times 100$$

Here operating profit means net sales minus operating expenses.

**(6) Return on Investment**

The return on net capital employed or investment is a guide to compare the profitability of a business. It is also an indicator of proper utilization of net capital employed towards achieving desirable profits net capital employed is the total of fixed assets plus current assets minus current liabilities. The only difference between the gross capital employed and the net capital employed is that current liabilities are deducted from the gross capital employed.

Return on investment has been computed by dividing the net profit by the net capital employed. A continuous rise in the ratio will indicate better and better utilization of net capital employed and a decline in the ratio will suggest an adverse situation. This ratio is the most important studying the management efficiency of the enterprise. It is used to study the operational efficiency of the enterprise it also indicates the earning capacity of the capital

This ratio is also known as net worth ratio or return on share holders. ROI established relationship between net profit after tax and shareholders' funds.

$$ROI = \frac{\text{Net profit (after tax)}}{\text{Share holders funds}} \times 100$$

Here shareholders fund means equity share capital preference. Share capital + accumulated profits accumulated losses.

### **(7) Return on equity capital (ROEC)**

Equity shareholders are the true owners of a company. They bear more risk. They are entitled to get their share of dividend only after the payment of fixed dividend to preference share holders. Therefore the dividend payable to equity share holders varies depending upon the quantum of profits available to them. High return on equity capital attracts more investment it is calculated to establish relationship between net profit available to equity share holders and equity share capital it is expressed as

$$ROEC = \frac{\text{Net profit (after tax) - Preference div.}}{\text{Paid up equity share capital}} \times 100$$

### **(8) Return on capital employed**

This is the second type of ROI it is similar to the ROA except in one respect here the profits are related to the total capital employed the term capital employed refers to long term funds supplied by the creditors and owner of the firm. The ROI can be computed in different ways using different concepts of profit and capital employed thus

$$ROCE = \frac{\text{Net profit (after tax) / GBIT}}{\text{Average total capital employed}} \times 100$$

$$ROCE = \frac{\text{Net profit (after tax) + Interest - tax. adv. on Interest}}{\text{Average total cap. Employed}} \times 100$$

$$\text{ROCE} = \frac{\text{Net profit after taxes} + \text{Interest}}{\text{Average total cap. Employed} - \text{Average Intangible assets}} \times 100$$

### 9. Price Earnings ratio (PER)

This ratio is very useful to the investing public to decide whether to make or not make to an investment in share of a company. It is calculated to established relationship between market price per share and earnings per share.

$$\text{PER} = \frac{\text{Market value per share}}{\text{Earning per share}} \times 100$$

### 10. Earning per share:

Earning per share is calculated by dividing net profit after tax (NPAT) less preference dividend by the total number of equity shares held.

$$\text{EPS} = \frac{\text{NPAT} - \text{Preference dividend}}{\text{no. of equity shares}} \times 100$$

### (iv) Solvency Ratios:

Solvency ratio are those ratio calculated to determine the firms ability to meet its long term obligations the claims of debentures holders and other financial institutions which have offered long and medium term loans to the firms the following are the solvency ratios.

#### (1) Proprietary ratio:

Proprietary ratio is the ratio of shareholders funds to total assets. It is also called as net worth to total assets ratio or equity ratio. It serve as a measure of long term solvency it is expressed as.

$$\text{Priority Ratio} = \frac{\text{Net worth (shareholders fund)}}{\text{Total Assets}}$$

**(2) Debt equity ratio :**

Debt equity ratio is calculated to know the extent of outsiders funds and shareholders' funds used in acquiring the assets for a firm. In other words it is calculate to measure the relative claims of outsiders and share holders against the assets of a firm. It is also called as external internal equity ratio or debts to net worth ratio. It is computed as under

$$\text{Debt. Equity Ratio} = \frac{\text{Out Siders fund}}{\text{Share holders funds}}$$

**(3) Solvency ratio :**

Solvency ratio is ratio of total liabilities to total assets therefore this ratio established relationship between the external equities or outsiders fund and total finance required for acquisition of assets. Its is expressed as

$$\text{Solvency Ratio} = \frac{\text{Total outside liabilities}}{\text{Total Assets}}$$

**(4) Fixed assets to net worth ratio:**

This ratio established relationship between fixed assets and proprietors funds. This indicates the extent to which the fixed assets are financial by owners funds. It is shown as

$$\text{Fixed Assets to N/W} = \frac{\text{Fixed Assets (less DEPM)}}{\text{Share holders funds}}$$

**(5) Current Assets to net worth ratio**

This ratio is calculated to measure the proportion of current assets financial by owners' funds. It is expressed as :

$$\text{Current Assets to N/W} = \frac{\text{Current Assets}}{\text{Share holders funds}}$$

**(6) Interest coverage ratio :**

This ratio indicates whether the earnings of a firm are sufficient to pay interest charges periodically or not. In other words its is calculated

to whether the creditors or lender are secured or unsecured in respect of their periodical interest income. It is also called as debt service ratio or charges cover ratio it is shown as:

$$\text{Interest Coverage ratio} = \frac{\text{Net profit before interest and taxes}}{\text{Interest charges}}$$

**(7) Capital gearing ratio**

Capital gearing ratio shows the relationship between equity shareholders funds and fixed interest bearing debentures / loan / preference share capital. If the fixed interest bearing debentures and preference share capital exceeds equity share holders funds it is called highly geared capital and if equity share holders funds exceed the interest bearing debentures and preference share capital it is called low geared capital and if both are equal it is called evenly geared capital. This ratio is expressed as

$$\text{Capital Operating Ratio} = \frac{\text{equity shareholders funds}}{\text{Interest bearing debentures} + \text{preference capital}}$$



**Table 4.1**

**Formulas of Various Types of Ratios**

| Various Types of Ratio                                                                                                                                                                                                                                                          | Formula                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (I) Liquidity Ratio<br>1. Current Ratio<br>2. Acid Test Ratio<br>3. Absolute liquid Ratio                                                                                                                                                                                       | $\frac{\text{Current Assets}}{\text{Current Liabilities}}$ $\frac{\text{Cash} + \text{Accounts Receivables} + \text{Short term Investment}}{\text{Current liabilities}}$ $\frac{\text{Absolute liquid assets}}{\text{current liabilities}}$                                                                                                                                                                                                                                                         |
| (I) Activity / Efficiency Ratio<br>1. Inventory turnover Ratio<br>2. Debtors turnover Ratio<br>3. Creditors turnover Ratio<br>4. Working capital turnover Ratio<br>5. Working Capital turnover Ratio<br>6. Fixed Assets turnover Ratio                                          | $\frac{\text{Cost of goods sold}}{\text{Average investment}}$ $\frac{\text{Total sales}}{\text{Sundry debtors}}$ $\frac{\text{Net credit purchases}}{\text{Average creditors}}$ $\frac{\text{Cost of good sold}}{\text{Average working capital}}$ $\frac{\text{Cost of good sold}}{\text{Net fixed assets}}$                                                                                                                                                                                        |
| (II) Profitability Ratio<br>1. Gross profit Ratio<br>2. Net Profit Ratio<br>3. Operating Ratio<br>4. Expense Ratio<br>(A) Cost of goods sold Ratio<br>(B) Administrative Expenses Ratio<br>(C) Selling and dis. Ratio<br>5. Operating Profit Ratio :<br>6. Return on Investment | $\frac{\text{Gross Profit} \times 100}{\text{Net Sales}}$ $\frac{\text{EAT} \times 100}{\text{Net Sales}}$ $\frac{\text{Operating Cost} \times 100}{\text{Net sales}}$ $\frac{\text{Cost of good sold} \times 100}{\text{Net Sales}}$ $\frac{\text{Office expenses} \times 100}{\text{Net Sales}}$ $\frac{\text{Selling \& Dist. 3exp} \times 100}{\text{Net Sales}}$ $\frac{\text{Operating Profit} \times 100}{\text{Sales}}$ $\frac{\text{Net Profit (After Tax)}}{\text{Share holders' funds}}$ |

| Various Types of Ratio               | Formula                                                                                         |
|--------------------------------------|-------------------------------------------------------------------------------------------------|
| 7. Return on equity capital          | $\frac{\text{Net profit after tax profit div}}{\text{Paid up equity share capital}} \times 100$ |
| 8. Return on capital employed        | $\frac{\text{Net profit after tax + Interest}}{\text{Earnings per share}}$                      |
| 9. Price earnings Ratio              | $\frac{\text{NPAT pref. div}}{\text{No. of equity share}} \times 100$                           |
| 10. Earnings per share               |                                                                                                 |
| IV Solvency Ratio                    | $\frac{\text{Net worth Shareholders funds}}{\text{Total assets}}$                               |
| 1. Proprietary Ratio                 | $\frac{\text{Out sides funds}}{\text{Shareholders' funds}}$                                     |
| 2. Debt equity Ratio                 | $\frac{\text{Total outside liability}}{\text{Total assets}}$                                    |
| 3. Solvency Ratio                    | $\frac{\text{Fixed assets less DEPM}}{\text{Share holders' funds}}$                             |
| 4. Fixed assets to net worth Ratio   | $\frac{\text{Current assets}}{\text{Share holder funds}}$                                       |
| 5. Current Assets to net worth Ratio | $\frac{\text{Net profit before interest and taxes}}{\text{Interest charges}}$                   |
| 6. Interest coverage Ratio           | $\frac{\text{Equity shareholders funds}}{\text{Interest billing / deb profits}}$                |
| 7. Capital Gearing Ratio             |                                                                                                 |

#### 4.6 COMPONENTS OF WORKING CAPITAL

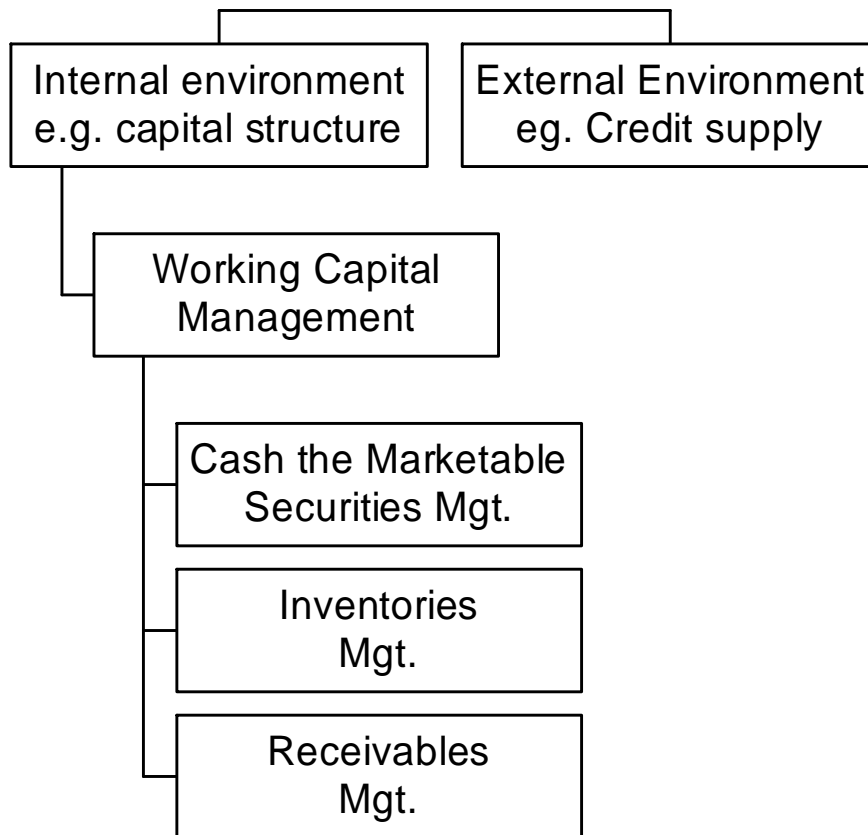
The working capital management as a system consist of three sub systems. It is also called the components of working capital

- (1) Cash and marketable securities management
- (2) Inventory management
- (3) Receivable Management

This system can be depicted as shown below:

System view of working capital management

## System View of Working Capital Management



Source: Working Capital Management by Dr. Sujan C. Jain and Dr. N.D. Mathur

The salient feature of the working capital system are different inter relationship among the sub systems and the environmental factors. These inter relationship influence both the level and characteristics of the remaining sub system

### **(I) Cash and marketable securities management :**

The term cash includes coins, currency and cheques held by the firm and balance in its bank accounts. Sometimes near cash items such as marketable securities or bank time deposit are also includes in cash. The basis characteristics of reality be converted in to cash. Generally when a firm has excess cash it invests it in marketable securities. This kind of investment contributes some profits to the firm cash in the business enterprise may be compared to the blood of the human body

blood gives life and strength to the human body and cash imports life and strength profits and solvency to the business organization

Cash is a medium of exchange to purchase the goods and services and to discharge the liabilities so cash management assumes more importance than other current assets because cash is the most significant and the least productive assets that a firm holds cash balance less and unproductive investment also.

A firm should keep sufficient cash neither more nor less. Cash shortage will disrupt the firms manufacturing operation while excessive cash will simply remain idle without contributing anything towards the firms' profitability cash turnover ratio and cash to current assets ration are the important ratio to analyze cash management

Cash turnover ratio is an important ratio of controlling cash it is reveals of effectiveness with which cash is utilized A high cash turnover ratio suggests better management of cash but too high ratio which may be due to the lower level of cash is not appreciated. Cash turnover ratio is calculated the following way

$$\text{C.T.R.} = \frac{\text{Sales}}{\text{Cash and bank balance}}$$

(C.T.R. = Cash turnover ratio)

Cash to current assets ratio explains the relationship between the cash and the current assets as a whole it a major portion of current assets are made up to cash alone the profitability will be decreased because cash itself does not yield any profit. So if the amount of cash balance is excessive then it can be concluded that management is inefficient to employ the surplus cash. The proportion of cash to current assets should be kept as low as possible. The ratio of cash to current assets is

$$\frac{\text{Cash + bank balance}}{\text{Current Asset}} \times 100$$

A down ward trend in this ratio indicates the better control whereas an upward trend reveals a stuck control over cash resources. It is very difficult to lay down any standard norms in this regards.

## **(II) Inventory Management**

The word inventory represents the aggregate of those items of tangible personal property which (a) are held for sale in the ordinary course of business (b) are in the process of production for sales or (c) are to be currently consumed in the production of goods or services to be available for sale. Inventory is the life blood of the manufacturing industries. But an excess or shortage of inventory is harmful for the smooth running of an organization inventory is the most important component of working capital and has an important contribution to the maximization of profit of a business organization

The term inventory management is used to two ways unit control and value control. Production and purchase official use this word in term of unit control whereas in accounting this ward is used in terms of value control.

The objective of Inventory management is to create a balance between the desires. To minimize capital investment on the one hand and to avoid extension of the delivery period on the order to avoid unnecessary capital locked up in inventories and to exercise economies in ordering the obtaining and storing of material and to minimize the possibility of delay in production through regular supply of raw materials stores and spares tools and other equipment and when required are the main objectives of inventory management

The aim of inventory management should be to avoid excessive and inadequate levels of inventories and to maintain sufficient inventory for the smooth production and sales operations

Inventory turnover ratio inventory to current assets ratio are the important ratios to analyze inventory management.

The formula of both above ratio is as under

$$\text{Inventory turnover Ratio} = \frac{\text{Sales}}{\text{Inventory(stock)}}$$

$$\text{Inventory to Current Assets Ratio} = \frac{\text{Inventory}}{\text{Current Assets}} \times 100$$

### **(I) Receivables Management**

Accounts receivable management is also an important aspect of working capital management the amount of investment in accounts receivables for most firms also represent a very substantial portion of current assets. That credit considers as a marketing tool, acts as a bridge for the movement of goods through production distribution stages to customers finally receivables are also a part of working capital and next only to Inventory.

Receivable or book debts constitute a sub spatial portion of current assets of several organizations. They act as a buffer that allows the production and sale process to operate with minimum disturbance. They form about 1/3 part of current assets in India

The term receivables has been defined by Emerson as when goods of services are sold under an arrangement permitting the customers to pay of them at later date the amount due from the customers is recovered as accounts receivable.

Accounts receivables are amounts owed to the business firm usually by its customers. Sometimes this is broken down in to trade accounts receivables and other account receivables the former refers to accounts owned by customers and the later refer to amounts owned by employees and others. The receivable arising of credit has there characteristic firstly it involves an element of risk which should be carefully analyzed. Cash sales are totally riskless but not the credit sales as the cash payment has yet to be received. Secondly it is based on economic value. To the buyer the economic value in goods are service passes immediately at the time of sales while the seller expect

an equivalent value to be received later on thirdly it implies futurity. The cash payment for goods or services receives by the buyer will be made by him in a future period

The basic goal of receivable management is to maximize the value of the firm by achieving a tradeoff between liquidity and profitability. The purpose of credit management is not to maximize sales but to minimize the risk of bad debt. Thus to achieve the goal of worth maximization the firm should manage its receivables

- (a) To obtain optimum volume of sales
- (b) To control the cost of credit and keep it at minimum
- (c) To maintain investment in debtors at optimum level.

Thus basic goals of receivable management are to maximize the value of the firm. Granting of credit and its management involves costs. To maximize the value of the firm these costs must be controlled and they should remain within acceptable limits. This cost includes the credit administration expense, bad debt losses, and opportunity cost of the funds tied up in receivables. The aim of their management is to regulate and control these costs, not to abolish them at all. The costs can be reduced to zero, if no credit is guaranteed.

Debtors' turnover ratio, receivables to current assets ratio are used to evaluate the performance of receivables management. Following are the formulas of both ratios.

(i) Debtors turnover ratio =  $\frac{\text{Total Sales}}{\text{Sundry debtors}}$

(ii) Receivables to current assets ratio =  $\frac{\text{Receivables}}{\text{Current assets}} \times 100$

Debtors turnover ratio shows the relationship between net sales and debtors of a concern. This ratio helps to judge the adequacy of working capital. From the receivables to current assets ratio, the management should try to maintain the credit policy of the firm.

#### 4.7 USED RATIOS IN PRESENT STUDY:

The data obtained have been duly classified edited and tabulated under various groups as per requirements of the study and analytical tools like ratios, percentages trends regression analysis and t-test were used for objective analysis the drawings for meaningful conclusions.

Researcher used the following ratios to analyze the performance of working capital in Gujarat State Fertilizer Company (GSFC) and Gujarat Narmdavelly Fertilizer Company (GNFC):

- (1) Current Ratio
- (2) Quick Ratio
- (3) Current Assets to Total Assets Ratio
- (4) Working Capital to Sales Ratio
- (5) Inventory Turnover Ratio
- (6) Debtors Turnover Ratio
- (7) Cash Turnover Ratio
- (8) Creditors Turnover Ratio

#### 4.8 (I) CURRENT RATIO:

Current ratio is calculated for current assets divided by current liabilities during that period. Table 4.2 shows the current ratio of the selected unit GSFC and GNFC under the study periods:

**Table 4.2**

#### **Current Ratio of the selected unit GSFC and GNFC**

| Year    | Current Assets | Current Liabilities | Ratio | Index | Current Assets | Current liabilities | Ratio | Index |
|---------|----------------|---------------------|-------|-------|----------------|---------------------|-------|-------|
| 2003-04 | 1193.57        | 765.67              | 1.56  | 100   | 746.07         | 730.26              | 2.23  | 100   |
| 2004-05 | 1297.28        | 730.56              | 1.78  | 114   | 824.43         | 981.09              | 2.42  | 109   |
| 2005-06 | 1717.32        | 740.15              | 2.30  | 117   | 882.77         | 1343.04             | 2.37  | 106   |
| 2006-07 | 1730.74        | 549.77              | 3.15  | 202   | 1410.30        | 539.68              | 2.61  | 117   |
| 2007-08 | 1487.58        | 683.69              | 2.18  | 140   | 1203.97        | 488.67              | 2.46  | 110   |
| Average | 1485.30        | 693.97              | 2.14  | 140   | 1013.45        | 816.55              | 2.42  | 109   |

Source: Published annual reports of selected units from 2003-04 to 2007-08



Current ratio is used to measure the liquidity position of the concern and thus it reflects the short solvency of the concerned. It is also called as working capital ratio or bankers' ratio in the words of **School and Haley** the simplest measure of the firm's ability to raise funds to meet short form obligations is the current ratio. It is the ratio current assets to current liabilities this ratio indicates the availability of current assets in rupees for every one rupee of current liabilities. A ratio of greater than one means that concern has more current assets than current liabilities.

Above mentioned table 4.2 indicates the current ratio and index of fertilizer unit under study during 2003-04 to 2007-08

It can be seen from the above table that increase of GSFC the current ratio continually increase during the first year at the study. It was 1.56 during 2003-04, 1.78 during 2004.05, 2.30 during 2005-06, 3.15 during 2006-07 But then after decrease and went down to 2.18 during 2007-08 during the study period average current ratio was 2.14

In case of GNFC the current ratio shows a mixed trend. It was 2.23 the lowest level in 2003-04 where as it was of 2.61 the highest level in 2006-07 after than it was 2.40 in year 2007-08 Average current ratio was 2.42 In relation to inter firm comparison during the five year of study in GNFC this ratio was higher as compare to GSFC. GSFC in the beginning two year ratio is not maintain to standard Average ratio after than it become increase and decrease also. On other side GNFC standard Average ratio was maintain to every year.

### **Hypothesis Testing:**

Hypothesis base on t test:

T- Test of current ratio of GNFC and GNFC

**Table 4.3**  
**Analysis of test in GSFC**

| Year    | $x_1$      | $(x_1 - \bar{x}_1)$ | $(x_1 - \bar{x}_1)^2$      | $x_2$      | $(x_2 - \bar{x}_2)$ | $(x_2 - \bar{x}_2)^2$      |
|---------|------------|---------------------|----------------------------|------------|---------------------|----------------------------|
| 2003-04 | 1.56       | -0.63               | 0.3969                     | 2.23       | -0.19               | 0.0361                     |
| 2004-05 | 1.78       | -0.41               | 0.1681                     | 2.42       | 0                   | 0                          |
| 2005-06 | 2.30       | 0.11                | 0.0121                     | 2.37       | -0.5                | 0.0025                     |
| 2006-07 | 3.15       | 0.96                | 0.9216                     | 2.61       | 0.19                | 0.0361                     |
| 2007-08 | 2.18       | -0.01               | 0.0001                     | 2.46       | 0.04                | 0.0016                     |
|         | $\sum x_1$ |                     | $\sum (x_1 - \bar{x}_1)^2$ | $\sum x_2$ |                     | $\sum (x_2 - \bar{x}_2)^2$ |
|         | 10.97      |                     | 1.4988                     | 12.09      |                     | 0.0763                     |

$$\begin{aligned} \bar{x}_1 &= \frac{\sum x_1}{n_1} \\ &= \frac{10.97}{5} \\ &= 2.19 \end{aligned}$$

$$\begin{aligned} \bar{x}_2 &= \frac{\sum x_2}{n_2} \\ &= \frac{12.09}{5} \\ &= 2.42 \end{aligned}$$

$H_0$  = There would be no significant difference in average times of current ratio in selected unit GSFC and GNFC

$H_1$  = There would be significant difference in average times of current ratio in selected Units GSFC and GNFC

$$H_0 = \mu_1 = \mu_2$$

$$H_1 = \mu_1 \neq \mu_2$$

$$\begin{aligned} \sigma &= \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}} \\ &= \sqrt{\frac{1.4988 + 0.0763}{5 + 5 - 2}} \\ &= \sqrt{\frac{1.5751}{8}} \\ &= \sqrt{0.1968875} \end{aligned}$$

$$= 0.4437$$

$$= 0.44$$

$$\begin{aligned} t &= \frac{|\bar{x}_1 - \bar{x}_2|}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \\ &= \frac{|2.19 - 2.42|}{0.44 \sqrt{\frac{1}{5} + \frac{1}{5}}} \\ &= \frac{0.23}{0.44 \sqrt{\frac{2}{5}}} \\ &= \frac{0.23}{0.44 \sqrt{0.4}} \\ &= \frac{0.23}{0.44 \times 0.63} \\ &= \frac{0.23}{0.2772} \end{aligned}$$

$$t = +0.83$$

Calculated value of 't' = +0.83

$$\begin{aligned} df &= n_1 + n_2 - 2 \\ &= 5 + 5 - 2 \\ &= 8 \end{aligned}$$

5% level of significance table value of 't' = 2.306

Calculated value of 't' is + 0.83 while table value of 't' is 2.306 which is lower than the table value so null hypothesis is accepted. It shows that there is no significant difference in current ratio of GSFC and GNFC. It can be said that the current ratio of both the company GSFC and GNFC is not the same.

### (III) Quick Ratio :

Quick ratio is calculated for liquid assets divided by current liabilities during that period. Table 4.4 shows quick ratio of the GSFC and GNFC under the study periods.

**Table 4.4**  
**Quick Ratio of selected units GSFC and GNFC under study**

| Year    | Current Assets | Current Liabilities | Ratio | Index | Liquid Assets | Current liabilities | Ratio | Index |
|---------|----------------|---------------------|-------|-------|---------------|---------------------|-------|-------|
| 2003-04 | 820.76         | 765.67              | 1.07  | 100   | 571.06        | 334.92              | 1.71  | 100   |
| 2004-05 | 901.50         | 730.56              | 1.23  | 115   | 563.68        | 340.24              | 1.66  | 97    |
| 2005-06 | 1182.25        | 740.15              | 1.60  | 150   | 613.19        | 371.98              | 1.65  | 96    |
| 2006-07 | 1192           | 549.77              | 2.17  | 203   | 1021.82       | 539.69              | 1.89  | 111   |
| 2007-08 | 863.53         | 682.49              | 1.27  | 119   | 817.97        | 488.67              | 1.67  | 98    |
| Average | 992.15         | 693.74              | 1.47  | 134   | 717.54        | 415.09              | 1.72  | 101   |

Source: Published annual report of selected units from 2003-04 to 2007-08

Above table 4.4 shows the quick ratio and index of fertilizer units under study from 2003-04 to 2004-05.

It can be known from the above mentioned table that incase of GSFC the quick ratio constant increases during the first four year of the study time. It was 1.07 during 2003-04 1.23 during 2004.05 1.60 during 2005-06 2.17 during 2006-07 But then after this ratio was decrease and went down to 1.27 during 2007-08 and average ratio of GSFC 1.43 during the study period

In case of GNFC the quick ratio indicates a mixed friend. It was 1.71 during 2003-04 and 1.65 the lowest level in 2005-06 where as it was of 1.89 the highest level in 2006-07 after the year this ratio is decreases and went down to 1.67 during 2007-08. Average ratio of GNFC 1.73 during the study time in relation to inter – firm comparison during the first year of study to GNFC average ratio of GNFC also higher compare to GSFC while company the quick ratio of both the units is observed that quick ratio of GNFC is comparatively better for all the year accept the year 2006-07 from the above it can be said that the

quick ratio of GNFC shows quite better picture than the GSFC during the period under study.

Hypothesis Testing:

Hypothesis based on 't' test of quick ratio of GSFC and GNFC

**Table 4.5**  
**Analysis of 't' test in GSFC and GNFC**

| Year    | $x_1$      | $(x_1 - \bar{x}_1)$ | $(x_1 - \bar{x}_1)^2$      | $x_2$      | $(x_2 - \bar{x}_2)$ | $(x_2 - \bar{x}_2)^2$      |
|---------|------------|---------------------|----------------------------|------------|---------------------|----------------------------|
| 2003-04 | 1.07       | -0.4                | 0.16                       | 1.71       | -0.01               | 0.0001                     |
| 2004-05 | 1.23       | -0.24               | 0.0576                     | 1.66       | -0.06               | 0.0036                     |
| 2005-06 | 1.60       | 0.13                | 0.0169                     | 1.65       | -0.07               | 0.0049                     |
| 2006-07 | 2.17       | 0.7                 | 0.49                       | 1.89       | 0.17                | 0.0289                     |
| 2007-08 | 1.27       | -0.20               | 0.04                       | 1.67       | -0.05               | 0.0025                     |
|         | $\sum x_1$ |                     | $\sum (x_1 - \bar{x}_1)^2$ | $\sum x_2$ |                     | $\sum (x_2 - \bar{x}_2)^2$ |
|         | 7.34       | 0.7645              | 8.58                       |            |                     | 0.0400                     |

$$\begin{aligned} \bar{x}_1 &= \frac{\sum x_1}{n_1} & \bar{x}_2 &= \frac{\sum x_2}{n_2} \\ &= \frac{7.34}{5} & &= \frac{8.58}{5} \\ &= 1.47 & &= 1.72 \end{aligned}$$

$H_0$  = There would be no significant difference in average times of quick ratio in GSFC and GNFC

$H_1$  = There would be significant difference in average times of quick ratio in GSFC and GNFC

$$H_0 = \mu_1 = \mu_2$$

$$H_1 = \mu_1 \neq \mu_2$$

$$\sigma = \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}}$$

$$\begin{aligned}
&= \sqrt{\frac{0.7645 + 0.0400}{5 + 5 - 2}} \\
&= \sqrt{\frac{0.8045}{8}} \\
&= \sqrt{0.1005625} \\
&= 0.3171 \\
&= 0.32
\end{aligned}$$

$$\begin{aligned}
t &= \frac{|\bar{x}_1 - \bar{x}_2|}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \\
&= \frac{|1.47 - 1.72|}{0.32 \sqrt{\frac{1}{5} + \frac{1}{5}}} \\
&= \frac{+.25}{0.32 \sqrt{\frac{2}{5}}} \\
&= \frac{+.25}{0.32 \times 0.63} \\
&= \frac{+.25}{0.2016} \\
&= 0.2016 \\
&= +1.2400 \\
&= + 1.24
\end{aligned}$$

Calculated value of 't' = +1.24

$$\begin{aligned}
\text{d.f.} &= n_1 + n_2 - 2 \\
&= 5 + 5 - 2 \\
&= 8
\end{aligned}$$

5% level of significance

Table value of t = 2.306

Calculated value of 't' is + 1.24 while table value the calculated value. It shows that there is no significance difference in quick ratio of

GSFC and GNFC during period under study so the null hypothesis is accepted. It can be said that the quick ratio of both the company is the same.

**(III) Current Assets to Total Assets Ratio:**

Current assets total assets ratio is calculated for current assets divided by total assets during that period table 4.6 shows at current assets to total assets ratio for the selected units GSFC and GNFC under the studying:

**Table 4.6**  
**Current Assets to Total Assets Ratio of GSFC and GNFC under study**

| Year    | Current Assets | Total Liabilities | Ratio | Index | Current Assets | Total liabilities | Ratio | Index |
|---------|----------------|-------------------|-------|-------|----------------|-------------------|-------|-------|
| 2003-04 | 1193.57        | 3041.03           | 39.25 | 100   | 746.07         | 1901.08           | 39.23 | 100   |
| 2004-05 | 1285.15        | 3114.71           | 41.26 | 105   | 824.43         | 1982.18           | 41.59 | 106   |
| 2005-06 | 1717.31        | 3301.49           | 52.02 | 133   | 882.77         | 2000.69           | 44.12 | 112   |
| 2006-07 | 1730.74        | 3205.83           | 53.99 | 138   | 1410.29        | 2693.87           | 52.35 | 133   |
| 2007-08 | 1487.58        | 2978.33           | 49.95 | 127   | 1203.97        | 2863.85           | 42.04 | 107   |
| Average | 1482.87        | 3128.28           | 47.29 | 120   | 1017.57        | 2288.48           | 43.07 | 113   |

Source: Publish annual report of GSFC and GNFC from 2003-04 to 2007-08

Table 4.6 Indicates that the current assets to total assets ratio in GSFC first four year continually a 39.25% in 2003-04 and reached 53.99% highest during the study time and last year 2007-08 the ratio was decreased to 49.95 during the study period. The current assets to total assets ratio in GNFC same position of GSFC first four year continually increased during the study period. It was 39.23% in 2003-04 and reached 52.35% highest during the study time then after this ratio is decreased. It was 42.04 in the year 2007-08 during the study period In relation to inter firm comparison during the study time in GSFC this ratio was higher as compare to GNFC table 4.5 depicts that on an average

basis more than 47.87% of the total assets were invested in current assets.

Hypothesis testing:

Hypothesis based on 't' test 't' test of current assets to total assets ratio of GSFC and GNFC

**Table 4.7**  
**Analysis of 't' test in GSFC and GNFC**

| Year    | $x_1$      | $(x_1 - \bar{x}_1)$ | $(x_1 - \bar{x}_1)^2$      | $x_2$      | $(x_2 - \bar{x}_2)$ | $(x_2 - \bar{x}_2)^2$      |
|---------|------------|---------------------|----------------------------|------------|---------------------|----------------------------|
| 2003-04 | 39.25      | -8.04               | 64.64                      | 39.23      | -4.64               | 21.53                      |
| 2004-05 | 41.26      | -6.03               | 36.36                      | 41.59      | -2.28               | 5.20                       |
| 2005-06 | 52.02      | 4.93                | 22.37                      | 44.12      | 0.25                | 0.0625                     |
| 2006-07 | 53.99      | 6.70                | 44.89                      | 52.35      | 8.48                | 71.91                      |
| 2007-08 | 49.95      | 2.66                | 7.07                       | 42.04      | -1.83               | 3.35                       |
|         | $\sum x_1$ |                     | $\sum (x_1 - \bar{x}_1)^2$ | $\sum x_2$ |                     | $\sum (x_2 - \bar{x}_2)^2$ |
|         | 236.47     |                     | 175.33                     | 219.33     |                     | 102.05                     |

$$\begin{aligned}\bar{x}_1 &= \frac{\sum x_1}{n_1} \\ &= \frac{236.47}{5} \\ &= 47.29\end{aligned}$$

$$\begin{aligned}\bar{x}_2 &= \frac{\sum x_2}{n_2} \\ &= \frac{219.33}{5} \\ &= 43.87\end{aligned}$$

$H_0$  = There would be no significant difference in current assets to total assets ratio of GSFC and GNFC

$H_1$  = There would be significant different in current assets to total assets ratio of GSFC and GNFC

$$H_0 = \mu_1 = \mu_2$$

$$H_1 = \mu_1 \neq \mu_2$$



$$\begin{aligned}\sigma &= \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}} \\ &= \sqrt{\frac{175.33 + 102.05}{5 + 5 - 2}} \\ &= \sqrt{\frac{277.38}{8}} \\ &= \sqrt{34.6725} \\ &= 5.88\end{aligned}$$

$$\begin{aligned}t &= \frac{|\bar{x}_1 - \bar{x}_2|}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \\ &= \frac{|47.29 - 43.87|}{5.88 \sqrt{\frac{1}{5} + \frac{1}{5}}} \\ &= \frac{3.42}{5.88 \sqrt{\frac{2}{5}}} \\ &= \frac{3.42}{5.88 \times 0.63} \\ &= \frac{3.42}{3.70} \\ &= 0.92\end{aligned}$$

$$t = 0.92$$

Calculated value of  $t = 0.92$

$$\begin{aligned}\text{d.f.} &= n_1 + n_2 - 2 \\ &= 5 + 5 - 2 \\ &= 8\end{aligned}$$

5% level of significance Table value of  $t = 2.306$

Calculated value of 't' is 0.92 while table value of 't' is 2.306 which is greater than the calculated value so null hypothesis is accepted. It shows that there is no significant difference in current assets to total assets is not same alternative hypothesis is rejected. The results are as per expectation.

**(IV) Working Capital to Sales Ratio :**

Working capital to sales ratio is calculated for sales divided by working capital during that period. Table 4.8 shows the working capital to sales ratio of the selected units GSFC and GNFC under the study time

**Table 4.8**  
**Working Capital Sales Ratio of selected unit GSFC and GNFC**

| Year    | Sales   | Working Capital | Ratio | Index | Sales   | Working Capital | Ratio | Index |
|---------|---------|-----------------|-------|-------|---------|-----------------|-------|-------|
| 2003-04 | 2219.36 | 427.91          | 5.19  | 100   | 1552.87 | 411.15          | 3.78  | 100   |
| 2004-05 | 2760.41 | 554.59          | 4.98  | 96    | 1935.53 | 484.19          | 4.00  | 106   |
| 2005-06 | 3004.35 | 977.16          | 3.07  | 59    | 2281.33 | 510.79          | 4.47  | 118   |
| 2006-07 | 3516.03 | 1180.90         | 2.98  | 57    | 2739.27 | 870.60          | 3.16  | 83    |
| 2007-08 | 3727.15 | 805.09          | 4.63  | 89    | 3433.91 | 715.30          | 4.80  | 127   |
| Average | 3045.46 | 789.13          | 4.17  | 120   | 2388.58 | 598.41          | 4.04  | 106   |

Source: Published annual report of GSFC and GNFC from 2003-04 to 2007-08

The higher ratio of working capital reveals the better and efficient management and utilization of current assets and vice versa the above table 4.8 reveals the working capital to sales ratio in GSFC and GNFC.

This ratio is an index of efficiency or profitability of a business firm further this ratio also indicates whether the sales are adequate in comparison to current assets or whether the current assets are too high in comparison to the sales.

Table 4.8 makes it evident the ratio of working capital to sales ratio in GSFC ranged between 2.98 times and times indicating a fluctuating trend during the four years 2003-04, 2004-05 and 2005-06

2006-07 the ratio was 5.19 4.98 3.07 and 2.98 respectively it can be said that the trend was decreasing due to increase in the sundry debtors in the year 2007-08 it stepped up 4.63 the average ratio was 6.23 times in GSFC the ratio was 5.19 times in 2003-04 which was the highest level of the study period. This ratio can declined and went down to 2.98 in 2006-07 showing a good support working capital to sales after the year it was increase 4.63 during the last year of sundry period.

In case of GNFC the working capital to sales ratio in the beginning three years this ratio was increased. It was 3.78 the lowest level in 2003-04 and where as it was of 4.47 the highest level in 2005-06 after than it decreased and went down to 3.15 during highest level in 2007 – 08 that means GNFC the working capital to sales ratio represent a trend. In relation to comparison during the first two year of study in GSFC this ratio was higher as compare to GNFC where as during the last three years this ratio higher in GNFC. The average working capital to sales ratio of GNFC was which is lower than the average ratio at GSFC during the study period.

### Hypothesis Testing:

Hypothesis based on 't' test 't' test of working capital to sales ratio of GSFC and GNFC:

**Table 4.9**  
**Analysis of 't' test GSFC and GNFC**

| Year    | $x_1$      | $(x_1 - \bar{x}_1)$ | $(x_1 - \bar{x}_1)^2$      | $x_2$      | $(x_2 - \bar{x}_2)$ | $(x_2 - \bar{x}_2)^2$      |
|---------|------------|---------------------|----------------------------|------------|---------------------|----------------------------|
| 2003-04 | 5.19       | 1.02                | 1.0404                     | 3.78       | -2.26               | 0.0676                     |
| 2004-05 | 4.98       | 0.81                | 0.6561                     | 4.00       | -0.04               | 0.0016                     |
| 2005-06 | 3.07       | -1.10               | 1.21                       | 4.47       | -0.43               | 0.1849                     |
| 2006-07 | 2.98       | -1.19               | 1.4161                     | 3.15       | -0.89               | 0.7921                     |
| 2007-08 | 4.63       | 0.46                | 0.2116                     | 4.80       | 0.76                | 0.5776                     |
|         | $\sum x_1$ |                     | $\sum (x_1 - \bar{x}_1)^2$ | $\sum x_2$ |                     | $\sum (x_2 - \bar{x}_2)^2$ |
|         | 20.85      |                     | 4.5342                     | 20.20      |                     | 1.6238                     |

$$\begin{aligned}\bar{x}_1 &= \frac{\sum x_1}{n_1} \\ &= \frac{20.85}{5} \\ &= 4.17\end{aligned}$$

$$\begin{aligned}\bar{x}_2 &= \frac{\sum x_2}{n_2} \\ &= \frac{20.20}{5} \\ &= 4.04\end{aligned}$$

$H_0$  = There would be no significant difference in working capital to sales ratio of GSFC and GNFC

$H_1$  = There would be significant difference in working capital to sales ratio of GSFC and GNFC

$$H_0 = \mu_1 = \mu_2$$

$$H_1 = \mu_1 \neq \mu_2$$

$$\begin{aligned}\sigma &= \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}} \\ &= \sqrt{\frac{4.5342 + 1.6238}{5 + 5 - 2}} \\ &= \sqrt{\frac{6.1580}{8}} \\ &= \sqrt{0.7698} \\ &= 0.88\end{aligned}$$

$$\begin{aligned}t &= \frac{|\bar{x}_1 - \bar{x}_2|}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \\ &= \frac{|4.17 - 4.04|}{0.88 \sqrt{\frac{1}{5} + \frac{1}{5}}} \\ &= \frac{0.13}{0.88 \sqrt{2/5}} \\ &= \frac{0.13}{0.88 \times 0.63}\end{aligned}$$

$$= \frac{0.13}{0.55}$$

$$= 0.24$$

$$t = 0.24$$

Calculated value of  $t = 0.24$

$$\text{d.f.} = n_1 + n_2 - 2$$

$$= 5 + 5 - 2$$

$$= 8$$

5% level of significance Table value of  $t = 2.306$

Calculated value of 't' is 0.24 while table value of 't' is 2.3.6 which is greater than the calculated value 90 null hypothesis is accepted alternative hypothesis is rejected. It shows that there is no significance difference in working capital to sales ratio of GSFC and GNFC.

#### **(I) Inventory Turnover Ratio:**

Inventory turnover ratio is also called stock turnover ratio it shows whether investment in inventory is efficiently used or not. The objective of calculating this ratio is to check whether only the required minimum has been locked up in inventory. The cost of production cannot be an idle criterion to judge the degree of over stocking of inventory. Better criterion therefore seem to be the inventory turnover i.e. sales divided by inventory

A low turnover indicates an over investment and a high turnover indicates under investment in inventory. If the ratio increase it means maximum output of finished goods to be sold which is favorable for the unit. The inventory turnover ratio is the year stick to measure the number of times inventories sold and replaced by finished goods during a particular period by comparing the sales with the inventory in trade. This ratio is a test of efficient inventory management.

A high ratio indicates better performance and bricks sales of the company's product more over there will be lesser amount of capital

blocked up in the form of working capital and all related cost of maintaining inventory will be appreciable a low ratio result in blocking of funds in inventory which may ultimately result in heavy losses due to inventory becoming obsolete or deteriorating in quality. Thus the indication of inventory over stocking or over valuation can be brought out by this ratio.

While using this ratio care should be taken as a very high low level of inventories which result in frequent stock outs indicating ineffectiveness of production planning and control while a very low ratio may be the result of a very high level of inventory which may result in an increase of costs of maintaining inventory ultimately resulting adverse effect to the profitability of a firm

Inventory turnover of a firm GSFC and GNFC has been represented in the following table 4.10:

**Table 4.10**  
**Inventory Turnover in GSFC and GNFC**

| Year    | Total Sales | Inventory | Turnover Time | Index | Total Sales | Inventory | Turnvoer Time | Index |
|---------|-------------|-----------|---------------|-------|-------------|-----------|---------------|-------|
| 2003-04 | 2029.00     | 392.47    | 5.17          | 100   | 1247.55     | 198.13    | 6.30          | 100   |
| 2004-05 | 2364.50     | 378.23    | 6.25          | 121   | 1500.03     | 217.88    | 6.88          | 109   |
| 2005-06 | 2424.59     | 459.36    | 5.28          | 102   | 1709.95     | 265.17    | 6.45          | 102   |
| 2006-07 | 3006.16     | 536.55    | 5.60          | 108   | 2127.67     | 329.03    | 6.47          | 103   |
| 2007-08 | 3228.42     | 581.05    | 5.56          | 107   | 2746.47     | 387.24    | 7.09          | 113   |
| Average | 2110.09     | 469.53    | 5.56          | 107   | 1866.33     | 279.49    | 6.68          | 106   |

Source: Published annual report of GSFC and GNFC from 2003-04 to 2007-08

Table 4.10 makes it evident that the inventory turnover ratio in GSFC presented a trend during the study time. It was 5.17 in 2003-04 after the year was increased 6.25 firm 2004-06 which stepped down to 5.28 train 2006-07 and last year it was again decreased in 2009-08 it was 5.56 train 2007-08 during the study period stock turnover ratio was 5.56 time

Incase of GNFC registered hachuring trend incase of inventor turnover ratio during the study period the ratio was 6.88 time in 2004-05 and after the ratio declined during the next year it was 6.45 time in 2005-06 and after rising up to 6.47 time and 7.09 in 2006-07 to 2007-08

During the study period the performance in respect of inventory management of GNFC was impressive than that of GSFC. The average of stock ratio during the study time was also higher in GNFC (6.68) in comparison to that of GSFC (5.56)

Stock turnover ratio ranged 5.17 times to 6.25 time in GSFC while in GNFC it range 6.30 time to 7.09 time during the study period Besides this ratio was always higher in GNFC as compared to GSFC during the study period of 2003-04 to 2007-08.

### Hypothesis Testing:

Hypothesis based on 't' test 't' test of inventory turnover ratio of GSFC and GNFC

**Table 4.11**

**Analysis of 't' test in GSFC and GNFC**

| Year    | $x_1$      | $(x_1 - \bar{x}_1)$ | $(x_1 - \bar{x}_1)^2$      | $x_2$      | $(x_2 - \bar{x}_2)$ | $(x_2 - \bar{x}_2)^2$      |
|---------|------------|---------------------|----------------------------|------------|---------------------|----------------------------|
| 2003-04 | 5.17       | -0.39               | 0.1521                     | 6.30       | -0.38               | 0.1444                     |
| 2004-05 | 6.25       | 0.69                | 0.4761                     | 6.88       | 0.20                | 0.04                       |
| 2005-06 | 5.28       | -0.28               | 0.0784                     | 6.45       | -0.23               | 0.0529                     |
| 2006-07 | 5.60       | 0.04                | 0.0016                     | 6.47       | -0.21               | 0.0441                     |
| 2007-08 | 5.56       | 0                   | -                          | 7.09       | 0.41                | 0.1681                     |
|         | $\sum x_1$ |                     | $\sum (x_1 - \bar{x}_1)^2$ | $\sum x_2$ |                     | $\sum (x_2 - \bar{x}_2)^2$ |
|         | 27.86      |                     | 0.7082                     | 33.19      |                     | 0.4495                     |

$$\begin{aligned} \bar{x}_1 &= \frac{\sum x_1}{n_1} \\ &= \frac{27.86}{5} \\ &= 5.56 \end{aligned}$$

$$\begin{aligned} \bar{x}_2 &= \frac{\sum x_2}{n_2} \\ &= \frac{33.19}{5} \\ &= 6.68 \end{aligned}$$

$H_0$  = There would be no significant difference in inventory  
Turnover ratio of GSFC and GNFC

$H_1$  = There would be significant difference in inventory turnover  
Ratio of GSFC and GNFC

$$H_0 = \mu_1 = \mu_2$$

$$H_1 = \mu_1 \neq \mu_2$$

$$\sigma = \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}}$$

$$= \sqrt{\frac{0.7082 + 0.4495}{5 + 5 - 2}}$$

$$= \sqrt{\frac{1.1577}{8}}$$

$$= \sqrt{0.1447}$$

$$= 0.3804$$

$$= 0.38$$

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$= \frac{|5.56 - 6.68|}{0.38 \sqrt{\frac{2}{5}}}$$

$$= \frac{1.12}{0.38(0.63)}$$

$$= \frac{1.12}{0.2394}$$

$$= 0.2394$$

$$t = 4.67$$



Calculated value of 't' = 4.67

$$\begin{aligned} \text{d.f.} &= n_1 + n_2 - 2 \\ &= 5 + 5 - 2 \\ &= 8 \end{aligned}$$

5% level of significance

Calculated value of 't' is 4.67 while table value 't' is 2.306 which is lower than the calculated value so null hypothesis is rejected it shows that there is significance difference in stock turnover ratio GSFC and GNFC it can be that the ratio of stock turnover is not same.

### **(III) Debtor Turnover Ratio :**

Debtors constitute an important constituent of current assets and therefore the quality of debtors to a great extent determines a firm's liquidity. This ratio shows the relationship between net sales and debtors of a concern. This ratio helps to judge the adequacy of working capital debtors are expected to be converted into cash over a short period and therefore debtors are included in current assets. It is expressed as under:

$$\text{Debtors turnover ratio} = \frac{\text{Total Sales}}{\text{Sundry Debtors}}$$

Another way debtor's turnover ratio is computed for average debtors divided by net credit sales during that period. Table 4.10 shows of debtor's turnover ratio of the selected units under study time from 2003-04 to 2007-08:

**Table 4.12****Debtors Turnover Ratio of selected units under study**

| Year    | Average Debtors | Net Credit Sales | Ratio | Index | Average Debtors | Net Credit Sales | Ratio | Index |
|---------|-----------------|------------------|-------|-------|-----------------|------------------|-------|-------|
| 2003-04 | 421.43          | 2219.36          | 18.99 | 100   | 210.19          | 1552.87          | 13.54 | 100   |
| 2004-05 | 560.49          | 2760.41          | 20.30 | 107   | 236.27          | 1935.53          | 12.21 | 90    |
| 2005-06 | 745.72          | 3004.35          | 24.82 | 131   | 359.86          | 2281.33          | 15.77 | 116   |
| 2006-07 | 841.49          | 3516.03          | 23.93 | 126   | 517.70          | 2739.27          | 18.90 | 140   |
| 2007-08 | 669.07          | 7727.115         | 17.95 | 95    | 497.48          | 3433.91          | 14.49 | 107   |
| Average | 647.64          | 2045.46          | 21.40 | 112   | 364.30          | 2388.58          | 14.98 | 113   |

Source: Published annual reports of selected units form 2003-04 to 2007-08.

It is seen from the above table 4.12 that the debtors turnover ratio in GSFC in the beginning three years it was continually increased. It was 18.99% in 2003-04 reached to 24.82% highest level in year 2005-06 But after the two year it was continually decrease and went down to 23.93% in 2006-07 and 17.95% in 2007-08.

The debtors turnover ratio is GNFC witnessed mixed turnover during the study period. It was 13.54% in 2003-04 which decreased to 12.21% in year 2004-05. But the ratio again increased after two years and reached to 18.90% in 2006-07 and than after the ratio was decreased and reached 14.49% lowest level in 2007-08 finally the average ratio of GNFC it was 15.25%.

On the basis of above analysis it can be concluded that the credit policy of the GSFC was became liberal in last there study period c from 2005-06 to 2007-08). In this period the credit and collection policy was showed in efficient it is suggested that the GSFC should try to increase this ratio by formulating credit control policies. The management of the concern will have to device ways and means to improve the collections.

In relation to the interfirm comparison during the five year of study in GSFC debtors' turnover ratio was constant higher as compare to

GNFC. In this study average ratio was also higher as compared to GNFC during the study period.

The analysis of the receivables turnover ratio supplements the information regarding the liquidity of the receivables. The ratio measures how rapidly debts are collected. A high ratio is indicated of shorter time lay between credit sales and cash sales collection. A low ratio shows that debts are not being collected rapidly. The objective of the comparison of the debts turnover ratio is to judge how old the accounts are and to know how fast cash will flow from collection.

Amount of the sales is taken for the whole accounting year while the amount of debtors does not represent one accounting year and the sales includes both credit and cash sales etc are to be considering while using this ratio.

Hypothesis Testing:

Hypothesis based on 't' test 't' test of debtors' turnover ratio of GSFC and GNFC

**Table: 4.13**  
**Analysis of 't' test in GSFC and GNFC**

| Year    | $x_1$      | $(x_1 - \bar{x}_1)$ | $(x_1 - \bar{x}_1)^2$      | $x_2$      | $(x_2 - \bar{x}_2)$ | $(x_2 - \bar{x}_2)^2$      |
|---------|------------|---------------------|----------------------------|------------|---------------------|----------------------------|
| 2003-04 | 18.99      | -2.21               | 4.8841                     | 13.54      | -1.44               | 2.0736                     |
| 2004-05 | 20.30      | -0.90               | 0.8100                     | 12.21      | -2.77               | 7.6729                     |
| 2005-06 | 24.82      | 3.62                | 13.144                     | 15.77      | 0.79                | 0.6241                     |
| 2006-07 | 23.93      | 2.73                | 7.4529                     | 18.90      | 3.92                | 15.3664                    |
| 2007-08 | 17.95      | -3.25               | 10.5625                    | 14.49      | -0.49               | 0.2401                     |
|         | $\sum x_1$ |                     | $\sum (x_1 - \bar{x}_1)^2$ | $\sum x_2$ |                     | $\sum (x_2 - \bar{x}_2)^2$ |
|         | 109.99     |                     | 36.8139                    |            |                     |                            |

$$\begin{aligned}\bar{x}_1 &= \frac{\sum x_1}{n_1} & \bar{x}_2 &= \frac{\sum x_2}{n_2} \\ &= \frac{105.99}{5} & &= \frac{74.91}{5} \\ &= 21.20 & &= 14.98\end{aligned}$$

$H_0$  = There would be no significant difference in debtors turnover ratio of selected units

$H_1$  = There would be significant difference in debtors turnover ratio of GSFC and GNFC

$$H_0 = \mu_1 = \mu_2$$

$$H_1 = \mu_1 \neq \mu_2$$

$$\begin{aligned}\sigma &= \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}} \\ &= \sqrt{\frac{36.8139 + 25.9771}{5 + 5 - 2}} \\ &= \sqrt{\frac{62.791}{8}} \\ &= \sqrt{7.8489} \\ &= 2.8016 \\ &= 2.80\end{aligned}$$

$$\begin{aligned}t &= \frac{|\bar{x}_1 - \bar{x}_2|}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \\ &= \frac{|21.20 - 14.98|}{2.80 \sqrt{\frac{2}{5}}} \\ &= \frac{6.22}{2.80(0.63)}\end{aligned}$$

$$= \frac{6.22}{1.764}$$

$$= 3.53$$

$$t = 3.53$$

Calculated value of 't' = 3.53

$$\text{d.f.} = n_1 + n_2 - 2$$

$$= 5+5 -2$$

$$= 8$$

5% level of significance table value of t = 2.306

Calculated value of 't' is 3.53 while table value of 't' is 2.306 which is lower than the calculated value so null hypothesis is rejected it shows that there is a significance difference in turnover of GSFC and GNFC it can be said that the ratio of debtors turnover is not same.

**(V) Creditors Turnover Ratio :**

Average creditors divided by net credit purchases is creditors turnover ratio creditors turnover ratio GSFC and GNFC during the study period of 2003-04 to 2007-08 was indicated the following table 4.14

**Table 4.14**

**Creditors' Turnover ratio of selected units of GSFC and GNFC**

| Year    | Average Creditors | Net Credit Purchase | Ratio | Index | Average Creditors | Net Credit Purchase | Ratio | Index |
|---------|-------------------|---------------------|-------|-------|-------------------|---------------------|-------|-------|
| 2003-04 | 631.24            | 1153.72             | 54.71 | 100   | 230.89            | 510.84              | 45.19 | 100   |
| 2004-05 | 593.08            | 1454.96             | 40.76 | 75    | 216.54            | 508.45              | 39.48 | 86    |
| 2005-06 | 549.63            | 1686.36             | 32.59 | 60    | 212.75            | 772.97              | 27.52 | 61    |
| 2006-07 | 494.35            | 1996.56             | 24.76 | 41    | 309.71            | 1060.19             | 29.19 | 65    |
| 2007-08 | 352.80            | 2217.82             | 15.91 | 29    | 347.83            | 1231.18             | 28.25 | 63    |
| Average | 524.22            | 1501.88             | 33.72 | 55    | 263.54            | 775.93              | 33.92 | 70    |

Source: Computed from the published annual reports of selected units

Table 4.14 reveals that the creditors turnover ratio in GSFC was 54.7%, 40.76% , 32.54%,22.26% and 15.91% respectively during the study period of 2003-04 to 2007-08 First year of study period it was highest 54.7% and after the four year it was constantly declined and reached to 15.91% in year 2007-08 and average ratio of GSFC it was 30.21%

The creditors' turnover ratio in GNFC was 45.19%, 39.48%, 27.52%, 29.19% and 28.25% respectively during the study period of 2003-04 to 2007-08 First years of study period it was highest 45.19% and after the four year it was remained in mix trend. It was 45.19% in 2003-04 which decreased to 38.78% in 2004-05 and 27.52% in 2005-06 next year this ratio was increased to 29.19% in 2006-07 finally this ratio is went down to 28.25% in 2007-08 average ratio of GNFC during the study time was 31.87%

In relation to the inter firm comparison during the five years of study in GSFC this ratio was constant increased as compare to GNFC. But the average ratio of GSFC (33.74%) near about GNFC (33.92%)

### Hypothesis Testing:

Hypothesis base on't' test't' test of creditors turnover ratio of GSFC and GNFC

**Table 4.15**  
**Analysis of't' test in GSFC and GNFC**

| Year    | $x_1$      | $(x_1 - \bar{x}_1)$ | $(x_1 - \bar{x}_1)^2$      | $x_2$      | $(x_2 - \bar{x}_2)$ | $(x_2 - \bar{x}_2)^2$      |
|---------|------------|---------------------|----------------------------|------------|---------------------|----------------------------|
| 2003-04 | 54.71      | 20.97               | 439.74                     | 45.19      | 11.27               | 127.0129                   |
| 2004-05 | 40.76      | 7.02                | 49.28                      | 39.48      | 5.56                | 30.9136                    |
| 2005-06 | 32.59      | -1.15               | 1.3225                     | 27.52      | 6.40                | 40.9600                    |
| 2006-07 | 24.76      | -8.98               | 80.640                     | 29.19      | -4.43               | 22.3729                    |
| 2007-08 | 15.91      | -17.83              | 317.9089                   | 28.25      | -5.67               | 32.1489                    |
|         | $\sum x_1$ |                     | $\sum (x_1 - \bar{x}_1)^2$ | $\sum x_2$ |                     | $\sum (x_2 - \bar{x}_2)^2$ |
|         | 168.73     |                     | 16963                      |            |                     | 253.4083                   |

$$\begin{aligned}\bar{x}_1 &= \frac{\sum x_1}{n_1} & \bar{x}_2 &= \frac{\sum x_2}{n_2} \\ &= \frac{168.73}{5} & &= \frac{169.63}{5} \\ &= 33.74 & &= 33.92\end{aligned}$$

$H_0$  = There would be no significant difference in creditors turnover ratio of selected units

$H_1$  = There would be significant difference in creditors turnover ratio of GSFC and GNFC

$$H_0 = \mu_1 = \mu_2$$

$$H_1 = \mu_1 \neq \mu_2$$

$$\begin{aligned}\sigma &= \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}} \\ &= \sqrt{\frac{888.8931 + 253.4083}{5 + 5 - 2}} \\ &= \sqrt{\frac{1142.3014}{8}} \\ &= \sqrt{142.7877} \\ &= 11.95 \\ t &= \frac{|\bar{x}_1 - \bar{x}_2|}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \\ &= \frac{|33.74 - 33.92|}{11.95 \sqrt{\frac{2}{5}}} \\ &= \frac{0.18}{11.95(0.63)}\end{aligned}$$

$$= \frac{0.18}{7.5285}$$

$$= 0.024$$

$$t = 0.024$$

Calculate value of 't' = 0.024

$$\text{d.f.} = n_1 + n_2 - 2$$

$$= 5 + 5 - 2$$

$$= 8$$

5% of level of significance table value of t = 2.306

Table value of t = 2.306 Calculated value of t is 0.024 while table value of t is 2.306 which is greater than the calculated value so null hypothesis is accepted and it shows that there is no significance difference in creditors turnover ratio of GSFC and GNFC. It can be said that the ratio of creditors' turnover is same.

#### **(VI) Cash – Turnover Rati:**

This is an important ratio of controlling cash. It is reveals of effectiveness with which cash is utilized. Cash and bank balance is a paramount need of business firm for its day to day operations A high cash turnover ratio suggest better management of cash bust too high ratio which may be due to the lower level to cash is not appreciated. Cash turnover ratio has been computed by dividing the cash balance by current liabilities. The following table shows the cash turnover ratio



**Table 4.16****Cash turnover ratio of selected unit under study**

| Year    | Cash Balance | Current Liabilities | Ratio | Index | Cash Balance | Current Liabilities | Ratio | Index |
|---------|--------------|---------------------|-------|-------|--------------|---------------------|-------|-------|
| 2003-04 | 41.54        | 765.66              | 5.43  | 100   | 202.16       | 334.92              | 60.36 | 100   |
| 2004-05 | 55.34        | 730.56              | 7.58  | 140   | 72.17        | 34.024              | 21.21 | 35    |
| 2005-06 | 25.18        | 740.15              | 3.40  | 63    | 55.02        | 371.98              | 14.79 | 25    |
| 2006-07 | 194.46       | 549.84              | 35.36 | 651   | 130.48       | 539.64              | 24.18 | 40    |
| 2007-08 | 81.92        | 682.49              | 12.00 | 220   | 151.41       | 488.67              | 30.98 | 51    |
| Average | 79.69        | 693.74              | 11.40 | 212   | 122.25       | 415.10              | 29.45 | 49    |

Source: Published annual report of selected units from 2003-04 to 2007-08

Above table 4.17 indicates the cash turnover ratio and index of fertilizer units under study from 2003-04 to 2007-08 table 4.11 make it evident that the cash turnover ratio in GSFC witnessed a index trend during the study period. It was 5.43% 2003-04 which ranged up to 7.58% in 2004-05 and declined to 3.40% in 2005-06 next year this ratio was increasing again to 35.36% in 2006-07 and it was down to 12% in 2007-08. In case if GNFC This ratio was 6.36%, 21.21%, 14.79%, 24.18% and 30.48% respectively during the study period from 2003-04 to 2007-08 this ratio second higher in 2003-04. it was 60.36% after two year this ratio was down and reached to 14.79% in 2005-06 than after this ratio increased to 24.18% in 2006-07 and showed continuous increasing trend during next year reaching to 30.98% in 2007-08 showing signs of improvements from view point of liquidity management the unit study performed well particularly during the last two year of the study period.

The interfirm comparison of the cash turnover ratio during the first three years of study in GNFC this ratio was higher as compare to GSFC. After than 2006-07 ratio was higher in GSFC next year 2007-08 ratio was lower as compare to GNFC. The average of this ratio the study period was also higher in GNFC (29.45%) in comparison to that

GSFC (29.45%) in comparison to that GSFC (11.49%). It shows that the performance in respect of cash management in GNFC was impressive than that of GSFC during the study period.

### Hypothesis Testing:

Hypothesis base on 't' test 't' test of cash turnover ratio of GSFC and GNFC

**Table 4.17**  
**Analysis of 't' test in GSFC and GNFC**

| Year    | $x_1$      | $(x_1 - \bar{x}_1)$ | $(x_1 - \bar{x}_1)^2$      | $x_2$      | $(x_2 - \bar{x}_2)$ | $(x_2 - \bar{x}_2)^2$      |
|---------|------------|---------------------|----------------------------|------------|---------------------|----------------------------|
| 2003-04 | 5.43       | -6.06               | 36.7236                    | 60.36      | 30.91               | 955.4281                   |
| 2004-05 | 7.58       | -3.91               | 15.2881                    | 21.21      | -8.24               | 67.8976                    |
| 2005-06 | 3.40       | -8.09               | 65.4481                    | 14.79      | -14.066             | 214.9156                   |
| 2006-07 | 35.36      | 23.87               | 569.7769                   | 24.18      | -4.27               | 18.2329                    |
| 2007-08 | 12.00      | 0.51                | 0.261                      | 30.98      | 1.53                | 2.3409                     |
|         | $\sum x_1$ |                     | $\sum (x_1 - \bar{x}_1)^2$ | $\sum x_2$ |                     | $\sum (x_2 - \bar{x}_2)^2$ |
|         | 63.77      |                     | 687.4968                   |            |                     | 1258.8151                  |

$$\begin{aligned} \bar{x}_1 &= \frac{\sum x_1}{n_1} \\ &= \frac{63.77}{5} \\ &= 11.49 \end{aligned}$$

$$\begin{aligned} \bar{x}_2 &= \frac{\sum x_2}{n_2} \\ &= \frac{151.52}{5} \\ &= 29.45 \end{aligned}$$

$H_0$  = There would be no significant difference in cash turnover ratio of selected units

$H_1$  = There would be significant difference in cash turnover ratio of GSFC and GNFC

$$H_0 = \mu_1 = \mu_2$$

$$H_1 = \mu_1 \neq \mu_2$$

$$\begin{aligned}\sigma &= \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}} \\ &= \sqrt{\frac{687.4968 + 1258.8151}{5 + 5 - 2}} \\ &= \sqrt{\frac{1946.3119}{8}} \\ &= \sqrt{243.2889} \\ t &= 15.60\end{aligned}$$

Calculated value of 't' = 15.60

$$\begin{aligned}\text{d.f.} &= n_1 + n_2 - 2 \\ &= 5 + 5 - 2 \\ &= 8\end{aligned}$$

Table Value of t = 2.306 Calculated value of 't' is 15.60 while table value of 't' is 2.306 which is lower than the calculated value. So null hypothesis is rejected and it shows that there is significance difference in cash turnover ratio of GSFC and GNFC. It can be said that the ratio of cash turnover is not same

### **Financing of Current Assets:**

Net working capital to total working capital:

This ratio is computed by dividing the net working capital by total working capital here total working capital means total current assets thus the ratio is

$$\frac{\text{Net working capital}}{\text{Total working capital}} \times 100$$

Following table shows net working capital to total working capital ratio in GSFC and GNFC during the study period of 2003-04 to 2007-08

**Table 4.18****Net working to total working capital**

| Year    | Net w.c. | Total w.c. | %     | Net w.c. | Total w.c. | %      |
|---------|----------|------------|-------|----------|------------|--------|
| 2003-04 | 427.90   | 1193.57    | 36.85 | 15.81    | 746.07     | 2.12   |
| 2004-05 | 566.72   | 1247.28    | 43.68 | -166.66  | 824.43     | -20.22 |
| 2005-06 | 977.17   | 171732     | 56.90 | -460.27  | 882.77     | -52.13 |
| 2006-07 | 1180.97  | 1730.74    | 68.23 | 870.60   | 1410.30    | 61.73  |
| 2007-08 | 803.89   | 1487.18    | 54.04 | 715.30   | 1203.97    | 59.41  |
| Average | 791.33   | 1485.30    | 52.27 | 196.90   | 1043.45    | 13     |

Sources: Published annual report of GSFC and GNFC from 2003-04 to 2007-08

It is evident from above table that the percentage of net working capital to total working capital in GSFC increased in four year. It was 35.81% in the year 2003-04, 43.68% in 2004-05, 56.90% in 2005-06 68.23% in 2006-07 and 2007-08.

The ratio was decreased at 54.04% maximum working capital percentage was held in 2006-07 as 68.23% in the year 2003-04 the ratio was 35.85% which was lower than the average rate of 52.27% to current assets on the basis of above analysis it can be conolded that moreover net working capital changed mainly due to changes in the current assets. The portion of net working capital was high in GSFC through the study period.

In case of GNFC the ratio or working capital as percentage of working capital is very low in the year 2003-04 only 2.12% in the year 2004-05 and 2005-06 the ratio was negative 20.22% and -52.13% respective. In both the year current liability was more than current assets in the GNFC in the year 2006-07 and 2007-08 the ratio was 61.73% and 59.41% respectively

The ratio of working capital as percentage of total working capital (Current assets) shows long term financing of current assets where as the ratio of current liabilities to current assets shows short term financing of current assets.

**Table: 4.19**

**Average C.L to C.A ratio in GSFC and GNFC**

| <b>Average of C.A during<br/>2003-04</b> |         | <b>Average of<br/>C.L</b> | <b>Average of<br/>Ratio</b> | <b>Average of<br/>Index</b> |
|------------------------------------------|---------|---------------------------|-----------------------------|-----------------------------|
| GSFC                                     | 1485.30 | 693.47                    | 2.14                        | 140                         |
| GNFC                                     | 1013.45 | 816.55                    | 2.42                        | 109                         |

Above table show the picture of average C. A during the period 2003-04 to 2007-08 Average of C.L, Average of ratio and Average of index of both the company GSFC and GNFC. Comparison to GSFC AV ratio of C. A the ratio of GNFC loos more (AV 2.42) GSFC company's AV current ratio is 4.20

Average ratio of GSFC is 2.14 which was maintained in the year of 2005-06 2007 and 2007-08 respectively 2.30, 3.15 and 2.18 remaining two years 2003-04, 2004-05 it was respectively which was lower then std. ratio (2.14)

In case of GNFC average CA during 2003-04 to 2007-08 was 1013.45 Average of C.L was 816.55 Crores average ratio of Average C.L to Av assets was 2.42 which was below in the year 2003-04, 2004-05 and 2005-06 respectively 2.23, 2.42 and 2.37 this ratio was satisfactory in the year 2006-07 and 2007-08 or which was above the standard ratio (2.42)

## **References**

1. Ravi M. Kishore Financial management third edition 2002, Page 106
2. P.V. Kulkarni and B.G. Satyaprasad Financial management thirteenth edition 2005 Himalaya publishing house 309
3. P.V. Kulkarni and B.G. Satyaprasad Financial management thirteenth edition 2005, Page 311
4. Prasana Chandra Manager's Guide to finance and accounting tata MC greaus Hill Publishing company ltd. Page 33
5. P.V. Kulkarni and B.G. Satya Prasad Financial Management Thirteenth editions 2005, Himalaya Publishing house Page 312
6. P.V. Kulkarni and B.G. Satya Prasad Financial management thirteenth edition 2005, Himalaya Publishing house Page 316
7. Prasana Chandra Manager's Guide to finance and accounting. Tata MC grow hill publishing company ltd. Page 30
8. M.Y .Khan / P.K. Jain Financial management third edition (Text and problems) Page 47
9. Varn Horne J.C. Financial Management and Policy prentice hall of Indian Pvt. Ltd., New Delhi 1975 Page 658
10. Schall L.D. and Haley C.W Introduction to financial management tata MCG raw hill publishing co. ltd., New Delhi Edition 1979, Page 412

# **CHAPTER - 5**

## **SUMMARY FINDINGS AND SUGGESTIONS**

- 5.1 INTRODUCTION
- 5.2 SUMMARY
- 5.3 FINDINGS
- 5.4 SUGGESTIONS

## 5.1 INTRODUCTION

Fertilizer industry is one of the important industries in India. It plays a dominant role in the national economy. India's fertilizers industry is the third largest in the world. The production and uses of fertilizers to a large extent shows a country like India the need for a well established fertilizer industry is of paramount importance. It is also important from the point of view of employment generation and revenues to the government in the term of taxes and duties.

When the Indian economic reforms programme was launched in 1991 the liberalization was high on the government Agenda. The fertilizer sector was also affected because of re forms which resulted in increased prices of fertilizer

Working capital management is new concept in management in the area of research like as accounting for human resources financial management marketing management and liquidity management fertilizer is considered as the most essential element for increasing agricultural production and land productivity no doubt there is an increase in the use of chemical fertilizer and in secticides after the green revolution the development of industry, trade, commerce, infracture, transportation communication etc depends on agriculture provide employs round about 65% of the population. The use of chemical fertilizer is necessary for the increase in agro-production time by time the central and state government announced different types of schemes for the development of Indian agri. Production.

Due to the extensive support of Indian government there is increase in production of chemical fertilizer.

There are two corporate units of chemical fertilizer working in Gujarat GSFC and GNFC. IFFCO and KRIBHCO are working in co-operative sector in Gujarat state

When the Indian economic reforms programme was kunched in 1991 the liberalization and micro economic stabilization was high on the



government agenda. The fertilizer sector was also affected because of reforms which resulted in increased prices of fertilizer.

The present research deals with the working capital management in fertilizer industry of Gujarat state comparative study of selected units of fertilizer industry of Gujarat state fertilizer and chemicals limited and Gujarat Narmada Valley fertilizer company limited for the analyzing the working capital management of selected units the data relating to GSFC and GNFC for the past five year viz 2003-04 to 2007-08 have been received

## **5.2 SUMMARY:**

The researcher has prepared main five chapters in the study. In this chapter the summary of the entire research study have been given which is as under.

### **Chapter – 1**

#### **Introduction of Fertilizer Industry**

The first ever fertilizer sector in Gujarat state was established in 1967. by GSFC at Baroda. GSFC was the first joint sector industrial unit in India equity capital of state government 49% and public 51% the performance of the company on production front was increasing during the period of study. Today GSFC has its 11 regional offices 19 area offices 33 company operated retail points in state of Gujarat 571 number of dealers 275 number of Agro – personal. GSFC is one of the major suppliers of fertilizer in the states of Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Punjab, Haryana, Uttar Pradesh, Andhra Pradesh and Karnataka sales of the GSFC also showed constant increasing every years. GNFC sold its fertilizer in a states of India GNFC known as Gujarat Narmada valley fertilizers company limited. It is launched on may 1976 the company has its own sows captive power plant. The sales of GNFC recorded constant increasing during the study period of 2003-04 to 2007-08. The operating profit of GNFC also

recorded an increasing trend during the study time both the company received so many awards and certificate during the study period in the area of best performance. GNFC sold 48.9% manufactured fertilizer in Gujarat it sold 9.7% fertilizer in Maharashtra it sold 9.2% fertilizer in Madhya Pradesh and Chhattisgarh it sold 8.2% fertilizer in Uttar Pradesh it sold 6.8% fertilizer in Rajasthan it sold 6% fertilizer in Punjab it sold 5.8% fertilizer in Andhra Pradesh it sold 2.9% fertilizer in Haryana and it sold 2.4% fertilizer in Karnataka in 2004-05 GNFC undertakes various integrated rural development programmes like fertilizer demonstration farmers meeting crop seminars veterinary camps and distribution of fruit tree grafts, women welfare programmes school children motivational programmes and distribution of sports items to them GNFC educational programme activities are carried out in 18 villages of Barsood district every year.

## **Chapter 2**

### **Conceptual Framework of Working Capital Management**

The present research study deals with the aspect of working capital management. The term working capital means excess of current assets over current liabilities. The Quantum straps and utilization of current assets are included in quantitative aspects. Working capital is a vital factor in business activities and various ratios are computed in this study period of 2003-04 to 2007-08. This research is calculated with a view to exploring the performance of selected units. The objective of the study is to analyze the components performance appraisal of working capital in GSFC and GNFC. A firm's ability to pay its debts can be measured through the use of working capital ratio. Working capital is the soul of a unit. Average net working capital of GSFC was 791.33 Crores and total average working capital was 1485.30 crores during the study period average net working capital of GNFC was 196.90 crores and average total working capital was 1013.45 crores.

Average net working capital to total working capital ratio during the study period was 52.27% and 13% respectively.

### **Chapter – 3**

#### **Research Methodology**

The title of the present study is, “A comparative study of working capital management with reference to GSFC and GNFC” which cover the period of the five years from 2003-04 to 2007-08. The study is based on secondary data mainly the annual report and accounts of selected units (Gujarat state fertilizers and chemicals limited and Gujarat Narmada valley Fertilizer Company limited. The main object of the study is to find out the liquidity and situation of working capital of both the company’s GSFC and GNFC. Various statistical tools like mean, regression, index number have been used and ‘t’ test have been applied to test the validity of two hypothesis namely (1) null hypothesis (2) Alternate hypothesis the limitations of the research study have also been presented in this chapter.

### **Chapter - 4**

#### **Analysis and Interpretations of Working Capital:**

This chapter presented data analysis part. The researcher has analyzed the data to fulfill the objectives of the present studying this chapter researcher has included the theoretical background of the meaning of ratio utility of ratios limitation of ratios classification of ratio components of ratio most important part of this chapter was analysis of working capital ratio for the period of five year 2003-04 to 2007-08

The role of working capital in business is akin to that of heart in the human body. Funds are the life blood of business body. Just as the heart circulates the blood to various organs of body funds are rotated to various business activities through proper working capital management and any obstruction in the smooth rotation of funds may causes serious

problem in business operations for the evaluation of the working capital management position, various ratios are calculated like current ratio quick ratio current assets to total assets ratio working capital to sales ratio inventory turnover ratio debtors turnover ratio cash turnover ratio and creditors turnover ratio

The researcher has also prepared the table of financial data hypothesis testing table of 't' test and analysis of the 't' test and all the financial information about the two selected units GSFC and GNFC.

## **Chapter-5**

### **Summary, Findings and Suggestions**

In chapter five the researcher has discussed the summary findings and suggestions of this study.

#### **Findings:**

For analyzing the working capital management performance of the GSFC and GNFC under the study the data relating to two units for the past five year viz 2003-04 to 2007-08 have been collected and statistical technique like – t – test have been applied to analyze and give some findings. The major findings are as under:

- (1) Current ratio is calculated to establish relationship between the current assets and current liabilities the analysis shows the ups and downs in the ratio of both the units during the study period. In GSFC the current ratio constant increase during the first four year of the study. It was 1.56 during 2003-04 1.78 during 2006-05, 2.30 during 2005-06 3.15 during 2006-07 But then after decrease and went down to 2.18 during 2007-08 during the study period average current ratio was 2.14 the current ratio ranged between 2.23 in 2003-04 and 2.61 in GNFC in 2006-07 indicating a mixed trend in both selected fertilizer units under study

In GSFC the average ratio was 2014 times and 2042 times in GNFC. It reflects narrow gap in the ratio of both the units. It shows that GSFC has more current assets than current liabilities as compared to GNFC. The application of 't' test makes it clear that the difference in query times of current ratio was significant at 5% level of significance the null hypothesis is accepted. Alternative hypothesis is rejected. It shows that there is no significance difference in current ratio of GSFC and GNFC. It can be said that the current ratio of both the company is not the same.

- (2) Quick ratio is measures the relationship between the absolute liquid assets to current liabilities in case of GSFC the quick ratio constant increases during the first four year of the study period respectively 1.07, 1.23, 1.60 and 2.17 times. But this ratio was decrease and went down to 1.27 times during 2007-08 the average ratio of GSFC was 1.43 during the study time. In case of GNFC the quick ratio times indicates a mixed trend it was 1.71 during 2003-04 and 1.65 the lowest level in 2005-06 where as it was of 1.89 the highest level in 2006-07 after the year this ratio is decreases and went down to 1.67 times average ratio of GNFC 1.73 times during the study time from 2003-04 to 2007-08 Average ratio of GNFC (1.72 Times) was higher compare to GSFC (1.47 times) was higher compare to GSFC (1.4 times). The GNFC has shows better performance because of more quick liquid assets than the current liabilities than the GSFC on the basis of result obtained from 't' test it may be concluded that the difference in average times of quick ratio in both units was significant at 5% level of significance null hypotheses is accepted it can be said that the quick ratio of both the company is the same.
- (3) Current assets to total assets ratio is computed for current assets divided by total assets during that period current assets to total

assets ratio in GSFC first four year constant increased during the study period during the period 203-04 to 2006-07 it was 39.25%, 41.26%, 52.02% and 53.99% respectively and last year 2007-08 the ratio was decreased to 49.95% the current assets to total assets ratio in GNFC same position of GSFC. The average ratio of GSFC was 47.29% and it was 43.87% in GNFC. As compare to GNFC the average GNFC was higher the application of 't' test makes it clear that the difference in average of current assets to total assets ratio was significant at 5% level of significance the null hypothesis is accepted. It shows that there is no significance difference in currents to total asses ratio of GSFC and GNFC. It can be said that the ratio if current assets to total assets is no same alternative hypothesis is rejected. The result is as per exectation

- (4) The working capital to sales ratio up and down to GSFC and GNFC this ratio shows a mixed trend during the study period the ratio of working capital to sales ratio in GSFC ranged between 2.98 times and 5.19 times this ratio GSFC 5.19, 4.98 and 2.98 times during the study period of 2003-04 to 2006-07. This ratio in the beginning three years was increased. It was 3.78 the lowest level in 2003-04 and where as it was of 4.47 the highest level in 2005-06 after than it decreased and went down to 3.15 during 2006-07. Where it was of 4.80 the highest level in 2007-08 Average GSFC ratios was 4.17 higher as compare to GNFC.

On the basis of result obtained from't' test it may be concluded that there is no significance difference in working capital to sales ratio of GSFC and GNFC. Calculated value of't' is lower than the table value of 't', so null hypothesis is rejected and it can be said that the ratio of current assets to total assets is not showing the same result as per expectation.

- (5) Inventory turnover ratio shows increasing trend except 2004-05 in GSFC during the study period however this ratio showed fluctuating trend in GNFC during the study period average inventory turnover ratio of GSFC was 5.56 times and 6.68 times it was in GNFC during the study period from 2003-04 to 2007-08. during the study period the performance in respect of inventory management of GNFC was impressive than that of GSFC stock turnover ratio ranged 5.17 times to 6.25 times in GSFC while in GNFC It ranged 6.30 time to 7.09 time during the study period. This ratio was always higher in GNFC as compared to GSFC on the basis of result obtained from 't' test it may be computed that calculated value of 't' is 4.67 while table value of 't' is 2.306 which is lower than the calculated value so null hypothesis is rejected it shows that there is a significance difference in stock turnover ratio of GSFC and GNFC. It can be said that the ratio of stock turnover is not same in both the company.
- (6) Debtors' turnover ratio is computed for average debtors divided by net credit sales during that period debtors turnover ratio in GSFC in the beginning three years it was constant increased. It was 18.99% in 2003-04 reached to 24.82% highest level in the year 2005-06 but after the two years it was constant decrease and went down to 23.93% in 2006-07 and 17.95% in 2007-08 and average ratio of GSFC was 21.27% In GNFC it was 13.54% in 2003-04 which decreased to 12.21% in the year 2004-05 this ratio showed mixed trend in GNFC during the study period during the five year of study in GSFC debtors turnover ratio was constant higher as compare to GNFC. In this study average ratio was also higher as compared to GNFC during the study time as per 't' test table value of 't' test is lower than the calculated value of 't' so null hypothesis is rejected it shows that there is a significance

difference in debtors turnover ratio of GSFC and GNFC. It can be said that the ratio of debtors' turnover is not same.

- (7) Cash turnover ratio in GSFC showed decline during the study period. However this ratio in GNFC showed last two years an increasing trend except 2006-07 and 2007-08 during the study period.
- (8) Creditors' turnover ratio in GSFC and GNFC showed mixed trend during the study period. But average ratio was near about compare to GSFC and GNFC during the study period.

#### **5.4 SUGGESTIONS:**

Major suggestion to GSFC and GNFC are given below

- (1) The current ratio is much higher in GNFC as compare to GSFC. It shows assets are higher and liabilities are lower in GNFC. So GSFC has needed to reduce current liabilities and growth up to current assets.
- (2) The companies GSFC and GNFC Should try to reduce personnel expense. By reducing these expenses companies can transfer more amounts to retained in business in GSFC.
- (3) The company should try to increase exports. This can be done with the support of government which should allow export incentives to the companies.
- (4) The excise duty on fertilizer which has been constant on the rise during the study period should be lowered down by the central government so that the cost of production and selling price of fertilizer can be reduce and thus sales of fertilizer can be further promoted.
- (5) The debtor turnover ratio is much higher in GSFC as compared to GNFC during the study period. It shows the liberal credit policy hence GSFC must reduce the period credit given to its debtors.



## BIBLIOGRAPHY

- Ravi. M. Kishore – Cost Accounting and Financial Management 3<sup>rd</sup> edition
- Kothari C.R. - Research Methodology, New Age International Publisher New Delhi.
- S.G. Gupta -Statistical Methods, Sultan Chand & Sons, New Delhi.
- Dr. Patel A.S.- Land organization & production of crops
- Presanna Chandra -Manager's Guide to Finance and Accounting, Tata McGraw Hill Publishing Company, New Delhi.
- Porin M.E. -Fertilizer Manufactures, M.R.I Publishers Moscow ,1998
- Roman L. Well- Managerial Accounting, Halt Saunders International Editions.
- P.V. Kulkarni -Financial Management, Himalaya Publishing House, Thirteen editions 2005
- B.G. Satya Prasad – Financial Management, Himalaya publishing house, Third edition
- Ravi M. Kishore -Financial Management, Himalaya publishing thirteen edition 2005
- S.C. Kushani – Financial Management and Analytical and Conceptual Approach, Chitanya Publishing House, 1981
- Van Horne J.C -Financial Management and Policy, Prentice Hall of Indian(P) Ltd. New Delhi. 1975
- Weston J.F. Land Brigham E.E -Management Finance, Holt Rinechart and Winston Inc, Second edition
- Santosh Gupta – Research Methodology and Statistical Techniques, Deep & Deep Publication Pvt. Ltd. New Delhi. 2003
- S.J. Parmar - Financial Efficiency, Raj Book Enterprise, Jaipur, First pub. 2001
- M.Y. Khan and P.L. Jain – Financial Management Text Problems - Cases, Tata McGraw Hill Publishing Company, New Delhi. 4<sup>th</sup> edition.
- N.P. Agrawal Analysis of financial statements national publishing house first ed. 1981
- Pandey I.M. -Financial Management, Vikas Publishing House Pvt. Ltd. New Delhi. 1979
- N.P. Agrawal- Analysis of Financial Statements, National Publishing House, First ed. 1981

- Rajnarain Mathur -Introduction to Money Exchange and Banking, Sultan Chand & Sons, New Delhi, 1962
- Bharti V. Pathak – Indian Financial System, Decision Education Pvt. Ltd, 2003
- Anthony Robert – Management Accounting Tax and Cases, Illions Homewood Rkhers D. Irwin 3<sup>rd</sup> ed. 1946
- Hampton John J -Financial Decision Making Concept Problems and Cases, Reston Publishing Company, Reston Virginia ed. 1952 and 1976
- Eric L. Kohler -A Dictionery for Accounting, Prentice Hall of India Pvt. Ltd. 1978
- Foulke Roy A. – Practical Financial Statement Analysis, Tata McGraw Hill Publishing Co., New Delhi. Ed. 1972
- Guthmann Hurry G – Analysis of Financial Statement, Prentice Hall of India, New Delhi. 4<sup>th</sup> ed. 1966
- Dr. S.N. Maheshwary- Management Accounting and Financial Control, Sultan Chand Sons, New Delhi.
- Dr. B.L. Verma -Analysis of Financial Statement, Arihant Publishers, Jaipur ,1988
- Dr. H.L. Tondon and Pratap Narayan- Fertilizers in Indian Agriculture Past Present Future, 1950

**JOURNALS:**

1. The Management Accountant
2. Indian Journal of Fertilizer
3. The Accounting World
4. The Indian Economy
5. Indian Institute of Finance
6. Fertilizer News
7. GSFC Mahitc Pustika
8. Indian Journal of Accounting
9. The Chartered Accountants.

**NEWS PAPERS:**

1. The Economic Times
2. The Times of India
3. The Financial Express
4. The Indian Express

**OTHER:**

1. Published annual report of GNFC from 2003-04 to 2007-08
2. Published annual report of GNFC from 2003-04 to 2007-08

**WEBSITES:**

1. [www.agritech.com](http://www.agritech.com)
2. [www.agritech.com](http://www.agritech.com)
3. [www.itd.org](http://www.itd.org)
4. [www.fertilizer.org](http://www.fertilizer.org)
5. [www.google.com](http://www.google.com)

**Appendix-01**  
Calculated Ratio of GSFC and GNFC

| Sr. No. | Name of the Ratio                    | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 |
|---------|--------------------------------------|---------|---------|---------|---------|---------|
| 1       | Current Ratio                        |         |         |         |         |         |
|         | GNFC                                 | 1.56    | 1.78    | 2.30    | 3.15    | 2.18    |
|         | GNFC                                 | 2.23    | 2.42    | 2.37    | 2.61    | 2.46    |
| 2       | Quick Ratio                          |         |         |         |         |         |
|         | GSFC                                 | 1.07    | 1.23    | 1.60    | 2.17    | 1.27    |
|         | GNFC                                 | 1.71    | 1.66    | 1.65    | 1.89    | 1.67    |
| 3       | Current assets to total assets ratio |         |         |         |         |         |
|         | GSFC                                 | 39.25   | 41.26   | 52.02   | 53.99   | 49.95   |
|         | GNFC                                 | 39.23   | 41.51   | 44.12   | 52.35   | 42.04   |
| 4       | Working capital to sales ratio       |         |         |         |         |         |
|         | GSFC                                 | 5.19    | 4.98    | 3.07    | 2.98    | 4.63    |
|         | GNFC                                 | 3.78    | 4.00    | 4.47    | 3.16    | 4.80    |
| 5       | Inventory turnover ratio             |         |         |         |         |         |
|         | GSFC                                 | 5.17    | 6.25    | 5.28    | 5.60    | 5.56    |
|         | GNFC                                 | 6.30    | 6.88    | 6.45    | 6.47    | 7.09    |
| 6       | Debtors turnover ratio               |         |         |         |         |         |
|         | GSFC                                 | 18.99   | 20.30   | 24.82   | 23.93   | 17.95   |
|         | GNFC                                 | 13.54   | 12.21   | 15.77   | 18.90   | 14.49   |
| 7       | Creditors turnover ratio             |         |         |         |         |         |
|         | GSFC                                 | 54.71   | 40.76   | 32.69   | 24.76   | 15.91   |
|         | GNFC                                 | 45.19   | 39.48   | 27.52   | 29.19   | 28.25   |
| 8       | Cash turnover ratio                  |         |         |         |         |         |
|         | GNFC                                 | 5.43    | 7.58    | 3.40    | 35.36   | 12.00   |
|         | GNFC                                 | 60.36   | 21.21   | 14.99   | 24.18   | 30.98   |

Source: Published annual reports of GSFC and GNFC from 2003-04 to 2009-08

**Appendix – 02**  
Average ratios of GSFC and GNFC (2003-04 to 2004-05)

| Sr. No. | Name of the ratio                            | Average ratio |       |
|---------|----------------------------------------------|---------------|-------|
|         |                                              | GSFC          | GNFC  |
| 1       | Average current ratio                        | 2.14          | 2.42  |
| 2       | Average quick ratio                          | 1.47          | 1.72  |
| 3       | Average current assets to total assets ratio | 47.29         | 43.87 |
| 4       | Average working capital to sales ratio       | 4.17          | 4.04  |
| 5       | Average Inventory turnover ratio             | 5.56          | 6.58  |
| 6       | Average debtors turnover ratio               | 21.30         | 14.98 |
| 7       | Average creditors turnover ratio             | 33.74         | 33.92 |
| 8       | Average cash turnover ratio                  | 11.49         | 29.45 |

Source: Published annual reports of GSFC and GNFC from 2003-04 to 2007-08

**Appendix – 03**

Current ratio of GSFC (2003-04 to 2007-08) (Rs. In Crores)

| Particular                        | 2003-04        | 2004-05        | 2005-06        | 2006-07        | 2007-08        | Average        |
|-----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Current Assets                    |                |                |                |                |                |                |
| Income accrued on investment      | 0.17           | 0.10           | 0.10           | 0.10           | 0.10           | 0.114          |
| Inventories                       | 32.81          | 383.65         | 535.06         | 538.04         | 624.05         | 490.72         |
| Sundry debtors                    | 533.57         | 587.40         | 904.04         | 778.93         | 559.20         | 672.63         |
| Cash and Bank Balance             | 41.54          | 55.34          | 25.18          | 194.46         | 81.92          | 79.69          |
| Loans & Advance                   | 245.48         | 270.79         | 252.94         | 219.21         | 222.31         | 242.15         |
| <b>Total</b>                      | <b>1193.57</b> | <b>1217.28</b> | <b>1717.32</b> | <b>1730.34</b> | <b>1487.58</b> | <b>1485.30</b> |
| Current Liabilities               |                |                |                |                |                |                |
| Sundry creditors                  | 633.04         | 553.11         | 546.14         | 342.55         | 363.05         | 487.58         |
| Advance from customers            | 8.15           | 11.50          | 10.09          | 9.31           | 13.47          | 10.50          |
| Unpaid dividends                  | 0.50           | 0.36           | 0.35           | 0.58           | 0.87           | 0.532          |
| Unpaid palimony                   | -              | -              | -              | -              | -              | -              |
| Unpaid matures deposit            | 0.76           | 0.88           | 1.09           | 1.96           | 1.41           | 1.22           |
| Unpaid matured debenture          | 0.29           | 0.23           | 0.21           | 0.15           | 0.08           | 0.19           |
| Interest accuued but not on loans | 124.26         | 19.59          | 13.91          | 15.37          | 7.39           | 13.74          |
| Provisions                        |                |                |                |                |                |                |
| Retirement Benefits               | 60.55          | 69.77          | 17.63          | 84.48          | 215.00         | 101.47         |
| Proposed dividend                 | -              | 11.95          | 35.86          | 35.86          | 35.88          | 29.88          |
| Tax on proposed dividend          | -              | 1.68           | 5.03           | 6.09           | 6.09           | 4.722          |
| <b>Total</b>                      | <b>765.67</b>  | <b>730.56</b>  | <b>470.15</b>  | <b>549.77</b>  | <b>68.69</b>   | <b>593.97</b>  |

Source: Annual published report (2003-04 to 2007-08)

**Appendix – 04**

Current ratio of GSFC (2003-04 to 2007-08) (Rs. In Crores)

| Particular                     | 2003-04       | 2004-05       | 2005-06        | 2006-07        | 2007-08        | Average        |
|--------------------------------|---------------|---------------|----------------|----------------|----------------|----------------|
| Current Assets                 |               |               |                |                |                |                |
| Interest Accrued on Investment | 1.43          | 1.41          | 1.41           | 1.41           | 4.48           | 2003           |
| Inventories                    | 175.01        | 260.75        | 269.58         | 388.47         | 386.00         | 295.962        |
| Sundry debtors                 | 182.95        | 289.59        | 430.12         | 605.28         | 389.68         | 377.52         |
| Cash and Bank Balance          | 202.16        | 72.17         | 55.02          | 130.48         | 151.41         | 122.48         |
| Loans & Advance                | 184.52        | 200.51        | 126.64         | 284.66         | 272.40         | 213.75         |
| <b>Total</b>                   | <b>746.07</b> | <b>824.43</b> | <b>882.77</b>  | <b>1410.03</b> | <b>1203.97</b> | <b>1013.45</b> |
| Current Liabilities            |               |               |                |                |                |                |
| Sundry creditors               | 233.10        | 199.96        | 225.52         | 393.90         | 301.75         | 270.85         |
| Interest Accrued but not due   | 8.45          | 8.24          | 7.40           | 7.98           | 7.70           | 8.07           |
| Unclaimed dividends            | 4.72          | 4.87          | 4.43           | 5.33           | 6.01           | 5.07           |
| Unclaimed matures deposits     | 0.59          | 0.30          | 0.18           | 0.10           | 0.05           | 0.24           |
| Unclaimed matures debentures   | 0.67          | 0.54          | 0.40           | 0.23           | 0.13           | 0.39           |
| Provisions                     |               |               |                |                |                |                |
| Proposed dividend              | 43.94         | 54.93         | 62.25          | 66.05          | 66.05          | 58.62          |
| Tax on proposed dividend       | 5.63          | 7.70          | 8.73           | 11.23          | 11.23          | 22.90          |
| Provision retirement           | 15.03         | 15.73         | 17.20          | 19.96          | 55.95          | 24.77          |
| Provision for taxation         | 220.46        | 342.85        | 506.37         | -              | -              | 356.56         |
| Ad. Tax ded. And source        | 197.67        | 320.43        | 485.53         | -              | -              | 334.54         |
| Promision Medial benefits      | -             | -             | -              | -              | 2.72           | 2.72           |
| Other Liabilities              | -             | 25.52         | 24.47          | 34.90          | 37.08          | 30.49          |
| <b>Total</b>                   | <b>730.26</b> | <b>981.09</b> | <b>1343.04</b> | <b>539.68</b>  | <b>488.67</b>  | <b>816.55</b>  |

Source: Annual published report (2003-04 to 2007-08)