CHAPTER: 4

OBJECTIVE OF THE STUDY, RESEARCH METHODOLOGY AND PROFILE OF THE COMPANIES UNDER STUDY

4.1 OBJECTIVES OF THE STUDY

The objective of the study is to evaluate the management of working capital in co-operative, public and private sector companies of fertilizer industry in India. This broader objective has covered the following points/indicators:-

1) Structure of working capital.
2) Liquidity and profitability relationship.
3) Impact of working capital on profit.
4) Trend in working capital.
5) Financing of working capital
6) Management of inventory, cash, receivables and payables.

4.2 RESEARCH METHODOLOGY

Research methodology describes choice of appropriate tools and techniques for gathering the information required for the solution of the problem and making inferences in the light of laid down objectives. By methodology of any exploration means the selection of the representative sample, gathering of significant data, application of suitable exploratory tools/techniques for investigation and elucidation of the same for methodical study of the problem. The research methodology is both a science and an art which defines as to how research is done methodically to resolve the research problem at hand by applying a range of steps rationally. It is the only way to scientifically resolve the research problem by adopting various steps judiciously.
“Research methodology involves such general activities as identifying problems, review of the literature, formulating hypotheses, procedure for testing hypotheses, measurement, data collection analysis of data, interpreting results and drawing conclusions”.

4.2.1 Title of the study

The title of the study is “Management of Working Capital in Fertilizer Industry: A Comparative Study”

4.2.2 Universe of the study

The universe of study was created keeping in mind the following factors:-

i) The activity of company should be manufacturing and marketing of fertilizers.

ii) The installed capacity of the company should be at least five lacs metric tons per year.

iii) Data for the study from 1999-2000 to 2008-2009 are available.

Accordingly 24 companies which consists of 7 in the public sector, 15 in the private sector and 2 in the cooperative sector were included in the universe. The universe was stratified into three strata for the purpose of selecting the sample i.e. cooperative, public and private sector.

4.2.3 Size of the sample

Out of 24 companies in the universe, a sample of 10 companies was selected. Four companies are chosen out of seven companies in the public sector, while four companies have been selected out of fifteen companies in the private sector were randomly selected and to facilitate within sector comparison both of companies from co-operative sector have also been selected, completing the sample size.

4.2.4 Companies selected for study

Co-operative Sector

a) Indian Farmers Fertilizer Co-operative Limited (IFFCO)
b) Krishak Bharti Co-operative Limited (KRIBHCO)

**Public Sector**

a) National Fertilizer Limited (NFL)

b) Rashtriya Chemicals and Fertilizer Limited (RCF)

c) Fertilizer and Chemicals Travancore of India Limited (FACT)

d) Madras Fertilizer Limited (MFL)

**Private Sector**

a) Gujarat Narmada Valley Fertilizer Company Limited (GNVFC)

b) Chambal Fertilizer Limited (CFL)

c) Nagarjuna Fertilizer and Chemicals Limited (NAFL)

d) Gujarat State Fertilizer and Chemicals Limited (GSFC)

4.2.5 **Source of data**

Keeping in mind the objectives of the present study, secondary data have been extracted from the annual reports of the selected companies. Published annual reports from 1999-2000 to 2008-2009 were collected from the library of Fertilizer Association of India, New Delhi. The general information relating to fertilizer industry of India was obtained from various books, journals, newspapers, articles and published material of companies available in the libraries and internet.

4.2.6 **Analysis**

For the purpose of evaluation of management of working capital in companies under study, the following techniques and tools of analysis have been applied:-

**Statistical techniques**

Following techniques have been applied for descriptive analysis:

a) **Percentage:** To know the proportion of components of working capital percentage, following formula has been used:
% age = \((\text{Amount of component ÷ Amount of total components}) × 100\)

b) **Arithmetic Mean:** Arithmetic mean gives a single value to describe the whole data. Arithmetic mean of variables has been obtained by adding the values of observations and dividing it by the number of observations. To know the arithmetic mean following formula has been used:

\[ A = \frac{1}{n} \sum_{i=1}^{n} x_i \]

\(A\) = average (or arithmetic mean)
\(n\) = the number of observations
\(x_i\) = the value of each observation

c) **Standard Deviation:** The standard deviation is the most extensively used for calculating significant evaluation of deviation. The standard deviation, also well-known as root mean square deviation, is generally expressed by the Greek letter \(\sigma\). This can be calculated by following formula:-

\[ \sigma = \sqrt{\frac{\sum(x - \bar{x})^2}{N - 1}} \]

Where
\(\Sigma\) = Summation
\(X\) = Individual value
\(M\) = Mean of all values
\(N\) = Sample size (Number of values)
d) **Co-efficient of Variation:** Co-efficient of variation is a relative measure of dispersion. It is used in problems where we want to compare the variability of two or more than two series. Formula to calculate of CV is as under:

\[ C.V. = \frac{\sigma}{X} \]

Where

\[ X = \text{mean}, \]
\[ \sigma = \text{standard deviation} \]

e) **Trend analysis:** Trend study makes it simple to realize the changes in a variable during a period. It has been applied to establish the propensity concerning changes in net working capital during the period of study. It is a vibrant technique of investigation to screen the changes over the period. Trend analysis shows us the path which a variable is going to take and by understanding this source future of the variable can be anticipated.

The trend for various variables has been calculated using exponential trend method. The equation of the exponential curve is in the form,

\[ Y = a + bx \]

Putting the equation in logarithmic form

\[ \log Y = \log a + X \log b \]

To obtain the value of the constants a and b, the two normal equations have been solved as under:

\[ \sum \log Y = N \log a + \log b \sum X \]
\[ \sum (X \cdot \log Y) = \log a \sum X + \log b \sum X^2 \]
f) Correlation:

Correlation analysis helps to assess the extent and trend of the association between two or more variables. To know the correlation between two variables following formula has been used:

\[ r = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}} \]

\( \sum xy = \) sum of the products of paired variables

\( \sum x = \) sum of x variable

\( \sum y = \) sum of y variable

\( \sum x^2 = \) sum of squared x variable

\( \sum y^2 = \) sum of squared y variable

g) Graphical presentation of data

Some of the variables relating to management of working capital have been presented through diagrams to make the presentation easily understandable.

Financial tools

Following ratios have been applied for financial analysis:

a) Current Ratio: This ratio shows the association between current assets and current liabilities of a company. It is a vital indicator of analyzing the company’s capability to pay its current obligations out of short term funds. The following formula has been used to calculate the CR:-

\( CR = \frac{\text{current assets}}{\text{current liabilities}} \)

b) Quick Ratio: This ratio shows the association between current assets and current liabilities of a company in the near future. This ratio excludes inventory from the current
assets. Hence it can measure the liquidity situation of a company more efficiently. It is a key ratio utilized for analyzing the company’s capability to pay its current obligations out of short term funds quickly. The following formula has been used to calculate the QR:

\[
QR = \frac{(\text{current assets} - \text{inventory})}{(\text{current liabilities})}
\]

c) **Profit before Tax Ratio**: Profit before tax ratio has been calculated to reflect efficiency of management in selling activities. The following formula has been used to calculate the PBTR:

\[
PBTR = \frac{\text{Profit before tax}}{\text{Net sales}} \times 100
\]

d) **Return on Total Assets**: This ratio has been used to evaluate company’s earnings before tax. The ratio is taken as a pointer to show how successfully a company uses its total assets to produce earnings before disposing its contractual obligations. The following formula has been used to calculate the ROTA:

\[
ROTA = \frac{\text{(profit before tax)}}{(\text{total assets}) \times 100}
\]

e) **Inventory Turnover Ratio**: This ratio has been used to see as to how many times inventory turned over in a given period. The following formula has been used to calculate the ITR:

\[
ITR = \frac{\text{cost of goods sold}}{\text{average inventory}}.
\]

f) **Average Inventory Period**: This method has been applied to calculate average time for which inventory was held. The following formula has been used to calculate the AIP:

\[
AIP = \frac{365}{\text{(cost of goods sold/average inventory)}}
\]

g) **Debtor Turnover Ratio**: This ratio has been used to see as to how many times receivable turned over in a year. The following formula has been used to calculate the DTR:

\[
DTR = \frac{\text{annual credit sales}}{\text{average accounts receivable}}
\]
h) **Average Collection Period**: This method has been applied to calculate average time for collection receivable. The following formula has been used to calculate the ACP:

\[ ACP = \frac{365}{\text{annual credit sales/average receivable}} \]

i) **Cash Turnover Ratio**: This ratio has been used to see as to how many times cash turned over in a year. The following formula has been used to calculate the CTR:

\[ CTR = \frac{\text{current liabilities}}{\text{average cash}} \]

j) **Average Age of Cash**: This ratio has been applied to calculate average time for which cash was held. The following formula has been used to calculate the AAC:

\[ AAC = \frac{365}{\text{current liabilities/average cash}} \]

k) **Payable Turnover Ratio**: This ratio has been used to see as to how many times payables turned over in a year. The following formula has been used to calculate the PTR:

\[ PTR = \frac{\text{credit purchase}}{\text{average payables}} \]

l) **Average Payable Period**: This ratio has been applied to calculate average time for payment of payables. The following formula has been used to calculate the APP:

\[ APP = \frac{365}{\text{credit purchase/average payables}} \]

Data drawn from the annual reports of the companies have been tabulated by creating appropriate tables matching with the objectives of present study. The data have also been presented in the form of graphs wherever necessary. The statistical techniques and financial tools have been used for analysis of the tabulated data. On the basis of results derived form the various operations applied on the tabulated data findings have been drawn.

**4.2.7 Scope of the study**

The present study “**Management of Working Capital in Fertilizer Industry: A Comparative Study**” evaluates the management of working capital in fertilizer industry of India. Management of current assets and current liabilities has been logically reviewed.
The effective management of working capital is very important for the achievement of goals of the company. The study attempts to conclude the competence and usefulness of management of each facet of working capital.

4.2.8 Limitations of the study

Though the study has been undertaken with enormous responsibility, appropriate attempt has been made to investigate all aspects. Precautions have also been taken to develop a systematic approach towards the conduct of the study. However every study has its limitations and this study is also no exception. The present study has the following limitations:-

a) The study is limited to secondary data obtained from published annual reports of the companies, thus its authenticity primarily depends on quality of such data.

b) The study is restricted to a period of ten years i.e. from 1999-2000 to 2008-2009.

c) The study is limited to ten companies from fertilizer industry of India.

Therefore, whilst implementing the conclusions/suggestions of the study one should be vigilant enough and make use of this study thoughtfully only by taking these limitations duly into consideration.

4.2.9 Scheme of the study

The study has been carried out with following chapters’ scheme:

**Chapter-1**, titled “Fertilizer Industry of India – An Overview”, throws light on the inception along with growth and development of fertilizer industry of India. It covers aspects such as subsidy available to fertilizer industry, demand and supply of fertilizers in India, new joint ventures taken abroad by Indian fertilizer companies and challenges ahead of fertilizer industry.

**Chapter-2**, named “Management of Working Capital – An Integrated View” covers the various aspects of working capital and its proper management. A brief description of
management of various components of working i.e. cash, inventory, receivables, payables and financing of working capital has also been elucidated.

Chapter-3, labelled as “Review of Literature and Rationale of the Study”, envelops both the literature so studied for the purpose of research and the rationale and justification behind taking up the study matter.

Chapter-4, with the heading “Objectives of Study, Research Methodology and Profile of the Companies under Study”, displays the objectives of the study along with the research methodology used for the study undertaken. The chapter surmounts the universe and sample of the study, statistical and financial tools used for research purpose besides mentioning the scope and purpose of study. The profile of the companies under study has also been described.

Chapter-5, titled “Structure of Working Capital”, covers the analysis of various components of working capital of the companies under study.

Chapter-6, captioned as “Working Capital-Trends”, studies the various increases and decreases in the working capital of the companies along with straight line trends.

Chapter-7, labelled as “Management of Inventory, Receivables, Cash and Payables”, studies the efficiency in management of various components of working capital viz. Inventory, receivables, cash and payables with the help of ratio analysis and other tools.

Chapter-8, with the heading “Financing of Working Capital”, explores the trends and sources in financing the working capital requirements followed by the companies.

Chapter-9, named “Liquidity and Profitability Relationship”, focusses on studying the association between liquidity and profitability through current ratio, quick ratio, profit before tax ratio and return on total assets.

Chapter-10, titled “Impact of Working Capital on Profit”, gives an insight of the influence of working capital on profits of the companies by studying their correlation.
Chapter-11, labelled as “Conclusions and Suggestions”, is the concluding chapter of the study which provides a summary of the major findings and suggestions for the improvement of working capital management.

4.3 PROFILE OF THE FERTILIZER COMPANIES UNDER STUDY

4.3.1 Indian farmers Fertilizers Cooperative Limited (IFFCO)

Indian Farmers Fertilizer Co-operative Limited (IFFCO) was registered on November 3, 1967 as a Multi-unit Co-operative Society. On the enactment of the Multipurpose Co-op Societies Act 1984 and 2002, the Society is deemed to be registered as a Multi-State Co-op Society. The number of Co-op Societies associated with IFFCO has risen from 57 in 1967 to 39884 at present. The Society is primarily engaged in production and distribution of fertilizers. IFFCO commissioned an ammonia - urea complex at Kalol and the NPK/DAP plant at Kandla both in the state of Gujarat in 1975. Ammonia - urea complex was set up at Phulpur in the state of Uttar Pradesh in 1981. The ammonia - urea unit at Aonla was commissioned in 1988. In 1993, IFFCO had drawn up a major expansion programme of all the four plants under aegis of IFFCO VISION 2000. The expansion projects at Aonla, Kalol, Phulpur and Kandla were completed as per schedule. Another growth path was chalked out to realise newer dreams and greater heights through Vision 2010. As part of this vision, IFFCO has acquired fertilizer unit at Paradeep in Orissa in September 2005. As a result of these expansion projects and acquisition, IFFCO's annual capacity has been increased to 3.69 million tonnes of Urea and NPK/DAP equivalent to 1.71 million tonnes. IFFCO, at present, is a leading player in India's fertilizer industry and is making substantial contribution to the efforts of Indian Government to increase food grains production in the country.
4.3.2 Krishak Bharti Cooperative Limited (KRIBHCO)

Krishak Bharti Cooperative Limited (KRIBHCO) was incorporated as a multi state cooperative society on 17.04.1980 to implement the ammonia fertilizer project at Hazira, based on natural gas from Bombay high/ South Basin. The society commissioned its ammonia/urea plant in 1985. The Hazira complex has two streams of Ammonia plants and four streams of Urea plants. The annual capacity of urea plants is 17.29 lakh MT.

KRIBHCO also installed a Bio-fertilizer unit at Hazira in 1995. The capacity of this unit was enhanced from 100 MTPA to 250 MTPA in 1998. Two more Bio-fertilizer units of 150 MTPA capacity each were also installed, one at Varanasi, U.P in September 2003 and another one in Lanja, Maharashtra in March 2004.

As on 31.03.2009 the authorized share capital of the society stood Rs.500 crore and the paid up share capital was Rs. 390.68 crore. The total membership as on 31.03.2009 was 6523. During the year 2008-09 KRIBHCO produced 17.43 lakh MT of urea (8.02 lakh MT in terms of nitrogen “N”) achieving capacity utilization of 100.8% and 10.85 lakh MT of ammonia achieving capacity utilization of 108.1%.

4.3.3 Fertilizers and Chemicals Travancore (FACT)

Fertilizers and Chemicals Travancore Limited (FACT) was incorporated in 1943. In 1947 FACT started production of Ammonium Sulphate with an installed capacity of 50.000 MT per annum at Udyogmandal, near Cochin. In the year 1960, FACT became a PSU and towards the end of 1962, Government of India became its major shareholder.

From a modest beginning, FACT has thus grown and diversified into a multi-division/multifunction Organization with basic interest in manufacturing and marketing of fertilizers and Petrochemicals, Engineering Consultancy and Design and in Fabrication and Erection of industrial equipments.
During the financial year 2008-09 FACT made an upsurge in sales turnover and profit. Production of NP was 6.05 LMT, Ammonium Sulphate was 1.28 LMT and Caprolactam was 0.13 LMT. Up to December 2009 the company had produced 4.81 LMT of NP, 1.15 LMT of ammonium sulphate and 0.29 LMT of Caprolactam.

4.3.4 Madras Fertilizers Limited (MFL)

Madras Fertilizer Limited (MFL) was incorporated in December 1966 as a Joint Venture between Government Of India (GOI) and AMOCO India Inc. of USA(AMOCO) with GoI holding 51% of the equity share capital. In 1985 AMOCO disinvested its shares, which were purchased by GoI and NIOC in their respective proportions on 22.07.1985. The revised shareholding pattern was GoI 67.55% and NIOC 32.45%. The shareholding pattern up to May 11, 1997 was GoI 69.78% and NIOC 30.22%.

MFL commenced commercial production in 1971, with an annual installed capacity of 1.7 lakhs tonnes of Nitrogen and 1.12 lakhs tonnes of phosphate. A major revamp/expansion was carried out in 1998 at a cost of Rs 601 crore, enhancing the annual installed capacity to 2.54 lakhs tones of N and 1.42 lakh tones of P, corresponding to 4,86,750 MT of urea and 8,40,000 MT of complex fertilizers.

4.3.5 National Fertilizers Limited (NFL)

National Fertilizers Limited (NFL) was incorporated on 23rd August 1974 for setting up two nitrogenous plants, at Bathinda(Punjab) and Panipat (Haryana) with LSHS as feedstock, each having Urea production capacity of 5.11 lakh MT per annum. Consequent upon the reorganization of the FCI, the Nangal Unit (including Nangal Expansion Project) of FCI was also transferred to NFL w.e.f. 1.4.1978.

A gas based ammonia and urea fertilizer project on the HBJ pipeline at Vijaipur in Guna District of Madhya Pradesh, with an annual capacity of 7.26 lakh tonnes Urea commenced
commercial production on 1.7.1988. With commissioning of its expansion unit on 31.03.97 urea capacity was doubled from 7.26 lakh MT to 14.52 lakh MT per annum. The production capacity of gas based plants in the country has been re-assessed w.e.f. April 1st, 2000 resulting in capacity revision from 7.26 lakh tonnes to 8.64 lakh tones for both Vijaipur-I and Vijaipur- II.

Apart from producing nitrogenous fertilizers, NFL also manufactures various industrial products like nitric acid, ammonium nitrate, sodium nitrate, sulphur, methanol, liquid nitrogen, liquid oxygen etc. These chemicals are used as inputs for production of various other chemicals. The company commissioned an Argon gas plant designed to produce the 120 NM3/hr. of Argon gas at its Panipat Unit in October, 1997.

4.3.6 Rashtriya Chemicals and Fertilizers Limited (RCF)

Rashtriya Chemicals and Fertilizers Limited (RCF) was incorporated as a separate company on 6th March 1978 as a result of reorganization of the erstwhile Fertilizer Corporation of India Limited. At the time of its formation, the company had only one operating unit at Trombay (near Mumbai) and two major projects under implementation viz; Trombay IV and Trombay- V expansion. The gas based Thal-Vaishet fertilizer complex about 100 kms from Trombay, was later installed and commissioned by RCF and it commenced commercial production on June 1, 1985. As on 31st March 2009, the company had an authorized share capital of Rs. 800 crore and a subscribed and paid up capital of Rs. 551.69 crore.

The annual installed capacity of all the units of RCF is about 10.54 lakh MT of nitrogen and 1.17 lakh MT of phosphate. The production during 2008-09 was 9.46 lakh tonnes of nitrogen and 0.706 lakh tonnes of phosphate. Besides fertilizers, the company also produces a number of industrial products such as methanol, Concerted Nitric Acid and
Methylamines, Ammonium Bicarbonate, Sodium Nitrate, Demethyl, Formamide, Demethyl Acetamide, Ammonium Nitrate, Argon, etc.

4.3.7 Chambal Fertilizers and Chemical Limited (CFL)

Chambal fertilizers and chemicals limited (CFL) one of the largest private sector fertilizer producers in India was promoted by Zuari Industries Limited in the year 1985. Two hi-tech nitrogenous fertilizer (urea) plants of CFL are located at Gadepan in Kota district of Rajasthan which were built at a price of over Rs. 25 billion (USD 500 billion). These two plants produce about 2 million tonnes of urea per annum. The first plant was commissioned in 1993 while the second plant was commissioned in 1999. Using state of the art technology including that from Denmark, Italy, United States and Japan, both these plants are hi-tech and use sophisticated techniques of production.

CFL caters to the need of the farmers in ten states in Northern, Central and Western regions of India. CFL is the leading fertilizer supplier to the State of Rajasthan. The company has an intricate network of marketing comprising 11 regional offices, 1,700 dealers and 20,000 village level outlets all over India.

Donning the mantle of providing all agri-products through a ‘single window’, the company seeds to enable the farmers to buy all products from single source. Urea and other agri-products like DAP (Di-Ammonium Phosphate), MOP (Murate of Potash), SSP (Single Super Phosphate), pesticides and different seeds are provided by the CFL. Most of these products are first sourced from reputed suppliers in the market and then sold under the ‘Uttam’ brand. Today Chambal Fertilizers Limited has consolidated its market position in agri-business and diversified into several other sectors.

4.3.8 Gujarat Narmada Valley Fertilizers Company Limited (GNFC)

Set up in Bharuch, Gujarat in 1976 Gujarat Narmada Valley Fertilizers Company Ltd. (GNFC) is the largest single stream Ammonia-Urea fertilizer complex. Located at Bharuch
in an extremely prosperous industrial belt, GNFC draws on the resources of the natural wealth of the land as well as the industrially rich reserves of the area. Set up in 1982 GNFC started its manufacturing and marketing operations in the right earnest. Over the next few years, GNFC successfully commissioned various projects-in fields as diverse as chemicals, fertilizers and even electronics.

Ever since inception, GNFC has strived for an extensive growth as a part of progressive vision of GNFC addressing genuine environmental concerns. GNFC has now extended its profile beyond fertilizers through horizontal integration, in Chemicals/petrochemicals, Energy Sector, Electronics/Telecommunications and Information Technology. It thus forms an ambitious and challenging addition to its corporate portfolio. GNFC has adopted an enterprising and strategic view towards its expansion and diversification policy.

4.3.9 Gujarat State Fertilizers and Chemicals Limited (GSFC)

Taking its first step in the year 1967 Gujarat State Fertilizers and Chemicals Ltd (GSFC) started six plants with an initial investment of Rs. 40 crore. All these were basically nitrogenous and phosphatic fertilizer plants which began their production of Ammonia, Urea, Ammonium Sulphate (AS), Diammonium Phosphate (DAP), Sulphuric Acid and Phosphoric Acid is the right earnest. In order to meet increasing demand of Nitrogenous Fertilizers, expansion of Ammonia and Urea plants was undertaken with an investment of Rs. 23 crore in 1969. Second expansion was subsequently undertaken in 1974. Today GSFC is a multi-location, multi-plant, multi-services & multi-crore company, which aims to provide much more than just fertilizers. Eversince it began operations in 1962, GSFC has translated the facet of care in its every activity consistently. Unfolding as an efficient organization, Gujarat State Fertilizers and Chemicals Ltd, has carved a niche for itself in the annals of Indian Corporate history, being founded with the single minded principle of offering the best to its customers.
GSFC is expanding its philosophy of care and extending it to every facet of its existence, employees, suppliers, services, society and even the environment. It has offered its care to an even larger section of society, by transcending its boundaries by fulfilling goal of being “Basic to India’s Progress”.

4.3.10 Nagarjuna Fertilizers and Chemicals Limited (NFCL)

Nagarjuna Fertilizers and Chemicals Limited (NFCL) mandate the prosperity of majority of farmers in India. NFCL not only markets a wide-range of plant nutrients- Urea, zinc products, water soluble fertilizers, water management systems, plant protection chemicals but offers agriculture research and IT services. It lays stress on importance on technology transfer and provides value added services to the farmers through demonstrations, adaptation of villages, education programmes, farmer training and advisory services, etc. NFCL has a Urea manufacturing plant at Kakinada in Andhra Pradesh which is one the best fertilizer plants in India in terms of both capacity utilization and Safety & Environmental Hazards.

NFCL has the highest market penetration through various input companies, product brands and ranges, with close to 14,000 dealers covering more than 1,00,000 agricultural villages across all 28 states. Serving Indian farmers with major inputs like Urea, Micro Irrigation Systems, Water Soluble Fertilizers, micro Nutrients, NFCL also provides services and solutions through company owned Portal ikisan.com. NFCL is market leader in India in water soluble fertilizers segment and has been supplying to Indian farmers various water soluble fertilizers since 1962 from two of the world’s leading companies i.e. Haifa from Israel & Yara from Norway.