CHAPTER THREE

RESEARCH METHODOLOGY

This chapter presents the research methodology adopted for this study. It is organized into eleven sections. It begins with an introduction that revolves around the theme of research, followed by problem statement which the researcher seeks to answer. The scope of the study, data resources and the research objectives follow. The hypotheses are taken up in the next session followed by research design which elaborates on selection of the sample from the intended population. The chapter further delves into questionnaire development and the actual administration of the questionnaire including methods adopted to increase the target response rate. The tools used for analyzing the data obtained through the survey are then mentioned. The chapter concludes with a mention of the limitations of this study.

3.1 Introduction

The purpose of this chapter is to define the research problem which the researcher seeks to answer. Methodology plays a very important role in any research work. The effectiveness of a research work depends entirely on the correctness of selecting of research method. It is the plan which incorporates the whole of the procedure that has been followed to carry out the project work. The flow chart at the end of the chapter (See Figure – 3.1) briefly describes the Research Methodology adopted for this study.

3.2 Problem Statement

Trading in commodity futures has been in existence in India from the nineteenth century with organized trading in cotton through the establishment of Cotton Trade Association in 1875. Over a period of time other commodities were permitted to be traded in futures exchanges. Regulatory constraints post independence resulted in virtual dismantling of the commodities futures markets. Traditionally commodity exchanges in India have been product specific.
The need for a national multi-commodity exchange is now well articulated and accepted. However the mere setting up of a multi commodity exchange is not going to result in a vibrant and liquid commodities derivatives market. There are a host of issues which need to be addressed along with the setting up of multi commodity exchange in order to develop the markets.

**RQ 1:** Who are the players that drive any derivatives markets?

A cursory examination of these markets shows that there are limited hedgers and arbitrageurs scattered across the various markets. The existing exchanges being product specific, speculators if any, are intrinsically linked to the trade and are limited in number. Today the scope to hedge positions in a commodity is limited by access to the market.

**RQ 2:** What are the main operational issues of a multi commodity exchange?

If the exchange is to attract participation by a larger body of investors and arbitrageurs, it has to ensure the safety and integrity of the market. This has several elements like the exchange structure; method of trading; types of exchange contracts; settlement process and issues faced by participants during cash as well as physical settlements; availability and condition of warehouses, particularly in the rural areas; inspection facilities in the warehouses; acceptability of warehouse receipts; and government taxes levied on movement of goods etc.

**RQ 3:** What is the perception of the participants on a commodity exchange with regard to the working of the exchanges?

It is essential for a commodity exchange to know what its participants feel about the working of the exchange. Participants would mean the traders, buyers, sellers, warehouses and their managers, supervision agents, and any other individual or organization who is directly or indirectly associated with exchange. Feedback from such participants would only provide an insight to the exchange as well as the government on improvements required or new features to be added to the exchanges for facilitation of trade and increase in volumes on these exchanges.
Though studies have been undertaken on commodity exchanges, they mainly focused on Government regulations and the impact of the exchange prices on commodity prices. Analysis on other factors like clearing and settlement processes, absence of physical deliveries on Indian exchanges, identification of kind of warehousing facilities required and the role of Warehouse Receipts in improving overall functioning of these exchanges were not undertaken. At the most, they were in the form of articles in newspapers, house magazines, and discussions on television channels but no serious attempts have been made yet to delve deep into the problems of commodity exchanges and provide concrete suggestions.

This research studies the operational bottlenecks faced by our multi commodity exchanges especially during physical deliveries and goes deep into the warehousing aspect of commodity exchanges. It further analyzes the acceptability, adequacy and existing facilities and suggests ways to improve and enhance the physical deliveries on these exchanges.

3.3 Objectives of the Study

The objectives of this study are as follows:

1. Study the current working of the national commodity exchanges of India and analyze the effectiveness of delivery settlements against cash settlement of contracts.

2. Study the adequacy and quality of existing warehouses in the country.

3. Study the present system of quality control and gradation/standardization available in the commodity exchanges of India and to critically comment on the same.

4. Study the feasibility of the Warehouse Receipts (WR) System in commodities.

5. Study the perception of participants with respect to working of commodity exchanges of India.
3.4 Scope of the Study

This study covers the following areas:

1. Existing operational facilities of multi commodity exchanges of India.
2. Existing operations of warehouses.
3. Extent of utilization of warehousing facilities by the futures markets in India.
4. Role played by banks in promoting the use of Warehouse Receipts in India.
5. Role of Inspection agencies.

3.5 Sources of Data

Since no public data was available on research topic, necessary data for this study had to be collected. Thus surveys were conducted using structured questionnaire, personal interviews, exchange of views over electronic mails and telephonic interviews. Primary data has been collected through the use of a structured questionnaire. The questionnaire was administered to three different groups of respondents. This was also followed by an in-depth interview with few respondents as well as researcher’s personal visits to the commodity exchanges and warehouses in the NCR and Mumbai area.

Therefore the methodology is a mix of quantitative and qualitative techniques with the survey and interviews generating simple qualitative data.

3.6 Research Hypotheses

The following twenty (20) hypotheses were designed for testing:

H₀₁: There is no significant difference in the mean value of certain basic facilities enjoyed by the farmers across the three groups of respondents.

H₀₂: There is no significant difference in the mean value of issues in hedging of commodities across the three groups of respondents.
$H_03$: There is no significant difference in the mean value of activities suggested for resolution of issues regarding hedging of commodities across the three groups of respondents.

$H_04$: There is no significant difference in the mean value for commodity exchange to provide efficient trading platforms across the three groups of respondents.

$H_05$: There is no significant difference in the mean value of necessity of a nation-wide trading facility across the three groups of respondents.

$H_06$: There is no significant difference in the mean value of issues faced in physical settlement of commodities across the three groups of respondents.

$H_07$: There is no significant difference in the mean value of reasons for not opting for physical deliveries across the three groups of respondents.

$H_08$: There is no significant difference in the mean value of existence of uniformity in settlement procedures across the three groups of respondents.

$H_09$: There is no significant difference in the mean value of physical delivery as the hallmark of a robust futures market in commodities across the three groups of respondents.

$H_{10}$: There is no significant difference in the mean value of physical delivery of goods being inconsiderable and make the futures market unstable across the three groups of respondents.

$H_{11}$: There is no significant difference in the mean value of need for efficient settlement process across the three groups of respondents.

$H_{12}$: There is no significant difference in the mean value of agreement that cash settlement overcomes issues faced in physical settlements across the three groups of respondents.

$H_{13}$: There is no significant difference in the mean value of benefits of warehousing across the three groups of respondents.
H₀₁₄: There is no significant difference in the mean value of types of subsidiary services provide by warehouses across the three groups of respondents.

H₀₁₅: There is no significant difference in the mean value of function of Warehouse Receipt System and its financing across the three groups of respondents.

H₀₁₆: There is no significant difference in the mean value of better services and infrastructure offered by Government warehouses across the three groups of respondents.

H₀₁₇: There is no significant difference in the mean value of requirement for national commodity exchanges to follow stringent quality norms for storage across the three groups of respondents.

H₀₁₈: There is no significant difference in the mean value of prerequisite of warehouse receipts to a futures contract across the three groups of respondents.

H₀₁₉: There is no significant difference in the mean value of requirement of standard and quality assurance/certification procedure across the three groups of respondents.

H₀₂₀: There is no significant difference in the mean value of existence of uniform standards for grading and quality specifications across the three groups of respondents.

3.7 Research Design

The research is descriptive in nature. Since there is a lack of literature with respect to operational aspects of Indian multi commodity exchanges, the qualitative technique of survey research methodology was adopted for this study.

3.7.1 Procedure for selecting Population

All the participants who are associated with the working and functioning of a commodity exchange formed the population for this study. These participants were classified into three groups, they being:
Group A: Participants, which included:

1. National commodity exchanges of India
2. Industry experts, economists and members of Forward Market Commission
3. Commodity producers/end consumers/traders/hedgers/speculators/industrialists

Group B: Administrators, which included:

4. Warehouse owners/managers of:
   i. Warehouses of the exchanges
   ii. Warehouses of private parties
   iii. Public/Government warehouses
5. Clearing Agents
6. Quality and inspection agents

Group C: Banks

3.7.2 Procedure for Selecting Sample

The process of sample selection for each of the three groups mentioned in 3.7.1 was sequential and in two stages.

3.7.2.1 Sample Selection of Participants:

1. National commodity exchanges of India: In the first phase, the five (5) commodity exchanges which have been granted a national status were identified – MCX, NCDEX, NMCE, ACE, ICEX. The sampling in this phase was judgmental. In the second phase, four (4) respondents from each of these commodity exchanges were selected from the top management executives, operational desk heads, customer service heads. The sampling in this phase was convenience.
2. Industry experts, economists and members of Forward Market Commission: From various journals, news articles, reports and periodicals, ten (10) industry experts and economists and five (5) members of the FMC were identified and selected for the survey. The sampling was based on convenience.

3. Commodity producers/end consumers/traders/hedgers/speculators/industrials: The exact population of this sub-group was difficult to identify as no specific information was available for this group either on the commodity exchanges or on various websites. Thus based on convenience 250 respondents were selected for this survey.

3.7.2.2 Sample Selection of Administrators:

Sample from the Administrators group was selected from the following three sub-groups as follows:

1. Warehouse owners/managers: In the first phase, the major warehouses which were linked to the five commodity exchanges were identified. Twenty five (25) warehouses of the commodity exchanges, twenty (20) warehouses of private agencies, and fifty (50) warehouses of public or government agencies were identified. This formed the population. In the second stage, based on convenience, a target number of warehouses were selected for the survey. They were fifteen (15) from the warehouses of the commodity exchanges, all twenty (20) warehouses of private agencies and twenty (20) warehouses of public/government agencies. In phase two, one respondent was selected based on convenience from each of the fifty-five (55) warehouses identified.

2. Clearing Agents: In the first phase, it was identified that each commodity exchange had its own panel of clearing agents. From the panel, ten (10) top clearing agents were identified based on opinion about their performance from the Participants group (on word of mouth). In phase two, one respondent from each of these ten clearing agents was selected. The sampling was judgmental since respondents selected were of managerial level and were directly associated with the clearing activities on the commodity exchanges.
3. Quality and inspection agents: The first phase identified the top five assayers working for these commodity exchanges and in the second phase, three (3) respondents from each of these five assayers were selected based on the judgment that there should be one respondent from each of the related activities of an assayer of quality check, weighment check and warehouse inspection.

3.7.2.3 Sample Selection of Banks:

In the first phase six banks were selected based on convenience for this survey. In the second phase, four respondents from each bank were selected also based on convenience.

3.7.3 Sample Size:

Main purpose of sampling is to reduce the error with smallest sample size of the population without losing usability as well as increasing the reliability at the same time. The minimum sample size was taken as per the thumb rule given below (Gupta, 2003):

\[ \text{Min sample size required} = \text{four times the number of question items} \]

This sample size must be the representation of the population for the response required to achieve the objectives of this research work. From this sample frame, the conclusions and inferences can be drawn after analyzing the data using proper tools. As there are sixty three (63) question items in the questionnaire developed for this research work, a minimum of 252 respondents are essentially required, as per the above stated thumb rule. On the basis of the above explained procedure for selection of sample, the questionnaire was administered to a total of 389 respondents, thus adhering to the thumb rule on sample size and ensuring that sample size is adequate enough for analysis of data to achieve the objectives of this research work.

3.8 Development of the Questionnaire

A three (3) stage process below illustrates the process adopted for identification of questionnaire (attached in Annexure) items before conducting the final survey:
1. Identification of the dimensions:

Questions were based on findings of previous researches and studies. After the identification of the problem, an extensive review of literature was done for identifying the scales for measures relevant to this study.

2. In-depth interviews:

In-depth interviews and exchange of views over electronic mails with select industry experts; members of the commodity exchanges; members of the leading warehouse management service providers like NBHC, NCMSL, CWC and members of the regulatory institutions of the Government of India were conducted to gain broader knowledge about the problem statement and to evaluate the content validity and wordings of individual scale items for the formation of the pilot questionnaire.

3. Pre-Testing of questionnaire:

Items pertaining to a questionnaire were pre-tested, including layout, length, response format, sequence, meaning of words and questions difficulty. After completing the questionnaire each respondent was asked to comment whether the instructions were precise and whether any ambiguity or difficulty occurred in answering any of the questions. According to the respondents, few questions needed better phrasing. Final versions were generated after minor modifications to the suggested questions.

3.8.1 Structure of the Questionnaire

The questionnaire was structured and undisguised. It had a mix of dichotomous, 5 point Likert scales, multiple choice and also some open-ended questions. The aim was to collect data on the opinion of respondents about the current working of our national commodity exchanges, the operational performance of the exchanges, the present and future status of warehousing in commodity exchanges, changes required to be brought in especially in warehousing and physical deliveries, to make India a global commodity trading hub.
The questionnaire was divided into two (2) sections:

Section A dealt with collecting the demographic information of respondents;

Section B dealt with specific questions on the research and was further divided into seven sub-sections to collect information on specific issues. They were:

A. General information and views: Eleven (11) questions

B. Issues, hedging and risk: Nine (9) questions

C. Settlement and delivery: Sixteen (16) questions

D. Warehousing and Warehouse Receipts: Seventeen (17) questions

E. Inspection and quality: Six (6) questions

F. Regulation: Three (3) questions

G. Snapshot which contained one (1) question seeking their opinion about the performance of the commodity exchanges on various parameters.

All these questions were coded for computer tabulation.

3.8.2 Content Validity of the Questionnaire

For carrying out the content validity of the questionnaire, the questionnaire was developed and pre-tested with specific groups to ensure that measures were in line with the common understanding of the concepts.

3.9 Questionnaire Administration

A mix of various methods was employed for administering the questionnaire.

Personal visits: The researcher personally visited the commodity exchanges MCX, NCDEX and ACE as well as government and private warehouses in and around National Capital Region (NCR), Mumbai and Chennai. This was done to get first hand information on the exact working of the exchanges as well as to collect information on
warehousing facilities provided by these exchanges, value and volume of contracts physically settled and impact of electronic warehousing receipts on the deliveries on these exchanges.

**Interviews:** In-depth interviews were conducted on a one-on-one basis with the industry experts, top management of the three commodity exchanges, few top participants on these exchanges and various warehouse in-charges. The interview was unstructured and direct for duration of about thirty (30) minutes to one (1) hour.

Apart from the above two methods, data was also collected by mailing the questionnaire to the target sample. This was followed by random telephonic calls to the respondents to ensure that the respondents were able to understand and fill the questionnaires.

A total of 285 questionnaires were distributed to the Group A of Participants out of which 108 responses were received. After going through the data, 87 questionnaires were found to be usable, which have been considered for this study. Therefore, the response rate is 30.5 percent which is acceptable. A response rate of 25 percent is considered desirable for survey findings (Yu and Cooper, 1983; Malhotra and Grover, 1998).

The questionnaire was also distributed to 80 respondents of Group B of Administrators and 44 questionnaires duly filled-in were received. The response rate is 55 percent which is acceptable.

For Group C, consisting of Banks, 24 questionnaires were distributed and 13 responses were received. The response rate was 54 percent which is acceptable.

**3.9.1 Techniques to increase the response rate**

Total Design Method (TDM) was used for implementing this survey:

1. A personalized covering letter was sent to persuade respondents
2. Questionnaire was designed and pre-tested to ensure that it took approximately half an hour to give response.
3. Respondents were motivated to respond as survey was related to an area of their interest.

4. Gentle reminders for cooperating with the study were also sent to respondents every weekend.

3.10 Tools of Analysis

The statistical techniques used were:

1. Descriptive analysis: Pictorial depiction and calculation of frequency and mean values.

2. Hypothesis testing: The hypothesis was tested using one-way ANOVA - Analysis of variance (ANOVA) provides a statistical test of whether or not the means of several groups are all equal, and therefore generalizes $t$-test to more than two groups. ANOVAs are useful in comparing two, three, or more means. A statistical hypothesis test is a method of making decisions using data. A test result (calculated from the null hypothesis and the sample) is called statistically significant if it is deemed unlikely to have occurred, assuming the truth of the null hypothesis. A statistically significant result (when a probability (p-value) is less than a threshold (significance level)) justifies the rejection of the null hypothesis. For this study, since there are three groups of respondents (more than two), use of ANOVA was justified.

3.11 Limitations of the Study

The study may suffer from the following limitations:

1. Limited to national multi-commodity exchanges:
   a. This study is limited to national multi commodity exchanges of India, covering the public and private warehouses only in NCR, Mumbai and Chennai. It does not cover warehouses located in other regions of the country.
b. The study also targets the views of respondents associated with only the national commodity exchanges. It does not study the views of respondents associated with the regional commodity exchanges.

2. Quality of data:
   a. Quality of primary data is subject to level of cooperation and opinion as well as level of understanding of the respondents.

3. Sample selection:
   a. The sample for group of Participants might not be completely representative since the participants’ population is large which includes all the actual users of the commodity exchanges, the personnel working in all national commodity exchanges of India, industry experts, economists, and people connected to the regulatory authority for the commodity exchanges.
   b. The sample size was small and conclusions drawn may lead to variations.

4. Period of survey:
   a. The data collected further also pertains to six months, until December 2011 and therefore, it suffers from time constraint and any new developments in this field after this period is beyond the scope of this study.
Figure – 3.1: Flow chart for the Research Methodology