Chapter - 1

Introduction
Introduction

In the present scenario of globalised trend of liberalization, privatization and intense competition among business enterprises to garner the share of markets, new management paradigm and the changes in the method of doing business has become essential. With increasing globalization and the pressure of competitiveness on businesses, their size has grown beyond proportions like a dinosaur, whose external nervous system was so large and complex that it could take minutes for the creature to realize that its foot was on fire similarly traditional supply chains take entirely too long to register and communicate important changes in the customer and market demands, (Sahay & Ramneesh, 2002).

Today, the competition takes place at the level of supply chains. One supply chain competes with another and the success of the chain is dependent on the relationship between the organizations within the chain. A supply chain is a complex network of relationship that organizations maintain with trading partners to source, manufacture and deliver products. To effectively manage this complexity on real time basis is critical for the success of any supply chain. Management of multiple relationships within the supply chain is increasingly referred to as “Supply Chain Management” (Mentzer & Zacharia, 2000, Mentzer et.al.2001). There is a fundamental difference between supply chain and supply chain management. Supply chain as a phenomenon of business always exists, ‘whether they are managed or not’ is what distinguishes supply chain from supply chain management, (Mentzer et.al.2001). Supply chain is concerned with the smooth flow and physical aspects of the flow of resources whereas supply chain management is a broader philosophy, which incorporates the integration and value enhancement aspects of the value chain, (Lambert et.al. 1996; Christopher, 1992; Mentzer et.al.2001).

Modern business era is an era of cooperative competition. A group of independent but interdependent organizations cooperate with each other to compete efficiently and effectively with other such groups (Faulkner & Rond, 2000). Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores; so that the merchandise is produced and distributed in the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements (David Simchi et.al 2005). The ‘Supply chain’, as defined here, has three primary components, namely, Procurement, Production and Distribution that extends to several tiers of suppliers in the procurement side and the final end user of the products and services produced on the distribution side (Shanthakumar...
Palaniswami, 2004). Hence supply chain management is the management of upstream and downstream relationships with suppliers and customers to deliver the superior value at cost to the supply chain as a whole.

Supply chain management is an integrated approach which considers both the inbound and outbound flow of materials, services, and goods to the firm. It is a network of related activities with the purpose of managing the orderly flow of material and personnel within the supply chain. Integration is the basic principle of the supply chain philosophy (Douglas et al. 1998). Effective and efficient supply chain requires integration at Inter-departmental, Intra-departmental & Intra-organizational level involving operational, behavioural, communicational, and interactive flows. It is highly interactive and complex, and requires simultaneous consideration of many trade-offs.

**Concerns of the developing world – population growth and food security**

There is an increasing awareness at the global level on issues of food supply and the need to produce more food to meet the demands of the increasing population. The world population over the next 50 years will increase from 6 billion to 9 billion people, as a consequence in 2050 there will be a need for food to feed the world as much as the man has already consumed over the past 10,000 years.

India is home to about one billion people and as per Asian standards, it requires around 200 million tonnes of food grains per year. With 15 to 17 million people are added every year to its population, India requires 3 million tonnes extra grains per year for the ever increasing population. Hence agriculture is vital to India for sustenance of about one-sixth of the world’s population. The need to ensure adequate food supply to the world’s second most populous country has guaranteed agriculture a place at the top of the nation’s priority list (Acharya, 2002c).

**India’s green revolution in agriculture**

India has quadrupled its food grains production since independence in 1947. India produced 50.82 million tonnes of food grains in 1950-51; the total production of food grains touched the peak of 217.28 million tonnes in 2006-07. The increase in agricultural production has been brought about by bringing additional area under cultivation, extension of irrigation facilities, use of improved high yielding variety of seeds, better techniques evolved through agricultural research, water management, and plant protection through judicious use of fertilizers, pesticides and cropping practices. In 1950-51, the yield of
wheat per hectare was 663 kgs which increased to 2708 kgs per hectare in 2006-07, an increase by four times, but it is still very low compared to the world standards.

India has always been a major producer of rice, as it is the staple diet of a majority of the Indian population. But the major contribution to the tremendous growth in food grains production comes from wheat. India produced 6.46 million tonnes of wheat in 1950-51 and the production of wheat was 75.80 million tonnes in 2006-07 which works out to be more than twelve times. The changes witnessed in the wheat production became more pronounced in the mid-sixties and early seventies with the introduction of high yielding varieties. This was characterized as the green revolution.

Table No.1.1 India's Position in World Agriculture in 2006

<table>
<thead>
<tr>
<th>Item</th>
<th>India</th>
<th>World</th>
<th>India's Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>% Share</td>
</tr>
<tr>
<td>1. Area (Million Hectares)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Area</td>
<td>329</td>
<td>13445</td>
<td>2.4</td>
</tr>
<tr>
<td>Land Area</td>
<td>297</td>
<td>13015</td>
<td>2.3</td>
</tr>
<tr>
<td>Arable land</td>
<td>160</td>
<td>1423</td>
<td>11.2</td>
</tr>
<tr>
<td>2. Population (Million)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1152</td>
<td>6593</td>
<td>17.5</td>
</tr>
<tr>
<td>Agriculture</td>
<td>563</td>
<td>2606</td>
<td>21.6</td>
</tr>
<tr>
<td>3. Economically active population (Million)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>480</td>
<td>3141</td>
<td>15.3</td>
</tr>
<tr>
<td>Agriculture</td>
<td>278</td>
<td>1353</td>
<td>20.5</td>
</tr>
<tr>
<td>4. Crop Production (Million Tonnes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cereals</td>
<td>239</td>
<td>2221</td>
<td>10.8</td>
</tr>
<tr>
<td>Wheat</td>
<td>69</td>
<td>606</td>
<td>11.4</td>
</tr>
<tr>
<td>Rice(Paddy)</td>
<td>137</td>
<td>635</td>
<td>21.6</td>
</tr>
<tr>
<td>Total Pulses</td>
<td>14</td>
<td>60</td>
<td>23.3</td>
</tr>
</tbody>
</table>

Source: www.Faostat.fao.org

India is the seventh largest country in the world with an area of 329 million hectares which works out to 2.45 percent of the world area. It has 160 million hectares of arable land (11.24 percent of the arable land of the world), which is next to USA. However, India possesses the largest irrigated area in the world (50 million hectares, 19.6 percent of world’s irrigated land) and is the second highest producer of rice and wheat. It’s global share in rice and wheat production works out to be 21.6 percent and 11.4 percent which is next to China. India is the largest grower of wheat in terms of area and ranks 9th in the world in terms of yield per hectare.

**The need for revolution in Indian food processing sector**

From a country that was struggling to feed its population and facing widespread famine in
the early part of the 19th century, India has become a major exporter of agricultural produce, largest producer of the milk and a leading producer of fruits and vegetables. This impressive feat was largely due to the Green Revolution in agriculture. It is an outcome of the recognition by the policy makers of the strategic significance of food in India. While the Green revolution in the sixties made India self-sufficient in food, India’s second revolution – in food processing is just round the corner. Food processing is as important as agriculture.

The main reason to look at the Indian food industry is that it shows the potential to become a key sector in the future. India is one of the biggest emerging markets in the world with over a billion population and a 300 million strong middle class. Another reason is that it bases economic development on local resources, as they are uniquely transformed by local tradition and culture. The assumption that Indian food sector which was more traditional characterized by informal and exploitative labour doesn’t appear to be convincing. The present day need is the food of convenience, high quality, nutritive, and minimally processed, innovative and newer products. This changeover has been primarily due to changing life styles, growing nutritional awareness, dual incomes; increasing literacy rate and a sharp rise in income of the middle class group. The dynamic socio-economic factors have increased the demand for a range of food products. The attitude of consumers towards traditional cooking, health and hygiene, food quality are changing in which convenience plays a dominant role in it. Change in food consumption pattern is a real phenomenon.

The processing food segment accounts for USD 29.4 billion, in a total estimated food market of about USD 91.7 billion. The food processing industry is one of the largest industries in India. It currently ranks fifth in terms of production, consumption, export, and growth prospects. The Confederation of Indian Industry (CII) has estimated that the food-processing sector has the potential of attracting USD 33 billion investment in 10 years and generates employment of 9 million person-days. The government has formulated and implemented several schemes to provide financial assistance for setting up and modernizing the food processing units, creation of infrastructure, the support for research and development and human resource development in addition to other promotional measures to encourage the growth of the processed food sector.

Though the industry is large in size, it is still at a nascent stage in terms of development. Of the country's total agriculture and food produce, only 2 per cent is processed. The
highest share of processed food is in the dairy sector, where 37 per cent of the total produce is processed, of which only 15 per cent is processed by the organized sector (MOFPI, 2008).

Need for the proposed research

Food marketing brings together the producer and the consumer. It is the chain of activities that brings food from “farm gate to plate”. The marketing of even a single food product can be a complicated process involving many producers and companies. For example, 56 companies are involved in making one can of chicken noodle soup. These businesses include not only chicken and vegetable processors but also the companies that transport the ingredients and those who print labels and manufacture cans. The food marketing system is the largest direct and indirect non-governmental employer in most of the countries (Alastair Robertson, 2002).

In the current business environment, which appears difficult and unpredictable, the Indian industry has found a new avenue to pin its hopes on. Supply chain and logistics are suddenly under close scrutiny. Between them, they offer companies the best way to sustain their business in rough times. Supply chain management in India comes in several shapes and forms. The rural turnaround, the packaging innovations and the ever increasing aspirations of the middle class which is driving lifestyle and health products and the emergence of the modern trade will allow for state of the art supply chain management and a relatively direct interaction of the brand with the consumers. There are challenges and opportunities which sit alongside each other as we look at the future ahead.

Fierce competition in today’s global markets, the introduction of products with shorter and shorter life cycles, and the heightened expectations of customers have forced business enterprises to invest and focus their attention on the supply chains. Successful models of supply chain management in the Indian food business are isolated cases that have not been replicated in full measure for which several reasons could be identified. (For example) Every year, Rs.50,000 crore worth of food produce is wasted in India because of lack of proper infrastructure for storage and transportation under controlled conditions on one hand and emerging trends, opportunities, and competition on the other.

McKinsey & Company, Inc. and the Confederation of Indian Industry recently conducted an extensive study of the current prospects for the Indian agribusiness. The report shows that food industry offers one of the largest opportunities in India today. Over the next ten
years, some 200 million people will move from subsistence foods, like cereals and pulses, to basic products that demand more processing, like packaged Atta (wheat flour) and packaged homogenized milk. Their food habits will consequently undergo a rapid change. The most notable feature of this change is that cereals will come to represent a lower proportion of expenditure and protein a higher proportion. As incomes rise and food consumption patterns evolve, India’s food industry will shift away from subsistence foods to basic foods over the coming decade. This will result in an increased focus on greater protein intake and better quality. The major opportunities for business will be in high growth, mass-based, high volume market products, such as processed milk (a USD10 billion industry), poultry (USD 7.5 billion), packaged Atta (USD 4 billion) and bakery products (USD 3 billion). This will demand a very substantial large-scale investment.

The literature review in the field of supply chain management in the food processing industry particularly in India clearly indicates that the quantum and quality of work that has been done is minimal and deficient in many ways. Most of the articles, reports, facts and figures, projections and opinions which appear in the media—both print and electronic—on supply chain management in Indian food processing industries are either too general or relies on the commonly held stereotype and untested notions on the emerging trends in the processed food products and are not qualified enough to make an empirical contribution to the chosen area. The research studies in the food processing industries are fragmented and the supply chain management issues are studied in isolation. The analysis of supply chain management in the food processing industry requires an integrated approach and has a tremendous potential and prospect for research, especially in view of the above cited deficiencies. The proposed study is designed to make an in-depth study of the various aspects of supply chain management when confronted with the realities of global competition, pressure on market share, shrinking product-to-delivery cycle times and increasing customer demands for products or services which incorporate greater value and improved quality. Hence supply chain management in the food processing industry is of great interest to both researchers and practitioners.
Statement of the problem

Keeping this as a backdrop, a study entitled “Supply Chain Management in Food Processing Industry” - A study with reference to selected food processing units in Karnataka state is proposed with the following objectives:

Research objectives

1. to discuss the issues and challenges of supply chain management in the wheat based food processing industry.
2. to examine the current supply chain management practices in the wheat based food processing industry.
3. to critically appraise the supply chain management strategies followed in the wheat based food processing industry, its strengths and weaknesses.
4. to study and analyze coordination across the members of the supply chain in the wheat based food processing industry.
5. to study and analyze value delivery across the supply chain in the wheat based food processing industry.
6. to develop an appropriate model for the supply chain management in the food processing industry based on the findings of this study.

Nature of the study

The Nature of the study is largely diagnostic. Diagnostic study is directed towards discovering what is happening? Why it is happening? And what can be done about it. It aims at identifying the causes of a problem and the possible solutions to it. The general requirement of the diagnostic studies is that, the researcher should have the prior knowledge of the problem, its thorough formulation and clear-cut definition of the given formulation, adequate methods for collecting accurate information, precise measurement of variables, statistical analysis, and the test of significance. As the aim is to obtain complete and accurate information about a given situation / phenomenon, this research design provides much more provision for protection against bias than is required in an exploratory study. A diagnostic study is also actively guided by hypothesis than in a descriptive study. While descriptive study is oriented towards finding out what is occurring, a diagnostic study is directed towards discovering not only what is occurring but why it is occurring and what can be done about it (Krishnaswamy and Ranganatham, 2005).
Figure No.1.1 Supply Chain of wheat processing industry in Karnataka state
- An overview

Farmers

Primary Assembly Market middlemen (Merchant middlemen/Agent middlemen)

Secondary Wholesale Market middlemen (Merchant middlemen/Agent middlemen)

Food Corporation of India

Primary level Processors (Wheat roller flour mills)

Urban Market Wholesalers

Secondary level Processors (Bakers / Biscuit Manufacturers)

Marketing Company

State civil Supply departments

Redistribution Stockists

C & F agents

C & F agents

Fair Price Shops

Wholesalers

Redistribution Stockists

Redistribution Stockists

Semi-wholesaler

Wholesalers

Wholesalers

Retailers

Retailers

Retailers

Consumers
Scope of the study

1. Constituents of the supply chain

Analysis of an integrated supply chain management calls for consideration of all the constituents of the supply chain. In this research, in order to keep the present study in manageable limits both in terms of cost and time, the scope of the study is limited to only a few important constituents of the supply chain such as farmers, procurement-intermediaries, processors and distribution-intermediaries and retailers.

2. Wheat based food processing units of Karnataka at the primary level.

Processing is converting the agro-produce to make it suitable for consumption. The food processing industry can be classified by the extent of processing involved in the manufacture of the finished product. The primary processing would encompass cleaning, grading, powdering, and refining of the agricultural produce as in the case of wheat-to-wheat flour. The secondary processing would include the conversion of the basic product to a stage where it is ready for consumption. (Example: high value added brand products like biscuits and bakery products). Though Karnataka is not a major wheat producing state in India, it is one of the largest markets for processed food products in India. In Karnataka, a consumer spends over 70% on processed foods and spends less than 30% on basic foods in the food products basket (Subhashree, et.al, 2004) and it has substantial number of large wheat roller flour mills and wheat based food product manufactures such as bakers and biscuit manufacturers across the state. The scope of this research has been confined to study the supply chain management in few selected wheat based food processing units of Karnataka at the primary level.

3. Geographical domain of the study

Farmers: Wheat is grown in 15 of the 27 districts of Karnataka. The top five wheat producing districts namely Belgaum, Bijapur, Bagalkot, Gadag, and Dharwad have been considered for the study. The considerations made in selection of these districts are, apart from being the top wheat producing districts of Karnataka, there is enough representativeness and size of the targeted population and will be able to yield or make precise estimate.

Procurement-intermediaries: The APMC markets from five large wheat producing (dealing) districts of Karnataka state namely Belgaum, Bijapur, Bagalkot, Gadag, and Dharwad were selected for the study. Bangalore district was also selected as the sixth
district for the study, as its contributions to wheat trade in Karnataka accounts to almost 65 percent.

**Primary processing units (Wheat roller flour mills):** As per Karnataka Roller Flour Mills Associations members' directory there are about 57 large wheat flour mills in the state and about 60% of the large wheat flour mills are located in Bangalore and Mysore districts. With an intention of identifying and studying the best practices through the establishment of the bench marking the process, the large wheat flour mills located in these two districts were selected for the study.

**Distribution-intermediaries & Retailers:** Wheat has been consumed in almost every district of the Karnataka state. Five districts, namely, Bangalore-Urban, Bangalore-Rural, Mysore, Kodagu, and Dakshina Kannada were selected for the distribution part of the study. Consideration made in selection of these districts are apart from being the base of the researcher, they provide a good setting for this type of research. In the preliminary study conducted by the researcher on consumption of wheat related products in Karnataka state it was found that, there is more or less similarity in consumption behaviour as far as wheat related products are concerned between any of the districts in Karnataka. There is enough representation and size of the targeted population in these selected districts which will able to yield precise estimate. There is also similarity in channels of distribution, structure, and process across Karnataka state as far as the FMCG products are concerned.

**Research questions**

The following questions are also setup for further investigations by developing the research hypotheses for analyzing the statistical associations between various factors, attributes pertaining to the research problem which are essential in establishing the supposition.

1. Whether the overall objectives of the business between various constituents of the supply chain are same or different?
2. Whether the relationship existing between the various constituents of the supply chain are similar or different?
3. Whether the level of internal-integration between various identified constituents of the supply chain are similar or different?
4. Whether the level of external-integration between various identified constituents of the supply chain with their partners are similar or different?
5. Is there any relationship between the size of the farmers and their preference for a particular marketing practice?
6. Is there any relationship between the education of the farmers and their preference for a particular marketing practice?
7. Is there any relationship between type of ownership or ownership form of the supply chain members and their internal-integration?
8. Is there any relationship between type of ownership or ownership form of the supply chain members and their external-integration?
9. Is there any relationship between experience of the supply chain members (number of years in business) and the level of relationship with their partners?

Research hypotheses

**H1: Null Hypothesis:** There are no significant differences in the overall objectives of business between various identified constituents of the supply chain.

**H1A: Alternative Hypothesis:** There are significant differences in the overall objectives of business between various identified constituents of the supply chain.

**H2: Null Hypothesis:** There are no significant differences in the existing relationships between various identified constituents of the supply chain.

**H2A: Alternative Hypothesis:** There are significant differences in the existing relationships between various identified constituents of the supply chain.

**H3: Null Hypothesis:** There are no significant differences in the level of internal-integration between various identified constituents of the supply chain.

**H3A: Alternative Hypothesis:** There are significant differences in the level of internal-integration between various identified constituents of the supply chain.

**H4: Null Hypothesis:** There are no significant differences in the level of external-integration between various identified constituents of the supply chain.

**H4A: Alternative Hypothesis:** There are significant differences in the level of external-integration between various identified constituents of the supply chain.

**H5: Null Hypothesis:** There are no significant relationship between the size of the farmers and their preference for a particular marketing practice.

**H5A: Alternative Hypothesis:** There are significant relationship between the size of the farmers and their preference for a particular marketing practice.

**H6: Null Hypothesis:** There are no significant relationship between the education of the farmers and their preference for a particular marketing practice.
H6A: **Alternative Hypothesis:** There are significant relationship between the education of the farmers and their preference for a particular marketing practice.

H7.1: **Null Hypothesis:** There are no significant relationship between the type of ownership or ownership form in procurement-intermediaries and their level of internal-integration.

H7.1A: **Alternative Hypothesis:** There are significant relationship between the type of ownership or ownership form in procurement-intermediaries and their level of internal-integration.

H7.2: **Null Hypothesis:** There are no significant relationship between the type of ownership or ownership form in primary processors and their level of internal-integration.

H7.2A: **Alternative Hypothesis:** There are significant relationship between the type of ownership or ownership form in primary processors and their level of internal-integration.

H7.3: **Null Hypothesis:** There are no significant relationship between the type of ownership or ownership form in distribution-intermediaries and their level of internal-integration.

H7.3A: **Alternative Hypothesis:** There are significant relationship between the type of ownership or ownership form in distribution-intermediaries and their level of internal-integration.

H8.1: **Null Hypothesis:** There are no significant relationship between the type of ownership or ownership form in procurement-intermediaries and their level of external-integration.

H8.1A: **Alternative Hypothesis:** There are significant relationship between the type of ownership or ownership form in procurement-intermediaries and their level of external-integration.

H8.2: **Null Hypothesis:** There are no significant relationship between the type of ownership or ownership form in primary processors and their level of external-integration.

H8.2A: **Alternative Hypothesis:** There are significant relationship between the type of ownership or ownership form in primary processors and their level of external-integration.

H8.3: **Null Hypothesis:** There are no significant relationship between the type of ownership or ownership form in distribution-intermediaries and their level of external-integration.

H8.3A: **Alternative Hypothesis:** There are significant relationship between the type of ownership or ownership form in distribution-intermediaries and their level of external-integration.
H9.1: **Null Hypothesis:** There are no significant relationship between the years of experience in the business of procurement - intermediaries and the level of existing relationship with their partners

H9.1A: **Alternative Hypothesis:** There are significant relationship between the years of experience in the business of procurement - intermediaries and the level of existing relationship with their partners

H9.2: **Null Hypothesis:** There are no significant relationship between the years of experience in the business of primary processors and the level of existing relationship with their partners

H9.2A: **Alternative Hypothesis:** There are significant relationship between the years of experience in the business of primary processors and the level of existing relationship with their partners

H9.3: **Null Hypothesis:** There are no significant relationship between the years of experience in the business of distribution-intermediaries and the level of existing relationship with their partners

H9.3A: **Alternative Hypothesis:** There are significant relationship between the years of experience in the business of distribution-intermediaries and the level of existing relationship with their partners

H9.4: **Null Hypothesis:** There are no significant relationship between the years of experience in the business of retailers and the level of existing relationship with their partners

H9.4A: **Alternative Hypothesis:** There are significant relationship between the years of experience in the business of retailers and the level of existing relationship with their partners
The research framework

The purpose of developing the research framework is to establish a vision to study the supply chain system of the food processing industry, which is hopefully fundamental in its beginning. At present, there is no authoritative and comprehensive study which completely covers the above chosen area. In this sense, the issue of SCM in food processing industries can be considered as a less explored area in research.

Supply chain management is in itself a system; it is a network of related activities with the purpose of managing the orderly flow of material from source to production to its consumption. The system approach is a simplistic yet a powerful paradigm for understanding the relationships. The system approach simply states that all functions or activities need to be understood in terms of how they affect, and are affected by other elements and activities with which they interact. The idea is that if one looks at actions in isolation, one will not understand the big picture or how such actions will affect, or be affected by, other activities. The system approach is core to understanding and evaluating any supply chain.

The subject of supply chain management has evolved from several subject areas; it becomes necessary to use the principle of combining the different methods to put the study in its proper context and the topic calls for integrated approach which requires an examination of integration at inter-departmental, intra-departmental & intra-organizational level involving operational, behavioural, communicational, interactive flows. In view of these, it was thought that, it would be an interesting and relevant proposition to make a genuine attempt to study and analyze the multitude and magnitude of the linkages that exists in the supply chain of the food processing industries with clearly defined boundaries. We call this the T-approach —“ (letter T within a circle – which means- it is a study with some amount of spread and some amount of depth with a precisely defined boundary). This T-approach is a strategic approach which is an amalgamation of system and integrated approach and is proposed to critically appraise the supply chain. Developing such a framework in strategic context is essential in maximizing the value from supply chain management system.
Table No.1.2 Basic framework for the research

<table>
<thead>
<tr>
<th>Major Components of the supply chain</th>
<th>Research objectives</th>
<th>Purpose</th>
<th>Results &amp; Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research objectives</strong></td>
<td>to discuss the issues and challenges of supply chain management in the wheat based food processing industry.</td>
<td>The aim of this part of the research is to examine the wheat marketing practices being followed in the selected districts, to identify and discuss the problems related to agri-markets and its infrastructure, and also to discuss the issues, challenges and opportunities in strengthening the supply chain linkages which will increase the effectiveness of the supply chain.</td>
<td>The aim of this part of the research is to conduct value analysis across supply chain, to examine the current procurement practices of the firm, to examine the current distribution practices of the firm, to study and analyze sales &amp; operations management, to study Demand Management, Demand side collaboration, Supply side collaboration.</td>
</tr>
<tr>
<td><strong>Primary Constituents of the supply chain</strong></td>
<td>Farmers, Traders, Brokers, Stockists, Commission agents, Primary Market Wholesalers, Urban Market Wholesalers</td>
<td>Primary Processing Wheat Roller flour Mills</td>
<td>Redistributors, Stockists, Wholesalers, Retailers</td>
</tr>
<tr>
<td><strong>Sample size</strong></td>
<td>350</td>
<td>34</td>
<td>350</td>
</tr>
<tr>
<td><strong>Research tools &amp; methodology</strong></td>
<td>Primary data collection through-Personal Interviews, field visits, survey through semi-structured questionnaires. Secondary data collection through research journals, reports of various government and non-governmental agencies, dissertations and electronic data bases, financial and general press.</td>
<td>Primary data collection through-Personal interviews, survey through semi-structured questionnaires, experiential study through plant visits. Secondary data collection through research journals, reports of various government and non-governmental agencies, dissertations and electronic data bases, financial and general press.</td>
<td>Primary data collection through-Personal interviews, survey through semi-structured questionnaires. Secondary data collection through research journals, reports of various government and non-governmental agencies, dissertations and electronic data bases, financial and general press.</td>
</tr>
<tr>
<td><strong>Area / Location</strong></td>
<td>Belgaum, Bijapur, Bagalkot, Gadag, Dharwad and Bangalore</td>
<td>Bangalore and Mysore</td>
<td>Bangalore-Urban, Bangalore-Rural, Mysore, Kodagu and Dakshina Kannada</td>
</tr>
<tr>
<td><strong>Results &amp; Discussion</strong></td>
<td>Critical analysis of the findings and development of an appropriate model for Food Processing Industry in Supply Chain Management based on the findings of the study.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Detailed Sample plan is presented in table no.1.3
Table No.1.3: Sample Plan for the study

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Major components of Supply chain</th>
<th>Sampling method for the whole study</th>
<th>Sample Size for major components</th>
<th>Major Constituents of the supply chain</th>
<th>Sample size for major constituents</th>
<th>Sample elements</th>
<th>Sampling method for the constituents</th>
<th>Sample units and Sample sizes in each category</th>
<th>Instrument used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Procurement</td>
<td></td>
<td>Farmers</td>
<td>250</td>
<td>Farmers</td>
<td>Proportionate Stratified Sampling</td>
<td>Belgium – 80</td>
<td>Questionnaire – Farmers</td>
<td></td>
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<td>Processors</td>
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<td>Complete Enumeration</td>
<td>Belagum and Mysore</td>
<td>Questionnaire – Processors</td>
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<td>Retailers</td>
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<td>Bangalore Urban – 120</td>
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<td>Bangalore Rural – 35</td>
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<td></td>
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<td></td>
<td>Belagah Kannada – 35</td>
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<td></td>
<td></td>
<td></td>
<td>Mysore – 50</td>
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<td></td>
<td></td>
<td></td>
<td>Kodag – 10</td>
<td></td>
</tr>
</tbody>
</table>

Total Sample size for the study = 734
Sampling

Sample is a part of the population, or a subset from a set of units, provided by some process or other, usually by a deliberate selection with the object of investigating the properties of the parent population or set. This section will present the Sampling methods, population of interest (Sampling unit), sample selection, questionnaire development, and execution procedures.

In practice, the concept of supply chain management in Indian food processing industries is in its infancy stage. Because of the complexity and the broad area of supply-chain; the design of the study should encompass the maximum diversity and calls for inclusion of various constituents of the supply chain. Hence in this study, three major components of supply chain have been considered, namely, Procurement, Production, and Distribution. The various important constituents considered under these three major components of supply chain are farmers, procurement intermediaries in case of procurement, primary and secondary processing units in case of production and distribution intermediaries and retailers in case of distribution.

Quota sampling method is employed for the whole study by assigning appropriate quotas to each of the major components and constituents identified. It is typically used to assure that all the components and constituents are adequately and appropriately represented keeping in mind the total size of the sample which should be in manageable limits and also without sacrificing the character of the study. The quota is the exact number or minimum number of units to be selected. Quota sampling is a form of non-probability sampling frequently used in settings where it is difficult to obtain a sampling frame. A Sampling frame is a means of representing the elements of the population. A sampling frame may be a telephone book, a city directory, an employee register, etc. A perfect sampling frame is one in which every element of the population is represented or complete listing of all members of the population (Dorothy and Hubert, 2001). The Quota sampling is a special form of Stratified cum Purposive sampling or Judgement sampling and thus enjoys the benefits of both. The selection of the samples of various constituents’ also calls for purposive sampling (Silverman, 2000) based on a ‘best practice’ approach (Bateman, 2001) whereby the firms employing best practices were to be selected as participants. But Quota sampling is a restricted type of Judgement sampling; it suffers all the limitations of the Judgement or Purposive sampling (Gupta, 2004). To reduce the limitations of
biasedness because of personal beliefs and prejudices of the investigator, enough consultations were made with Agri-experts, Industry-experts and Subjects experts in selection of the Sample units and sizes.

Within the broad classification, proportionate stratified sampling has been used for selecting the samples from the major constituents of the supply chain.

A proportionate stratified random sampling is one where the population is divided into mutually exclusive and mutually exhaustive strata or sub-groups and drawing simple random sample from each group. The stratified sampling ensures the representative character of the sample with respect to property which forms the basis of classifying the units and characteristics of each of the sub-groups can be estimated and comparisons made. If a population from which a sample to be drawn does not constitute a homogeneous group, stratified sampling technique is generally applied in order to obtain a representative sample. Under stratified sampling the population is divided into several sub-populations (different sub-populations are called ‘strata’) and then we select items from each stratum to constitute a sample. Since each stratum is more homogeneous than the total population and by estimating more accurately each component parts, we get a better estimate of the whole. In brief, the stratified sampling results in more reliable and detailed information. It may be noted that stratification does not mean absence of randomness. All that it means is that the population is first divided into certain strata and then simple random sample is selected within each stratum of the target population. (Beri, 2010)

The major issues in proportionate stratified random sampling are the stratification of the universe into different strata or sub-groups and determination of the sample sizes from different strata. In this study, for all the major components of the supply chain identified, the target population is divided into different strata on the basis of geographical areas or administrative divisions of the state. The strata are purposively formed and are based on the experiential survey conducted by the researcher and the personal judgement of the researcher. The sizes of the sample in each constituent of the supply chain are in the same proportion as they exist in the population. The basis of the strata identified and selection of the sample size in all the components of the supply chain identified are discussed in detail in the later section of this part of the study.
PROCUREMENT – Farmers & Procurement-intermediaries

Selection of the districts

Wheat has been grown in the following 15 of the 27 districts of Karnataka. They are Belgaum, Bijapur, Bagalkot, Gadag, Dharwad, Gulbarga, Bidar, Koppal, Chitradurga, Bellary, Raichur, Haveri, Davanagere, Chikmagalur, Mandya. The top five wheat producing districts namely Belgaum, Bijapur, Bagalkot, Gadag, and Dharwad have been considered for the study.

District profiles

**Belgaum** is the largest producer of wheat in Karnataka state. Some of the other important crops grown in Belgaum are Paddy, Ragi, Jowar, Bajra, Maize, Minor millets, Gram, Tur, Other pulses, Groundnut, Sugar, and Cotton. Wheat is the fourth largest crop grown in terms of area, after Jowar, Maize, and Sugarcane and fourth in terms of production, after Sugarcane, Maize, and Jowar.

The agricultural holding patterns in Belgaum is dominated by marginal farmers with 41.59%, followed by small farmers with 27.36%, semi-medium farmers with 19.20%, medium farmers with 9.43% and larger farmers with 1.31%.


There are 47 Agricultural regulated markets in the districts in which 10 are main markets and 37 are sub-markets. The turnover in these markets for the year 2006-07 was Rs.34823.26 Lakhs

There are about 267 traders, 1 broker, 103 exporters, 147 importers, 47 stockists, 189 commission agents, and 409 retailers in the Belgaum market.

The market is conveniently located and is at a distance of 8 Kms from the railway station and 2 Kms from the state highway. The mode of transportation generally adopted is by road.

**Bijapur** is the second largest producer of wheat in Karnataka state. Some of the other important crops grown in Bijapur are Paddy, Jowar, Bajra, Maize, Gram, Tur, and other pulses, Groundnut, Sugar, and Cotton. Wheat is the fifth largest crop grown in terms of area, after Jowar, Gram, Bajra, and Groundnut and sixth in terms of production, after
Jowar, Sugarcane, Maize, Gram, and Bajra.

The agricultural holding patterns in Bijapur are marginal farmers with 12.51%, small farmers with 32.81%, semi-medium farmers with 32.20%, medium farmers with 19.19%, and larger farmers with 3.28%.


There are 17 Agricultural regulated markets in the districts in which 3 are main markets and 14 are sub-markets. The turnover in these markets for the year 2006-07 was Rs.12542.83 Lakhs.

There are about 292 traders, 269 exporters, 265 importers, 275 stockists, 177 commission agents, and 49 retailers in the Bijapur market.

The market is conveniently located and is at a distance of 3 Kms from the railway station and is on the NH-13 national highway. The mode of transportation generally adopted is by road.

**Bagalkot** is the third largest producer of wheat in Karnataka state. Some of the other important crops grown in Bagalkot are Paddy, Jowar, Bajra, Maize, Minor Millets, Gram, Tur, and other pulses, Groundnut, Sugar, and Cotton. Wheat is the seventh largest crop grown in terms of area, after Jowar, Maize, Sugarcane, Bajra, Gram, and Groundnut and fourth in terms of production, after Sugarcane, Maize, and Jowar.

The agricultural holding patterns in Bagalkot are marginal farmers with 27.87%, small farmers with 32.20%, semi-medium farmers with 25.70%, medium farmers with 12.51% and larger farmers with 1.71%.

The average yield of wheat(Kg/Ha) for the year 1999-2000, 2000-2001, 2001-2002, 2002-2003, and 2003-2004 were 1457, 1633, 1424, 1461, and 1261 Kg/Ha respectively.

There are 20 Agricultural regulated markets in the districts in which 5 are main markets and 15 are sub-markets. The turnover in these markets for the year 2006-07 was Rs.17082.62 Lakhs.

There are about 187 traders, 50 exporters, 33 importers, 75 stockists, 96 commission agents, and 48 retailers in the Bagalkot market.
The market is conveniently located and is at a distance of 3 Kms from the railway station and is 0.5 Kms from the state highway. The mode of transportation generally adopted is by road.

**Gadag** is the fourth largest producer of wheat in Karnataka state. Some of the other important crops grown in Gadag are Paddy, Ragi Jowar, Bajra, Maize, Minor Millets, Gram, Tur, and other pulses, Groundnut, Sugar, and Cotton. Wheat is the fifth largest crop grown in terms of area, after Jowar, Groundnut, Gram, and Cotton and third in terms of production, after Maize, Jowar.

The agricultural holding patterns in Gadag are marginal farmers with 18.54%, small farmers with 35.32%, semi-medium farmers with 29.11%, medium farmers with 14.84% and larger farmers with 2.18%.


There are 22 Agricultural regulated markets in the districts in which 5 are main markets and 17 are sub-markets. The turnover in these markets for the year 2006-07 was Rs.20764.32 Lakhs.

There are about 368 traders, 282 exporters, 296 importers, 313 stockists, 216 commission agents, and 609 retailers in the Gadag market.

The market is conveniently located and is at a distance of 1 Km from the railway station and is 0.5 Kms from the state highway. The mode of transportation generally adopted is by road.

**Dharwad** is the fifth largest producer of wheat in Karnataka state. Some of the other important crops grown in Dharwad are Paddy, Ragi, Jowar, Maize, Minor Millets, Gram, Tur, and other pulses, Groundnut, Sugar, and Cotton. Wheat is the fourth largest crop grown in terms of area, after Cotton, Gram, and Jowar and seventh in terms of production, after Maize, Sugarcane, Cotton, Rice, Gram, and Jowar.

The agricultural holding patterns in Dharwad are marginal farmers with 20.84%, small farmers with 32.24%, semi-medium farmers with 27.66%, medium farmers with 16.49%, and larger farmers with 2.77%.

respectively.

There are 16 Agricultural regulated markets in the districts in which 5 are main markets and 11 are sub-markets. The turnover in these markets for the year 2006-07 was Rs.29635.44 lakhs.

There are about 233 traders, 112 exporters, 165 importers, 184 stockists, 128 commission agents, and 233 retailers in the Dharwad market.

The market is conveniently located and is at a distance of 3 Kms from the railway station and is on NH-4 national highway. The mode of transportation generally adopted is by road.

It has been observed in Karnataka that the Marginal land holding, Small holding, Semi-medium numbers have increased tremendously, while the number of large holdings decreased from 1980-81 to 2000-01. The total area has been marginally increased from 11746 to 12307 thousand hectares from 1980-81 to 2000-01. The net irrigated area has increased substantially from 1212 to 2820 from 1980-81 to 2004-05.

Selection of the farmers

In this study the eligible participants are farmers of all the categories which include Marginal farmers, Small farmers, Medium farmers, Large farmers, Very large farmers from the five large wheat producing districts of Karnataka state.

Proportionate stratified sampling method has been employed in selection of samples. The sample frame was the village-wise crop area data which is compiled from the source document of RTC (Pahani), recorded and submitted by the Village Accountants to Tahsildars in the respective districts.

Table No.1.4 Sampling distribution - Farmers

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>District</th>
<th>Total output (In Tonnes)</th>
<th>Proportions</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Belgaum</td>
<td>59112</td>
<td>32.37</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>Bijapur</td>
<td>44599</td>
<td>24.42</td>
<td>65</td>
</tr>
<tr>
<td>3</td>
<td>Bagalkot</td>
<td>32903</td>
<td>18.01</td>
<td>45</td>
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<tr>
<td>4</td>
<td>Gadag</td>
<td>24519</td>
<td>13.42</td>
<td>35</td>
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<td>5</td>
<td>Dharwad</td>
<td>21470</td>
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<tr>
<td>Total</td>
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<td>182603</td>
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</table>

Selection of the procurement-intermediaries

The eligible participants in the study were Traders, Brokers, Stockists, Commission Agents, Primary market wholesalers, Urban market wholesalers at the APMC markets
from the five large wheat producing (dealing) districts of Karnataka state were selected for the study. Bangalore district was selected as the sixth district for the study, as its contributions to the wheat trade in Karnataka accounts to almost 65 percent.

Proportionate stratified sampling method has been employed in the selection of samples. The sample frame was the data available at the APMC markets of the respective districts.

Table No.1.5 Sampling distribution – Procurement-intermediaries

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>District</th>
<th>Turnover (Rs. in Lakhs)</th>
<th>Proportions</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Belgaum</td>
<td>34823.26</td>
<td>10.35</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Bijapur</td>
<td>12542.83</td>
<td>3.72</td>
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<tr>
<td>3</td>
<td>Bagalkot</td>
<td>17082.62</td>
<td>5.07</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Dharwad</td>
<td>29635.44</td>
<td>8.81</td>
<td>10</td>
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<tr>
<td>5</td>
<td>Gadag</td>
<td>20764.32</td>
<td>6.17</td>
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<td>6</td>
<td>Bangalore</td>
<td>221616.54</td>
<td>65.86</td>
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<td>Total</td>
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<td>336465.01</td>
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<td>100</td>
</tr>
</tbody>
</table>

PRODUCTION - Processors

Selection of the Primary processing units (Wheat roller flour mills):

Milling is one of the most important links in the wheat supply chain. The milling or wheat processing is to convert wheat into flour, maida. To critically appraise various aspects in terms of multitudes and magnitude of the supply chain management and to study the issues & challenges which are essential in strengthening the supply chain linkages, the size of the respondent firms should be large enough to contribute expected information to fulfill the requirements of the study. As per the Karnataka Roller Flour Mills Associations members’ directory, there are about 57 large wheat flour mills in the state and about 60% of the large wheat flour mills are located in Bangalore and Mysore districts. Hence the eligible participants in the study were large wheat flour mills located in these two districts. Complete enumeration method has been employed in the selection of the samples.

Table No.1.6 Sampling distribution – Primary processing units

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Districts</th>
<th>Numbers of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bangalore</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>Mysore</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>34</td>
</tr>
</tbody>
</table>

DISTRIBUTION: Distribution-intermediaries & Retailers

Selection of the districts

Bangalore-Urban, Bangalore-Rural, Mysore, Kodagu and Dakshina Kannada districts of Karnataka State
District profiles

**Bangalore urban** district has 3 taluks - Bangalore north consisting of Dasarahalli, Yelahanka, and Byataraynapura; Bangalore south consisting of Kengeri, Krishnarajapura, Mahadevapura, and Bommanahalli and Anekal taluk consisting of Anekal and Pattanagere. According to the Census of India, 2001, Bangalore urban district had a population of 65,37,100 and the projected population at 2011 is 88,59,400. Bangalore urban had an urban population of 57,60,000 and a rural population of 7,77,100. The projected population of this district for the year 2011 by the Census of India is 79,57,900 for Bangalore urban – urban; and for Bangalore urban-rural is 9,01,500. The religion-wise population of Bangalore-urban is Hindu-79.37%, Muslim-13.38%, Christian-5.80%, Jain-1.05%, and others-0.40%. The total literacy of Bangalore-urban is at 83%, while male literacy is at 87.90%, and female literacy is at 77.50%.

**Bangalore rural** district has 8 taluks consisting of Nelamangala, Doddaballapur, Devanahalli, Hosakote, Magadi, Ramanagaram, Channapattana, Kanakapura. According to the Census of India, 2001, Bangalore rural district had a population of 18,81,500 and the projected population at 2011 is 21,33,600. Bangalore rural had an urban population of 4,07,400 and a rural population of 14,74,100. The projected population of this district for the year 2011 by the Census of India is 5,47,200 for Bangalore rural-urban and for Bangalore rural-rural is 15,86,400. The religion-wise population of Bangalore-rural is Hindu-90.03%, Muslim-9.07%, Christian-0.46%, Jain-0.11%, and others-0.34%. The total literacy of Bangalore-rural is at 69.70%, while male literacy is at 79.10%, and female literacy is at 59.80%.

**Dakshina Kannada** district has 5 taluks consisting of Mangalore consisting of Mulki, Mudbidri, Mangalore and Ullal, Bantval, Belthangadi, Puttur, and Sullia. According to the Census of India 2001, Dakshina Kannada district had a population of 18,97,700 and the projected population at 2011 is 22,13,000. Dakshina Kannada had an urban population of 7,29,300 and a rural population of 11,68,400. The projected population of this district for the year 2011 by the Census of India is 9,97,000 for Dakshina Kannada urban and for Dakshina Kannada rural is 12,16,000. The religion-wise population of Dakshina Kannada is Hindu-68.59%, Muslim-22.07%, Christian-8.69%, Jain-0.55%, and others-0.09%. The total literacy of Dakshina Kannada is at 83.40%, while male literacy is at 89.70%, and female literacy is at 77.20%.
Mysore district has 7 taluks consisting of Periyapatna, Hunsur, Krishnarajanagara, Mysore, Heggadadevanakote, Nanjanagud, and Tirumakudal-Narasipur. According to the Census of India, 2001, Mysore district had a population of 26,41,000 and the projected population at 2011 is 30,59,500. Mysore had a urban population of 9,82,100 and a rural population of 16,58,900. The projected population of this district for the year 2011 by the Census of India is 11,81,100 for Mysore urban and for Mysore rural is 18,78,400. The religion-wise population of Mysore is Hindu-87.44%, Muslim-8.97%, Christian-1.32%, Jain-0.57%, and others-1.80%. The total literacy of Mysore is at 78.00%, while male literacy is at 83.70%, and female literacy is at 72.30%.

Kodagu district has 3 taluks consisting of Madikeri, Somavarpet, and Virajpet. According to the Census of India, 2001, Kodagu district had a population of 5,48,600 and the projected population at 2011 is 6,18,100. Kodagu had a urban population of 75,400 and a rural population of 4,73,200. The projected population of this district for the year 2011 by the Census of India is 72,800 for Kodagu urban and for Kodagu rural is 5,45,300. The religion-wise population of Kodagu is Hindu-82.16%, Muslim-14.30%, Christian-3.27%, Jain-0.04%, and others-0.23%. The total literacy of Kodagu is at 63.50%, while male literacy is at 70.90%, and female literacy is at 55.80%.

Selection of Distribution Intermediaries

Eligible participants in the study were Redistributors, Stockists, Wholesalers, Agents of FMCG majors like, HUL, ITC, Britannia industries limited, Procter & Gamble, MTR, KOF, Godrej Pillsbury, SmithKline & Beecham, PepsiCo, Coca-cola, Emami, etc. and other unorganized players of the five districts of Karnataka state chosen for study. Proportionate stratified sampling method has been employed in selection of the samples.

As no sampling frame was available, intermediaries’ lists were collected from the above mentioned players and randomly selected according to the proportion of the population of the selected five districts. Proportionate stratified sampling method has been employed in selection of the samples.

Table No.1.7 Sampling distribution – Distribution-intermediaries

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Districts</th>
<th>Population</th>
<th>Proportions</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bangalore Urban</td>
<td>6537100</td>
<td>48.40</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>Bangalore Rural</td>
<td>1881500</td>
<td>13.93</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Dakshina Kannada</td>
<td>1897700</td>
<td>14.05</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>Mysore</td>
<td>2641000</td>
<td>19.55</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Kodagu</td>
<td>548600</td>
<td>4.06</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>13505900</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Selection of Retailers

Eligible participants in the study were Provision stores, General stores, Kirana shops, Supermarkets, Hypermarkets, and other retail formats dealing with wheat related products available from the five districts-Bangalore, Mandya, Mysore, Kodagu, and Dakshina Kannada which were selected for the study. Proportionate stratified sampling method has been employed in selection of the samples according to the proportion of the population of the selected five districts. The total sample size of retailers was kept at 250.

Table No.1.8 Sampling distribution – Retailers

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Districts</th>
<th>Population</th>
<th>Proportions</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bangalore Urban</td>
<td>6537100</td>
<td>48.40</td>
<td>120</td>
</tr>
<tr>
<td>2</td>
<td>Bangalore Rural</td>
<td>1881500</td>
<td>13.93</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>Dakshina Kannada</td>
<td>1897700</td>
<td>14.05</td>
<td>35</td>
</tr>
<tr>
<td>4</td>
<td>Mysore</td>
<td>2641000</td>
<td>19.55</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>Kodagu</td>
<td>548600</td>
<td>4.06</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>13505900</td>
<td>100</td>
<td>250</td>
</tr>
</tbody>
</table>

The research process

As per the research plan five semi-structured questionnaires were prepared for five major constituents of the supply chain identified namely, farmers, procurement-intermediaries, processors, distribution-intermediaries and retailers. The first stage in the development of questionnaires involved in-depth discussion on the framework of the questionnaire with the guide, agri-experts, food-experts, industry-experts, and subject experts, resulting in detailed listing of important information and key issues which are incorporated into the initial questionnaire. The second stage involved the pre-testing and revision of the initial questionnaires. To ensure its relevance and effectiveness, the questionnaires were pre-tested on a representative sample of the industry. Pre-testing of all the questionnaires took place during January 2008-to-June 2008. Feedback and suggestions by respondents were sought and the questionnaire suitably modified before conducting the survey.

Feedback and suggestions by respondents were sought and the questionnaire suitably modified before conducting the survey. Refinements were made upon their responses in the questionnaires which were administered to check for appropriate form, wording, order, and duration to answer the questions. The questionnaire was validated in terms of face validity and content validity before using it for survey. The instrument was in English. The respondents were briefly explained and left for self-administered completion by the respondents themselves. And in some cases, as and when there is hesitation on the part of
respondents to answer on their own, either because of lack of proficiency in English (in some cases of farmers, procurement-intermediaries, distribution-intermediaries and retailers) or for their inability to understand some management related questions which they were unable to answer, researchers collected the information by explaining to the respondents questions in their local language i.e. Kannada.

The research instrument was a semi-structured questionnaire consisting of questions to fulfil the objectives set. According to the type of information to be collected, open-ended, closed-ended, multiple-choice type questions, ranking and Likert scale are included in the study. A 5-point Likert scale is extensively used in all the questionnaires to ensure higher statistical variability among the survey responses. The Likert scale is designed to measure the intensity with which an attitude is expressed. This scale consists of a number of statements which express either favourable or unfavourable attitudes towards the object of the study. It provides more precise information about a respondent's degree of agreement, (Rensis Likert, 1932). A copy of the instruments administered to respective respondents is presented in Annexure.

The farmers and procurement-intermediaries survey took place during January 2009-to-December 2009 in all the identified five districts, namely, Belgaum, Bijapur, Bagalkot, Gadag, and Dharwad from the farmers and six districts (markets), namely, Belgaum, Bijapur, Bagalkot, Gadag, Dharwad and Bangalore from the procurement-intermediaries. The primary processors survey took place January 2009-to-March 2010 from all identified respondents in Bangalore and Mysore districts. The distribution-intermediaries and retailers survey took place during January 2009-to-March 2010 in all the identified five districts, namely, Bangalore Urban, Bangalore Rural, Dakshina Kannada, Mysore, Kodagu of Karnataka state.

The response rate in farmers, distribution-intermediaries and retailers survey was 100% and the response rate for procurement-intermediaries and processors survey was 51% and 94% respectively.

In the survey, the data were collected through the questionnaire from the eligible respondents. Whenever there was difficulty in obtaining the information from the respondents or hesitation from the respondents to provide the information, the information was collected from the organizations through key informants. Reliance on the key informant technique is widely popular in marketing research. Each completed
questionnaires collected from the respondents were systematically edited for completeness, consistency, and legibility, and in some cases when there was confusion/clarification in the responses, callbacks were made for verification.

The primary data collected from the respondents of the identified constituents of the supply chain are evaluated and analyzed with appropriate statistical tools to arrive at the conclusion. Data summarizations and data association techniques such as percentages, mean, median, standard deviation, percentage mean, rankings, ratings on various supply chain related issues, Chi-square test, Fisher’s Exact test, F-test, Kruskal-Wallis test, etc. are extensively used for testing the hypothesis and to draw the inferences from the data.

Limitations of the study

Despite all the best possible efforts to make it comprehensive and scientific, the research has come across some of the following limitations,

- In this research, a single respondent of an organization was asked to respond to the complex supply chain management issues dealing with all the participants across the chain, including upstream suppliers and downstream customers. Therefore, the use of a single respondent may generate some measure of inaccuracy.

- The sample population being just a representative of the whole population meant that the findings cannot be generalized. On many issues in the research, subjective opinions of the respondents were relied upon and the bias responses from the respondents if any, might lead to certain errors.

- The geographical domain of the study is confined only to the state of Karnataka and the results of the study cannot be extrapolated to supply chains in other states or in India as a whole.
Out line of the dissertation

This section outlines the organization of the dissertation.

Chapter 1 presents an introduction to the subject matter of the thesis, the need for the proposed research, statement of the problem with the objectives set, nature of the study, demarcation of the study, the frame work for the study, the uniqueness of the research frame work, methodology used in the research process, limitations of the study and the layout of the thesis.

Chapter 2 presents the profile of the major components and constituents of the supply chain with the key issues, problems, challenges, and opportunities it is facing. This chapter is also intended to provide background information for developing the research frame work for the study.

Chapter 3 presents the profile of the various drivers of the supply chain with key issues, challenges, and opportunities it is facing. This chapter is also intended to provide background information for developing the research frame work for the study.

Chapter 4 presents the review of the literature pertaining to the research problem, its objectives, and research frame works, findings, etc.

Chapter 5 presents the data analysis and interpretation with discussion on major findings of the study. The primary data collected from the survey are evaluated and analyzed with appropriate statistical tools to arrive at meaningful conclusions. The discussions on major findings of the research are presented with appropriate recommendations for the problems identified in this research.

Chapter 6 presents the conceptualization of strategies for energizing the supply chain management in food processing industries. This section has two parts. The first part presents food value analysis across the supply chain to assess the opportunities and possible approaches to make significant improvements in the efficiency and competitiveness of food value chains and the second part presents a generic model of supply chain to connect the farmers and the consumers through Corporate-SHG network linkage.

Chapter 7 presents the concluding remarks with identification of scope and directions for further research.