

**MARKETING MANAGEMENT OF PESTICIDES IN  
DHARWAD DISTRICT**

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**MARKETING MANAGEMENT OF PESTICIDES IN  
DHARWAD DISTRICT**

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IN  
AGRIBUSINESS**

***BY***

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**CERTIFICATE**

This is to certify that the thesis entitled “**MARKETING MANAGEMENT OF PESTICIDES IN DHARWAD DISTRICT**” submitted by Mr. MOHASIN A. HOSURKAR, for the degree of **MASTER OF BUSINESS ADMINISTRATION** in **AGRIBUSINESS** to the University of Agricultural Sciences, Dharwad is a record of research work carried out by him during the period of his study in this University, under my guidance and supervision, and the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

**DHARWAD  
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Gratitude takes three forms, "A feeling from the heart, an expression in words and a giving in return....."

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# CONTENTS

Sl. No.	Chapter Particulars
	CERTIFICATE
	ACKNOWLEDGEMENT
	LIST OF ABBREVIATIONS
	LIST OF TABLES
	LIST OF FIGURES
1.	INTRODUCTION
2.	REVIEW OF LITERATURE
	2.1 Market structure of pesticide dealers
	2.2 Pesticide purchasing behaviour of farmers
	2.3 Product promotion measures adopted by different pesticide firms
	2.4 Problems faced by farmers in purchasing the pesticides
3.	METHODOLOGY
	3.1 Description of the study area
	3.2 Nature and sources of data
	3.3 Sampling Procedure
	3.4 Analytical tools and techniques employed
4.	RESULTS
	4.1 Market structure of pesticides dealers
	4.2 Pesticide purchasing behaviour of farmers
	4.3 Product promotion measures adopted by different Pesticide firms
	4.4 Problems faced by farmers in purchasing the pesticides
5.	DISCUSSION
	5.1 Market structure of pesticides dealers
	5.2 Pesticide purchasing behaviour of farmers
	5.3 Product promotion measures adopted by different pesticide firms
	5.4 Problems faced by farmers in purchasing the pesticides and suggest suitable policy measures
6.	SUMMARY AND POLICY IMPLICATIONS
	REFERENCES

## LIST OF ABBREVIATIONS

<b>CR</b>	: Concentration Ratio
<b>FAO</b>	: Food and Agricultural Organization
<b>FYM</b>	: Farm Yard Manure
<b>GDP</b>	: Gross Domestic Product
<b>IFFCO</b>	: Indian Farmers Fertilizers Co-operative Limited
<b>IPM</b>	: Integrated Pest Management
<b>KAIC</b>	: Karnataka Agro Industries Corporation
<b>KCC</b>	: Kisan Call Centre
<b>KSCMF</b>	: Karnataka State Co-operative Marketing Federation
<b>MNC</b>	: Multinational Corporation
<b>RSK</b>	: Raita Samaparka Kendra
<b>UK</b>	: United Kingdom
<b>UPL</b>	: United Phosphorous Limited
<b>USA</b>	: United States of America

## LIST OF TABLES

Table No.	Title
3.1	Salient features of the study area
3.2	Land utilization pattern in the study area
3.3	Cropping pattern in the study area
3.4	Area irrigated by different sources in the study area
4.1	Distribution of pesticide dealers in Dharwad taluk during 2015-16
4.2	Distribution of pesticide dealers in Hubli taluk during 2015-16
4.3	Distribution of pesticide dealers in Kalaghatgi taluk during 2015-16
4.4	Distribution of pesticide dealers in Navalgund taluk during 2015-16
4.5	Distribution of pesticide dealers in Kundgol taluk during 2015-16
4.6	Distribution of pesticide dealers in Dharwad district during 2015-16
4.7	Purchase pattern of pesticides by the farmers
4.8	Farmers preference for purchasing of pesticides
4.9	Pesticide companies preferred by the farmers for purchasing of pesticides in Dharwad district
4.10	Promotional measures for the purchase of pesticides by the farmers in Dharwad district
4.11	Farmers consultation with dealers during purchase of pesticides
4.12	Reasons for purchasing chemical pesticides over bio-pesticides
4.13	Product promotion measures preferred by different pesticide dealers
4.14	Dealers opinions regarding the promotional strategies implemented by the pesticide companies
4.15	Problems faced by farmers in purchasing the pesticides from agro dealers
4.16	Problems faced by farmers in purchasing the pesticides from Raita Samparka Kendra (RSK)
4.17	Problems faced by pesticide dealers while selling pesticides

## LIST OF FIGURES

<b>Figure No.</b>	<b>Title</b>
3.1	Map showing the study area
4.1	Distribution of pesticide dealers in Dharwad taluk during 2015-16
4.2	Distribution of pesticide dealers in Hubli taluk during 2015-16
4.3	Distribution of pesticide dealers in Kalaghatgi taluk during 2015-16
4.4	Distribution of pesticide dealers in Navalgund taluk during 2015-16
4.5	Distribution of pesticide dealers in Kundgol taluk during 2015-16
4.6	Distribution of pesticide dealers in Dharwad district during 2015-16

# 1. INTRODUCTION

India is predominantly an agrarian economy with nearly 70 per cent of the people depending on agriculture and around 65 per cent of the population living in rural areas. Agriculture sector contributed nearly 17.9 per cent of gross domestic product (GDP) during the year 2016. In order to meet the ever increasing demand for food and fodder, efficient management of inputs like high yielding variety seeds, irrigation, fertilizers and crop protection chemicals are important. In the absence of recommended usage of chemicals, the positive effects of these inputs get nullified if there is severe attack of pests and diseases on the crop.

Agriculture is the mainstay of the Indian economy. It is a formidable task to ensure food security for 1.34 billion Indian people with shrinking cultivable land resources and this necessitates the use of high yielding variety of seeds, balanced use of fertilizers and judicious application of quality pesticides along with education to farmers for the implementation of modern farming techniques. For each acre of land there are 50 to 300 million buried weeds. Crop or plant have to compete with 30,000 species of weeds, 3,000 species of nematodes and 1,00,000 species of plant eating insects. 25 to 40 per cent of crop output is lost due to the attack of pests and diseases during 2015-16 ([www.ficci.com](http://www.ficci.com)). To minimize these losses and to enhance yield it is essential to use crop protection chemicals. Pesticides are the chemicals that kill or destroy the pests, even though the pesticides are poisonous chemicals, they are major saviour of humankind as they have helped us to keep up with the food demands of the growing population. Pesticides are our evil necessity which we cannot do without it. Pesticides are relied upon for various purposes namely increasing agriculture production, forestry, public health, *etc.* In the absence of pesticides the humans, plants and animals would suffer from various diseases.

Food and Agricultural Organization (FAO) has defined the term of pesticide as any substance or mixture of substance intended for preventing, destroying or controlling any pest, including vectors of human or animal disease, unwanted species of plants causing harm during the production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products, animal feed stuffs or substances which may be administered to animals for the control of pest, arachnids or other pest in or on their bodies. It includes substances intended for the plant growth regulator, defoliant or agent for thinning fruit or preventing the premature fall of fruit. These substances applied to crops either before or after harvest and also used to protect the commodity from deterioration during storage and transport ([www.fao.org](http://www.fao.org)).

Types of plant protection chemicals

**Insecticides:** Insecticides provide protection to the crops from the insects either by killing them or by preventing their attack. They help in controlling the pest population below a desired threshold level.

**Fungicides:** Fungi are the most widespread causes of crop loss across the world. Fungicides protect the crops from the attack of fungi and can be of two types: protectants and eradicates, these prevent or inhibit fungal growth and kill the pathogen by application. This in turn improves productivity, reduces blemishes on crop and improves storage life and quality of harvested farm product.

Herbicides: Herbicides also called as weedicides used to kill undesirable plants. They can be of two types: selective and non-selective. Selective herbicides kill specific plants, leaving the desired crop unharmed, while non-selective herbicides are used for widespread clearance of ground and are used to control weeds before crop planting.

Others: Fumigants and rodenticides are the chemicals which protect the grains from pest attacks during crop storage. Plant growth regulators help in controlling or modifying the plant growth process and are usually used in cotton, paddy and fruit crops.

Pesticides provide benefits to producers through prevention of yield losses, improved crop quality, enhanced market opportunities and an improved net return. To avoid crop losses, farmers have to use pesticide at optimum level in appropriate time. To achieve high yield without crop losses, farmers need to practice proper pesticide management and they must have proper knowledge of product and its usages like right pesticide, right time of usage, the right equipment and the right method of spraying.

The role of pesticides in crop production is important as it is a protective umbrella for other inputs. A crop could be attacked by a number of pests, which appear at different stages of crop growth but their virulence varies widely. The loss sustained by the crop depends upon the extent and pest attack. If the attack is of epidemic nature, there may be total crop loss, inspite of all other inputs being optimal. Timely and judicious use of pesticides can save the crop from such disasters. Hence, pesticides play a crucial part in the agribusiness input industry and progressive efforts are made to improve pesticides marketing management in agriculture sector.

India is the fourth largest global producer of pesticides after U.S.A, Japan and China. This segment generated a value of US\$ 4.4 billion in 2015 and is expected to grow at 7.5 per cent per annum to reach US\$ 6.3 billion by 2020. While the domestic demand is expected to grow at 6.5 per cent per annum, exports are estimated to grow at 9 per cent per annum during the same period (Anon., 2016).

In India, there are about 125 technical grade manufacturers, 800 formulators, over 1,45,000 distributors. 60 technical grade pesticides are being manufactured indigenously. Technical grade manufacturers sell high purity chemicals in bulk to formulators. Formulators, in turn, prepare formulations by adding inert carriers, solvents, surface active agents, deodorants *etc.* These formulations are packed for retail sale and brought to the farmers (Anon., 2016).

The production of pesticides in India is 1,86,830 million tonnes during 2014-15. Approximately 50 per cent of the demand comes from domestic consumers, while the rest goes towards exports (Anon., 2015).

The worldwide consumption of pesticides is about two million tonnes per year out of which 48 per cent is used by Europe alone, 25 per cent is consumed in USA and 27 per cent in the rest of the world. In which 47.5 per cent is the share of herbicides, 29.5 per cent is the share of insecticides, 17.5 per cent is of fungicides and others account for 5.5 per cent. The maximum usage of pesticides in Taiwan 17 kg/ha followed by China 12 kg/ha, globally, the pesticides cover only 25 per cent of the cultivated land area (Anon., 2016).

Globally India shares around 3.75 per cent of the pesticides. The usage of pesticide in India is 0.6 kg/ha. The total pesticide consumption in India is around 54,532 metric tonnes, out of which 65 per cent are in the form of insecticides, 16 per cent are herbicides, 15 per cent are fungicides and 4 per cent are others. The highest consumption of pesticide in India was found in Maharashtra viz., 11,665 metric tonnes and lowest consumption was found in Andaman and Nicobar Islands viz., 13.5 metric tonnes. The consumption of pesticide in Karnataka viz., 1,283 metric tonnes in 2015-16 ([www.indiastat.com](http://www.indiastat.com)).

In India, about 45 per cent of the pesticides consumption in cotton, followed by paddy 22 per cent, vegetables 9 per cent, plantations 7 per cent, wheat 4 per cent, pulses 4 per cent and other crops 9 per cent which account for the rest of the pesticides consumption in India ([www.ficci.com](http://www.ficci.com)).

The market structure of pesticides is also an important factor that influence the greater extent of use of pesticides by the farmer as the concentration of pesticide dealers in the market ultimately determines their pricing and the products promotion activities taken up for the benefit of the farmers. It is also important to note that economic viability of using pesticides is the prime factor that derives the pesticides adoption in the long run. As such, the identification of farmers specific characteristics relevant to pesticides adoption behaviour would through light on various issues surrounding the marketing and usage of pesticides. It will also help understand the need to motivate farm operators to use pesticides.

Marketing management of pesticides is a system of interacting activities of agencies which moves the pesticides from place of production to the ultimate buyer. Hence, distribution system is the nucleus of marketing system. Marketing wing of any pesticide company has a greater responsibility to make availability of pesticides to farmers at right time, right place and right price. The distribution system involves a number of channels, marketing functionaries and interaction between them. Hence, the choice of right distribution channel is of paramount importance to the manufactures. Distribution channel plays a strategic role in the effective performance of pesticide marketing system. The pesticide distribution channel take possession of goods on certain specified terms and conditions like issue price, distribution margin, credit period, discount if any *etc.* The strategies and the policies followed by the pesticides distribution channel have to be in consonance with the marketing operations of the manufactures.

The most common source of farmer procurement of pesticides is through local agricultural supply dealers. The dealer plays an important role not only in the distribution of pesticides but as an important source of information about the products and their uses. The retail sales point being the last element in the distribution forms the most important link between pesticide manufactures and buyers. The farmer looks at the dealer as his friend. The involvement of retailers in any undesirable activity like sales of various pesticides exorbitant interest over the credit sales have played havoc and resulted in many farmers committing suicide.

The large number of end users and the predominantly generic nature of the market make it essential to have a strong and efficient distribution network for the crop protection market. However, the industry has been faced by problems arising out of supply chain inefficiencies and inadequate

infrastructure. Lack of efficient distribution system also makes it difficult for pesticide companies to reach out the farmers and promote their products and educate them about their benefits.

Therefore, movement of pesticides from various manufacturing units and places to the ultimate user points covering large distances in the most economical manner, while maintaining the chemical and physical properties of the product in an acceptable package and ensure its timely availability is by no means an easy task. The complexity of the problem is bound to increase in the near future in view of the projected consumption of inputs in the country. To develop an effective and economic national distribution system is vital to achieve the desire results. The importance of pesticide marketing system in the transformation of agricultural science thus, needs no over emphasis. It is as important of production and improved agronomic practices to achieve increased agricultural production.

## Special features of the study

The present study has been undertaken on concentration of dealers in pesticide market in the study area as dealers of pesticide act as important source of information to their customers' in providing enough knowledge on effective and safe usage of recommended pesticides. Besides study focuses on farmer's knowledge, purchasing behaviour, greater understanding on the factors of pesticide purchase, decision making in the buying process of pesticides and problems faced by them while purchasing pesticides. Also, efforts made to examine the sales promotion measures undertaken by the pesticide companies and farmers' impressions about such measures could guide the companies in suitably revising their promotional measures.

## Specific objectives of the study

1. To analyze the market structure of pesticides in Dharwad district
2. To study the pesticide purchasing behaviour of farmers
3. To study the various product promotion measures adopted by different pesticide firms
4. To study the problems faced by farmers in purchasing the pesticides and suggest suitable policy measures

## Presentation of the study

The entire study has been presented in seven chapters. In the first chapter, the nature and importance of the present study and the specific objectives of the study have been indicated. Second chapter deals with the review of the relevant research studies connected with the objectives. The third chapter outlines briefly the main features of the study area, the nature and source from which the relevant data have been collected and the statistical tools and techniques employed in the study for evaluating the objectives.

The fourth chapter is devoted for the presentation of analyzed data through different techniques in which relevant details have been compressed and summarized under different tables under appropriate heads. Chapter fifth discusses the results of the study. In the sixth chapter, a brief summary of the main findings of the study have been presented along with the conclusion and the policy implications that emerged from the findings of the study and in the seventh chapter, provides the list of literature referred for the present study is provided.

## 2. REVIEW OF LITERATURE

Marketing management of pesticides plays an important role in agribusiness input industry. Its development in broader perspective can bring about increase in agriculture income. Very few studies have been attempted on pesticide marketing management in India. This chapter throws light on some important research works carried out by various researchers as related to the problem under study. The reviews are presented under the following heads:

- 2.1 Market structure of pesticide dealers
- 2.2 Pesticide purchasing behaviour of farmers
- 2.3 Product promotion measures adopted by different pesticide firms
- 2.4 Problems faced by farmers in purchasing the pesticides

### 2.1 Market structure of pesticide dealers

Padmanaban and Sankaranarayan (1999) studied the market structure for pesticides in Tuticorn district in South Tamil Nadu. In this study they made an attempt to analyze market structure of pesticides at retail level and identified that the market situation was oligopoly, implying that major share of pesticides sale was concentrated with few dealers based on brand name, symbol and colour of the packing material offered by the firms. The farmers were able to differentiate different brands of pesticides. Competition between the existing retailer in retaining the market share and high investment acted as barriers to entry of new retailers.

Bhattacharyya and Paliwal (2000) carried out study on bio-fertilizer marketing. They studied the current market structure for bio-fertilizers. According to them, out of various channels of bio-fertilizer marketing and distribution a state government holds the key because many private organizations did not get suitable returns from sales. They proposed that the marketing efforts should be made via manufacturer to state marketing federation, district level co-operatives to primary cooperative societies and then to farmers. They also proposed the chain of marketing efforts involving state industries corporation, district agro service centres, wholesalers, private retail dealers, volunteer organizations and through own depot outlets.

Handiganur and Kunnal (2000) studied the market structure for chickpea in different markets of Karnataka. The analysis of the market power concentration by the intermediaries revealed that the top four sellers and buyer during lean period controlled more than 50 per cent of the quantity of chickpea transacted in all the markets with exception of Bhalki market. The results of Lorenz coefficient of inequality indicated that the high Lorenz value noticed in some of the markets was the result of few large sized firms sharing the major quantity of produce transacted and turnover made by them. The low value of Lorenz coefficient in some markets inferred that marketing system of chickpea was most competitive due to the fact that arrivals in the market was distributed among more number of intermediaries. The rejuvenation of co-operative societies by linking of credit with marketing and establishment of Karnataka Pulse Growers Federation would go a long way in avoiding the concentration of produce in the hands of few traders.

Kashimanavar (2000) studied that the marketing management in fertilizer distribution in Dharwad district and found that the private sector had highest share 16.82 per cent followed by Karnataka State Co-operative Marketing Federation (KSCMF) 13.52 per cent and Karnataka Agro Industries Corporation (KAIC) 8.85 per cent. Agency-wise growth rate of fertilizer marketing indicated that private sector had shown highest growth rate, whereas the co-operative sector had the highest number of retail outlets.

Elangovan and Zeaudeen (2001) opined that the market structure of groundnut in Ramanathapuram district of Tamil Nadu. The market structure was analyzed by computing the coefficient of inequality from size distribution of buyers of firms, which came down from 0.55 to 0.38 over the study period indicated a steady improvement in the size distribution. It was a greater share towards a greater competitiveness among the buyers.

Huballi (2002) analyzed the market structure for wholesale market of tamarind in Bellary, Gulbarga and Raichur markets. Lorenz curve and Gini coefficient were used to analyze the market power concentration among the different traders in selected markets. The computed value of Gini coefficient for tamarind was found to be 0.32, 0.30 and 0.34 in Bellary, Gulbarga and Raichur markets respectively in 2000-2001. This showed that there was a greater degree of competitiveness in these markets.

Udaya (2002) studied the pesticide marketing in Karnataka and found that the market concentration was least in pesticides sales, with top 10 firm's market share accounting to 25.5 per cent and the market was highly competitive rather than concentrated.

Ananda (2003) studied the structure, conduct and performance of Bangalore silk exchange and found that, with the Gini-coefficient ratio of 0.44 in the case of price and 0.44 in quality handled, Bangalore silk exchange was relatively competitive. However, there was relatively more competition in quality handled than the prices.

Kiran (2003) analyzed market concentration for coconut market in Arsikere and Tiptur markets. The Gini coefficient for commission agents and traders in Arsikere market was found to be 0.05 and 0.16, indicating greater degree of competitiveness of commission agent and traders. The Gini coefficient for both commission agents and traders was 0.01 in Tiptur market, indicating greater competitiveness.

Ravikumar *et al.* (2003) analyzed the structural performance of groundnut in Anakapalle, Adoni and Warangal markets of Andhra Pradesh by taking 30 commission agents and wholesalers from Anakapalle market, 60 commission agents and 75 wholesalers from Adoni market and 75 commission agents and 80 wholesalers from Warangal market. The results revealed that there exists higher degree of competitiveness for groundnut in Adoni market (for both commission agents and wholesalers) and market concentration was low as the arrivals were distributed among more number of intermediaries.

Meena *et al.* (2006) studied the impact of dairy cooperatives on the rural household economy in Alwar District of Rajasthan. The study covered 75 members of milk producers and 75 non-member milk producers from six milk procurement societies existing in the selected villages which were post-stratified into small, medium plus large herd size categories. This clearly indicated that income of the

member group was more equitably distributed as compared to non-member group. In order to quantify the difference between member and non-member group, the Gini-concentration ratio was computed. The Gini-concentration ratio for member group was observed to be lower (0.4841) as compared to the non-member group (0.7532), indicating the income from dairying to be more equitably distributed in member group which could be attributed to the member of dairy cooperative societies being motivated to produce more milk with the facilities extended to them together with realising remunerative price of milk.

Gururaj (2007) conducted a study on market structure for bio-pesticides. The results revealed that 22 per cent of the total number of firms handled 6.11 per cent of the total value of sales of bio-pesticides in Belagavi taluk. Around 74 per cent of the firms handled 52 per cent of the sales and 89 per cent handled around 78 per cent sales and the extent of market power concentration was computed with Lorenz coefficient of inequality which happened to be 0.339 for Belagavi taluk. The coefficient indicated low concentration of market power with dealers.

Raju (2007) carried out a study on vegetable seed marketing in Belagavi district to analyse the market structure for vegetable at dealer's level. The result shows that 11 per cent of the total number of firms handled 3.21 per cent of the total value of sales of vegetable seeds in Belagavi taluk market. While around 11 per cent of dealers handled around 3 per cent of sales of vegetable seeds, half of the total number of dealers accounted for around 28 per cent of sales. However, as the Table reveals around 78 per cent of total number of dealers handled around 60 per cent of total sales and around 89 per cent of total number of dealers handled around 79 per cent of total sales. The extent of market power concentration was computed with the Lorenz coefficient of inequality. This was confirmed by the low value of Lorenz coefficient *i.e.*, 0.287.

Gajendran and Kathiravan (2008), studied monopoly power in the duck egg and meat market structure in Tamil Nadu, the fourth largest duck raising zone of India. The result was analyzed by means of Concentration Ratio (CR) and Hirschman-Herfindahl Index (H index) and in the absence of monopoly, Bain's classification was used to identify the prevailing structure of market. The trader in the channels landed money and other inputs to the farmers and in turn receiving their produce. The 'H' index computed for eggs at farm level was 0.149, while CR was 0.11 indicated the absence of monopoly. The 'H' index and CR for duck meat were 0.163 and 0.132, respectively. Despite the presence of competitive seller and buyer groups, the duck egg and meat marketing system in Tamil Nadu could be termed as 'Pure Competitive' considering the contributing factors such as product differentiation and the degree of market intelligence.

Kanyenga and Mangisoni (2008) assessed market concentration in the tobacco industry of Malawi. Firm level data on annual sales (1996-2006) were collected to compute comparable measures of market concentration to determine the size distribution of buying firms and measure the level of firm concentration in the tobacco industry. The industrial concentration ratios used in measuring market concentration show high concentration and high inequality in market share distribution among firms. The four firm concentration ratios (98 %), Herfindahl – Hirschman Index (3.119) and Gini coefficient (0.57) were all above the cut-off levels. To enhance competition in the tobacco industry, the competition policy needs to be restructured to attract other potential buyers to enter the market. In medium term the tobacco control commission should devise ways of prohibiting mergers that facilitate or strengthen high market concentration.

Reuben and Mshelia (2008) structural analysis of yam markets in southern part of Taraba state, Nigeria. It was specifically identified the degree of product differentiation, market information dissemination and determined the concentration of yam sellers in the markets. A total of 205 respondents comprising of 95 retailers and 110 wholesalers were randomly selected in 2007-08 cropping season. Gini coefficient and Lorenz curve were the analytical tools used. The Gini coefficient of 0.56 and 0.52 were obtained for wholesaling and retailing respectively. The markets therefore exhibit features of imperfect markets of monopolistic competition. To reduce high concentration and income inequality among the sellers especially in wholesale business, funds, security and physical market facilities should be provided to yam markets in the area.

Sudhakara (2011) studied the market structure for systemic pesticides in Kolar district of Karnataka. The results revealed that about 30 pesticide companies operated in the study area with total sales of `27.63 crore during 2010-11. The top seven companies in terms of sales in the study area accounted for 67.50 per cent of the total sales. These companies were MNCs which were highly popular due to which their products had high market penetration power.

Yesufu and Ayanwale (2011) assessed the structure, conduct and profitability associated with the broiler processing market in south western Nigeria in a panel of three years spanning 2004-2006. The market structure was estimated using the market Concentration Ratios and the Gini Coefficient. The results of the market structural parameters showed that the concentration ratios (CR4) values were 94.4 per cent, 94.7 per cent and 93.3 per cent in 2004, 2005 and 2006, respectively, while the Gini Coefficient was 0.90. These parameters showed that there was a high degree of concentration in the industry implying a monopolist market structure.

Prasoon (2013) studied on market share of fertilizer companies. The result shows that out of 32 companies operating in Hoshangabad district 9 were dealing with urea fertilizer so to measure the trade concentration among the companies, Gini coefficient was used and the Gini Coefficient value for urea fertilizer market was 0.3974, which shows that sell of urea by companies were inclined towards perfect equality. It was observed from the Table 4.2 that highest amount of sale was made by IFFCO *i.e.*, 20,076 tonnes of fertilizers and the lowest amount of sale was made by Zuari Agro Chemicals limited *i.e.*, 1,075 tonnes of fertilizers. The bottom four companies in urea fertilizer market account for 74 per cent of market share, while the remaining five companies account for 26 per cent of market share. The value of Gini coefficient represent that each company was having good amount of share in the market. Hence the cumulative distribution of sales was inclined towards perfect equality or good market concentration.

Surjeet (2015) conducted a study on market analysis of pesticides for paddy crop. This research had been done under sponsorship of Excel Crop Care Limited in paddy crop of Kelwara region of Baran district of Rajasthan. The study concluded that UPL, Excel and PI were major players for paddy crop in study area. Total market size was 306 lakh (Fungicides – 147 lakh, Insecticides – 90 lakh and Herbicides – 90 lakh). Market sizes of Excel crop care was about 21.57 per cent for paddy crop.

## 2.2 Pesticide purchasing behaviour of farmers

Rohini and Padmanaban (2001) analyzed the factors responsible for brand and dealer loyalty towards pesticides in Coimbatore district of Tamil Nadu state. The results showed that price of the preferred brand and efficiency of the preferred brand was significant at one per cent level for brand loyalty. The factor advertisement also influenced the brand loyalty at five per cent level. With regard to dealer loyalty, factors such as credit availability and quality of product were significant at one per cent level. The study showed that farmers are loyal to pesticide brands and to pesticide dealers.

Sanjay and Abdul (2002) studied that purchasing decision of branded rice was done by housewives and retailers were the main source of information. Most of consumers preferred to buy 10 kg packs rather than 25 kg. The quality and image of brand were ranked as major factors for brand preference in purchasing of branded rice.

Nandagopal and Chinnaiyan (2003) conducted a study on brand preference of soft drinks in rural Tamil Nadu, used Garret's ranking technique to rank factors influencing the soft drinks preferred by rural consumer. They found that the product quality was ranked as first followed by retail price, good quality and availability were the factors, which influenced the rural consumers of a particular brand of a product.

Sampathkumar (2003) studied about brand preferences in soft drinks in Telangana region of Andhra Pradesh. The study found that in rural market about 37.5 % of consumer preferred Thums-up (urban 30 %) followed by coca cola 28.5 per cent (urban 37.5 %), Pepsi 12.5 per cent (urban 9 %), Limca 4 per cent (urban 8.5 %). Most of the urban consumers purchased soft drinks in nearest kirani stores *i.e.*, 67 per cent (rural 73 %) followed by super bazaar 27 per cent (rural 26 %) and others 6 per cent (rural 1 %). The methods of physical distribution were a very vital role in a company's success and failure in the market.

. Nagaraja (2004) identified the important factors influencing the purchasing of the goods among the rural consumers. The factors were quality, price, easy availability, advertising, use by the neighbour consumers and experience of the own family members. In the rural areas, cinema dialogues, pictures and names of famous heroes and heroines, flowers, symbols, entertainments, quickies, short theatre commercials, TV spots, cricket themes and road shows are used extensively to influence the consumer behaviour. Here the result found that the rural consumer was very much attached and influenced by "touch and feel" aspect of any promotional activity.

Kim *et al.* (2005) analyzed the relationship among brand equity factors such as brand awareness, brand image, brand preference and brand loyalty. They suggested a strategy for brand management in contract food service management companies. They concluded that brand awareness had positive effect on brand image and brand preference and recommended that the contract food service companies should focus on improving brand awareness as a brand strategy. In addition, brand preference and brand image had significant positive effects on brand loyalty. Thus, the companies should strive to strengthen brand loyalty through building brand preference and brand image. Brand loyalty promoted more customer visits, which was directly related to profitability of contract food service management companies, the authors concluded.

Narang (2006) found that, a buyer did not stick to one brand. They should be able recall different brand names when they go for purchase. Repetitive advertising could be used to promote brand recall. The product should be associated with style and trend, so that it appeals to the youth and the brand name should be developed as a fashion statement. Promotional schemes such as discounts and free offers with purchase were suggested to increase rates.

Gururaj (2007) conducted a study on purchase pattern of pesticides in Belagavi district. The results revealed in respect of cabbage, majority 47 per cent of the respondents got the information regarding bio-pesticides from neighbouring farmers. With regards to time of purchase of bio-pesticides, majority (60 %) of the farmers used to purchase it on the day of spray. Regarding the season of purchase of bio-pesticides for Cabbage, that a maximum number of farmers (70 %) made purchases in Kharif season. Around 67 per cent of the respondents purchased bio-pesticides from only one source. The results also indicated that a majority of cabbage growers *i.e.*, around 97 per cent purchased bio-pesticides on cash payments.

Hingley (2007) reported that the brands being an important source of competitive advantage, knowledge of branding was needed to inform their management. Study investigated the role of branding in the industrial purchase of agricultural tractors in the UK. The overall conclusion was that branding could play an important role in industrial purchase decisions, brand name, price, dealer proximity, quality of dealer's service and buyer's experience with the dealer. The conjoint analysis revealed that brand accounts for 38.95 per cent of the purchase decision, ahead of price 25.98 per cent and service 14.90 per cent.

Raju (2007) studied on farmers' preferences for different companies while buying tomato seeds in Belagavi district. The results revealed that around 42 per cent of the farmers opined that they preferred Namadari Seed Company while buying tomato seeds. The golden seed company was the next most preferred company, which was preferred by around 17 per cent of farmers followed by east-west company which was preferred by around 11 per cent respondents. While around 8 per cent preferred J.K. seeds, the Indo-American and Syngenta companies were both preferred by around 6 per cent growers each. The other companies were preferred by the same proportion of farmers.

Khooharo *et al.* (2008) investigated pesticide import trends, marketing margins, incentives of various intermediaries, price index of common insecticides and total outlay of farmers on the purchase of pesticides in Pakistan. The estimation of the quadratic regression model revealed steeper growth trend as compared to that of simple linear regression model. Local companies offered high profit margins up to (30 %) and incentive schemes to dealers to get maximum market share as compared to multinationals (15 %). Multinationals imparted effective training programmes for the capacity building of farmers and dealers. The total outlay of farmers on the purchase of pesticides in Pakistan was estimated at 19.61 billion against the import bill of 8.14 billion for 2003.

Ademola (2009) stated that mood was the knowledge of particular relevance for the understanding of consumer behaviour. This study was essentially used two scales that was attitude towards using advertised products and intention to try advertised products were employed to measure advertising effectiveness. The result revealed that positive mood group had a more positive attitude and greater intention to try advertised products when compared with subjects in the induced negative mood group. This attempt can be made in finding the effect of consumer's mood on advertising effectiveness on TV ad in case of consumers purchase decision.

Shivakumar (2010) studied on brand preference of seeds by farmers in Haveri district of Karnataka state. The results revealed that farmers always look for quality and yield of seed as important factors, which are ranked first and second with a Garret's score of 95.01 and 94.80 per cent. Dealers, observation of neighbours or farmers field and suitable for region had a respective Garret's score of 92.80, 92.33, 92.41, considerably influenced farmers to purchase a particular brand, since both of them are the major source of information about seed brands. Varietal characters, timely availability, price and subsidy also made the farmers to purchase a particular brand and have a Garret's score of 91.81, 90.97, 89.90 and 89.42 respectively. Advertisement and brand image helped to create a recognizable brand with a respective score of 88.26, 87.43 with a rank of tenth and eleventh. Whereas after sales service, based on demand in market and proximity of outlets had a Garret's score of 80.77, 79.57 and 75.20 respectively with little influence on decision making in purchase of a particular seed.

Guo (2011) analysed a research on influencing factors of consumer purchasing behaviour in cyber space. Studied an empirical analysis of the hierarchy model of influencing factors of online shopping which was built by domestic scholars and gets the relative importance of this influencing factor. Outcome of study was that security of online shopping, prices and commercial credit are primary factors influencing consumers purchasing behaviour while genders education levels of consumers and designs of store are the secondary ones.

Abdul and Velayutham (2013) studied that consumer behaviour had an essential criteria in present marketing scenario. Consumers are the kings of markets, without consumers no business organization can run. All the activities of the business concerns end with consumers and consumer satisfaction. They analyse that customer behaviour study was based on consumer buying behaviour, with the customer playing the three distinct roles of user, payer and buyer. Consumer buying behaviour has become an integral part of strategic market planning. In order to develop a framework for the study consumer behaviour it was helpful to begin by considering the evaluation of the field of consumer research and the different paradigms of thought that have influenced the discipline.

Dharmraj *et al.* (2013) studied to identify the factors that affect consumers purchasing behaviour towards agriculture inputs like fertilizer, seeds, agrochemicals, oils and lubricants *etc.* Buying behaviour refers to the act of consumers obtaining and using goods and services and the decision process that determines these acts. Buying decision is a set of many decisions which may involve a product, brand, style, quality, dealer, time, price and mode of payment. Price was the most important consideration at the time of purchasing agriculture inputs followed by packaging, branding, fair billing and home delivery. It can be concluded from the result that the respondents were mainly purchasing the agri-inputs from the cooperative societies of their area. Major reasons for purchasing from cooperative societies included fairness in billing and credit facilities given to the farmers. From the above results, it can be stated that agri-inputs remain a price-sensitive market as factors like quality, brand and packaging.

Farkhade (2014) revealed that consumers buying motives becomes more important because they make their buying decisions in each and every aspects of life. All promotional activities are basically dependent on consumption pattern of the consumers which is directly or indirectly affects the

sales of the products and services. The framed objectives of the paper, to study buying motives of agricultural equipments and to evaluate the most important factors like products brand, availability of products, financial subsidy, product capacity, after sales services *etc.* Traditional consumer behaviour shopping has its own model, which the buying process starts from the problem recognition, information search, evaluation of alternatives, then purchase and at last post-purchase behaviour.

Nisar (2014) reported that the purpose of the study was to explore the relationship between consumer behaviour and beverage brand (coca cola and Pepsi cola). Frequency and regression analysis used in study. He found from the study that the majority of the Pakistani prefers coca cola and results further suggested that the consumer behaviour can significantly influence the beverage brand of Pakistan. It also said that beverage industry of Pakistan put their focus upon the consumer behaviour and produce their products according to their consumer demand and satisfy the consumers.

Rani (2014) studied the consumer buying behaviour, which refers to the buying behaviour of the ultimate consumer. Many factors influence the individual in what he is and the consumer in his decision making process, shopping habits, purchasing behaviour, the brands he buys or the retailers he goes. A purchase decision was the result of each and every one of these factors. An individual and a consumer was led by his culture, his subculture, his social class, his membership groups, his family, his personality, his psychological factors, *etc.* For a successful consumer oriented market service provider should work as psychologist to procure consumers. By keeping in mind affecting factors things can be made favourable and goal of consumer satisfaction can be achieved. Study of consumer buying behaviour was gate way to success in market.

Sampathkumar (2014) conducted a study on brand preference of pesticides used in tomato production in Kolar taluk. The results shows that factors influencing the farmer's preference for pesticides. Retailer suggestion, immediate control of pest and diseases and quality of fruits were the major influencing factors, which are ranked first, second and third with a mean scores of 57.21, 56.84 and 56.28 respectively. The other factors like credit is available for purchase, always it is available and using it for several years, was moderately influencing farmer's preference of various brands. Factors like other farmers were also recommended for this brand, Horticulture/agriculture officer's recommendation and price were least influencing factors on the farmers while preferring pesticides brands.

Sivakumar (2014) studied that the factors influencing the purchase of agricultural tractors and to evaluate the most important factors like brand name, subsidy, horsepower, maintenance etc considered for the purchase of agricultural tractors. The study was carried out in Sivaganga district of Tamil Nadu state. The researcher has used both primary and secondary data for the study. The researcher has collected primary data from the tractor owners who had bought their tractor for service to the dealer point during the study period in Sivaganga district. It was found that subsidy was ranked first and followed by sources consulted, horse power, after sales service, price and brand name respectively are considered for purchase of tractors.

Tandel *et al.* (2015) studied farmer's buying behaviour for pesticides revealed that farmers still depended on the written media for information. The newspaper and farm magazine were the source in the decision-making process of farmers. The involvement of the innovator and the early adopter should not be overlooked for demonstration purposes. Farmers still relied on observing, visiting and seeking the results that their neighbours obtained by using various agricultural production supplies.

Tandel *et al.* (2015) conducted a study on farmers buying behaviour towards pesticide. The results revealed that many farmers do not avail themselves of various purchasing opportunities available to them. The number of farmers who purchased pesticides was limited. Farmers did not purchase their pesticides much before the time they used them. It is possible that the limited shopping activities of the farmer may not force the dealers to be as aggressive and competitive as they might be. Farmers might consider their purchasing actions if they are interested in reducing their production costs and buying their pesticides at the best price. Farmers might also consider their reasons for using pesticides, that past experience was an important reason for using a pesticide. Perhaps farmers should make better use of educational influence to assure the pesticides are best suited for the job required.

### 2.3 Product promotion measures adopted by different pesticide firms

Bhattacharya and Paliwal (2000) conducted a study on promotional measures adopted for bio-fertilizer marketing. They stressed the need on availability of credit to farmers, technical knowledge to farmers and availability of bio-fertilizers at district and taluk levels and also to make the people aware of importance of bio-fertilizer for soil and crop growth. The promotional measures such as radio, T.V, Press ads hoardings, wall paints, roadside boards, cinema slides, film show, puppet show, cycle rally, street drama *etc.*

Shakeel (2000) evaluated the sale promotion measure followed by Gulbarga milk producers union limited. He concluded that the union is needed to change its pattern and type of sales promotion measures to the present context so as to compete with private dairies in the field.

Nareshprasad (2002) stated that the field demonstrators were taken up to educate the farmers about the benefit of improved agronomic practices including soil test based fertilizer recommendations, high yielding variety seeds, proper water management and adequate insect pest control.

Prakash (2002) reported increasing use of information technology in seed sector promotion. There are websites, which give updates on prevailing availability, domestic and global prices, local and global demand, acceptable condition of trade and related aspects.

Udaya (2002) in his study on pesticides marketing in Karnataka found that, the factors contributing to pesticide promotion activities were spot demonstration, farmers meeting and fair participation were ranked first, second and third respectively and radio stood at fourth from the effectiveness point of view. Wall paintings, theatres, distribution of literature, calendars were less effective.

Ravichandran and Narayanarajan (2004) found that advertisement played a vital role in influencing the purchase decision of a particular brand. Socio-economic factors such as sex, age, education, occupation and income influenced the brand preference and motivated the buyer to choose a particular brand. Quality of product also largely determines the buyer market.

Gautham and Pawan (2005) maximum number of respondents were of the view that the duration of advertisement should be of thirty seconds to one minute and frequency of repetition of advertisements should be more than five times a day so that better understanding and remembrance of the advertisement can be there. The survey revealed that family drama and news events should be used most on the copy of the advertisement to make it more effective.

Raju (2007) studied product promotional measures in vegetable seed marketing and extent of farmers preference in Belagavi district. The promotional measures considered were field demonstration, farmers visit to research plot, jeep Champaign, field day, slide show, posters, wall painting, farmer meeting, live telecast *etc.* Among 108 sample farmers 39 opined that field demonstration was the major promotional measure which attracted the farmers to go for selection of seed companies for their seed purchases.

Kawpong (2010) studied integrated marketing communication for SME's organic fertilizer in Khonkaen, Thailand. He was a young entrepreneur of a recently established company. Their product is liquid organic fertilizer branded "Men-Ngern". Product awareness, image and sales are lower than expected. Given the limited financial and human resources, he needs to do his best for the desired marketing communication practices. He must decide what he should do in terms of promotion of the product based on the relevant environmental factors and consumer behaviour.

Shivakumar (2010) studied on major product promotions adopted by seed firms in Haveri district. The results shows that farmers meeting, field days, field visits and exhibitions like krishimelas, harvest days with almost all firms used these methods to promote products (100 %). Other advertisements like wall posters (100 %), Wall paintings (100 %), banners (100 %), shop hangers, posters (100 %) were commonly used. If the brand is new, jeep campaign (87.50 %) was done before sowing season to promote brands. Since the dealers were another important source of information about seeds they were given with advance coupons and discounts to promote products. Dealer meetings were also held by firms. Free seed samples were also given to farmers. Field demonstrations and field days were conducted for farmers in the selected farmer field to impart and create awareness about the brand.

Basavaraja (2013) studied different product promotion measures adopted by companies in Tungabhadra command area of Karnataka. The results revealed that shop hangers (100 %) was the most influential and popular method adopted by distributors for promoting their products, followed by banners which accounted for 90 per cent. The other product promotion measures are fairs (85 %), yearly wall calendars (90 %), local print media (75 %), tin plates (75 %), credit sales (75 %), distribution of hand bills (70 %) and spot demonstration (65 %). The measures such as field demonstration (10 %), theatre (20 %), farmers meeting (50 %), F. M. radio (50 %), wall paintings or postures (45 %) were the comparatively least adopted methods used by the firms.

Gupta and Shallu (2013) studied the impact of promotional activities on consumer buying behaviour. The findings have been made through snap survey analysis which consisted of 200 consumers in the market. Findings have also been made theoretical analysis in order to provide in-depth analysis into the way different promotional factors influence consumers' decision-making processes. It has been found that promotional activities have positive effects on consumers, purchasing behaviour or brand choice in cosmetic industry.

Soni Neha and Verghese Manoj (2013) in their paper had made effort to find the various sales promotion tools and its impact on purchase decision. The different promotional Tools used were offer, premium, contest, Rebate, Price Pack. A questionnaire was formulated with a sample size of 109 respondents. The analysis showed that among the various tools of promotion: offer, premium and contest are having significant impact on consumer purchase decision.

Uti Charles *et al.* (2013) in their paper has examined the queries bordered on advertising clutters, medium, message, method, timing and their implication on achieving tactical marketing and sales objectives. The authors have received an extensive review of literature in order to establish a relationship of cause and effect between point of purchase advertising and consumer purchase behaviour. The findings of the study were advertising facilitates consumer choice. Point of purchase advertising was a veritable tool & plays an important role in the marketing process. Money spent on advertising should not be considered as expenditure but part of "investment" required for successful business execution.

## 2.4 Problems faced by farmers in purchasing the pesticides

Sankari (1991) identified that credit availability, distance from farm to dealer location, price of the product, peer group influence and availability of preferred brand were the factors contributing to the dealer loyalty of farmers. One of the major constraints in establishing an IPM programme was the lack of adequate information about farmers' knowledge, perceptions and practices in pest management.

Chothe and Borkar (2000) observed that more number of respondents (61.33 %) in Nagpur district of Maharashtra had the problem of lack of knowledge about bio-fertilizers, followed by lack of knowledge about benefits of bio-fertilizers (56.66 %) and lack of knowledge about application methods of bio-fertilizers (52 %), extension workers never show method and result demonstration (41.33 %), no evidence by agricultural department (25.32 %) and non-availability of guidance on agriculture science in village (20 %).

Ganesh (2000) classified the problems faced by the farmers under four groups *viz.*, production, financial, infrastructural and marketing problems in Gazani lands of Karnataka. With respect to the production problems, majority of the farmers complained of non availability of better variety seeds. Regarding financial problems, lack of funds for purchase of improved inputs was the major problem. Extension problems included non availability of package of practices. The important problem was absence of market regulation and information.

Kameswara Rao (2000) studied the problems of production and marketing of banana in Tungabhadra command area. The study revealed that, the major problems faced by 85 per cent farmers was non-availability of sufficient irrigation water. 73 per cent of farmers were opined that

higher prices of fertilizers, 68 per cent of the farmers were facing the problem of non-availability of quality planting material. The other major problems in production of banana in study area were labour shortage in peak time, hazards of soil salinity storms of heavy winds. The major financing problems were available loan was inadequate, high procedural complication of loan and high rate of interest. The major problems in marketing of banana in study area were high price fluctuations, high transportation cost and delayed payments on sale proceeds by the trader or businessman and high commission of intermediaries.

Singh *et al.* (2000) studied constraints in fertilizer use in Arid Zone of Western Rajasthan. They found that among the fertilizer users, maximum farmers have applied more nitrogenous fertilizer as compared to phosphatic fertilizer and fertilizer applied was less than the recommended dose. The main constraints perceived by the farmers were lack of irrigation facilities, high cost of fertilizers and lack of knowledge on fertilizer use.

Jansirani *et al.* (2001) reported that the major constraints faced by the betel vine growers were varietal susceptibility to pest and diseases (84 %) and soil and water problems (76 %). More than half of the growers have expressed high cost of fertilizers (56 %) followed by high cost of pesticides (54 %) and lack of technical guidance (53 %). The major constraint such as non-availability of inputs in time was expressed by less than 50 per cent of the respondents.

Shivalinge and Srikanthmurthy (2001) reported that the foremost constraints expressed by the big farmers were inadequate irrigation (92 %) followed by erratic supply of electricity (90 %), lack of knowledge regarding the pest and diseases management (88 %) and non-availability of labour (80 %).

Vyas and Patel (2001) on constraints faced by milk producers in adoption of dairy technology revealed that non availability of loan facilities for purchase of milch animals and fodder, non availability of artificial insemination and milk marketing facilities, lack of knowledge of scientific animal feeding as well as preservation practices and no pasture land were the main constraints in adoption of dairy industry.

Babanna (2002) reported that non-availability of labour at right time (75 %), identification of pests and diseases (73 %), controlling the pests and diseases (67 %), non-availability of technical knowledge (58 %), not getting proper remunerative price (43 %), non-availability of processing units (41 %) and non-availability of continuous power supply (38 %), were the major constraints faced by the arecanut growers in Shivamogga district.

Gaddi *et al.* (2002) in a study on yield gap and constraints in cotton production in Karnataka reported that non-availability of labour during weeding and picking of cotton during peak seasons was a major problem as expressed by three-fourths of the respondents. More than 70 per cent of the sample farmers opined that, the incidence of pests and diseases like bollworm, whitefly and leaf reddening prevented them from achieving greater farm potential in cotton. The proportion of sample farmers expressing their difficulty in obtaining the operating fund was high (71.25 %) followed by dissatisfaction towards the germination quality, cost of seed, cost of fertilizers and plant protection chemicals. More than 40 per cent of the sample farmers were not aware of recommended spacing and seed rate, dose, schedule of application of chemical fertilizer and plant protection chemicals. Growing of cotton on the unsuitable soils as a factor hindering productivity was reported by one-third of the sample farmers.

Latha (2003) found that the major constraints faced by coconut growers in central dry zone of Karnataka were erratic supply of electricity, high cost of inputs, lack of knowledge regarding pest and diseases, lack of technical guidance and lack of water for irrigation. Regarding marketing of coconut major problems faced were high transportation charges, lack of storage facilities, high commission charges and distant location of market.

Ashok Kumar *et al.* (2006) studied the ultimate objective of generation of any technology, particularly in the field of agriculture, its speedy diffusion and quicker adoption by the farmers at large. But a number of constraints might be responsible for slowing down rate of adoption. In the present study the most important constraint in adoption of banana production technology was lack of knowledge. The other constraints found in order of importance were low profit due to high cost of cultivation and high price of chemicals for plant protection.

Paulvamele *et al.* (2006) reported that, one of the major constraints on establishing an IPM programme was lack of adequate information about farmers' Knowledge, perceptions and practices in pest management. If scientists have to work with farmers to improve crop production and crop protection, they should recognize farmers' constraints and their existing technical knowledge. Knowledge of pests varied between farmers working in similar or different agro-ecosystems.

Tanveer (2006) conducted a study to know the constraints faced by the paddy growers in Mandya district of Karnataka. He opined that major constraints as expressed by the farmer-respondents in the study area were high cost of inputs, fluctuation in the prices of the produce, shortage of organic manures/FYM, lack of transportation, marketing facilities and scarcity of funds.

Gururaj (2007) studied the problems faced by farmers in the purchase and use of bio-pesticides. The study revealed that loss of effectiveness of bio pesticide due to weather change after spraying to the crop was considered to be a major problem in the purchase and use of bio-pesticides by a vast majority of growers (around 77 per cent of cotton growers and 70 per cent of cabbage growers), followed by lack of technical guidance (47 per cent of cotton growers and 57 per cent of cabbage growers), problem of bio-pesticide spoilage after its exposed to the air (43 per cent of the cotton growers and 33 per cent of the cabbage growers). The problem of the adulteration of the product in the market was experienced by around 33 per cent of cotton growers and 27 per cent of cabbage growers. Similarly, a large proportion of the interviewed dealers (around 67 per cent) opined that investment in bio- pesticide business was risky.

Latha *et al.* (2007) studied the constraints in adoption of recommended IPM practices by trained farmers of cotton. A total of 60 cotton farmers from Kurnool district, Andhra Pradesh, who were trained on integrated pest management (IPM) were asked about the constraints in their adoption of IPM practices. High costs of inputs was perceived by most farmers as a problem, followed by lack of awareness on advanced IPM practices and difficulty in implementing biological control methods.

Mahavir Singh *et al.* (2007) conducted a study to identify the constraints in adoption of improved farm implements in four selected villages in Bundelkand region in Jhansi, Uttar Pradesh. Fourteen constraints were identified for non-adoption of farm implements, *viz.*, lack of technical guidance, lack of knowledge, lack of resources to purchase the implements, non-availability of implements and tools, higher cost, complicacy of practices and non availability of labour in the villages. The results revealed that the first three constraints were the most prominent factors identified in adoption of improved farm machinery in the selected villages.

Raju (2007) in his study on vegetable seed marketing in Belgaum district, reported the problems faced by dealers which included high competition, perceived by around 57 per cent of the respondents, followed by lack of extension activities (13 %), pressure for sale on credit basis and inadequate trained personnel for marketing (10 %). Further, huge initial investment and unsold stocks were problems for 7 per cent and 3 per cent dealers respectively. Mean while, farmers were facing problems like non-availability of seeds in time. High seed price, low yield, Lack of credit and non-viable seeds were major problem of farmers. Only 8 per cent farmers considered fake seed as the major problems.

Timmanna (2007) reported on problems faced by farmers in the purchase of cotton seeds in Dharwad district. Farmer opined that the seeds were of low quality, with instability in yield. The other problems faced by farmers were untimely supply of seed, lack of technical guidance and price variations. Similarly, the dealers opined that untimely supply and inadequate storage facilities were the major problems. The supply of adulterated seeds and high transportation were reported as low intensive problem by dealers in the districts.

Sudhakara (2011) studied the problems faced by sample farmers while buying systemic pesticides in Kolar district of Karnataka. High price of pesticide was the major problem faced by majority (28.33 %) of the farmers as the farmer is always price conscious. Unavailability of pesticides in required quantity and time (25.56 %) and inability of dealer to suggest proper formulations/concentrations (17.78 %) were the other major problems faced by the farmers. Apart from these, problems like dilemma in choosing a brand out of several brands (11.67 %) due to lack of knowledge and information of pesticide use, inability of the dealer to suggest the right product for crop (10 %) and inefficiency of pesticides (6.67 %) were the other problems faced by farmers.

Bandara *et al.* (2013) study revealed that the majority of respondents has considered only efficacy of pesticide rather than their outer appearance and ingredients. Some respondents reported that they just go to seller and take chemicals whatever the seller recommends without knowing brand name or company's name.

Basavaraja (2013) conducted a study on problems encountered by farmers in tungabhadra command area of Karnataka. The results revealed farmers gave first rank to lack of knowledge of composition with average score of 71.05. Hoarding or artificial shortages of fertilizers as the next major problem perceived by the respondents with average score of 68.47 reductions in subsidies is the other problem assigned by the that respondents with average score of 57.42. The remaining problems perceived by farmers such as frequent price rise of fertilizers (54.35), existence of adulterant brands (48.82), poor proximity of retail outlets (42.8), lack of credit facility (34.65), fluctuation in prices (32.95), non-availability of fertilizers in time (31.27), irrational government policies (59.68) come next in that order.

### 3. METHODOLOGY

This chapter outlines briefly the characteristics of the study area, the methods adopted in selection of the samples, the nature and sources of data and the various statistical tools and techniques employed in analyzing the data. These items are described under the following sub-heads:

- 3.1 Description of the study area
- 3.2 Nature and sources of data
- 3.3 Sampling procedure
- 3.4 Analytical tools and techniques employed

#### 3.1 Description of the study area

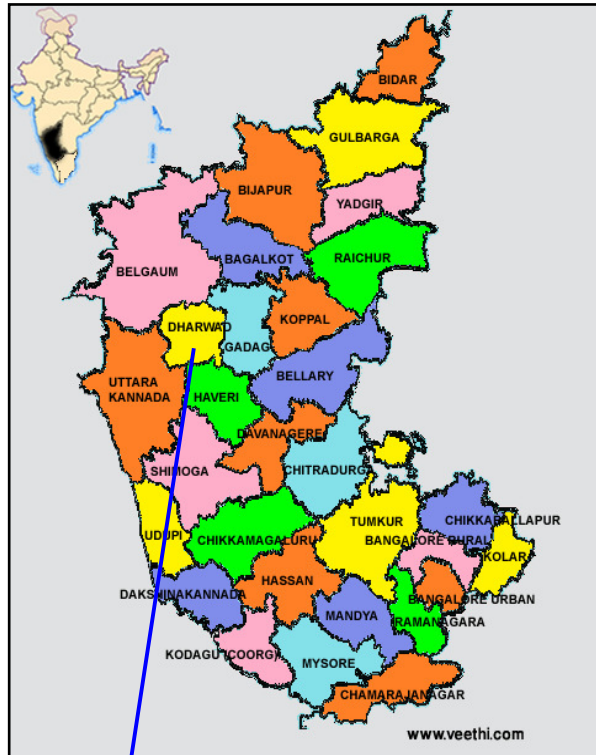
Karnataka state is situated in west central part of the peninsular India. It consists of a narrow elongated belt between the Arabian sea and western Ghats and enhancing coastline of about 400 km. The state has an area of 1,19,257 sq. km and is situated between 115°19' North latitude and 74°78' East longitudes. The state is bounded by Maharashtra on the north and by Goa and the Arabian sea on the west. It has a common border with Andhra Pradesh on the east and with Tamil Nadu and Kerala on the south. The average rainfall of the state is 1,139 mm. The state receives rainfall both from southwest and northeast monsoons. The mean temperature ranges from 21.5°C to 31.7°C. The climatic endowments are favourable for the adoption of crossbred cattle and for the production of crops throughout the year.

##### 3.1.1 Location

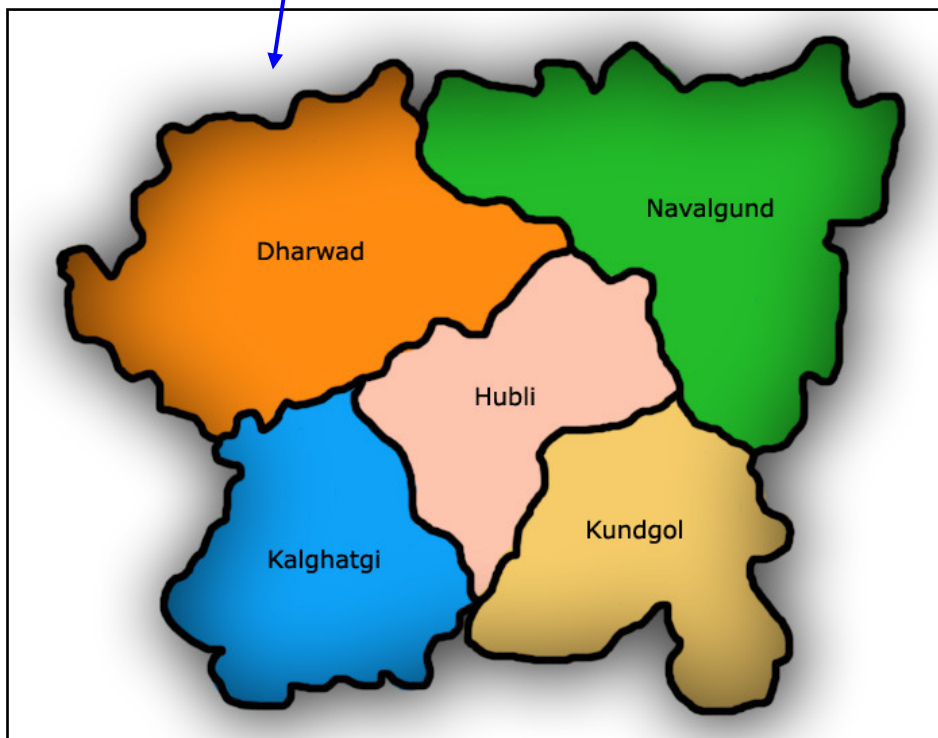
Dharwad district falls in the Northern part of Karnataka between 15° 15' and 15° 35' North latitude and 75° 00' and 75° 20' East longitudes, in the Northern Dry Zone and Northern Transitional Zone. It is bound to the North by Belgavi district, on the South by Haveri district, East by Gadag district and West by Uttara-Kannada district. It consists of five taluks viz; Dharwad, Hubli, Kalghatgi, Kundgol and Navalgund. The district has area of 4,263 sq. km constituting about 2.22 per cent of the state area (Fig. 3.1).

##### 3.1.2 Geographic and demographic features

Dharwad district has an area of 4,263 sq. km. Dharwad taluk has an area of 1,032 sq. km. Navalgund, Kalaghatgi, Hubli and Kundgol taluks have an area of 1,080 sq. km, 682 sq. km, 731 sq. km and 648 sq. km respectively. As per 2011 census, the total population of Dharwad district was 18,46,993. The total population of Dharwad taluk was 6,99,567 and that of Navalgund, Kalaghatgi, Hubli and Kundgol taluks were 1,90,177, 1,54,767, 6,36,767 and 1,65,715 respectively. The density of population in Dharwad district was 377 per sq. km. The density of population in Dharwad, Navalgund, Kalaghatgi, Hubli and Kundgol taluks were 219 per sq. km, 163 per sq. km, 201 per sq. km, 207 per sq. km and 242 per sq. km respectively (Table 3.1).



**a) KARNATAKA STATE**



**b) DHARWAD DISTRICT**

**Fig. 3.1: Map showing the study area**

### 3.1.3 Soils

Soils in Dharwad district comprises of red, medium black and deep black soils. Similar types of soils were found in Dharwad taluk. Kalaghatgi taluk comprised of red and medium black soils, Navalgund, Hubli and Kundgol taluks, major part of soils comprised of deep black soil.

### 3.1.4 Rainfall

The South-west monsoon is most crucial for Dharwad district. Average annual rainfall of the district was 769 mm, Kalaghatgi taluk has an average annual rainfall of 833 mm, where as Dharwad, Navalagund, Hubli and Kundgol taluk receive an average annual rainfall of 860 mm, 771 mm, 755 mm and 627 mm, respectively.

### 3.1.5 Land utilization pattern

The land utilization pattern of Dharwad, Hubli, Kalaghatgi, Navalgund and Kundgol taluks is presented in the Table 3.2. The net sown area of Dharwad taluk was 1,11,148 ha and that of Navalgund, Kalaghatgi, Hubli and Kundgol taluks were 1,67,601 ha, 50,213 ha, 90,839 ha and 1,08,720 ha, respectively. The area under forest was 13,676 ha in Dharwad taluk, 19,526 ha in Kalaghatgi and 5,263 ha in Hubli taluk. No forest cover was seen in Navalgund and Kundgol taluk. The fallow land accounted for 10,596 ha in Dharwad taluk, 1,770 ha in Kalaghatgi taluk, 19,257 ha in Navalgund taluk, 7,595 ha in Hubli taluk and 2,232 ha in Kundgol. About 25,732 ha of land were found to be not available for cultivation in Dharwad district as whole. The land not available for cultivation in Dharwad, Hubli, Kalaghatgi, Kundgol and Navalgund taluks was 9,188 ha, 6,300 ha, 4,634 ha, 2,213 ha and 3,397 ha, respectively.

### 3.1.6 Cropping pattern

The cropping pattern of Dharwad district and selected taluks are presented in the Table 3.3. The major crops of Dharwad district were jowar, maize, paddy and wheat among cereals, Bengal gram and Red gram among pulses, cotton and groundnut among commercial crops. Similar cropping pattern was observed in Dharwad and Kalaghatgi taluk.

### 3.1.7 Area irrigated by different sources

The area irrigated by different sources in Dharwad district and selected taluks are presented in Table 3.4. The major sources of irrigation in Dharwad district are canals, tanks and wells. However, the canal irrigation was not found in Dharwad and Kalaghatgi taluk. In Kalaghatgi, Dharwad and Hubli taluks, major sources of irrigation are Bore wells and wells. The total area irrigated in the Dharwad district was 39,485 ha. The area irrigated in Dharwad, Kalaghatgi, Navalgund, Hubli and Kundgol was 8,951 ha, 2,689 ha, 23,654 ha, 3,586 ha and 605 ha, respectively.

## 3.2 Nature and sources of data

Both primary and secondary sources of data were collected for the study to evaluate the objectives of the study.

### 3.2.1 Primary data

Primary data were collected from both farmers and pesticide dealers in the study area. Farmers were contacted with a pre-tested schedules for collecting information pertaining to their purchase pattern of pesticides, preference for purchasing pesticides, pesticide companies preferred by the farmers for purchasing of pesticides, promotional measures for purchasing the pesticides, farmers consultation with dealers during purchase of pesticides, reasons for purchasing chemical pesticides over bio pesticides and problems faced by farmers in purchasing pesticides.

Dealers were contacted for ascertaining the various product promotion measures adopted by different pesticide firms and problems faced by the pesticide dealers with the help of pre-tested schedules.

### 3.2.2 Secondary data

The secondary data regarding pesticide sales in the study taluks, number of pesticide dealers were collected from distributors, Assistant Director of Agriculture (ADA) and Joint Director of Agriculture (JDA) office in Dharwad district. The data regarding cropping pattern and general information regarding the study area were collected from the records maintained at the Dharwad District Statistical Office and the Department of Agriculture during the study period 2015-16.

## 3.3 Sampling procedure

Dharwad district was purposively selected for the study, since it has multiple cropping situation. Dharwad district represents most of the suitable climatic and geographical conditions. Here mainly, Cotton, Chilli, Onion, Groundnut, Soybean, Bengal gram and Green gram are grown, which consume maximum pesticides compared to other crops. For the study, all the taluks of Dharwad district such as Dharwad, Hubli, Navalgund, Kalghatgi and Kundgol were selected and from each taluk 24 farmers and 6 dealers were selected randomly for fulfilling the objectives of the study. Thus the total sample size for the study was 120 farmers and 30 dealers.

## 3.4 Analytical tools and techniques employed

The data collected from primary and secondary sources was subjected to applied appropriate analytical techniques in order to arrive at meaningful conclusions. The different analytical tools and techniques used in the study were as follows.

3.4.1 Tabular analysis

3.4.2 Gini coefficient

3.4.3 Garret's ranking technique

### 3.4.1 Tabular analysis

The data collected were presented in tabular form to facilitate easy comparisons. The tabular presentation was followed to study the purchase pattern of pesticides, farmers preference for purchasing of pesticides, pesticide companies preferred by the farmers for purchasing of pesticides promotional measures for purchasing pesticides by the farmers, farmers consultation with dealers during purchase of pesticides and various product promotion measures adopted by different pesticide firms were worked out in terms of percentages.

**Table 3.1: Salient features of the study area****(as per 2011 census)**

Sl. No.	Taluks	Geographical area (sq. km)	No. of habited villages	Total population	Rural population	Urban population	Male population	Female population	Population density (per sq. km)	Normal rainfall (mm)	Actual rainfall (mm)
1	Dharwad	1,122	118	6,99,567	2,32,672	4,59,655	3,53,701	3,45,866	219	865	860
2	Hubli	731	58	6,36,767	1,42,565	5,01,533	3,23,498	3,13,269	207	732	755
3	Kalagatgi	682	87	1,54,767	1,37,851	16,916	79,842	74,925	201	980	833
4	Kundgol	648	58	1,65,715	1,46,996	18,628	85,012	80,703	242	716	627
5	Navalgund	1,080	58	1,90,177	1,37,346	52,831	97,074	93,108	163	643	771
Dharwad district		4,263	379	18,46,993	7,97,430	10,49,563	9,39,127	9,07,866	377	787	769

**Source:** District Statistical Office, Dharwad, 2015-16

**Table 3.2: Land utilization pattern in the study area**

(Area in ha)

Sl. No.	Particulars	Dharwad district	Sample taluks				
			Dharwad	Hubli	Kalghatgi	Navalgund	Kundgol
<b>I</b>	<b>Area under forest</b>	35,235	13,676	5,263	19,526	0	0
<b>II</b>	<b>Land not available for cultivation</b>						
	i) Non agriculture uses	21,747	8,508	5,263	3,678	2,750	1548
	ii) Barren land	3,985	680	1,037	956	647	665
	Total	25,732	9,188	6,300	4,634	3,397	2,213
<b>III</b>	<b>Other uncultivated land</b>						
	i) Cultivable waste	2,669	1,531	106	798	61	173
	ii) Permanent pastures	3,571	1,959	607	688	5	312
	iii) Trees and Grove	178	0	63	6	3	103
	Total	6,418	3,490	776	1,492	69	591
<b>IV</b>	<b>Fallow land</b>						
	i) Current fallow	34,631	8,706	4,260	1,415	16,257	993
	ii) Other fallow	6,819	1,890	3,335	355	0	1,239
	Total	41,450	10,596	7,595	1,770	19,257	2,232
<b>V</b>	<b>Net sown area</b>	5,28,521	1,11,148	90,839	50,213	1,67,601	1,08,720
	<b>Geographical area</b>	4,27,329	1,11,788	73,707	68,757	1,08,218	64,859

**Source:** District Statistical Office, Dharwad , 2015-16

**Table 3.3: Cropping pattern in the study area**

Particular	(Area in ha)					
	Dharwad district	Dharwad taluk	Hubli taluk	Kalaghatgi taluk	Navalgund taluk	Kundgol taluk
<b>I. Cereals</b>						
Paddy	25,952	1,230	481	1,304	27	272
Ragi	108	0	14	1	0	93
Jowar	51,139	11,640	9,358	5,682	1,487	9,586
Wheat	41,041	6,933	2,613	60	22,339	9,096
Maize	41,377	8,233	6,379	3,234	22,289	1,242
Other cereals	2,830	970	1,188	384	9	279
<b>Total</b>	<b>1,62,447</b>	<b>39,906</b>	<b>20,033</b>	<b>22,403</b>	<b>59,537</b>	<b>20,568</b>
<b>II. Pulses</b>						
Bengal gram	47,573	18,150	2,165	553	24,519	2,186
Red gram	2,944	1,098	854	222	102	668
Other pulses	52,176	1,726	7,447	3,174	18,970	5,325
<b>Total</b>	<b>1,02,693</b>	<b>36,508</b>	<b>10,466</b>	<b>3,949</b>	<b>43,591</b>	<b>8,179</b>
<b>III. Commercial crops</b>						
Oil seeds	75,965	14,883	15,353	13,715	11,003	21,011
Cotton	72,612	2,216	20,636	5,730	17,216	26,814
Total non food crops	1,50,495	17,402	36,366	20,555	28,225	47,947
<b>IV. Total food crops</b>	<b>3,78,026</b>	<b>93,746</b>	<b>54,473</b>	<b>29,658</b>	<b>1,39,376</b>	<b>60,773</b>

**Source:** District Statistical Office, Dharwad , 2015-16

**Table 3.4: Area irrigated by different sources in the study area**

(in No's)

SI. No.	Particulars	Dharwad district	Dharwad taluk	Hubli taluk	Kalaghatgi taluk	Navalgund taluk	Kundgol taluk
1	Canals	24,957	0	1,303	0	23,654	0
2	Tanks	60	39	0	21	0	0
3	Wells	579	400	0	0	170	0
4	Bore wells	14,185	8,894	2,024	2,662	0	605
5	Other sources	283	18	259	6	0	0
	<b>Total</b>	<b>39,485</b>	<b>8,951</b>	<b>3,586</b>	<b>2,689</b>	<b>23,654</b>	<b>605</b>

**Source:** District Statistical Office, Dharwad , 2015-16

### 3.4.2 Gini coefficient

The Gini coefficient (G) is normally used to measure the inequality in distribution. It was developed by the Italian Statistician Corrado Gini and published in his paper "Variabilitae mutabilita" in 1912. The Gini coefficient is defined as a ratio of the areas on the Lorenz curve diagram. Gini coefficient of inequality was estimated using the following formula.

$$G = 1 - \frac{\sum_{i=1}^{i=n} (X_i - X_{i-1}) (Y_i - Y_{i-1})}{10,000}$$

Where,

G = Gini coefficient of inequality, which takes the values between 0 and 1 with G=0 indicating perfect equality in distribution and L=1 indicating perfect inequality in distribution.

$X_i$  = Cumulative percentage of number of firms up to and including  $i^{\text{th}}$  class

$Y_i$  = Cumulative percentage of value of sales by firms up to and including  $i^{\text{th}}$  class

n = Number of firms

i = 1, 2, 3...n size groups

### 3.4.3 Garret's ranking technique

Garret's ranking technique was used to rank the problems faced by the farmers in purchasing the pesticides and problems faced by pesticide dealers while selling pesticides. Basically it gives the change of orders of constraints into numerical scores. The major advantage of this technique as compared to simple frequency distribution is that the constraints are arranged based on their importance from the point of view of respondents. Hence, the same number of respondents on two or more constraints may have been given different rank.

Garret's formula for converting ranks into per cent was given by,

$$\text{Per cent position} = 100 \times \frac{(R_{ij} - 0.5)}{N_j}$$

Where,

$R_{ij}$  = Rank given for  $i^{\text{th}}$  factor by  $j^{\text{th}}$  individual

$N_j$  = Number of factors ranked by  $j^{\text{th}}$  individual

The per cent position of each rank then converted into scores referring to the Table given by Garret's and Woodsworth (1969). For each factors, the scores of individual respondents were added together and divided the total number of the respondents for whom scores were added. These mean scores for all the factors were arranged in descending order, ranks were given and most important factors were identified.

## 4. RESULTS

In accordance with the objectives of the study, the data collected from both primary and secondary sources were analyzed and interpreted. The results presented in this chapter under the following heads:

- 4.1 Market structure of pesticide dealers
- 4.2 Pesticide purchasing behaviour of farmers
- 4.3 Product promotion measures adopted by different pesticide firms
- 4.4 Problems faced by farmers in purchasing the pesticides

### 4.1 Market structure of pesticide dealers

#### 4.1.1 Distribution of pesticide dealers in Dharwad taluk during 2015-16

Table 4.1 elucidated the concentration of pesticide dealers in Dharwad taluk. In case of 0-10 lakhs group size of firms 10.25 per cent of firms handled 2.35 per cent of sales. In the group size of 10-20 lakhs 20.51 per cent of firms handled 8.26 per cent sales. In case of 20-30 lakhs size group 12.82 per cent of firms handled 7.69 per cent of sales. While in the group size of 30-40 lakhs 17.95 per cent of firms handled 14.67 per cent of sales. In case of 40-50 lakhs group size of firms 25.64 per cent of firms handled 31.86 per cent of sales. However in the group size of above 50 lakhs 12.83 per cent of firms handled 35.15 per cent of sales and the extent of market concentration was computed with Gini coefficient of inequality which happened to be 0.598 for Dharwad taluk. Fig. 4.1 shows the extent of concentration in Dharwad taluk diagrammatically.

#### 4.1.2 Distribution of pesticide dealers in Hubli taluk during 2015-16

Table 4.2 reveals that the concentration of pesticide dealers in Hubli taluk during 2015-16. In the size group of 0-10 lakhs 33.64 per cent of firms handled 10.97 per cent of sales. In the group size of 10-20 lakhs 25.45 per cent of firms handled 16.20 per cent sales. In case of 20-30 lakhs size group 22.72 per cent of firms handled 24.26 per cent of sales. While in the sales range of 30-40 lakhs 6.37 per cent of firms handled 10.09 per cent of sales. In case of 40-50 lakhs size group 3.63 per cent of firms handled 7.12 per cent of sales. Where as in the group size of above 50 lakhs 8.19 per cent of firms handled 31.36 per cent of sales and the extent of market concentration was calculated with Gini coefficient of inequality which happened to be 0.631 for Hubli taluk and it was slightly higher than Dharwad Taluk. Fig. 4.2 shows the extent of concentration in Hubli taluk graphically.

#### 4.1.3 Distribution of pesticide dealers in Kalghatgi taluk during 2015-16

Table 4.3 indicates that the concentration of pesticide dealers in Kalghatgi taluk of Dharwad district. In case of 0-10 lakhs size group of firms 14.28 per cent of firms handled 3.92 per cent of sales. In the group size of 10-20 lakhs 28.58 per cent of firms handled 16.93 per cent of sales of pesticides in the study area. Where as in case of 20-30 lakhs size group 14.28 per cent of firms handled 12.80 per cent of sales. While in the group size of 30-40 lakhs 28.58 per cent of firms handled 35.50 per cent of sales. In case of above 40 lakhs 14.28 per cent of firms handled 30.85 per cent of sales and the extent of market concentration was computed with Gini coefficient of inequality was found to be 0.546 for kalghatgi taluk and it was slightly lower than Hubli and Dharwad Taluk. The same thing was shown in Fig. 4.3. It presents the extent of concentration in Kalghatgi taluk diagrammatically.

**Table 4.1: Distribution of pesticide dealers in Dharwad taluk during 2015-16**

<b>Group size of firms (` in lakhs)</b>	<b>No. of firms</b>	<b>Percentage of firms</b>	<b>Pesticide sales (in `)</b>	<b>Percentage of sales</b>	<b>Cumulative percentage of firms</b>	<b>Cumulative percentage of sales</b>
0-10	4	10.25	34,64,975	2.35	10.25	2.35
10-20	8	20.51	1,21,83,751	8.26	30.76	10.61
20-30	5	12.82	1,13,46,853	7.70	43.58	18.31
30-40	7	17.95	2,16,36,143	14.68	61.53	32.98
40-50	10	25.64	4,69,74,962	31.86	87.18	64.84
Above 50	5	12.83	5,18,25,854	35.15	100	100
<b>Total</b>	<b>39</b>	<b>100</b>	<b>14,74,32,538</b>	<b>100</b>		
<b>Gini Coefficient = 0.598</b>						

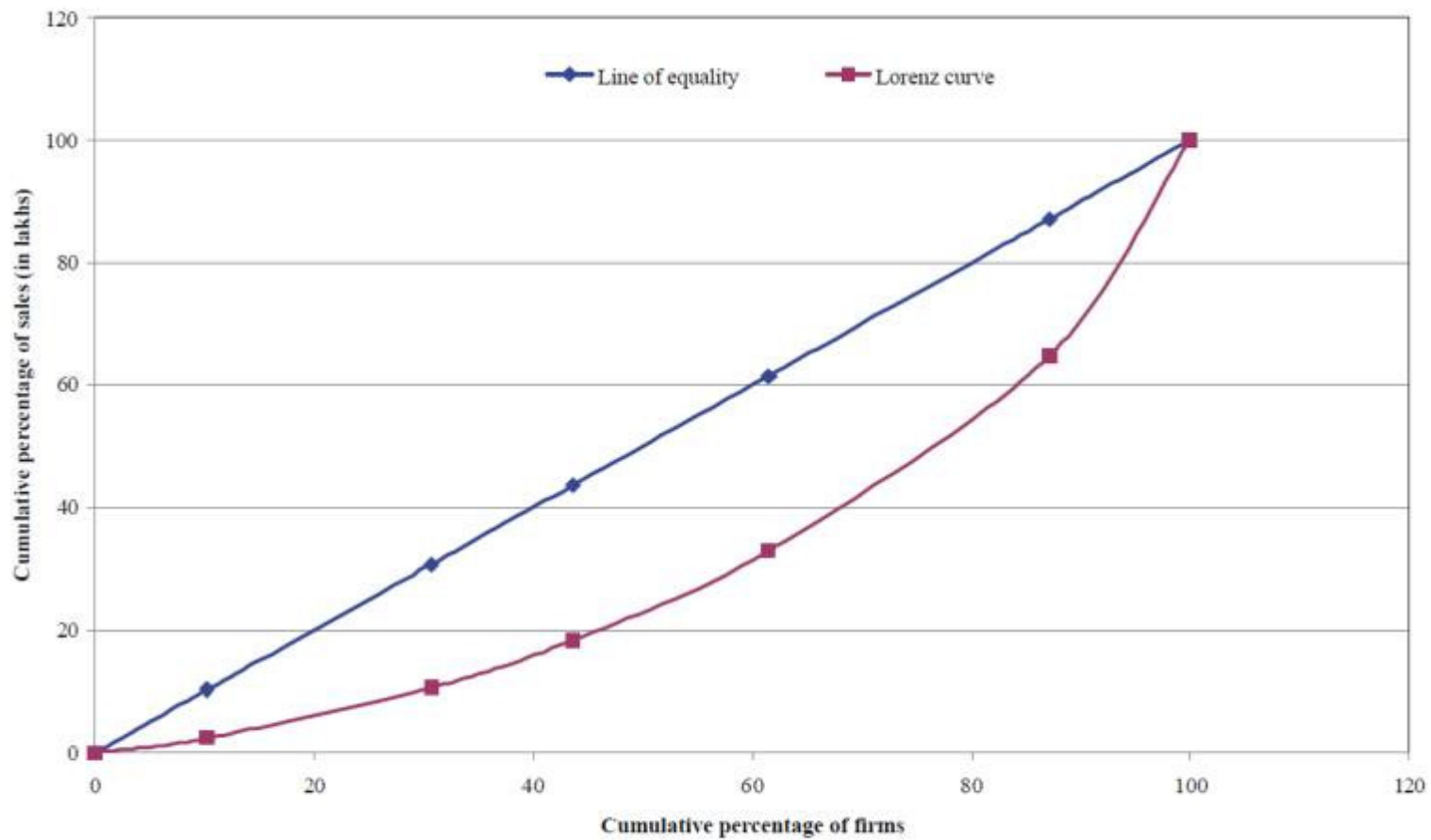


Fig. 4.1: Distribution of pesticide dealers in Dharwad taluk during 2015-16

Fig. 4.1 Distribution of pesticide dealers in Dharwad taluk during 2015-16

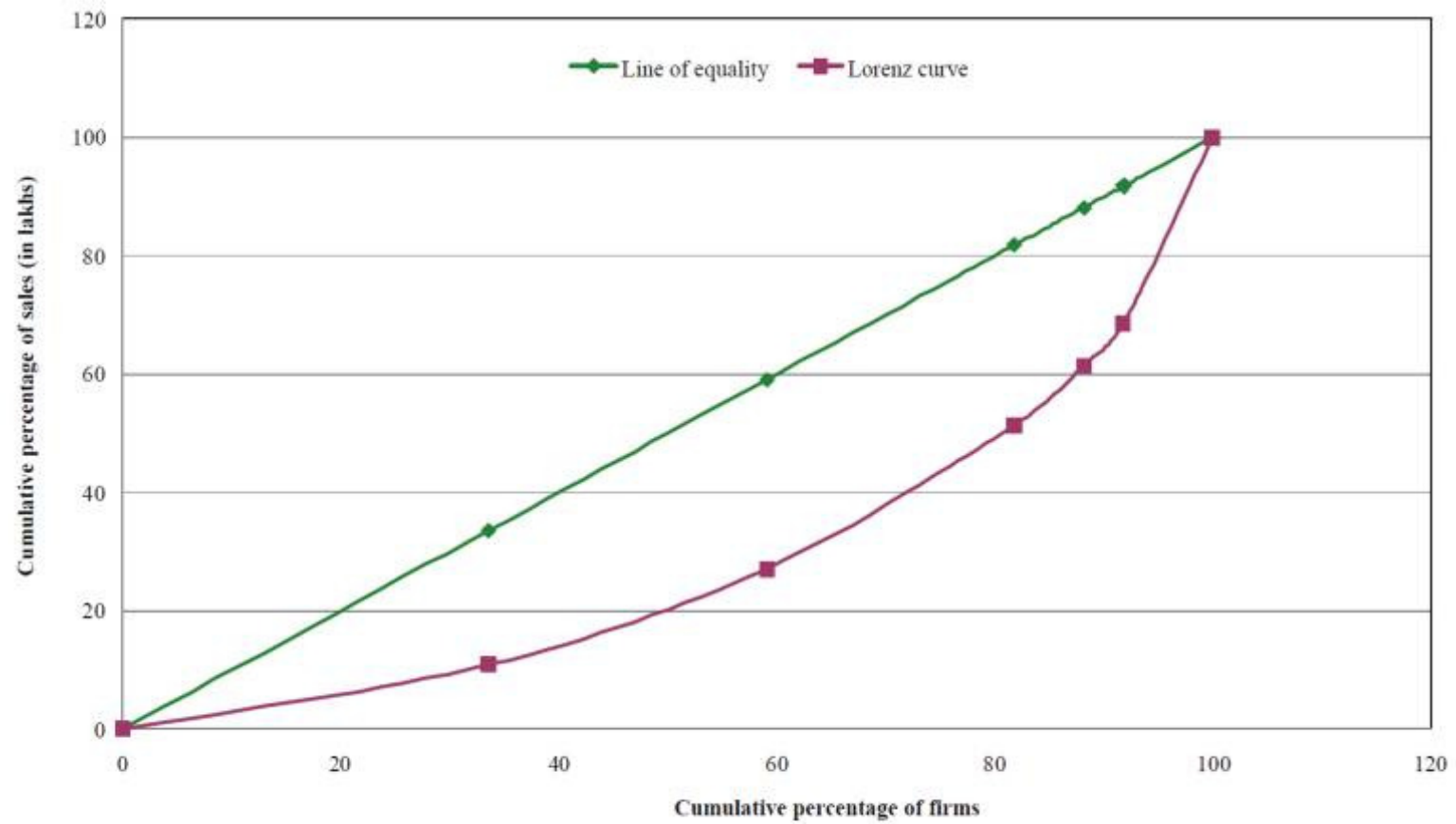


Fig. 4.2: Distribution of pesticide dealers in Hubli taluk during 2015-16

Fig. 4.2 Distribution of pesticide dealers in Hubli taluk during 2015-16

#### 4.1.4 Distribution of pesticide dealers in Navalgund taluk during 2015-16

The concentration of pesticide dealers in Navalgund taluk was presented in Table 4.4 the results revealed that in the sales range of 0-10 lakhs 45.72 per cent of firms handled 18.52 per cent of sales. In the group size of 10-20 lakhs 37.15 per cent of firms handled 43.31 per cent sales of pesticides. While in case of 20-30 lakhs size group 5.71 per cent of firms handled 10.77 per cent of sales. Where as in the group size of 30-40 lakhs 11.42 per cent of firms handled 27.40 per cent of sales and the extent of market concentration was computed with Gini coefficient of inequality which happened to be 0.529 for Navalgund taluk and it was slightly lower than Hubli, Dharwad and Kalghatgi taluks. It is graphically shown in Fig. 4.4, indicates the extent of concentration in Navalgund taluk.

#### 4.1.5 Distribution of pesticide dealers in Kundgol taluk during 2015-16

Table 4.5 presents the market concentration of pesticide dealers in Kundgol taluk. In case of 0-10 lakhs size group 27.77 per cent of firms handled 10.06 per cent of sales. In the sales range of 10-20 lakhs maximum 10 numbers of firms are there which accounts for 55.56 per cent of firms and handled 56.29 per cent sales of pesticides. In the size group of 20-30 5.55 per cent of firms handled 7.48 per cent of sales. While in the group size of 30-40 lakhs 11.12 per cent of firms handled 26.17 per cent of sales and the extent of market concentration was computed with Gini coefficient of inequality which happened to be 0.451 for Kundgol taluk and it was slightly lower than other selected taluks of Dharwad district. Fig. 4.5 shows the extent of concentration in Navalgund taluk diagrammatically.

#### 4.1.6 Distribution of pesticide dealers in Dharwad district during 2015-16

Table 4.6 shows that market concentration of pesticide dealers in Dharwad district comprising of all the taluks in the district. In case of 0-10 lakhs size group of firms maximum 63 firms made 4,30,15,931 ` pesticide sales *i.e.*, 30.14 per cent of firms handled 8.79 per cent of pesticide sales. The sale of 61 firms in the group size of 10-20 lakhs was ` 9,24,96,030 *i.e.*, 29.19 per cent of firms handled 18.91 per cent of pesticide sales. In case of 20-30 lakhs size group 16.27 per cent of firms handled 16.46 per cent of sales. Where as in the group size of 30-40 lakhs 10.53 per cent of firms handled 15.20 per cent of sales. While in the of group size of 40-50 lakhs 6.69 per cent of firms handled 13.15 per cent of sales. However in the group size of above 50 lakhs 15 firms made ` 13,45,49,317 of pesticide sales and it was highest amount of sale made by these firms in Dharwad district. This shows 7.18 per cent of firms handled 27.49 per cent of pesticide sales and the extent of market concentration was computed with Gini coefficient of inequality which happened to be 0.638 for Dharwad district. Fig. 4.6 shows the extent of concentration in Dharwad district graphically by using Lorenz curve technique.

### 4.2 Pesticide purchasing behaviour of farmers

#### 4.2.1 Purchase pattern of pesticides by the farmers

Table 4.7 presents the purchase pattern of pesticides by the farmers. The results revealed that all 120 samples farmers quoted that, their source of purchase was from private agro service centre which accounts for 100 per cent followed by Raita Samparka Kendra (72.5 per cent).

**Table 3.3: Cropping pattern in the study area**

Particular	(Area in ha)					
	Dharwad district	Dharwad taluk	Hubli taluk	Kalaghatgi taluk	Navalgund taluk	Kundgol taluk
<b>I. Cereals</b>						
Paddy	25,952	1,230	481	1,304	27	272
Ragi	108	0	14	1	0	93
Jowar	51,139	11,640	9,358	5,682	1,487	9,586
Wheat	41,041	6,933	2,613	60	22,339	9,096
Maize	41,377	8,233	6,379	3,234	22,289	1,242
Other cereals	2,830	970	1,188	384	9	279
<b>Total</b>	<b>1,62,447</b>	<b>39,906</b>	<b>20,033</b>	<b>22,403</b>	<b>59,537</b>	<b>20,568</b>
<b>II. Pulses</b>						
Bengal gram	47,573	18,150	2,165	553	24,519	2,186
Red gram	2,944	1,098	854	222	102	668
Other pulses	52,176	1,726	7,447	3,174	18,970	5,325
<b>Total</b>	<b>1,02,693</b>	<b>36,508</b>	<b>10,466</b>	<b>3,949</b>	<b>43,591</b>	<b>8,179</b>
<b>III. Commercial crops</b>						
Oil seeds	75,965	14,883	15,353	13,715	11,003	21,011
Cotton	72,612	2,216	20,636	5,730	17,216	26,814
Total non food crops	1,50,495	17,402	36,366	20,555	28,225	47,947
<b>IV. Total food crops</b>	<b>3,78,026</b>	<b>93,746</b>	<b>54,473</b>	<b>29,658</b>	<b>1,39,376</b>	<b>60,773</b>

**Source:** District Statistical Office, Dharwad , 2015-16

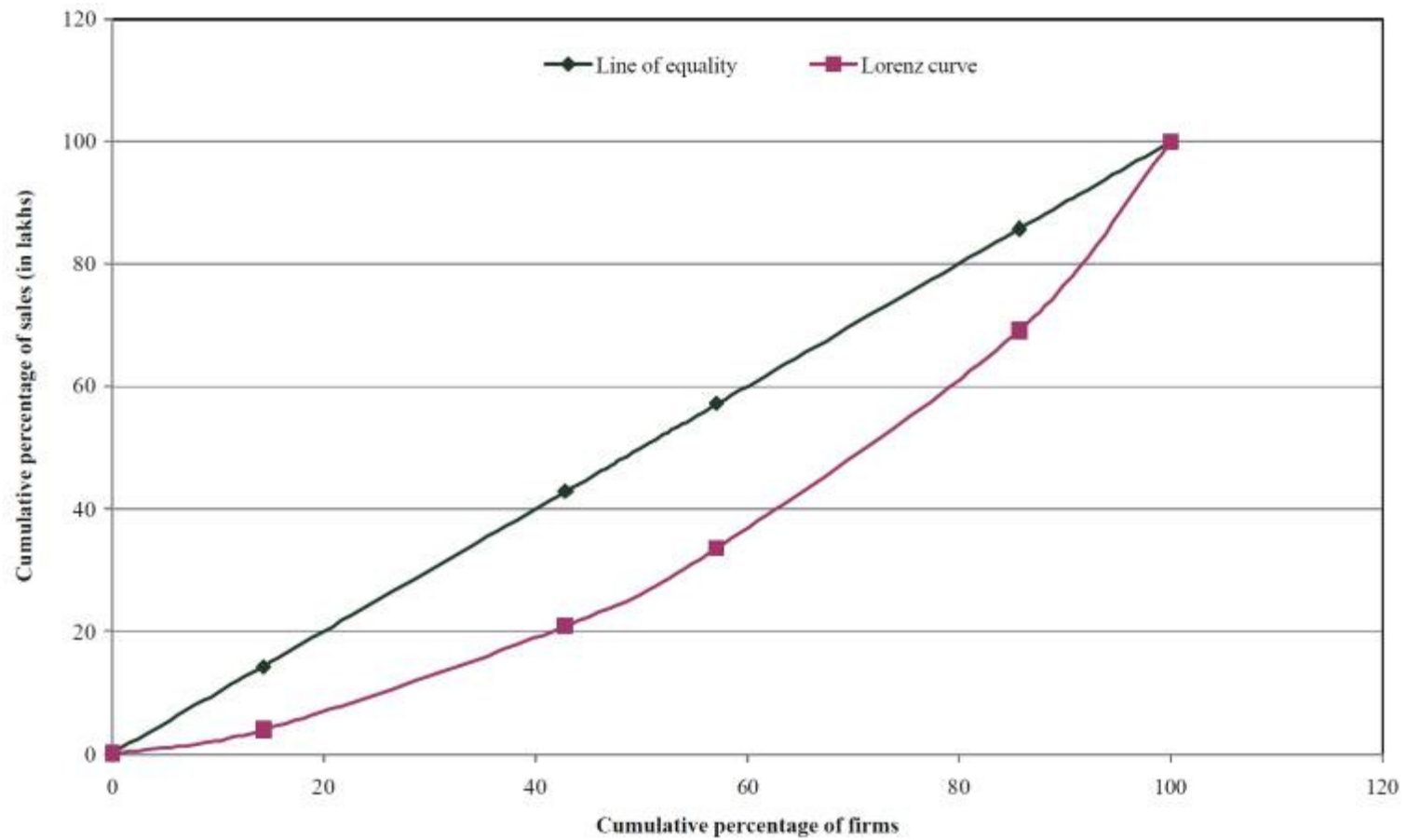


Fig. 4.3: Distribution of pesticide dealers in Kalaghatgi taluk during 2015-16

Fig. 4.3 Distribution of pesticide dealers in Kalaghatgi taluk during 2015-16

**Table 4.4: Distribution of pesticide dealers in Navalgund taluk during 2015-16**

<b>Group size of firms (` in lakhs)</b>	<b>No. of firms</b>	<b>Percentage of firms</b>	<b>Pesticide sales (in `)</b>	<b>Percentage of sales</b>	<b>Cumulative percentage of firms</b>	<b>Cumulative percentage of sales</b>
0-10	16	45.72	91,30,050	18.52	45.72	18.52
10-20	13	37.15	2,13,55,032	43.31	82.87	61.83
20-30	2	5.71	53,05,297	10.77	88.58	72.60
30-40	4	11.42	1,35,12,985	27.40	100	100
<b>Total</b>	<b>35</b>	<b>100</b>	<b>4,93,03,364</b>	<b>100</b>		
<b>Gini Coefficient = 0.529</b>						

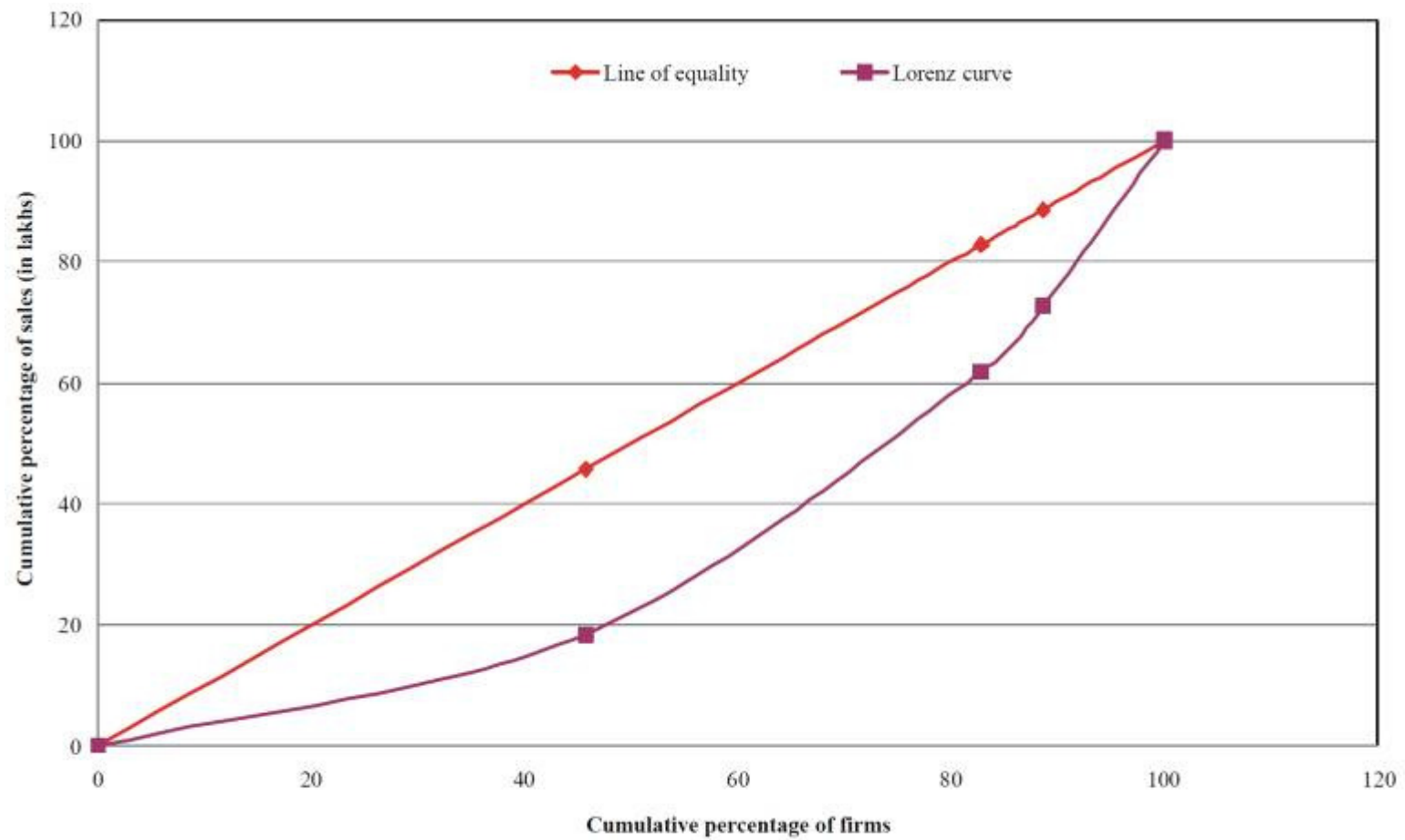


Fig. 4.4: Distribution of pesticide dealers in Navalgund taluk during 2015-16

Fig. 4.4 Distribution of pesticide dealers in Navalgund taluk during 2015-16

**Table 4.5: Distribution of pesticide dealers in Kundgol taluk during 2015-16**

<b>Group size of firms (` in lakhs)</b>	<b>No. of firms</b>	<b>Percentage of firms</b>	<b>Pesticide sales (in `)</b>	<b>Percentage of sales</b>	<b>Cumulative percentage of firms</b>	<b>Cumulative percentage of sales</b>
0-10	5	27.77	28,72,317	10.06	27.77	10.06
10-20	10	55.56	1,60,55,084	56.29	83.33	66.35
20-30	1	5.55	21,36,458	7.48	88.88	73.83
30-40	2	11.12	74,63,250	26.17	100	100
<b>Total</b>	<b>18</b>	<b>100</b>	<b>28527109</b>	<b>100</b>		
<b>Gini Coefficient = 0.451</b>						

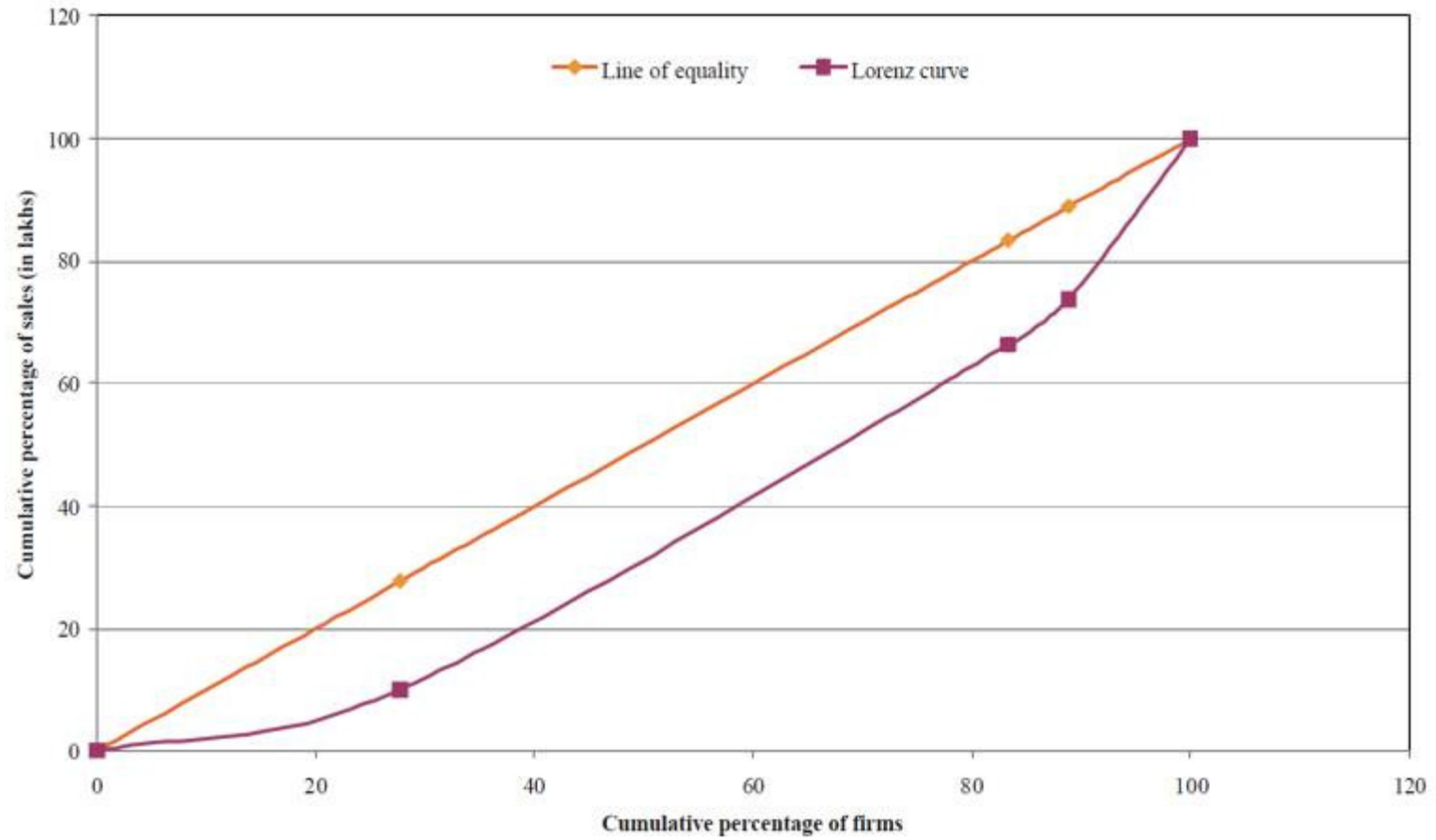


Fig. 4.5: Distribution of pesticide dealers in Kundgol taluk during 2015-16

Fig. 4.5 Distribution of pesticide dealers in Kundgol taluk during 2015-16

**Table 4.6: Distribution of pesticide dealers in Dharwad district during 2015-16**

<b>Group size of firms (` in lakhs)</b>	<b>Number of firms</b>	<b>Percentage of firms</b>	<b>Pesticide sales (in `)</b>	<b>Percentage of sales</b>	<b>Cumulative percentage of firms</b>	<b>Cumulative percentage of sales</b>
0-10	63	30.14	4,30,15,931	8.79	30.14	8.79
10-20	61	29.19	9,24,96,030	18.91	59.33	27.7
20-30	34	16.27	8,05,47,660	16.46	75.6	44.16
30-40	22	10.53	7,43,66,489	15.2	86.13	59.36
40-50	14	6.69	6,43,40,603	13.15	92.82	72.51
Above 50	15	7.18	13,45,49,317	27.49	100	100
<b>Total</b>	<b>209</b>	<b>100</b>	<b>48,93,16,030</b>	<b>100</b>		
<b>Gini Coefficient = 0.638</b>						

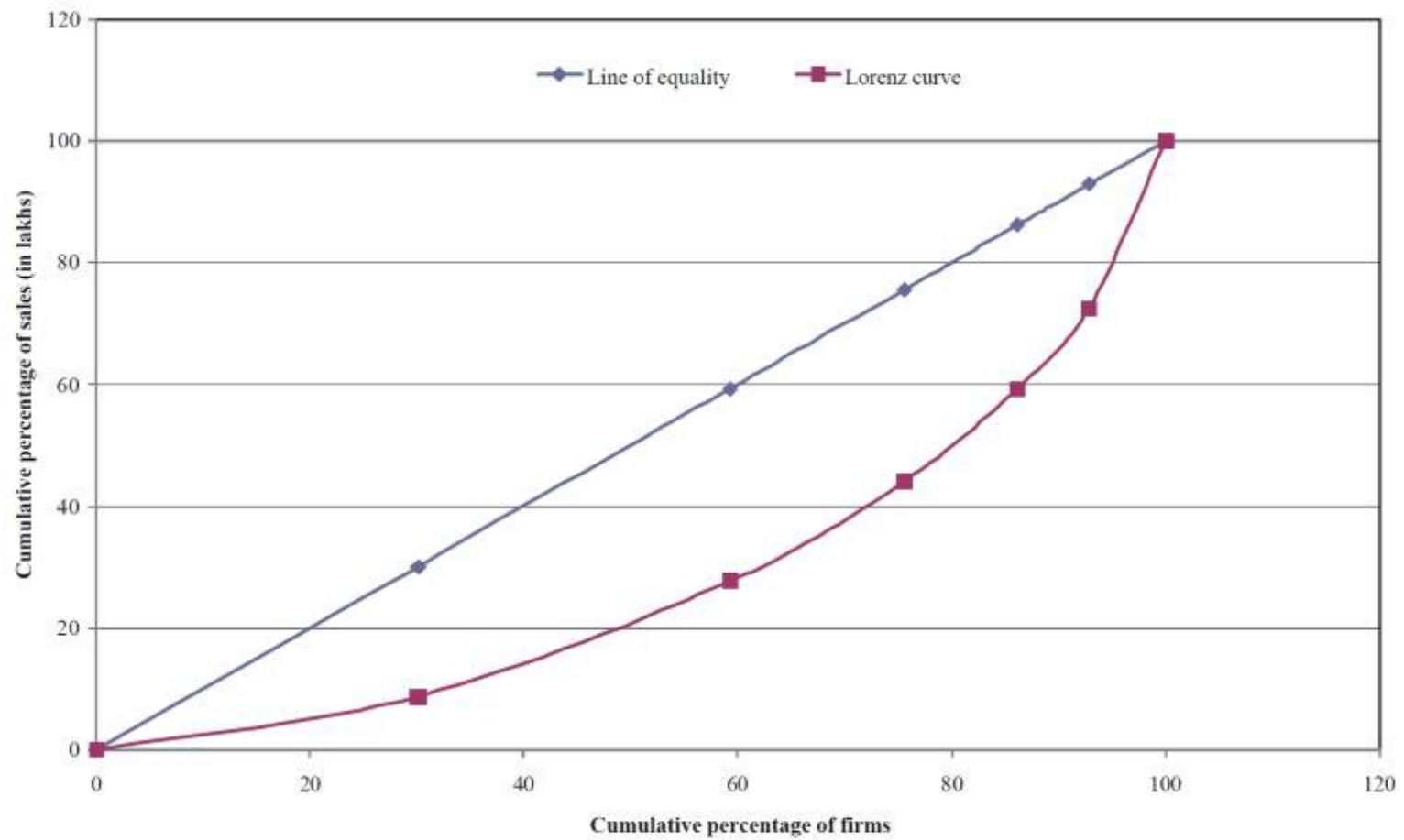


Fig. 4.6: Distribution of pesticide dealers in Dharwad district during 2015-16

Fig. 4.6 Distribution of pesticide dealers in Dharwad district during 2015-16

With regards to mode of purchase for pesticides, majority 84 sample farmers used to purchase on cash payments that accounts for 70 per cent, followed by 20 per cent of the farmers made purchase of pesticides both on cash and credit terms and only 10 per cent of the farmers made purchases on credit basis.

Regarding time of purchase for pesticides as many as 80.83 per cent of farmers were used to purchase one day before spraying, while 12.50 per cent of the respondents purchased the pesticides two to three days before spraying and 6.66 per cent of the farmers purchased on the day of spray.

As for the season of purchase the result revealed that most of the farmers (94.16 %) made pesticides purchase during *kharif* season, followed by 73.33 per cent of the farmers who purchased in *rabi* season and 39.16 per cent of the farmers purchased in summer season.

#### 4.2.2 Farmers preference for purchasing of pesticides

The factor such as brand image, dealers recommendation, price, peer group influence, influence of advertisement, pesticide company officer recommendation, credit availability, own determination of the pest infestation level and kisan call centre guidance were considered to study the farmers preference for purchasing of pesticides and are presented in Table 4.8. The result revealed that majority of the farmers 86.66 per cent opined that brand image was the preference for purchasing of pesticides.

Dealers recommendation was the next factor preferred by the farmers while purchasing pesticides as opined by 79.16 per cent of the respondents, followed by price (65.83 %), peer group influence (53.33 %), influence of advertisement (44.16 %), pesticide company officer recommendation (35 %).

Factors such as credit availability (27.50 %), own determination of the pest infestation level (17.50 %) and Kisan Call Centre guidance (5 %) were the least factor as opined by the total respondents in the study area.

#### 4.2.3 Pesticide companies preferred by the farmers for purchasing of pesticides in Dharwad district

Table 4.9 presents the results of pesticide companies preferred by the farmers for purchasing of pesticides in Dharwad district. The results revealed that Bayer crop science Ltd was the most preferred company for purchasing of pesticides as opined by 77.50 per cent of respondents.

The Dupont India Ltd was the next preferred company for purchasing of pesticides as opined by 72.50 per cent respondents, followed by United Phosphorous Ltd (65 %), Crystal crop protection Pvt. Ltd (51.66 %), Excel crop care Ltd (42.50 %) and other pesticide companies accounting for 30.83 per cent as opined by the total sample respondents.

#### 4.2.4 Promotional measures for the purchase of pesticides by the farmers in Dharwad district

The results of the promotional measures for the purchase of pesticides by the farmers in Dharwad district are presented in Table 4.10. The promotional measures considered were field demonstration, Field day, farmers meeting, jeep campaign, banners, distribution of literature, posters, mass media, shop hangers and fairs.

**Table 4.7: Purchase pattern of pesticides by the farmers****(n=120)**

<b>Sl. No.</b>	<b>Particulars</b>	<b>No. of respondents</b>	<b>Percentage</b>
<b>1</b>	<b>Source of purchase</b>		
i	Private agro service centre	120	100
ii	Raita Sampark Kendra	87	72.50
<b>2</b>	<b>Mode of purchase for pesticides</b>		
i	Cash	84	70
ii	Credit	12	10
iii	Cash and Credit	24	20
<b>3</b>	<b>Time of purchase</b>		
i	2-3 days before spraying	15	12.50
ii	One day before spraying	97	80.83
iii	On the day of spraying	8	6.66
<b>4</b>	<b>Season of purchase</b>		
i	<i>Kharif</i>	113	94.16
ii	<i>Rabi</i>	88	73.33
iii	Summer	47	39.16

**Table 4.8: Farmers preference for purchasing of pesticides****(n = 120)**

<b>Sl. No.</b>	<b>Particulars</b>	<b>No. of respondents</b>	<b>Percentage</b>
1	Brand image	104	86.66
2	Dealers recommendation	95	79.16
3	Price	79	65.83
4	Peer group influence	64	53.33
5	Influence of advertisement	53	44.16
6	Pesticide company officer recommendation	42	35.00
7	Credit availability	33	27.50
8	Own determination of the pest infestation level	21	17.50
9	Kisan Call Centre guidance	6	5.00

The results revealed that among 120 sample farmers, 110 farmers opined that field demonstration was the most influential promotional measures for the purchase of pesticides by the farmers which accounts for 91.66 per cent. Field day was the next important influential promotional measures for the farmers to purchase pesticides as opined by 80 per cent of the respondents.

Farmers meeting was another factor for the farmers to purchase pesticides as opined by 70.83 per cent of the respondents, followed by jeep campaign (65 %), banners (57.50 %), distribution of literature (50 %), posters (41.66 %), mass media (27.50 %), shop hangers (18.33 %) and fairs was the least promotional measures for the purchase of pesticides as opined by 12.50 per cent of the total surveyed respondents in Dharwad district.

#### **4.2.5 Farmers consultation with dealers during purchase of pesticides**

The results of the farmers' consultation with dealers during purchasing of pesticides are presented in Table 4.11. The results shows that majority of the farmers (90 %) opined that against specific pest and symptoms of diseases were the consultation with dealers during purchasing of pesticides.

For choosing the particular brand was the next farmers consultation with the dealers during purchasing of pesticides as opined by 75 per cent of the sample respondents, followed by application of right dose of spray (64.16 %), resistance power after application (53.33 %) and time of spray was the least factor as opined by 16.66 per cent of total surveyed respondents.

#### **4.2.6 Reasons for purchasing chemical pesticides over bio pesticides**

Table 4.12 presents the reasons for purchasing chemical pesticides over bio pesticides. It can be seen from table that better results compared to bio pesticides was the major factor of farmers towards the purchase of chemical pesticides over bio pesticides as opined by 95 per cent of the respondents followed by less number of sprays required compared to bio-pesticides (78.33 %), increase in the quality of the produce (56.66 %), expectation of reduced crop loss (42.50 %) and realization of high income was the least reason of farmers towards the purchase of chemical pesticides as opined by the 30 per cent of total respondents.

### **4.3 Product promotion measures adopted by different Pesticide firms**

#### **4.3.1 Product promotion measures preferred by different pesticide dealers**

Promotional measures comprise of a set of strategies taken up, so that the farmers are induced to go in for the pesticide brands. The product promotion measures preferred by different pesticide dealers such as field demonstration, farmers meeting, field day, distribution of literature, jeep campaign, posters, banners, shop hangers, fairs and mass media are presented in Table 4.13.

From the table it can be seen that majority of the pesticide dealers (93.33 %) preferred field demonstration and it was the most influential method adopted by the pesticide firms for promoting their products.

Farmer meeting was the next important promotional measure preferred by different pesticide dealers as opined by 86.66 per cent of the respondents, followed by field day (83.33 %), distribution of literature (76.66 %), jeep campaign (70 %), posters (56.66 %), banners (53.33 %), shop hangers (46.66), fairs (36.66 %) and mass media was the least promotional measure as preferred by 20 per cent of the respondents.

**Table 4.10: Promotional measures for the purchase of pesticides by the farmers in Dharwad district**

(n = 120)

<b>Sl. No.</b>	<b>Promotional measures</b>	<b>No. of respondents</b>	<b>Percentage</b>
1	Field demonstration	110	91.66
2	Field day	96	80.00
3	Farmers meeting	85	70.83
4	Jeep campaign	78	65.00
5	Banners	69	57.50
6	Distribution of literature	60	50.00
7	Posters	50	41.66
8	Mass media	33	27.50
9	Shop hangers	22	18.33
10	Fairs	15	12.50

**Table 4.11: Farmers consultation with dealers during purchase of pesticides****(n=120)**

<b>Sl. No.</b>	<b>Particulars</b>	<b>No. of respondents</b>	<b>Percentage</b>
1	Against specific pest and symptoms of diseases	108	90.00
2	For choosing the particular brand	90	75.00
3	Application of right dose of spray	77	64.16
4	Resistance power after application	64	53.33
5	Time of spray	20	16.66

**Table 4.12: Reasons for purchasing chemical pesticides over bio-pesticides****(n = 120)**

<b>Sl. No.</b>	<b>Particulars</b>	<b>No. of respondents</b>	<b>Percentage</b>
1	Better results compared to bio pesticides	114	95.00
2	Less number of sprays required compared to bio pesticides	94	78.33
3	Increase in the quality of the produce	68	56.66
4	Expectation of reduced crop loss	51	42.50
5	Realization of high income	36	30.00

**Table 4.13: Product promotion measures preferred by different pesticide dealers****(n = 30)**

<b>Sl. No.</b>	<b>Promotion measures</b>	<b>No. of respondents</b>	<b>Percentage</b>
1	Field demonstration	28	93.33
2	Farmers meeting	26	86.66
3	Field day	25	83.33
4	Distribution of literature	23	76.66
5	Jeep campaign	21	70.00
6	Posters	17	56.66
7	Banners	16	53.33
8	Shop hangers	14	46.66
9	Fairs	11	36.66
10	Mass media	6	20.00

**Table 4.14: Dealers opinions regarding the promotional strategies implemented by the pesticide companies**

(n = 30)

<b>Sl. No.</b>	<b>Particulars</b>	<b>No. of respondents</b>	<b>Percentage</b>
1	Promoting the dealers store by providing banners, shop hangers and calendars	30	100
2	Discount	27	86.66
3	Credit sales	24	80.00
4	Trial plots	22	73.33
5	Good margin	18	60.00
6	Dealers tour	9	30.00
7	Award	5	16.66

### 4.3.2 Dealers opinions regarding the promotional strategies implemented by the pesticide companies

The factors such as promoting the dealers store by providing banners, shop hangers, calendar, discount, credit sales, trial plots, good margin, dealers tour and award were considered to study the dealers opinions regarding the promotional strategies implemented by the pesticide companies and are presented in Table 4.14.

It can be seen from the table that all the sample dealers (100 %) opined that promoting the dealers store by providing banners, shop hangers and calendars are the promotional strategies implemented by the pesticide companies, followed by discount (86.66 %), credit sales (80 %), trial plots (73.33 %), good margin (60. %), dealers tour (30 %) and award was the least promotional strategy implemented by the pesticide companies as opined by 16. 66 per cent of total surveyed respondents.

## 4.4 Problems faced by farmers in purchasing the pesticides

### 4.4.1 Problems faced by farmers in purchasing the pesticides from agro dealers

The survey was conducted to know the problems faced by farmers in purchasing the pesticides from agro dealers and it was analyzed using Garret's ranking technique. The analysis of the problems faced by the farmers such as lack of product information, high price, lack of credit availability, no discount, proximity of outlets, dilemma in choosing a brand, non availability of pesticides in time, poor quality products, duplicate brands and inability of the dealer to suggest the right product for crop are presented in Table 4.15.

The results revealed that among the ten problems faced by farmers lack of product information was the major problem faced by farmers in purchasing the pesticides from agro dealers as expressed by most of the farmers and it was assigned first rank with mean score of 85.21.

Higher price was next problem faced by farmers in purchasing the pesticides from agro dealers with a mean score of 82.14. Lack of credit availability came in third position with a mean score of 79.20, followed by no discount (IV), proximity of outlets (V), dilemma in choosing a brand (VI), non availability of pesticides in time (VII), poor quality products (VIII), duplicate brands (IX) and inability of the dealer to suggest the right chemical for control of pests and diseases of crop (X) was the least problem faced by farmers in purchasing the pesticides from agro dealers.

### 4.4.2 Problems faced by farmers in purchasing the pesticides from Raita Samparka Kendra (RSK)

The survey was conducted to know the problems faced by farmers in purchasing the pesticides from Raita Samparka Kendra (RSK) and it was analyzed using Garret's ranking technique. The analysis of the problems faced by the farmers such as lack of product information, preferred brands are not available, untimely supply, poor quality products, lack of subsidies are presented in Table 4.16.

It can be seen from the table that lack of product information was the major problem faced by farmers in purchasing the pesticides from Raita Samparka Kendra (RSK) as opined by most of the farmers and it was assigned first rank with a mean score of 76.49.

**Table 4.15: Problems faced by farmers in purchasing the pesticides from agro dealers****(n = 120)**

<b>Sl. No.</b>	<b>Problems</b>	<b>Mean score</b>	<b>Rank</b>
1	Lack of product information	85.21	I
2	Higher price	82.14	II
3	Lack of credit availability	79.20	III
4	No discount	76.48	IV
5	Proximity of outlets	74.82	V
6	Dilemma in choosing a brand	71.63	VI
7	Non availability of pesticides in time	68.19	VII
8	Poor quality products	67.04	VIII
9	Duplicate brands	65.43	IX
10	Inability of the dealer to suggest the right chemical for control of pests and diseases of crop	60.22	X

**Table 4.16: Problems faced by farmers in purchasing the pesticides from Raita Samparka Kendra (RSK)**

(n= 120)

<b>Sl. No.</b>	<b>Problems</b>	<b>Mean score</b>	<b>Rank</b>
1	Lack of product information	76.49	I
2	Preferred brands are not available	69.31	II
3	Untimely supply	63.11	III
4	Poor quality products	58.96	IV
5	Lack of subsidies	54.65	V

Preferred brands are not available was the next major problem faced by farmers in purchasing the pesticides from Raita Sampark Kendra (RSK) with a mean score of 69.31, followed by untimely supply (III), poor quality products (IV) and Lack of subsidies (V) was the least problem faced by farmers in purchasing the pesticides from Raita Samparka Kendra (RSK).

#### 4.4.3 Problems faced by pesticide dealers while selling pesticides

The survey was conducted to know the problems faced by dealers while selling pesticides and it was analyzed using Garret's ranking technique. Table 4.17 presents various types of problems faced by the dealer's *viz.* high competition among the dealers, risky investments, credit facility to farmers, inadequate trained personnel for marketing, product complaints from customers and lack of storage facility.

High competition among the dealers was the major problem faced by pesticide dealers while selling pesticides as opined by most of the dealers and it was assigned first rank with a mean score of 72.05, followed by risky investments as assigned II rank, credit facility to farmers III rank, inadequate trained personnel for marketing IV place product complaints from customers V rank and lack of storage facility VI rank was the least problem faced by dealers during selling the pesticides in Dharwad district.

**Table 4.17: Problems faced by pesticide dealers while selling pesticides****(n= 30)**

<b>Sl. No.</b>	<b>Particulars</b>	<b>Mean score</b>	<b>Rank</b>
1	High competition among the dealers	72.05	I
2	Risky investments	67.59	II
3	Credit facility to farmers	58.75	III
4	Inadequate trained personnel for marketing	55.24	IV
5	Product complaints from customers	49.84	V
6	Lack of storage facility	43.56	VI

## 5. DISCUSSION

The results of the study presented in the previous chapter are discussed in detail in this chapter under the following heads:

- 5.1 Market structure of pesticide dealers
- 5.2 Pesticide purchasing behaviour of farmers
- 5.3 Product promotion measures adopted by different pesticide firms
- 5.4 Problems faced by farmers in purchasing the pesticides

### 5.1 Market structure of pesticide dealers

Market structure was studied using the concept of Gini coefficient of inequality. In order to investigate the extent of market concentration in the hands of dealer, it was proposed to compute the cumulative per cent of the all the dealers and also the cumulative per cent of the sales by dealers in the study area. These values were subjected to Gini coefficient value. The Gini coefficient helps in explaining precisely about the extent of inequality in the district.. The distribution of firms in different size groups was analyzed by working out the percentage of the firms in each group and their sales of pesticides. Market is considered more competitive or market concentration is supposed to be lower when the Gini coefficient of inequality gets smaller.

#### 5.1.1 Distribution of pesticide dealers in Dharwad taluk during 2015-16

The results presented in Table 4.1 shows that the concentration of pesticide dealers in Dharwad taluk. Frokim the study, it was found that highest sales was in the size group of above 50 lakhs *i.e.*, 12.83 per cent of the number of firms handled 35.15 per cent of the sales of pesticides. Lowest sale was in the range of 0-10 lakhs which shows that 10.25 per cent of firms handled only 2.35 per cent of sales. Table also inferred that cumulatively 87.18 per cent of total number of firms handled 64.84 per cent of the total sales of pesticides in Dharwad taluk and Gini coefficient of inequality for Dharwad taluk was slightly low (0.598) compared to Hubli taluk, indicating moderately oligopolistic competition.

#### 5.1.2 Distribution of pesticide dealers in Hubli taluk during 2015-16

Table 4.2 results inferred that the market concentration of pesticide dealers in Hubli taluk. It was clear from Table that in the group size of above 50 lakhs 8.19 per cent of the firms handled 31.36 per cent of sales and it was highest sale made by this group size of firms. Table also observed that cumulatively 91.81 per cent of total number of firms handled 68.63 per cent of the total sales of pesticides in Hubli taluk and Gini coefficient of inequality for Hubli taluk was slightly high (0.631) compared to Dharwad taluk, inclined towards perfect inequality, indicating moderately oligopolistic competition.

### 5.1.3 Distribution of pesticide dealers in Kalghatgi taluk during 2015-16

The results presented in Table 4.3 revealed that the concentration of pesticide dealers in Kalghatgi taluk. The results shows that in case of 30-40 group size 28.58 per cent of the firms handled 35.50 per cent of sales and it was highest sale made by this group size of firms. Table also observed that cumulatively 91.81 per cent of total number of firms handled 68.63 per cent of the total sales of pesticides in Kalghatgi taluk and Gini coefficient of inequality for Kalghatgi taluk was slightly low (0.546) compared to Hubli and Dharwad taluk, indicating moderately oligopolistic competition.

### 5.1.4 Distribution of pesticide dealers in Navalgund taluk during 2015-16

The results presented in Table 4.4 shows that the concentration of pesticide dealers in Navalgund taluk. The result depicted that highest sale made by 10-20lakhs group size of firms, as 37.15 per cent of the firms handled 43.31 per cent of sales. In the category of 20-30 lakhs size group 5.71 per cent of firms handled 10.77 per cent of sales which forms lowest sales among different group size of firms. Table also shows that cumulatively 88.58 per cent of total number of firms handled 72.60 per cent of the total sales of pesticides in Navalgund taluk and Gini coefficient of inequality for Navalgund taluk was slightly low (0.529) compared to Hubli, Dharwad and Kalghatgi Taluk, indicating moderately oligopolistic competition.

### 5.1.5 Distribution of pesticide dealers in Kundgol taluk during 2015-16

Table 4.5 shows that the concentration of pesticide dealers in Kundgol taluk. Here highest sale was made by 10-20lakhs group size of firms *i.e.*, 28.58 per cent of the firms handled 35.50 per cent of sales. Table also depicted that cumulatively 88.88 per cent of total number of firms handled 73.83 per cent of the total sales of pesticides in Kundgol taluk and Gini coefficient of inequality for Kundgol taluk was low (0.451) compared to Hubli, Dharwad, Kalghatgi and Navalgund Taluk, indicating monopolistic competition.

### 5.1.6 Distribution of pesticide dealers in Dharwad district during 2015-16

Table 4.6 result presents overall market concentration of pesticide dealers in Dharwad district. The result shows that highest pesticide sales made by above 50 lakhs group size of firms, as 7.18 per cent of the firms handled 27.49 per cent of sales due to preference of farmers for particular dealer shop to buy pesticides and firms also take risky investments to sell pesticides. In the category of 0-10 lakhs size group 30.14 per cent of firms handled 8.79 per cent of sales which forms lowest sales among different group size of firms because high competition among the dealers, no spurious brands to sell pesticides, depending upon the other agri inputs available in the shops as farmers buy other inputs while purchasing pesticides. Dealership experience, shop is in convenient place are some other reasons to fall in the category of 0-10 lakhs group size of firms in Dharwad district. From the Table it can be also seen that cumulatively 92.82 per cent of total number of firms handled 72.51 per cent of the total sales of pesticides in Dharwad district and the overall Gini coefficient of inequality for Dharwad district was found to be 0.638 which was inclined towards perfect inequality, indicating moderately oligopolistic competition. Similar results were observed in case of Gururaj (2007).

## 5.2 Pesticide purchasing behaviour of farmers

### 5.2.1 Purchase pattern of pesticides by the farmers

Table 4.7 shows that purchase pattern of pesticides adopted by the farmers. The results inferred that majority of the farmers opined that their source of purchase was from private agro service centre, as availability all different types of pesticide brand in the market and farmers were also purchased from Raita Samparka Kendra (RSK) on subsidy basis.

With regard to mode of purchase, maximum number of farmers paid in cash for purchasing pesticides as farmers were not getting credit facility from pesticide dealers and small proportion of farmers purchased pesticide on cash and credit basis as farmers had good relationship with dealers, permanent and regular customer to purchase pesticide on credit basis.

Regarding time of purchase, majority of farmers purchased pesticides one day before spraying this was due to the fact that pesticides get leaked and exposed to air during storage if they purchase early. While the next option for purchase of pesticide preferred by a farmers was buying it 2-3 days before spraying and very few farmers chose to purchase pesticide on the day of spray as looking into the crop stage and pest infestation level.

In case of season of purchase, majority of the farmers purchased pesticide during *kharif* season because most of the farmers grow their crops in *kharif* season. Depending upon monsoon, land availability and irrigation, farmers growing crops in *rabi* and summer season that leads to decrease in the purchase of pesticides.

### 5.2.2 Farmers preference for purchasing of pesticides

The result presented in Table 4.8 revealed that brand image was most preferred by the sample farmers for purchasing of pesticides because farmers purchased that brand which had good results and strong reputation in the market. Dealer's recommendation was the next factor preferred by the farmers while purchasing pesticides, since dealer shop was major source of purchase and information to the farmers. Price of the pesticides was another factor for purchasing pesticides due to the purchasing power of farmers.

Influence of advertisement, credit availability and own determination of the pest infestation level were the factors considered by the farmers to purchase pesticides. Here farmers were influenced by company advertisement, credit facility given by the dealers and less proportion of farmers identified pest infestation level for purchasing pesticides.

Peer group influence, pesticide company officer recommendation and Kisan Call Centre guidance were some other factors preferred by farmers for purchasing of pesticides as farmers were getting suggestion from agriculture department. Pesticide company officer also visit farmer's field to recommend pesticides by seeing their crops and kisan call centre respond issues raised by farmers instantly in local language and solve their issues related to farming, but majority of the sample farmers not aware of Kisan Call Centre. Similar results were noticed in case of Sampathkumar (2014).

### 5.2.3 Pesticide companies preferred by the farmers for purchasing of pesticides in Dharwad district

Table 4.9 shows that pesticide companies preferred by the farmers for purchasing of pesticides in Dharwad district. The results revealed that Bayer crop science Ltd, Dupont India Ltd, United Phosphorous Ltd, Crystal crop protection Pvt. Ltd, Excel crop care Ltd are the top five companies preferred by the farmers for purchasing of pesticides due to their brand image in the market, good quality products, promotion measures adopted by them and very few farmers preferred other pesticide companies for purchasing of pesticides.

### 5.2.4 Promotional measures for the purchase of pesticides by the farmers in Dharwad district

Table 4.10 presents promotional measures for the purchase of pesticides by the farmers in Dharwad district. The result shows that there are many tactics and ways that go in effective pesticide advertisement such as farmers meeting, field demonstration, field day, Jeep campaign, banners, distribution of literature, posters, mass media, shop hangers and fairs.

The results inferred that field demonstration, field day and farmers meeting, were the most influential promotional measures for the purchase of pesticides by the farmers as it was attributed to the fact that seeing is believing meaning that farmers directly knowing the performance of the products and farmers interact with marketing personnel and get things clarified.

Jeep campaign, banners, distribution of literature, posters are provided relatively less effective alternative way of promotional measures for the purchase of pesticides by the farmers. Here campaign is usually done after the sowing season with the help of jeeps through distribution of literature, fixing posters in village area to create awareness about the brand.

Mass media, shop hangers and fairs were found be least promotional measures, as farmers rarely come across these types of promotional measures for purchasing of pesticides.

### 5.2.5 Farmers consultation with dealers during purchase of pesticides

Table 4.11 presents farmers consultation with dealers during purchasing of pesticides the results inferred that majority of the farmers opined that specific pest and symptoms of diseases was the consultation with dealers during purchasing pesticides, followed by for choosing the particular brand, application of right dose of spray, resistance power after application and time of spray was the least factor opined by the sample farmers. This indicates that lack of knowledge of farmers against specific pest and symptoms of diseases, pesticide brand, right dosage, resistance power and time of spray during purchasing of pesticides as dealers were major source of information for consultation during purchasing pesticides.

### 5.2.6 Reasons for purchasing chemical pesticides over bio-pesticides

Table 4.12 presents reasons for purchasing chemical pesticides over bio-pesticides. The results inferred that majority of the farmers opined that chemical pesticides had better results compared to bio pesticides because of immediate results against different pest and diseases.

Farmers felt that the number of sprays required with chemical pesticides was less than bio pesticides. It is further noticed from the Table that quality improvement as a result of chemical pesticides use was the motivation for the purchase of chemical pesticides in pest control. Expectation of reduced crop loss and realization of high income were found to be least factor towards the purchase of chemical pesticides as farmers were mainly depending upon the result of the product if the product is good then provide benefits to producers through prevention of crop losses and increases profit.

## 5.3 Product promotion measures adopted by different Pesticide firms

### 5.3.1 Product promotion measures preferred by different pesticide dealers

Promotion measures are the tool applied for getting good results in sales operation. The philosophy of any pesticide firm is 'Farmer (as customer) is the king'. Marketing of pesticides in the market involves the best use of all available strategies to promote their products. To create awareness and to make the farmers to buy their products and it was presented in Table 4.13. The major product promotions adopted by pesticide firms as opined by pesticide dealers, field demonstration as one of the most widely used and effective technique for creating awareness among the farmers regarding what can be accomplished through use of an improved product or practice and convincing them to adopt these technologies. Since, farmers believe in 'seeing is believing' concept and they do not take risk with new products. They opined that field demonstrations create faith among the farmers and dealers as they directly knowing the performance of the products.

Farmer meeting was the next important promotion measure and excellent way to present the benefits of pesticide products. These meetings are conducted in an orderly manner, which gives an opportunity for pesticide companies, dealers, farmers to exchange ideas for further development. Training programmes are organized before conduction of demonstrations which helps to create awareness about their products as depicted by pesticide dealers.

Pesticide dealers preferred field days are organized as a major programme at the demonstration plot, scientists and experts are invited for interaction with the farmers in their field. The farmers on whose fields the demonstrations are laid out, share their experience and opinion about the crop stand and results of the product applied to field.

Campaign is usually done after the sowing season with the help of jeeps through distribution of literature and to create awareness about the brand. Posters and banners with an impressive design and appropriate caption displayed at important locations in rural areas can attract attention and serve as constant reminder media, as preferred by the medium proportion of pesticide dealers.

Shop hangers, fairs like krishimela, krishi abhiyana programme conducted by RSK and mass media were found to be the least factors as farmers rarely come across these types of advertisement as opined by pesticide dealers. Similar results was studied by Basavaraja (2013).

### 5.3.2 Dealers opinions regarding the promotional strategies implemented by the pesticide companies

Table 4.14 presents dealers opinions regarding the promotional strategies implemented by the pesticide companies. It was observed that all dealers opined that promoting the dealers store by providing banners, shop hangers and calendars are the promotional strategies implemented by the pesticide companies. Dealers got discount, credit sales, shop hangers, trial plot and good margin from the pesticide companies, If the pesticide brand is new in market, firms will give discount, trial plots for confirming the quality of the product. Shop hangers provided to the dealer because farmers come regularly in touch with these strategies at dealers store and good margin to promote new product by counter sale. Dealer's tour and award were the least promotional strategy got from pesticide companies, it is depending upon the pesticide sold by each dealer.

## 5.4 Problems faced by farmers in purchasing the pesticides and suggest suitable measures

### 5.4.1 Problems faced by farmers in purchasing the pesticides from agro dealers

Table 4.15 presents the problems faced by farmers in purchasing the pesticides from agro dealers. The results inferred that lack of product information was the major problem faced by farmers in purchasing the pesticides because of lack of knowledge of different molecules, different type of pesticides available in the market and against specific pest and diseases.

Higher prices, lack of credit availability, no discount were other major problems faced by farmers in purchasing the pesticides from agro dealers because of the weak economic condition of the farmers. Dilemma in choosing a brand as another problem faced by farmers due to lack of knowledge and information of different brand.

Apart from these, problems like non availability of pesticides at right time, poor quality products to control pest and diseases of crop can be a problems to farmers.

Duplicate brands and inability of the dealer to suggest the right product for crop were the least problem faced by farmers in purchasing the pesticides from agro dealers. similar results were observed in case of Sudhakara (2011).

### 5.4.2 Problems faced by farmers in purchasing the pesticides from Raita Samparka Kendra (RSK)

Table 4.16 presents problems faced by farmers in purchasing the pesticides from Raita Samparka Kendra (RSK). The results found that lack of product information ranks first because illiteracy among the farmers. It was clear from Table that preferred brands are not available for purchase in Raita Samparka Kendra as compared to dealers shops which are available to farmers.

Untimely supply, poor quality products were the others problems, as farmers did not get good quality and in time from Raita Samparka Kendra (RSK) and lack of subsidies was found be least problem, as some of the farmers did not get subsidised pesticide products from RSK.

#### 5.4.3 Problems faced by pesticide dealers while selling pesticides

Table 4.17 shows problems faced by pesticide dealers during selling pesticides. The results revealed that, a majority of dealers felt that high competition among the dealers was a major problem for them. In the present days markets for agro inputs are witnessing stiff competition among sellers,. Since every pesticide dealer normally deals in pesticides, this kind of tough competition among pesticide selling units was a matter of concern for the dealers.

Risky investments and credit facility to farmers were other problems faced by pesticide dealers. If the product doesn't move fast in the market without giving credit facility to farmers and gets piled up in the stock, dealers naturally loses profit, time and money invested by the them.

Inadequate trained personnel for marketing is one of the problem, as poor work of marketing personnel appointed by the companies for suggesting farmers to purchase from particular dealer, product complaints from customers was another problem because farmers did not got results of purchased product and lack of storage facility was the least problems faced by dealers to store products during selling the pesticides.

## 6. SUMMARY AND POLICY IMPLICATIONS

Agriculture is the mainstay of the Indian economy. It is a formidable task to ensure food security for 1.34 billion Indian people with shrinking cultivable land resources and this necessitates the use of high yielding variety of seeds, balanced use of fertilizers and judicious application of quality pesticides along with education to farmers for the implementation of modern farming techniques. For each acre of land there are 50 to 300 million buried weeds. Crop or plant have to compete with 30,000 species of weeds, 3,000 species of nematodes and 100,000 species of plant eating insects. 25 to 40 per cent of crop output is lost due to the attack of pests and diseases during 2015-16. To minimize these losses and to enhance yield, it is essential to use crop protection chemicals.

The role of pesticides in crop production is important as it is a protective umbrella for other inputs. A crop could be attacked by a number of pests, which appear at different stages of growth of crop but their virulence varies widely. The loss sustained by the crop depends upon the extent and pest attack. If the attack is of epidemic nature, the crop loss may be total inspite of all other inputs being optimal. Timely and judicious use of pesticides can save the crop from such disasters. Hence, pesticides play a crucial part in the agribusiness input industry and progressive efforts are made to improve pesticides marketing management in agriculture sector.

India is the fourth largest global producer of pesticides after US, Japan and China. This segment generated a value of US\$ 4.4 billion in 2015 and is expected to grow at 7.5 per cent per annum to reach US\$ 6.3 billion by 2020. While the domestic demand is expected to grow at 6.5 per cent per annum, exports are estimated to grow at 9 per cent per annum during the same period. The production of pesticides in India is 1,86,830 million tonnes during 2014-15. Approximately 50 per cent of the demand comes from domestic consumers while the rest goes towards exports.

Globally, India shared around 3.75 per cent of the pesticides. The usage of pesticide in India is 0.6 kg/ha. The total pesticide consumption in India is around 54,532 metric tonnes, in which 65 per cent are in the form of insecticides, 16 per cent are herbicides, 15 per cent are fungicides, 4 per cent are others. The highest consumption of pesticide in India was found in Maharashtra *viz.*, 11,665 metric tonnes and lowest consumption was found in Andaman and Nicobar Islands *viz.*, 13.5 metric tonnes. The consumption of pesticide in Karnataka *viz.*, 1,283 metric tonnes in 2015-16.

Marketing management of pesticides is a system of interacting activities of agencies which moves the pesticides from place of production to the ultimate buyer. Hence, distribution system is the nucleus of marketing system. Marketing wing of any pesticide company has a greater responsibility to make availability of pesticides to farmers at right time, right place and right price. The distribution system involves a number of channels, marketing functionaries and interaction between them. Hence, the choice of right distribution channel is of paramount importance to the manufactures. Distribution channel plays a strategic role in the effective performance of pesticide marketing system. The pesticide distribution channel take possession of goods on certain specified terms and conditions like issue price, distribution margin, credit period, discount if any *etc.* the strategies and the policies followed by the pesticides distribution channel have to be in consonance with the marketing operations of the manufactures.

The present study has been undertaken on concentration of dealers in pesticide market in the study area. Besides, study focuses on farmer's knowledge, their purchase pattern of pesticides, factors influencing for purchasing pesticides. Also efforts made to examine the sale promotion measures undertaken by the pesticide companies and farmers' impressions about such measures could guide the companies in suitably revising their promotional measures and problems faced by farmers in purchasing pesticides.

### Specific objectives of the study

1. To analyze the market structure of pesticides in Dharwad district
2. To study the pesticide purchasing behaviour of farmers
3. To study the various product promotion measures adopted by different pesticide firms
4. To study the problems faced by farmers in purchasing the pesticides and suggest suitable policy measures

### Methodology

Dharwad district was purposively selected for the study, since it has multiple cropping situation. For the study, all the taluks of Dharwad district such as Dharwad, Hubli, Navalgund, Kalghatgi and Kundgol were selected.

Both primary and secondary sources of data were collected for the study to evaluate the objectives of the study. Primary data were collected from both farmers and pesticide dealers for collecting information pertaining to their purchase pattern of pesticides, factors influencing for purchasing pesticides, promotional measures for purchasing pesticides and problems faced by farmers in purchasing the pesticides.

The secondary data regarding pesticide sales in the study taluks, number of pesticide dealers were collected from distributors, Assistant Director of Agriculture(ADA) and Joint Director of Agriculture(JDA) office in Dharwad district. The data regarding cropping pattern and general information regarding the study area were collected from the records maintained at the Dharwad District Statistical Office and the Department of Agriculture during the study period 2015-16.

The data collected from primary and secondary sources were analysed through the analytical techniques in order to arrive at meaningful conclusions. The different analytical techniques used in the study were as follows, Tabular analysis, Gini coefficient and Garret's ranking technique.

### Major findings of the study

1. It was inferred from the study that market structure of pesticides in the study area was highly concentrated and Gini coefficient value indicates moderately oligopolistic competition in all the taluks of Dharwad district.
2. The results of purchase pattern of pesticides by the farmers inferred that majority of the farmers purchased pesticides from private agro service centre. With regard to mode of purchase, maximum number of farmers paid in cash for purchasing pesticides. Regarding time of purchase, majority of the farmers purchased pesticides one day before spraying. In case of season of purchase, most of the farmers purchased pesticide during *kharif* season.

3. The result of farmers preference for purchasing of pesticides revealed that brand image was most preferred by the sample farmers for purchasing of pesticides.
4. The result revealed that Bayer crop science Ltd was the most preferred company by the farmers for purchasing of pesticides due to their brand image in the market, good quality products and promotion measures adopted by them.
5. The results inferred that field demonstration, field day and farmers meeting were the most influential promotional measures for the purchase of pesticides by the farmers.
6. Majority of the farmers opined that against specific pest and symptoms of crop diseases were the consultation with dealers during purchasing pesticides.
7. Majority of the farmers felt that chemical pesticides had better results compared to bio pesticides because of immediate results against different pest and diseases.
8. Among the various promotion measures, field demonstration as one of the most widely used and effective technique for creating awareness among the farmers regarding what can be accomplished through use of an improved product or practice and convincing them to adopt these technologies. Since, farmers believe in 'seeing is believing' and they do not take risk with new products. They opined that field demonstrations create faith among the farmers and dealers as they directly knowing the performance of the products.
9. Majority of the dealers opined that promoting the dealers store by providing banners, shop hangers and calendars are the promotional strategies implemented by the pesticide companies for promoting their products.
10. Lack of product information was the major problem faced by the farmers in purchasing of pesticides from agro dealers and Raita Samparka Kendra.
11. Majority of dealers felt that high competition among the dealers was a major problem for them while selling pesticides.

## Policy implications

1. During study, it was found that Kisan Call Centre (KCC) guidance was least factor preferred by the farmers while purchasing pesticides. Hence, there is need to disseminate information about Kisan Call Centre among the farmers by Agriculture Department that respond issues raised by farmers instantly in local language and solve their issues related to farming.
2. It was found that field demonstration as a promotional measure were most preferred by the both farmers and pesticide dealers in the study area, as it provides them with an idea of practical performance of the crop. The pesticide supplying firms need to take into account this preference of the farmers in formulating their product promotion strategies.
3. During farmers' survey, it was observed that lack of knowledge about pesticides was the major problem faced by farmers. Hence, there is a need to provide adequate technical guidance regarding control of crop pest and diseases, different types of pesticides and application of right dose of spray of plant protection chemicals to the farmers through conducting training programme by Agriculture Department.

4. High price of pesticides is one of the problems faced by farmers in purchasing the pesticides from agro dealers. There shall be subsidy for selected chemicals by the Government to sell pesticides in the market.

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# **MARKETING MANAGEMENT OF PESTICIDES IN DHARWAD DISTRICT**

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**2017**

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## **ABSTRACT**

The study was undertaken in the year 2016-17 in five taluks of Dharwad district under UAS Dharwad jurisdiction. Primary data were collected by random sampling method and from each taluk 24 farmers and 6 dealers were selected. Thus the total sample size for the study was 120 farmers and 30 dealers. Secondary data regarding pesticide sales were collected from distributors, Joint Director of Agriculture (JDA) and Assistant Director of Agriculture (ADA) office in Dharwad district during the period 2015-16. Tabular analysis, Gini coefficient and Garret's ranking techniques were used for data analysis.

Market concentration was highly concentrated and Gini coefficient value indicated moderately oligopolistic competition in pesticides. All the sample farmers purchased pesticides from private agro service centre due to availability of all different types of pesticide brand in one place. Majority of the farmers (86.66 %) opined that brand image was the preference for purchasing of pesticides. Field demonstration was the most influential promotional measure preferred by the farmers while purchasing pesticides which accounts for 91.66 per cent. Majority of the farmers (90 %) consulted with dealers regarding specific pest and a symptom of diseases during purchasing of pesticides. All the selected sample dealers opined that promoting the dealers store by providing banners, shop hangers and calendars were the promotional strategies implemented by the pesticide companies for promoting their products. Lack of product information was the major problem faced by farmers in purchasing the pesticides from agro dealers and Raita Samparka Kendra (RSK) with a mean score of 85.21 and 76.49 respectively. There is need to educate farmers regarding control of crop pest and diseases, different types of pesticides and application of right dose of spray through conducting training programme by the Department of Agriculture.