

**A STUDY ON FARMERS PREFERENCE FOR PESTICIDE
BRANDS AND PROMOTIONAL STRATEGIES OF PESTICIDE
COMPANIES IN CHIKKABALLAPURA DISTRICT**

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**DEPARTMENT OF AGRICULTURAL MARKETING,
CO-OPERATION AND BUSINESS MANAGEMENT
UNIVERSITY OF AGRICULTURAL SCIENCES
BANGALORE - 560 065**

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COMPANIES IN CHIKKABALLAPURA DISTRICT**

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*Project Report submitted to the
University of Agricultural Sciences, Bangalore
in partial fulfillment of the requirements
for the award of the degree of*

MASTER OF BUSINESS ADMINISTRATION
(Agribusiness Management)

BANGALORE

SEPTEMBER, 2012



Affectionately dedicated to

My Beloved Parents,

My Brothers, Sisters



My Chairman

**DEPARTMENT OF AGRICULTURAL MARKETING,
CO-OPERATION AND BUSINESS MANAGEMENT
UNIVERSITY OF AGRICULTURAL SCIENCES
G.K.V.K., BANGALORE - 560 065**

CERTIFICATE

This is to certify that the Project Report entitled, “**A STUDY ON FARMERS PREFERENCE FOR PESTICIDE BRANDS AND PROMOTIONAL STRATEGIES OF PESTICIDE COMPANIES IN CHIKKABALLAPURA DISTRICT**” submitted by **Mr. SUNDAR SINGH, G., ID No. MBAL 0026** in partial fulfillment of the requirement for the degree of **MASTER OF BUSINESS ADMINISTRATION (Agribusiness Management)** to the University of Agricultural Sciences, Bangalore, is a record of bonafide research work done by him during the period of his study in this University under my guidance and supervision and the Project Report has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

Bangalore

September, 2012

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(Sundar Singh, G.)

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PROMOTIONAL STRATEGIES OF PESTICIDE COMPANIES IN
CHIKKABALLAPURA DISTRICT**

Sundar Singh, G

Abstract

India is the fourth largest producer and tenth largest consumer of pesticides in the world. In spite of being one of the largest producer and consumer, the crop losses in India due to pest attack is very high which resulted in huge losses (Rs. 90,000 crores per annum). Keeping this issue in mind the study was conducted in Chikkaballapura district with the objective of analysing factors influencing the farmer's brand preference for pesticides. Among the companies selling pesticides in the district, Bayer Crop Science has the highest market share both in the sale of insecticide and fungicide. In respect of weedicide, Excel Industries has highest market share. On the whole, Bayer Crop Science has the highest market share with 11.53 per cent followed by Syngenta India (10.25%). The study also analysed the key factors influencing the farmer's brand preference in respect of quality, brand popularity, price and timely availability of pesticide in the market. About 80 per cent of farmer's preferred Coragen brand in insecticide, 86 per cent preferred Sectin brand in fungicide and 47 per cent preferred Round up brand in weedicide. The study has revealed that DuPont was very aggressive in conducting promotional activities through Farm demonstrations, Farmer training programmes, Jeep campaigns and Posturing followed by Bayer Crop Science, BASF India and Indofil Chemicals for the sale of pesticides in the district. The study also observed that retail traders and company representatives play an important role in promotion and sale of pesticides. Hence, the companies need to focus more on encouraging the retail traders and employees by motivating them to sustain business in the long run.

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B. M. Shashidhara
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ಕೀಟನಾಶಕ ಔಷಧಿಗಳ ಬ್ರ್ಯಾಂಡ್ ಗಳಲ್ಲಿ ರೈತರ ಆಧ್ಯತೆ ಮತ್ತು ಕೀಟನಾಶಕ ಸಂಸ್ಥೆಗಳ ಜಾಹೀರಾತು
ಕಾರ್ಯತಂತ್ರಗಳು - ಚಿಕ್ಕಬಳ್ಳಾಪುರ ಜಿಲ್ಲೆಯಲ್ಲಿನ ಅಧ್ಯಯನ.

ಸುಂದರ್ ಸಿಂಗ್, ಜಿ
ಸಾರಾಂಶ

ಪ್ರಪಂಚದಲ್ಲಿ ಕೀಟನಾಶಕ ಔಷಧಿಗಳ ಉತ್ಪಾದನೆಯಲ್ಲಿ ಭಾರತವು ನಾಲ್ಕನೇ ಸ್ಥಾನ ಮತ್ತು ಬಳಕೆಯಲ್ಲಿ ಹತ್ತನೇ ಸ್ಥಾನ ಪಡೆದಿದೆ. ಆದರೆ ಸಹ ಭಾರತದಲ್ಲಿ ಕೀಟ ಹಾವಳಿಯಿಂದ ಬೆಳೆಹಾನಿ ವಾರ್ಷಿಕವಾಗಿ ಸುಮಾರು ರೂ ೯೦,೦೦೦ ಕೋಟಿಯಷ್ಟು ನಷ್ಟವಾಗುತ್ತಿದೆ. ಪ್ರಸ್ತುತ ಅಧ್ಯಯನವು ರೈತರ ಬ್ರ್ಯಾಂಡ್ ಗಳ ಆಧ್ಯತೆಯ ಮೇಲೆ ಪ್ರಭಾವ ಬೀರುವ ಅಂಶಗಳು ಮತ್ತು ಕೀಟನಾಶಕ ಸಂಸ್ಥೆಗಳ ಜಾಹೀರಾತು ಕಾರ್ಯತಂತ್ರಗಳನ್ನು ಕುರಿತು ವಿಶ್ಲೇಷಿಸುವ ಉದ್ದೇಶದೊಂದಿಗೆ ಚಿಕ್ಕಬಳ್ಳಾಪುರ ಜಿಲ್ಲೆಯಲ್ಲಿ ಈ ಅಧ್ಯಯನವನ್ನು ಕೈಗೊಳ್ಳಲಾಯಿತು. ಈ ಅಧ್ಯಯನದಿಂದ ಕಂಡು ಬಂದ ಮುಖ್ಯ ಅಂಶವೆಂದರೆ ಜಿಲ್ಲೆಯ ಕೀಟನಾಶಕ ಔಷಧಿ ಮಾರಾಟದಲ್ಲಿ ಬೇಯರ್ ಕ್ರಾಪ್ ಸೈನ್ಸ್, ಕೀಟನಾಶಕ ಮತ್ತು ಶಿಲೀಂಧ್ರನಾಶಕದಲ್ಲಿ ಗರಿಷ್ಠ ಮಾರುಕಟ್ಟೆ ಪಾಲನ್ನು ಹೊಂದಿದೆ. ಅದೇ ರೀತಿ ಕಳೆನಾಶಕ ಮಾರಾಟದಲ್ಲಿ ಗರಿಷ್ಠ ಮಾರುಕಟ್ಟೆ ಪಾಲನ್ನು ಎಕ್ಸೆಲ್ ಇಂಡಸ್ಟ್ರೀಸ್ ಲಿಮಿಟೆಡ್ ಹೊಂದಿದೆ. ಒಟ್ಟಾರೆ ಕೀಟನಾಶಕ ಮಾರುಕಟ್ಟೆಯಲ್ಲಿ ಶೇಕಡ ೧೧.೫೨ ಬೇಯರ್ ಕ್ರಾಪ್ ಸೈನ್ಸ್, ತದನಂತರ ಶೇಕಡ ೧೦.೨೫ ಸಿಂಜೆಂಟ ಭಾರತ ಲಿಮಿಟೆಡ್ ಹೊಂದಿದೆ. ಶೇಕಡ ೮ ರಷ್ಟು ರೈತರು ಕೋರಾಜೆನ್ ಕೀಟನಾಶಕ ಬ್ರ್ಯಾಂಡನ್ನು, ಶೇಕಡ ೮ ರಷ್ಟು ರೈತರು ಸೆಕ್ಟಿನ್ ಶಿಲೀಂಧ್ರನಾಶಕ ಬ್ರ್ಯಾಂಡನ್ನು ಮತ್ತು ಶೇಕಡ ೪೭ ರಷ್ಟು ರೈತರು ರೌಂಡಪ್ ಬ್ರ್ಯಾಂಡಿನ ಒಲವು ತೋರಿಸಲು ಮುಖ್ಯ ಅಂಶಗಳೆಂದರೆ ಗುಣಮಟ್ಟ, ಬ್ರ್ಯಾಂಡ್ ಜನಪ್ರಿಯತೆ, ಬೆಲೆ ಮತ್ತು ಮಾರುಕಟ್ಟೆಯಲ್ಲಿ ಕ್ರಿಮಿನಾಶಕದ ಸಕಾಲಿಕ ಲಭ್ಯತೆ. ಈ ಜಿಲ್ಲೆಯ ಕೀಟನಾಶಕ ಔಷಧಿಗಳ ಮಾರಾಟದಲ್ಲಿ ಡುಪಾಂಟ್ ಕಂಪನಿಯು ಬೆಳೆ ಪ್ರಾತ್ಯಕ್ಷಿಕೆ, ರೈತ ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮಗಳು, ವಾಹನ ಸಂಚಾರ ಪ್ರಚಾರ ಮತ್ತು ಬಿತ್ತಿ ಪತ್ರ ಅಂಟಿಸುವಿಕೆ ಮೂಲಕ ಅತ್ಯಂತ ಪರಿಣಾಮಕಾರಿಯಾಗಿ ಜಾಹೀರಾತು ಕಾರ್ಯತಂತ್ರಗಳನ್ನು ನಡೆಸುತ್ತಿದೆ. ತದನಂತರ ಬೇಯರ್ ಕ್ರಾಪ್ ಸೈನ್ಸ್, ಬಿ.ಎ.ಎಸ್.ಪ್ ಮತ್ತು ಇಂಡೋಪಿಲ್ ಕೆಮಿಕಲ್ಸ್ ಕಂಪನಿಯು ನಡೆಸುತ್ತಿರುವುದು ಕಂಡುಬಂದಿದೆ. ಪ್ರಸ್ತುತ ಅಧ್ಯಯನದಿಂದ ಕಂಡುಬಂದ ಇನ್ನೊಂದು ಮುಖ್ಯ ಅಂಶವೆಂದರೆ ಚಿಲ್ಲರೆ ವ್ಯಾಪಾರಿಗಳು ಮತ್ತು ಕಂಪನಿ ಪ್ರತಿನಿಧಿಗಳು ಜಾಹೀರಾತು ಮತ್ತು ಮಾರಾಟದ ಚಟುವಟಿಕೆಯಲ್ಲಿ ಪ್ರಮುಖ ಪಾತ್ರವನ್ನು ವಹಿಸಿರುತ್ತಾರೆ. ಆದ್ದರಿಂದ ಕಂಪನಿಗಳು ಚಿಲ್ಲರೆ ವ್ಯಾಪಾರಿಗಳಿಗೆ ಮತ್ತು ಉದ್ಯೋಗಿಗಳಿಗೆ ಉತ್ತೇಜನ ನೀಡುವ ಮೂಲಕ ದೀರ್ಘಾವಧಿಯಲ್ಲಿ ವ್ಯಾಪಾರ ವೃದ್ಧಿಸಿಕೊಳ್ಳಲು ಯೋಜನೆಗಳನ್ನು ಹಾಕಿಕೊಳ್ಳಬೇಕಾಗುತ್ತದೆ.

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(ಡಾ. ಬಿ.ಎಂ. ಶಶಿಧರ)
ಪ್ರಧಾನ ಸಲಹೆಗಾರರು

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INTRODUCTION

CHAPTER I

INTRODUCTION

Agriculture is the primary growth engine of the Indian economy as nearly 70 per cent of the population of the country depends on agriculture. Agriculture and allied sectors contributed 14.80 per cent to gross domestic product (GDP) during the year 2011-12. The agriculture sector share in total export and import trade was 13 and 4.38 per cent respectively during the year 2011-12. Providing employment to over 60 per cent of the rural population and ensuring food security to more than 1.21 billion population with diminishing cultivable land resource is a herculean task. This necessitates use of high yielding variety of seeds, balanced use of fertilizers and recommended usage of quality pesticides along with educating farmers in use of modern farming techniques. Pesticides act as a protective umbrella for the other inputs and they play an important role in crop production by way of controlling insect pests, diseases and weeds, which in turn help in avoiding huge losses in farm produce. The share of pesticides in total cost of cultivation is as much as 50 per cent in cotton (Britha *et al.* 2003).

Agriculture in the country has undergone tremendous changes during post independence era. It is growing at a compound rate of 2.7 per cent. The food grain production has more than tripled from 50.8 million tonnes (1950-51) to 241.56 million tonnes (2010-11). Food grain productivity has increased from an average of 522 kg/ha to 1798 kg/ha in the last five decades. Despite a steady drop in its share in GDP from 36.40 per cent (1982-83) to 14.80 per cent (2011-12), agriculture still plays a significant role in Indian economy.

During the last five decades, the productivity of Indian agriculture has increased dramatically. The yield of crops like rice and wheat almost

doubled and the yield of the other food as well as non- food crops too increased considerably. The compound growth rate in respect of rice has increased from 1.34 to 1.61 per cent during the period 2000-2010 in relation to 1990-2000. Similarly in respect of pulses the compound growth rate has increased from 0.93 to 1.64 percent. In respect of oil seeds, it has increased from 1.42 to 2.63 per cent, cotton from -0.41 to 11.22 per cent and food grains 1.52 to 2.94 per cent during the period 2000-2010 in relation to 1990-2000. This increase is mainly due to intensive use of high yielding varieties, hybrid seeds, assured irrigation, fertilizers, pesticides, credit facility, minimum support price, improved infrastructure and hard working and innovative farming community. Although yield-augmenting technological changes led to self sufficiency in food production, the predicted demand for food grains is expected to increase to 280.06 million tonnes by 2020-21. The food grain production in India has to increase by atleast two million tonnes a year to meet the increasing demand in the country. The incremental production to meet this demand will have to come from increased agricultural productivity as the scope for bringing additional land under cultivation is limited. Concurrently, a number of biotic and abiotic factors also continue to constrain the growth in agricultural productivity. The protective role of pesticides in agricultural growth and development is paramount.

The study conducted by the Central Pollution Control Board, Government of India (May 2007), has highlighted that the food grain losses in India due to the weeds accounts to 28 per cent followed by diseases (25%), insect pests (23%), storage pest and diseases (10%), rats (8%) and others (6%). The crop losses due to pests, diseases and weeds are approximately in the range of 10 to 30 per cent of crop production amounting to Rs. 90,000 crores per annum. Even if part of 50 per cent of the potential loss is salvaged, it can make an immense contribution to

the economy. The investment in pesticides is generally not towards increasing yield but minimizing the losses.

1.1 Concepts and classification of pesticides

The term pesticide covers a wide range of compounds including insecticides, fungicides, herbicides, rodenticides, molluscicides, nematocides, plant growth regulators and others. Among these, organochlorine (OC) pesticides are the only effective means of controlling disease organisms, weeds, or insect pests in many circumstances.

They are classified into three major categories on basis of the types of pests they control.

- i) Insecticide: They are agents of chemical or biological origin that controls pests. Insecticides act against insects which feed on crops, leaves, roots, and other parts of plants. Among the insecticides, one of the largest molecules globally available is Chlorpyrifos.
- ii) Herbicide: A herbicide, commonly known as weed killer, is a type of pesticide used to kill unwanted plants that act as parasites on the agricultural crop. Herbicides are usually safe and don't affect the environment. However, consumption is low due to availability of cheap labour which is employed to pull out the weeds manually.
- iii) Fungicide: These are used to control disease attack on the crops. High use of new hybrid seeds has led to increase in diseases, resulting in higher sales in the past five years. Its use has increased from 8 to 16 per cent. Mancozeb is the largest selling product in this category.

1.2 Pesticides during ancient period

In the ancient period, there were records of pest control through the extract of plant as well as through the cow's urine. Turmeric powder

mixed with cow's urine was sprayed to control the caterpillars and sucking pests. There are records of using neem leaf extract and also chilly extract to control some beetles and aphids. The use of ash as a dust and neem oil and pongamia oil was also common.

1.3 History of pesticide development

The earliest record of the use of insecticides dates back to the writings of Greeks and Chinese. The era of pesticide has been divided into following major periods.

1.3.1 Era of natural products

From time immemorial till the beginning of 19th century, arsenicals, petroleum oils, soaps and botanicals were used. Among botanicals, pyrethrum was introduced in 1818 in Europe from Persia. Erasmus Darwin recommended use of tobacco juice in 1763.

1.3.2 Era of fumigants, inorganic and petroleum products

The period between 1854-1939 can be termed as pre-Dichloro Diphenyl Trichloro ethane (DDT) era. Paris-green, lead arsenate, calcium arsenate, etc., were the main products. In 1865, paris green was used against Colorado beetle, lead arsenate (in 1892) as orchard spray. In 1907, calcium arsenate was used as crop dust in USA. Rotenone (the fish poison) was introduced in 1927.

1.3.3 The DDT period

Muller discovered DDT in 1939 at Basle in Switzerland, which marked a new era in chemical control of insects. In 1942, BHC an organochlorine was discovered in France and England simultaneously. The other pesticides like indane, chlorine, toxaphone came to market by the end of 1948. All these pesticides are neurotoxin in nature.

1.3.4 Organophosphate period

Parathion and Malathion are common products invented in Germany in 1945. Similarly, diazinon was invented in Switzerland. Others like dichloroovas, phorate, dimeton, etc were proved as effective pesticides.

1.3.5 Carbamate period

In 1953, a Carbamate insecticide called "carboryl (sevin®)" was discovered in USA. This discovery was another milestone in the history of pesticides.

1.3.6 New groups of insecticides

From 1969 onwards, the chemicals developed were called as third generation pesticides. The following are the major groups of pesticides developed after 1969.

- ❖ Formamidines (generally, they are neurotoxins)
- ❖ Hormone mimics: These disrupt the metamorphosis of the pests and they are JH (Juvenile Hormone) analogues.
- ❖ Chitin synthesis inhibitors (e.g. Diflubenzuron, Flufenoxaron, etc.)
- ❖ Synthetic pyrethroids (e.g. Fenvalerate, Deltamethrin, Tralomethrin, Phenothrin, Permethrin, Cypermethrin, etc.)
- ❖ Neonicotinoids (e.g. Imidacloprid, Thiamethoxam, etc.)

1.4 Entry of chemical pesticides to Indian market

The acute food shortage during Bengal famine of 1943 (Famine Commission-1945) was mainly due to rice blast disease. The Commission suggested the establishment of an organization for effective control of pests and diseases. Based on the Commission's recommendation, the

Directorate of Plant Protection, Quarantine and Storage (Directorate of PPQ&S) was established at Faridabad during May 1946.

The Destructive Insects and Pests Act, 1914 was enacted to control the locusts. The Government of India through the Directorate of PPQ&S initiates, plans, supports and encourages innovative programmes and activities such as integrated pest management encompassing surveillance and monitoring, use of bio-control agents, quality control of pesticides, human resource development, etc. To regulate the imports/exports, manufacture, safe transport, storage, distribution, sale and use of pesticides, the Central Government in cooperation with State Governments implemented the Insecticides Act, 1968, through the Central Insecticides Board and Registration Committee. DDT was used for the first time in India in 1947 to control malaria. In agriculture, the usage of pesticides started in 1949 with the use of BHC to control locusts.

1.5 Global scenario of pesticides

The global pesticide market was valued at approximately \$43 billion in 2009 and is expected to grow at a compound annual growth rate (CAGR) of 3.6% to reach \$51 billion by 2014 (E.I.D - Parry India Limited, 2011). However, competitive pricing environment and market maturity will substantially limit gains - especially for some of the most widely used products. Large and established markets of North America and Western Europe are expected to post below-average growth in the coming years, mainly due to market maturity and efforts to limit unnecessary usage of pesticides, such as restriction of commercial and consumer pesticide application in some countries. This sluggishness is also expected for markets like Japan. However in the Asia and Pacific region many countries are projected to post strong growth. Above-average growth in agricultural output in China, Indonesia and Thailand

will boost growth for crop protection chemicals. Moreover, pesticide use in India and other less developed countries is becoming more common, creating growth in areas where there had previously been little or no pesticide usage. The emerging agricultural powerhouse, however, is in Central and South America. Brazil, already one of the World's most potent agricultural producers, is expected to post growth well above the regional average, which itself is substantially faster than the global growth average. The pesticide markets in Africa and parts of the Middle East will also register strong growth but much of the region will remain substantially under developed as a market for synthetic pesticides. Regulatory considerations continue to reshape the market. Regulatory forces have a more profound influence on the pesticide industry than they do in most other segments of the chemical industry. The perpetual effort to replace environmentally damaging products with benign alternatives leads to an ever-evolving array of active ingredients. This evolution has led to drastic reductions in the use of some products, including bans on many products that were mainstays of the marketplace. As a result, growth of replacement products has been considerable. These products, such as those designated by the US Environmental Protection Agency as "reduced risk pesticides" include glyphosate, upon which the well-known roundup consumer and agricultural products are based. The US, Western Europe, Japan and a few other countries have the most stringent regulatory requirements for pesticides. However, in general every country has some sort of regulatory framework in place that governs use of pesticides under specific applications.

1.6 Indian Scenario of pesticides

Pesticides and Chemical fertilizers played an important role in the "Green Revolution" during the 1960s and 1970s. India ranks 10th in the world in pesticide consumption with total consumption of about 500

million tonnes. India is the largest manufacturer of basic pesticides among the South Asian and African countries, with the exception of Japan. The Indian pesticides market is the 12th largest in the world with a value of US\$0.6 bn, which is 1.6% of the global market pie. Indian exports of agrochemicals have shown an impressive growth over the last five years. The key export destination markets are USA, U.K., France, Netherlands, Belgium, Spain, South Africa, Bangladesh, Malaysia and Singapore.

India is one of the most dynamic generic pesticide manufacturers in the world with more than 60 technical grade pesticide being manufactured indigenously by 125 manufacturers consisting of large and medium scale enterprises (including about 10 multinational companies) and more than 500 pesticide formulators spread over the country for use in agriculture, public health, household and plant protection. India is the 4th largest producer of agrochemicals after USA, Japan and China with a value of \$3.6 billion in 2009, among which approximately \$1.8 billion is used in domestic market and the rest \$1.8 billion for exports. Import is approximately above \$500 million. The production of insecticides in 2009 was about \$810 million, fungicides \$260 million, herbicide \$290 million and others \$40 million. The share of India in global protection market is only 7%. About 83,000 tonnes of pesticides are used annually in agriculture sector with a value of Rs 4500 crores. (Credit Analysis & Research Limited, 2010)

1.7 Production of pesticides in India

The production of pesticides in India started during the first five year plan onwards. In the World, there are around 900 types of pesticides being produced. However, the Government of India based on expert committee opinion has restricted its number to 217 for domestic use. About half of these are produced in India and the rest are imported.

Presently, the technical grade pesticides are growing at the rate of 7.5 per cent per annum. Till the end of 1974, the pesticides which were both imported and manufactured in India, were 130 only, but by the end of 2009, the number of pesticides which were imported and manufactured in India has increased to 659. India has registered only 217 numbers of pesticides for domestic use which is quite low compared to the developed countries like USA and European Union. USA has registered highest number of pesticides at 775, European union - 600 chemicals, Vietnam - 432 chemicals and Indonesia-341 chemicals respectively (Federation of Farmers Associations: real facts about Indian agriculture -2009).

The demand for pesticides is being affected by seasonality; the pesticides manufacturers often face low capacity utilization, thereby not able to take full advantage of the economies of scale. During 2003-04, the domestic capacity was 1,34,000 MT, whereas actual production was only 85,000 MT (63.4 per cent capacity utilization). However, in 2007-08, against the capacity of producing 1,46,000 MT, the production was 83,000 MT i.e. 56.8 per cent capacity utilization. As on March 2010, the total installed capacity of pesticide production in India was 2,72,600 MT and production in the Indian pesticide industry has remained stable at 82,000-85,000 MT in 2009-10. (Department of Chemicals and Petrochemicals, 2010).

The decline in capacity utilization was mainly due to the ban on DDT, BHC, etc., for use in agriculture. The other reason was due to the entry of high efficiency new molecules which are used at low dosages. Even though there is decline in pesticides production, the pesticide market is growing at an average of eight percent annually in value terms. India's pesticide industry is the largest in Asia and twelfth largest in the World, with over 304 million acres under crop cultivation.

1.8 Utilization/application of pesticides in India

The pesticide industry in India is self-sufficient with just 4 per cent Imports. India produces 12 per cent of world's food grain but uses less than 2 per cent of pesticides used worldwide. In developed countries like USA, Europe, Japan, China, etc., where pesticide use is 20 times more than India, their crop yields are much higher compared to India. The consumption of pesticides in India was one of the lowest at 0.032 kg/ha during 1954-55. During 1966, with the introduction of high yielding varieties of rice and wheat, the usage of pesticides reached 0.094 kg/ha. Since then, the use of pesticides has increased tremendously. At the end of the first decade of introduction of new varieties, the pesticides use on agriculture had increased to 0.266 kg/ha. The per hectare consumption of pesticides was 557 gms in 2007-08 which was barely above the African countries' consumption.

In India, the consumption of pesticides is concentrated on three crops namely, paddy (29%), cotton (27%) and wheat (8%) accounting for more than 60 percent of the total consumption during the year 2006-07 (www.rallis.co.in). India's total consumption of pesticides during 1990-91 was 75,033 MT, whereas during 2008-09 it was only 43,860 MT. This was mainly due to the penetration of potent molecules, which required lower quantity per application per unit area are almost 8-100 times less than the previous molecules and also less number of applications (Bambawale, 2007). Some of the lowest dosage chemicals in the market are; chlorimuron ethyl + metasulfuron methyl (Almix®) at 8 g/ac, metasulfuron methyl (Algrip®) at 8 g/ac, thiomethaxone (Astra®) requiring 40 g/ac and Acetamiprid (Pride®) at 20g/ac. India, being a tropical country, the consumption pattern is also more skewed towards insecticides which accounted for (65%) followed by herbicides with 16 per cent, fungicides (15%) and others (4%) of the total pesticide consumption during 2010. Rice is the highest pesticides consuming crop in India

forming 19.8 per cent of the total pesticides consumption followed by cotton. Six states namely Uttar Pradesh, Punjab, Maharashtra, Haryana, West Bengal and Rajasthan have consumed about 73 per cent of the total pesticides produced in the country. The state of Punjab is having highest pesticide consumption in the country (General agriculture by Muniraj singh Rathore, 2012). In India, the insecticides account for major share. On the contrary, the global pesticides consumption revealed that, herbicides accounted for the major share to the tune of 48 per cent, followed by insecticides (24 %), fungicides (22 %) and others (6 %). In the World, the crop-wise share indicated that cereals accounted for 37 per cent of the total pesticides consumption followed by vegetables (26 %), soybean (10 %), cotton (9 %), sugar beet (2 %) and others accounting for the remaining 10 per cent. (Singh, 2005 & Varshney, 2009).

Consumption of pesticides in India is very poor as compared to global consumption 0.90 kg/ha. Low consumption can be attributed to fragmented land holdings, lower level of irrigation, dependence on monsoons, low awareness among farmers about the benefits of usage of pesticides, the cultivated area coming under crop protection umbrella is poor (20%), which result in crop losses due to pests and diseases and Pesticide is the last input in agricultural cropping operation; hence, farmers generally have no surplus money left and start using them only after the pest attack. According to the Working Group on the Indian chemical industry (for the formulation of the Eleventh Five Year Plan) consumption of pesticides in India per hectare is among the lowest in the world; the consumption is close to 0.57 kg/ha in India while in countries like Taiwan it is 17 kg/ ha; in the US it is 2.25kg/ha, in the EU it is 2.5kg/ha and in Japan it is 11 kg/ha.

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 of 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.

Marketing of pesticides is a system of interacting activities of agencies; these agencies transport 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 in making available pesticides to farmers at right time, at right place and at right price. The distribution system involves a number of channels, marketing functionaries and interaction between them. Hence, the choice of right distribution channel plays a strategic role in the effective performance of pesticide marketing system. The pesticides distribution channel takes possession of goods on certain specified terms and cultivation like issue price, distribution margin, credit period, discount if any etc. The strategies and the policies followed by the pesticide distribution channel have to be in consonance with the marketing operations of the manufactures.

The retail sale point being the last element in the distribution channel forms the most important link between the pesticide manufacturer and the buyers. The farmer looks at the retailer/dealer who are very close and have a good knowledge in providing quality Agro chemicals for a particular crop problem.

The distribution of pesticides attains special significance, since agriculture in India predominantly dependent on traditional technology.

Unlike consumer products, pesticide distribution system is governed by certain unique features like; supply is continuous but production of crops is seasonal and short lived, pesticides are marketed through a network of retail outlets spread throughout the length and breadth of the country with diverse agro-climatic regions; government control and inadequate storage facilities at buyer's level.

It is a challenging task to move pesticides from manufacturing units and places to the ultimate end user point's covering large distances in most economical manner while preserving the chemical and physical properties of the product in an acceptable package and at the right time. The complexity of the problem is bound to increase in the near future in view of the projected increase in consumption of inputs in the country. To meet the challenge, "the logistic marketing" has to play a crucial role. The need to develop an effective and economic national distribution system is vital to achieve the desired results. "Logistic" is thus an extremely important function in pesticide marketing discipline. The importance's of pesticide marketing system in the transformation of agricultural sciences thus, need no emphasis. It is an important component of production and improved agronomic practices to achieve increased agricultural production.

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest (insects, mites, nematodes, weeds, rats, etc.).

Keeping these issues in mind the present study was undertaken with an overall objective of assessing the market share of different brands of pesticides; to know the factors influencing the brand preference of pesticide by farmer's and examine the promotional strategies employed by pesticide companies. The study was taken up to examine the promotional policies of pesticide companies, dealers and

government regulatory measures in evolving the policies or strategies for an effective pesticides marketing. In this regard, a study on farmer's preference for pesticide brands and promotional strategies of pesticide companies in Chikkaballapura district was taken up with the following objectives.

1.9 Objectives

1. To analyse the market share of different brands of pesticides in the district,
2. To analyse the factors influencing the brand preference of pesticides in the district and
3. To examine the promotional strategies employed by the pesticide companies in the district.

1.10 Hypotheses

1. Only few brands have dominated the market in the district.
2. The farmer preference for pesticides is influenced by various parameters like price, quality and company.
3. Only few companies are employing aggressive promotional strategies in the market.

1.11 Limitations of the study

The study is based on both primary as well as secondary data. The primary data was collected from the sample farmers by survey method. As many of the farmers furnished the required information from their memory and experience, the collected data would be subjected to recall bias. The study area was limited to Chikkaballapura district and the findings may not be appropriate to other markets, as vast difference exists among the farmers with regard to demographic and psychographic characteristics. Hence, the findings of the study are limited to these constraints.

1.12 Organization of the study

The study has been organized in to several chapters as indicated below.

- Chapter I** - Deals with introduction covering the status of pesticides in India, history of pesticide development, global scenario, Indian scenario, production and consumption of pesticides, objective significant of the study.
- Chapter II** - Pertains Reviews of Literature which are presented in consonance with the study objectives.
- Chapter III** - Describes main features of the study area, sampling framework, database and analytical tools employed in the analysis of data.
- Chapter IV** - Deals with result of the study representing though tables.
- Chapter V** - Deals with the interpretation and discussion of the result.
- Chapter VI** - Summarizes the major findings of the study and policy implications.
- Chapter VII** - References: This chapter provides the list of literature referred for the present study



REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

Past studies pave way for future research endeavours. An acquaintance with earlier studies has been felt necessary to develop better understanding of the present study and to formulate an appropriate research methodology. Keeping in view the objectives of the study, an attempt has been made to review the past studies related to the subject.

A detailed review on various concepts and methodologies are presented under the following headings.

- 2.1 Market share of different brands of pesticides.
- 2.2 Factors influencing the brand preference of pesticides.
- 2.3 Promotional strategies employed by the pesticide companies.

2.1 To analyse the market share of different brands of pesticides

Shankaramurthy (1986) studied the performance of the Karnataka State Co-operative Marketing Federation and analysed its market share in the sale of seeds, fertilizers and plant protection chemicals. The study revealed that the share of federation in marketing of fertilizers was around 23 percent. However in respect of plant protection chemicals the share was very marginal (1.83%) and insignificant in respect of seed (0.06%). The author suggested aggressive promotional strategies to penetrate the market in respect of plant protection chemicals and seed.

Hentschel (1991) in his study on European mushroom market opined that mushroom production (90 per cent champignons) in the EU(12) increased by an average 5.6 per cent per year in the 1980s, with rates in the Netherlands, Italy, the UK and Irish republic as high as 8-9

per cent. The effects of this in increasing competition for market share in Germany, which has the highest consumption of fresh and processed mushrooms, is discussed.

Yeladahalli (1991) in his study on sectoral analysis of agricultural input marketing in Karnataka forecasted that the consumption of all plant protection chemicals will increase from the level of 4,000 tonnes to about 10,000 tonnes by the year 2005. The study has highlighted significant increase of insecticides and fungicides consumption. However, weedicides and rodenticides showed marginal consumption.

Kunnal and Murthy (1994) highlighted that the private seed firms dominated the seed market in the state with the share of 67 per cent of seeds of pulse crops and about 85 per cent in seeds of oil seed crops. The state seed corporation had fairly good share of 28.30 per cent in distribution of seeds of pulse crops but in case of oilseeds it was not satisfactory. The Karnataka oil seed grower's co-operative federation has captured only about 10 per cent of oil seed market in the state.

Shivakumar (1994) observed that the farmers mainly depend on private dealers for purchase of pesticides. Friends, neighbors' and relatives were the major source of information on dealers and in case of brands it was extension personnel of the department of agriculture. The price, quality and advertisement about the brands contributed significantly to brand loyalty. The availability of credit, advertisement and competitive price of pesticides from the dealer contributed significantly to dealer loyalty.

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 amounting to 25.5 percent and the market was highly competitive rather than concentrated.

Khooharo *et al.* (2008) made a study on empirical analysis of pesticide marketing in Pakistan. The study investigated pesticide import trends, marketing margins and incentives of various intermediaries, price index of common insecticides and total outlay of farmers on the purchase of pesticides in Pakistan. Estimates of the quadratic regression model revealed steeper growth trend as compared to that of simple linear regression model. Local companies offered high profit margins upto (30 %) and incentive schemes to dealers to get maximum market share as compared to multinational companies (15 %). MNCs imparted effective training programmes for the capacity building of farmers and dealers.

Weber (2008) studied the Management of brands in case of apple industry and found out that the active use of brand names and branding (Club varieties) in the apple industry is relatively recent. It is estimated that the number of branded varieties in the EU was 4 in 1997, 20 in 2007 and predicted 35 in 2012 with a volume of 4,20,000 tonnes or 5 per cent of total market share. Apple varieties have a product cycle as any other product and data show that the top-5 varieties with 81 per cent market share 35 years ago have only 15 per cent today. The boom varieties of the early 2000s, Gala and Braeburn, are not expanding as fast as they used to. In Switzerland new consumers brands like Diwa and Mairac are an attempt to improve Swiss production and consumption. New varieties Milwa, La Flamboyante and Galmac have promising potential but it is too early to decide if they will succeed within the consumer brands Diwa and Mairac.

2.2 To analyse the factors influencing the brand preference of pesticides in the district

Kumar *et al.* (1987) examined the factors influencing the buying decision making of 200 respondents for various food products. Country of origin and brand of the products were cross tabulated against age,

gender and income. Results revealed that the considered factors were independent of age, education and income. The brand image seemed to be more important than the origin of the product since the consumers were attracted to the brands.

Shaw *et al.* (1993) studied the consumption pattern of processed food in Delhi. Results showed that easy availability, taste and advertisements of the processed products were more popular. Major factors which influenced buying decisions of consumers were brand name, government certification and price of the product. He noticed that processed food products were boon to busy housewife as it made cooking simple and saved time. But the consumption base for these products had low domestic base on account of their high cost and ignorant about the use of these products especially among semi-urban and rural consumers.

Ragavan (1994) reported that, quality, regular availability, price, accuracy in weighing and billing, range of vegetables and accessibility as the factors in the order of importance which had influenced purchase of vegetables by respondents from modern retail outlet.

Dhillon *et al.* (1995), while studying the purchase behaviour in Ludhiana, rural and urban respondents ranked nearby market (mean score of 1.47 for rural and 2.10 for urban) and main market (mean score of 0.88 for rural and 1.38 for urban) as their first and second preference of order respectively for the purchase of food items. The prime factor indicated by the rural respondents for buying their food items was appearance with mean score of 4.01 followed by price, quality and place of buying to which they ranked second, third and fourth with mean scores of 3.81, 3.45 and 2.96 respectively. But urban respondents visualized these factors little differently and ranked quality, appearance,

place of buying and expiry date as first, second, third and fourth ranks with mean score of 4.69, 4.01, 3.20 and 3.05 respectively.

Wandel (1995) used multivariate analysis to study factors influencing the consumption of vegetables and fruits among Norwegian consumers. The factors, which determined consumption, were sex, age, income and household structure. Further it was reported that health conscious consumers used more fruits and vegetables, whereas those preferring for quickly prepared food tended to have a low consumption of vegetables.

Cicia and Giudice (2002) studied the preferences of an important category of consumers of organic products (regular consumers of organic food or RCOF) allowing for preference heterogeneity. A survey instrument was developed to elicit preferences for important qualitative and quantitative attributes of extra virgin olive oil. Each respondent made eight choices to rank-order nine product profiles in terms of their individual preference. Product attributes included price, origin of production, type of certification and visual appearance. Results displayed significant preference heterogeneity for origin of production and price. It was also found that price played an important role as quality proxy, while visual appearance was not significant in preference modeling and the type of certification program had a fixed effect.

Nandagopal and Chinnaiyan (2003) conducted a study on brand preference of soft drinks in rural Tamil Nadu, using Garrets 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 main factors, which influenced the rural consumers of a particular brand of a product.

Ramasamy *et al.* (2005) studied consumer behaviour towards instant food products in Madurai, the second largest city in Tamil Nadu and observed that consumers do build opinion about a brand on the basis of which various product features play an important role in decision making process. A large number of respondents (78.00%) laid emphasis on quality and 76.00 per cent on price which was an important factor, while 64.00 per cent of the respondents attached importance to the image of the manufacturer and 50.00 per cent considered packaging as an important factor and an equal percentage (50.00%) felt longer shelf life influenced them.

Narang (2006) opined that, a buyer does not stick to one brand in case of food purchasing. They should be able recall different brand names when they go for purchase. Repetitive advertising can 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.

Vincent (2006) elicited that quality was an important factor that draws consumer towards branded products. Branded products were accepted as good quality products. People do not mind paying extra for branded products, as they get value for money. Media is a key constituent in promoting and influencing brand. A child's insistence affects family's buying behavior. Children are highly aware and conscious of branded items. Although unbranded products sometimes give same satisfaction as branded products, customers would still prefer to purchase a branded product.

Venkateswaran *et al.* (2011) examined the brand preference of selective household brands at Dindigul, Tamil Nadu. The study observed that in forming tendency of customers to prefer a particular brand, the

market variables like advertisement, quality of product, brand name and image plays essential role. So a market must understand how consumer made the purchase decision towards the brand. And also observed factors influence the consumer to go for purchase decision.

2.3 To examine the promotional strategies employed by the pesticide companies in the district

Meenakshi (1984) studied the impact of pesticides promotion activities of the concerned agencies on the consumption of pesticides, and found that the various pesticide promotion activities undertaken by the pesticides industry in terms of advertisements in news papers and radio regarding pesticide use, screening of technical films and conducting field demonstrations with respect to pesticides use and other related items were hardly of any use to the pesticides user. It was difficult to measure the effect of promotion campaigns and to assess the return on every rupee spent on sales promotion but nevertheless the results of the study indicated that the strategies adopted by the pesticides companies were not very successful in promoting the consumption of pesticides.

Renu (1986) while studying the sales promotion techniques defined promotional techniques as demand stimulating activities. The major tools of promotion are advertising, personal selling, publicity and sales promotion. The author stated to use this tool in blend so as to form an optimum promotional mix. Advertisement is paid form of non-personal selling, presentation of ideas, goods or services by an identified sponsor. Personal selling is oral presentation in conversation with one or more prospective purchases for the purpose of making sales. Publicity is non-personal stimulation of demand for a product, service or business; it can be from radio, television or stage that is not paid for by the sponsor. Sales promotion is a short- term incentive to encourage purchase; it is available at point of purchase.

Dave (1988) acknowledges advertising and promotion to boost consumption of dairy products, which helps both the farmers and the consumers. He suggested increase in the funds for promotion of sales, only if the evidence of increase in sale due to these measures are obtained.

Biradar (1995) in his study on marketing strategies for fertilizers, has stressed the need for market segmentation on fertilizer, crop-wise, soil-wise etc. The author suggested that the dealers and retailers need to be trained in promoting sales of fertilizers. The other measures suggested are farmers training programmes, package of practices to farmers, establishment of retail outlets, intensive farmer oriented market development programmes, projecting favourable image of the companies by maintaining high standards in dealings with farmers.

Bhattacharrya and Paliwal (1998) in this study on biofertilizer marketing: A big challenge, analysed the promotional measures adopted for biofertilizer marketing. The author stressed the need for extending credit, technical knowledge, bio-fertilizers to the farmers at district and taluk levels and also to make aware of importance of bio-fertilizer for soil and crop growth. The author suggested promotional measures such as radio, T.V. spots, Press adds, hoardings, wall paints, road side boards, cinema slides, film show, puppet show, cycle rally, street drama etc for increasing the sales of bio-fertilizer.

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.

Birthal *et al.* (2003) revealed in their study on pesticides use in Rainfed Cotton that, reduction in pesticide use would occur through education of the farmers in pest management in particular, and technology management in general. Making farmers aware of pest, pest-predator relationships and action, and economic threshold level of pest helped farmers use pesticides judiciously.



METHODOLOGY

CHAPTER III

METHODOLOGY

In this chapter a brief description of the study area, sampling frame, database and method of analysis employed are presented under the following headings:

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

3.1 Description of the study area

3.1.1 Location of the study area

The study was conducted in Chikkaballapura and Bagepalli taluks of Chikkaballapura district of the Karnataka State. Chikkaballapura district is located in the southern region of the state and happens to be the eastern-most district of the Karnataka state. Chikkaballapura district falls under 'Eastern Dry Zone (Zone 5)' of the Agro-climatic zones. The district situated in semi-arid drought-prone region, lies between 77° 35' to 77° 52' East longitude and 13 19' to 13 39' North latitude, extending over an area of 4,254 km². Elevation from the Mean Sea Level (MSL) is 800-900 m in major areas and in remaining areas it is 900-1500m. The district is bounded by the district of Bangalore Rural on the south; it is bounded by Anantapur district of Andhra Pradesh on the north. On the east it is surrounded by Kolar and Chittoor districts of Andhra Pradesh. The district headquarters, Chikkaballapura town is located 50 Kms from (north east) Bangalore (Fig. 3.1). The general features of the study area are presented in table 3.1.



Fig. 3.1 Map of the study area

Table 3.1: General features of the study Area

Sl. No	Particulars	Chikkaballapura District
1.	Geographical Area (Ha)	4,04,501
2.	Taluks (No.)	6
3.	Hoblies (No.)	26
4.	Villages (No.)	
4a.	Inhabited	1,321
4b.	Un-inhabited	193
5.	Population (No.)	12,54,377
6.	Density of population (per sq. km)	298
7.	Decadal growth of population (per cent)	9.17
8.	Annual average rainfall (mm)	750
9.	Average no. of rainy days per year (days)	47
10.	Temperature (°C)	
10 a.	Minimum	21
10 b.	Maximum	32

Source: Chikkaballapura District at a Glance 2009-10, District Statistical Office, Chikkaballapura.

3.1.2 Population and demography

The geographical area of Chikkaballapura district is 4,04,501 hectares, spread over six taluks, 26 hoblies in 1321 villages. The population of the district according to 2011 census was 12, 54,377 with 1000: 976 male to female ratio. The overall population density of the district is 298/ sq. km compared to the state's figure of 276/ sq. km in 2009-10.

3.1.3 Climate, rainfall and soil type

There are three distinguishable agricultural seasons in the district viz., Kharif (June-September), Rabi (October-January) and summer (February-May). The South West monsoon commences by the end of May or early June and continues intermittently till the end of September.

The actual rainfall in the district during 2009-10 was 750mm with a major portion received from South-West monsoon. The average number of rainy days per year was 47.6 days.

3.1.4 Land utilization

The land utilization pattern in the district is presented in table 3.2. The total geographical area of Chikkaballapura district 4,04,501 hectares, out of which the net sown area during 2009 was 1,74,234 hectares (43.07%). The total irrigated area was just 41,311 hectares (10.21%), since bore wells are the only source of irrigation in the district. The area not available for cultivation was 1, 15,939 hectares (28.66%), fallow land was 46,953 hectares (11.61%) and forest land was 49,704 hectares (12.29%).

Table 3.2: Land Use Pattern in Chikkaballapura district

Sl. No	Particulars	Area (In hectares)	Per cent
1.	Geographical Area	4, 04,501	100
2.	Forest	49,704	12.29
3.	Not available for cultivation	1,15,939	28.66
4.	Other uncultivable land	72,135	17.83
5.	Fallow land	46,953	11.61
6.	Net sown area	1,74,234	43.07
7.	Irrigated area	41,311	10.21

Source: Chikkaballapura District at a Glance 2009-10, District Statistical Office, Chikkaballapura.

The total geographical area of Bagepalli taluk was 90,009 hectares, out of which the net sown area during 2009-10 was 32,798 hectares. The total irrigated area was only 7,021 hectares, since bore wells are the only source of irrigation in the Taluk. The area not available for cultivation was 32,746 hectares, fallow land was 13,774 hectares and forest land was 18,458 hectares.

The total geographical area of Chikkaballapura taluk was 55,612 hectares, out of which the net sown area during 2009-10 was 19,875 hectares. The total irrigated area was 5,213 hectares, since tube wells are the only source of irrigation in the taluk. The area not available for cultivation was 28,221 hectares, fallow land was 6,095 hectares and forest land was 19,720 hectares.

3.1.5 Cropping pattern

The cropping pattern in the district is presented in the table 3.3. During 2009-10, the net sown area in Chikkaballapura district was 1,74,234 hectares out of which, cereals and other minor millets accounted for 50.68 per cent of the total net sown area. Oil seeds, pulses and fruits accounted for 14.35, 10.52 and 10.30 per cent of the net sown area, respectively. While the area under sugar cane was negligible (0.2 % of the net sown area) the non-food crops accounted for just 10.76 per cent.

During 2009-10, the net sown area in Bagepalli taluk was 32,798 hectares out of which, cereals and other minor millets accounted for 43.53 per cent of the total net sown area. Oil seeds, pulses, vegetables and fruits accounted for 31.23, 12.13, 5.41 and 3.55 per cent of the net sown area, respectively. While the area under sugar cane was negligible (0.006 %), the non-food crops accounted for 4.12 per cent of the net sown area.

Table 3.3: Cropping Pattern in Chikkaballapura district (2009-10)

(In hectares)

Sl. No	Particulars	Taluks						District Total
		Bagepalli	Chikkaballapura	Chintamani	Gauribidanur	Gudibande	Shidlagatta	
1	Cereals and millets	14277 (16.17) [8.19]	10300 (11.66) [5.91]	16465 (18.64) [9.45]	27275 (30.89) [15.65]	7821 (8.86) [4.49]	12165 (13.78) [6.98]	88303 (100) [50.68]
2	Pulses	3981 (21.71) [2.29]	2716 (14.81) [1.56]	6236 (34.01) [3.58]	1782 (9.17) [1.02]	1859 (10.14) [1.07]	1762 (9.61) [1.01]	18336 (100) [10.52]
3	Oil seeds	10245 (40.97) [5.88]	1284 (5.14) [0.74]	1989 (7.95) [1.14]	7675 (30.70) [4.40]	3195 (12.78) [1.83]	616 (2.46) [0.35]	25004 (100) [14.35]
4	Fruits	1165 (6.49) [0.67]	2140 (11.92) [1.29]	6977 (38.85) [4.00]	3419 (19.04) [1.96]	231 (1.29) [0.13]	4025 (22.42) [2.31]	17957 (100) [10.31]
5	Vegetables	1776 (30.41) [1.01]	959 (16.42) [0.55]	795 (13.61) [0.45]	630 (10.79) [0.36]	327 (5.60) [0.19]	1354 (23.18) [0.78]	5841 (100) [3.35]
6	Other non food crops	1352 (7.21) [0.76]	2476 (13.21) [1.42]	5726 (30.54) [3.29]	2775 (14.80) [1.60]	1360 (7.26) [0.78]	5058 (26.98) [2.90]	18747 (100) [10.76]
7	Sugar cane	2 (4.35) [0.001]	0 (0.00) [0.00]	0 (0.00) [0.00]	35 (76.09) [0.02]	0 (0.00) [0.00]	9 (19.57) [0.01]	46 (100) [0.03]
8	Total crops	32798 [18.82]	19875 [11.40]	38188 [21.92]	43591 [25.01]	14793 [8.49]	24989 [14.34]	174234 [100]

() Indicates percentage to total crops of Taluk

[] Indicates percentage to the District's total

Source: Chikkaballapura District at a Glance 2008-09, District Statistical Office, Chikkaballapura

Bagepalli taluk contributed 40.97 per cent of the total district's oilseed production. Similarly it accounted for 30.41 per cent, 21.71 per cent, 16.16 per cent and 4.35 per cent of district's total production of vegetables, pulses, cereals and other minor millets and sugar cane. The taluk is producing 7.21 per cent of non-food crops of the district.

During 2009-10, the net sown area in Chikkaballapura taluk was 19,875 hectares out of which, cereals and other minor millets accounted for 51.82 per cent of the total net sown area. Pulses, fruits, oil seeds and vegetables accounted for 13.67 per cent, 10.77 per cent, 6.46 per cent and 4.86 per cent of the net sown area, respectively. Also non-food crops accounted for 12.46 per cent of the net sown area

Chikkaballapura taluk contributed 11.67 per cent of the total district's cereals and other minor millets production. In the same way it accounted for 14.81 per cent, 5.13 per cent, 11.91 per cent and 16.41 per cent of district's total production of pulses, oilseeds, fruits and vegetables. It is also producing 13.20 per cent of district's non-food crops.

3.2 Sampling design

Chikkaballapura district was purposively selected for the study to examine farmers' preference for pesticide brands, since it is one of the important fruits and vegetables growing districts in the state. The area is known for intensive usage of pesticide for cultivation of fruits and vegetables. Chikkaballapura district was purposively selected because of its potential for the pesticides business. From the district, two taluks, viz., Chikkaballapura and Bagepalli, which have highest cropping area under fruits and vegetable crops particularly tomato, potato, cabbage, onion, chilli, beans and grapes were selected. As a result farmers have to depend on pesticides to protect the crops from pests and diseases. From these two taluks, five villages each were randomly selected and in each

village, nine farmers growing either fruits or vegetables or both were selected randomly. Thus, a total of 90 sample respondent farmers were selected. In addition, 20 pesticide retailers from two taluk were selected randomly to study the market share and promotional strategies used by pesticide companies.

3.3 Nature and source of data

In order to evaluate the objectives of the study, the data was collected from both primary and secondary sources.

Primary data: Primary data was collected both from farmers and retail trader respondents with respect to factors influencing the choice of brand, presence of pesticide companies in promotional strategies and influence of promotional activities on farmers' pesticide purchase behaviour.

Secondary data: The secondary data regarding market share, cropping pattern, land utilization, general information of district and area under cultivation was collected from the Department of Agriculture, Chikkaballapura. Secondary data was also collected with different company sales executives regarding pesticide sales for the year 2011-12 to estimate the share of different pesticide companies and their brands.

3.4 Analytical tools and techniques employed

3.4.1 Tabular analysis

This approach was used for the analysis of the market share of different companies. The companies present in the business in the district were tabulated, computed and presented meaningfully in terms of percentages. The share of each firm was worked out as percentage to total. Tabular analysis was also used to examine purchase pattern, sales pattern and opinion about hybrid varieties.



Fig 3.2 Some of the major pesticide companies in south India.

3.4.2 Garret ranking technique

Garrett's ranking technique was used to rank factors influencing farmers' brand preference for various brands of pesticides and promotional activities that influence on farmers in pesticide marketing. The order of the merit given by the respondents was converted into ranks by using the following formula. Accordingly these ranks were converted to scores by referring to Garrets table.

Garrett's formula for converting ranks into per cent was given by
per cent position = $100 \times (R_{ij} - 0.50) / N_j$

Where R_{ij} = Rank given for i th item by j th individual

N_j = Number of items ranked by j th individual

The per cent position of each rank was converted to scores by referring to tables given by Garret and Woodworth (1969). For each factor, the scores of individual respondents were summed up and divided by the total number of respondents for whom scores were gathered. The mean scores for all the factors were ranked, following the decision criterion that higher the value, the more important is the factor in order of preference by customers.



RESULTS

CHAPTER IV

RESULTS

Keeping the objectives in view, the results of the study is presented under the following headings.

- 4.1 Demographic characteristics of the respondents.
- 4.2 Market share of different brands of pesticides.
- 4.3 Factors influencing farmers' preference for various brands of pesticides in Chikkaballapura district.
- 4.4 Promotional strategies employed by the pesticide companies.

4.1 Demographic characteristics of the respondents

The results in respect of demographic characteristics of the sample are presented under the following headings.

4.1.1 Age of respondent farmers

The distribution of the respondent farmers according to their age is presented in Table 4.1. It could be seen from the table that the average age of the respondent farmers was found to be 39 years. The age wise classification of respondent farmers showed that nearly 38 per cent of farmers belonged to the age group of 31-40 years followed by 41-50 years (26%) the remaining farmers were under the age group up to 30 (23%) and the rest 13 per cent belonged to the age group of more than 50 years.

4.1.2 Educational status of the respondent farmers

The distribution of the respondents by education level has been presented in the Table 4.2. In the cumulative sample of 90 respondent farmers, 45.56 per cent of them had education upto high school followed by 20 per cent was studied up to PUC and 14.44 per cent had no

Table 4.1: Age of respondent farmers**(N = 90)**

Sl. No.	Particulars	Number	Per cent
1.	Average age of the respondents (Years)	39	-
2.	Age group		
a.	Up to 30	21	23.33
b.	31-40	34	37.78
c.	41-50	23	25.56
d.	More than 50	12	13.33
Total		90	100.00

Table 4.2: Educational status of the respondent farmers**(N = 90)**

Sl. No.	Education level	Number	Per cent
1.	No schooling	13	14.44
2.	Primary school	09	10.00
3.	Middle School	05	5.56
4.	High school	41	45.56
5.	PUC	18	20.00
6.	Graduation	04	4.44
Total		90	100.00

schooling. Ten per cent of them had education up to primary school followed by 5.56 per cent who studied up to middle school. Nearly 4 per cent of the farmers studied up to graduation level.

4.1.3 Size of the family of the respondents

The family size of the respondent farmers in Chikkaballapura district is presented in Table 4.3. The highest numbers of respondents were under the category of four to eight (77%) persons followed by the family size of more than eight members (17 %) and less than four members (6%). The average family size of the sample farmers was found to be 6 members in the study area.

4.1.4 Classification of respondents based on land holding

The distribution of respondent farmers according to land holding is presented in Table 4.4. Among sample farmers 51 per cent were under the category of small farmers followed by medium farmers (30%), marginal farmers (14.5%) and large farmers 4.5 per cent respectively. The average land holding size of the sample farmers was found to be 4.8 acres in the study area.

4.1.5 Type of land holding based on source of irrigation of the respondent farmers

The distribution of respondent farmers based on type of land holding is presented in Table 4.5. Out of the 90 sample respondents 57.78 per cent had irrigated land, nearly 36 per cent had both irrigated and dry land while the remaining 6.67 per cent had dry land only.

4.1.6 Classification of respondent farmers based on years of experience in farming

The sample respondents were classified according to the experience in farming and the same is presented in Table 4.6. It could be

Table 4.3: Size of the family of the respondents**(N = 90)**

Sl. No.	Particulars	Numbers	Per cent
1.	Average family size of the respondents	6	-
2.	Family size		
a.	Less than 4 members	06	6.66
b.	4-8 members	69	76.67
c.	More than 8 members	15	16.67
Total		90	100.00

Table 4.4: Classification of respondents based on land holding**(N = 90)**

Sl. No.	Particulars	Numbers	Per cent
1.	Average land holdings (Acres)	4.8	-
2.	Size of holding		
a.	Marginal farmers (1 – 2.5 Acres)	13	14.44
b.	Small farmers (2.5 – 5 Acres)	46	51.12
c.	Medium farmers (5 – 10 Acres)	27	30.00
d.	Large farmers (More than 10 Acres)	4	4.44
Total		90	100

Table 4.5: Type of land holding based on source of irrigation of the respondent farmers (N = 90)

Sl. No	Nature of land holdings	Numbers	Per cent
1.	Irrigated	52	57.78
2.	Dry land	06	6.67
3.	Both irrigated and dry land	32	35.55
Total		90	100.00

Table 4.6: Classification of respondent farmers based on years of experience in farming (N = 90)

Sl. No.	Experience in farming (years)	Numbers	Per cent
1.	Less than 10	23	25.56
2.	10-20	46	51.11
3.	21-30	17	18.89
4.	More than 30	04	4.44
Total		90	100.00
5.	Average experience in farming of the respondents (years)	15.38	
6.	Average number of members engaged in farming in the family	2.94	

seen from the table that, the highest number (51.11%) had experience ranging from 10 to 20 years followed by 26 per cent with less than 10 years and the remaining 18.89 per cent had 21- 30 years experience. Only about 4.44 per cent of the respondents had more than 30 years experience in farming. The average experience of farmers in farming was found to be approximately 15 years in the study area.

The average family members engaged in the farming was found to be around 3 in the study area.

4.1.7 Number of crops grown per season by the respondent farmers

Table 4.7 presents the number of crops grown per season by the sample farmers. It is observed from the table that 68 per cent of the farmers cultivate two crops per season. Nearly 27 per cent of them cultivate three crops and rest 5 per cent of farmers cultivates four crops.

The average number of crops grown per season by the respondents was found to be around 2 in the study area.

4.1.8 Number of pesticides sprays given per crop per season by the sample respondents

Table 4.8 provides the information on number of pesticides sprays given per crop per season by the sample farmers. It can be revealed from the table an on average 22 times farmers sprayed pesticides on the grape cultivation per season followed by 13 spray of pesticides on cabbage crop, 12 times spray on potato crop, 10 times spray on both tomato and onion crops, 9 times spray of pesticides on chilli crop while the remaining 8 times farmers took up pesticide spray on beans crop. Hence it is clear from the table that use of pesticides on crops is very high, since they have no other alternatives to save their crops from pest attack.

Table 4.7: Number of crops grown per season by the respondent farmers (N = 90)

Sl. No.	Number of crops grown per season	Number	Per cent
1.	Two crops	64	67.77
2.	Three crops	21	26.67
3.	Four crops	5	5.56
Total		90	100
Average number of crops grown per season		2	

Table 4.8: Number of pesticides sprays given per crop per season by the sample respondents (N = 90)

Sl. No.	Crop	Number of sprays/season	Average number of sprays
1.	Grapes	20 – 27 sprays	22
2.	Tomato	8 – 12 sprays	10
3.	Potato	9 – 15 sprays	12
4.	Cabbage	11 – 15 sprays	13
5.	Beans	7 – 10 sprays	8
6.	Onion	9 – 12 sprays	10
7.	Chilli	8 – 10 sprays	9

4.1.9 Annual expenditure of respondents on pesticides purchase

The sample respondents were classified according to the amount spent on pesticides purchase per year per acre and the same is presented in Table 4.9. Nearly 38 per cent of the respondents incurred Rs. 21,000 to Rs.50, 000 on purchase of pesticides followed by 30 per cent who purchased pesticides more than Rs. 1 lakh. Fifteen per cent of the sample farmers purchased pesticides up to Rs. 20,000 and remaining 11 per cent purchased pesticides ranging from Rs. 51,000 to Rs.1 lakh in the study area.

4.1.10 Age distribution of respondent retailers

Keeping the objectives in mind the primary data was collected from retail traders also in the study area. The table 4.10 provides socio economic profile of sample retail traders.

The sample respondents of retailers were classified according to the age group and the details are presented in Table 4.10. The average age of the sample retail traders was found to be 38 years. The age wise classification of sample retailers showed that 50 per cent of retailers belonged to the age group of 31-40 years followed by age groups of 41-50 years (25%).The remaining traders are in the range of 30 years (15%), followed by more than 50 (10%) years.

4.1.11 Educational status of the respondent retailers

Education plays a key role in enhancing the individual knowledge of the traders in the study area. The distribution of the respondent retailers by education level has been presented in the Table 4.11. In the cumulative sample of 20 respondents, 45 per cent of them had education upto graduation level followed by high school (35%) and the remaining respondents (20%) studied upto PUC level.

Table 4.9: Annual expenditure of respondents on pesticides purchase (N = 90)

Sl. No.	Amount of pesticides purchased (Rs/year/acre)	Numbers	Per cent
1.	Up Rs. 20,000	10	11.11
2.	Rs. 21000 – 50,000	34	37.78
3.	Rs. 51,000-1,00000	19	21.11
4.	Rs. More than 1,00000	27	30.00
Total		90	100.00

Table 4.10: Age distribution of respondent retailers (N = 20)

Sl. No.	Age group	Number	Percentage to total
1.	Up 30	03	15.00
2.	31-40	10	50.00
3.	41-50	05	25.00
4.	More than 50	02	10.00
Total		20	100.00
5.	Average age of the respondents (Years)	38.07	

However it interesting to note that among the sample retail traders only 55 per cent had undergone diploma in agri-inputs.

4.1.12 Type of Agri-inputs dealt by the sample retailers

Table 4.12 clearly indicates that the average experience of retail traders in trading of agri-inputs is about 8 years. Among the sample retail traders all of them are handling pesticides, 70 per cent are handling seeds, 55 per cent handling fertilizers and just 10 per cent of them are dealing with farm equipments.

4.1.13 Type of ownership of retailing in Agri-inputs

The information regarding nature of ownership of sample respondents is presented in Table 4.13. Proprietorship of retailing in agri-inputs was 90 per cent and remaining 10 per cent of the retailing was under partnership form of business organization.

4.2 Market share of different brands of pesticides.

4.2.1 Market share of different brands of insecticide in Chikkaballapura district

The market share of different brands of insecticide sold by the sample retail traders in Chikkaballapura district is presented in table 4.14. The table provides very interesting information about the insecticides sold in the market. The company, Bayer Crop Science stands first in the sale of insecticides with a share of 32.92 per cent followed by DuPont India Ltd. (21.52%) and Rallis India Ltd. (20.2%). However from the point of brands Coragen manufactured by DuPont India Ltd. stands first with a market share of 18.33 per cent. The other brands which are very near to Coragen are Fame (15.39%), followed by Spintor (13.24%) and Takumi (10.95%).

Table 4.11: Educational status of the respondent retailers (N = 20)

Sl. No.	Education level	Numbers	Per cent
1.	No schooling	0	00.00
2.	Primary school	0	00.00
3.	Middle school	0	00.00
4.	High school	07	35.00
5.	PUC	04	20.00
6.	Graduation	09	45.00
Total		20	100
7.	Diploma in Agri-inputs handling	11 (20)	55.00

Table 4.12: Type of Agri-inputs dealt by the sample retailers (N = 20)

Sl. No.	Product range dealt/retails with	Numbers	Per cent
1.	Pesticides	20	100.00
2.	Seeds	14	70.00
3.	Fertilizers	11	55.00
4.	Farm equipments	02	10.00
Average experience in dealership/retailing		7.95	

Table 4.13: Type of ownership of retailing in agri-inputs (N = 20)

Sl. No.	Nature of ownership	Numbers	Per cent
1.	Partnership	02	10.00
2.	Proprietorship	18	90.00
Total		20	100

Table 4.14: Market share of different brands of insecticides in Chikkaballapura district.

Sl. No.	Brand name	Companies	Average sales/retailer/year (Rs. Lakhs)	Percentage share
1.	Coragen	DuPont India Ltd.	2.269	18.83
2.	Fame	Bayer Crop Science	1.855	15.39
3.	Spintor	Bayer Crop Science	1.596	13.24
4.	Takumi	Rallis India Ltd	1.320	10.95
5.	Proclaim	Syngenta India Ltd.	1.067	8.85
6.	Rogor	Rallis India Ltd	0.806	6.69
7.	Lancer gold	United Phosphorus Limited	0.706	5.85
8.	Actara	Syngenta India Ltd.	0.586	4.86
9.	Confidor	Bayer Crop Science	0.517	4.29
10.	Intrepid	BASF India Ltd.	0.385	3.19
11.	Lannate	DuPont India Ltd.	0.325	2.69
12.	Metador	Syngenta India Ltd.	0.312	2.59
13.	Tatafen	Rallis India Ltd	0.308	2.56
Total			12.051	100.00

4.2.2 Market share of different brands of fungicides in Chikkaballapura district

The market share of different brands of fungicides is presented in table 4.15. Similar to insecticide brands even in fungicides two companies have a largest share in the market. The companies, Bayer Crop Science had a market share of 29.27 per cent followed by DuPont India Ltd. (27.85%) The other companies like BASF India Ltd., Syngenta India Ltd. and United Phosphorus Ltd. had a marginal share in the market with 11.17 per cent, 10.98 per cent and 9.13 per cent respectively.

With respect to fungicide brands, Sectin manufactured by Bayer Crop Science had a share of 13.28 per cent followed by Kocide (11.29%) and Curzate with a share of 10.01 per cent (both brands are manufactured by DuPont India Ltd.). It is also clear from the table that few brands had a very marginal share in the market.

4.2.3 Markets share of different brands of weedicides in Chikkaballapura district

The market share of different brands of weedicides is presented in table 4.16. In addition to insecticide and fungicides, weedicides are also now emerging as one of the type of pesticides with a lot of market potential in the study area. With respect to the important players in the market Excel Industries Ltd. has highest share in the market (24.47%) followed by Monsanto India Ltd. (15.98%), Makhteshim Agan Industries (12.37), United Phosphorus Ltd. (11.03%) and Syngenta India Ltd. (9.72%). When it comes to brands, Roundup manufactured by Monsanto India Ltd had a market share of 15.98 per cent followed by Lasso with 14.61 per cent and Glycel with market share of 13.83 per cent. However, Gramoxone manufactured by Syngenta India Ltd having least market

Table 4.15: Market share of different brands of fungicides in Chikkaballapura district

Sl. No	Brand name	Companies	Avarage sales/retailer/year (Rs. Lakhs)	Percentage share
1.	Sectin	Bayer Crop Science	2.69	13.28
2.	Kocide	DuPont India Ltd.	2.28	11.29
3.	Curzate	DuPont India Ltd.	2.02	10.01
4.	Saaf	United Phosphorus Limited	1.85	9.13
5.	Antracol	Bayer Crop Science	1.52	7.52
6.	Ergon	Rallis India Ltd	1.44	7.10
7.	Equation pro	DuPont India Ltd.	1.32	6.55
8.	Amistar	Syngenta India Ltd.	1.27	6.28
9.	Acrobat	BASF India Ltd.	1.22	6.03
10.	Cabrio top	BASF India Ltd.	1.04	5.14
11.	Redomil gold	Syngenta India Ltd.	0.95	4.70
12.	M-45	Indofil Chemicals Company	0.91	4.49
13.	Melody duo	Bayer Crop Science	0.87	4.32
14.	Nativo	Bayer Crop Science	0.84	4.15
	Total		20.21	100.00

Table 4.16: Markets share of different brands of weedicides in Chikkaballapura district

Brand name	Companies	Avarage sales/ retailer/year (Rs. Lakhs)	Percentage share
Roundup	Monsanto India Limited	1.27	15.98
Lasso	Sinochem India Co. Pvt. Ltd	1.16	14.61
Glycel	Excel Industries Ltd	1.10	13.83
Agile	Makhteshim Agan Industries	0.98	12.37
Glyphogon	Cheminova India Ltd	0.94	11.82
Sweep	United Phosphorus Limited	0.88	11.03
Meera 71	Excel Industries Ltd	0.85	10.64
Gramoxone	Syngenta India Ltd.	0.77	9.72
Total		7.94	100.00

share of 9.72 per cent. The other brands market share ranges between 9 to 11 per cent.

4.2.4 Market share of pesticide companies in Chikkaballapura district

The market share of different pesticide producing companies is presented in Table 4.17. It is clear from the table that market share of pesticides in the Chikkaballapura district has spread over to more than 12 companies with total sales of Rs. 27.89 crores during 2011-12. Among these companies Bayer Crop Science has largest market share of 11.53 per cent with a total sale of pesticides nearing to Rs. 3.22 Crores. The Syngenta India Ltd has its presence in the market near to Bayer Crop Science with a market share of 10.25 per cent with total sale of Rs. 2.86 Crores. The other companies were also more or less had similar share in the market. BASF India Ltd had a market share of 9.56 per cent followed by DuPont India Ltd (8.72%), Indofil Chemicals Company with 8.72 per cent. It is also interesting to note that apart from 12 companies listed in table 4.17 the other companies had a market share of 23.99 per cent, which indicates presence of large number of players in the market.

4.2.5 Market share of pesticide companies in Chikkaballapura district

In order to examine the market share of pesticides in Chikkaballapura district, the primary data was also collected from retail traders who are selling various types of pesticides in the district and the same has been presented in the table 4.18. The table provides the market share of pesticides from the point of sale of pesticide by retail traders. It is clear from the table that the retail traders who are selling pesticides from Bayer Crop Science had achieved the highest market share with an average sale of Rs. 9.90 Lakhs per retail trader per year. The other companies who are able to compete with Bayer Crop Science

Table 4.17: Market share of pesticide companies in Chikkaballapura district (2011-2012)

Sl. No.	Companies	Sales (Rs.crores)	Percentage share
1.	Bayer Crop Science	3.22	11.53
2.	Syngenta India Ltd.	2.86	10.25
3.	BASF India Ltd.	2.67	9.56
4.	DuPont India Ltd.	2.43	8.72
5.	Indofil Chemicals Company	2.07	7.43
6.	Rallis India Ltd	1.75	6.28
7.	Excel Industries Ltd	1.64	5.89
8.	Makhteshim Agan Industries	1.28	4.58
9.	United Phosphorus Limited	1.14	4.10
10.	Dow AgroSciences India Ltd	0.95	3.42
11.	Nagarjuna Fertilizers & Chemicals Ltd	0.63	2.25
12.	Dhanuka Agritech Ltd	0.56	2.00
13.	Others	6.69	23.99
Total		27.89	100.00

Source: As per the data provided by sales executive of different companies in Chikkaballapura district

Table 4.18: Market share of pesticide companies in Chikkaballapura district (2011-2012).

Sl. No.	Companies	Average Sales/ Retailer / year (Rs.Lakhs)	Sales (%)
1.	Bayer Crop Science	9.9	11.94
2.	Syngenta India Ltd.	8.92	10.76
3.	BASF India Ltd.	8.41	10.14
4.	DuPont India Ltd.	7.77	9.37
5.	Indofil Chemicals Company	6.79	8.19
6.	Rallis India Ltd	5.92	7.14
7.	Excel Industries Ltd	5.63	6.79
8.	Makhteshim Agan Industries	4.61	5.56
9.	United Phosphorus Limited	4.21	5.08
10.	Dow AgroSciences India Ltd	3.31	3.99
11.	Nagarjuna Fertilizers & Chemicals Ltd	2.41	2.91
12.	Dhanuka Agritech Ltd	1.82	2.20
13.	Others	13.2	15.92
Total		87.34	100.00

Source: As per the primary data collected from sample retail traders in Chikkaballapura district

are Syngenta India Ltd, BASF India Ltd and DuPont India Ltd. For example the retail traders who are selling Syngenta India Ltd pesticides is able to sell on an average Rs. 8.92 Lakhs followed by the retail trader of BASF India Ltd with a average sales figure of Rs. 8.41 Lakhs. The retail trader who are selling pesticide products from other companies had a average sales volume ranging from Rs. 7.7 Lakhs to as low as Rs. 1.82 lakhs.

4.3 Factors influencing farmers' preference for various brands of pesticides

4.3.1 Factors influencing farmers' preference for various brands of pesticides in study area

The factors influencing the farmers' preference for various brands of pesticides are presented in table 4.19. The quality, brand popularity and price are the key influencing factors, which are ranked first, second and third with a mean scores of 80.33, 65.47 and 63.61 respectively. The other factors like timely availability, previous experience and retailer recommendation are moderately influencing farmers' preference for various brands of pesticides. However it is also clear from the table that factors like co-farmer opinion, sales promotional activity and advertisement are least influencing factors on the farmers while purchasing pesticides.

4.3.2 Farmers' preference for various brands of insecticides in Chikkaballapura district

A perusal of Table 4.20 indicates the information on farmers' preference for 13 most accepted insecticides. Among the most popular insecticides, 80 per cent of the sample farmers preferred Coragen brand as their first preference followed by Fame brand (77.78%) and Spintor brand (74.44%) as their second and third preference respectively. The

Table 4.19: Factors influencing farmers' preference for various brands of pesticides in study area

Sl. No.	Attributes	Total score	Mean score	Rank
1.	Quality	7230	80.33	I
2.	Brand Popularity	5892	65.47	II
3.	Competitive price	5725	63.61	III
4.	Timely availability	4798	53.31	IV
5.	Previous experience	4465	49.61	V
6.	Retailer Recommendation	4298	47.76	VI
7.	Co-farmer opinion	3314	36.82	VII
8.	Sales promotional activity	2882	32.02	VIII
9.	Advertisement	1972	21.91	IX

Table 4.20: Farmers' preference for various brands of insecticides in Chikkaballapura district (N = 90)

Sl. No	Insecticides	No. of farmers	Per cent	Rank
1.	Coragen	72	80.00	I
2.	Fame	70	77.78	II
3.	Spintor	67	74.44	III
4.	Takumi	54	60.00	IV
5.	Proclaim	51	56.67	V
6.	Rogor	47	52.22	VI
7.	Lancer gold	43	47.78	VII
8.	Actra	41	45.56	VIII
9.	Confidor	35	38.89	IX
10.	Interprid	30	33.33	X
11.	Lannate	25	27.78	XI
12.	Metadoor	16	17.78	XII
13.	Tatafen	13	14.44	XIII

Multiple response taken

other brands like Takumi (60%), Proclaim (56.67%) and Rogor (52.22%) are also popular among the farmers in the study area. However, farmers have given least preference to Tatfen brand with 14 per cent.

4.3.3 Farmers' preference for various brands of fungicides in Chikkaballapura district

Table 4.21 indicate that most of the sample farmers (85.56%) preferred Sectin brand as their first preference followed by Kocide brand (83.33%) and Curzate brand (80%) as their second and third preference respectively. However, Saaf (77.78%), Antacol (70%), Ergon (67.78%), Equationpro (63.33%), Amister (61.11%) and Acrobat (60%) are also moderately preferred brands among the farmers in Chikkaballapura district. In case of Nativo (35.56%) and Tata master (29%) brand having least preference by farmers in Chikkaballapura district.

4.3.4 Farmers' preference for various brands of weedicides in Chikkaballapura district

The farmers' preferences for various brands of weedicides are presented in table 4.22. Nearly 48 per cent of the sample farmers' preferred Round up brand as their first choice followed by Lasso brand (43%) and Glycel brand (40%) as their second and third choice respectively. The other brands like Agile (36%), Glyphogon (29%) and sweep (24%) are also popular among the farmers in the study area. However, farmers have given least preference to Gramoxone brand with 11 per cent.

Table 4.21: Farmers' preference for various brands of fungicides in Chikkaballapura district (N = 90)

Sl. No	Fungicides	No. of farmers	Per cent	Rank
1.	Sectin	77	85.56	I
2.	Kocide	75	83.33	II
3.	Curzate	72	80.00	III
4.	Saaf	70	77.78	IV
5.	Antracol	63	70.00	V
6.	Ergon	61	67.78	VI
7.	Equationpro	57	63.33	VII
8.	Amister	55	61.11	VIII
9.	Acrobat	54	60.00	IX
10.	Cabriotop	46	51.11	X
11.	Redomylgold	45	50.00	XI
12.	M-45	35	38.89	XII
13.	Melodyduo	34	37.78	XIII
14.	Nativo	32	35.56	XIV
15.	Tatamaster	26	28.89	XV

Multiple response taken

Table 4.22: Farmers' preference for various brands of weedicides in Chikkaballapura district (N = 90)

Sl. No	Weedicides	No. of farmers	Per cent	Rank
1.	Roundup	43	47.78	I
2.	Lasso	39	43.33	II
3.	Glycel	36	40.00	III
4.	Agile	32	35.56	IV
5.	Glyphogon	26	28.89	V
6.	Sweep	21	23.33	VI
7.	Meera 71	19	21.11	VII
8.	Gramoxone	10	11.11	VIII

Multiple response taken

4.4 Promotional strategies used by the pesticide companies

4.4.1 Promotional strategies used by the pesticide companies according to respondent farmers

The promotional strategies used by the pesticide companies are presented in table 4.23. The table clearly indicate that 97 per cent of farmers are of the view that DuPont India Ltd. conducted more promotional strategies like on field promotional activities in the form of field demonstration, field day and exhibition of the product at krishi melas. Similarly they also organise off field demonstrations (89%) through posturing, jeep campaign, group discussion and night meetings, Training programme, distribution of leaf lets and calendar, product briefing to dealer, proper display at retailer counter and through T.V advertisement. Bayer Crop Science also conducted promotional strategies like on field (88%) and off field (83%), BASF India Ltd. with on field (84%) and off field (81%). Nagarjuna Fertilizer and Chemicals Ltd. have conducted least promotional activities like on field (8%) as well as off field (6%).

4.4.2 Awareness about pesticide companies by farmers in Chikkaballapura district

The table 4.24 indicate that cent per cent respondent farmers were aware of Bayer Crop Science, Syngenta India Ltd, DuPont India Ltd and BASF India Ltd companies. However, companies like Dhanuka Agritech Ltd. and Nagarjuna Fertilizers & Chemicals Ltd were least known to the sample farmers in the Chikkaballapura district.

4.4.3 Influence of promotional activities on farmers purchase behaviour in pesticides marketing

The Influence of promotional activities on farmers' purchase of pesticides is presented in table 4.25. Among various factors, the retail

Table 4.23: Promotional strategies used by the pesticide companies according to respondent farmers

(N = 90)

Sl. No	companies	On field (No. of farmers)	Per cent	Off-field (No. of farmers)	Per cent
1.	DuPont India Ltd.	87	96.67	80	88.89
2.	Bayer Crop Science	79	87.78	75	83.33
3.	BASF India Ltd.	76	84.44	73	81.11
4.	Indofil Chemicals Company	74	82.22	70	77.78
5.	Syngenta India Ltd.	72	80.00	69	76.67
6.	Rallis India Ltd	68	75.56	65	72.22
7.	Excel Industries Ltd	62	68.89	45	50.00
8.	United Phosphorus Limited	50	55.56	31	34.44
9.	Makhteshim Agan Industries	26	28.89	12	13.33
10.	Dow AgroSciences India Ltd	15	16.67	13	14.44
11.	Dhanuka Agritech Ltd	10	11.11	08	8.89
12.	Nagarjuna Fertilizers & Chemicals Ltd	07	7.78	05	5.56

Multiple response taken

Table 4.24: Awareness about pesticide companies by farmers in Chikkaballapura district (N = 90)

Sl. No	Companies	Numbers	Per cent
1.	Bayer Crop Science	90	100.00
2.	Syngenta India Ltd.	90	100.00
3.	DuPont India Ltd.	90	100.00
4.	BASF India Ltd.	90	100.00
5.	Indofil Chemicals Company	86	95.56
6.	Rallis India Ltd	84	93.33
7.	Excel Industries Ltd	80	88.89
8.	United Phosphorus Limited	63	70.00
9.	Dow AgroSciences India Ltd	47	52.22
10.	Makhteshim Agan Industries	34	37.78
11.	Dhanuka Agritech Ltd	33	36.67
12.	Nagarjuna Fertilizers & Chemicals Ltd	30	33.33

Multiple response taken

Table 4.25: Influence of promotional activities on farmers purchase behaviour in pesticides marketing

Sl. No.	Attributes	Total score	Mean score	Rank
1.	Retail traders influence	7270	80.78	I
2.	Company representative influence	6721	74.68	II
3.	On farm demonstration	5954	66.16	III
4.	Farmer meetings	5455	60.61	IV
5.	Distribution of literature	5066	56.29	V
6.	Through participation in fairs	4616	51.29	VI
7.	Wall paintings	4420	49.11	VII
8.	Banners	3773	41.92	VIII
9.	Posters	3479	38.66	IX
10.	Radio	2988	33.20	X
11.	Local papers	2524	28.04	XI
12.	Theaters	1734	19.27	XII

trader influence, company representative influence and on farm demonstration are the key factors, which are ranked first, second and third with the mean scores of 80.78, 74.68 and 66.16 respectively. Farmers meeting, distribution of literature and samples, through participation in fairs and wall painting are moderately influencing factors, which are ranked fourth, sixth, and seventh with mean scores of 60.61, 56.29, 51.29 and 49.11 respectively. The remaining activities like banners, posters, radio, local papers and theaters are least influencing factors which are ranked eighth, ninth, tenth, eleventh and twelfth with the mean scores of 41.92, 38.66, 33.20, 28.04 and 19.27 respectively.



DISCUSSION

CHAPTER V DISCUSSION

Keeping the objectives in view, the empirical results of the study are discussed under the following headings.

- 4.1 Demographic characteristics of the respondents.
- 4.2 Market share of different brands of pesticides.
- 4.3 Factors influencing farmers' preference for various brands of pesticides in Chikkaballapura district.
- 4.4 Promotional strategies employed by the pesticide companies.

5.1 Demographic characteristics of the respondents

5.1.1 Age of respondent farmers

The age of the household head is an important aspect in agriculture because it determines experience one has in certain type of farming. The distribution of the respondent farmers according to their age (Table 4.1). The study revealed that nearly 38 per cent of farmers belonged to the age group of 31-40 years. This was followed by age groups of 41-50 years, upto 30 years and above 50 years which accounted for 25.56 per cent, 23.33 per cent and 13.33 per cent respectively. Hence it is clear that the middle age respondents are actively engaged in farming in the study area.

5.1.2 Educational status of the respondent farmers

Education plays a key role in enhancing an individual knowledge of the farmers' and their perception about particular brand of the company. In the cumulative sample of 90 respondent farmers (Table 4.2) 45.56 per cent of them had education upto high school, followed by 20 per cent studied up to PUC, indicating that most of them had knowledge

of pesticide brands and its usage on the crops for maximizing the productivity of the crop.

5.1.3 Size of the family of the respondents

Size of the family place an important role in agriculture particularly in respect of cultivation of fruits and vegetables. Further due to labour shortage in agriculture the family members have to contribute their physical labour either directly or indirectly in agriculture. The highest numbers of respondent are coming under the category of four to eight (77%) which indicates that the higher concentration of family member in agriculture. The next category of respondents (17%) had more than eight member which are indicates even more participation among the respondent members (Table 4.3).

The casual discussion among the family respondents revealed that cultivation of fruits and vegetables is very attractive in the present day's circumstances due to high prices in the market which enhances their agricultural income. Hence the respondents with large families are cultivating fruits and vegetables to increase income from agriculture.

5.1.4 Classification of respondents based on land holding

The respondents were classified according to land holdings (Table 4.4). The table clearly indicates that the average land holding size was found to be 4.8 acres with largest concentration of small farmers. The small level farmers are involved mainly in fruits and vegetables production followed by medium farmers (30%). The marginal farmers (14.5%) and large farmers (4.5%) were showed less interest in fruit and vegetable cultivation.

5.1.5 Type of land holding based on source of irrigation of the respondent farmers

The farmer having irrigated land holding were more because they rely more on bore wells for the cultivation of land. However, few small farmers could not afford to have bore wells hence they were mainly depending on rains in the study area. Some of the farmers (36%) had both types of land in which some were irrigated and the rest were dry lands (Table 4.5)

5.1.6 Classification of respondent farmers based on year of experience in farming

The farmers with experience ranging from 10 to 20 years were more in number because almost all of them were aged between 30 to 40 years (Table 4.6). Further they had good education which indicated that they are using new techniques in farming. The respondents having greater than 30 years of farming experience were very few.

5.1.7 Number of crops grown per season by the respondent farmers

The number of crops grown per season is bit high since the farmers grow mainly vegetables which are short duration in nature. Since the farmers from this region are very close to Bangalore city. Hence they grow crop depending upon demand for the vegetables, expected prices in the market etc. (Table 4.7).

5.1.8 Number of pesticides sprays given per crop per season by the sample respondents

An average numbers of pesticides sprays given per crop per season taken up by the sample farmers ranging from 8 to 22 times as they cultivated both grapes and vegetable in the study area. The person who cultivated grapes applied an on average 22 spray per season because to

control most prevalent Downey mildew disease and sucking pests (Table 4.8).

5.1.9 Annual expenditure of respondents on pesticides purchase

Table 4.9 it is clear from the table that farmers spend substantial amount on purchase of pesticides. The main factors responsible for the purchase of pesticides by farmers is due to cultivation of HYV vegetable and fruit crops which are more prone to pests and diseases. Further from the point of realising higher income cultivation of vegetables are very attractive since Bangalore city is a very good market with assured demand with attractive price. Hence farmers take risk in investing mainly on seeds, fertilizers and also on pesticides.

5.1.10 Age distribution of respondent retailers

It is clear from the table 4.10 among 20 retail traders nearly 50 per cent of them are coming under the category of 31 to 40 years. Next to this category nearly 25 per cent of the retail traders are coming under the category of 41 to 50 years. This clearly indicates that most of the retail traders started their business at a later stage and be part of this business upto 50 years. Further it is also clear from the table that the younger person joining this business is marginal with 15 per cent and also persons after 50 years remaining in the retail business is also negligible with 10 per cent. It is clear from this table that retail business traders as a group revolves around middle aged probably due to risk in the business and also penetration in to the market takes long time. Hence, the retail traders who have communication ability to persuade farmers to buy their pesticides brands. Patience, entrepreneurship skill and ready to take risk can only survive in this competitive business.

5.1.11 Educational status of the respondent retailers

Table 4.11 clearly indicates that the retail traders are all literates who are attracted to this business due to attractive margin in the agri-input business. Hence knowledge, awareness entrepreneurship qualities exhibited by the retail traders are mainly due to their educational background.

5.1.12 Type of Agri-inputs dealt by the sample retailers

It is evident from the table 4.12 that the retail traders deal with all the inputs required by the farmers depending on type of pesticides, seeds and fertilizers for a crop in a season. With respect to sale of agricultural equipments it is clear that only few retail traders deal with them either because of huge investment needed or because of limited sale of agricultural machinery in the region. Further farm equipments manufacturers encourage establishment and sale of their own brands usually at taluk or district level through their own dealers. Hence the retail traders focus mainly on sale of pesticides, seeds and fertilizers.

5.1.13 Type of ownership of retailing in Agri inputs

In any business there are various risk involved, if an individual undertaken business whether it is profit or loss it become his effort but if there are two or three people involved in any business sharing of profit and loss is a very tricky business which may leads to differences of opinion among the partners which may results in legal disputes which may in the end ruining all the partners involved. Hence it is clear from the table that nearly 90 per cent of the traders are doing retail business individually and only 10 per cent of the retail traders entered the business in partnership mode (Table 4.13).

5.2 Market share of different brands of pesticides

5.2.1 Market share of different brands of insecticide in Chikkaballapura district

The market share of different brands of insecticide sold by sample retailer traders in Chikkaballapura district (Table 4.14) provides very interesting information about the insecticides sold in the market. From the point of companies, Bayer Crop Science stands first in the sale of insecticides with a share of 32.92 per cent followed by DuPont India Ltd. (21.52%) and Rallis India Ltd. (20.20%). Since, Bayer Crop Science gains popularity due its product portfolio, product innovation and value addition of existing molecule and releasing the product into the market as a new brand which results in drawing the attention of the farmer to purchase the new brands of Bayer Crop science. However, from the point of brands, Coragen manufactured by DuPont India Ltd. stands first with a market share of 18.33 per cent. This was due to its high level acceptance by the farmers for effective control of Lepidopteran Insects in the vegetables like Tomato, Potato, Cabbage and Beans. At the grass root level the brand gained more popularity due to its aggressive product promotion strategy adopted by the company. The popularity of Tatafen manufacture by Rallis India Ltd is low because its field acceptance is very less and there is higher brand loyalty for Bayer Crop Science products in insecticides. In addition, the brand promotion strategies of Rallis India Ltd are very marginal and hence least effective in the market.

5.2.2 Market share of different brands of fungicides in Chikkaballapura district

The market share of different brands of fungicides is similar to insecticides (table 4.15). Bayer Crop Science had a higher market share (29.27%) due its wide range of product portfolio, acceptance of brand in the market, product innovation and its effective marketing strategies.

DuPont India Ltd. (27.85%) was also popular with its product and its acceptance is very satisfactory in the market but with lower product portfolio when compared to Bayer Crop Science.

With respect to fungicide brands Sectin manufactured by Bayer Crop Science had a share of 13.28 per cent due to its effective immediate control against Downey Mildew and Anthracnose of Grape crop and controlling Blight disease in vegetable crops which are grown majorly in Chikkaballapura district, followed by Kocide (11.29%) and Curzate with a share of 10.01 per cent (both brands are manufactured by DuPont India Ltd). These two were effective when used in combination against Downey Mildew, Anthracnose of Grape and Chilli crop and Blight Diseases in vegetable especially Tomato and Potato.

5.2.3 Market share of different brands of weedicides in Chikkaballapura district

Monsanto India Ltd had a greater share (15.98%) due to higher effectiveness on all the weeds in the field of Grapes (major fruit crop in the study area), name recognition and brand loyalty among farmers. Lasso manufactured by Sinochem India Pvt Ltd had a share of 14.61 per cent which is due to multiple crop application and good field acceptance level, with respect to crops like Tomato, Potato, Cabbage and Chilli as they were the major vegetable crop in the study area. The Gramoxone manufactured by Syngenta India Ltd had least market share of 9.72 per cent because of lack of non availability in the store and due to more number of alternative products of different companies which are frequently available in the market (Table 4.16).

5.2.4 Market share of pesticide companies in Chikkaballapura district

As per the data provided by sales executive of different companies (Table 4.17) it was observed that Bayer Crop Science is having higher relative market share due to its recognition, more number of multi spectrum products, well equipped and qualified R & D facility, time adherence for supply and release of products as per farmers requirement, broadcasted availability throughout the year and aggressive promotional activities running throughout the year. Followed by Syngenta India Ltd (10.25%) stands second because their lower field promotional activities compared to Bayer Crop Science and it is also giving tough competition to Bayer. It's very interesting to know that though the DuPont India Ltd stands first in terms of conducting field promotional activity but in total market share it was occupied fourth position because of lower product portfolio and its products are very costlier but giving very good results in field. Dow Agro Sciences Ltd, Nagarjuna Fertilizer and chemicals Ltd and Dhanuka Agritech Ltd had negligible market share since these companies are not well known to farmers, due to absence of field staff, lack of supply of materials and less number of dealers handling the companies' products.

5.2.5 Market share of pesticide companies in Chikkaballapura district

As per the primary data collected from retail traders who are selling pesticides of different companies (Table 4.18). It was observed that Bayer Crop Science has relative market share with an average sales of Rs. 9.90 Lakh per retail trader per year due to very good rapport relationship with farmers and dealers, name recognition, more number of multispectrum products, well equipped and qualified R & D facility, time adherence for supply and release of products as per farmers

requirement, broadcasted availability throughout the year and aggressive promotional activities running throughout the year. The second company was Syngenta India Ltd with sales of Rs. 8.92 because their lower field promotional activities compared to Bayer Crop Science and it is also giving tough completion to Bayer. It's very interesting to know that though the DuPont India Ltd stands first place in terms of conducting field promotional activity but in total market share it was occupied fourth position because of lower product portfolio and its products are very costlier. Dow Agro Sciences Ltd, Nagarjuna Fertilizer and chemicals Ltd and Dhanuka Agritech Ltd has very marginal market share because these companies are not well known to farmers, with less field staff, supply of materials not good and less number of dealers handling their products.

The results of the study are on par with previous study of Kunnal and Murthy (1994) highlighted that the private seed firms dominated the seed market in the Karnataka state with the share of 67 per cent of seeds of pulse crops and about 85 per cent in oil seed crops. The state seed corporation had fairly good share of 28.30 per cent in distribution of seeds of pulse crops but in case of oilseeds it was not satisfactory. The Karnataka oil seed grower's co-operative federation has captured only about 10 per cent of oil seed market in the state.

5.3 Factors influencing farmers' preference for various brands of pesticides

5.3.1 Factors influencing farmers' preference for various brands of pesticides in study area

The factors influencing farmers brand preference (Table 4.19) were quality, brand popularity, competitive price, timely availability, previous experience, retailer recommendation, co-farmers opinion, sales promotional activity and advertisement. Quality, brand and price are the major factors of sample farmers for selecting particular company brands

of pesticides as they are the prime things to be admitted in the study area.

5.3.2 Farmers' preference for various brands of insecticides in Chikkaballapura district

Farmer purchase particular insecticides according to their requirement. In the study area, as many as 13 popular insecticides were traded. Among them, majority 80 per cent of the sample farmers preferred Coragen brand as their first preference followed by Fame brand (77.78%) and Spintor brand (74.44%) as their second and third preference respectively. This is because these companies have substantial R & D facilities which has resulted in the manufacture of highly efficient pesticides. Along with their quality products, sales promotion through aggressive advertising and its accessibility to farmers in almost all retail stores has become the hallmark of these companies. All these have contributed to the farmers' preference for the above mentioned insecticides (Table 4.20).

5.3.3 Farmers' preference for various brands of fungicides in Chikkaballapura district

In case of fungicides (Table 4.21) most of the sample farmer's preferred Sectin brand as their first preference followed by Kocide brand and Curzate brand as their second and third preference respectively. Since its quality, brand name, awareness among the farmers, its availability throughout the year and mainly these brands is having good control over Late blight of Tomato and Potato, Downey mildew of Grapes and Anthracnose disease of Chilli majorly grown in the study area. Hence, most of the farmers develop brand loyalty to these brands.

5.3.4 Farmers' preference for various brands of weedicides in Chikkaballapura district

When it comes to weedicides (Table 4.22) nearly 48 per cent of the sample farmers' preferred Round up brand as their first choice mainly due to its quality in controlling all kind of weeds and company of this brand has very good R & D facility. Lasso brand and Glycel brand were the second and third choice due to quality and its availability in almost all retail stores.

The results of the present study are on par with previous studies, Nandagopal and Chinnaiyan (2003) identified quality, price, and availability as the driven factors influenced consumer's preference for soft drinks in Tamil Nadu and Dharmaraj (2010) analyzed the factors influencing the preference of passenger cars such as social status, image of manufacturer, celebrity endorsements, brand loyalty, style, and driving comfort quality, comfort, road grip, luxury, warranty, space, power break and steering among which price and brand played a crucial role in consumer preference.

5.4 Promotional strategies used by the pesticide companies

5.4.1 Promotional strategies used by the pesticide companies according to respondent farmers

Among various companies DuPont India Ltd and Bayer Crop Science stands first and second in terms of conducting promotional strategies both in on field and off field due to they are spending 2.5 to 3 per cent of total sales amount on field promotional activities and their field staff is also more in number followed BASF India Ltd, Indofil Chemicals Company and Syngenta India Ltd and Rallis India Ltd having little lower staff. Few companies' promotional strategies are not very aggressive with least presence in the market also (Table 4.23).

5.4.2 Awareness about pesticide companies by farmers in Chikkaballapura district

Generally awareness of farmers about particular brand of a company is correlated with sales of products of that company. Among respondents cent per cent are aware about Bayer Crop Science, Syngenta India Ltd, DuPont India Ltd and BASF India Ltd company brands due to their continuous supply and brand image. These companies were having highest market shares in the study area. The companies like Dhanuka Agritech Ltd. and Nagarjuna Fertilizers & Chemicals Ltd were having least awareness among farmers since few promotional activities and least presence in the study area (Table 4.24).

5.4.3 Influence of promotional activities on farmers purchase behaviour in pesticides marketing

While building a brand, promoting its strength, reducing its weakness and making brand more valuable, advertisement is the bottom line of marketing. There are many strategies in effective pesticide advertisement such as advertizing through on farm demonstration, wall paintings, local papers, distribution of literature, banners, postures, retail trader influence, company representative influence, on farm demonstration, farm meetings, local papers, theaters (slides and films), radio and participation in fairs. The effectiveness of different means of advertisement are analyzed and the results are presented in the Table 4.25. It could be observed from the table that, the dealer and company representative had the highest influence and are ranked first and second on pesticide purchase decisions of the farmers. Therefore firm has to maintain good relationship with the dealers as well as company employee for better product promotion. The other important advertising strategies are farm demonstration, farmer meetings, distribution of literature and participation in fairs that are rated III, IV, V and VI in the order of their

effectiveness as an advertisement media. The importance of these means in advertising is attributed to the fact that farmers are in a position to participate in such events, which gives the platform for the farmer to visualize the impact on result demonstration and also there are opportunities for discussion and verification of facts. Wall paintings, banners, posters, radio, local paper and theaters are least influencing factor on farmers purchasing decision in pesticide market.

The results of the present study are on par with previous studies, 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.



**SUMMARY & POLICY
IMPLICATIONS**

CHAPTER VI

SUMMARY AND POLICY IMPLICATIONS

In agriculture particularly in crop protection the pesticides are playing an important role since they act as protective umbrella for other inputs. Insect pests, disease and weeds appear at different stages of crop growth and loss sustained by the crop depends on the extent and virulence of pest attack. In order to meet the ever increasing demand of food and fodder, efficient management of inputs like high yielding variety seeds, irrigation, fertilizers and crop protection chemicals are important. The annual loss of agricultural production in India is estimated to be around Rs. 90,000 crores. Even if 50 per cent of the potential loss is salvaged, it can make an immense difference in reducing losses in agriculture. Hence production and marketing of pesticides plays a crucial role in agribusiness input industry. In India the investment in pesticides industry is generally not oriented towards yield increasing brands but on loss minimizing products.

The production of pesticides in India started during the first five year plan period. At present there are around 900 types of pesticides manufactured in the world. However, the Government of India based on expert committee advice has allowed only 217 types of pesticides to use in agriculture in the country. About half of these pesticides are produced in India and the rest are being imported. At present the technical grade pesticides are growing at the rate of 7.5 per cent per annum.

As on March 2010, the total installed capacity of pesticide production in India was about 2,72,600 MT. However the actual pesticide production is around 82,000 to 85,000 MT.

During first five year plan period the consumption of pesticides in India was one of the lowest with 0.032 kg/ha. However by 1996 with the

introduction of high yielding varieties of rice and wheat, the usage has increased to 0.094 kg/ha. Since then, the use of pesticides has increased significantly. At the end of the first decade of introduction of new varieties, the pesticides use on agriculture had increased to 0.266 kg/ha. The per hectare consumption of pesticides was 557 gms in 2007-08 which is equivalent to African countries' consumption. In developed countries like USA, EEC, Japan, China, etc., pesticide use is 20 times more than India, and as result their crop yields are much higher compared to India.

The marketing of pesticide by a company has a greater responsibility to make available pesticides to farmers at right time, at right place and at 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 pesticide manufactures. Distribution channel plays a strategic role in the effective performance of pesticide marketing system. The pesticides distribution channel takes possession of goods on certain specified terms and condition like issue price, distribution margin, credit period, discount if any, etc. The strategies and policies followed by the pesticide distribution channel have to be in consonance with the marketing operations of the manufactures.

The distribution of pesticides attains special significance, since Indian agriculture is predominantly dependent on traditional technology. Unlike consumer products, pesticide distribution system is governed by certain unique features like supply is continuous but production of crops is seasonal and short lived, pesticides are marketed through a network of retail outlets spread throughout the length and breadth of the country with diverse agro-climatic regions; government control on distribution, inadequate storage facilities at buyer's level and dependence on large number of users with different consumer profiles.

Therefore, it is a challenging task to move pesticides from various manufacturing units and places to the ultimate end user point's covering large distances in most economical manner while preserving the chemical and physical properties of the product with a right package and selling at the right time. The complexity of the problem is bound to increase in the near future in view of the projected increase in consumption of inputs in the country. To meet the challenge, "the logistic marketing" has to play a crucial role. The need to develop an effective and economic national distribution system is vital to achieve the desired results. "Logistic" is thus an extremely important function in pesticide marketing discipline.

The retail traders play a critical role in pesticide marketing by linking pesticide manufacturer to the buyer. The importance of pesticide marketing in transformation of agriculture, thus need no emphasis to achieve increased agricultural production.

The present study was undertaken with an overall objective of assessing the market share of different brands of pesticides and analyzes the factors influencing the purchase of brands pesticides and examines the promotional strategies employed by pesticides companies. The present study was taken up with the following objectives.

The specific objectives of the study were

1. To analyze the market share of different brands of pesticides in the district,
2. To analyze the factors influencing the brand preference of pesticides in the district and
3. To examine the promotional strategies employed by the pesticide companies in the district.

The present study proposes to test the following hypotheses

1. Only few brands have dominated the market in the district
2. The farmer preference for pesticides is influenced by various parameters like price, quality and company reputation.
3. Only few companies are employing aggressive promotional strategies in the market.

Chikkaballapura district of Karnataka was purposively selected because of its potential for the pesticides market. For evaluating the specific objectives of the study, both primary and secondary data were utilized. The primary data is collected from 90 farmers and 20 traders in Chikkaballapura and Bagepalli taluk. In these two taluks 90 farmers were interviewed with respect to factors influencing the choice of brand, presence of pesticide companies in promotional strategies and influence of promotional strategies on farmers' pesticide purchase behaviour. The secondary data related to company wise sales of pesticides for the estimation of market share (2009-10) was collected from sales executive of respective companies.

The descriptive analysis is used to explain the brand preference, market share and promotional strategies used by the pesticide companies. Garrett's ranking technique was also used to analyse factors influencing farmers' brand preference of pesticides and the influence of promotional activities on farmers purchase behaviour

MAJOR FINDINGS OF THE STUDY

1. The average age of the sample farmers was found to be 39 years in the study area and another 38 per cent are under the age group of 31-40 years.
2. The average family size of the respondent farmers was found to be 6 members in the study area.
3. The 49 per cent of sample farmers are medium farmers with average land holding of 5.22 acres.
4. The majority of sample farmers (57.78%) had irrigated land. However, some of the farmers (35.55%) had both irrigated and dry land in the study area.
5. The average experience in farming of the sample farmers was found to be 15.38 years in the study area, majority of sample farmers (51.11 %) had experience ranging from 10 to 20 years in the study area.
6. The average number of crops grown per season by the sample farmers was two crops. Nearly 68 per cent of the sample farmers cultivate two crops per season
7. Nearly 38 per cent of sample farmers incurred Rs. 21,000 to 50,000 on purchase of pesticides in the study area.
8. The 30 per cent of the farmers sprayed pesticides in the range 36 to 45 times per crop per year followed by 26.67 per cent with 26 to 35 times in the study area

9. The average age of the sample retailer traders was found to be 38.07 years, majority 50 per cent of them are belonged to the age group of 31 to 40 years.
10. Forty five per cent of respondent retailers had education upto graduation level in the study area and majority (55%) had undergone diploma in agri-inputs handling.
11. The average experience of retail traders in retailing/dealership is about 7.95 years. All the retailers handing pesticides of which 90 per cent is of own proprietorship.
12. Bayer Crop Science company is having maximum market share in the sale of insecticide brands. However from the point of brands Coragen manufactured by DuPont India Ltd stands first in the market.
13. Bayer Crop Science company is having maximum market share both in the total sale and brand wise in fungicides in the study area.
14. With respect to weedicides Excel Industries Ltd has highest share in the market. However from the point of brand Roundup manufactured by Monsanto India Ltd stands first in the market.
15. Bayer Crop Science company has highest market share of pesticides followed by Syngenta India Ltd, BASF India Ltd and DuPont India Ltd in the study area.
16. The factors influencing the farmer's brand preference of pesticides are quality, brand popularity, price, quality and timely availability of pesticides in the market.

17. Among the most 13 popular brands of insecticides, majority of the sample farmers preferred Coragen followed by Fame, Spintor, Takumi, proclaim and Rogor brands in the study area.
18. Among the most 15 popular brands of fungicides, majority of the sample farmers preferred Sectin followed by Kocide, Curzate, Saaf, and Antracol brands in the study area
19. Among the most 7 popular brands of weedicides, majority of the sample farmers preferred Roundup followed by Lasso, Glycel and Agile brands in the study area
20. The sample farmers are of the view that Dupont India Ltd. conducted more both on field and off field promotional strategies followed by Bayer Crop Science, BASF India Ltd, Indofil Chemicals Comapny and Syngenta India Ltd.
21. Cent per cent respondent farmers are aware of brands of companies like Bayer Crop science, Syngenta India Ltd, Dupont India Ltd and BASF India Ltd.
22. Among the various means of advertisement of pesticides marketing or different strategies followed by the pesticide firms, the dealer influence on farmers, company representative influence on farmers and on farm demonstration stood first, second and third respectively. The other methods like farmers meetings, distribution of literature and fair participation were found to be best methods.

POLICY IMPLICATIONS

1. Chikkaballapura district of Karnataka is the one of intensive pesticide consuming area due to extensive cultivation of vegetables and fruits. Hence potential opportunities exist for pesticides companies to increase their market share by promoting their brands aggressively among farmers.
2. Farmers are using pesticides very frequently without adhering to recommended dosage. As a result they are spending more money on pesticides. Hence there is a need to educate the farmers through publicity or propaganda for the optimal use of pesticides.
3. At present only 55 per cent of the respondent retailers in the study area have completed Diploma in Agri input handling offered by the Agricultural University. This programme may be made as a mandatory course by the government for the retail traders to undertake agri inputs business.
4. At present only top five brands have dominated insecticides, fungicides and weedicides trade in the study area. Hence the minor players with negligible market share need to concentrate on brand building to increase their market share.
5. The business performance of agri input companies mainly depends on quality, brand popularity, competitive price and timely availability of pesticides. The companies need to focus on these issues to increase their share in the market.
6. The retail traders and company representatives play an important role in product sales and promotion. Therefore the companies need to attach more importance in maintaining cordial relationship with the trader and motivating employees of the company to sustain business in the long run.



REFERENCES

CHAPTER VII

REFERENCES

- BAMBAWALE, O.M., 2007, Expanding Dimensions of Plant Protection through Convergence of Chemical, Transgenic and Biological Means, SPS India Foundation Day Lecture, Society of Pesticide Science, India, IARI, New Delhi on November 16, 2007
- BHATTACHARYYA, P. AND PALIWAL, M.K., 1998, Biofertilizer Marketing: A Big Challenge. *Agricultural Marketing*, **12** (3): 14-20.
- BIRADAR, R.D., 1995, Marketing Strategies for Fertilizers. *Indian Journal of Marketing*, **23** (3): 3-6.
- BIRTHAL, P.S., SHARMA, SANT KUMAR AND A. DHANDAPANI, 2003, Pesticide use in Rainfed Cotton. *Agricultural Economic Research Review*, **13**(2): 107-122
- CICIA, G. AND GIUDICE, T.D., 2002, Consumers perception of quality in organic food - A random utility model under preference heterogeneity and choice correlation from rank-orderings. *British Food Journal*, **104**: 200-213.
- DAVE, D., 1988, Can dairy products compete. *Canadian Journal of Agricultural Economics*, **36** (4): 601-611.
- DHILLON, M.K., MIGLANI, S.S. AND SINGH, M.K.B., 1995 Preference place factors associated with purchase of food items and durable goods by rural and urban consumers, *Journal of research*, Punjab Agriculture University, **32** (1): 112-120.
- HENTSCHEL, G., 1991, Sharper competition on European mushroom markets. *Gastebau Magazine*, **38** (10): 4-6.

- KHOOHARO, A.A., MEMON, R.A. AND MALLAH, M.U., 2008, An Empirical Analysis of Pesticide Marketing in Pakistan. *Pakistan Economic and Social Review*, **46** (1): 57-74.
- KUMAR, K., AMBARISH, JORDAN, B.B. AND BARKER TANSU, A., 1987, Made in India, what it means to Indian consumers? *Indian journal of marketing*, **17** (9):26-34.
- KUNNAL, L.B. AND H.G. SHANKARA MARTHY., 1994, Seed market in Karnataka – A market share analysis. *The Bihar Journal of Agricultural Marketing*, **2** (4):51-56.
- MEENAKSHI, V., 1984, Economic Analysis of Pesticides Use by Farmers of Bangalore North Taluk- Karnataka, *M.Sc. (Agri.) thesis* (Unpub.), University of Agricultural Sciences, Bangalore.
- NANDAGOPAL, R. AND CHINNAIYAN, P., 2003, Brand preference of soft drinks in rural Tamil Nadu. *Indian journal of marketing*, **33** (1): 14-17.
- NARANG, R., 2006, A study on branded foods. *Indian journal of marketing*, **36** (11): 3-9.
- RAGAVAN, R., 1994, A study on the consumer response towards franchise vegetable outlets – A case of just picked. *M.Sc. (Agri.) Thesis*, Tamil Nadu Agric. Univ., Coimbatore
- RAMASAMY, K., KALAIVANAN, G. AND SUKUMAR, S., 2005, Consumer behaviour towards instant food products. *Indian journal of marketing*, **24** (2-3): 55-59.
- RENU, K., 1986, Sales promotion techniques. *Indian Journal of marketing*, **16** (10): 3-8

- SHANKARAMURTHY, H.G., 1986, Performance of the Karnataka State Co-operative Marketing Federation Ltd. and its impact on farm market-An Economic Analysis. *Ph.D. Thesis*, (Unpub.), Andhra Pradesh Agricultural University, Hyderabad.
- SHAW, A. MATHUR and MALHOTRA, N.N., 1993, A study of consumer attitudes towards processed foods. *Indian food packer*, 29-41.
- SHIVAKUMAR, S. D., 1994, Buying behavior of farmers with reference to pesticides- An analysis. *Indian Journal of Agricultural Marketing*, **8** (1): 126-128.
- SINGH, O.P., 2005, Consumption Pattern of Insecticides in Helicoverpa armigera Management in India, Recent Advances in Helicoverpa Management, Indian Society of Pulses Research and Development, IPR, Kanpur, pp. 17-24.
- UDAYA, P., 2002, Pesticides Marketing in Karnataka. *M.Sc. (Agri) Thesis* (Unpub.), University of Agricultural Sciences, Dharwad.
- VARSHNEY, J.G., 2009, Crop Care, **35** (1), 2009.
- VENKATESWARAN P.S., ANANTHI, N. AND BINITH MUTHUKRISHNAN, 2011, A study on consumer's brand preference of selective household brand at Dindigul, Tamil Nadu, *Indian journal of marketing*, **41**(10).
- VINCENT, N., 2006, A study on brand consciousness among children and its effect on family buying behaviour in Bangalore city. *Indian journal of marketing*, **36** (1): 12-18.

WANDEL, M., 1995, The study factors influencing the consumption of fruits, vegetables and potatoes among consumers in Norway, *Research paper*, National Institute for Consumer Research.

WEBER, M., 2008, Management of brands - the new challenge for the apple industry. *Obst und Weinbau, Wadenswil, Switzerland*, **144** (3): 11-14.

YELADAHALLI, R.A., 1991, Agricultural input marketing in Karnataka-A sectorial analysis *Ph.D. Thesis* (Unpub.), University of Agricultural Sciences, Dharwad.

Agriculture Statistics at a Glance-2010.

Credit Analysis & Research Limited, 2010.

Department of Chemicals and Petrochemicals, 2010.

E.I.D - Parry India Limited, Investor Presentation, November 2011.

Federation of Farmers Associations: real facts about Indian agriculture - 2009.

General agriculture by Muniraj Singh Rathore, 2012.

www.pesticideassociation.com.

www.rallis.co.in.