A STUDY ON BRAND PREFERENCE OF PESTICIDES USED IN TOMATO PRODUCTION IN KOLAR TALUK

SAMPATHKUMAR, B. N.

MBAL 2021

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

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Project Report submitted to the

University of Agricultural Sciences, Bengaluru

in partial fulfillment of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

(Agribusiness Management)

BENGALURU **JULY, 2014**

Affectionately dedicated to

My beloved parents, Sisters & my guide

DEPARTMENT OF AGRICULTURAL MARKETING, CO-OPERATION AND BUSINESS MANAGEMENT
UNIVERSITY OF AGRICULTURAL SCIENCES
GKVK CAMPUS, BENGALURU – 560 065

CERTIFICATE

This is to certify that the Project work entitled **"A STUDY ON BRAND PREFERENCE OF PESTICIDES USED IN TOMATO PRODUCTION IN KOLAR TALUK"** submitted by **Mr. SAMPATHKUMAR, B. N. MBAL 2021,** in partial fulfillment of the requirements for the degree of **MASTER OF BUSINESS ADMINISTRATION (Agribusiness Management)** to the University of Agricultural Sciences, GKVK, Bengaluru, is a record of bonafide research work carried out by him during the period of his study in this University under my guidance and supervision, and the project work has not previously formed the basis for the award of any other degree, diploma, associateship, fellowship or other similar titles.

Bengaluru
July, 2014

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Major Advisor

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4. **(H. K. RAMAPPA)**

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Bengaluru

July2014 ***(SAMPATHKUMAR, B. N.)***

A STUDY ON BRAND PREFERENCE OF PESTICIDES USED IN TOMATO PRODUCTION IN KOLAR TALUK

SAMPATHKUMAR B N

ABSTRACT

Branding of commodities and product differentiation has grown leafs and bounds. The branding of agri-inputs in India dates back to green revolution era and brand name influences purchase decision. The objectives of the study were to analyze pesticides brand awareness, brand and retail shop preference by tomato growers. Data was collected from ninety growers and ten retailers of agri–inputs. Data was analyzed by using tabular analysis and garret's ranking technique. Insecticide brand awareness ranges from seventy-two to ninety-seven per cent. The awareness about selected fungicides was more than ninety-one per cent. Brand with least awareness was sixty-seven per cent. Four brands of pesticides were preferred by cent percent. Two brands were preferred by Eighty eight per cent and eighty two per cent of farmers. The least preferred brand of pesticide was Pegasus (55%). The important reasons for preferring particular brand were retailer's suggestion and effective control of diseases. Factors influencing the choice of retailers were fellow farmer's recommendation, non-spurious products and availability of other agricultural inputs, which are ranked first, second and third with the mean scores of sixty eight, fifty seven and fifty six per cent. The pesticides companies should stress on brand building aggressively and target for positive word of mouth spread by the per cent users. The pesticides retailers advice was one of the major factors influencing the preference of brand. The manufacturing companies should integrate the retailers in brand promotion to influence the farmers brand preference.

(Sampathkumar B N)	**(T. N. Venkata Reddy)**
Signature of student	Signature of the Major Advisor

ಟೊಮ್ಯಾಟೊ ಉತ್ಪಾದನೆಯಲ್ಲಿ ಬಳಸುವ ಕೀಟನಾಶಕಗಳ ಬ್ರಾಂಡ್‌ಗಳ ಆಯ್ಕೆ– ಕೋಲಾರ ತಾಲ್ಲೂಕಿನಲ್ಲಿ ಒಂದು ಅಧ್ಯಯನ.

ಸಂಪತ್‌ಕುಮಾರ, ಬಿ. ಎನ್.,

ಸಾರಾಂಶ

ಪದಾರ್ಥಗಳ ಬ್ರಾಂಡೀಕರಣ ಇತ್ತೀಚೆಗೆ ಹೆಚ್ಚಿನ ಪ್ರಾಮುಖ್ಯತೆಯನ್ನು ಪಡೆಯುತ್ತಿದೆ. ವಸ್ತುಗಳ ಖರೀದಿಯ ಮೇಲೆ ಬ್ರಾಂಡ್‌ನ ಪರಿಣಾಮ ಇರುತ್ತದೆ. ಪ್ರಸ್ತುತ ಅಧ್ಯಯನದ ಮುಖ್ಯ ಉದ್ದೇಶಗಳೆಂದರೆ ಟೊಮ್ಯಾಟೊ ಬೆಳೆಗಾರರಲ್ಲಿ ಕೀಟನಾಶಕ ಬ್ರಾಂಡ್‌ಗಳ ಅರಿವು, ಕೀಟನಾಶಕ ಬ್ರಾಂಡ್ ಮತ್ತು ಚಿಲ್ಲರೆ ಅಂಗಡಿ ಆಯ್ಕೆ ಪದ್ಧತಿಗಳಾಗಿವೆ. ತೊಂಬತ್ತು ಜನ ಟೊಮ್ಯಾಟೊ ಬೆಳೆಯುವ ರೈತರಿಂದ ಹಾಗೂ ಹತ್ತು ಜನ ಕೀಟನಾಶಕಗಳ ಚಿಲ್ಲರೆ ಮಾರಾಟಗಾರರಿಂದ ಮಾಹಿತಿಯನ್ನು ಪಡೆಯಲಾಯಿತು. ಮಾಹಿತಿಯನ್ನು ಗ್ಯಾರೆಟ ಶ್ರೇಣಿಯ ತಂತ್ರ ಮತ್ತು ಸಾಮಾನ್ಯ ಕೋಷ್ಟಕಗಳನ್ನು ಬಳಸಲಾಗಿದೆ.

ಆಯ್ದ ನಾಲ್ಕು ಕೀಟನಾಶಕ ಬ್ರಾಂಡ್‌ಗಳ ಬಗ್ಗೆ ಶೇಕಡ ತೊಂಬತ್ತೊಂಬತ್ತಕ್ಕಿಂತ ಹೆಚ್ಚಿನ ಜನರಲ್ಲಿ ಅರಿವು ಇರುವ ಒಂದು ಬ್ರಾಂಡ್ ಪೆಗಸ್ಸಿಸ್ (ಶೇ. ೬೫) ನೂರಕ್ಕೆ ನೂರರಷ್ಟು ರೈತರು ನಾಲ್ಕು ಬ್ರಾಂಡ್ ಗಳನ್ನು ಮೆಚ್ಚುಗೆ ಪಡೆದಿರುವುದು ಕಂಡು ಬಂದಿದೆ. ಶೇಕಡ ಎಂಬತ್ತೆರಡರಿಂದ ಎಂಬತ್ತೆಂಟರಷ್ಟು ರೈತರು ಮೆಚ್ಚುಗೆ ಪಡೆದಿರುವುದು ಕಂಡುಬಂದಿದೆ. ಅತೀ ಕಡಿಮೆ ರೈತರು (ಶೇ.೩೫) ಮೆಚ್ಚುಗೆಯನ್ನು ಪಡೆದ ಬ್ರಾಂಡೆಂದರೆ ಪೆಗಸ್ಸಿಸ್. ಆಯ್ದ ಬ್ರಾಂಡ್‌ಗಳನ್ನೆ ಖರೀದಿಸಲು ಮುಖ್ಯವಾದ ಕಾರಣಗಳೆಂದರೆ ಚಿಲ್ಲರೆ ಅಂಗಡಿಯವನ ಸಲಹೆ ಮತ್ತು ರೋಗ ಹತೋಟಿಯ ಶಕ್ತಿ ಆಗಿದೆ. ನಿರ್ದ್ದಿಷ್ಟ ಚಿಲ್ಲರೆ ಅಂಗಡಿಯನ್ನು ಆಯ್ದುಕೊಳ್ಳಲು ಮುಖ್ಯ ಕಾರಣಗಳೆಂದರೆ ಇತರೆ ರೈತರ ಸಲಹೆ (ಮೊದಲ ಶ್ರೇಣಿ ಶೇ. ೬೮) ಗುಣಮಟ್ಟದ ಕೀಟನಾಶಕಗಳ ಲಭ್ಯತೆ (ಎರಡನೆ ಶ್ರೇಣಿ ಶೇ. ೫೭) ಮತ್ತು ಅಂಗಡಿಯಲ್ಲಿ ಇತರೆ ಕೃಷಿ ಸಲಕರಣೆಗಳ ಲಭ್ಯತೆ ಇರುವುದು (ಮೂರನೆ ಶ್ರೇಣಿ ಶೇ. ೫೬) ಕಂಡುಬಂದಿದೆ. ಕೀಟನಾಶಕ ಸಂಸ್ಥೆಗಳು ಪ್ರಬಲವಾದ ಬ್ರಾಂಡನ್ನು ಕಟ್ಟಿ ಆಕ್ರಮಣಕಾರಿಯಾಗಿ ಉತ್ತೇಜನ ಕೊಡಬೇಕಾಗಿದೆ. ರೈತಾಪಿ ಜನಾಂಗದಲ್ಲಿ ಬ್ರಾಂಡಿನ ಬಗ್ಗೆ ಮನೆ ಮಾತಾಗಿ ಪ್ರೋತ್ಸಾಹ ಕೊಡುವುದು. ಕೀಟನಾಶಕ ಸಂಸ್ಥೆಗಳ ಚಿಲ್ಲರೆ ಮಾರಾಟಗಾರರನ್ನು ವ್ಯಾಪಾರದ ಒಂದು ಅಂಗ ಎಂದು ಪರಿಗಣಿಸಿ ಅವರ ಮುಖಾಂತರ ಖರೀದಿಯ ಮೇಲೆ ಪರಿಣಾಮ ಮಾಡುವುದಾಗಿದೆ.

ವಿದ್ಯಾರ್ಥಿಯ ಸಹಿ	ಪ್ರಧಾನ ಮಾರ್ಗದರ್ಶಿಗಳು
ಸಂಪತ್‌ಕುಮಾರ, ಬಿ. ಎನ್.	**(ಟಿ. ಎನ್. ವೆಂಕಟರೆಡ್ಡಿ)**

A STUDY ON BRAND PREFERENCE OF PESTICIDES USED IN TOMATO PRODUCTION IN KOLAR TALUK

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Introduction

Tomato belongs to the Solanaceae family. The cultivated tomato was brought to Europe by the Spanish conquistadors in the sixteenth century and later introduced from Europe to southern and eastern Asia, Africa and the Middle East in India. chemical fertilizers and pesticides played an important role in the "Green Revolution" during the 1960s and 1970s.

India is one of the most dynamic generic pesticide manufacturers in the World, with more than 60 technical grade pesticides being manufactured indigenously by 125 producers consisting of large and medium scale enterprises including about 10 MNC's. India is the fourth largest producer of agrochemicals after USA, Japan and China. The agrochemicals market in India was Rs. 4,500 crores during 2009-10. Brand proliferation of pesticides was emerged in the recent past. The tomato growers are greatly confused or even not aware of different brands. In the light of this scenario the present study was initiated with specific objectives.

Objectives

1. To analyze the pesticide brands awareness among tomato growers.
2. To analyze the tomato growers brand preference for pesticides.
3. To study the tomato growers preferences for pesticide retail shop and reasons for choice.

Methodology

Kolar taluk was selected for the study on brand preference of pesticides used in tomato production, because it is one of the important tomato growing taluk in the district. Primary data was collected from 80 farmers and 10 retail shops. The secondary data regarding pesticide sales for the year 2012-2013 were collected from company sales executives. The data regarding cropping pattern and number of retailers in the taluk were collected from Department of Agriculture, GOK.

- The tabular analysis was used to analyse the market share and the number of brands available in the area.

- Garrett's ranking technique was used to rank the factors influencing farmer's brand preference of pesticides and promotional activities that influenced on farmers in pesticide marketing.

Results

✓ More than 90% of the sample farmers are aware of different brands of insecticides which are applied in tomato production. Similar trend is noticed in the awareness of fungicides of tomato growers. (fig : 1 & 2)

✓Cent per cent of the respondents preferred the market leader brands like Confidor, Coragen, Actra and Saaf the brands. (Fig : 3)

The preference for other brands of pesticides ranges from 52%-88% of the respondents.

✓ More than 80% of the respondents preferred specific retail outlet for purchase of pesticides and insecticides.

✓ More than 2/3 of the farmer prefers particular retail shop as it was recommended by fellow farmers followed by assured quality of the product in the shop (57 %). (Table-1)

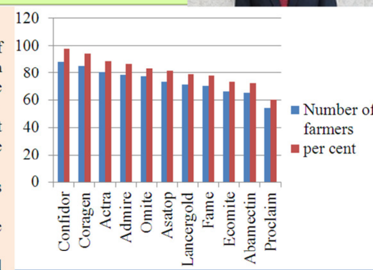

Fig.1: Awareness about insecticides applied in tomato production in Kolar taluk.

Table 1 Reasons for preferring particular pesticide retail shop. (Garrett's ranking)

Sl. NO	Attributes	Mean score	Rank
1.	Fellow farmers recommended buying from the shop	68.73	I
2.	No duplicate/Spurious products	56.97	II
3.	Retailer also sells other agricultural inputs	56.38	III
4.	Retailer will come to the help in case of in effectiveness of pesticides	55.81	IV
5.	Seedling nursery man recommended	55.78	V
6.	Horticulture or agriculture department personnel recommended	50.80	VI
7.	Credit is given	48.56	VII
8.	Wide product range available	44.04	VIII
9.	Wide brand range	42.07	IX
10.	Shop is in convenient place and nearest	24.62	X

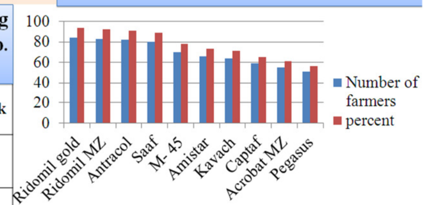

Fig.2: Awareness about fungicides applied in tomato production in Kolar taluk .

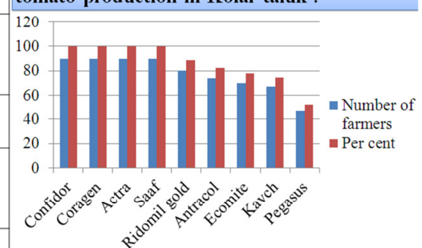

Fig.3: Brands of pesticides preferred by tomato growers in Kolar taluk.

Discussion

✓ The high degree of awareness among the respondents about insecticides and fungicides may be due to huge area under tomato in the Kolar district and the presence of major pesticides and fungicides companies in production belt.

✓ The other major reason for high degree of awareness was promotional activities taken in by the companies.

✓ Cent per cent farmer's preference for selected brands was due to the long presence of these brands in the market and their leadership and effective controlling of pests and diseases.

✓The store loyalty to purchase agri inputs is influenced by various factors like credit sales, social factors and popular image of the retailer.

Summary

- High degree of brand awareness of pesticides by tomato cultivator's exists.
- Strong degree of brand preference of pesticides was noticed.
- High degree of store loyalty to purchase pesticide was observed.

Recommendations

- Companies to enter the business of pesticides for tomato crop should promote brands to create awareness leading to brand preference.
- The retailers dealing with pesticides should build confidence and establish personnel relationship with the farmers for developing store loyalty.

Advisory committee

Chairman: Mr. T. N. Venkatareddy

Members.: Dr. G. N. Nagaraja

Mr. P. V. Ramegowda

Dr. H. K. Ramappa

Dr. B. M. Shashidhara

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I INTRODUCTION

India is predominantly an agrarian economy with nearly 70 percent of the people depending on agriculture and around 65 per cent of the population living in rural areas. Agriculture sector contributed nearly 12 per cent of our gross domestic product (GDP) during the year 2012-2014. In order to meet the ever-increasing demand for food and fodder, efficient management of inputs like high yielding variety seeds, irrigation, fertilizers and crop protection chemicals, are important. In the absence of recommended usage of chemicals, the positive effects of these inputs get nullified if there is severe attack of pests and diseases on the crop. Therefore, pesticides act as a protective umbrella for the other inputs and they play in important role in crop production (Brithal *et al.*2003).

Tomato belongs to the Solanaceae family and this family also includes other well-known crop species, such as potato, tobacco, pepper and eggplant (aubergine).Tomato has its origin in the South American Andes. Tomato has been used as food by the inhabitants of central and South America since pre- historic times. It originally came from Peru to tropical Mexico. Tomato was introduced into Europe by the Spanish explorers in the early 16th century. When it was introduced into Europe it was known as "Golden Apple" or "Love Apple". Among Vegetables, tomato occupies the world's largest area under cultivation after potato and sweet potato but it tops among the list of canned vegetables. In India, tomato has become a very popular vegetable especially during the last 30 to 40 years.

The fruit is available in the market round the year. The fruit contain (94%) moisture. Tomato fruit is rich in vitamin A and C. It is extensively used in culinary preparations like Soups, Pickles, Ketchups, Sauces, Juices and Chutneys. Tomato is also used as a vegetable, it is used regularly along with other vegetables and it constitutes a good part of human diet. It is said to have certain medicinal values and is recommended in the diet of the patients suffering from skin diseases, night-blindness and stunted growth.

There are several diseases on tomato caused by fungi, bacteria, viruses, nematodes and abiotic factors. Among the fungal diseases, early blight also known as target spot disease incited by *Alternaria solani* (Ellis and Martin) Jones and Grout is one of the world's most catastrophic disease. The causal organism is air borne also survive in soil and is responsible for early blight and fruit rot of tomato. The disease appears on leaves, stems, petiole, twig and fruits under favorable conditions resulting in defoliation, drying off twigs and premature fruit drop and thus causing loss from50 to 86 percent in fruit yield. Late blight is a pandemic disease in world it causes up to 100 per cent yield loss

Importance of tomato

Tomato is the world's largest vegetable crop and known as protective food because of its special nutritive value and its wide spread production. Tomato is one of the most important vegetable crops cultivated for its fleshy fruits. Tomato is considered as important commercial and dietary vegetable crop. Tomato is protective supplementary food. As it is short duration crop and gives high yield, it is important from economic point of view and hence area under its cultivation is increasing day by day. Tomato is rich source of minerals, vitamins and organic acid, essential amino acids and dietary fibers.

China is the largest producer of tomato and United States leads in the productivity. India stands second in terms of the total area under tomato accounts for 13.11 per cent, but with the share of 9.12 per cent, it stands third in the production.

In the country scenario during the year 2010, Orissa stands first in terms of total area under cultivation (16.22%), followed by Andhra Pradesh (13.71%) and West Bengal (8.43%). Andhra Pradesh stands first in production (13.28%) followed by Karnataka (12.70%) and Orissa (11.21%). (WWW.nhb.gov.in)

During 2008-09, Kolar District contributed to 14.38 per cent of the State's total area under tomato. However, it accounts for 24.78 per cent of State's total tomato production. Productivity of tomato in Kolar District is 1.72 times more than State's productivity and about 3 times more than country's productivity.

History of brands

Brands are not new to marketing. Historically, the concept of brand was first used by the ancient Egyptian brick-makers who drew symbols on bricks for identification. Other examples of the use of brands were found in Greek and Roman times; at this time, due to illiteracy shopkeepers identified their shops using symbols. Moreover, in the middle Ages, craftsmen marked their goods with stamps as a trademark by which to differentiate their skills. The next milestone of brand evolved in North America with the growth of cattle farming as a kind of legal protection, proof of ownership and quality signals.

Brand preference

Agrochemicals: "Dawai" as the farmers call it, had a very limited brand preference and their awareness was very limited in terms of brands and Companies. We were surprised to note that farmers had no preference for a particular product and dealers/retailers could easily influence his pattern of buying pesticides. Regional agrochemicals companies like GSP Crop Science, Chemet Chemicals and Excel Crop Care dominated the Surat belt, while leading Companies like Bayer Crop, Rallis India and Syngenta were conspicuously absent. Among Pan-India players, we could see products of PI Industries and United Phosphorus (UPL) being sold in most of the depots. Another noticeable Observation was that agrochemicals sales are done mostly on credit and a farmer pays back at the end of season from the proceeds of his crop produce.

Brand preference in FMCG

More and more consumers in India now prefer to go for branded products, with 82 per cent of them looking at brands as aspirational symbols and improved standard of living, according to a recent study. About 82 per cent consumers in Indian are increasingly expecting brands to enhance personal well-being as brands become aspirational symbols of their improved standard of living. The global average is 70 per cent while Asia's average is 77 per cent.

Many people in India, however, tend to believe that overall intentions of brands are a bit skeptical communication creating huge opportunities for brands to make a real, tangible meaningful difference, the study said. The India findings high light deep customer involvement with brands. Meaningful today is real business, delivering what matters when, in the truest economic and social sense.

History of pesticide development

The earliest record of the use of insecticides dates back to back the writings of Greeks and Chinese. A.D. Pliny in his writings has briefly mentioned several pesticides, including arsenicals. The era of pesticide has been divided into following major periods.

a) Era of natural products

From time immemorial until the beginning of 19^{th} century, Arsenicals, Petroleum oils, Soaps and Botanicals were used. Among botanicals, Pyrethrum was introduced in the year 1818 in Europe from Persia. Erasmus Darwin recommended use of Tobacco juice in 1763.

b) Era of fumigants, inorganic and petroleum products

The period between 1854-1939 can be termed as Pre-Dichloro Diphenyl Trichloroethane (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.

C) 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, Toxaphonecame to market by the end of 1948. All these pesticides are neurotoxin in nature.

d) Organophosphate period

Parathion and Malthionare common products invented in Germany in 1945. Similarly, Diazinon was invented in Switzerland. Others like, Dichlorovas, Phorate, Dimeton, etc were proved as effective pesticides.

e) Carbamate period

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

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.)
- Neonicotindes (e.g. Imadacloprid, Thimethxam, etc.)

Pesticides during ancient period

In the ancient period, there were records of pest control through the plant origin extracts 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 chilly extract to control some beetles and aphids. Use of ash as a dust and neem oil and pongamia oil was also common.

Entry of chemical pesticides to Indian market

The acute food shortage during Bengal famine of 1943 (Famine Commission-1945) was mainly due to rice blight disease. The Commission suggested the establishment of comprehensive organization for effective control of pests and diseases. Based on this Commission’s recommendation during May 1946, The Directorate of plant protection, Quarantine and storage (Directorate of PPQ&S) was established in Faridabad.

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 co-operation with State Governments Implements 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.

Global Scenario of Pesticides

Global pesticide industry continues to find growth opportunities after a tough 2009 during which the pesticide market declined. The $45 billion global pesticides industry is expected to recover and register modest growth. However, a difficult pricing environment and market maturity will substantially limit gains especially for some of the most widely use 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 Canadian municipalities. The same sluggishness is expected for the large, developed Japanese market. However, many countries in the Asia/Pacific region are projected to post strong growth. Above –average growth in agricultural output in China, Indonesia and Thailand, for example, 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 market for synthetic pesticides. Regulatory considerations continue to reshape the market. Regularly 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 begins 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's consumer and agricultural products are based. The US, Western Europe, Japan and a few other areas have the most stringent regulatory requirements for pesticides. However, nearly every country has some sort of regulatory framework in place that governs which pesticides can be used in specific applications.

Production of pesticides in India

The production of pesticides in India started from 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. Until 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, was 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, EU-600 chemicals, Vietnam-432 chemicals and Indonesia-341 chemicals respectively. (Federation of Farmers Associations: real facts about Indian agriculture-2009).

As on March 2010, the total installed capacity of pesticide production in India was 2,72,600 MT. The decline in capacity utilization was mainly due to the ban on high dosage pesticides (DDT, BHC, etc.) for use in agricultural crop production. The other reason was due to the entry of high efficiently 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 in Asia and twelfth largest in the world, with over 304 million acres under crop cultivation.

Utilization/application of pesticides in India

The consumption of pesticides in India was one of the lowest at 0.032 kg/ha during 1954-55. During 1966, the year of 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 550gms in 2003-04 which was barely above the African countries' consumption.

In India, the consumption of pesticides is concentrated on three crops namely, cotton, paddy and chilly accounting for more than 70 percent of the total consumption (Brithal, 2003) India's total consumption of pesticides during 1990-91 was 75,033 MT, whereas during 1990-2000 it was only 46,195 MT. This was mainly due to the penetration of potent molecules, which required lower quantity per application and less number of applications. Some of the lowest dosage chemicals in market are; chloromiron ethane (Almex®) at 8g/ac, thiomethaxone (Astra®) requiring 40 g/ac and Acetamiprid (Pride®) at 20g/ac. In India, the insecticides account for major share (73.40%) followed by fungicides with 18.05 per cent, weedicides (4.70%) and rodenticides (3.30%). On the contrary, the global pesticides consumption revealed that, herbicides accounted for the major share to the tune of 45 per cent, followed by insecticides (30%), fungicides (20%) and others (5%). 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 (Joshi, 2002).

The highest pesticide application per hectare in the World is in Japan, to tune of 10.70kgs and the other important high pesticides consuming countries are North Korea

(6.60kgs), Europe (5.30kgs), USA (3.50kgs), China (0.68kgs), Indonesia (0.60kgs) and Thiland (1.40kgs). However, in terms of total pesticide consumption, Europe accounts for the highest (32%), followed by USA (20%), Asia (12%) and others (36%) during 2003-04.

The main yield-limiting factors in most parts of the World are insect pests, diseases and weeds. A significant proportion of the potential agricultural production is lost due to pests. Reliable estimates of crop loss, however, are scarce. Amongst the best-documented information, Okere et al. (1995) estimated 42 per cent loss in the global output due to insect pests, diseases and weeds, despite use of various plant protection chemicals. Similar observations have been made by who estimated 40 percent pre-harvest production loss and post-harvest in higher in the Asian countries. In India, the pre-harvest production loss due to insect's pests is estimated to 25per cent for rice, 5 to 10 percent for wheat and 30 percent for pulses (Dhaliwal and Arora, 1993). For cotton, rapeseed-mustard and sugarcane, the loss is estimated to be around 50, 35, and 20 per cent, respectively.

The British Protection Council (Sankari, 1996) has estimated that world weeds take 10 per cent of potential yield, diseases 12 per cent, field pests 14 per cent, pests and diseases in store 14 per cent. The annual loss of agricultural production due to this in India is estimated at Rs 20,000 crores. Even, if part of 50 per cent of the potential loss is salvaged, it can make an immense difference to our economy. The cost benefit ratio of pest control work is 1:4. The investment in pesticides is generally not for increasing yield but for minimizing losses.

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

Need pesticides

Today's modern agriculture produces plentiful food, at a reasonable price, all over the last 60 years, farmers and growers have changed the way they produce food in order to meet the expectations of consumers, supermarkets and Governments. In doing so, they have made many changes to the existing production technologies. This often includes the use of pesticides. Farmers use pesticides to

- Protect crops during their growth from insect pests, weeds and diseases.
- Prevent rats, mice, flies and other insects from contaminating foods whiles they are being stored.

- Safeguard human health, by stopping food crops being contaminated by post-harvest and disease causing agents.

However, as pesticides are used to kill unwanted pests, weeds and pathogenic agent, they can also harm people, wildlife and the environment. This is why there are strict regulatory system controls in place over their sale and use. It is up to everyone who is involved with pesticides, whether they are farmers, professional growers or gardeners, to ensure that they are used safely and effectively.

Pesticides industry

India is one of the most dynamic generic pesticide manufacturers in the World, with more than 60 technical grade pesticides being manufactured indigenously by 125 producers consisting of large and medium scale enterprises (including about 10 multinational companies) and more than 500 pesticide formulators spread over the country. India is the fourth largest producer of agrochemicals after USA, Japan and China. The agrochemicals market in India was Rs. 4,500 crores during 2009-10.

The Government is promoting research on the use of alternative and safe pesticides using neem seeds. The department of chemicals and petrochemicals are undertaking a country programme entitled "development and production of neem products as environment friendly pesticides" with the financial assistance of United Nations Development Programme (UNDP).

The present study was undertaken with overall objective of assessing the pesticide brand awareness, pesticide brand preference, reasons for preferring the particular pesticide brand, and choice for retail shop. The present study was taken up with the following specific objectives.

Objectives

1. To analyze the pesticide brands awareness among Tomato growers,

2. To analyze the Tomato growers Brand preference for pesticides and

3. To study the tomato growers preferences for pesticide Retail Shop and Reasons for Choice.

Hypotheses

1. Tomato growers are not aware of complete range of brands,
2. Tomato growers have no brand loyalty and
3. Tomato growers are loyal to specific pesticide retailer.

Limitations of the study

The study is based on both primary as well as secondary data. 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 basis. The study area was limited to Kolar taluk and the findings may not be appropriate to other markets, as vast difference exists with regard to demographic and psychographic characteristics. Hence, the findings of the study are limited to these constraints.

Organizations of the study

The study has been organized in to seven 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 pesticide Objective significant of the study.
Chapter II	Pertains to 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 through tables
Chapter V	Deals with the interpretation and discussion of result.
Chapter VI	Summarizes the major findings of the study and policy implications
Chapter VII	Reference chapter provides the list of literature referred for the present study.

II REVIEW OF LITERATURE

A review of research work done earlier pertaining to the present study has been presented below. Studies conducted on Brand preference of pesticides used in tomato production .Studies pertaining to pesticide brand awareness, pesticide brand preference, reasons for preferring the particular pesticide brand, and choice for retail shop have been reviewed and presented under the following headings.

2.1 Pesticide brands awareness among Tomato growers.
2.2 Tomato growers Brand preference for pesticides.
2.3 Tomato grower's preferences for pesticide Retail Shop and Reasons for Choice.

2.1 Pesticide brands awareness among Tomato growers.

Aaker (2000) studied in the free press New York opined that brand awareness was remarkably durable and sustainable asset. It provides a sense of familiarity especially in low- involvement products such as soaps, a sense of presence or commitment and substance and it was very important to recall at the time of purchasing process. Apart from the conventional mass media, there were other effective means to create awareness *viz.*, event promotions, publicity, sampling and other attention getting approaches.

Chen (2001) expressed a different thought on brand awareness that it was a necessary asset but not sufficient for building strong brand equity. In this view, a brand could be well known because it had bad quality.

Hoyer and Brown (2004) explained in is study that the core of brand equity lies in the construct of brand awareness. Brand equity occurs when the consumer has a high level of awareness and familiarity with the brand and holds some strong, favorable and unique associations in memory. In low investment decision setting brand awareness is just adequate leading to purchase. Thus, when perceived quality differences exist among competing brands, consumers may pay a price for employing simple choice heuristics such as brand awareness in the interest of economizing time and effort.

Srivastava (2008) provided detailed information about the growth of retailing industry in India. She examined the growing awareness and brand consciousness among people across different classes in India and how the urban and semi-urban retail markets are witnessing significant growth.

Christian Homburg *et al., in (2010)*In Business-to-Business (B2B) environments, many firms focus their branding activities on the dissemination of their brand name and logo without developing a more comprehensive brand identity. Thus, the creation of brand awareness is an important goal in many B2B branding strategies. However, it is still unclear if the great investment necessary to build a high level of brand awareness really pays off in business markets. Therefore, drawing on information economics theory, this paper investigates under which conditions brand awareness is associated with market performance in a B2B context. Results from a cross-industry study of more than 300 B2B firms show that brand awareness significantly drives market performance. This link is moderated by market characteristics (product homogeneity and technological turbulence) and typical characteristics of organizational buyers (buying center heterogeneity and time pressure in the buying process).

Anupam Jain *et al., (2012)* in their study in Garhwali of Uttarakhanda on brand awareness in rural area and to study the interest of consumers in branded products of Fast Moving Consumer Goods (FMCG), found that the brand awareness is showing increasing tendency everywhere and Garhwali Region of Uttarakhanda State is not an exception to it.

Sweety Gupta *et al.,*(2013) reported thatthe brand awareness is showing increasing trend everywhere and Jagraon Region of Punjab State is not an exception to it. To examine the validity of this general statement that is being discussed day in and day out by the researcher, market managers, producers, consumers, advertisers, etc., Research Paper on brand awareness in rural area on Daily Consumption Goods in Jagraon Region of Punjabis taken up. The paper throws light on behavior of rural consumers regarding brands of daily consuming goods.

2.2 Tomato growers Brand preference for pesticides.

Shaw *et al.,*(1993) studied the consumption pattern of processed 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 house wife as it made cooking simple and save 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.

Singh *et al.,* (1995) studied in Hissar city is considered factors namely quality, availability, convenient pack size, flavor, colour, freshness and mode of payment to study the preference for a particular brand of milk. The 70 per cent of the respondent prefer branded milk.

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 particular brand of product.

Sampathkumar (2003) studied about brand preference in soft drinks in Telangana region of Andra Pradesh. He found that in rural market about 37.5 per cent of consumers preferred Thumbs-up (urban 30%), followed by Coco cola (28.5%) (Urban 7.5%), Pepsi 12.5 per cent (urban 9%), Limca 4 per cent urban 8.5 per cent. Most of the urban consumers 67 per cent purchased soft drinks in nearest kirani stores rural 73per cent followed by super bazaar 27 percent, rural 26 per cent and others 6 per cent, rural 1 per cent. The method of physical distribution played very vital role in company's success and failure in the market. Transportation is among the major functions of physical distribution transport adds time and place utility for the product.

Ramasamy *et al.,* (2005) studied consumer behavior 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 purchased were suggested to increase rates.

Vincent (2006) studied in Bangalore city, 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 money 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 produce.

Venkateswaran *et al.,* (2011) examined the brand preference of selective household article brands at Dindigul, Tamil Nadu. The study observed that influencing the tendency of customers to prefer a particular brand, the market variables like advertisement, quality of product, brand name and image plays important role. Therefore, a market must understand how consumer made the purchase decision of the brand.

2.4 Tomato grower's preferences for pesticide Retail Shop and Reasons for Choice.

Sivakumar *et al.,*(1994) analyzed buying behavior of farmers with respect to pesticides in the Tamil Nadu with the special reference of the factors influencing loyalty of farmers towards dealers and brands. Friends, neighbors and relatives were major source of information on dealers. In case of brands it was extension personnel of department of agriculture, the price quality and advertisements about the brand contributed significantly to brand loyalty. Credited availability, advertisements and price of products available with dealer contributed significantly to brand loyalty. Credit availability, advertisements and price of products available with dealer contributed significantly to dealer's loyalty.

Padmanaban (1999) conducted study on brand loyalty, which revealed that the price of the preferred brand and efficiency of preferred brand as well as influence advertisement significantly influenced the brand loyalty. Only when the price of a particular brand is competitively lower to price of other brand in the market the farmers would naturally prefer to low brand, otherwise farmer would naturally continue to purchase the same brand.

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

Topcu and Uzundumlu (2009) studied with the aim of determining the salient factors affecting customer retailer loyalty in Turkey. The results showed that satisfaction with the product and store image in cluster 1, satisfaction with the sales process and perceived service quality in cluster 2, and variety seeking in Cluster 3 were the most prominent retailer attributes that affected consumer retailer loyalty.

Nezakati *et al.,* (2001) conducted the study with the aim of examine how the respondents perception will be influenced by factors of Malaysian customer loyalty and made innovative change to keep track towards preferred fast food restaurants. The findings of this study indicated that product quality, customer satisfaction and brand trust is the dominant variable that drives the customer loyalty to preferred fast restaurants.

Schwarzova and Stojarova (2011) analyzed the customers in the agricultural machinery market and their loyalty to each brand in the Czech Republic. The result found that loyalty for just one brand in the agricultural machinery market. For John Deere brand, there was proven the loyalty-subjects perceiving the mark as the best in the market, also buying it the results can help for our future analyses to understand factors influencing the market and analyses of each brand, and how their strategy in the market is conformed to the subject perception and behavior.

Yun *et al.,* (2012) investigated the influence of expectations and evaluation of functional and social attributes on Indian consumers food retail loyalty. Structural equation modeling results indicate that social self-congruity is an important determinant of food store patronage in India. Food assortment and services are critical drivers of supermarket loyalty, whereas relative advantage is the only determinant of store lead to increased store commitment and perception of greater relative advantage for traditional retail shoppers, whereas positive store experiences increase switching costs for supermarket customers.

Chrysochou *et al.,* (2012) examined the role of quality assurance labels as drivers of customer's loyalty in the case of traditional food products in France. More specifically, it investigates whether quality assurance labels, such as the Designation of Origin Labels (DOLs), perform as better drivers of loyalty in comparison to other brand-related attributes, such as price and brand type, and if brands carrying a designation of origin labels exhibit higher loyalty levels in comparison to brands that do not carry any DOL label. The findings show that in comparison with other extrinsic product attributes, DOLs constitute less important drivers of loyalty. However, brands carrying a DOL in comparison to brands that do not carry any DOL label exhibit higher levels of loyalty.

Hyeon Suk and Seoung Kyu (2012) measured the relationship between brand equity and rice purchase decision in seoul concluded promotion strategies involves two key decisions: the percentage reduction in price from the existing price point, and the frequency with which a product is promoted. These decisions, in turn are critically dependent upon how many consumers can be convinced to switch to a brand by temporarily reducing its price, and how many are instead brand loyal. Theoretical models of how the strength of brand loyalty influences optimal promotion strategies have been developed. Results confirmed that retailers promote strong brands shallower and more frequently compared to brands with weak loyalty.

Bruwer and Buller (2013) conducted study on the level of product involvement, brand loyalty, and preference for country-of-origin wine brands of Japanese wine consumers. Regression analysis on brand loyalty and involvement by the age demographic, and increases with age until the 35-45 year age group (Generation-X) and then slowly decreases. A strong positive relationship exists between consumption frequency and quantity, and the level of involvement. High involvement consumers show a strong preference for old world produced wines, mainly from France and Italy.

III METHODOLOGY

In this chapter, detailed account of research design is discussed. The information on agro climatic and economic features of the study area, database and analytical tools and techniques for data analysis is provided. This information is presented under the following broad headings.

3.1 Description of the study area

3.2 Sampling procedure

3.3 Nature and sources of data

3.4 Analysis tools and techniques employed

3.1 Description of the study area

3.1.1 Location of the study area

The study was conducted in Kolar taluk of the Kolar district of the Karnataka state. Kolar taluk is located in the southern region of the State. Kolar is one among the five taluks of Kolar district. The taluk & district Headquarters Kolar is at a distance of 66 kms from Bangalore. The taluk is bound by Sidlaghatta and Chintamani of Chikkaballapur district, Srinivasapur, Mulbagal, Bangarpet & Malur taluks of Kolar district and Hoskote taluk of Bangalore Rural District. The taluk geographically lies between 78^0 $17^'$ $5^{``}$& $77^0$ 56` 15`` longitude and 13^0 1` 46``& $13^0$ 18` 8`` latitude. The geographical area of the taluk is 793 square kilometers. Kolar taluk comes under Kolar revenue sub-division. This taluk is further divided into seven hobilies *viz.* Kolar, Vokkaleri, Vemagal, Narasapur, Sugatoor, Holur and Huthur. There are 327 inhabited villages with one town. Kolar town is the Taluk Headquarters. All the district & taluk level departments of the government are located in Kolar town.

Kolar is located at 13.13°N 78.13°E. It has an average elevation of 822 meters (2,697 ft). 32 kilometers (20 miles) from Kolar Gold Fields. The city is located on the southern maiden (plains) region of Karnataka. The nearest railway junction is Bangarpet at a distance of about 15 km. It is situated on the Bengaluru to Chennai National Highway-4. As of the 2011 census, Kolar municipality had a population of 1,38,553. The municipality had a gender ratio of 978 females per 1,000 males and (11.5%) of the populations were under six years old. Effective literacy was (84.02%) male literacy was (87.28%) and female literacy was (80.69%). Kannada is the major language however, a significant population speaks Telugu. Tamil is also spoken in few places like KGF. (Fig.1).

Table 3.1: General features of the study area

Sl.No	Particulars	Kolar taluk
1.	Geographical Area	793 sq km
2.	Forest area(ha)	4633
3.	Nonagricultural land (ha)	10897
4.	Hobblies (No)	7
5.	Villages (No)	327
6.	Gram panchayats	11
7.	Population (No)	3,85,415
8.	Density of population (per sq km)	306
9.	Literacy Rate (%)	76%
10.	Annual average rainfall (mm)	743mm
11.	Temperature (^{0}C)	
a.	Minimum	34^{o}C
b.	Maximum	23^{o}C

Source: Kolar taluk at glance 2011

Table 3.2 Production of tomato in the taluk(MT)

Bangrpet	Kolar	Malur	Mulbagal	Srinivaspura
52385	104612	69402	120744	25711

Source: Kolar taluk at glance 2011

MAP OF KARANATAKA

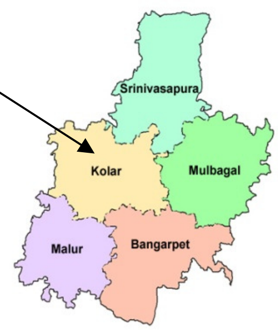

Fig. 1: Map showing the location of the study area

3.1.2 Climate, Rainfall and Soil type

The influence of climate and rainfall on agriculture is important as farming predominantly depends upon these factors. There are three distinguishable agricultural seasons in the district, *viz. Kharif* (June to September), Rabi (October to January) and summer (February to May). The southwest monsoon, which usually commences by about the end of May or early June, continues intermittently until the end of September.

The average annual rainfall in the taluk is 743-mm.The average annual number of rainy days in 2013 was 52 in kolar taluk. It is observed that, there is a wide variation in pattern and distribution of rainfall over the years.

The soils in the taluk mostly consists red loamy soils, which are shallow in depth and well drained but medium in plant nutrients. Some patches of clay lateritic soils are there in the district and they are highly suitable for vegetable production.

3.1.3 Cropping pattern

During 2011-12, the net sown area in kolar taluk was 33,538 hectares. Out of these Pulses, oil seeds, and vegetables accounted for 4313, 445, and 1450 acres of the net sown area, respectively. Vegetables are the potato, tomato, beans and onion accounted for 22,559, 1,04,612, 4,614 and 1,226 (M Tons) production of important vegetables.

Kolar taluk contributed 20 per cent of the total district's cereals and other minor millets production. It accounted for 11.18, 2.70, 12.41 and 14.50 per cent of district's total production of pulses, oilseeds, fruits, vegetables. It produced 27.88 per cent of district's non-food staples.

3.14 Sampling procedure

Kolar taluk was selected for the study on brand preference of pesticides used in tomato production, because it is one of the important tomato growing taluk in the district. It ranks second in terms of production of vegetables like tomato, cabbage, cauliflower, onion and potato in the state. Kolar taluk is the largest producer of tomato in Karnataka. The productivity of tomato in Kolar taluk is almost three times more than the country's average.

For the purpose of detailed study, only those pesticides brands, which were used for tomato crop protection, were considered for the study. The list of 18 villages where tomato was grown was prepared and 5 tomato growing farmers were randomly selected from each village. Thus, making the total sample of 90 farmers. The list of total number of pesticide retailers operating in Kolar town was obtained from the Karnataka state department of agriculture (KSDA). Ten retailers were randomly selected for the collection of information out of 21 retailers. The information about pesticides business, customer relationship, and store loyalty by farmers was collected from the ten retailers. The respondents were selected from among the tomato growers who have grown tomato during either *kharif* or rabi season of 2013.

3.1.5 Nature and source of data

Primary data was collected both from farmers and retail trader respondents with respect to pesticide brands awareness among tomato growers, brand preference for pesticides and tomato grower's preferences for pesticide retail shop and reasons for choice. The opinion of sales executives of different private pesticide companies was elicited on pesticide.

3.1.6 Analytical tools and techniques employed

Tabular analysis

The information collected from tomato growers and retailers was analyzed by simple tabular analysis.

Garret ranking technique

Garrett's ranking technique was used to rank factors influencing farmer's 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 into scores by referring to Garrets table.

Garrett's formula for converting ranks into per cent was given by per cent position= 100*(Rij-0.50)/Nj

Where Rij = Rank given for ith item by jth individual

Nj = Number of items ranked by jth individual

For each factor, the scores of missing 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. The same Garret ranking was done for the factor influencing the pesticide retail shop preference.

IV RESULTS

The result of the study is presented in this chapter under the following headings.

4.1 Demographic characteristics of the respondents
4.2 Pesticide brands awareness among Tomato growers.
4.3 Tomato growers Brand preference for pesticides.
4.4 Tomato grower's preferences for pesticide Retail Shop and Reasons for Choice.

4.1Demographic characteristics of the respondents

The result in respect of demographic characteristics of the tomato growing sample farmers is presented under the following headings.

4.1.1 Age of respondent farmers in Kolar taluk

The distribution of respondents 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 38 years. The age wise classification of respondent farmers showed that 18 per cent of them belonged to the age group of up to 30 years, 31-40 years 43 per cent, 41-50 years 21 per cent and the rest 15 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, 55.56 per cent of them had education up to high school followed by 15.56 per cent was studied up to PUC and 12.22 per cent had no schooling, 12.22 percent of them had education up to middle school followed by 4.44 per cent who studied up to graduation level.

Table 4.1: Age of the respondent farmers in Kolar taluk

(n=90)

Sl. No	Age group	Number	Percent
1.	UP to 30	18	20
2.	31-40	39	43.33
3.	41-50	19	21.11
4.	More than 50	14	15.56
Total		**90**	**100.00**
Average age group of the respondents (years)		38	-

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

Sl. No	Education level	Number	Percent
1.	No schooling	11	12.22
2.	Middle school	11	12.22
3.	High school	50	55.56
4.	PUC	14	15.56
5.	Graduation	4	4.44
Total		**90**	**100.00**

4.1.3 Size of the family in the study area

The family size of the respondent farmers in Kolar taluk is presented in Table 4.3. The highest numbers of members in respondent's families were under the category of four to eight (81.11%) persons followed by the family size of more than eight members (15.56%) and less than four members (3.33%). The average family size of the sample farmers was found to be six members among the respondents.

4.1.4The land holding based on source of irrigation of the respondent farmers

The distribution of respondent farmers based on source of irrigation is presented in table 4.4. Out of the 90 sample respondents 1.11 per cent had irrigation with tank, 3.33 per cent had both tank and bore well while the remaining 95.56 per cent had only bore well as a source of irrigation.

Table 4.3: Size of the family in the study area

(n=90)

Sl. No	Family size	Numbers	Percent
1.	Less than 4 members	3	3.33
2.	4-8 members	83	81.11
3.	More than 8 members	15	15.56
Total		**90**	**100.00**
Average family size of the respondents		6	-

Table 4.4: The land holding based on source of irrigation of the respondent farmers

(n=90)

Sl. No	Source of irrigation	Numbers	Per cent
1.	Tank only	1	1.11
2.	Bore well only	86	95.56
3.	Both tank and bore well	3	3.33
Total		**90**	**100.00**

4.1.5 Distribution of land holdings based on method of irrigation of the respondent farmers

The distribution of respondent farmers based on irrigation method is presented in Table 4.5. Out of the 90 sample respondents 94.44 per cent had drip irrigation, 2.22 per cent had both flood and Drip irrigation while the remaining 3.33 per cent had flood irrigation.

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

The sample respondents were classified according to the number of years of experience in farming and the same is presented in Table 4.6. It could be seen from the table that, the highest number (56.67%) had family experience less than 10 years followed by 35.56 per cent with 10-20 years and the remaining 7.77 per cent had 21-30 years' experience in farming. The average experience of farmers in farming was found to be approximately 11 years among the respondents.

Table 4.5: Distribution of land holdings based on method of irrigation of the respondent farmers (n = 90)

Sl. No	Particulars	Numbers	Per cent
1.	Flood irrigation	3	3.33
2.	Drip irrigation	85	94.45
3.	Both flood and drip irrigation	2	2.22
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	Percent
1.	Less than 10	51	56.67
2.	10-20	32	35.56
3.	21-30	7	7.77
Total		**90**	**100.00**
Average experience in farming of the respondents (years)		11	-

4.2 Awareness about pesticide brands among Tomato growers.

4.2.1 Classification of respondent farmers based on land holding

The distribution of respondent farmers according to land holding is presented in Table 4.7among sample farmers, 23.33 percent were under the category of small farmers, medium farmers (5.56%), Marginal farmers (68.89%) and large farmers 2.22 per cent. The average land holding size of the sample farmers was found to be 5 acres.

4.2.2 Details of tomato cultivation in different seasons in a year.

It can be observed from the Table 4.8 that 92.22 per cent of the respondents have grown tomato during summer season. The numbers of farmers growing tomato during *kharif* were 62 (68.99%) and the least number of farmers have grown tomato during rabi 40 (44.44%).

Table 4.7: Classification of respondent farmers based on land holding

(n=90)

Sl. No	Size of holding	Numbers	Per cent
1.	Marginal farmers(1-2.5 Acres)	62	68.89
2.	Small Farmers (2.5-5 Acres)	21	23.33
3.	Medium farmers (5-10Acres)	5	5.56
4.	Large farmers (More than 10 Acres)	2	2.22
5.	**Total**	**90**	**100**
6.	Average land holding (Acres)	5	-

Note:* Multiple responses were given by the respondent

Table 4.8: Details of tomato cultivation in different seasons in a year.

Sl. No	Season	Number of farmers grown	Per cent
1.	Kharif	62	68.89
2.	Rabi	40	44.44
3.	Summer	83	92.22
Average number of crops grown per season		2	

Note:* Multiple responses were given by the respondent

4.2.3 Brand awareness of insecticides and acaricides among tomato growers.

Table 4.9 indicates that most of the sample farmers (97.78%) were aware of confider brand followed by Coragen brand (94.44%) and Actra brand (88.89%). The awareness was moderate to Admire (86.67%), Omite (83.33%), Asatop (81.11%), Lancer gold (78.89%), Fame (77.78%) and Ecomite (73.33%) are also moderately aware of brands among the farmers in Kolar taluk. In case of Abamectin (72.22%) brand having least awareness by farmers in Kolar taluk. It is noteworthy that degree of awareness about top ten brands is above 72 per cent. It is also presented in Fig.2.

4.2.4 Brand awareness of fungicides brands among tomato growers.

The awareness about fungicides are presented in the Table 4.10 indicate that most of the sample farmers (93.33%) were aware of toRidomil gold brand followed by Ridomil MZ brand (92.23%) and Antracol brand (91.11%). However, Saaf (88.89%), M-45 (77.78%), Amistar (73.33%), Kavach (71.11%) and captaf (65.56%) are also popular among the farmers in the study area. In case of Acrobat MZ (61.11%) and Pegasus (56.67%) brand having least awareness among respondent farmers in Kolar taluk. This is also presented in the form of chart in Fig.3.

Table 4.9: Brand awareness of insecticides and acaricides among tomato growers

(n=90)

Sl. No	Insecticides	No. of farmers	Percent	Rank
1.	Confider	88	97.78	I
2.	Coragen	85	94.44	II
3.	Actara	80	88.89	III
4.	Admire	78	86.67	IV
5.	Omite	77	83.33	V
6.	Asatop	73	81.11	VI
7.	Lancergold	71	78.89	VII
8.	Fame	70	77.78	VIII
9.	Ecomite	66	73.33	IX
10.	Abamectin	65	72.22	X

Note: * Multiple responses were given by single farmer

Table 4.10: Brand awareness of fungicides among tomato growers.

(n=90)

Sl. No	Fungicides	No. of farmers	Per cent	Rank
1.	Ridomil gold	84	93.33	I
2.	Ridomil MZ	83	92.23	II
3.	Antracol	82	91.11	III
4.	Saaf	80	88.89	IV
5.	Dithane M- 45	70	77.78	V
6.	Amistar	66	73.33	VI
7.	Kavach	64	71.11	VII
8.	Captaf	59	65.56	VIII
9.	Acrobat MZ	55	61.11	IX
10.	Pegasus	51	56.67	X

Note:* Multiple responses were given by the single farmer

4.2.5 Sources of information about pesticides brands to respondents farmers

The sources of information to the farmer's about various brands of pesticides are presented in table 4.11. Favorable briefing by other farmers, outdoor advertisements through billboards and banners and retailers were the major source of brand information, which were ranked first, second and third with a mean scores of 68.48, 66.76 and 65.33 respectively. The other sources of brand information were Exhibitions, Field days, Friends and Radio. However, it is also clear from the table that sources like newspaper and TV were reaching to least number of respondents. The ranking was done as per the Garrett's ranking method.

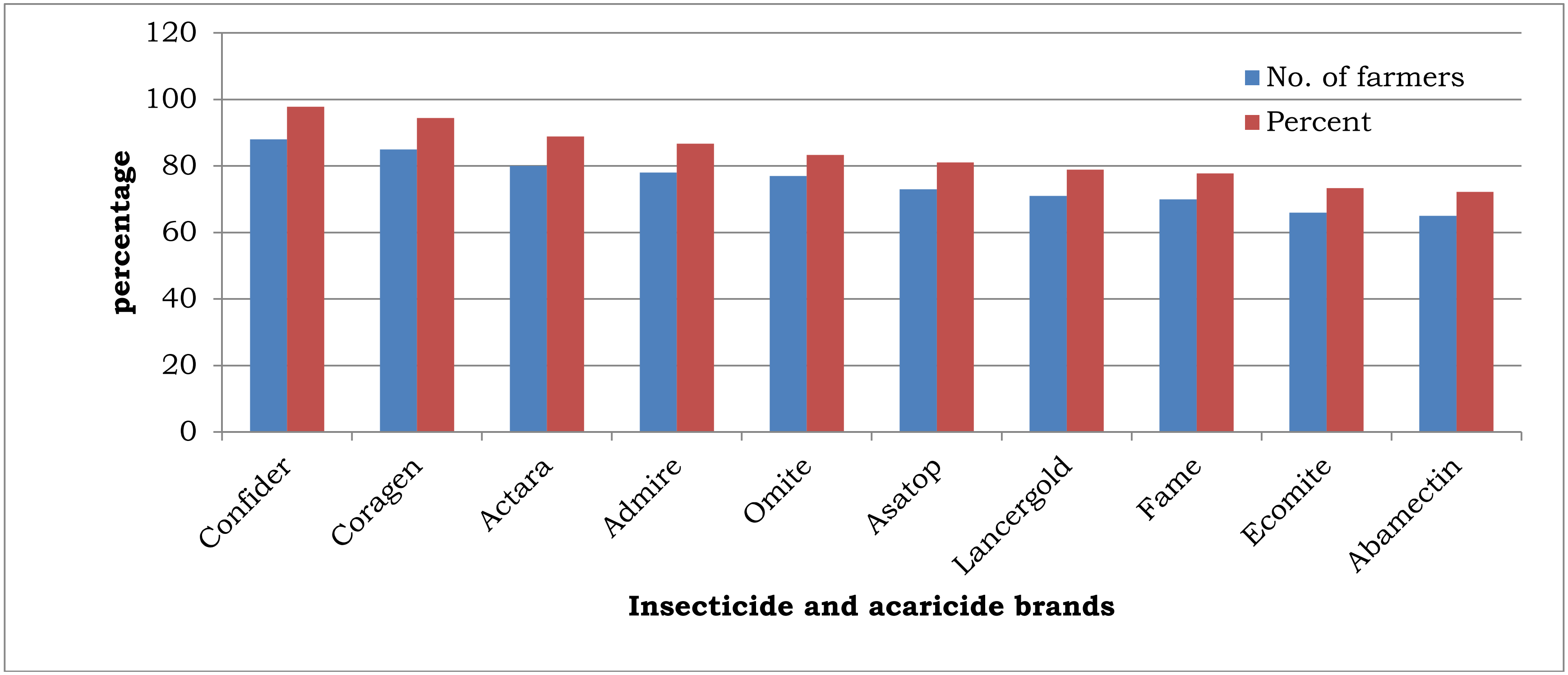

Fig. 2: Brand awareness of insecticides and acaricides among tomato growers.

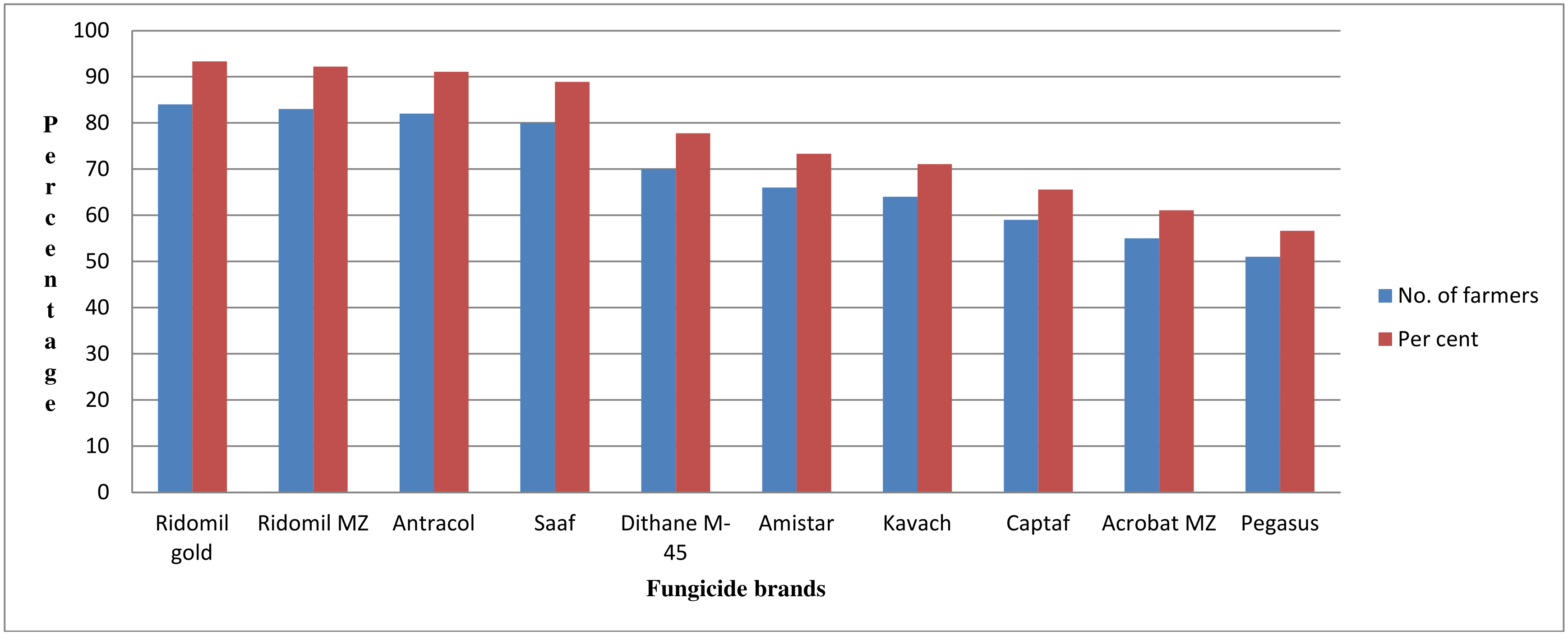

Fig. 3: Brand awareness of fungicides among tomato growers.

Table 4.11 Sources of information about pesticides brands to respondents farmers

(Garrett's ranking)

Sl. No	Attributes	Mean score	Rank
1.	Other farmers	68.49	I
2.	Outdoor advertisements through billboards and banners	66.77	II
3.	Retailers	65.33	III
4.	Exhibitions	59.19	IV
5.	Field days	56.13	V
6.	Friends	48.43	VI
7.	Radio	31.13	VII
8.	News paper	30.11	VIII
9.	T V	28.69	IX

Note:* Multiple responses were given by the respondent

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

Table 4.12 provides the information on number of pesticides sprays given per crop by the sample farmers. It can be noted from the table that an on average pesticides were sprayed eight times during *kharif* crop season. Followed by five sprays during rabi season and 10 times were sprayed during summer season.

Table 4.12: **Number of pesticides sprays given per crop per season by the sample respondents farmers** (n = 90)

Sl. No	Season	Number of farmers	Average number of sprays
1.	Kharif	62	8.44
2.	Rabi	40	4.08
3.	Summer	83	9.45

Note:* Multiple responses were given by the respondent

4.1.3 Brand preference for pesticides among tomato growers.

4.3.1 Amount expenditure of respondent farmers on pesticides purchase

The samples of respondent's farmers were classified according to the amount spent on pesticides purchase per crop per acre and the same is presented in Table 4.13. 36.67 per cent of the respondents spent Rs 21,000 to 50,000 on pesticides followed by 10 per cent who purchased pesticides more than Rs. 1 lakh. 30 per cent of the sample farmers spent up to Rs. 20,000 and remaining 23.33 per cent spent ranging from Rs.51, 000 to Rs. 1 lakh in the study area.

Table 4.13: Amount expenditure of respondent's farmers on pesticides purchase

(n=90)

Sl. No	Amount spent on purchase of pesticides crop/acre	Numbers	Per cent
1.	Up to Rs. 20,000	27	30
2.	Rs. 21,000-50,000	33	36.674
3.	Rs. 51,000-1,00,000	21	23.33
4.	Rs. More than 1,00,000	9	10
Total		**90**	**100.00**

Note:* Multiple responses were given by the respondent

4.3.2 The diseases of tomato crop in the field and their severity.

Most of the diseases seen in tomato crop of sample farmers were damping off and tomato leaf curl (100%) followed by tomato spotted wilt virus (98.88%) and fusarium wilt (96.66%) as severe diseases However, Late blight (91.11%), early blight (88.89%) and Root knot nematode (84.44%) were also on tomato crop in Kolar taluk. In case of Buckeye rot (72.22%) and Bacterial canker (43.33%) disease were also noticed, but severity was less indicated in (Table 4.14).

4.3.3 Pesticides brands preferred by tomato growers.

Table 4.15 indicate that cent per cent of the respondent farmers were preferred Confidor, Coragen, Actara and Saaf brands. However, brands like Ridomil gold, Antracol and Ecomite are moderately preferred. However, brands like Kavach and Pegasus were least preferred by the sampled farmers in Kolar taluk.

Table 4.14 The diseases of tomato crop in the field and their severity.

(n = 90)

Sl. No	Diseases of tomato crop	Number of farmers considered as major disease	Per cent	Rank
1.	Damping off	90	100	I
2.	Tomato leaf curl	90	100	II
3.	Tomato spotted wilt virus	89	98.88	III
4.	Fusarium wilt	87	96.66	IV
5.	Late blight	82	91.11	V
6.	Early blight	80	88.89	VI
7.	Root knot nematode	84	84.44	VII
8.	Buckeye rot of tomato	65	72.22	VIII
9.	Bacterial canker	39	43.33	IX

Note:* Multiple response were given by the respondent

Table 4.15 Pesticides brands preferred by tomato growers.

(n = 90)

Sl. No	Brands	Number of farmers	Per cent
1.	Confidor	90	100
2.	Coragen	90	100
3.	Actara	90	100
4.	Saaf	90	100
5.	Ridomil gold	80	88.89
6.	Antracol	74	82.22
7.	Ecomite	70	77.78
8.	Kavch	67	74.44
9.	Pegasus	47	52.22

Note:* Multiple responses were given by the respondent

4.3.4 Reasons for preferring particular brand of pesticide.

The factors influencing the farmer's preference for pesticides is presented in Table 4.16. Retailer suggestion, Immediate control of pest and diseases and quality of fruits were the major influencing factors, which are ranked first, second and third with a mean scores of 57.21, 56.84 and 56.28 respectively. The other factors like credit is available for purchase, always it is available and using it for several years, is moderately influencing farmer's preference of various brands. However it is also clear from the table that factors like other farmers were also recommended for this brand, Horticulture/agriculture officer's recommendation and price least influencing factors on the farmers while preferring pesticides brands.

Table 4.16 Reasons for preferring particular brand of pesticide.

(Garrett's ranking)

Sl. No	Attributes	Mean score	Rank
1.	Retailer suggestion	57.21	I
2.	Effective control of pest and diseases	56.84	II
3.	Quality of fruits will be better	56.28	III
4.	Credit is available for purchase	54.80	IV
5.	Always it is available	53.60	V
6.	I am using it for several years	53.56	VI
7.	Other farmers recommended	52.83	VII
8.	Horticulture officers recommended	39.46	VIII
9.	Price is less	25.54	IX

Note:* Multiple responses were given by the respondent

4.4 Tomato grower's preferences for pesticide Retail Shop and Reasons for Choice.

4.4.1 Longevity of farmers associated with retailers.

The relationship between the retailers of pesticides and their customers is presented in Table 4.17 it can be evidenced from the table that 55.56 per cent of the farmers were known to the retailers in last 10 years and 37.78 percent were known was last 20 years. It's interesting to note 6.66 per cent farmers have long association for last 30 years.

4.4.2 Reasons for preferring particular retail shop of pesticides by the tomato growers.

The reasons for preferring particular retail shop is indicated in Table 4.18. Among various factors influencing for choice retailers fellow farmer's recommendations, no spurious products and retailer also sells other agricultural inputs were the key factors, which are ranked first, second and third with the mean scores of 68.73, 56.97 and 56.38 respectively. Retailer will come to the help in case of defect in pesticides, seedling nursery man recommended, Horticulture or Agriculture Department personnel recommended and credit was given are moderately influencing factors, which ranked fourth, fifth, sixth and seventh with mean scores of 55.81, 55.78, 50.80 and 48.56 respectively. The remaining issues like wide product range, wide brand range and shop is in convenient place and nearest are least influencing factors which are ranked eighth, ninth, and tenth with mean scores of 44.04, 42.07 and 24.62 respectively.

Table 4.17 Longevity of farmers association with retailers. (n = 90)

Sl. No	Particulars	Numbers	Percent
1	5-10 years	50	55.56
2	11-20 years	34	37.78
3	21-30 years	6	6.66
Total		**90**	**100.00**

Note:* Multiple responses were given by the respondent

Table 4.18 Reasons for preferring particular retail shop of pesticides by the tomato growers. (Garrett's ranking)

Sl. No	Attributes	Mean score	Rank
1.	Fellow farmers recommended buying from the shop	68.73	I
2.	No duplicate/Spurious products	56.97	II
3.	Retailer also sells other agricultural inputs	56.38	III
4.	Retailer will come to the help in case of in	55.81	IV
5.	Seedling nursery man recommended	55.78	V
6.	Horticulture or agriculture department personnel	50.80	VI
7.	Credit sales	48.56	VII
8.	Wide product range	44.04	VIII
9.	Wide brand range	42.07	IX
10.	Shop is in convenient place and nearest	24.62	X

Note:* Multiple responses were given by the respondent

VI DISCUSSION

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

5.1 Demographic characteristics of the respondents

5.2 Pesticide brands awareness among tomato growers.

5.3 Tomato growers brand preference for pesticides.

5.4 Tomato grower's preferences for pesticide retail shop and reasons for choice.

5.1 Demographic characteristics of the respondents

5.1.1 Age of the respondent farmers in Kolar taluk

The distribution of respondents 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 38 years. The age wise classification of respondent farmers showed that 18 per cent of them belonged to the age group of up to 30 years, 31-40 years 43 per cent, 41-50 years 21 per cent and the rest 15 per cent belonged to the age group of more than 50 years. As per the census 2011 (74%) of the Indians are below the age of 40 years. The respondents in the study below 40 years constituents' 61per cent. This group is nearer to the census 2011 figures of 74per cent.

5.1.2 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, 55.56 per cent of them had education up to high school followed by 15.56 per cent was studied up to PUC and 12.22 per cent had no schooling, 12.22 percent of them had education up to middle school followed by 4.44 per cent who studied up to graduation level. The literacy rate in the Kolar district is 76 per cent the literates among the respondents in the study constituted 87.78%. Which is higher that district literacy rate of 76 per cent.

5.1.3 Size of the family in the study area

The family size of the respondent farmers in Kolar taluk is presented in Table 4.3. The highest numbers of members in respondent's families were under the category of four to eight (81.11%) persons followed by the family size of more than eight members (15.56%) and less than four members (3.33%). The average family size of the sample farmers was found to be six members among the respondents. The number of nucleus families are increasing in the country and the findings of the also are in tuned with general trend in the country.

5.1.4 The land holding based on source of irrigation of the respondent farmers

The distribution of respondent farmers based on source of irrigation is presented in Table 4.4. Out of the 90 sample respondents 1.11 per cent had irrigation with tank, 3.33 per cent had both tank and bore well while the remaining 95.56 per cent had only bore well as a source of irrigation. The percentage of the respondents among the irrigated farmers, irrigating the lands with bore well constituents 95.56 per cent the study area being low rain fall area and no perennial water resources mainly depends on ground water exploitation through bore wells this may be the reason for this high per cent of respondents who are depending upon bore well irrigation.

5.1.5 Distribution of land holdings based on method of irrigation of the respondent farmers

The distribution of respondent farmers based on irrigation method is presented in Table 4.5. Out of the 90 sample respondents 94.44 per cent had drip irrigation, 2.22 per cent had both flood and Drip irrigation while the remaining 3.33 per cent had flood irrigation. The highest number of respondents (94.44%) was adopted drip irrigation mainly for judicious of limited water available through bore wells.

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

The sample respondents were classified according to the number of years of experience in farming and the same is presented in Table 4.6. It could be seen from the table that, the highest number (56.67%) had farming experience less than 10 years followed by 35.56 per cent with 10-20 years and the remaining 7.77 per cent had 21-30 years' experience in farming. The average experience of farmers in farming was found to be approximately 11 years among the respondents. Contrary to the notion that youths are not taking up agriculture as a profession this study indicates more than half of the respondents have taken up agriculture have an occupation in last 10 years.

5.2 Awareness about pesticide brands among Tomato growers.

5.2.1 Classification of respondent farmers based on land holding

The distribution of respondent farmers according to land holding is presented in Table 4.7 among sample farmers, 23.33 percent were under the category of small farmers, medium farmers (5.56%), Marginal farmers (68.89%) and large farmers 2.22 per cent. The average land holding size of the sample farmers was found to be 5 acres. As for the census data 2011 the percentage of parameters in India with less than 2.5 acres are 64 per cent among the respondents. The percentage of farmers with less than 2.5 acres constitutes 68.89 per cent.

5.2.2 Details of tomato cultivation in different seasons in a year.

It can be observed from the Table 4.8 that 92.22 per cent of the respondents have grown tomato during summer season. The numbers of farmers growing tomato during *kharif* were 62 (68.99%) and the least number of farmers have grown tomato during rabi 40 (44.44%). In spite of water scarcity in general and particularly during summer 92.22 per cent of the respondents are grown expecting better prices during summer.

5.2.3 Brand awareness of insecticides and acaricides among tomato growers.

Table 4.9 indicates that most of the sample farmers (97.78%) were aware of confider brand followed by Coragen brand (94.44%) and Actara brand (88.89%). The awareness was moderate to Admire (86.67%), Omite (83.33%), Asatop (81.11%), Lancer gold (78.89%), Fame (77.78%) and Ecomite (73.33%) are also moderately aware of brands among the farmers in Kolar taluk. In case of Abamectin (72.22%) brand having least awareness by farmers in Kolar taluk. It is not worthy that; degree of awareness about top ten brands is above 72 per cent. It is also presented in Fig.2. The awareness about a product is very critical in the selling of the product. 6 brands of insecticides out 10 are among tomato growers and the percentage of farmers who were aware of insecticides brand ranges from 87-97 per cent.

5.2.4 Brand awareness of Fungicides brands among tomato growers.

The awareness about fungicides are presented in the Table 4.10 indicate that most of the sample farmers (93.33%) were aware to Ridomil gold brand followed by Ridomil MZ brand (92.23%) and Antracol brand (91.11%). However, Saaf (88.89%), M-45 (77.78%), Amistar (73.33%), Kavach (71.11%) and Captaf (65.56%) are also popular among the farmers in the study area. In case of Acrobat MZ (61.11%) and Pegasus (56.67%) brand having least awareness among respondent farmers in Kolar taluk. This is also presented in the form of chart in Fig.2. Four brands of fungicides were popular with farmers ranging from 88-93% about these four fungicide brands.

5.2.5 Sources of information about pesticides brands to respondent farmers

The sources of information to the farmer’s about various brands of pesticides are presented in Table 4.11. Favorable briefing by other farmers, outdoor advertisements through billboards and banners and retailers were the major source of brand information, which were ranked first, second and third with a mean scores of 68.48, 66.76 and 65.33 respectively. The other sources of brand information were Exhibitions, Field days, Friends and Radio. However, it is also clear from the table that sources like newspaper and TV were reaching to least number of respondents. The ranking was done as per the Garret ranking method. Satisfied customer is an asset to the company. Satisfied farmer will share is experience with other farmer about the brands and this will have great influence on purchase decision. The major source of information about pesticide brands was briefing for the fellow farmers outdoor advertisements also attracts the farmers and this was second major source of information pesticide brand.

5.2.6 Number of pesticides sprays given per crop per season by the sample respondent farmers

Table 4.12 provides the information on number of pesticides sprays given per crop by the sample farmers. It can be noted from the table that an on average pesticides were sprayed eight times during *kharif* crop season. Followed by five sprays during Rabi season and 10 times were sprayed during summer season. The highest number of pesticide sprays were done during summer followed rabi and *kharif* probably the season for highest number of sprays during summer due to higher intensity of more pest and diseases in during summer followed by *kharif* season.

5.1.3 Brand preference for pesticides among tomato growers.

5.3.1 Amount expenditure of respondent farmers on pesticides purchase

The samples of respondent's farmers were classified according to the amount spent on pesticides purchase per crop per acre and the same is presented in Table 4.13. 36.67 per cent of the respondents spent Rs 21,000 to 50,000 on pesticides followed by 10 per cent who purchased pesticides more than Rs. 1 lakh. 30 per cent of the sample farmers spent up to Rs. 20,000 and remaining 23.33 per cent spent ranging from Rs.51,000 to Rs. 1 lakh in the study area. The amount spent on pesticides is very huge in tomato cultivation and this may be due to high intensity of pest and diseases and high cost of pesticides.

5.3.2 The diseases of tomato crop in the field and their severity.

Most of the diseases seen in tomato crop of sample farmers were damping off and tomato leaf curl (100%) followed by tomato spotted wilt virus (98.88%) and fusarium wilt (96.66%) as severe diseases However, Late blight (91.11%), early blight (88.89%) and Root knot nematode (84.44%) were also tomato crop in Kolar taluk. In case of Buckeye rot (72.22%) and Bacterial canker (43.33%) disease were also noticed, but severity was less (Table 4.14). Many pests and diseases have occurred in tomato crop. However, few pests and diseases were consider very severe by tomato growers by ranging from 90 -100 per cent of respondents.

5.3.3 Pesticides brands preferred by tomato growers.

Table 4.15 indicate that cent per cent of the respondent farmers were preferred Confidor, Coragen, Actara and Saaf brands. However, brands like Ridomil gold, Antracol and Ecomite are moderately preferred. However, brands like Kavach and Pegasus were least preferred by the sampled of farmers in Kolar taluk. All brands in the market are not preferred the consumers. Few brands are more preferred by cent per cent of the respondents.

5.3.4 Reasons for preferring particular brand of pesticide.

The factors influencing the farmer's preference for pesticides is presented in Table 4.16. Retailer suggestion, Immediate control of pest and diseases and quality of fruits were the major influencing factors, which are ranked first, second and third with a mean scores of 57.21, 56.84 and 56.28 respectively. The other factors like credit is available for purchase, always it is available and using it for several years, is moderately influencing farmer's preference of various brands. However it is also clear from the table that factors like other farmers were also recommended for this brand, Horticulture/Agriculture officer's recommendation and price least influencing factors on the farmers while preferring pesticides brands. Many factors will influence in preferring a particular a brand of a product in case of pesticide brand preference the major factors influenced were retailer suggestion quick control of pest and diseases and quality maintenance of vegetables.

5.4 Tomato grower's preferences for pesticide retail shop and reasons for choice.

5.4.1 Longevity of farmers associated with retailers.

The relationship between the retailers of pesticides and their customers is presented in Table 4.17it can be evidenced from the table that 55.56 per cent of the farmers were known to the retailers in last 10 years and 37.78 percent were known was last 20 years. It's interesting to note 6.66 per cent farmers have long association for last 30 years. The period of association of tomato growers and personnel relationship with retailers of pesticides influences the store loyalty in addition to the other factors.

5.4.2 Reasons for preferring particular retail shop of pesticides by the tomato growers.

The reasons for preferring is indicated in Table 4.18. Among various factors, fellow farmer's recommendations, no spurious brands and retailer also sells other agri inputs were the key factors, which are ranked first, second and third with the mean scores of 68.73, 56.97 and 56.38 respectively are the reasons for preferring a retailer. Retailer will come to the help in case of defect in pesticides, seedling nursery man recommended, Horticulture or Agriculture Department personnel recommended and credit was given are moderately influencing factors, which ranked fourth, fifth, sixth and seventh with mean scores of 55.81, 55.78, 50.80 and 48.56 respectively. The remaining issues like wide product range, wide brand range and shop is in convenient place and nearest are least influencing factors which are ranked eighth, ninth, and tenth with mean scores of 44.04, 42.07 and 24.62 respectively. Building the band image of the retailers among the customers goes to long way to build store loyalty by customer delivering better satisfaction to the exciting customers will result in spread of favorable word of mouth to fellow farmers.

VI SUMMARY AND PRACTICAL UTILITY OF THE STUDY

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 extent loss 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 85,000MT.

During first five-year plan period, the consumption of pesticides in India was one of the lowest with 0.032 kg/ha. 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 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 ia 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.

The retail traders play a critical role in pesticide marketing by linking pesticide manufacture 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 overall objective of assessing the pesticide brand awareness, pesticide brand preference, reasons for preferring the particular pesticide brand, and choice for retail shop. The present study was taken up with the following objectives.

The specific objectives of the study were

1. To analyze the pesticide brands awareness among Tomato growers in the Kolar taluk,

2. To analyze the tomato growers brand preference for pesticides in the Kolar taluk and

3. To study the tomato growers preferences for pesticide retail shop and reasons for choice in the Kolar taluk.

The present study propose to test the following hypotheses

1. Tomato growers are not aware of complete range of brands,

2. Tomato growers have no brand loyalty and

3. Tomato growers are loyal to pesticide retailer.

Kolar taluk was selected for the study on brand preference of pesticides used in tomato production, because it is one of the important tomato growing taluk in the district. It ranks second in terms of production of vegetables like tomato, cabbage, cauliflower, onion and potato in the state. Kolar taluk is the largest producer of tomato in Karnataka. The productivity of tomato in Kolar taluk is almost three times more than the country's average. For evaluating the specific objectives of the study, both primary and secondary data were utilized.

For the purpose of detailed study, only those pesticides brands, which were used for tomato crop protection, were considered for the study. The list of 18 villages where tomato was grown was prepared and 5 tomato growing farmers were randomly selected from each village, thus making the total sample of 90 farmers. The list of total number of pesticide retailers operating in Kolar town was obtained from the KSDA. Ten retailers were randomly selected for the collection of information out of 21 retailers. The information about pesticides business, customer relationship, and store loyalty by farmers was collected from the ten retailers. The respondents were selected from among the tomato growers who have grown tomato during either *kharif* or rabi or season of 2013.

Primary data was collected from both farmers and retail trader respondents with respect to pesticide brands awareness among tomato growers, brand preference for pesticides and tomato grower's preferences for pesticide retail shop and reasons for choice. The opinion of sales executives of different private pesticide companies was elicited on pesticide.

Major findings of the study

1. 64 per cent of the respondents of tomato grower's age was more than 30 years.

2. 80 per cent of the respondents had formal education at different levels.

3. More than 2/3 of the respondent's family had family size of 4-8 members.

4. 95 per cent of the respondents were depending on bore wells for irrigation and 2/3 of the farmers were marginal farmer.

5. Around 95 per cent of the farmers have adapted drip irrigation.

6. The 92 per cent of farmers grown during tomato in summer.

7. 72 per cent of the tomato growers were aware of the top ten brands of the pesticides applied in tomato cultivation.

8. On an average pesticides were sprayed 8 times during *kharif* season.

9. Favorable briefing by other fellow farmers and outdoor advertisement of pesticide were the major source of brand information by the respondents.

10. Confidor, Coragen, Actara, Saaf brands of pesticides were preferred by cent per cent of the tomato growers.

11. 55 per cent of the tomato growers were known to the pesticide retailer for the last 10 years. The pesticide dealers knew nearly half of the tomato growers for the last 20 years ago.

12. Fellow farmer's recommendation not selling spurious brands and handling other agri inputs were the key factors influenced in preferring a particular retail shop with a mean score of 68, 56 and 56 respectively.

13. The advice of the horticulture department officer influence selection of retailer.

Practical utility of the study

- The awareness of 10 brands of pesticides was more among tomato growing farmers.

- The source of pesticides brand information for tomato growers was from fellow farmers and outdoor advertisement.

- The pesticides companies should stress on brand building aggressively and target for positive word of mouth spread by the present users.

- The pesticides retailers advice was one of the major factors influencing the preference of brand. The manufacturing companies of pesticides should integrate the retailers in brand promotion to influence the farmers brand preference.

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A Study on brand preference of pesticides used in tomato production in Kolar taluk

SCHEDULE

Name of the investigator: **Sampathkumar B N** Date of interview:

I. General Information

i) Name of the farmer:

ii) Age of respondent farmer:

a) Up to 30
b) 31-40
c) 41-50
d) More than 50

iii) Educational status of the respondent farmers:

a) No schooling
b) Primary school
c) Middle school
d) High school
e) PUC
f) Graduation/Post graduate

iv) Size of the family of the respondents

1) Average family size of the respondents
2) Family size
   a) Less than 4 members
   b) 4-8 members
   c) More than 8 members

V) Size of land holding Acres

a) 1-2.5 acres b) 2.5-5acres c) 5-10 acres d) More than 10 acres

V) Source of irrigation

a) Irrigated b) Dry land c) Both irrigated and dry land

Vi) Years of experience in farming

a) Less than 10 b) 10-20 c) 21- 30 d) More than 30

vii) Numbers of pesticides used

Viii) Number of pesticides used per crop per season by the sample respondents

i) Tomato
   a) 4-8 sprays
   b) 8-12 sprays

IX) Annual expenditure of respondents on pesticides purchase

a) Up to Rs 20000
b) 21000- 50000
c) 51000- 100000
d) Rs more than 100000

X) Age distribution of respondent retailers

a) Up to 30 b) 31-40 c) 41-50 d) more than 50

XI) Type of ownership of retailing in agri- inputs

a) Partnership b) Proprietorship

Xii) Exposure and cosmopolitians of the respondents subscribed to:
a) Farm magazine
b) News paper
c) Watching agri papers in T V
d) Visiting to field days
e) Interact with other progressive farmer in the locality.
f) Contact wit agri university/KVK

XII) Objective 1

i) List of pesticides brand applied in tomato production

a) Ridomil M Z **b)** antracol **c)** Pulsar **d)** Curzate **e)** Acrobat M Z

d) Brigade **e)** Confider **f)** Ridomil Gold **g)** Captaf **h)** Bavistin

i) Folicur **j)** Ergon Star **k)** Admire **l)** Rekord **m)** Asatop

ii) From which source you get the pestiside brand awareness

a) Friends
b) News papers
c) TV
d) Radio
e) Advertisement company
f) Any other source

XIII) Objective 2

1) To growers brand preference for pesticides
   a) Which are the factors you considered while buying the pesticides
   b) Which brand you prefer mostly
      I) From how many years
      II) Why you prefer that brand mostly
      III) What are the advantages of brand
      IV) Disadvantages of brand.

   c) What are the terms and condition for brand preference in pesticides.

   d) What is the yield of tomato by applying that brand.

2) List out the disease out for tomato crop.

a) Damping off **b)** Early blight **c)** Late blight **d)** Tomato leaf curl **e)** Tomato spotted wilt virus **f)** Buckeye rot of tomato **g)** Fusarium wilt of tomato **h)** Bacterial wilt of tomato **i)** Bacterial canker **j)** Root knot nematode

3) Which brand of pesticides have applied in the tomato production.

4) Why

a) More effective in controlling specific pest and diseases.

b) Always it is available

c) Price is less

d) Retailer suggested to apply this

e) Credit is available for purchase

f) Am using it for several years

g) Horticulture department recommended

h) Quantity of fruits will be better.

i) Immediate control of pests and diseases is done.

j) Advertisement of brand particularly seen in tv and other adds influenced to buy.

k) Other farmers recommended for this brand.

l) The quality of other brands in this category are not good.

VIX) Objective 3

a) Know the retailer since many years
b) They will give extend credit.
c) No duplicate
d) Fellow farmers recommended buying from the shop.
e) Shop is convenient place and nearest.
f) Retailer will come to the help in take of pesticides.
g) Retailer also helps other agri inputs.
h) Seed link nursery man recommended.
i) Horticulture and other members recommended.
j) Company sales representatives recommended specific shop.