MARKETING MANAGEMENT OF PESTICIDES IN KARNATAKA

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Master of Agribusiness Management

By

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CERTIFICATE

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

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Affectionately Dedicated

to My Mother

Smt. Parvatamma T. R.

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Introduction

I. INTRODUCTION

Indian agriculture owes its three fold increase in agricultural production to a significant extent to modern technology, adoption of high yielding varieties, increased use of fertilizers and intensive cropping, all these have made farming complex and costly. Inputs such as fertilizers, irrigation and improved seeds, the key elements of modern technology, provide a favourable climate for rapid growth of pests as well. In the absence of pest control the positive contribution of such inputs would be nullified and farmers may incur heavy losses.

The British Crop 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 in India is estimated at Rs.20,000 crores even if a 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 towards yield increasing but loss minimizing.

The role of pesticides is most significant among various agricultural inputs. Since pesticide act as protective umbrella for other inputs. A crop is equally attacked by a number of pests which appear at different stages of growth of crop, but their virulence varies widely. The loss sustained by the crop depends on the extent and virulence of pest attack. If the attack is of epidemic nature, the crop loss may be total in spite of all other inputs being optimal. To elucidate this point further, after using other

inputs such as HYV seeds, irrigation, fertilizers, machinery, labour and credit if the crop is destroyed by pests and diseases the entire investment is lost. Timely and judicious use of pesticides can save the crop from such disaster. Hence, marketing of pesticides is a crucial part in agribusiness input industry and progressive efforts are made to improve pesticides marketing management in the agricultural sector.

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

The retail sale point, being the last element in the distribution channel, forms the most important link between the pesticide manufacturer and the buyers. The farmer looks at the retailer/dealer as his friend. The involvement of the retailer in any undesirable activity like

sale of various pesticides, exorbitant interest over the credit sales have played havoc and resulted in many farmers committing suicide.

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

Therefore, movement of pesticides from various manufacturing units and places to the ultimate user points covering large distances in the most economical manner while maintaining the chemical and physical properties of the product in an acceptable package and the ensure its timely availability is by no means an easy task. The complexity of the problem is bound to increase in the near future in view of the projected consumption of inputs by the turn of the country. To meet the challenge successfully, "The logistic marketing" would have to play a crucial role. The need to develop an effective and economic national distribution system is vital to achieve the desired results. "Logistics" is thus an extremely important function in pesticide marketing discipline. The

importance of pesticide marketing system in the transformation of agricultural science thus, needs no over emphasis. It is as important of production and improved agronomic practices to achieve increased agricultural production.

The consumption of chemical pesticides in India is quite low at 1.8 kg per ha as against 6.4 kg in Korea 5.4 kg in China and 3.9 kg in Indonesia (Raghavan, 1999). However, the consumption of pesticides is concentrated on three crops namely cotton, paddy and chilli and that too in a few states like Andhra Pradesh, Uttar Pradesh, Punjab, Gujarat, Karnataka and Maharashtra, Karnataka stands at the ninth position consuming 0.345 kg per ha. Tamil Nadu stands first position consuming 1.125 kg per ha (Sharma and Sharma, 1999). Unless more and stringent efforts are made towards ushering in an efficient marketing of pesticides, we cannot hope to increase the agricultural production in the near future with targets of about 220 million tonnes of food grain by 2010 AD. Hence, this calls for a critical study of the pesticide marketing management.

The present study has been undertaken with a view to highlight market structure for pesticides at dealers level, pesticides purchasing behaviour of farmers, brand equity of pesticide firms, cost and margins involved in different brands of pesticides. This research is conducted, keeping in view of pesticide companies, distributors, dealers and government regulatory measures in evolving the policies/strategies for effective pesticide marketing.

Specific objectives

The specific objectives of the study are

1. To analyse the market structure for pesticides at dealers level
2. To study the pesticide purchasing behaviour of farmers
3. To analyse brand equity of pesticide firms
4. To analyse cost and margins involved in marketing of selected brands of pesticides
5. To project the demand for selected brands of pesticides
6. To suggest appropriate strategies for effective pesticide marketing by pesticide companies and by government regulatory measures

Presentation of the study

The importance and significance of the present study along with the specification of the objectives to be achieved are presented in the first chapter. The second chapter deals with the review of the some of the earlier studies pertaining to the objectives of the present study. Chapter three describes the methodology adopted and analytical framework adopted for the study. The results of the study are presented in the fourth chapter. The fifth chapter deals with the interpretation and discussion of the results. The last chapter contains the summary of the main findings and policy/strategy implications emerging from the findings of the present study.

Review of Literature

II. REVIEW OF LITERATURE

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

The review is presented under the following heads.

2.1 Marketing structure for pesticides at dealers level

2.2 Pesticide purchasing behaviour of farmers

2.3 Brand equity of pesticide firms

2.4 Costs and margins involved in marketing of pesticides

2.5 Demand projection for different brands of pesticides

2.1 MARKETING STRUCTURE FOR PESTICIDES AT DEALERS LEVEL

Holmes (1970) studied the market structure in a north Indian Tahasil. The number, size and spatial location of marketing agents, condition of entry into the market and availability of information on prices to farmers were the factors considered in market structure. It appeared that the food grain marketing system had a good basic strength. The analysis of structure indicated the existence of a substantially competitive environment.

Rajagopalan *et al.* (1973) examined the efficiency of retailing fertilizer in Coimbatore district. The study revealed that the marketing system was not efficient, the increased satisfaction could be derived at increasing cost due to non-availability of desired types of fertilizers in time. The farmers preference was not technically sound and hence he was not optimizing. Hence, they suggested more intensive extension education strategies to be devised for educating farmers. The timeliness of supply influenced cost, optimisation over time and space had become increasingly crucial for distribution.

Horowitz (1981) in his study "market definition in anti trust analysis", states that market structure concept in relation to economists and marketers as economics and marketing disciplines take different methodological approach toward solving market structure analysis problem, each has its own strengths and limitations. Economics is concerned with broad socio-economic issues (eg. Market competition and fair pricing) as well as managerial, microeconomic problems (eg. Firm pricing strategies). Marketing, on the other hand, is more concerned with managerial aspects of market structure analysis. Each touches on the primary domain of the other, the distinction between economic and marketing structures analysis is a matter of relative emphasis.

Baker (1985) emphasized that market structure analysis is inherently managerial, that is the relationship between firm behaviour and marketing structure. The firm's definition of its industry and its market will be critical to the formulation of its own competitive strategy and success or otherwise of this strategy. Marketers turn to measures of

cross elasticity to help then the relationship of market structure and the firm.

Russell *et al.* (1988) examined that marketing person in situation analyse value to managerial market structure analysis, regarding the application of product mix elasticities to firm strategic decision making. Relating elasticities to market structure is a difficult task, through the economic theory of demand, the abstractness of the theory makes it difficult to forecast how brand's marketing mix elasticities will be affected by changing competitive conditions.

Bain (1989) emphasized that the most characteristics and strategic aspects of market structures are, the degree of seller concentration, the degree of buyer concentration, the product differentiation and the condition of entry to the market. He classified any product or service marketing as high seller concentration (where three sellers supply about 90 per cent of the market), the moderate seller concentration (where four sellers supply about 60 per cent of the market) and low seller concentration (where twenty sellers supply about 45 per cent of the total market).

Broaddus (1991) studied the structure of the market structure of the market for banking services in Federal Reserve Bank of Richmond and stated that market structure is important in that it affects market outcomes through its impacts on the motivations, opportunities and decisions of economic factors participating in the market. The goal of economic market structure analysis is to isolate these effects in an

attempt to explain and predict market outcomes. Market structure analysis attempts to explain and predict market outcomes through the extent of market competition. A key element of economic market structure analysis is product substitutability. Product substitutability is strategically linked with market definition, a foundation element of market structure analysis.

Colton (1993) studied about consumer information and workable competition in telecommunication and emphasized that markets are classified according to the structure of the industry serving the market. Industry structure is categorized on the basis of market structure variables which are believed to determine the extent and characteristics of competition. Those variables which have received the most attentions are number of buyers and sellers, extent of product substitutability, costs, extent of mutual interdependence and ease of entry and exit. According to Colton the taxonomy of market structure: perfect competition, monopolistic competition, oligopoly and monopoly.

Yadav (1995) studied the bundle evaluation in market segments, he interprets that market structure is central to both economics and marketing, both disciplines are concerned with strategic decision making. In decision making analysis, market structure has an important role through its impact on decision making environment. The extent and characteristics of competition in the market affect behaviour among the actors. Person in situation methodology can help reveal the relationship between market structure and elasticity structure.

Padmanabhan and Sankaranayrayan (1999) studied the market structure for pesticides in Tuticorin district in South Tamil Nadu. In this study they made an attempt to analyse market structure of pesticides at retail level and the degree of concentration. The market structure of pesticides at retail level was identified as oligopoly, implying that major share of pesticides sales was concentrated with few dealers based on brand name, symbol and colour of the packing material offered by the firms. The farmers were able to differentiate the pesticides. Competition between the existing retailers in retaining the market share and high investment act as barriers to entry.

2.2 PESTICIDE PURCHASING BEHAVIOUR OF FARMERS

Kaurshal *et al.* (1976) found that educational level significantly influenced the brand loyalties in use of washing soaps. Educated people based their loyalties on easy lather formation, convenience in handling and soaps not affecting skin, while less educated people on the basis of price, attractive packaging and easy availability in the market. Sellers can adopt suitable marketing strategies dividing high quality products among educated and cheap products among illiterate class.

Venkateshwaralu *et al.* (1984) attempted to examine the reason for being brand loyal. It has been found that 50 per cent of consumer respondents preferred a particular brand because they are convinced that its quality is better than that of other brands. Another 38 per cent of the sample consumer felt taste makes them to go in for a particular brand while very few consumers in the sample have stated low price and easy

availability as reasons for selecting a brand. The implications are clear that consumer are fairly brand conscious and hence effective brand strategy has its role in effective marketing.

Ali (1992) studied the factors influencing purchasing decision for processed products. It revealed that factors such as taste, family preference, price, good keeping quality, well known brand, colour and consistency were important in the buying decision of the consumer in that order.

Webster (1992) studied about "the changing role of marketing in the corporation", he estimated that it costs six to nine times more to acquire a new customer than it does to retain a current one. Hence ongoing customer relationships are the company's most important business aspects. There should be less focus on functionalism and production and more on relationship and meanings.

Sivakumar *et al.* (1994) analysed buying behaviour of farmers with respect to pesticides, considering the factors influencing loyalty of farmers towards dealer and brand. Friends, neighbours 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. Credit availability, advertisements and price of products available with dealer contributed significantly to dealer loyalty.

Aaker (1997) studied about building brands without mass media, he revealed that several companies in Europe have come with alternate

age, the various companies share characteristics that could serve as guidelines for any company hoping to build successful brand, the characteristics are 1. Senior managers were carefully involved with brand buildings efforts, 2. The companies recognized the importance of clarifying their core brand identity, 3. They made sure that all their efforts to given visibility were lead to that core identity, studying methods of companies outside one's own individual and country can be instructive for managers.

Kharwadkar (1997) expressed that the 5th P i.e. people (field force) is an important tool of successful brand creation in agro-chemicals. The marketing programmes can be directed towards brand preference and brand loyalty as a powerful instrument of demand creation and demand retention. Segmentation emphasizes demand side of the market. Major segmentation variables for pesticide market are mainly classified as geographic, demographic, psychographic and behaviouristic.

Ashalatha (1998) studied the factors influencing the performance of BAMUL milk for a sample of 100 respondents. The study revealed that the factors such as door delivery, clean packing, quality, hygienic, preparation, time saving, reliability good. Value for money, freshness and desired flavour were important in the similar order in influencing the decision of buyers for BAMUL milk.

Keller *et al.* (1998) reports the results of laboratory experiment examining the effects of meaningfulness of brand names. It was found that brand name explicitly conveying a product benefit (eg. Picture perfect television) lead to higher recall of an advertised benefit claim consistent

with the brand name compared with non-suggestive brand name (Eg. Emporium televisions). Conversely, a suggestive brand name leads to lower recall of a subsequently advertised benefit claim unrelated in product meaning (Eg. Superior sound) compared with non-suggestive brand name. The author discuss implications of these findings for marketers with respect to advertising strategies and optimal use of meaningful brand names in building and managing brand equity.

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 of advertisement significantly influenced the brand loyalty. Only when the price of a particular brand is comparatively lower to prices of other brand in the market the farmers would naturally prefer to low priced brand. Otherwise farmer would naturally continue to purchase the same brand.

Padmanaban and Sankaranarayanan (1999) analysed farmer loyalty to dealer for pesticides in southern Tamil Nadu. The study showed that the price of pesticides and credit availability were the important factors influencing the dealer loyalty of farmers towards the purchase of pesticides. The study brought to light that farmers were highly sensitive towards price of a product and credit facilities. When credit facilities are made available to the farmers by the dealers coupled with reasonable pricing of products, farmers become more and more loyal to dealers. This study also underlines the importance of crucial role played by the dealers in pesticide marketing.

2.3 BRAND EQUITY OF PESTICIDE FIRMS

Aaker (1991) defines brand equity as a set of brand aspects and liabilities linked to a brand, its name and symbol, that add to or subtract from the value provided by a product or service to a firm and/or that firm's customers.

Leuthesser *et al.* (1995) reveals in his study "brand equity – the halo effect measure", that brand equity represents the value (to a consumer) of a product without the brand's name. In other words, brand equity represents the degree of which a brand's name alone contributes value to the offering (again, from the perspective of the consumer).

Dhar (1997) reports in his article "marketing concept of agro-chemicals", that effective communication plays a major role in pesticide dealer and inturn he pass on the communication to our pesticide units. If he passes the message to the farmer, the message tend to become weekend while moving down, the most effective communication is face to face communication with the user/farmer. The farmer can understand the message, if he can first be shown how it can benefit him and why it is important to them.

Katyal (1997b) reveals in his article "role of mnemonics in rural marketing – a study for pesticide industry", that local manufactures of pesticides are exploiting strong brand equity being enjoyed by major Indian brands and Multi national companies brand in order to establish a market for their own brands. This fact necessitate adoption of some marketing tools which would help farmers in identifying superior brands

and assist rural marketers in defeating the motives of local manufactures in exploiting the popularity being enjoyed by genuine brands for filling up their own packets.

Kharwadkar (1997) reports that brand management or brand equity has become a key marketing buzzword in todays competitive world. Brand management is common marketing tool adopted in agrochemical industry. Field force plays on important role in agrochemical industry for successful brand promotion. Brand equity provides value to customer by enhancing customer's: interpretation, processing of information. Confidence in the purchase decision and use satisfaction.

Murry and Heide (1998) reported that the result of a study that examines retailer participation in manufacturer – sponsored promotion programs. Two particular aspects of participation are studied namely (1) retailer agreement to participate in point of purchase programmes and (2) retailer compliance with established agreements. The results suggest that interpersonal relationship are less important determinants of participation than economic incentives.

Tax *et al.* (1998) reported in their study "customer evaluation of service complaint experiences : implication for relationship marketing", that many companies consider complaints handling as means of increasing customer commitment and building customer loyalty. In this study authors find that a majority of complaining customers were dissatisfied with recent complaint handling experiences. The results support a quasi "brand equity" perspective – wherein satisfaction with complaint handling has a direct impact on trust and commitment.

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Iyengar (1999) reveals in a study "market driven pesticides – present trends and future prospects", that the agro-chemical industry is dominated by Research and Development based companies which have relied on developing new active ingredients to replace existing products. The top 20 agro-chemical companies in the world are, Novarts, Dupont, Monsanto, Zeneca, AgrEvo, Bayer, Rhone Poulenc, Dow Elance, Cyanamid, BASF, Sumitomo, Kumiai, FMC, ISK, Sankyo, Nihon Nohyaku, Rohm and Haas, Hokko and Nissan, all are rated orderly based on their market share.

Burke (2001) has created a brand equity index comprised of three components, best described as "brand equity molecule". Which is overarching device of retaining and attracting customers. The three atoms which embeded to molecule are 1) image, 2) value and 3) loyalty. Image and value perceptions pull in new customers while loyalty and value retain customers.

2.4 COSTS AND MARGINS INVOLVED IN DIFFERENT BRANDS OF PESTICIDES

Dhar (1997) reported in his study "marketing concepts for agro-chemicals", that there is a cut throat competition among pesticides units in old aged products like endosulfan, monocrotophos, cypermethrin, phorate, butachlor EC, isoproturon, acephate, fenvelerate, the difference between procured price and maximum retail price is to the tune of 30-50 per cent. Wholesalers are offered schemes for advance booking, where heavy discounts are given and wholesaler sells the same products at

maximum retail price to the farmer. In most of the areas wholesaler acts as retailer.

Katyal (1997a) reported in his study "role of marketing mix elements in adoption of herbicides to be used under reduced tillage system", that pesticide industry had witnessed sudden influx of local companies in almost all major pesticide markets. Local brands have been sold at lower prices as compared to those of big Indian companies and that of multinational companies. These local manufacturers have adopted trade policies which are most favourable for channel intermediaries that is why their brands are getting dealer push which has strong influence on the purchase behaviour of rural customers.

Sabur and Aktar (1997) studied "marketing and economic use of pesticides in Bangladesh" and noted that the gross margin and net margin of dealers was higher than that of retailers. This was because of dealers lower marketing cost and imperfection of market at dealer level. Entry into dealer market is not easy compared with retail market, because dealers need larger amount of capital and reputation.

Anonymous (1999a) stated in the article "strategy for developing the pesticide industry", that the top 20 agro-chemical companies in the world control 85 per cent of the global sales, and the top 10 command 72 per cent market share. This implies predominance of big players, who can allocate large budgets and the best possible technical manpower and infrastructure for the intense research and development inputs that industry demands.

2.5 DEMAND PROJECTION FOR DIFFERENT BRANDS OF PESTICIDES

Yelledhalli (1991) studied about "agricultural input marketing in Karnataka - a sectorial analysis", forecasted that the consumption of all the plant protection chemicals will increase from level of 4000 tonnes to about 10000 by the year 2005. Insecticides and fungicides show significant increase as seen by growth rates in consumption of plant protection chemicals. However the other group which includes weedicides, rodenticides etc. showed marginal consumption.

Singhal (1997) reports that the trend line of spending on agrochemical business expected an exponential growth. The compound average growth has been around 15 per cent since 1988. This trend is likely to continue for some year. The pesticide market in India is essentially driven by a more than adequate indigenous manufacturing capacity.

Anonymous (1999b), reports that many pesticide cause the development of resistance in populations of organisms; many species of insects, mites, nematodes, microorganisms and weeds have acquired a degree of resistance against one or several types or chemical groups of pesticides. These chemicals become gradually less effective, which necessiates the application of higher dosages, higher application frequencies and mixtures, hence there will be rapid replacement of those chemicals with new products. This is so called "pesticide treadmill".

Parker (1999) estimates that the world market for agrochemicals at end user level is worth around US$45 billion and growing at 1-2 per cent per year, more slowly than during the previous two decades. Agrochemicals still takes lion's share of total crop protection market although diseases and insect resistant, herbicide-tolerant seed varieties and biological pesticides are gradually increasing their shares.

Raghavan (1999) observes that the first generation pesticides based on organochlorin compounds have more or less been phased out by most of countries in pacific regions. Their place has been taken over by organophosphorus pesticides, by mideighties synthetic compounds containing chrysanthemic acid showed insecticidal potency. This led to the development of more than 35 pyrethroid esters.

Sharma and Sharma (1999) estimated that production of pesticides in India increased from 56,090 tonnes during triennium ending 1983-84 to 90,229 MT in triennium ending 1995-96. The production of herbicides registered the highest compound growth rate (15.97%) followed by fungicides (5.55) and lowest in case of insecticides (3.77%) during the period 1981-95. Cotton alone accounts for about 40 per cent of total consumption of pesticides, followed by rice (18.6%) and vegetables (7.3%).

Methodology

III. METHODOLOGY

The chapter contains description of the study area, the sampling procedure, nature and sources of data used in the study, analytical tools and techniques employed. Finally terms and concepts used in the study are discussed under the following heads.

3.1 Description of the study area

3.2 Sampling

3.3 Nature and source of data

3.4 Analytical techniques employed

3.5 Definition of the terms and concepts used

3.1 DESCRIPTION OF THE STUDY AREA

Karnataka state is situated in the west central part of Paninsular India. It consists of a narrow elongated belt between the Arabian sea and western ghats and enhancing coastline of about 400 kilometers.

The state has an area of 1,19,257 sq.km and is situated between 115° and 19° north latitude and 74° and 78° east longitudes. The state is bounded by Maharashtra on the north and by Goa and the Arabian sea on the west. It has a common border with Andhra Pradesh on the east and with Tamil Nadu and Kerala on the south. The average normal rainfall of the state of 1139 mm. The state receives rainfall both from south west and north east monsoons. The mean temperature ranges from 21.5°C to 31.7°C. The climatic endowments are favourable for the

adoption of crossbred cattle and for the production of crops throughout the year if water is made available.

Raichur district is situated in northern dry zone of Karnataka between 16°15N latitude and 77°20 E longitude and at 389 meters above mean sea level. The average annual rainfall is about 650 mm which is confined to monsoon period from June and to November with occasional showers in pre-monsoon months of April and May. This district has wet and perennial irrigation through Left Bank Channel and Tungabhadra Main Project. The soil of district comprises medium black soil and deep black soil. The mean maximum temperature is more than 30°C throughout the year except in December. The relative humidity is uniformly high during the monsoon months from July to September and uniformly low during summer months from March to May.

3.2 SAMPLING

Total geographical area of Raichur district is 8355843 ha. In the total geographical area about 20,557 ha is available for agricultural purposes, 1,01,311 ha of land is canal irrigated and total irrigated land is 1,22,140 ha.

In Raichur district Lingsgur taluk is the largest having 23.22 per cent of total geographical area under it, followed by Manvi taluk with about 21.42 per cent, Devdurga is the smallest taluk having about 17.89 per cent.

In terms of land available for agricultural purpose Lingsgur taluk has 35.78 per cent and ranked first in the district, followed by Devdurga,

Sindhnur, Manvi and Raichur taluks having 24.31 per cent, 18.99 per cent, 17.11 per cent and 3.78 per cent respectively. Again interms of land available for cultivation purpose, Lingsgur taluk ranks first with 34.84 per cent and this was followed by Devdurga taluk with 26.44 per cent, Manvi taluk with about 22.77 per cent, Raichur taluk with 8.68 per cent and Sindhnur with about 7.26 per cent.

Cropping pattern

It could be seen from the table 1 that the crops cultivated in Raichur district are paddy, jowar, bajra, maize, wheat, bengalgram, tur, sugarcane, fruits, vegetables, oilseeds, cotton and chilly with 108728 ha, 151002 ha, 41782 ha, 213 ha, 3123 ha, 6709 ha, 18041 ha, 79 ha, 565 ha, 1545 ha, 174719 ha, 36346 ha and 3469 ha, respectively.

The major field crops of Raichur district were identified as jowar, paddy, cotton, oilseeds, tur, bajra and chilly. Sindhnur taluk is having highest paddy growing area with about 53.6 per cent of the total paddy grown area and is followed by Manvi with about 32.05 per cent, Raichur with about 13.74 per cent, Devadurga with about 0.55 per cent and Lingsgur with about 0.039 per cent.

Cotton is mainly grown in Devdurga with about 37.42 per cent of the total cotton area in Raichur district, followed by Manvi with about 22.7 per cent, Raichur with about 21.62 per cent, Sindhnur with about 16.19 per cent and Lingsgur with 2.05 per cent.

Tur is grown in Devdurga covering 50.2 per cent of the total tur grown area in the district, followed by Raichur with about 22.11 per cent,

Table 1. Taluk-wise distribution of land and cropping pattern in Raichur district (1997-98)

(in hectares)

Sl. No	Particulars	Devdurga	Lingsgur	Manvi	Raichur	Sindhnur	Total
1.	Geographical area	150979	194010	179273	151415	160166	835843
2.	Agricultural land	4999	7357	3518	778	3905	20557
3.	Cultivable land	2832	3732	2439	930	778	10711
4.	Farm holdings	37558	46815	49606	41896	51004	226879
5.	Canal irrigated land	820	-	26494	12772	61225	101311
6.	Total irrigated land	2778	10236	27781	19550	61795	122140
7.	Paddy	602	42	34849	14945	58290	108728
8.	Jowar	30156	34813	27023	32189	26821	151002
9.	Bajra	14970	22497	17041	913	1661	41782
10.	Wheat	462	1900	228	9	524	3123
11.	Bengalgram	1000	3597	1002	772	338	6709
12.	Tur	9069	3360	857	3990	765	18041
13.	Sugarcane	-	-	8	5	66	79
14.	Fruits	118	114	36	37	260	565
15.	Vegetables	600	239	279	280	147	1545
16.	Oilseeds	28015	55831	28614	37377	24882	174719
17.	Cotton	13603	748	8251	7859	5885	36346
18.	Chilly	150	500	700	1965	154	3469

Lingsgur with about 15.62 per cent, Manvi with about 4.75 per cent and Sindhnur with 4.24 per cent.

Raichur taluk tops in chilly grown area with about 56.6 per cent, which is followed by Manvi with about 20.17 per cent, Lingsgur with about 14.41 per cent, Sindhnur with 4.43 per cent, Devdurga with about 4.32 per cent.

Pesticide consumption in Raichur district

The consumption of technical pesticides in India was about 86,330 MT in 1997-1998. India exports of pesticides, valued at labour 691,72,81,000 rupees and importing the pesticides valued about 137,52,96,000 rupees.

At present the consumption of chemical pesticides is highest in Andhra Pradesh (33%), followed by Punjab (14%) and Karnataka (11%). Other major consumers are Tamil Nadu (9 per cent), Maharashtra, (7 per cent), Haryana (6 per cent), Gujarat (5 per cent) and Uttar Pradesh (5 per cent). The rest of the states account for a consumption of only 9.5 per cent of the total pesticides consumed in the country.

Of the total chemical pesticides consumed in India, cotton accounts for the maximum consumption of 45 per cent, rice 22 per cent, vegetables 9 per cent, plantations 7 per cent and pulses 4 per cent. The rest of the crops account for a consumption of only 9 per cent.

It was estimated that pesticide sales turnover is about 40 crores annually. The share of insecticide was 31 crores, fungicides was of about 7 crores and herbicides was of about 2 crores in Raichur district (Fig. 1).

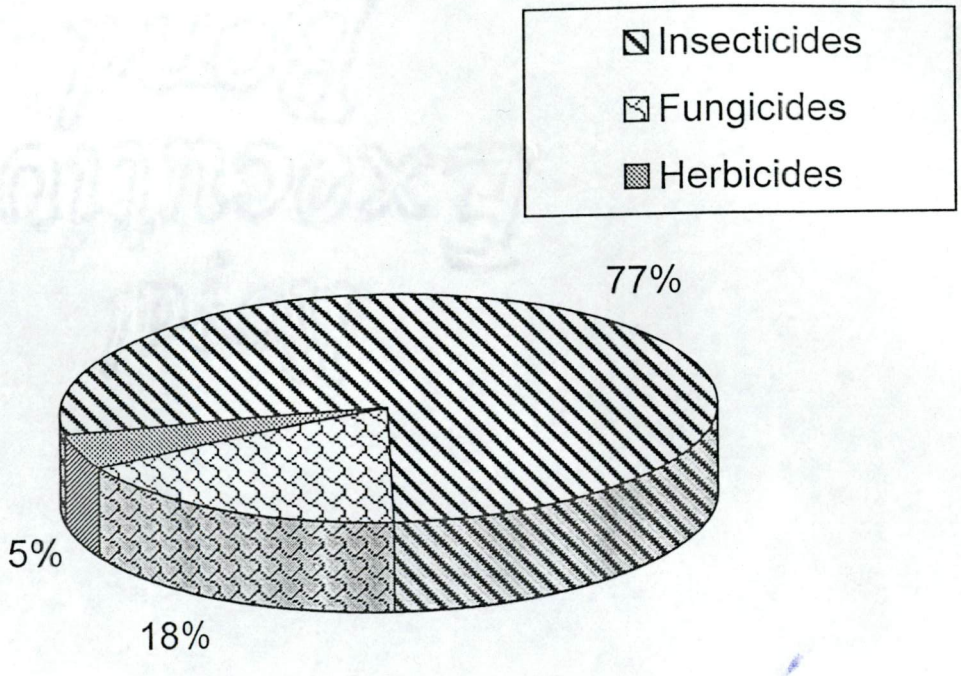

Fig. 1. Share of insecticides, fungicides and herbicides in Raichur district

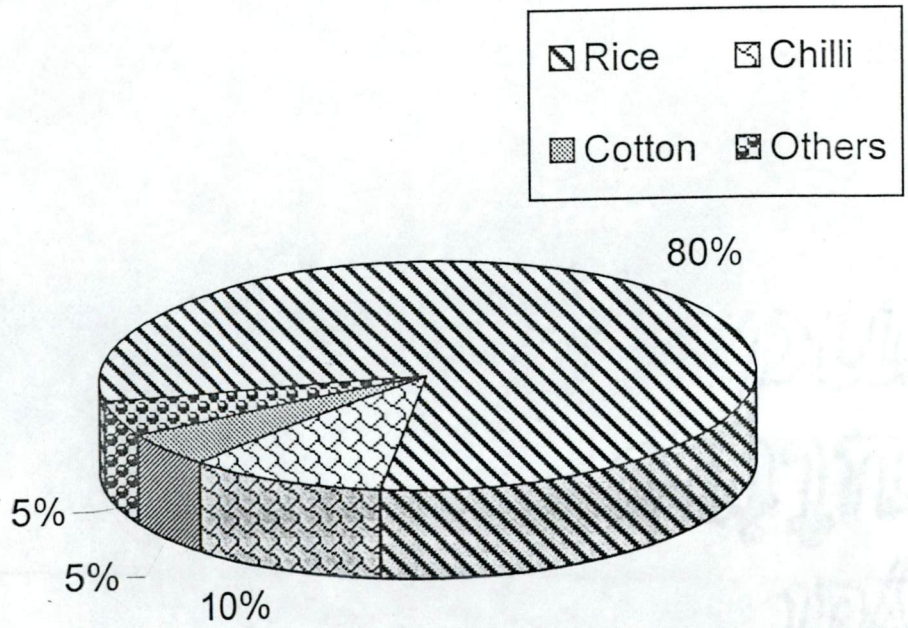

Fig. 2. Consumption of pesticides by different crops in Raichur district

Of the total chemical pesticides consumed in Raichur district, rice accounted for the maximum consumption of 80 per cent, 10 per cent by chilly, 5 per cent by cotton. Other crops accounted for a consumption of only 5 per cent (Fig. 2).

Sampling design

Raichur district is purposively selected for the study, since paddy, cotton, tur, chilly are grown relatively higher than other district which consume maximum pesticides compared to other crops. Four command area taluks such as Raichur, Manvi, Sindhnur and Devadurga were selected purposively, from each taluk 40 farmers were selected randomly as respondents, with respect to dealers 10 dealers from each taluk were selected.

For the purpose of detail study, only those pesticides which were commonly used by farmers were selected. The negligible ones were excluded from the analysis, because of the existence of the numerous brands of pesticides available in the market, the technical grade material was used as quantities of plant protection chemicals marketed. They were broadly grouped into

a) Insecticides

b) Fungicides

c) Herbicides

Under the group insecticides, organophosphoric compounds like acephate, chloropyriphos, DDVP, dimethote, ethion, metasystox, methyl

parathion, monocrotophos, phorate, phosalone, phosphamidon, propanophos, quinalphos, trizophos, endosulfan and synthetic compounds like alpha cyperthrin, cyfluthrin, cyper-25, deltamethrin, fenvalarate, lambdayhalothrin 5 EC, lambdayhalothrin 25 EC. Finally carbomates like carbaryl, carbofuron, cartap 49, BPMC (Bipvin), fipronyl, confidor, methomyl and thiodicarb were the different pesticides taken into consideration.

The group fungicides consisted of wettablesulfer, copperoxy-chloride, adenolphos, hitozin, mancozeb, hexaconazole, triclozole.

Herbicides group consisted of anilofas, butachlor and pretilachor.

3.3 NATURE AND SOURCE OF DATA

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

1. Primary data

Primary data regarding brand loyalty, dealer loyalty, brand equity were collected personally interviewing farmers.

2. Secondary data

The data regarding pesticide sales were collected from different company sales officers. The data regarding cropping pattern and number of dealers were collected from joint director of agriculture department, Raichur.

3.4 ANALYTICAL TECHNIQUES EMPLOYED

3.4.1 Tabular presentation/analysis

3.4.2 Regression analysis

3.4.3 Compound growth rate analysis

3.4.1 Tabular presentation/analysis

This technique was exclusively used for the presentation of following aspects.

1. Degree of concentration of sellers and buyers

The degree of sellers and their concentrations was assessed by estimating the aggregated percentage share of sales turnover of single firm concentration to twenty firm concentration. The buyers concentration was analysed through distribution pattern of pesticide retail outlets in relation to the number of farm holding.

2. Product differentiation

The number of respondents and percentage to the total respondents for differentiating brands by brand name, brand symbol and colour of package are presented in tabular form.

3. Factors influencing for entry into marketing of pesticides

Factors influencing for entry into marketing of pesticides are listed and number of respondents to these factors as well as percentage to

the total respondents and accordingly rating were presented in tabular form.

4. Brand equity

The brand equity of different brands in different molecules of pesticide were rated by taking percentage to the total respondents using particular brands of pesticides and presented in tabular form.

5. Influential means of advertisement

Comparative rating method was used to analyse for rating the different means of advertisement. Where extent of influence like minimum and maximum for each means of advertisement and percentage total respondents to that particular means of advertisement was analysed and rated according to the averages of the different means of advertisement.

6. Costs and margins in different brands of pesticides

Prices and profit margin of different brands of pesticides at distributor and dealer level were worked out and presented. The total cost and margin were calculated by taking the difference of cost from the point of distributor to farmer.

3.4.2 Regression analysis

This technique was used to analyse brand loyalty and dealer loyalty of farmers.

1. Brand loyalty

A linear multiple regression model of the following form was specified to assess loyalty of the farmers.

$$Y = b_0+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_5x_5+b_6x_6+u$$

Where,

Y	=	Brand loyalty
b_0	=	Intercept
b_1-b_6	=	Regression co-efficients
x_1	=	Price of the preferred pesticides
x_2	=	Efficiency of the brand
x_3	=	Influence by advertisements
x_4	=	Package of the brand
x_5	=	Peer group influence
x_6	=	Availability of preferred brand

The variables x_2 to x_6 were measured using four point continuous scale based on satisfactory level that is,

4 - Higher satisfaction

3 - Satisfactory

2 - Moderately satisfactory

1 - Not at all satisfactory

If a farmer purchased the same brand more than once, then he was considered as brand loyal, a score of one was given to a farmer who had

purchased the brand of pesticide once, a score of two was given if he had purchased it for two years and so on.

2. Dealer loyalty

A linear multiple regression model of the following form was specified to assess dealer loyalty of the farmers.

$$Y = b_0+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_5x_5+b_6x_6+b_7x_7+b_8x_8+b_9x_9+b_{10}x_{10}+u$$

Where,

Y	=	Dealer loyalty
b_0	=	Intercept
b_1-b_{10}	=	Regression co-efficients
x_1	=	Price of the product
x_2	=	Credit availability
x_3	=	Peer group influence
x_4	=	Influence of dealer advertisement
x_5	=	Distance of dealer from farmer's place
x_6	=	Malpractice
x_7	=	Customer service
x_8	=	Discount/gift/incentive
x_9	=	Quality of the product
x_{10}	=	Availability of the preferred brand

If a farmer purchased from a particular dealer for more than one year, then he was considered as dealer loyal. A score of one was given to a

farmer who had purchased from a dealer for one year, a score of two was given if he had purchased it for two years, and so on.

The independent variable x_2 to x_{10} were measured using a four point continuous scale. The scores four, three, two and one were assigned to responses as highly satisfactory, satisfactory, moderately satisfactory and not at all satisfactory.

3. Compound growth rate analysis

In order to study the past pattern in use of pesticides and to make projections for the future, an exponential function was titled which would indicate the future trends as well. The functional form of the equation is given as follows

$$Y = ab^x$$

Where,

Y= consumption

X= number of years

a = intercept

b = regression co-efficient

Compound Growth Rate = (b-1) x 100

3.5 DEFINITION OF THE TERMS AND CONCEPTS USED

3.5.1 Effectiveness of the brand

The opinion of farmers regarding the control of pests by a particular brand was considered as effectiveness of brand. If the farmer found that a

particular pesticide is efficient or more effective in controlling the pest, then he considers the pesticides as an efficient one.

3.5.2 Peer group influence

The friends, neighbours, relatives, extension workers agriculture university Scientists were presumed to have influenced on choice of pesticide by farmers, hence considered peer group influence as a variable in brand loyalty test.

3.5.3 Malpractices

Adulteration and sale of spurious pesticides were some of the common malpracticing adopted by traders, the farmers were disloyal to the dealers who were resorting to the malpractices.

3.5.4 Generation pesticides

First generation pesticides were DDT, BHC called as organochlorins, second generation pesticides were organophosphoric compounds, third generation pesticides were bio pesticides (bio control pesticides) and synthetic compounds. First generation chemicals were banned to use as agriculture pesticides because of heavy residual effects.

Results

IV. RESULTS

The results of the analysis are presented in this chapter under the following heads.

4.1 Market structure for pesticides at dealers level

4.2 Pesticides purchasing behaviour of farmers

4.3 Brand equity of pesticide firms

4.4 Costs and margins involved in marketing of selected brands of pesticides

4.5 Demand projection for selected brands of pesticides

4.1 MARKET STRUCTURE FOR PESTICIDES AT DEALERS LEVEL

4.1.1 Degree of concentration of sellers and buyers

The number of sellers and their concentration were presented in table 2. The degree of concentration of sellers was assessed by estimating the aggregated percentage share of sales turnover of single firm, two firms, six firms, eight firms, ten firms, twelve firms, fourteen firms, sixteen firms, eighteen firms and twenty firms, to total sales value of pesticide firms. It could be seen from the table that single firm concentration ratio was only 3 per cent while twenty firm concentration ratio was 41.87 per cent.

The distribution pattern of pesticide retail outlets in relation to the number of farm holdings is analysed and presented in the table 3. There

Table 2. Number of sellers and their concentrations in marketing of pesticides in Raichur district

Firm concentrations	Percentage share in total sales value in percentage
Single	03.00
Two	05.50
Four	10.50
Six	15.50
Eight	20.50
Ten	25.50
Twelve	29.50
Fourteen	33.50
Sixteen	36.87
Eighteen	39.37
Twenty	41.87

Table 3. Distribution of dealers and farm holding in Raichur district

Name of taluk	Number of farm holdings	Number of dealers	Average number of farm holdings/dealers
Raichur	41896	67	625
Manvi	49606	69	719
Sindhnur	51004	110	464
Devdurga	37558	19	1977
Total	180064	265	679

were 265 pesticide retailer to cater to the needs of farmers in four study blocks. There were 180064 farm holdings in the study area, indicating the large number of buyers. On an average each dealer was catering to the needs of 679 farmers. The highest number of farm holding (1977) per dealer was in Devdurga with 19 dealers serving to 37558 holdings. The least average number of farm holding (464) in Sindhnur with 110 dealers serving to 51004 farm holdings.

4.1.2 Product differentiation

The degree of product differentiation by farmers among the pesticide brands of various firms/companies with the aid of brand name, brand symbol and colour of package are shown in table 4. The table reveals that 65 per cent of respondents differentiate the various brands by brand name, 20 per cent by brand symbol and 15 per cent of colour of package.

4.1.3 Factors resisting the entry of new firms into pesticide marketing

The factors effecting the entry of new firms was analysed and are presented in table 5. The table reveals that credit sales of pesticides to farmers is perceived as greatest barrier with 87 per cent of dealer respondents, this was followed by risky investments (80%), lengthy registration procedures (75%), high competition (62%), inadequate trained personnel for marketing (50%), high taxes (45%), need for advertisement (40%), government inference as well as lack of storage facility (37.5%), finally duplicate products and lack of transportation facility (25%) are factors resisting to entry as perceived by dealers.

Table 4. Product differentiation of pesticides in Raichur district

Product differentiation methods	Respondents	Percentage
Brand name	104	65.00
Brand symbol	32	20.00
Colour of package	24	15.00

Table 5. Factors resisting entry of new firms into pesticide marketing

Sl. No	Factors perceived	Respondents	Percentage	Rating factor
1.	Risky investments	32	80.00	II
2.	Credit sales	35	87.00	I
3.	Lengthy registration procedures	30	75.00	III
4.	Government interference	15	37.50	VIII
5.	High taxes	18	45.00	VI
6.	Lack of transportation facility	10	25.00	IX
7.	Inadequate trained personnel for marketing	20	50.00	V
8.	Lack of storage facility	15	37.50	VIII
9.	Duplicate products	10	25.00	IX
10.	High competition	25	62.00	IV
11.	Need for advertisement	16	40.00	VII

Note: There were multiple respondents for each factor perceived

4.2 PESTICIDE PURCHASING BEHAVIOUR OF FARMERS

4.2.1 Brand loyalty of farmers

The results of the brand loyalty function are presented in table 6. A regression function was computed taking the following factors *viz.*, price of preferred brand, effectiveness of the brand, influence of advertisement, packaging of product, peer group and resource person influence as well as availability of particular brand.

The results of the equation shows that the price of the preferred brand as well as peer group and resource person influence are found significant at 0.1 per cent, efficiency of preferred brand was significant at 1 per cent and package of brand as well as availability of brand were at non-significant. With respect to choice of brand, the coefficient of multiple determination was found to be 0.60 explaining the variation in the dependent variable to an extent of 60 per cent due to the variation in independent variables included in the function.

4.2.2 Dealer loyalty of farmers

The results of dealer loyalty function are presented in table 7. A regression function was computed taking the following factors *viz.*, price of preferred brand, credit availability, peer group influence, dealers advertisement, location, malpractices, customer service, discount/gift/ incentive, quality of the product, availability of the preferred brand.

The results of the equation shows that the price of preferred product was significant at 0.1 per cent influencing the dealers loyalty to

Table 6. Brand loyalty of farmers respondents for estimation of pesticides in Raichur district

Variables	Estimated co-efficients	Standard error	't' value
Intercept	-3.695	0.534	6.919
Price of preferred brand	1.106	0.118	9.341***
Effectiveness of the brand	0.421	0.114	3.683**
Influence of advertisement	0.147	0.062	2.354*
Packing of product	-0.056	0.088	0.637 NS
Peer group and resource person influence	0.312	0.058	5.322***
Availability of brand	0.068	0.058	1.159 NS

$R^2 = 0.60$ F = 38.54

*** Significant at 0.1 per cent
** Significant at 1 per cent
* Significant at 5 per cent
NS - Non-significant

Table 7. Dealer loyalty of farmers for pesticides in Raichur district

Variables	Estimated co-efficients	Standard error	't' value
Intercept	-4.681	0.712	-6.570
Price of preferred brand	0.925	0.166	5.550***
Credit availability	0.420	0.135	3.101*
Peer group influence	0.022	0.130	0.175 NS
Dealers advertisement	-0.076	0.105	-0.725 NS
Distance (location)	0.014	0.052	0.277 NS
Malpractices	0.228	0.070	3.251**
Customer service	0.025	0.071	0.362 NS
Discount/gift/incentive	0.114	0.048	2.366*
Quality	0.332	0.151	2.185*
Availability of brand	0.312	0.152	2.050*

$R^2 = 0.57$ F = 20.43

*** Significant at 0.1 per cent
** Significant at 1 per cent
* Significant at 5 per cent
NS - Non-significant

the large extent. The malpractices prevailing at the dealers point also significantly influenced the farmer showing significant at 1 per cent level. Credit availability, discount/gift/incentive, quality and availability of the preferred brand were significant at 5 per cent level influencing the dealer loyalty. Peer group influence, dealer advertisement, location and customer service stood at non-significant level to the dealer loyalty. The multiple determination was found to be 0.57 explaining the variation of 57 per cent in dealer loyalty of farmers to the variables included in the function.

4.3 BRAND EQUITY OF PESTICIDE FIRMS

4.3.1 Brand equity rating

The brand equity of top 5 firms/companies in different molecules are presented in the table 8 i.e. as per the sample size of 160 farmers in relation to awareness of the product. The results are shown in percentages. In monocrotophos, UPL stood first with 23 per cent equity followed by Novartis (19%), Denocil (12%), Vantech pesticides (10%) and Bayer (9%). In quinalphos, Novartis stood first with 28 per cent equity followed by UPL (22%), Guj. insect ltd. (19%), Bayer (12%) and Indofil (7%). In chlorophyriphos, excel rated first with 24 per cent equity, Denocil (23%), Indofil (16%), Novartis (13%) and Searle (11%). In fenvelerate, searle rated high with (30%), followed by UPL (18%), Rallis India (14%), Novartis (12%), Denocil (10%). In case of carbendazim, BASF stood first with 51 per cent equity, followed by Gujarat Insect Ltd (17%), Aventis (9%), Denocil (7%) and Rallis India (5%). In case of mancozeb, indofil rated

Table 8. Brand equity for selected pesticides in Raichur district

Molecules	Rating of different brands					
	I	II	III	IV	V	VI
Monocrotophos	UPL	Novartis	Denocil	Vantech pest.	Bayer	Others
	(23)	(19)	(12)	(10)	(9)	(27)
Quinalphos	Novartis	UPL	Guj. insecticides	Bayer	Indofil	Others
	(28)	(22)	(19)	(12)	(7)	(12)
Chloroyriphos	Excel	Denocil	Indofil	Novartis	Searle	Others
	(24)	(23)	(16)	(13)	(11)	(13)
Fenvelerate	Searle	UPL	Rallis India	Novartis	Denocil	Others
	(30)	(18)	(14)	(12)	(10)	(16)
Carbendazim	BASF	Guj. Insecticides Ltd.	Aventis	Denocil	Rallis India	Others
	(51)	(17)	(9)	(7)	(5)	(11)
Mancozeb	Indofil	UPL	Dupont	Rallis	Searle	Others
	(23)	(21)	(18)	(15)	(11)	(12)
Herbicides	Gharda	Aventis	Montaris Ind	Excel	UPL	Others
	(25)	(24)	(18)	(17)	(10)	(6)

Note: Figures in parenthesis indicate percentage to the total respondents for that particular brand

high with 23 per cent equity followed by UPL 21 per cent equity. Dupont (18%), Rallis India (15%) and Searle (11%).

In case of herbicides, Gharda stood first with (25%) equity followed by aventis (24%), montaris India (18%), Excel (17%) and UPL (10%).

4.3.2 Influential means of advertisement for sale of pesticides

Among different types of advertisement rating factor was calculated and represented in the table 9. Spot demonstration was first rated followed by farmers meeting (II), fairs participation (III), radio (IV), wall painting (V), theatres (slides and films) (VI), distribution of literature (VII), calendars (VIII), shop hangers (IX), local press (X), banner (XI) and finally posters (XII) were rated as influential means of advertisement in decreasing order.

4.4 COSTS AND MARGINS INVOLVED IN MARKETING OF SELECTED BRANDS OF PESTICIDES

The cost and margins of different brands of pesticides at distributors and dealers level are presented in the table 10. The profit margin at distributor level ranged from 17.30 per cent to 13.05 per cent. The highest profit margin (17.30%) was in monocrotophos of Jaikisaan brand and lowest profit margin (13.06%) was in imidochloprid of Bayer brand.

The profit margin at dealer level ranges from 14.82 to 2.63 per cent, the highest profit margin (14.82%) was in fenvalerate of Rallis India brand and lowest profit margin (2.63%) was in mancozeb of Jaikisaan brand.

Table 9. Influential means of advertisement in marketing of pesticides in Raichur district

Sl. No.	Media	Per cent of respondents	Extent of influence			Rating factor
			Min.	Max.	Avg.	
1.	Local press	25.00	30	50	38	X
2.	Theaters (slides and films)	53.12	45	55	50	VI
3.	Radio	60.00	50	60	54	IV
4.	Banners	37.50	30	40	37	XI
5.	Posters	63.75	30	45	36	XII
6.	Shop hangers	34.37	40	50	43	IX
7.	Wall paintings	40.00	50	55	52	V
8.	Calendars	51.25	35	50	46	VIII
9.	Farmers meeting	70.00	70	75	73	II
10.	Distribution of literature	35.00	35	55	49	VII
11.	Spot demonstration	70.00	70	80	77	I
12.	Fairs participation	45.00	60	70	66	III

Table 10. Brand-wise cost and margins of selected pesticides in Raichur district

(in rupees)

Sl. No.	Brands of pesticides	Distributors			Dealers			MRP	Total cost of margin
		Cost of pesticide	Sale price	Profit margin	Cost of pesticide	Sale price	Profit margin		
I	**Monocrotophos (ltr)**								
1	UPL	190	225	35 (15.50)	225	250	25 (10.00)	340	60 (24.00)
2	Novartis	240	280	40 (14.28)	280	290	10 (03.44)	416	50 (17.24)
3	Jaikisaan	190	230	40 (17.30)	230	240	10 (3.44)	491	50 (20.83)
II	**Fenvelerate**								
4	Searle	230	270	40 (14.80)	270	280	10 (3.57)	346	50 (17.85)
5	Rallis India	195	230	35 (15.20)	230	270	40 (14.82)	346	75 (27.77)
6	Jaikisaan	210	250	40 (16.00)	250	270	20 (7.41)	335	60 (22.22)
III	**Mancozeb (kg)**								
7	Indofil	150	174	24 (13.79)	174	190	16 (8.42)	285	40 (21.05)
8	Dupont	150	174	24 (13.79)	174	190	16 (8.42)	254	40 (21.04)
9	Jaikisaan	160	185	25 (13.57)	185	190	5 (2.63)	335	30 (15.78)
IV	**Imidochloprid (ltr)**								
10	Bayer	2730	3140	410 (13.06)	3140	3300	160 (4.85)	3582	370 (17.27)

Note: Figures in parenthesis indicate percentage values

Total cost margin from distribution to till it reaches the farmer ranged from 27.77 per cent to 15.78 per cent *i.e.*, highest cost margin 27.77 per cent in fenvelerate of Rallis India and lowest cost margin (15.78%) in mancozeb of Jaikisaan brand.

4.5 DEMAND PROJECTION FOR SELECTED BRANDS OF PESTICIDES

The growth rate and demand projection of different brands of pesticides are presented in the table 11. Among organophosphoric compounds metasystox was having highest growth rate (9.33%) with demand projection 6.51 mt for the year 2003. Growth rate was highly negative (-14.20) for phosphomidon and triazophos with 1.88 mt demand projection for 2003, dimethoate, ethion and methyl parathion are having stagnant growth rate with demand projection of 5 mt, 10 mt and 3 mt respectively upto 2003. Among synthetic compounds confidor is having highest growth rate (144.9) with demand projection of 440.6 mt for the year 2003 and growth rate was highly negative (-58.8) for carboryl with nill demand projection for year 2003. Alphacypermethrin, cypermethrin, BPMC and fipronyl are having constant growth rate upto 2003 with demand projection of 1 mt, 10 mt, 100 mt and 400 mt respectively, negative growth rate for remaining synthetic compounds were observed.

The molecules like lambdacyhalothrin 5 per cent EC, lambdacyhalothrin 25 per cent EC were introduced in year 2000-2001, hence no demand projection could be done. Among fungicides, hexaconazole is having highest growth rate (41.42) with demand projection of 56.55 mt for the year 2003 and most negative growth rate (-

Table 11. Demand projection for different molecules of pesticides in Raichur district

Sl. No.	Molecules	Growth rate in percentage	2000 (qty in m.t.)	2001 (qty in m.t.)	2002 (qty in m.t.)	2003 (qty in m.t.)
	OP compounds					
1	Acephate	8.19	50	54.09	58.50	63.29
2	Chloropyriiphos	8.32	59	63.90	69.21	74.96
3	DDVP	-8.08	30	27.57	23.34	23.29
4	Dimethoate	0	5	5	5	5
5	Ethion	0	10	10	10	10
6	Motasystox	9.33	5	5.46	5.96	6.51
7	Methyl parathion	0	3	3	3	3
8	Monocrotophos	6.92	100	106.92	114.31	122.23
9	Phorate	-5.32	500	473.41	448.21	424.36
10	Phosalone	-6.47	8	7.48	6.99	6.53
11	Phoshamidon	-14.20	15	12.72	10.91	9.36
12	Propanophos	-14.20	3	2.57	2.20	1.88
13	Quinalphos	-2.87	100	97.13	94.34	91.65
14	Triazophos	-14.20	3	2.57	2.20	1.88
15	Endosulfan	-7.26	70	64.91	60.19	55.82
	Synthetic compounds					
16	Alpha cypermethrin	0	1	1	1	1
17	Cyfluthrin	-8.26	30	27.52	25.24	23.15
18	Cypermethrin	0	10	10	10	10
19	Deltamethrin	-18.77	1	0.8123	0.660	0.537
20	Fenvelerate	-9.60	50	45.20	40.86	36.93
21	Lambdacyhlorothrin 5% EC	-	35	-	-	-
22	Lambdacyhlorothrin 25% EC	-	15	-	-	-
	Carbomates					
23	Carboryl	-58.8	2	0	0	0
24	Carbofuron	-2.54	1500	1461.9	1424.76	1388.57
25	Cartap	-	100	-	-	-
26	BPMC (Bipvin)	0	100	100	100	100
27	Fipronyl	0	400	400	400	400
28	Confidor (imdochloprid)	144.9	30	73.47	179.22	440.6
29	Methomyl	-1.34	3	2.95	2.91	2.87
30	Thiodicarb	-5.84	1	0.994	0.935	0.880
	Fungicides					
31	Wettable sulfer	0	20	20	20	20
32	Carbendazim	2.08	28	28.58	29.17	29.77
33	Copper oxy chloride	-12.69	35	30.55	26.67	30.05
34	Adphenolphos	-9.23	10	9.07	8.23	7.47
35	Kitazin	0	10	10	10	10
36	Mancozeb	-6.47	40	37.41	34.98	32.71
37	Hexaconazole	41.42	20	28.28	39.99	56.55
38	Tricolazole	12.93	15	16.93	19.12	21.559
	Herbicides					
39	Anilofas	-7.03	25	23.24	21.60	20.08
40	Butachlor	0	25	25	25	25
41	Pretilachlor	13.77	20	22.75	25.88	29.44

12.69) for copper-oxy-chloride with demand projection 30.05 mt for the year 2003. Molecules like wettable sulfer and kitazin are having stagnant growth rate with 20 mt and 10 mt as demand projection upto 2003. Among herbicides pretilochlor is having highest growth rate (13.77) with a projected demand 29.44 mt for the year 2003. Butochlor is having constant demand projection of 25 mt upto 2003, anilofas is having negative growth rate with demand projection of 20.08 mt for the year 2003.

Discussion

V. DISCUSSION

The results of the investigation presented in the previous chapter are discussed in this chapter under the following headings.

5.1 Market structure for pesticides at dealers level

5.2 Pesticide purchasing behaviour of farmers

5.3 Brand equity of pesticide firms

5.4 Costs and margins involved in marketing of selected brands of pesticides

5.5 Demand projection for selected brands of pesticides

5.1 MARKET STRUCTURE FOR PESTICIDES AT DEALERS LEVEL

Analysis of market structure was carried out by using most characteristic and strategic aspects. They are as follows,

5.1.1 Degree of concentration of sellers and buyers

5.1.2 Degree of product differentiation

5.1.3 Factors resisting the entry of new firms into pesticide marketing

5.1.1 Degree of concentration of sellers and buyers

Table 2 shows that single firm concentration was only 3 per cent meaning that 3 per cent of the total pesticides sales was done by single firm, likewise two firm concentration was 5.50 per cent, four firm

concentration was 10.50 per cent, six firm concentration was 15.50, eight firm concentration was 20.50, ten firm concentration was 25.50, twelve firm concentration was 29.50, fourteen firm concentration was 33.50 sixteen firm concentration was 36.87, eighteen firm concentration was 39.37 and twenty firm concentration was 41.87. According to Bain (1989) if three firm concentration was 90 per cent then it is high seller concentration, if four firm concentration was 60 per cent than it is moderate seller concentration and if twenty firm concentration was 45 per cent then it is low seller concentration. From the results obtained (Table 2), it could be inferred that pesticides retail sales was considerably low concentration market, since twenty firm concentration was only 41.87 of total market.

From table 3, it was confirmed that the concentration of pesticide buyers was comparatively higher in Devdurga with average number of farm holdings per dealer as 1977 followed by Manvi (719), Raichur (625) and Sindhnoor (464). Totally there were 180064 farm holdings with 265 pesticide dealers, indicating large number of buyers. On an average each dealer was catering to the needs of 679 farmers. Devdurga was having lower irrigated land among other study blocks hence there are less number of dealers leading to the high concentration of pesticide buyers. Sindhnoor was having highest irrigated land hence there are more number of dealers leading to the low concentration of pesticide buyers. Since irrigated land served as intensive agriculture cropping system with paddy, pesticide shops were more attracted because of this reason, higher irrigated areas were having highest number of pesticide dealers and this

led to low concentration of buyers in Sindhnoor with highest irrigated lands and high concentration of buyers in Devdurga with less irrigated lands.

5.1.2 Degree of product differentiation

The degree of product differentiation by farmers as among the pesticides of various sellers – that is the extent to which pesticides are viewed as heterogeneous or homogeneous and also how farmers differentiated the pesticides was confirmed from the table 4. As per the table, majority (65%) of the respondents were able to discriminate the pesticides by brand name, 20 per cent respondents would discriminate by brand symbol and very less respondents (15%) could discriminate by colour of the package. The farmers purchased and used pesticides manufactured by different firms and if they were satisfied with its performance then they tend to use the same pesticides by identifying with brand name, brand symbol and colour of package. This also encouraged the manufacturers to produce quality pesticides since the farmers will always purchase quality pesticides produced by them and buy repeatedly.

5.1.3 Factors resisting the entry of new firms into pesticide marketing

Factors resisting the entry of new firms into the pesticide marketing such as risky investments, credit availability, lengthy registration procedures, government interference, high taxes, lack of transportation facility, inadequate trained personnel for marketing, lack of storage facility, duplicate products, high competition, advertisement needs were all considered and analysed to know their extent of influence as factors for

entry to the market. The table reveals that making credit availability of pesticides to farmers was perceived as greatest barrier with 87 per cent of respondents, followed by risk investments (80%), lengthy registration procedures (75%), high competition (62%), inadequate trained personnel for marketing (50%), high taxes (45%), need for advertisement (40%), government interference as well as lack of transportation facility (25%) were factors of barriers to entry as perceived by dealers. The dealers who are already existing in the market can cut of their margins competitively. They can also provide credit with more number of credit days for repayment at interest rate so as to keep the farmers in their grip, which the new entrants to pesticide marketing cannot afford. The farmers in the study area prefer to purchase from single outlet as it would minimize their time, expenses and also facilitate purchasing on credit basis. Other than these reasons, there were already many number of sellers and vagaries of monsoon and high investment leading to risky investments hindering for entrants.

5.2 PESTICIDE PURCHASING BEHAVIOUR OF FARMERS

Pesticide purchasing behaviour of farmers was studied mainly by following two main aspects.

5.2.1 Brand loyalty

5.2.2 Dealer loyalty

5.2.1 Brand loyalty

The factors influencing brand loyalty such as price of preferred brand, effectiveness of the brand, influence of advertisement, packaging of

product, peer group and resource person influence as well as availability of product were analysed for brand loyalty of farmers using multiple regression analysis. The co-efficient of multiple determination was 0.60 which means that explanatory variables included in multiple regression function explained 60 per cent of variation in the brand loyalty of the farmers. From table 6 it could be inferred that the price of the preferred brand and peer group and resource person influence were significant at 0.1 per cent confirming that only when the price of a particular brand is comparatively lower to the price of other brands in the market and with influence of peer group like agriculture scientists, officers, the farmer would naturally prefer low priced brand.

Effectiveness of the brand was significant at 1 per cent inferring that farmer will continue to buy as long the effectiveness of the brand is comparatively good. Farmer was negligent over package of brand and availability of brand, he didn't thought package of brand and availability of brand as important because good brands will always be in demand and availability is assured. The results obtained in brand loyalty function were in accordance with Padmanaban (1999) except influence of peer group, where peer group influence factor has shown non-significant in his study, meaning that there was no influence of peer group to the brand loyalty of farmers in his study area. But all other factors has given the same results as of the present study conducted in Raichur district, inferring farmers of Raichur district had more attachment and listening to the suggestions of peer group.

5.2.2 Dealer loyalty

The factors influencing dealers loyalty such as price of preferred brand, credit availability, peer group influence, dealers advertisement, location, malpractices, customer service, discount/ gift/incentive, quality and availability of brand were analysed for dealer loyalty of farmers.

Table 7 shows the co-efficient of multiple determination was 0.57 indicating that the explanatory variables included in the function explained 57 per cent of variation regarding the selection of dealer. The price of preferred product was significant at 0.1 per cent influencing the dealer loyalty to the large extent, that means farmer is more sensitive to the price offered by the dealer. The farmer will continue to buy pesticide from same dealer as long as he gets the price of pesticide at reasonable price when compared to other dealers. The malpractices prevailing at the dealer point also significantly influenced the farmer at 1 per cent level, the farmers could buy pesticide from the same dealer only after believing that there is no malpractices prevailing at the purchasing pesticide shop. Credit availability, discount/gifts/incentives, quality, availability of the preferred brand were significant at 5 per cent level. Farmer's choice of dealer was also influenced by credit availability with the dealer so farmers brought pesticides from the same dealer as long as credit facility was available with the particular dealer.

Farmers were also sensitive towards discounts/gifts/incentives offered by the dealers. Farmers were also aware of quality of product delivered by the dealer, if once the farmer was satisfied with quality of

brand he will go to the same dealer only when that particular brand is available with that particular dealer.

Peer group influence, dealer advertisement, location and customer service were found to be insignificant towards influencing the dealer loyalty of farmers. Eventhough the choice of brand was significantly effected by the peer group influence but choice of the dealer was not affected by the peer group influence in other words farmers would not listen to the peer group while selecting the dealer unlike in selection of the brand. Dealers advertisement was not effective in influencing the dealer loyalty of farmers, hence if dealer goes for advertising with big budget would result in losses. Farmers were less sensitive to location and customer service since most of pesticides shops were located in the same place in all the blocks of the study area. Farmers were not expecting any service from dealers, since farmers could differentiate the different brands and molecule of pesticides dealers used to deliver the pesticide which the farmer would demand. The technical service of pesticides was provided by company's staff such as sales officers, field assistants, the technical service from pesticide dealers was found to be very less, but if pesticide dealer is a technical person doing technical service to farmers definitely it will help the farmers in choosing right pesticides. The results of the factor customer service was insignificant in influencing dealer loyalty may be because of the reasons that pesticide dealers were less effective in conveying the technical know how of pesticides to the farmers.

The results obtained for the dealer loyalty test of farmers were in line with Padmanaban (1999) where in his study, credit availability,

quality of the product, availability of preferred brand, price of the product and malpractices significantly influenced the dealer loyalty of the farmers. While customer service, peer group influence and dealer's advertisement were found insignificant in influencing the dealer loyalty of the farmers.

5.3 BRAND EQUITY OF PESTICIDE FIRMS

5.3.1 Band equity rating

Companies work hard in building the strength of their brands, it is critical to the on going brand management process to have meaningful and actionable data driven measure of brand equity measurement. An attempt is made to focus awareness measure of brand equity. The results presented in the table 8 shows different molecules, UPL brand of monocrotophos was having highest rating, meaning that awareness of UPL company's quinalphos was more when compared to other brands and novartis, monocrotophos was rated second meaning awareness of this brand is next to UPL company's monocrotophos, like this five company's were rated for 7 molecules of pesticide and in each molecule there were different companies having different ratings. The analysis showed the brand awareness or image of the brand according to the people's experiences. Other factor which influence brand equity is brand loyalty and earlier in 5.21 the results were already discussed about the factors influencing the brand loyalty. Brand image (awareness) and brand value perceptions pull in new customers while brand loyalty retain current customers Burke (2001). Companies strive hard to increase the brand equity of their products with different strategies which leads to different

brand equities in different product categories. In pesticide companies strategies of brand equity management were field work, early entry and market penetration, very good pull and push strategy, consistent hammering/market presence, satisfying customers latent needs – high perceived product value, market segmentation/positioning, commitment of field force to put forward brand name rather than molecule (Kharwadkar, 1997). Consistency is the key to successfully building and managing brand equity. Protecting a consistent image of brand to the customer will maximise the results of building brand equity. It is critical for managers and sales staff of pesticide companies to realize that brand equity can have positive as well as negative effects on product or company, because customer is the one who truly defines what brand equity means.

5.3.2 Influential means of advertisement for sale of pesticides

While building a brand, cultivating its strengths, pruning its weakness and making the brand more valuable, advertisement is the bottom line job of marketing. There are many tactics and ways that go in effective pesticide advertisement such as advertising through local press, theatres (slide and films), radio, banners, posters, farmers meeting, distribution of literature, spot demonstrations and fair participations. These means of advertisement were analysed for their effectiveness. The results in table 9 shows that spot demonstration, farmers meeting and fair participation were rated (I, II and III) best means of advertisement, it is attributed to the fact that 'seeing is believing'. Meaning that in all the above types of advertisement farmers would interact with marketing

personnel and get the things classified. Radio was found to be IV best means of advertising, as most of the farmers hear the radio. Wall paintings, theatres (slides and films), distribution of literature, calendars also provided relatively less effective alternative way of advertising. Local press and banners were found to be least effective source of advertisement, inferring that farmers rarely come across advertisement in local newspaper and banners.

5.4 COSTS AND MARGINS INVOLVED IN MARKETING OF SELECTED BRANDS OF PESTICIDES

Cost and margins of a product reflects the marketing strategies of companies. To analyse cost and margins it was impractical to select all molecules and brands since there are many number of molecules and brands in market, hence commonly used pesticide molecule such as monocrotophos from chemical insecticides, fenvelerate from synthetic insecticides and mancozeb from fungicide were selected, respective brands to pesticide molecules such as UPL, Novartis, Jaikisaan, Searle, Rallis India etc. were selected. Imidochloprid a new chemical from Bayer brand was also selected to analyse the cost and margin trend in newly introduced molecules of pesticides. The result in table 10 shows that the profit margins at distributor level ranged from 17.30 per cent to 13.05 per cent the highest profit margin (17.30%) was in monocrophos of Jaikisaan brand and lowest profit margin (13.05%) was in imidochloprid of Bayer brand. The profit margin at dealer level ranged from 14.81 to 2.63 per cent, the highest profit margin (14.81%) was in fenvelerate of Rallis India brand and lowest profit margin (2.63%) was in mancozeb of Jaikisaan

brand. Total cost margin from distributor to till it reaches to farmer ranged from 27.77 per cent to 15.78 per cent, the total highest cost margin 27.77 per cent was in fenvelerate of Rallis India and lowest cost margin (15.78%) was in mancozeb of Jaikisaan brand.

The results infer that, for the same molecule of pesticide various prices were existing with various brands at both distributors and dealers level. This is because of the companies strategies in positioning the brand like positioning by price, eg. low priced products, positioning with competition, positioning with repositioning competition, other than these strategies, the strategy of 'pull and push' makes the dealers and distributors to get different profit margins not only with different molecules but also with different brands of same molecule of pesticides, because of these reason total cost margin of different brands of same molecule as well as different molecule varied. Some brands have kept the higher total cost margin to distributors and dealers to felicitate credit availability of products by enhancing the time limit. There was difference in final sale price and MRP of the pesticides in all brands inferring that because of keen competition sale price was reduced from MRP to convenient price.

5.5 DEMAND PROJECTION FOR SELECTED BRANDS OF PESTICIDES

From the table 11, it could be seen that molecules of pesticides are having different growth rates, which can be classified as positive, constant and negative growth rates, this implies that pesticide molecules are in different stages of product life cycle. From results obtained, it can be

observed that newly introduced pesticide molecules like confidor (imidochloprid) a synthetic III generation insecticide, hexaconazole (fungicide), pretilachlor (herbicide) are showing higher growth rates with 144.9 per cent, 41.42 per cent and 13.77 per cent, respectively. Acephate (8.19%), chloropyriphos (8.32%), metasystox (9.33%), monocrotophos (6.92%), carbendazim (2.08%) and tricolazole (12.93%), molecules are showing comparatively lesser growth rates. Other molecules such as dimethoate, ethion, methyl parathion, alpha cypermethrin, cypermethrin, BPMC, fipronyl, wettable sulfer, kitazin and butachlor are showing constant growth rates. Remaining molecules such as DDVP (-8.08), phorate (-5.32%), phosalone (-6.47%), phosphamidon (-14.20%), propanophos (-14.20%), quinalphos (-2.87%), triazophos (-14.20%), endosulfan (-7.26%), cyfluthrin (-8.26%), deltamethrin (-18.77%), fenvelerate (-9.60%), carbonyl (-58.8%), carbofuron (-2.54%), methomyl (-1.34%), thiodicarb (-5.89%), copper oxy chloride (-12.69%), adhenolphos (-9.23%), mancozeb (-6.47%) and anilofos (-7.03%) are all showing negative growth rates. Demand projection of pesticide molecules for 2001, 2002 and 2003 were according to their respective growth rates.

The stages of pesticide life cycle lies in the concept pesticide treadmill (Anonymous, 1999b). Meaning that species of insects, mites, nematodes, microorganisms and weeds acquire a degree of resistance against one or several types or chemical groups of pesticides. These pesticides become gradually less effective, which necessiates replacement of resistant developed pesticides with new pesticides. This trend can be observed from the results obtained that imidochloprid, hexaconazole and

pretilachlor, which are newly introduced are having higher growth rates and demand inferring that old pesticides are loosing growth rates to newly introduced pesticides. From the table it can be observed that newly introduced molecules such as imidochloprid, lambdacyhalothrin 5% EC and lambdacyhalothrin 25% EC belong to synthetic group of insecticides, these results are in the line with view of Raghavan (1999), who inferred that there is general shift from II generation pesticides to III generation synthetic pesticides for the concern of using effective and environmentally safer pesticides.

Summary and Policy Implications

VI. SUMMARY AND POLICY IMPLICATIONS

The role of pesticide is most significant among various agriculture inputs, since pesticides act as a protective umbrella for other inputs, pests appear at different stages of crop growth and loss sustained by the crop depends on the extent and virulence of pest attack. After using all other inputs such as HYV seeds, irrigation, fertilizers, machinery, labour and credit, if the crop is destroyed by pests then the entire investment is lost. The annual loss of agricultural production due to pests in India is estimated at Rs.20,000 crores, even if a part of 50 per cent of potential loss is salvaged it can make an immense differences to our economy. The cost benefit ratio of pest control work is 1:4, hence marketing of pesticides is a crucial part in agribusiness input industry.

Marketing wing of any pesticide company has a greater responsibility to make available of right pesticides at right time to farmers. The pesticides distribution channel takes possession of goods on specified terms and conditions like issue price, distribution margins, credit period, discount if any etc. The strategies and the policies followed by the pesticide distribution channel have to be in consonance with marketing operations of the manufacturers.

The role of retailer in distribution channel of pesticide marketing has been considerable importance in linking pesticide manufacturer and the buyer. The importance of pesticide marketing in transformation of agricultural scene thus, needs no over emphasis, it is as important as production and improved agronomic practices to achieve increased agricultural production.

The present study has been undertaken with a view to highlight market structure for pesticides at dealers level, pesticide purchasing behaviour of farmers, brand equity of pesticide firms, cost and margins involved in different molecules of pesticides. This research is conducted keeping in view of pesticide companies, distributors, dealers and government regulatory measures in evolving the policies/strategies for effective pesticide marketing.

The specific objectives of study were

1. To analyse the market structure for pesticides at dealers level
2. To study the pesticide purchasing behaviour of farmers
3. To analyse the brand equity of pesticide firms
4. To analyse cost and margins involved in different brands of pesticides
5. To project the demand for different brands of pesticides
6. To suggest appropriate strategies for effective pesticide marketing by pesticide companies and by government regulatory measures

Methodology

The study was undertaken in the four Tungabhadra command area taluks namely, Devdurga, Manvi, Raichur and Sindhnur of Raichur district. Tabular analysis was done for assessing market structure, brand equity, cost and margins of different brands of pesticides. Regression analysis was exclusively used for estimation of brand loyalty and dealer

loyalty of farmers, compound growth rate analysis was used for demand projection of different brands of pesticides.

The primary data with respect to brand loyalty, dealer loyalty and brand equity was collected from farmers, distributors, dealers. Secondary data with respect to pesticide sales, cropping pattern and number of dealers were collected from sales officers of pesticide companies and Department of Agriculture, Raichur.

The findings of the study are summarised as follows.

1. Market structure for pesticides at dealers level was studied. The degree of sellers concentration product differentiation and barriers to entry were considered for this study. The market structure of pesticides at retail level was identified as low concentration market. The single firm concentration ratio was 3 per cent and twenty firm concentration was 41.87 per cent implying that the share in pesticides sales was distributed among many dealers. There were 183 dealers to cater to the needs 18004 farm holdings indicating large number of buyers. Devdurga was having high concentration of buyers and Sindhnoor was having low concentration of buyers. There was unequal distribution of farm holding with regard to pesticide dealers when compared with different taluk places. The farmers were able to discriminate the pesticides based on brand name, brand symbol and colour of package. The major barriers to entry for pesticide marketing were risky investments, making credit availability to farmers, lengthy registration procedures and competition among existing dealers.

2. Pesticide purchasing behaviour of farmers was studied considering brand loyalty and dealer loyalty. The analysis of brand loyalty using multiple regression revealed that farmers were very sensitive to price of preferred brand and brand loyalty of farmers was significantly influenced by peer group and resource person influence, effectiveness and advertisement of the brand. The dealer loyalty was significantly influenced by price of preferred brand, malpractices, credit availability, discount/gift/incentives, quality of pesticide delivered and availability of preferred brand with dealer.

3. By rating brand equity, it was found that different brands were having different rating in different molecules and this phenomena is because of different strategies and factors that influence brand equity such as early entry and market penetration in one or other molecules, push pull strategy, etc. Among various means of advertisement of pesticide marketing, direct contact to farmers type, such as spot demonstrations, farmers meeting and fairs participation were found to be best methods.

4. By analysing cost and margins involved in different brands of pesticide it was found that prices, profit margin and cost margin invariably varied in both brands of same molecules as well as different molecules at both dealer and distributor level, because of companies strategies in positioning the brand.

5. Demand projection for different molecules based on past data of consumption of pesticides revealed that increasing, constant and decreasing growth rates and respective demand projections were

because of reason that lies in the concept "pesticide treadmill", and introduction of new III generation pesticides, which are environmentally safer when compared to II generation pesticides.

POLICY IMPLICATIONS

Strategies for effective pesticide marketing by pesticide companies and by government regulatory measures

1. Even though many pesticide dealer shops were there in the market, they were unevenly distributed hence pesticide retail outlets should be encouraged to form uniform distribution with regard to market size or farm holdings.

2. Banks with micro loan scheme and crop insurance scheme should join hands with pesticide dealers for combating the problem of credit availability of farmers for effective pesticide marketing.

3. Agricultural scientists, extension workers, agricultural graduates should be effectively used to train the farmers regarding different molecules of pesticides with different brands existing in market, all the dealers should be given training on pesticides at periodic intervals which would be more effective in enhancing their knowledge.

4. Private pesticide companies while releasing new safety and effective pesticide should rely on direct farmer contacting advertisements and product promotion strategies.

5. There should be some regulation for fixing maximum ceiling price for pesticide marketing since there was large variation in profit margin and cost margin as well as exorbitant MRP over selling price were prevailing.

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MARKETING MANAGEMENT OF PESTICIDES IN KARNATAKA

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ABSTRACT

Marketing management of pesticides in Karnataka was conducted by highlighting the market structure for pesticides at dealers level, pesticides purchasing behaviour of farmers, brand equity of pesticide firms, costs and margins involved in different brands of pesticides. The study was undertaken in the four Tungabhadra Command Area taluks of Raichur district.

The market structure of pesticides at retail level was identified as low concentration market. There was unequal distribution of farm holding with regard to pesticide dealers when compared with different taluk places. The farmers were able to differentiate the pesticides based on brand name, brand symbol and colour of package. The major barriers to entry for pesticide marketing were risky investments, making credit availability to farmers, lengthy registration procedures and competition among existing dealers.

The analysis of brand loyalty revealed that farmers were very sensitive to price of preferred brand and brand loyalty of farmers was significantly influenced by peer group and resource person influence, effectiveness and advertisement of the brand. The dealer loyalty was significantly influenced by price of preferred brand, malpractices, credit availability, discount/gift/incentives, quality of pesticide delivered and availability of preferred brand with dealer.

Different brands were having different brand ratings in different molecules. Among various means of advertisement of pesticide marketing, direct contact to farmers type were found to be best methods. Prices, profit margin and cost margin invariably varied in both brands of same molecule as well as different molecules at both dealer and distributor level. Molecules of pesticides were having increasing, constant and decreasing growth stages. The stages of pesticide life cycle lies in the concept "pesticide treadmill" inferring that old pesticides are loosing growth rates to newly introduced pesticides.