"FARMERS BEHAVIOUR TOWARDS THE USE OF MARUTI FERTOCHEM MIXED FERTILIZERS IN AHMEDNAGAR DISTRICT"

by

Mr. GAIKWAD SUSHILKUMAR BHIMRAO

(Reg. No. 20165)

A Thesis submitted to the

MAHATMA PHULE KRISHI VIDYAPEETH
RAHURI, DIST. AHMEDNAGAR,
MAHARASHTRA, INDIA.

In partial fulfilment of the requirements for the degree

of

MASTER OF SCIENCE (AGRICULTURE)

in

AGRI-BUSINESS MANAGEMENT

DEPARTMENT OF AGRICULTURAL ECONOMICS,
POST GRADUATE INSTITUTE,
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2002

CANDIDATE'S DECLARATION

I hereby declare that this thesis or part thereof

has not been submitted by me or any other

person to any other University

or Institute for Degree

or Diploma

Place : **M.P.K.V., Rahuri**

Date : २४ / ६ /**2002**

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CERTIFICATE

This is to certify that the thesis entitled, **"FARMERS BEHAVIOUR TOWARDS THE USE OF MARUTI FERTOCHEM LTD. MIXED FERTILIZERS IN AHMEDNAGAR DISTRICT"** submitted to the Faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra State. India, in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE (AGRICULTURE)** in **AGRI-BUSINESS MANAGEMENT** embodies the results of piece of bona fide research work carried out by **Mr. GAIKWAD SUSHILKUMAR BHIMRAO** under my guidance and supervision and that no part of the thesis has been submitted to any other University for degree or diploma or publication in other form.

The assistance and help received during the course of this investigation and sources of references has been duly acknowledged.

Place : M.P.K.V., Rahuri

Date :29/06/2002

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Place : M.P.K.V., Rahuri

Date : / /2002

(D. M. Sawant)

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As the end of M.Sc. degree programme is in sight, a sudden realization makes me ponder over the last two years and as I sit today in retrospect, I picture myself about research and now I wonder, how inspite of it, I am at its final course. As I walk down the memory of lane, the first name that strikes distinctly is of my respected research guide **Dr. R.R. Suryawanshi**, Assistant Professor, Department of Agricultural Economics, Post Graduate Institute, Rahuri, whose profound interest in research, sterling guidance, unremitting encouragement and incessant inspiration and also for loving and affectionate treatments throughout the investigation as well as my entire stay in Rahuri.

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Ending is inevitable for any kind of work, I end by expressing endless thanks to all those whom I am able to recall here and also those whom I am not able to recall here and also those whom I might have left unknowingly.

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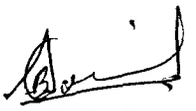

Rahuri (Sushil Gaikwad)
Dated : / /2002

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ABSTRACT

FARMERS BEHAVIOUR TOWARDS THE USE OF MARUTI FERTOCHEM MIXED FERTILIZERS IN AHMEDNAGAR DISTRICT"

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The study was conducted with a view to observe farmers behaviour towards the use of Maruti Fertochem mixed fertilizers in Ahmednagar district.

Ten villages, five each from two tahsils of Ahmednagar district viz., Shrirampur and Newase were selected on the basis of highest sale of Maruti Fertochem mixed fertilizers. The list of the users were obtained from field officers of Maruti Fertochem ltd. of the respective villages. The total sample of 90 users, from each village, three farmers of each three size groups using Maruti Fertochem mixed fertilizers were selected randomly.

The size groups are as follows.

i. Small - Upto 2 ha

ii. Medium - 2.01 to 4 ha

iii. Large - 4.01 and above ha

The primary data were collected from the selected by personal interview with the help of specially designed questionnaires by survey method for the year 2000-2001. Secondary data were obtained from district officer of Maruti Fertochem Ltd. Ahmednagar.

The study was conducted with the objectives to study socio-economic characteristics of users, assess the extent of use and the factors influencing it's use, to identify the various sales promotional strategies, tools and techniques adopted by the manufactures and to study the effect of mixed fertilizers on the productivity of crops.

The study revealed that proportionate investment kaccha residential buildings, farm machinary especially tractor and area under sugarcane (Adsali) showed an increasing trend, Also pucca residential buildings, farm implements and area under kharif, rabi and summer showed an increasing trend as the size of holdings increased. The cropping pattern of selected users were dominated by Sugarcane (Adsali) (47.29 percent) Jowar (13.70 percent) Wheat (5.49 percent) and Gram (3.36 percent).

The highest use of Maruti Fertochem mixed fertilizers was observed in sugarcane (45.90 percent) followed by Wheat, Gram and Jowar 41.96, 40.04 and 38.80 percent respectively. It was also observed that the use of fertilizers was more for sugarcane (Adsali) then the recommended while in wheat, jowar and gram the use of NPK was below the recommended dose.

Abst. Contd.... M.Sc. (Agri) Gaikwad S.B.

The study revealed that the old age, literacy, annual income percent irrigated area, price of mixed fertilizer, source of information, form a fertilizer, NPK content were the major influencing factors for the adoption of Maruti Fertochem mixed fertilizers. Company representative were found main source of information. Majority of the users were found to be satisfactory with the price of fertilizer

The Maruti Fertochem mixed fertilizers were found at maturity stage in the market. The company adopted market pricing method. The company carried out various advertisement activities. The company followed only one marketing channel that was company →dealer→farmer

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Pages 1 to 115

INTRODUCTION

1. INTRODUCTION

India achieved a record production of foodgrains of over 210 million tonnes. This achievement is, no doubt, spectacular and highly commendable achievement but we are up against a formidable challenge of feeding the ever growing population of the country which is likely to reach more than a billion by 2004 AD and it would be about 1.4 billion by 2025 and to feed this population the needed food grains would be about 300 million tonnes, and for this purpose, it would be necessary to use about 30 million tonnes of NPK. In addition another 14-15 million tonnes of NPK would be needed for horticulture, vegetable, plantation, sugarcane, cotton, oilseeds etc. Thus the total major nutrient (NPK) needs would be about 40-45 million tonnes by 2025. It would be certainly a difficult task to achieve this target of food production by using the needed nutrients but in the interest of the food security of the country there is no escape from accepting the challenge.

The land man ratio is already very low in India and there is no scope of increasing land under the cultivation. The increase in food production has, therefore, to come from the increased land productivity. It is by now well documented that fertilizer is the kingpin in the process. In years to come about 80 per cent of increased productivity has to come from fertilizer use. Average crop response to fertilizer use is indicated to be about 8-10 kg of crop yield to a kg of fertilizer nutrient. To produce an additional 100 million tonnes of foodgrains, an additional about 12 million tonnes of fertilizer is to be used. Since fertilizer is a high value input, farmers are to provided with

economically attractive package. This effort is to be supplemented by government and fertilizer industry. (Anonymous, 2002)

1.1 Importance of fertilizer

The gains of "Green revolution" are mainly attributed to the availability of three primary inputs viz., irrigation, high yielding varieties of seeds and chemical fertilizers. With the passage of time and increased consciousness among the farmers, there has been shift in fertilizer consumption as farmers started use of mixed fertilizers. As regards to the total cost of straight fertilizers distribution, items such as packaging, transportation, handling and storage etc. accounts for about 40 percent of total cost of fertilizers. Since the mixed fertilizers compare very favourably as far as the plant nutrient content and price as compared to the straight fertilizers. Mixed fertilizers play an important role i) In the labour scare areas there is a saving in the cost of application of fertilizers. ii) The mixture of fertilizer has better physical condition and can be drilled easily into the soil. iii) In mixed fertilizers, the plant nutrient required in small quantities are applied evenly than it they had been singly. While in use of mixed fertilizers the weaknesses are i) mixed fertilizers cannot meet the specific need of the crop. ii) There is less effective control on the part of the farmer regarding the plant food present in the mixture iii) This increases the relative cost of purchase by the farmer than the straight fertilizers.

Fertilizer industry besides making fertilizer available through increased production and operating a vast distribution network by supplemented government efforts in promoting fertilizer use and educating farmer on balanced and efficient use of fertilizer. A large

number of field programmes are being organised by the individual industry members independently. Indian fertilizer market is under transformation towards completely decontrol scenario. Decontrol of phosphatic and potassic fertilizer in Aug. 1992, has widen the N : P_2O_5 : K_2O consumption ratio which is yet to be recovered fully. (Shrotiya G.C. 2000). In free market environment under total decontrol scenario, it is feared that several of units may close down. Marketing of fertilizer is likely to be more aggressive and competitive. There is wide discrepancy in fertilizer consumption. For promoting balanced and efficient use fertilizer industry has to reorient its promotional programme with emphasis on the service package. To farmers catering the specific needs. Enhancing availability of other inputs including soil amendments, linkages to credit soil and tissue testing, quality testing, agro inputs, promotional of precision watershed development and extension will be some of the key components in the reoriented extension strategy of the fertilizer industry under free economy. Fertilizer sales points have to act as service centres. Involvement of fertilizers dealers intensively in these activities will help in retaining farmer customer with them.

1.2 Fertilizer Consumption

1.2.1 Fertilizer consumption in India

The Indian National Government launched the first five year plan in April, 1951 giving highest priority for agricultural development which directly gave boost to fertilizer consumption (N + P_2O_5 + K_2O) was 130.8 thousand tonnes. while at the end of eight plant (1996-97), it was 14308 thousand tonnes. The increased use of

Table 1.1 Yearwise total fertilizer production and consumption in India

Year	Production (000' tonnes)	Consumption (000' tonnes)	Use / ha (kg / ha)
1951-52	27	66	0.6
1960-61	166	294	1.9
1970-71	1061	2256	13.6
1980-81	3005	5516	31.5
1990-91	9044	12546	70.0
1991-92	9864	12728	69.7
1992-92	9751	12155	66.6
1993-94	9047	12366	67.8
1994-95	10438	13563	72.1
1995-96	11335	13876	74.4
1996-97	11172	14308	76.7
1997-98	13141	13165	86.8
1998-99	13647	16713	89.9
1999-2000	14280.7	18130	94.3

Source : Journal of the Indian society of soil science 2000

fertilizer was only in the beginning with the year 1966-67 due to use of high yielding varieties of field crops and expansion of area under irrigation. These factors gives emphasis on shifts in the productivity and production of food grains such as wheat, rice, maize and sorghum. This technology break through has resulted into spectacular changes in agricultural output in India. Since then fertilizer consumption increased at a much faster rate reaching the level of 18.13 million tonnes in 1999-2000 from 16.8 million tonnes during the year 1998-99. The consumption of N, P, and K increased from 11.35 to 11.62 from 4.1 to 4.8 and 1.31 to 1.7 million tonnes respectively, during the same period. Due to this technology overall NPK use ratio improved from 8.5 : 3.1: 1 to 6.8 : 2.8 : 1 during the same period. (Fertilizer News, 2000).

1.2.2 Fertilizer consumption in Maharashtra

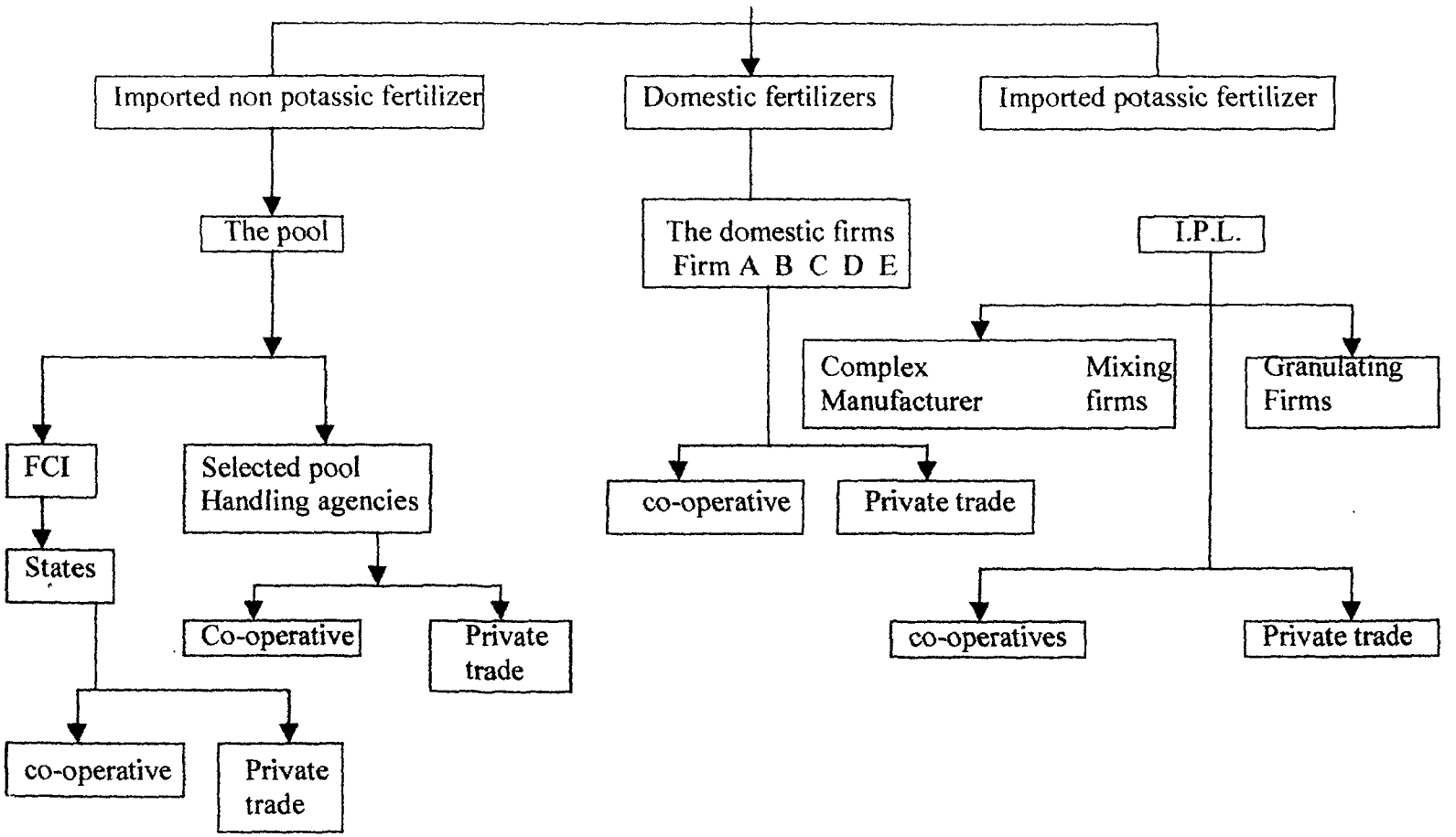
In 1960 Maharashtra was not self sufficient in food production and most of the farmers were not much aware about the chemical fertilizer. The fertilizer consumption (1961-62) in terms of nutrient was only 1.18 lakhs metric tonnes. During 1968, the agricultural universities had developed a new hybrid varieties and recommended fertilizer doses to such hybrids. Such type of green revolution in agriculture in Maharashtra had taken up a new steps. The use of chemical fertilizers was very essential. In order to achieve the estimated production of hybrids. Since then the fertilizer consumption in Maharashtra increased at faster rate reaching the level of 1950.20 thousand tonnes in 1999-2000 from 1661.00 thousand tonnes during the year 1998-99. The consumption of N, P and K increased from 1025

Table 1.2.2 : Fertilizer consumption in Maharashtra as compared to India

Sr. No.	Year	N		% to all India	P		% to all India	K		% to all India	N+P+K		%to all India
		India	Maha-rashtra		India	Maha-rashtra		India	Maha-rashtra		India	Maha-rashtra	
1	1960-61	2498	327	13.1	605	53	8.8	280	18	6.4	3383	398	11.8
2	1964-65	5748	480	8.4	1325	180	13.6	773	51	6.6	7846	711	9.1
3	1970-71	14870	1122	7.5	4620	519	11.2	2280	354	15.5	21770	1985	9.1
4	1975-76	20310	1686	8.3	4530	360	7.9	2700	527	19.5	27540	2573	9.3
5	1980-81	36780	2665	7.2	12140	914	7.5	6240	653	10.5	55160	4232	7.7
6	1985-86	56610	4106	7.3	20050	1514	7.6	8080	1073	13.3	84740	6693	7.9
7	1991-92	79970	7523	9.4	32210	3545	11.0	13280	2104	15.8	125460	13172	10.5
8	1992-93	84270	7303	8.7	28440	2806	9.9	8840	1216	13.7	121550	11325	9.3
9	1993-94	87880	8043	9.1	26670	2590	9.8	9090	1308	14.4	123640	11941	9.7
10	1994-95	95070	8716	9.2	29320	3458	11.8	11250	1668	14.8	135640	13842	10.2
11	1995-96	98230	8692	8.8	28980	3324	11.5	11560	1723	14.9	138770	13739	9.9
12	1996-97	103020	9087	8.8	29770	2968	9.9	10300	1230	11.9	143090	13285	9.2
13	1997-98	109050	9801	8.9	39170	4345	11.1	13730	1907	13.9	161950	16053	9.9
14	1998-99	113250	10255	9.1	40960	4577	11.2	13280	1791	13.5	167490	16623	9.9

Source : Epitome of Agriculture, commissioner Agriculture, M.S., Pune-1 (2000-2001), pp. 40-41.

1.3 The Fertilizer marketing system



to 1144, from 458 to 569.00 and from 178 to 136 thousand tonnes respectively during the same period. The overall NPK consumption ratio during same period was 5.8 : 2.6 : 1 to 4.8 : 2 : 4 : 1. Thus Maharashtra ranks second in positive growth of fertilizer consumption (17.6 per cent) and Uttar Pradesh stands first in positive growth of fertilizer consumption (20.5 per cent)

1.4 Characteristics of Maruti Fertochem mixed fertilizers.

i) Maruti Fertochem mixed fertilizers are coated with neem oil, due to which leaching losses are less.

ii) Due to special treatment fertilizers are slowly soluble, hence available in required quantity to the plant.

iii) These fertilizers are available in granular form hence can be drilled and leaching losses are minimum.

iv) In these fertilizers each granule contains standard ingredients of nutrients which assures providing nutrients in accurate quantity.

v) Company has its own, well equiped laboratory facilities which assures quanlity of these fertilizers.

1.5 Topic of the study

In agriculture, among all the modern inputs, fertilizer plays a key role. Fertilizer is most important input in modern agriculture whether it is organic or inorganic. Fertilizer can be universally accepted as an integral part of package of practices for raising Indian agriculture to a higher technology.

As a agri business management student, it is pertinent to have a study of a enterprise dealing with agri business. Hence this topic

is selected for the study. The Maruti Fertochem Mixed Fertilizer Limited, started in 1993 a small firm dealing with various mixed fertilizers. Due to its quality and dedication, the company has progressed very fastly in the last few years in the state as well as in Ahmednagar district in Particular. The token of which is the ISO-9002 certification conferred to the company, in the year 1999-2000. It was also awarded the 'Best private Fertilizer company' award of the state for the year 1998-99. Hence it is necessary to study the farmers behaviour regarding this fertilizers.

The research problems needs to deal with questions viz., which are the socio-economic characteristies of users? How much of these fertilizers used by the users? Which are the factors influencing farmers behaviour towards the use of these fertilizers.? Which are the sales promotional strategies adopted by the manufactures?what is the effect of these fertilizers on the productivity of the crop? The study is focussed towards these aspects, With this background in view the present investigation entitles "Farmers behaviour towards the use of Maruti Fertochem Mixed Fertilizers in Ahmednagar district" was planned and implemented with following specific objectives.

1.6 Objectives of the study

The overall objective of the present study is to have an economic evaluation of mixed fertilizer in Maharashtra. The specific objective of the study area as under,

i) To study the socio-economic characteristics of the users

ii) To assess the extent of its use and factors influencing the use of Maruti Fertochem mixed fertilizers.

iii) To study the various sales promotional strategies, tools and techniques adopted by manufactures.

iv) To study the effect of use of Maruti Fertochem Mixed fertilizers on the productivity of crops.

1.7 Scope and utility of study

The success of any organization in agricultural development depends on facilities for disposing of their product in the most advantageous manner. The need for efficient production along with proper marketing structure is important. This study will take into account to improve purchase behaviour of farmers towards Maruti Fertochem Mixed fertilizers.

The findings of the study will serve as a guideline to the Maruti Fertochem Mixed fertilizer manufactures to formulate or modify policies and to solve the problems associated with marketing of Maruti Fertochem Mixed Fertilizers.

1.8 Limitations of the study

The scope of the present study is limited to above said specific objectives. Even though, the sample for study is collected from Shrirampur and Newase tahsil of Ahmednagar district, yet the findings of present study could be relevant and applicable to similar situations existing elsewhere.

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

The farmers have realised the importance of use of mixed fertilizers in the production and productivity of crops. However, the use of mixed fertilizer is affected by wide variation and fluctuations in the irrigation structure and prices of fertilizers. A review of various studies in relation to farmers behaviour towards mixed fertilizer done by researchers in the past is necessary and helpful in proceeding further in right direction. This chapter reviews the literature on quantitative results arrived at in similar studies carried out by different researcher in the past. The literature relating to the study is further divided into following sub heads.

2.1 Socio-economic characteristics of users.

2.2 Extent of use of mixed fertilizers and factors influencing its use.

2.3 Sales promotional strategies, tools and techniques adopted by manufactures

2.4 Effect of use of mixed fertilizers on the productivity of crops.

2.1 Socio-economic characteristics of users

Pushkar Lal Joshi (1977) studied adoption of some chemical fertilizers and improved manuring techniques in village, in western Rajasthan. He found most of the farmers were aware about ammonium sulphate, calcium ammonium nitrate, single super phosphate and green manuring. But they had a detailed knowledge about the use of ammonium sulphate and calcium nitrate, only. However, he found ammonium sulphate and calcium ammonium

nitrate were tried by almost two-third of the farmers but only about half of them had adopted these. He further noticed that the adoption of fertilizers were highest in middle age group (36-44 years) followed by older age group (45-54 years) and younger age group (25-34 years). He also found membership and participation in different institutional activities have positive correlation with adoption of fertilizers. Land holding size and irrigation facilities were also found positive co-relation with fertilizer adoption. Further he noticed that 40 per cent farmer believed that fertilizer improve soil fertility and grain quality while 60 per cent of the farmer rejected chemical fertilizer because lack of irrigation facilities, technical knowhow and shortage of funds.

Khare and Singh (1989) studied the socio-economic determinants of fertilizer consumption. The study was conducted in Manipuri and Etawah district of Uttar pradesh. They observed literacy was a major determinant of nitrogenous fertilizer consumption. The information source and extension exposure were the significant determinants in nitrogenous and potash fertilizer consumption, while above said factors did not showed significant determinants for phosphatic fertilizers consumption.

Bhoite and Girase (1991) studied the relationship between farmers socio-personal traits and adoption of improved dry land technology. The study was conducted in Malegaon tahsil in Nashik district. Age, size of holding, social participation and extension contacts for adoption of improved practices was found to be non significant for bajara. While education, annual income for adoption of improved practices was found to be significant for bajara.

Kher *et al.* (1991) in their study in Tral tahsil of Pulwama district in Kashmir observed 42.5 per cent respondents with low adoption, 62.74 per cent with medium adoption and 9.80 per cent with high adoption had medium educational level for the adoption of improved almond cultivation practices.

Chandargi *et al.* (1991) in the study of temporal behaviour of jowar cultivation in Dharwad taluka of Karnataka state found that education had no significant association with adoption pattern of jowar cultivation.

Jagdale *et al.* (1993) in their study observed that annual income had significant relationship with the adoption of dryland technology in Karmala tahsil of Solapur district in Maharashtra.

Natikar *et al.* (1995) observed that 93 per cent of the respondents read newspapers and magazines and other literature to get the latest information about agriculture and allied aspects. They studied reading behaviour in 8 districts of North Karnataka.

Kalantri *et al.* (1991) in their study noticed that the newspapers were useful to the farmers in giving information on plant protection (67.63%), fertilizer application (60.58%) in Nagpur district of Maharashtra.

Dhas (1995) studied the influence of the social values on the adoption of improved cultivation practices of selected crops namely sugarcane, jowar and wheat in Shevgaon tahsil of Ahmednagar district. He noticed that education had significant association with the adoption of improved cultivation practices.

2.2 Extent of use of mixed fertilizers and factors influencing its use.

Lakshminarayana(1972) studied different communications and process of adoption of farm innovation in adopted villages. The study was conducted in Mandya district in Mysore. He found that friends, neighbours and village level worker were better communication media 57.3 and 50 per cent respectively, while less communication media were radio and newspaper 16 and 1.6 per cent respectively. Further he noticed that the knowledge about chemical fertilizers iron plough, insecticides and improved seeds were 86.7, 86.7, 69.2 and 47.5 per cent respectively, but the adoption of these innovation was 40.9, 19.2, 12.5 and 14.2 per cent respectively. Finally he concluded that mass communication was not crucial factor for the adoption of farm practices.

Bhilegaonkar (1979) studied shifts in use of fertilizer due to constraints. The study was conducted in Parbhani district of Maharashtra state. He observed that in 1972-73 big farmers, medium farmer and small farmer used 19.03, 22.39 and 29.32 kg / acre fertilizers, respectively, but in 1974-75 the use of fertilizers decreased by 16.56, 18.00 and 20.16 kg / acre respectively, due to high price of fertilizer and changed their cropping pattern. He further noticed that due to inadequate credit 19.73, 25 and 39.48 per cent big, medium and small farmer used low level of fertilizers, respectively.

Sinha S. K. (1980) worked on role of advertising in rural India. He found that, newspaper was very good medium of advertising in rural Indian market because it was within the reach of a relatively big section of the society. Regional news-papers were able to raise

awareness for a particular product among the existing and potential customers. Advertising through hoardings were also very popular in the rural Indian market.

Singh and Singh (1981) studied brand royalty in India. He found that nearly 91 per cent respondents stated quality of products and 87 per cent respondents stated habit of use and 48 per cent respondents stated availability of brand played significant role in choice of brand. He found radio (45 per cent), television advertisement (44 per cent) and press advertisement (43 per cent) constitute major source that provide information and influence the choice of respondents. He found quality of product (89 per cent), its previous usage (79 per cent), ready and regular availability (52 per cent) and brand or company reputation (49 per cent) emerge as the most important reasons of brand royalty among the family surveyed. He found 77.5 per cent respondents royal to their preferred brand. He found price, packaging advertising, premiums and guarantee use by friend and neighbours did not played significant role in choice of brand.

Gopalkrishna and Sholapurkar (1990) studied the fertilizer use pattern for dryland crops. They observed that the total fertilizer use for kharif jowar and rabi jowar was 82 and 56 per cent respectively as compared to recommended dose/ha. As compared to the normal dose of nitrogen and phosphorus used for kharif jowar was 15 and 29 per cent, while for rabi jowar it was 3 and 30 per cent respectively. They found that majority of farmers used less than 2/3 of the recommended dose of nitrogen and phosphorus. In case of Ragi the total fertilizer use was 88 per cent as compared to recommended dose/ha. As compared to the normal dose of nitrogen and phosphorus consumption was 27 and

35 per cent respectively. In case of Bajara total fertilizer consumption was 45 per cent, while intensity of use of nitrogen and phosphorus observed in case of Bajara was 20 and 35 per cent respectively. In case of Tur the total fertilizer consumption was 73 per cent while the consumption of nitrogen and phosphorus was 22 and 22 per cent respectively. In case of sunflower the total fertilizer consumption was 71 per cent, while the consumption of nitrogen and phosphorus was 13 and 20 per cent respectively. In case of safflower the total fertilizer consumption was 46 per cent while the consumption of nitrogen and phosphorus was 4 and 10 per cent respectively. Finally they concluded that the fertilizer application was high in case of kharif jowar, ragi, tur and sunflower as compared to bajara, rabi jowar and sunflower.

Kumar *et al.* (1991) studied fertilizer use in upper Gangetic plains Region. They found that the total consumption on N, P and K during 1989-90 in the region was 1349 thousand tonnes with a kharif : Rabi ratio was 39 : 61. The overall ratio of N : P : K consumption was 19.5 : 5.3 : 1. The ratio in kharif was wider, being 27.7 : 4.8 : 1, while in Rabi it was 16.0 : 5 : 6 : 1. They found that upper region contribute to 11.7 per cent of total fertilizer consumption and 13.8, 9.2 and 4.5 per cent of N, P_2O_5 and K_2O, in the country respectively. They also found there was wide variation in kg / ha consumption in the region, highest being 140 kg / ha in pillibhit to lowest of 60 kg / ha in Hardoi district.

Ram and Nandal (1994) studied the fertilizer use pattern in Haryana state. They observed that fertilizer consumption in Haryana was to the extent of 13.35 and 637.16 thousand tonnes during 1966-67 and 1991-92 which indicates that there was an increase by 47 times in

the consumption of fertilizers over 1996-97 in Haryana on an average the consumption of N, P_2O_5 and K_2O for Rabi season was 63.31, 73.35 and 64.26 per cent, while in Kharif season it was 36.69, 28.65 and 35.74 per cent respectively. They further noticed that fertilizer use per hectare was highest on medium forms i.e. 87.70, 23.24 and 116.74 kg N, P_2O_5 and K_2O, respectively, followed by large sized farms 79.39, 24.02 and 107.66 kg N, P_2O_5 and K_2O respectively and tasting in small sized farms 65.39, 16.9 and 82.46 kg N, P_2O_5 and K_2O respectively. They summarised the same factors for lowest application of fertilizer on smale farm size as low resource endowment, inadequate credit facilities, low socio-economic status and risk averting attitude etc.

Further, they estimated the relationship between percentage area allocation of fertilizer nutrient among major crops. Area under wheat was 23.59 per cent and the consumption of N, P_2O_5 and K_2O was 40.0, 10.02 and 7.49 per cent respectively. Area under cotton was 9.05 per cent and the consumption of N, P_2O_5 and K_2O was 13.28, 14.92 and 13.71 per cent respectively. Area under paddy was 8.40 per cent and the consumption of N, P_2O_5 and K_2O was 10.63, 9.31 and 10.34 per cent respectively. Area under sugarcane was 3.39 per cent and the consumption of N, P_2O_5 and K_2O was 4.68, 5.20 and 4.79 per cent respectively.

Baleka (1995) studied trends and economic disparities in fertilizer consumption in western Maharashtra. He estimated that compound growth rates for nitrogenous, phosphatic and potash fertilizer consumption on per hectare of both Net and Gross cultivated area from 1968-69 to 1990-91. He found that the compound growth rate per hectare of Net and Gross cultivated area were highest in

Jalgaon district i.e. 12.36, 16.00 and 14.02 per cent respectively, he further noticed that the overall compound growth rates for total nutrient (N+P+K) consumption on both Net and gross cultivated area was higher in Jalgaon district (13.10 and 12.10 per cent) respectively), while lowest in Dhule district (8.04 and 8.18 per cent respectively)

Morankar (1995) studied impact on fertilizer use due to price rise for irrigated crops of Ahmednagar district. The data pertained to two years viz, 1991-92 (before the prices rise of fertilizers) and 1992-93 (after the price rise of fertilizers). He found that the use of N, P_2O_5 and K_2O in the case of sugarcane planted was 629.12, 203.17 and 147.71 kg per hectare during the year 1991-92. And the same was 542.79, 178.84 and 67.94 kg per hectare during the year 1992-93 respectively. The per hectare use of N, $P_2O_5$and K_2O in case of sugarcane ratoon was 541.56, 181.48 and 128.52 kg during 1991-92 and the same was 502.12, 179.76 and 60.90 during the year 1992-93 respectively the per hectare use of N, $P_2O_5$and K_2O in case of wheat was 178.12, 68.42 and 8.13 kg during 1991-92 and it was 156.36, 47.39 and 2.51 kg during the year 1992-93 respectively. The per hectare use of N, $P_2O_5$and K_2O in case of gram was 19.12, 51.43 and 16.13 kg during 1991-92 and it was 15.47, 45.35 and 11.18 kg during the year 1991-93 respectively.

Joshi, *et al.* (1996) studied regionwise trend analysis of fertilizer consumption in Maharashtra State. They found that factors like irrigation, introduction of high yielding varieties and increasing area under commercial crops were influencing the use of chemical fertilizers in different region of Maharashtra. The study was undergone in western Maharashtra, Marathwada, Vidarbha and Konkan region for

the period 1956-57 to 1989-90. During this period they found that more than half the total quantity of fertilizer consumped by western Maharashtra while annual consumption of fertilizer was quite low in Konkan region. They further found that the consumption of nitrogenous, phosphatic and potassic fertilizers for Maharashtra as a whole has increased at the rate of 14.56, 16.34 and 4.30 per cent per annum, respectively over a period of 34 years.

Birari and Pawar (1996) studied changes in regionwise fertilizer use in Maharashtra due to with drawal of subsidies. They found that for the state as a whole consumption of fertilizer was 14.83 per cent in 1992-93. More than 50 per cent fertilizer (N, P, K) were consumed in western Maharashtra only. They further noticed that the maximum decline in the consumption of potassic, phosphatic and nitrogenous fertilizers observed in western Maharashtra was 46.25, 27.25 and 8.55 per cent respectively. The marginal increase in the consumption of nitrogenous fertilizers was noticed in Vidarbha (5.40 per cent) while for Konkan it was 3.72 per cent. Further they found increase in the prices; of fertilizer resulted in reduction in consumption of fertilizer in crops. It was maximum (66.55 per cent) in potassic and 40 per cent in phosphatic fertilizer for wheat and 24 per cent nitrogenous fertilizers for cotton. The total reduction in use of fertilizer ranged from 9.27 per cent in groundnut to 28.44 per in sugarcane.

Gadre *et al* (1996) studied size groupwise and districtwise disparities in fertilizer consumption in vidarbha region. They found that the consumption of N, P and K was more in case of small size groups of holdings than that of medium and large size groups of holdings. Further, they observed a tendency amongst the cultivators to

apply more quantity of fertilizers to cash crops like cotton and pulses and comparatively less quantity to food-grain crop like hybrid jowar.

Sharma (1998) studied current status and challenges of efficient use of fertilizers in Northern eastern hill states of India. He found that the average use of N, P_2O_5 and K_2O in the region was only 9.1 kg, 2.1 kg and 4.7 kg^{-1} which is 17.2, 13.5 and 75.8 per cent of the national average. The highest combined use of N, P_2O_5 and K_2O in the region was in Manipur (59.5 kg ha^{-1}, 79.9 per cent of all India average) and lowest was in Arunachal Pradesh (1.5 kg / ha^{-1}, 2.4 per cent of national average). Further he observed on an average farmer use only 11.3, 34.4 and 28.5 per cent of recommended dose of N, P_2O_5 and K_2O in the region and yield of rice, maize, foodgrains, mustard and pulses very between 47 to 74, 49 to 72, 28 to 75, 39 to 79 and 44 to 84 per cent respectively, of these obtained with recommended dose of fertilizers.

Kar (1998) found that monsoon, poor distribution network, infrastructure facilities, lack of awareness of fertilizer use were the main constraints in fertilizer use in North Eastern State of India.

Raghuram and Chowdry (1999) studied the comparative performance of private and co-operative outlets in fertilizer supply in west Godavari, Chitoor and Adilabad districts of Andhra pradesh. They observed that non-availability of desired fertilizer was a problem reported by 50 per cent of traders from each west Godavari and Adilabad districts and 33.34 per cent from Chitoor district. They also noticed that private traders were ahead of co-operatives in supply of

desired product, timely supply, credit sales and extension of technical knowledge.

Pawar (2000) studied farmers behaviour towards use of fertilizer in vidarbha region of Maharashtra. He found that 35 per cent respondents had low income while, 65 per cent had high income and found positively significant relationship between annual income and expenditure on fertilizers. Further he noticed 41.67 per cent farmer had small size of holding and rest 58.33 per cent had large size of holding and found positively significant relationship between size of holding and expenditure on fertilizers. He found 38 per cent farmers had less irrigated land, while 61.67 per cent had large size of irrigated area and found positively significant relationship between size of irrigated area and expenditure on fertilizers.

2.3 Sales promotional strategies, tools and techniques adopted by manufacturers

Lakshminarayan (1994) studied the sale promotion in fertilizer industry. He elaborated some extension activities which was responsible for sale promotion in fertilizer industry viz block demonstration in farmers field, intensive farmer contact programmes, village adoption, crop seminars, soil testing facilities including that of micro nutrients, dealer training programmes. He also pointed out some other promotion techniques like availability of smaller packing encourages lifting of fertilizers by small and marginal farmers. Farmers meeting, block demonstration and village adoption programmes have been found useful for semi-medium farmers. Direct mail, newsletters, soil testing and organizing field and individual demonstration have

been found useful for very large farmers. Mass media like press, radio and television help makes the brand familiar to the consumer. For the outdoor publicity undertake wall painting and point out sale publicity material at the dealer shop.

Maheshwari and Misra (1995) studied Marketing and logistics of fertilizer in an open environment. They found the company product must be line and mix, company must use backward, forward or horizontal integration, packing must be economy, convenience and promotion sell must be through all channels i.e. co-operative, private, own and govt. institutions and also used new channels i.e. selling through agricultural graduates or village opinion makers. The company must have its own 'Economic zones' for maximising sales. For the customer satisfaction it found better to monitoring the performance of order processer, warehouse, planner, inventory managers and transportation managers. For wide publicity of product company must use Radio, exhibitions and own documentaries. Transportation and warehousing items contributed about 60 per cent of the total marketing cost. It found better to make use of soil for long distance and for short distance the road facility.

Shrivastava (1996) studied the promotional activities of NCF (Hindustan Fertilizer Corporation). He found that HCF carried out Indo-German fertilizer education project (IGFEP) to promote balance use of fertilizers popularise complex fertilizers and increase consumption level of fertilizer under this project it was found that the consumption of nutrient increased from 10.2 to 34.60 kg / ha from year 1970-82 in west-bengal. HCF also carried out Indo-British fertilizer education project (IBFEP) to demonstrate effect of yield through

application of recommended fertilizer in Orissa, M.P., W. Bengal, Bihar, U.P. and Assam. During this project it was found that the consumption of fertilizer increased by 182 per cent while in post demonstration consumption was increased by 82 per cent HCF also started Bio-fertilizer production unit, Krishi Vigyan Kendra, haat campaign and mobile shops for providing small package of fertilizer to farmer.

Shanmugam (1996) studied fertilizer promotion by FACT in Kerala. He found that the fertilizer festivals in which soil testing, discussion with scientists, information about tractors and bullock carts were effective to promote fertilizer use. Fact started village adoption scheme in 1968 and through agricultural service centre supplied seeds, fertilizer, pump sets to the farmer under "Squade programme" personal contact was the most effective way of disseminating the fertilizer use technology among farmers. Crop campaigns, crop seminars with scientists, group discussion, soil testing, dealer training, block demonstration, seed farms, agricultural seminars, study classes, exhibitions study tour, soil testing, crop competition, Agro forestry were organised and he found 15 per cent annual increased in fertilizer consumption. 16 mm and 35 mm advertisement films showed in rural areas which create a good awareness about fertilizers. Printed leaftets, pamphlets, handouts, direct mailing, letters with optimum dose of fertilizer also found effective for efficient use of fertilizers. Hoarding, wall painting, banners, posters, boards and stickers found effective to attract the affection of passerby.

Shrotiya and Kaore (2002) studied promotional activities of IFFCO. They found that field activities were enlarged to cover

varying local situations. Mass contact with farmers through meetings, demonstrations, training's, village adoption and special projects remained the core activities in the promotional programmes. Balanced fertilizer application and increased fertilizer use efficiency has been the main plank of fertilizer promotion strategy of IFFCO. In the recent past, cropping system / farming system approach, integrated nutrient management, water use efficiency and use of IT have been identified as the thrust areas of promotional activities.

Guleria and Awasthi (2002) studied promotional activities of KRIBHCO. They found that 3 to 4 lakhs farmers are directly benefited from 3 to 5 thousand programmes conducted by more than 500 agricultural graduates / post graduates in 15 states i.e. on an average one programme per day in each state. Educational programmes include krishak seminar, rural technology mela, farmers study visit, Block demonstration and Intensive programmes like village adoption, farmers meetings, demonstrations, field days and technical wall paintings. Promotional programmes at KRIBHCO include group discussions, co-operative conferences, co-operative managers study visits, state consultative committee meetings, intensive sales promotional campaigns. KRIBHCO owns a fleet of six mobile soil testing vans. Soil samples are collected and tested at farmers' fields and fertilizer recommendations for different crops are made on the spot.

Singh (2002) studied "IndoGulf corporation, promotional activities. Main emphasis was laid on extension education programme. In 1987, Indo Gulf opened a chain of "Shaktiman Krishi Sewa Kendras" a one-stop multi input service centre, at selected locations

throughout the marketing territory. These centres are runned through selected whole sales and are manned by 'Field Assistants'. These Field Assistants are agriculture graduates and are technology qualified. Various extension programmes like soil testing and soil fertility mapping, farmers training camp, field days, distribution of literature, farmers tour etc. this form has opened 'Shakriman Krishi Swayam Rozgar Kendras (SKSRKS) to provide opportunity for unemployed agriculture graduates.

2.4 Effect of use of mixed fertilizer on the productivity of crops.

N.K. Khamparia (1997) studied the effect of phosphorus on the growth yield attributes of major kharif crops. Under rainfed condition. The plant height, number of branches of plant, pods, grain, straw and total dry matter. He experienced that the yields of soyabean, groundnut, mung were significantly improved by the application of recommended dose of phosphorus.

Sharma, Randhawa and Sordana (1997) conducted field investigations on performance of wheat cultivars under different sowing dates and levels of nitrogen under rainfed conditions. field investigations they conducted on sandy loam soils of Punjab Agricultural University Regional Research Station, Gurudaspur and revealed that November sowing of wheat significantly increased the grain yield (34.3%) and straw yield (20.3%) and improved harvest index over 27 Oct. sowing. Application of 90 kg N / ha increased the grain yield by 48.3 and 16.1 per cent over 30 and 60 kg N / ha respectively.

P. Velarasu and Parmatma Singh (1999) studied fertilizer use pattern and its impact on crop productivity. A case study of erode district in Tamilnadu.

They concluded that 'N' fertilizer still contributes significantly and positively to the productivity of majority of the crops. The impact was highly significant in cereal crops like rice, sorghum and in some oilseed crops also. They found that the impact of 'P' fertilizer on the productivity of crops was positive, they noticed that the impact fertilizer was found significant in case of rice, irrigated groundnut crops.

The impact of 'K' fertilizer was also found to be positive and significant in some oilseed crops. The impact on productivity was not expected to be significant since the role of P and K on crop yield is rather indirect by increasing root growth and by creating pest and disease resistance.

B.C. Biswas and Naresh prasad, (1999) studied the contribution of critical inputs in increasing crop productivity. They found that many factors have contributed to higher food grains production and productivity in the country. Of these factors contribution of water, seed and fertilizers showed a very significant role. Since their effects are inter dependent impact of individual input cannot be really isolated. But FAO estimates indicates that fertilizer has contributed about 50 per cent of increased food grain production of the world. The same as true in case of India.

Yadav (1999) studied current status of sugarcane response to fertilizer in different agro climatic zones. And experiences learnt from all India co-ordinated Research project on sugarcane. Each kg of

soil applied with NPK to planted sugarcane under irrigated conditions produced 275 kg cane in sub tropics. NPK fertilizers applied at 75 and 125 per cent of their recommended doses produced significantly more cane than obtained with their recommended doses at few locations.

G.K. Nema and M.S. Vaidya (1998) studied response of sugarcane to fertilizer nitrogen and organic manure in black calcareous soils of M.P. field experiment they conducted for two successive years to investigate the effect of nitrogen on yield and quality of sugarcane. They found that general, the growth and yield parameters of sugarcane improved significantly with the application of nitrogen. The level of 300 kg N ha^{-1} produced significantly highest cane and sugar yield over other treatments.

Methodology

3. METHODOLOGY

For the study of any type of investigation the researcher requires to adopt appropriate methods and procedures in order to achieve meaningful conclusions. This chapter deals with methodology adopted for the present study. The chapter is divided into four subheads as indicated below.

3.1 The study area

The Ahmednagar district of western Maharashtra was purposively selected for the present study.

3.2 Data base

3.2.1 Selection of Tahsils

It is seen from the table 3.1 that, there are 14 tahsils, out of which Newase and Shrirampur tahsils contributed 31.2 and 28.2 percent to the total sale of Maruti Fertochem mixed Fertilizers in Ahmednagar district. In view of this on highest sale proportionate basis, Newase and Shrirampur tahsils were selected for the study.

Table 3.1 Tahsilwise total sale of Maruti Ferlwchem Mixed Fertilizers for the year 2000-2001

Sr. No.	Tahsils	Total sale (M.T.)	% to district total sale
1	Ahmednagar	434	5.73
2	Parner	319	4.21
3	Shrigonda	212	2.80
4	**Shrirampur**	**2137**	**28.23**
5	**Newase**	**2365**	**31.25**
6	Jamkhed	303	4.00
7	Karjat	287	3.79
8	Sangamner	423	5.59
9	Rahata	207	2.74
10	Rahuri	239	3.16
11	Pathardi	193	2.55
12	Shevgaon	138	1.82
13	Kopargaon	217	2.87
14	Akole	95	1.25
	District total	7569	100.00

Source : District officer (Ahmednagar) of Maruti Fertochem Ltd.

3.2.2 Selection of villages

There are 114 and 136 villages in Newase and Shrirampur tahsils. However, the villages in each tahsil having highest sale of Maruti Fertochem Mixed Fertilizer were selected for the study. A list of selected villages (Maps) along with sale of this fertilizer is given in Table 3.2. Five villages were selected from each tahsils. Viz., Sonai, Ghodegaon, Vadala, Khadki, Bhenda from Newase tahsil and Belapur, Taklibhan, Haregaon, Ashoknagar, Khadki (Mahadev) from Shrirampur tahsil.

Table 3.2 Villagewise total sale of Maruti Fertochem Mixed Fertilizers during the year 2000-2001.

Sr. No.	Villages	Total sale (M.T.)	% in the dist. Total sale
	(Newase tahsil)		
1	Sonai	373	15.77
2	Ghoadegaon	332	14.03
3	Vadala	369	15.60
4	Khadki	384	16.24
5	Bhenda	263	11.12
	Total	1721	72.76
	Tahsil total	2365	100.00
	(Shrirampur tahsil)		
1	Belapur	332	15.54
2	Takli Bhan	412	19.28
3	Haregaon	327	15.30
4	Ashok Nagar	294	13.76
5	Khadki (Mahade)	229	10.71
	Total	1594	74.59
	Tahsil total	2137	100.00

Source : District officer (Ahmednagar) of Maruti Fertochem Ltd.

3.2.3. Selection of farmers

The list of the farmers who have used this fertilizers from the selected ten villages were obtained from the district officer of Ahmednagar which was main supplier and these farmers were categorised into three size groups on basis of operational holdings as below.

a) Size group I – upto 2 ha
b) Size group II- 2.01 to 4 ha
c) Size group III – 4.01 and above

From each selected villages, 3 farmers from each size group were selected randomly. Thus in all 9 farmers from each village, total 90 farmers from 10 villages, from two selected tahsils of Ahmednagar district.

3.3 Collection of data

For the purpose of accurate and reliable data the selected farmer were contacted personally and the data pertaining to the various aspects of the study were collected from them with the help of specially designed questionnaire for the year 2000-2001. The data were collected by survey method. Besides this, the data relating to the land use, cropping pattern, rainfall, irrigation structure etc. were collected from the secondary sources.

3.4 Analytical frame work

The data collected was compiled and analysed for interpretation of the results. Both tabular and statistical method of analysis were used to accomplish the objectives of the study.

3.4.1 Tabular Analysis

i) Age

The chronological age of the users at the time of an interview was taken into consideration and the users then were categorised in two classes.

Sr.No.	Age in years
1	upto 50
2	50 & above

ii) Education

It is the level of normal education which was successfully completed by the users. The following categories of education were formed.

Sr.No.	Categories	Education
1	Illiterate	No education
2	Primary	upto 7^{th}
3	Higher secondary	8^{th} to 12^{th}
4	Collegiate	13^{th} & above

iii) Occupational pattern

The occupational pattern of users were grouped into following categories

Sr.No.	Categories
1	Farming
2	Farming + service

iv) Annual income

In the present day, total annual income from all the services of the users was taken into consideration.

Sr.No.	Annual income in Rupees
1	upto 1,00,000
2	1,00,001 to 2,00,000
3	2,00,001 & above

vi) Land holding

The Land holding of users was grouped into following categories.

Sr.No.	Category (ha.)
1	Total land holding
2	Waste land / Uncultivated land
3	Cultivated land
4	unirrigated
5	Irrigated percent to the cultivated land holding

vii) Buildings

The buildings of the user were grouped into two categories.

Sr. No.	Category
1	Residential building
	i) Pucca
	ii) Kaccha
2	Store house

vii) Implements and machinery

The implements and machinery of the users was grouped into following categories.

Sr. No.	Categories
1	Farm Implements
	i) Bullock cart
	ii) Seed drill
	iii) Harrow
	iv) Hoe
	v) Iron plough
2	Farm machinery
	i) Oil engine
	ii) Electric motor
	iii) Tractor
	iv) Pipe line

ix) Land use pattern

The land use pattern of the users was grouped into six categories.

Sr. No.	Categories (ha.)
1	Total land holdings
2	Barren and uncultivated land
3	Net cultivated land
4	Cropped area
	Kharif
	Rabi
	Summer
	Annual (Sugarcane)
5	Gross cropped area
6	Cropping intensity

x) Cropping pattern

The cropping pattern of the users were grouped into four categories.

Sr. No.	Category
1	Kharif
2	Rabi
3	Summer
4	Annual

xi) Packaging material and size

Packaging material used was polythene bags and size is of 50 kg bags.

3.4.2 Statistical Analysis

i) Age

ii) Education

iii) Occupational pattern

iv) Annual income

As mentioned in tabular analysis.

v) Farming experience

The farming experience of the user was grouped into three classes.

Sr. No.	Farming Experience
1	upto 15 yrs
2	16 to 25 yrs
3	26 yrs and above

vi) Area under irrigation

Total irrigated area of the user was grouped into four categories.

Sr. No.	Irrigated area in percentage
1	100
2	75-99
3	50-74
4	below 49

vii) Price factor

Price of fertilizers as compared to other brands were grouped into three categories.

Sr. No.	Categories
1	Remunerative
2	High
3	Low

viii) Sources of information

It is the first source from which the users listen about Maruti Fertochem Mixed Fertilizers. It was categorised into six categories based on the information collected.

Sr. No.	Source of information
1	Company representative
2	Poster, Leaflets, magazines
3	Boards, wall paintings
4	Dealers
5	Progressive farmer
6	Radio

xi) Form of fertilizer used

It was grouped into three categories.

Sr. No.	Categories
1	Straight
2	Mixed
3	Both

ix) Opinion regarding NPK ingredients in Maruti fertochem Mixed Fertilizers.

The opinion of the users regarding NPK ingredients, its form, solubility was grouped into three categories.

Sr. No.	Opinion
1	Very good
2	Good
3	Fair

3.4.2 Statistical Analysis

1) Statistical test :

The x^2 statistic provides a measure of agreement between observed and expected frequencies. X^2 is non parametric or distribution free test. Following are the application of x^2 distribution.

1. The x^2 test for goodness or fit

1) Object

To investigate the significance of the difference between observed data averaged in K classes and the theoretically expected frequencies in K classes.

H_0 ; Observed frequencies are as per theoretical expectation

H_1 ; Observed frequencies are not as per theoretical expectation.

ii) Method

The test statistic is

$$X^2 = \sum_{i=1}^{k} \frac{(Oi - Ei)^2}{Ei}$$

Where O_1 and E_1 represents the corresponding observed and expected frequencies for each of the K classes. This statistic is compared with a value obtained from x^2, table with (K-1) degree of freedom.

iii) Conclusion

If x^2 cal > x^2 tab with (K-1) d.f. and at choosen level of significance, Reject Ho

It x^2 cal ≤ x^2 tab with (K-1) d.f. and at choosen level of significance, Accept H_0,

2) The x^2 test for independence of Attributes

i) Object

At a times we may consider two characteristics or attributes simultaneously. Our interest will be to test the association between these to attributes.

The sample of size, N, can be classified into r categories according to attribute A and C categories according to attribute B, the arrangement of frequencies into rxc cells is the contingency table with r rows and C columns. The hypothesis is under test is :

H_0 : The two attributes are independent of one another.

H_1 : The two attributes not independent of are another

$$X^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(Oij - Eij)^2}{Oij},$$

which follows x^2 – distribution with (r-1) (c-1) d.f.

Oij = Observed frequencies in (ij), cell

Eij = Expected frequencies in (ij), the cell

$$Eij = \frac{(Ai)\,(Bi)}{N}$$

Where,

Ai = ith row total

Bi = jth column total

N = total frequent

iii) Conclusion

If x^2 cal > x^2 Tab, with (r-1) (c-1) d.f. and at choosen level of significance, Reject H_0.

If x^2 cal < x^2 Tab with (r-1) (c-1) d.f. and at choosen level of significance, accept Ho.

3) Conditions for the validity of application of x^2 test

1) The sample observation should be independent

2) Oi = Ei

3) H_1 Total frequency should be reasonably large say H > 50

4) No theoretical cell frequency should be less than 5.

Multiple Regression Analysis

To find out the effect use of NPK nutrients on productivity of selected crops, the multiple regression analysis was fitted to the data.

$Y = a + b_1x_1 + b_2x_2 + b_2x_3 + u$

Where,

Y= dependent variable (yield)

x_1, x_2, x_3 = Independent variables i.e. N, P, K.

b_1, b_2, b_3 = Regression coefficient

a = Intercept

u = error term

SALIENT FEATURES OF STUDY AREA AND MARUTI FERTOCHEM LTD. AHMEDNAGAR

4. SALIENT FEATURES OF THE STUDY AREA AND MARUTI FERTOCHEM LTD. AHMEDNAGAR

4.1 Features of the study area

Agro-climatic conditions play on important role in agricultural production. The cultivation and growth of crops depends mainly on the soil type and the precipitation. Though these natural factors are beyond the control of man farmer adjusts his farming in such a way as to take advantage of the prevailing climatic conditions. Besides these factors irrigation, transport facilities, development of infrastructure facilities and market centres, progress in field education, credit and storage facilities etc. play an important role in the production of agricultural commodities. The knowledge about physical features and economic background of tract facilitates better understanding of the problem under investigation. As mentioned earlier Newase and Shrirampur tahsil in Ahmednagar district of Maharashtra state were purposively selected for conducting the study.

In view of the above, following general information of the study area is briefly discussed in this chapter.

4.1.1 Location

4.1.2 Population

4.1.3 Soils

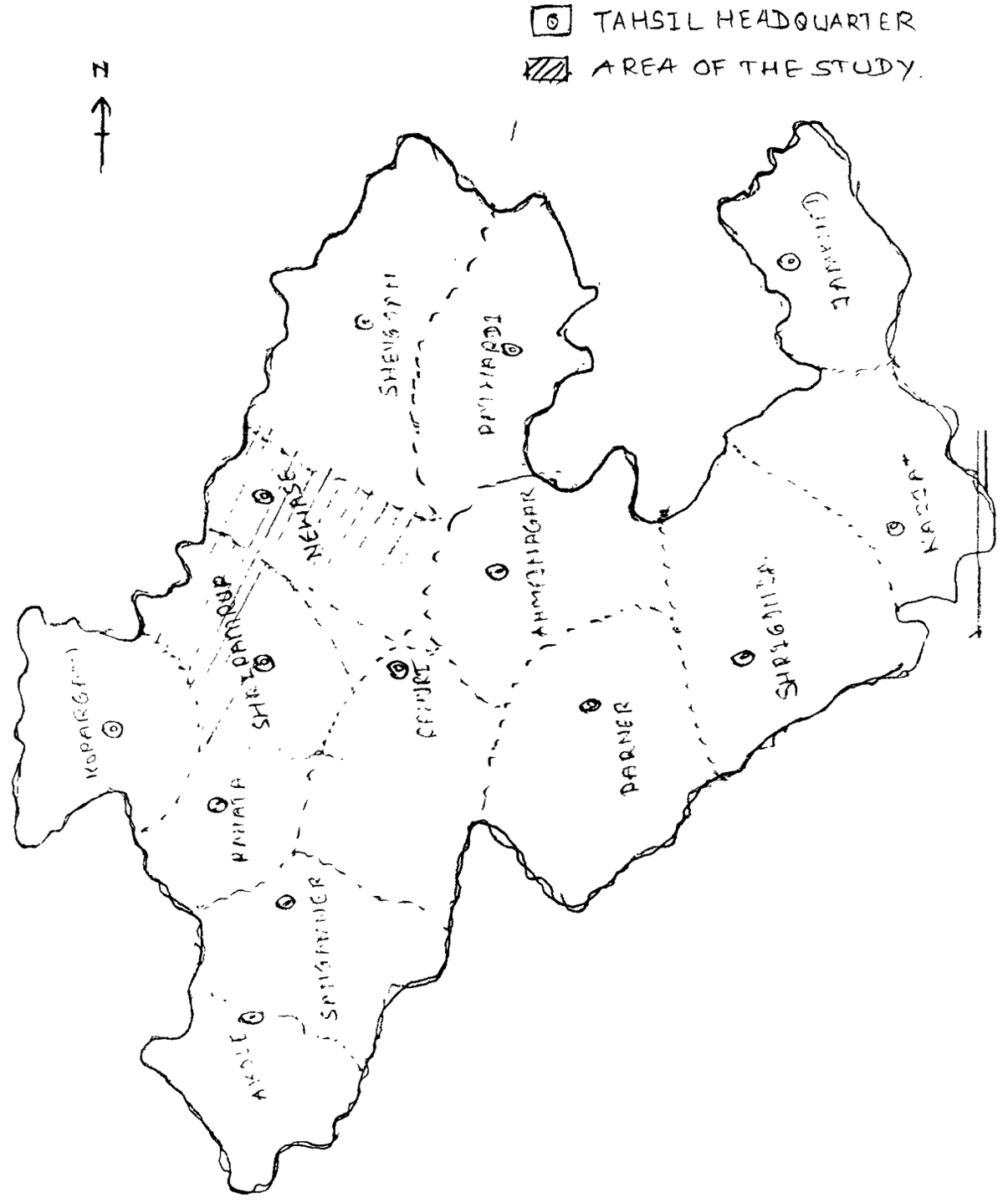
4.1.4 Climate and rainfall

4.1.5 Land utilization pattern

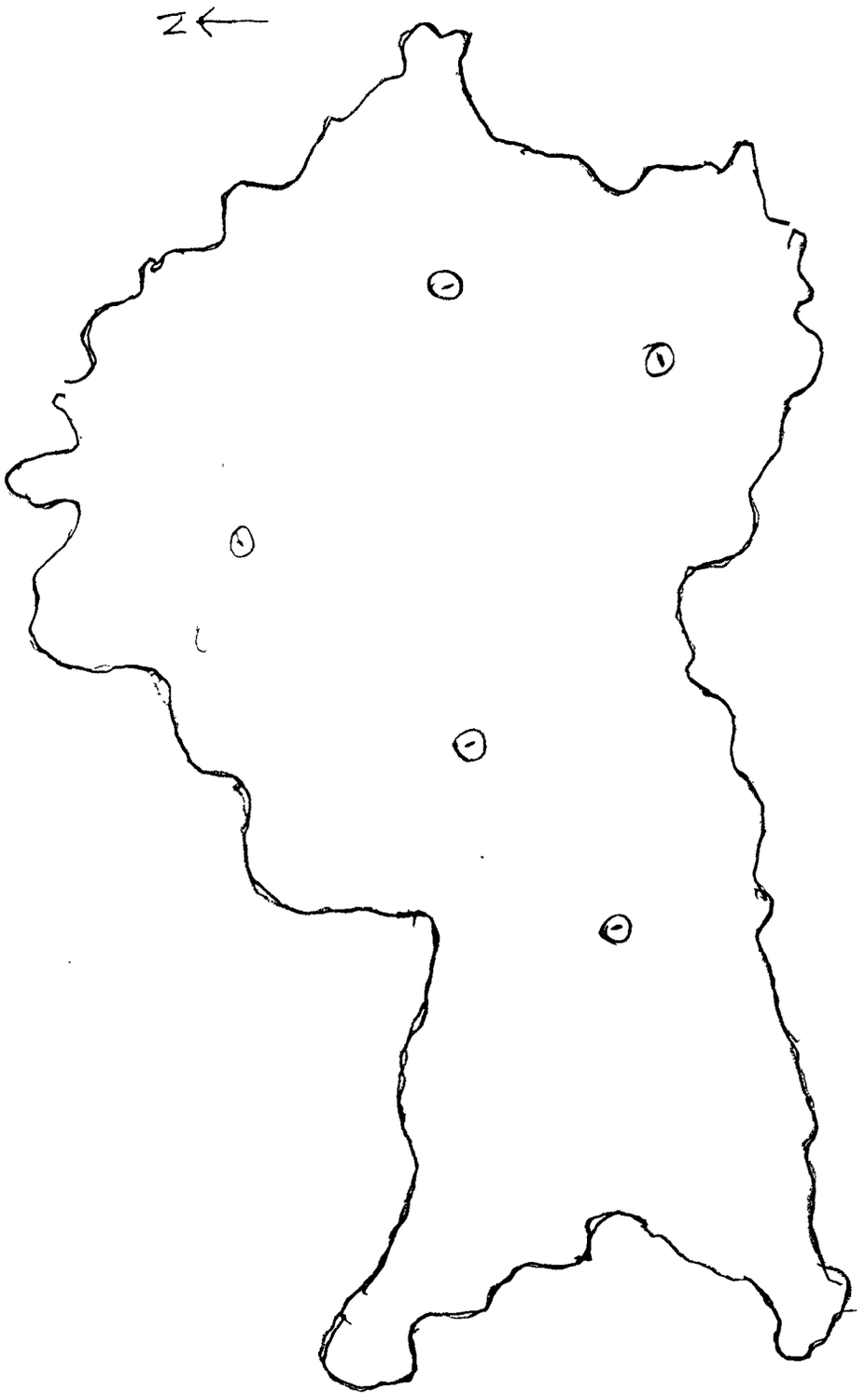
4.1.6 Cropping pattern

4.1.7 Irrigation

MAP OF AHMEDNAGAR DISTRICT SHOWING STUDY AREA

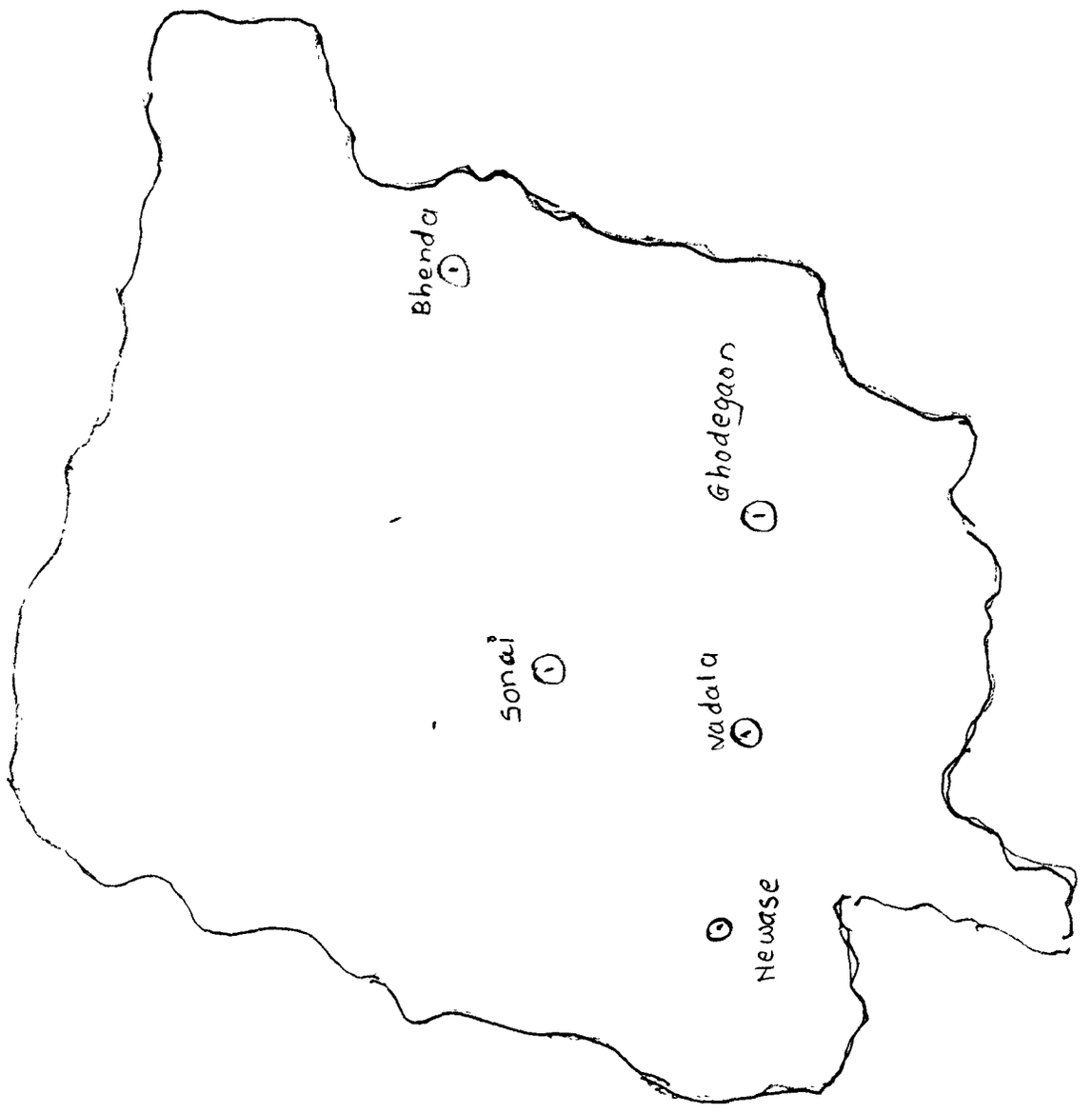


MAP OF SHRIRAMPUR TAHSIL SHOWING VILLAGE UNDER STUDY.



MAP OF NEWASE TAHSIL SHOWING VILLAGES UNDER STUDY

⊡ PLACE OF THE VILLAGE



4.1.8 Transport facilities

4.1.1 Location

Ahmednagar district is one of districts of Nashik Revenue Division situated on central part of Maharashtra and lies between $18^{0}2$ to 19^{0} 9' north latitude and 73^{0} 9' to 75^{0} 5' east longitude. The Ahmednagar district has a total geographical areas of 17048 sq. km and stands first in terms of area in the state.

4.1.2 Population

Ahmednagar district comprises of 14 tahsils. It has total population of 33,72,935 consisting of 84.18% rural and 15.82% urban population Shrirampur tahsil comprises of 136 villages and no town. It has an area of 541 sq. kms. Total population of tahsil is 2.23 lakhs according to 1991 census. Newase tahsil comprises of 114 villages and no town. It has an area of 1243.7 sq. Kms. Total population of tahsil is 2.73 lakhs according to the 1991 census.

4.1.3 Soils

Three types of soils are prevailing in the district viz., medium black, Shallow & Coarse soils along hilly areas soils are baread type. In general soils of the selected tract are Shallow & coarse.

4.1.4 Climate and rainfall

Climate of the district is dry and pleasant during most part of the rainy and winter seasons. Annual average maximum temperature is 38^{0}C with a range of 33^{0}C to 43^{0}C and the average minimum temperature is 17^{0}C with a range of 3^{0}C to 17°C.

Over the district the peak supply of rain is from the South West monsoon which begins about the middle of June and lasts till the end of October. In January and February rainfall is unusual, but from March till may the sky as a rule is cloudy. The average annual rainfall of the tract is 231 mm during kharif season, however the rainfall received during the year is 322 mm.

4.1.5 Land utilisation pattern

The information relating to the land use pattern in Ahmednagar district during the year 1999-2000 is given in table 4.1. The land use pattern in the district and tahsil gives an idea of the mode of agriculture. It was seen from the table that 68.99, 80.00, and 83.20 per cent of the total geographical area in Ahmednagar district, Shrirampur and Newase tahsils was net sown area during the year 1999-2000. The gross cropped area was 12670, 712 and 1181 thousand ha in the district. The area sown more than once was 935, 48 and 105 hundred ha in district, Shrirampur and Newase tahsils, respectively.

Table No. 4.1 Land utilization pattern of Ahmednagar district, Shrirampur and Newase tahsil during 1999-2000.

(Area in 00' ha.)

Sr. No.	Particulars	Ahmednagar district	Shrirampur tahsil	Newase tahsil
1.	Total geographical area	17020 (100.00)	822 (100.00)	1292 (100.00)
2.	Area under forest	1710 (10.04)	0 (--)	15 (1.16)
3.	Land put to non agricultural uses	784 (4.6)	0 (--)	77 (5.95)
4.	Barren and uncultivable land	616 (3.6)	9 (1.09)	7 (0.54)
5.	Cultivable waste	293 (1.72)	24 (2.9)	30 (0.23)
6.	Permanent pastures and other grazing land	511 (3.0)	21 (2.55)	2 (0.15)
7.	Current fallow	380 (0.02)	60 (7.2)	18 (1.39)
8.	Other fallow	919 (5.3)	65 (7.9)	63 (4.8)
9.	Net sown area	11735 (68.9)	664 (80.00)	1076 (83.20)
10.	Area sown more than once	935	48	105
11.	Gross cropped area	12670	712	1181

Source :District socio-economic review Ahmednaga(1999-2000) pp 29-32.

(Figures in parentheses are percentage to the total geographical area)

Table 4.2 Cropping pattern of Ahmednagar district, Shrirampur and Newase tahsil during 1999-2000

(Area in ha.)

Crops	Ahmednagar district		Shrirampur tahsil		Newase tahsil	
	Area	Percentage to G.C.A	Area	Percentage to G.C.A	Area	Percentage to G.C.A
Cereals						
Paddy	10802	0.852	25	0.03	0	--
Wheat	81915	6.46	9809	13.78	12443	10.5
Total jowar (K & R)	5,51,635	43.5	15621	21.9	35205	29.8
Bajra	3,30,692	26.1	20521	28.8	40704	33.9
Maize	6208	0.48	763	1.0	529	0.44
Wari	838	0.06	0	--	0	--
Nachani	2478	0.195	0	--	0	--
Other cereals	5893	0.465	0	--	28	0.02
Total cereals	**990460**	**78.17**	**46739**	**65.6**	**88909**	**75.2**
Pulses						
Gram	25680	2.02	5034	7.0	4370	3.7
Tur	17782	1.40	1660	2.3	2070	1.7
Mung	10272	0.810	177	0.2	202	0.17
Udid	590	0.046	2	0.003	0	--
Wal	476	0.037	0	--	0	--
Kulthi	13372	1.055	221	0.3	0	--
Mataki	12379	0.977	309	0.4	675	0.5
Other pulses	3483	0.2748	257	0.3	22	0.018
Total pulses	**84034**	**6.63**	**7660**	**10.7**	**7658**	**6.48**
Total food	1074525	84.8	54399	76.3	96567	81.7
grains	71895	5.67	7293	10.2	12321	10.4
Sugarcane	1576	0.124	0	--	0	--
Chilli	2	0.0001	0	--	0	--
Turmeric	2	0	0	--	0	--
Arecanut						

1	2	3	4	5	6	7
Spices and condiments	3542	0.279	183	0.25	544	0.4
Mango	749	0.059	138	0.19	93	0.078
Cashewnut	0	0	0	0	0	0
Fruits and vegetables	2353	1.598	2352	3.3	1793	1.5
Total food Crops	1172506	92.54	64232	90.27	111225	94.1
Cotton	3575	0.282	793	1.1	708	0.59
Other fibre crops	731	0.057	245	0.3	113	0.09
Total fibre crops	4306	0.339	1038	1.4	821	0.69
Oilseeds						
Groundnut	12448	0.98	324	0.4	1718	1.4
Safflower	24609	1.942	535	0.7	1349	1.1
Jawas	782	0.06	78	0.1	74	0.06
Sesamum	743	0.058	76	0.1	112	0.09
Coconut	21	0.0016	11	0.01	3	0.002
Other oilseeds	9753	0.769	1327	1.8	1749	1.4
Total oilseeds	48356	3.830	2351	3.3	5002	4.2
Tobacco	6	0.0004	0	0	0	0
Drugs and medicinal crops	18	0.0014	7	0.003	0	0
Forage crops	37699	2.975	3523	4.97	1030	0.8
Total non food crops	92495	7.300	6926	9.73	6853	5.19
Gross cropped area	126700	100.00	71158	100.00	118078	100.00

Source : District socio economics review Ahmednagar (1999-2000) pp. 33-38

4.1.6 Cropping pattern

The details of cropping pattern of Ahmednagar district and selected tahsils for the year 1999-2000 are presented in table 4.2. The cropping pattern of the of the Ahmednagar district as a whole and

also of Shrirampur and Newase tahsil are dominated by cereal crops with 78.17, 65.6 and 75.2 per cent contribution to gross cropped area respectively. While that of Sugarcane was 5.67, 10.2 and 10.4 percent in the district and tahsils respectively. The area under pulses is less in both Shrirampur and Newase tahsil as compared to the area under pulses in the district. The area under fibre crops in the district and Shrirampur and Newase tahsils are 0.33, 1.4 and 0.69 percent respectively. The area under oilseeds crops in the district and Shrirampur and Newase tahsils were 3.83, 3.3 and 4.2 per cent respectively. The area under forage crops in the district and Shrirampur and Newase tahsils over 2.97, 4.97 and 0.8 per cent respectively.

4.1.7 Irrigation

Irrigation is most important source in the cultivation of crops. The table 4.3 shows the irrigation information in Ahmednagar district and Shrirampur, Newase tahsils.

The net irrigated area in Ahmednagar district was 270982 ha and that of Shrirampur and Newase tahsils was 44569 and 38592 ha in 1999-2000 respectively. The percentage of gross irrigated area in relation to the gross cropped area was 28.56 per cent in Ahmednagar district and 73.39 and 45.69 per cent in Shrirampur and Newase tahsils respectively. The percentage of net irrigated area in relation to net cropped area was 37.28 per cent in the district and 67.11 and 35.88 per cent in Shrirampur and Newase tahsils, respectively. In Ahmednagar district and Shrirampur and Newase tahsils wells were the main source of irrigation.

Table 4.3 Irrigation status of Ahmednagar district, Shrirampur and Newase tahsil during year 1999-2000

(Area in ha)

Sr. No.	Particulars	Ahmednagar district	Shrirampur tahsil	Newase tahsil
1.	*Area under irrigation*			
	a) Surface	64250	13399	13608
	b) well	206732	31170	24984
2.	Net irrigated area	270982	44569	38592
3.	Gross irrigated area	361199	52,222	53946
4.	Net cropped area	7,26,700	66405	107554
5.	Gross cropped area	1267007	71158	118078
6.	% of gross irrigated area in relation to the gross cropped area	28.56	73.39	45.69
7.	% of net irrigated to the net cropped area.	37.28	67.11	35.88

Source : District socio economic review of Ahmednagar 1999-2000 pp-40.

4.1.8 Transport

The transport facilities in the district are well developed. In the district there are six railway stations.The district and tahsil head quarters are connected by road. Table 4.4 Shows transport system the district during 1999-2000.

4.2 Brief profile of Maruti Fertochem Ltd.

R.J. group is a business empire from Marathwada region. This company was established in the year 1993. With the objective of providing the fertilizers to the farmers of good quality, with minimum price. This company proved its worthiness by being honoured by the state government as the "Best private fertilizer company" for the year 1998-99.

Table 4.4 Transport system in Ahmednagar district

Sr. No.	Transport	In district
1.	Total railway route in km.	197
2.	Villages connected by road (no.)	1094
3.	Total road lengths in km.	14416
4.	National highway length in km.	60
5.	State highway length in km.	1710
6.	Important districts road length in Km.	2956
7.	Other district road length in km.	3299
8.	Rural roads length in km.	4407

Source : District socio-economic review Ahmednagar (1999-2000) pp 8

4.2.1 Board directors

The overall powers of management are vested in the hands of Board of Directors. The board of directors is elected for the period of six years.

The board of directors frames the strategy and policies for the rapid expansion of the company. The implementation of various policies, plans, is in the hands of managing directors as he directs and controls the whole business activity. Monthly meeting of the board of directors are held regularly on 10^{th} of every month.

4.2.2 Organisation and administration

To survive the strong competition of the market, the company has evolved sound management with disciplined and dedicated directors. The company has divided the region into zones viz., Marathwada, Western, Central zone. The extensive sale of the company is carried out by dedicated staff. From each district, district officer is responsible for the company's sale of fertilizers under whom,

sales managers, field assistant, field officers work for the marketing of the company. The district officer is to report to his senior i.e. zonal manager.

This extensive network of sales is managed by qualified persons from the field of business administration, Agriculture. The managing director presides over the meeting of the managers of the zones and branches held on 21st every month.

Review of various workdone and the progress made by the company in terms of sale is discussed. Further strategies for boosting the sales and covering broader network are formulated. Instructions are given by the managing director to the officers regarding various policies.

4.2.3 Gewrai granulated fertilizer

During, 1993, the company had set up a plant for the manufacture of granulated fertilizer at Gewrai village 30 km away from Aurangabad.

4.2.4 Process of manufacture

The procedure of Gewrai plant manufacturing granulated mixed fertilizer is briefly described below.

Fertilizer component such as ammonium sulphate, urea, single super phosphate, murate of potash, di-ammonium phosphate, dolomite etc. are received in bags and are emptied by coolies into crusher. A bucket elevator takes these components from the crusher to a distribution conveyor mounted above the feed hoppers, which are provided with a sharp conveyors and volumetic feeders, which

delivers a metered quantity of each fertilizer component to the conveyor belt that feeds direct into the rotating pan granular through a paddle conveyor. Where the components are homogeneously mixed. Each volumetric feeder is adjustable in order to assure that the correct ratio of components is feed as required.

The mixture is granulated in pan granulator with the addition of sprayed water. The granulated mixture falls through a hopper into the feed end of the oil fixed co-current drier drum the combustion air is drawn through the drier drum and cyclones by a fan and delivered to the exhaust stock.

The dried material is conveyed to the rotaing drum cooler. Cold air is drqwn through the cooler and cycloned by a fan and the exhaust air is delivered to the stack, then the product is carried to the vibrating screens which remove over size and under size material. The over size material is crushed by a chain mill and goes back to granulator alongwith under size material.

The finished granulated fertilizer has dimensions of 1.5 to 5.0 mm. This material is conveyed to the finished material godown and same is left in heaps and then after curing the product for half an hour is finally bagged in polythene bags.

4.2.5 Quality control of NPK product

The company has its own well equipped laboratory, to maintain the quality of granulated fertilizer mixtures. The representative sample is subjected to quality test under supervision of quality testing officer of the state government. The finished material is released for marketing. Following are the test performed for analysis.

1) Nitrogen is estimated by Kjeldhal's method. By this method nitrogen is estimated in the form of ammonia.
2) Phospharic acid is estimated by gravimetric test.
3) Potash is detected by flame photometer

RESULTS AND DISCUSSION

5. RESULTS AND DISCUSSION

General :

This chapter deals with the presentation, interpretation and analysis of data. Farmers behaviour towards the use of Maruti Fertochem Mixed Fertilizers has examined in detail to study the various aspects such as, socio-economic characteristics of users, factors influencing it's use, the various sales promotional strategies, tools and techniques adopted by the manufacturers, and its effect on the productivity of crop. The data for the year 2000-2001 was obtained from the users of Maruti Fertochem Mixed Fertilizers and also from the district officer of the company, and was analysed keeping in view the objectives under study. The results of the analysis are discussed as below.

5.1 Socio-economic characteristics of the users

The details regarding the socio-economic characteristics of the selected users are discussed and summarised as below

5.1.1 Age

5.1.2 Educational status

5.1.3 Occupational pattern

5.1.4 Annual income

5.1.5 Capital assets

5.1.5.1 Land holdings

5.1.5.2 Buildings

5.1.5.3 Implements and machinary

5.1.6 Land use pattern

5.1.7 Cropping pattern

5.1.1 Age

The information relating to the age groupwise distribution of users is presented in table 5.1.

Table 5.1 Age groupwise distribution of users.

(Numbers)

Sr. No.	Particulars	Size groups of holdings			Total
		I	II	III	
1.	Upto 50 years	17 (56.67)	14 (46.67)	15 (50.00)	46 (51.11)
2.	51years and above	13 (43.33)	16 (53.33)	15 (50.00)	44 (48.89)
	Total	30 (100.0)	30 (100.0)	30 (100.0)	90 (100.0)

(Figures in parentheses are percentage to the total)

It is apparent from the table 5.1 that at the total level the age groupwise distribution of users upto 50 years and 51 years and above was 51.11 and 48.89 per cent respectively. Among the size groups, it is seen than maximum number of users in small and medium size groups have distributed in upto 50 years (56.67 per cent) and 51 years and above group (53.33 per cent) respectively. Large size group showed equal distribution of users among two categories.

5.1.2 Educational status

Educational status of users is an important factor influencing managerial ability, skill, technical knowledge of the users.

Table 5.2 presents the information relating to educational status wise distribution of users.

Table 5.2 Educational statuswise distribution of users.

Sr. No.	Particulars	Size groups of holdings			Total
		I	II	III	
1.	Illiterate	1 (3.33)	2 (6.67)	5 (16.67)	8 (8.89)
2.	Primary	17 (56.67)	16 (53.33)	5 (16.67)	38 (42.22)
3.	Higher secondary	9 (30.00)	11 (36.67)	17 (56.67)	37 (41.11)
4.	Collegiate	3 (10.00)	1 (3.33)	3 (10.00)	7 (7.78)
5.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)

(Figures in parentheses are the percentage to the total)

It can be seen from the table 5.2 that, at the total level the percentage of illiterate and literate users to the total users were 8.89 and 91.11 per cent respectively. Among the literate category, the primary, higher secondary and collegiate education comprises of 42.22, 41.11 and 7.78 per cent respectively. Further it is apparent from the table that, the level of education of the users was relatively higher in the small size group. The illiteracy percentage showed an increasing trend as size of holding increased while percentage numbers of users in higher secondary education showed an increasing trend as size of holding increased.

5.1.3 Occupational pattern

The information on occupational patternwise distribution of the users is presented in table 5.3.

Table 5.3 Occupational patternwise distribution of users.

(Numbers)

Sr. No.	Particulars	Size groups of holdings			Total
		I	II	III	
1.	Farming	25 (83.33)	24 (80.00)	23 (76.67)	72 (80.00)
2.	Farming + service	5 (16.67)	6 (20.00)	7 (23.33)	18 (20.00)
3.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)

(Figures in parentheses are the percentage to the total)

It can be observed from the table 5.3 that, at the total, the proportion of users doing farming and farming + service was 80.00 and 20.00 per cent respectively. It can be depicted from the table 5.3 that the percentage of users doing farming showed an decresing trend as size of groups and holdings increased. While the percentage of users doing farming + service showed an increasing trend as the size of holding increased.

5.1.4 Annual Income

Table 5.4 depicts the information relating to the annual incomewise distribution of users.

Table 5.4 Annual incomewise distribution of users.

(Numbers)

Sr. No.	Particulars	Size groups of holdings			Total
		I	II	III	
1.	Upto 1,00,000	19 (63.33)	2 (6.66)	1 (3.33)	22 (24.44)
2.	1,00,00 to 2,00,00	9 (30.00)	20 (66.67)	3 (10.00)	32 (35.56)
3.	2,00,00 and above	2 (6.67)	8 (26.67)	26 (86.67)	36 (40.00)
4.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)

(Figures in parentheses are the percentage to the total)

It is apparent from the tabel 5.4 that of the total level the proportion of users acceding to income group of rupees upto, 1,00,000, 1,00,001 to 2,00,000 and 2,00,001 and above was 24.44, 35.56 and 40.00 per cent, respectively.

The users in the income group of rupees 2,00,000 and above showed an increasing trend as the size of holdings increase, while the users in the income group of rupees upto, 1,00,000 showed an decreasing trend as the size of holding increase.

5.1.5 Capital assests

The details regarding the investment in the capital assests by the users are given as below.

5.1.5.1 Land holding

The details regarding the size groupwise average size of land holdings possessed by the users are presented in table 5.5.

Table No. 5.5 Average size of land holdings of the selected users

(hectares)

Sr. No.	Particulars	Size groups of holdings			Total
		I	II	III	
1.	Total land holding	1.60 (100.00)	3.20 (100.00)	5.10 (100.00)	3.30 (100.00)
2.	Waste land / uncultivated land	0.10 (6.25)	0.24 (7.50)	0.48 (9.41)	0.27 (8.18)
3.	Cultivated land	1.50 (93.75)	2.96 (92.50)	4.62 (90.05)	3.03 (91.82)
4.	Unirrigated	0.40 (25.00)	0.45 (14.06)	0.50 (9.83)	0.45 (13.63)
5.	Irrigated percent to the cultivated land holding	1.10 (68.75)	2.51 (78.43)	2.12 (80.78)	2.57 (77.87)

(Figures in parentheses are the percentage to the total)

It can be seen from the table 5.5 that at the overall level users had an average land holding of 3.30 hectares. The percentage of waste and cultivated land to the total land holding at overall level, were 8.18 and 91.82 respectively. The percentage of irrigated and unirrigated land to the cultivated land at overall land were 77.87 and 13.63, respectively.

Further it can be seen from the table 5.5 that the average land holding possessed by small, medium and large groups of users were 1.60, 3.20 and 5.10 hectares, respectively. Of the total land holding possessed by the users, the proportion of waste land was the highest in large size group. (9.41 percent), followed by medium (7.50 percent) and small size group (6.25 per cent). The proportion of cultivated land to the total land holding was the highest in small size group (93.75 percent), followed by medium (92.50 percent) and large size group (90.05 percent). The proportion of unirrigated land to the total land holding was the highest in small size group (25.00), followed by medium (14.06 percent), and large size group (9.83 percent) the proportion of irrigated land to the total cultivated land was the highest in large size group (80.78 percent), followed by medium (78.43 percent) and small size group (68.75 percent). It is concluded from the table that waste, cultivated and irrigated land showed an increasing trend as size of holding increase in absolute terms.

5.1.5.2 Buildings

The details about the investment made in different types of buildings by the users are presented in table 5.6

Table 5.6 Average per farm investment made in different types of buildings

(Rupees)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
1.	Residential buildings i) Pucca ii) Kaccha	1,30,666 (98.74) 1665 (1.25)	2,35,664 (95.75) 6166 (2.50)	2,55,333 (90.41) 13,333 (5.59)	1,93,987 (94.34) 7054.66 (3.43)
	Sub Total	132331	241830	228666	201041
2.	Store house	-	4282 (1.73)	9.536 (4.00)	4606 (2.23)
3.	Total	1,32,331 (100.00)	2,46,112 (100.00)	2,38,202 (100.00)	2,05,647 (100.00)

(Figures in parentheses are the percentage to the total)

It is apparent from the table 5.6 that, at the overall level the per farm investment made in buildings was rupees 2,05,647 of which the proportion of pucca, kaccha residential buildings and store house were 94.34, 3.43 and 2.23 percent respectively.

Among the size groups it is seen that only medium and large size group have possessed the store house. Further it is observed that the investment in pucca residential buildings and kaccha residential buildings showed an increasing trend as size of holding increases.

5.1.5.3 Implements and machinery

The information on size groupwise and itemwise per farm investment made by users in farm implements and machinery is presented in table 5.7

It can be seen from the table 5.7 that at the overall, investment in farm implements and machinery was to the extent of Rs. 43, 972.90.

Table 5.7 Per farm size groupwise investment made in farm implements and machinary by users

Sr. No.	Particular	Size groups holding						Overall	
		I		II		III			
		Average Number	Perfarm investment	Average Number	Perfarm Investment	Average Number	Perfarm Investment	Average Number	Perfarm Investment
	Form implements								
1.	Bullock cart	0.5	1304 (6.20)	0.6	1813.0 (3.52)	0.6	1936.2 (3.25)	0.56	1684.30 (3.82)
2.	Seed drill	0.8	246 (1.18)	0.8	312.0 (0.61)	0.75	298.3 (5.00)	0.78	285.30 (0.65)
3.	Iron plough	0.7	350 (1.68)	0.8	480.7 (0.93)	0.8	492.6 (0.82)	0.76	440.60 (1.002)
4.	Harrow	0.8	143 (0.68)	0.8	163.4 (3.18)	0.6	149.4 (2.51)	0.73	151.60 (0.341)
	Subtotal		2043.00 (9.74)		2768.4 (8.24)		2876.5 (11.58)		2561.8 (5.81)
	Farm machinery								
1.	Oil engine	--	--	0.07	171.2 (0.332)	--	--	0.02	57.060 (0.12)
2.	Electric motor	0.3	2017 (9.71)	0.4	3096.8 (6.01)	0.4	3123.4 (5.24)	0.36	2745.60 (6.24)
3.	Tractor	0.01	14265 (68.71)	0.17	42149.5 (81.95)	0.2	49587.6 (83.24)	0.12	35333.60 (80.35)
4.	Pipeline	0.3	2436.00 (11.73)	0.4	3415.6 (6.64)	0.4	3981.4 (6.68)	0.36	3277.33 (7.45)
	Subtotal		18718 (90.26)		48833.1 (91.76)		56692.4 (88.42)		41413.5 (94.19)
	Grand total		20761.00 (100.00)		51429.2 (100.00)		59566 (100.00)		43972.90 (100.00)

Further it is seen that the proportion of investment made in implements and machinary to the total investment at the overall level was to the extent of 5.82 and 94.18 percent respectively. The major item of investment in farm implements was bullock cart (3.82 percent), while that of farm machinary was tractor (80.35 percent).

Among the size groups, it is seen that the same trend was followed for investment in farm implements and machinary but their proportion differ. It is concluded from the table 5.7 that, at overall level, major items of investment in farm implements and machinary were bullock cart and tractor respectively. Among the size group, it is concluded that; the investment in farm implements and machinary showed an increasing trend as size group of holding increases.

5.1.6 Land use pattern

The details regarding the size groupwise land use pattern of the users are presented in table 5.8.

Table 5.8 Average land use pattern of the selected users.

(hectares)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
1.	Total land holding	1.60 (100.00)	3.20 (100.00)	5.10 (100.00)	3.30 (100.00)
2.	Barren and uncultivated land	0.10. (6.25)	0.24 (1.50)	0.48 (9.41)	0.27 (8.18)
3.	Net cultivated land	1.50 (93.75)	2.96 (92.50)	4.62 (90.05)	3.03 (91.82)
4.	Cropped area Kharif	0.80 (53.33)	1.00 (33.78)	1.65 (35.71)	1.00 (33.00)
	Rabi	0.40 (26.67)	0.55 (18.58)	0.75 (16.23)	0.56 (18.48)
	Summer	0.30 (20.00)	0.65 (21.95)	1.05 (22.72)	0.66 (21.78)
	Annual (Sugarcane)	0.50 (33.33)	1.65 (55.754)	2.80 (60.60)	1.65 (54.45)
5.	Gross cropped area	2.00	3.85	6.25	4.03
6.	Cropping intensity	133.3	130.06	122.5	128.6

(Figures in parentheses are the percentage to the net cultivated area)

It is seen from the table 5.8 that at the overall level, the total land holding possessed by the users was 3.30 hectares. Out of the total land possessed by the users, the percentage of net cultivated and uncultivated land was 91.12 and 8.18 percent respectively. Among the size groups it is seen that the proportion of cultivated land to the total land holding was 93.75, 92.5 and 90.05 per cent in small, medium and large size groups, respectively. The gross cropped area at the overall level was 2.00, 3.85 and 6.25 hectares in small, medium and large size groups, respectively. The intensity of cropping at overall level was 128.6 percent, while GCA was 4.03 hectares.

Area under kharif, rabi, summer and annual crops especially, sugarcane at overall level was 1.00, 0.56, 0.66 and 1.65 hectares respectively. Among the size groups the percentage differ. It is concluded from the table 5.8 that, the gross cropped area especially area under sugarcane (Adsali) showed an increasing trend, while percentage area under kharif, rabi and summer crops showed an decreasing trend as size of holding increase. Area under sugarcane (Adsali) was the main factor for increasing cropping intensity in all the size groups of holdings.

5.1.7 Cropping pattern

Cropping pattern is another important vital factor influencing the level of expenses on farm inputs and the returns from the farm business. Table 5.9 depicts the information on area under different crops.

It is seen from the table 5.9 that at the overall level, amongst the kharif crops, the area under jowar was highest (9.42 percent), followed by Bajra (7.85 percent), soyabean (4.18 percent), Tur (3.14 percent) and maize (2.87 percent). In case of the rabi crops, at

overall level, it is seen that the area under wheat was highest (3.66 percent), followed by, gram (2.87 percent), jowar (2.61 percent), Pea (1.30 percent), Wal (1.30 percent) and Mataki (1.04 percent).

In case of summer crops the area under groundnut 6.54 percent was highest followed by sunflower (4.27 percent), fodder maize (3.28 percent) and Brinjal (1.82 percent). The area under annual crop

Table 5.9 Cropping pattern of selected users

(hectares)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
	Kharif				
1.	Jowar	0.25	0.30	0.55	0.36
		(13.70)	(8.10)	(9.24)	(9.42)
2.	Bajra	0.30	0.25	0.35	0.30
		(16.4)	(6.75)	(5.88)	(7.85)
3.	Maize	0.05	0.10	0.20	0.11
		(2.74)	(2.70)	(3.33)	(2.87)
4.	Soyabean	0.05	0.10	0.35	0.16
		(2.74)	(2.70)	(5.88)	(4.18)
5.	Tur	0.05	0.10	0.15	0.12
		(2.74)	(2.70)	(2.56)	(3.14)
	Sub Total	0.70	0.85	1.60	1.05
		(38.46)	(22.77)	(26.89)	(27.48)
	Rabi				
1.	Wheat	0.10	0.12	0.20	0.14
		(5.49)	(3.20)	(3.66)	(3.66)
2.	Gram	0.05	0.08	0.20	0.11
		(2.74)	(2.16)	(3.36)	(2.87)
3.	Jowar	0.05	0.10	0.15	0.10
		(2.74)	(2.70)	(2.52)	(2.61)
4.	Pea	0.04	0.08	0.04	0.05
		(2.19)	(2.16)	(6.67)	(1.30)
5.	Wal	0.04	0.08	0.04	0.05
		(2.19)	(2.16)	(6.67)	(1.30)
6.	Mataki	0.04	0.04	0.06	0.04
		(2.19)	(1.08)	(1.00)	(1.04)
	Sub Total	0.32	0.50	0.75	0.52
		(17.58)	(13.5)	(12.66)	(13.61)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
	Summer				
1.	Groundnut	0.10	0.22	0.45	0.25
		(5.49)	(15.90)	(7.50)	(6.54)
2.	Fodder Maize	0.05	0.10	0.20	0.11
		(3.84)	(2.70)	(3.30)	(3.28)
3.	Sunflower	0.00	0.22	0.15	0.15
		(4.39)	(5.90)	(2.52)	(4.27)
4.	Brinjal	0.05	0.06	0.10	0.07
		(2.74)	(1.60)	(1.66)	(1.82)
	Sub Total	0.30	0.60	0.90	0.6
		(16.48)	(16.21)	(15.12)	(15.06)
	Annual				
1.	Sugarcane (Adsali)	0.50	1.75	2.7	1.65
		(27.77)	(47.29)	(45.37)	(43.19)
	Total gross cropped area	1.82	3.70	5.95	3.82
		(100.00)	(100.00)	(100.00)	(100.00)

(Figures in parentheses are the percentage to the GCA).

especially sugarcane (Adsali) was 43.19 percent at overall level. Among the size groups the same trend was followed for area under kharif, rabi and summer crops but their percentage differs.

Amongst the size groups of holdings it is seen that, the proportion of the gross cropped area in small, medium and large size group was 1.82, 3.70 and 5.95 hectares, respectively. In case of kharif crops, jowar alone occupied the highest area in small size groups (13.70 percent) followed by medium and large size group 8.10 and 9.24 percent respectively. The proportion of area under Bajra was the highest in small size group (16.40 percent) followed by medium and large size group, 6.75 and 5.88 percent respectively. The proportion of area under maize was highest in large size group (3.33 percent) followed by small and medium groups 2.74 and 2.70 percent respectively. The proportion of

area under soyabean was highest in large size group (5.88 percent) followed by small and medium size group 2.74 and 2.70 percent, respectively. The jowar and soyabean showed an increasing trend as the size of holding increased.

In case of rabi crops, wheat alone occupied the highest proportion of area in small size group (5.49 percent) followed by large and medium size groups, 3.66 and 3.20 percent, respectively. The proportion of area under gram was highest in large size group (3.36 percent) followed by small and medium size group 2.74 and 2.16 percent respectively. The jowar, pea, wal and mataki showed an decreasing trend as size of holding increases.

In case of summer crops, groundnut alone occupied the highest proportion of area in large size group (7.50 percent) followed by medium and large size group 5.90 and 5.49 percent respectively. The proportion of area under sunflower was highest in medium size group (5.70 percent) followed by small and large size group, 4.39 and 2.52 percent, respectively. The area under fodder maize was highest in small size group (3.84 percent) followed by large and medium size group 3.3 and 2.70 percent, respectively. The area under Brinjal was highest in small size group (2.74 percent) followed by large size group and medium size group, 1.68 and 1.60 percent, respectively. The area under groundnut showed on increasing trend as the size of holding increased.

Proportion of area under sugarcane (Adsali) was highest in medium size group (47.29 percent) followed by large size group (45.37 percent and small size group 27.47 percent. The area under sugarcane (Adsali) at overall level was 43.19 percent.

5.2 Extent use of Maruti Fertochem mixed fertilizers

Generally, 18:18:10, 20:20:10, 20:20:0 types of mixed fertilizers are provided through Maruti Fertochem mixed fertilizers to the users. The per hectare use of Maruti Fertochem mixed fertilizers by the user for major crops viz. sugarcane, wheat, jowar and gram assessed in compared to the fertilizers used by the users and described as below.

5.2.1 Extent of use of Maruti Fertochem mixed fertilizers for sugarcane (Adsali) crop.

The information relating to per hectare use of Maruti Fertochem fertilizers by the users for sugarcane crop is presented in table 5.10.

It is apparent from the table that at the overall level per hectare use of N, P and K nutrients along with nutrients for sugarcane through Maruti Fertochem mixed fertilizers by the users to the total fertilizers use was 46.82, 45.65 and 44.00 percent respectively, indicating thereby the maximum use of nitrogen nutrient through Maruti fertilizers. Among the size groups, it is seen that the per hectare use of total nutrients was highest in size group III (46.65 percent), while it was lowest in size group I (44.46 percent). As regards to use of N, P and K nutrients, the same pattern was followed for size group III and I but the percentage differ. Among the size groups, more than 50 percent of total use of NPK nutrients was made through from use of other fertilizer for sugarcane by the users.

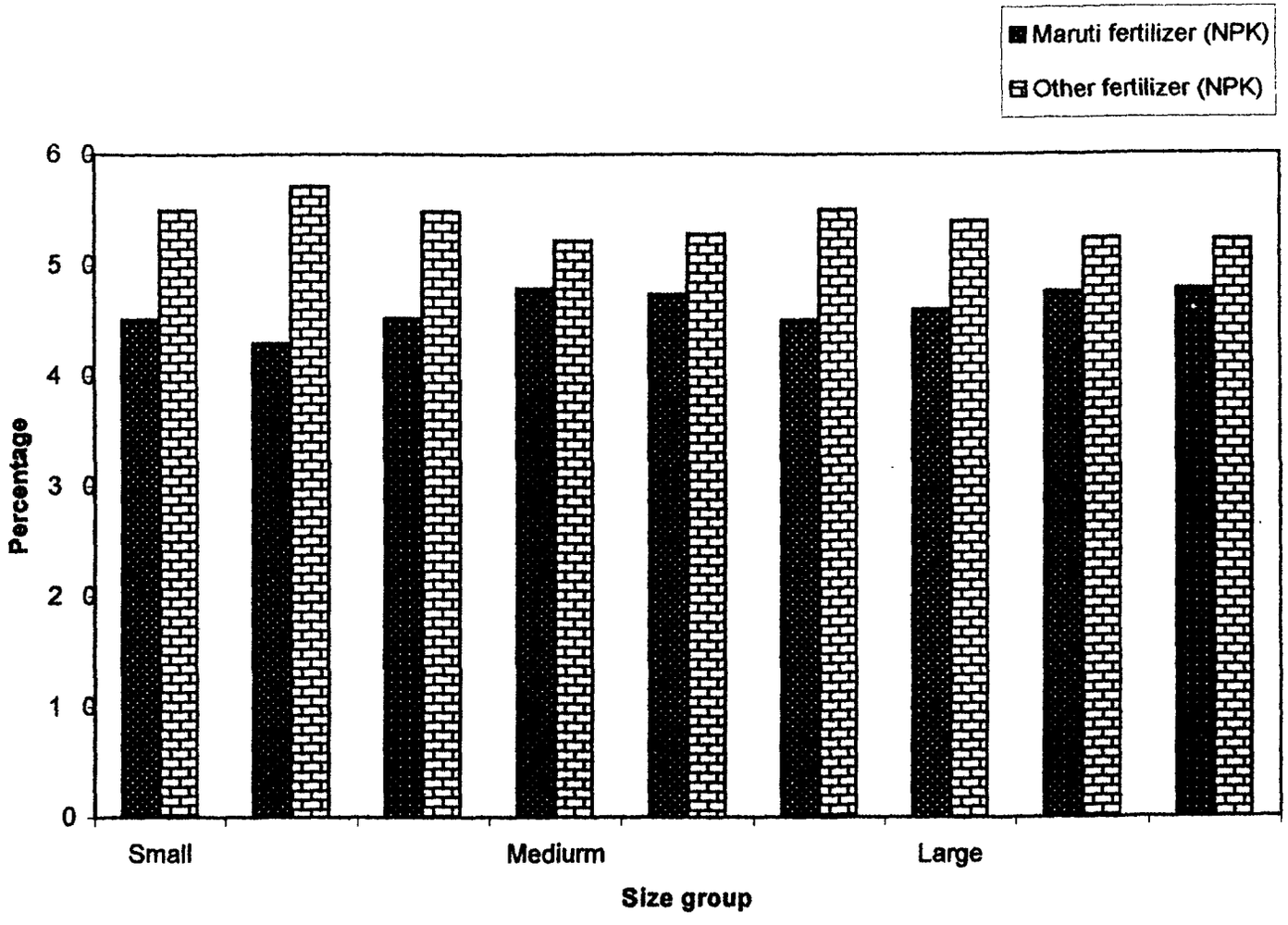


Fig. 4 Per hectare use of Maruti Fertochem mixed fertilizer for Sugarcane (Adsali)

5.2.2 Extent of use of Maruti Fertochem mixed fertilizer for wheat.

Table 5.11 depicts the information on per hectare use of Maruti Fertochem mixed fertilizers by the users for wheat crop. It can be observed from the table 5.11 that at the overall level, use of NPK with total nutrients were 41.17, 43.13, 38.46 and 41.96 percent respectively, through Maruti Fertochem mixed fertilizers by the users. Among the size group the use of total nutrients was found highest in size group I (44.80 percent), followed by size group II and III (41.36 and 40.00 percent) respectively.

Further, it is seen from table 5.11 that the per hectare use of nitrogen nutrients was highest in size group I (43.40 percent) while it is lowest in size group II (40.00 percent). In case of phosphorus nutrients, the highest use was found in size group I (45.45 percent), while lowest in III size group (40.42 percent). As regards to potash nutrients, maximum use was found in size group II (42.50 percent) and lowest use in size group I (37.50 percent).

It is concluded from the table that, 41.17 and 43.13 percent of N and P nutrients quantity was supplied through Maruti Fertochem mixed fertilizers.

5.2.3 Extent use of Maruti Fertochem mixed fertilizers for jowar

The information an per hectare use of Maruti Fertochem mixed fertilizers by the users for jowar crop is presented in table 5.12.

It is apparent form the table 5.12 that at the overall level, per hectare use of N, P, K and total nutrients in compare with other fertilizers for jowar crop through Maruti Fertochem mixed fertilizers to the total fertilizer use was 42.42, 57.14, 35.70 and 38.80 percent,

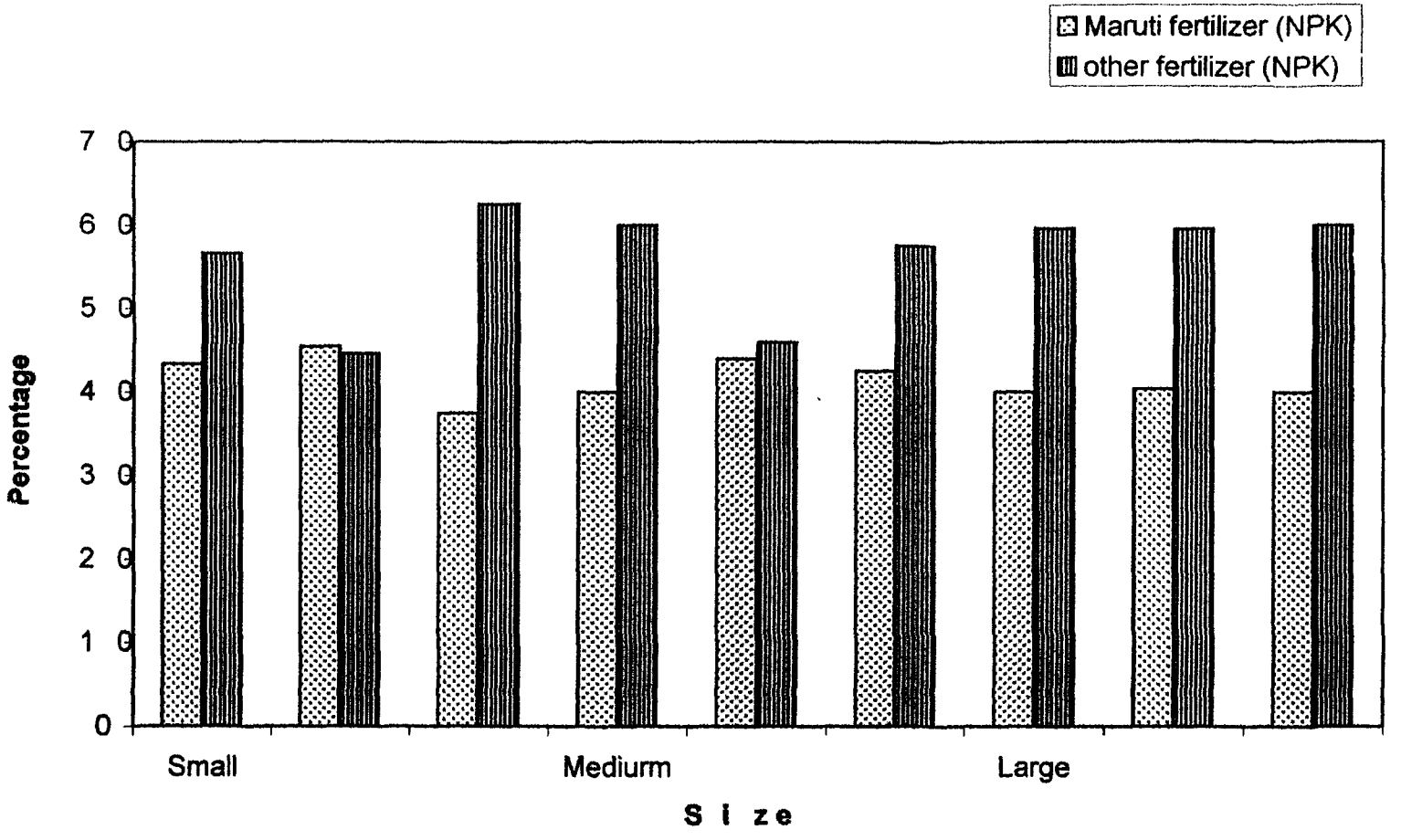


Fig. 5 Per hectare use of Maruti Fertochem mixed fertilizer for Wheat

Table 5.12 Per hectare use of Maruti Fertochem Mixed Fertilizer for jowar

(Kg)

Sr	Particular	Size groups of holdings												Overall			
		I				II				III							
		N	P	K	Sub total	N	P	K	Sub total	N	P	K	Sub total	N	P	K	Grand total
1.	Maruti	18.15 (45.00)	10.26 (38.46)	6.80 (33.33)	35.21 (41.17)	14.12 (42.42)	8.56 (40.00)	5.30 (35.7)	27.98 (34.6)	12.08 (45.85)	7.12 (43.75)	4.86 (36.36)	24.06 (42.85)	14.7 (42.42)	8.64 (57.14)	5.65 (35.7)	28.90 (38.80)
2.	Other fertilizer	22.60 (55.00)	16.18 (61.50)	11.26 (66.66)	50.04 (58.6)	19.17 (57.5)	12.16 (60.00)	9.26 (64.2)	40.54 (65.38)	16.18 (57.14)	9.28 (56.25)	7.12 (56.25)	32.56 (57.14)	19.26 (57.14)	14.66 (42.85)	9.26 (64.28)	43.18 (61.12)
3.	Total	40.75 (100.00)	26.44 (100.00)	18.06 (100.00)	85.25 (100.00)	33.29 (100.00)	26.72 (100.00)	14.68 (100.00)	78.69 (100.00)	28.26 (100.00)	16.38 (100.00)	11.98 (100.00)	56.62 (100.00)	33.26 (100.00)	23.33 (100.00)	14.91 (100.00)	72.17 (100.00)

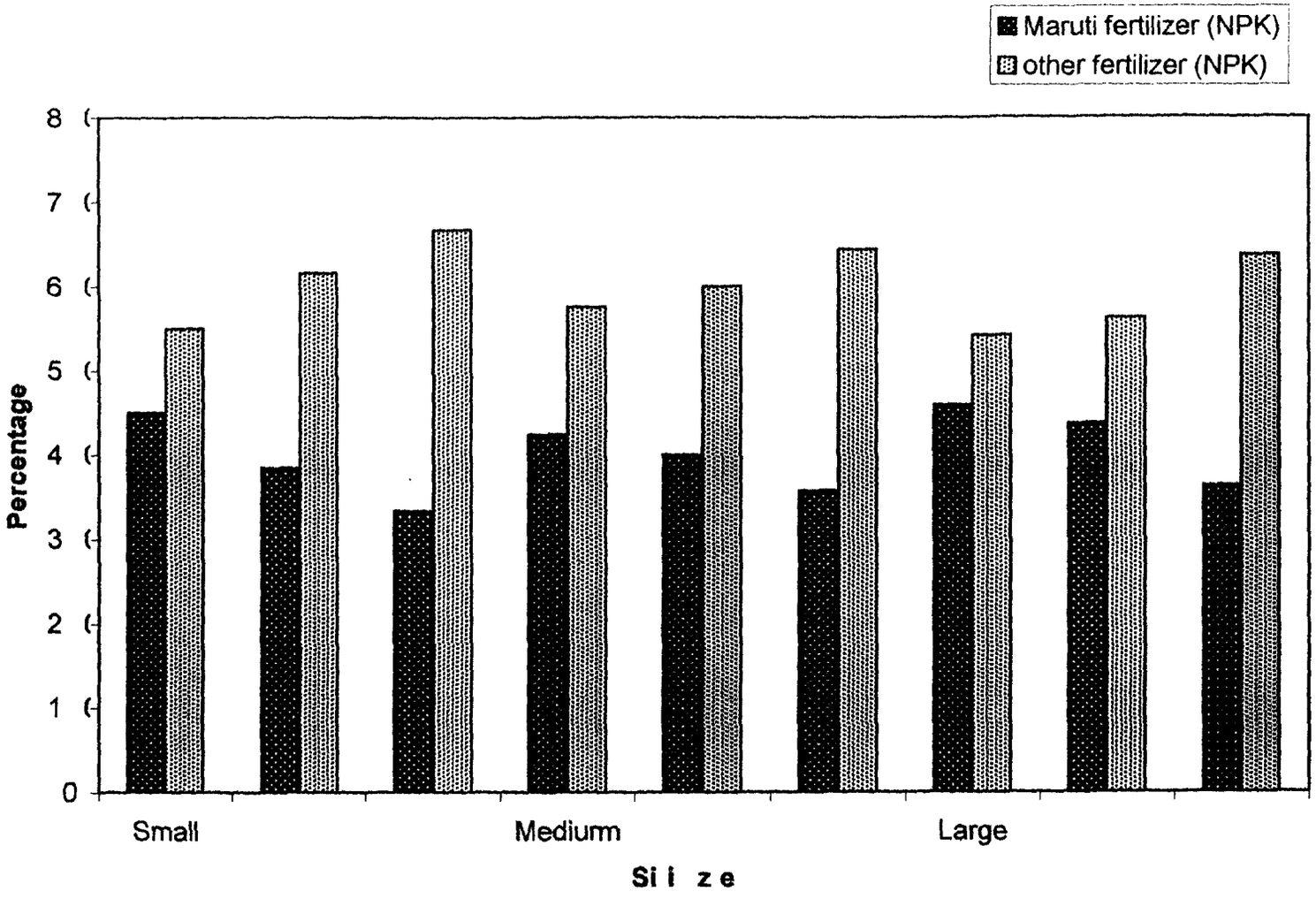


Fig. 6 Per hectare use of Maruti Fertochem mixed fertilizers for Jowar

respectively indicating thereby maximum use of phosphorus nutrients through Maruti Fertochem mixed fertilizers. The highest use of NPK nutrients was found in size group III (42.85 percent), while it was lowest in group II (34.60 percent). Among the size groups it is seen that hectare use of nitrogen nutrients by the users was highest in size group I (45.00 percent), while it was lowest in size group II (42.42 percent). In case of phosphorus nutrients, the highest use by the users was found in size group III (43.75 percent), while it was lowest in size group I (38.46 percent). As regard to use of potash nutrients by the users showed maximum use in size group III (36.36 percent) and lowest use in size group I (33.33 percent).

5.2.4 Extent use of Maruti Fertochem mixed fertilizers for gram

The table 5.13 depicts the informations on per hectare use of Maruti Fertochem mixed fertilizers for gram crop by the users.

It is observed from the table 5.13 that at the overall level, the per hectare proportion in use of N, P, nutrients through Maruti Fertochem mixed fertilizers were 37.22, 40.00 and 40.04 percent, respectively. This indicates that maximum quantity of phosphorus nutrients are supplied for gram through Maruti Fertochem mixed fertilizers. Further it is seen from table 5.13 at the overall level total (N+P) nutrients for gram through Maruti Fertochem mixed fertilizers to the total fertilizer use was 40.04 percent. Among the size group it was found highest in size group III (38.76 percent) and lowest in size group I (31.02 percent).

Table 5.13 Per hectare use of Maruti Fertochem mixed fertilizers for gram

Sr. No.	Particular	Size groups of holdings									Overall		
		I			II			III					
		N	P	Sub total	N	P	Sub total	N	P	Sub total	N	P	Grand total
1.	Maruti	4.12 (33.33)	9.56 (29.03)	13.68 (31.02)	3.04 (27.27)	7.50 (29.16)	10.54 (29.34)	5.12 (35.71)	12.16 (40.00)	17.28 (38.76)	5.42 (37.22)	12.13 (40.00)	17.55 (40.04)
2.	Other fertilizer	8.26 (66.66)	22.16 (70.96)	30.42 (68.98)	8.12 (72.73)	17.26 (70.84)	25.38 (70.66)	9.24 (64.19)	18.06 (60.00)	27.30 (61.24)	7.87 (62.38)	18.41 (60.00)	26.28 (59.96)
3.	Total	12.38 (100.00)	31.72 (100.00)	44.10 (100.00)	11.16 (100.00)	24.76 (100.00)	35.92 (100.00)	14.36 (100.00)	30.22 (100.00)	44.58 (100.00)	13.29 (100.00)	30.54 (100.00)	43.83 (100.00)

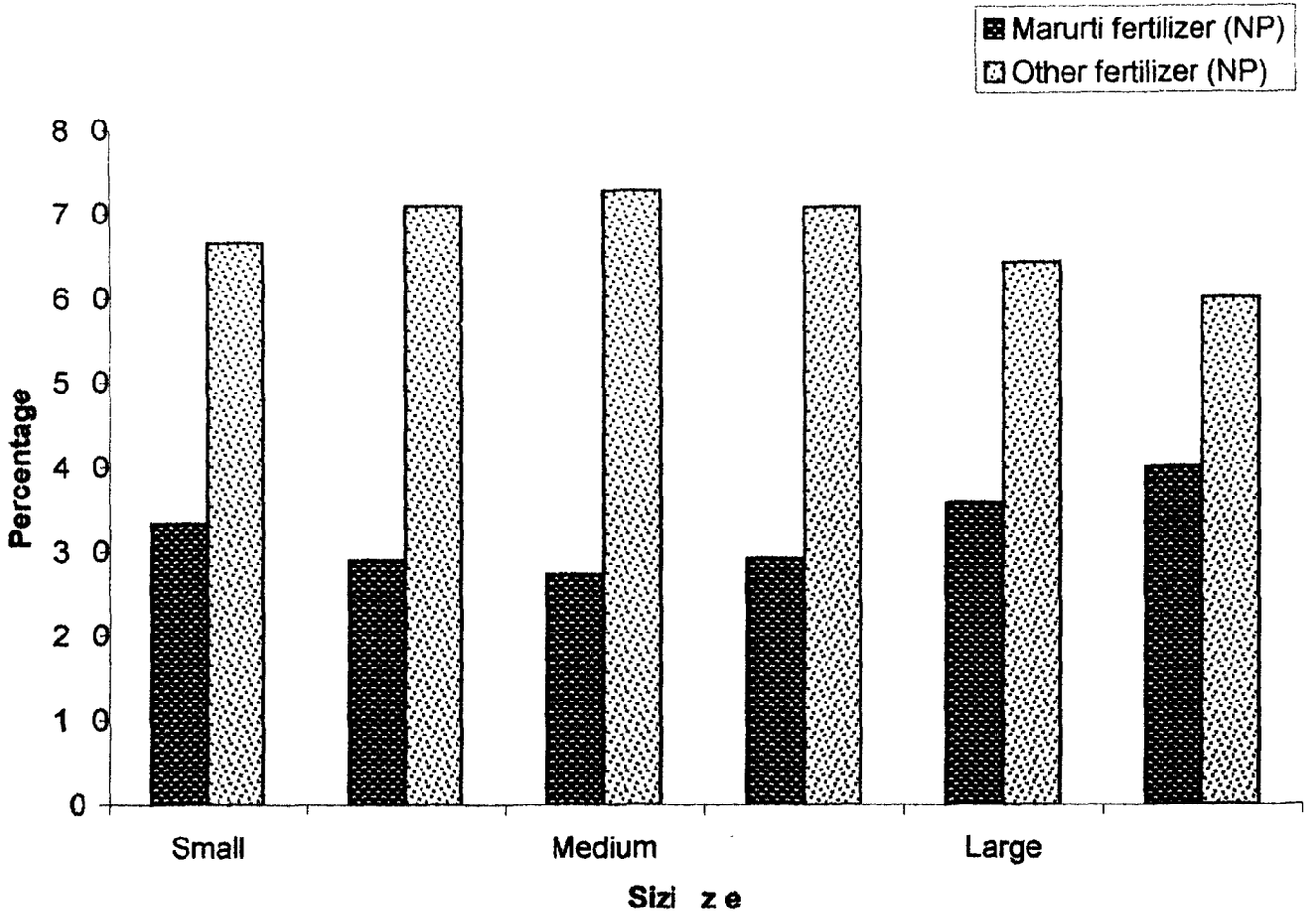


Fig. 7 Per hectare use of Maruti Fertochem mixed fertilizer for Gram

Table 5.14 Per hectare use of Maruti Fertochem mixed fertilizers for selected crops as compared to recommended dose.

(Kg)

Sr. No.	Particular	Size groups of holdings									Overall		
		I			II			III					
		N	P	K	N	P	K	N	P	K	N	P	K
1.	Sugarcane (Adsali) (through Maruti)	200.40	90.14	70.20	210.50	85.17	72.17	190.6	78.12	65.13	200.12	84.4	69.14
	Recommended dose	400	170	170	400	170	170	400	170	170	400	170	170
	Gap	200	79.86	99.80	189.5	84.83	97.83	209.4	91.88	104.8	199.9	85.6	100.86
	Total use	446	210	155.80	441.12	180.37	160.68	416.1	164.28	136.3	433.4	184.9	150.9
2.	Wheat (through Maruti)	50.12	25.27	15.12	40.17	22.18	17.16	38.18	19.07	15.70	42.66	22.84	15.66
	Recommended dose	120	60	60	120	60	60	120	60	60	120	60	60
	Gap	69.88	34.73	44.88	79.83	37.82	42.84	81.82	40.93	44.30	77.34	37.20	44.34
	Total use	115.22	55.55	40.26	100.45	50.34	40.42	93.20	47.95	37.50	102.84	51.56	39.30
3.	Jowar (through Maruti)	18.15	10.26	11.26	14.12	8.56	5.30	12.08	7.12	4.86	14.70	8.64	5.65
	Recommended dose	120	60	60	120	60	60	120	60	60	120	60	60
	Gap	101.85	48.74	48.74	105.88	51.44	54.67	107.92	52.88	55.14	105.30	51.36	54.35
	Total use	40.75	18.06	18.06	33.29	20.72	14.68	28.26	16.38	11.98	33.26	23.33	14.99
4.	Gram(through Maruti)	4.12	9.56		3.04	7.50		5.12	12.16		5.42	12.13	
	Recommended dose	25	50		25	50		25	50		25	50	
	Gap	20.88	40.44		21.96	42.50		19.88	37.84		19.58	37.87	
	Total use	12.38	31.27		11.12	24.76		14.36	30.22		13.29	30.54	

5.2.5 Extent use of Maruti Fertochem Mixed Fertilizers for selected crops by the users as compared to recommended doses of crops.

The table 5.14 depicts the picture on per hectare use of NPK nutrients through Maruti Fertochem mixed fertilizers for selected crops viz., Sugarcane, Wheat, Jowar and Gram by the users as compared to recommended doses of respective crops. At the overall level, it was seen than users are giving the fertilizers doses more than the recommended doses in sugarcane (Adsali). In case of wheat, jowar, gram users are using fertilizers below the recommended doses.

It is apparent from the table 5.14 that at the overall level per hectare proportion of gap in use of N, P and K nutrients dose for sugarcane (Adsali) crop given through Maruti Fertochem mixed fertilizers to the total recommended dose was to the extent of 199.9, 85.6 and 100.86 kg, respectively, indicating maximum use of nitrogen nutrient through Maruti Fertochem mixed fertilizer. The same trend was observed within size group but the percentage varies.

As regards to wheat crop, it was observed that, at the overall level, per hectare proportion of gap in use of N, P and K nutrients to dose given through Maruti Fertochem mixed fertilizer to the recommended dose was 77.34, 37.20 and 44.34 kg, respectively, thereby indicating the maximum use of nitrogen nutrient through Maruti Fertochem mixed fertilizer. The same trend was observed within size groups but the percentage varies.

For jowar crop it was observed that, at the overall level, per hectare proportion of gap in use of N,P and K nutrients dose by the users through Maruti Fertochem mixed fertilizers to the recommended dose of

NPK was 105.30, 51.36 and 54.35 kg, respectively, indicating thereby maximum use of nitrogen nutrients through Maruti Fertochem mixed fertilizer. The same trend was observed within the size groups but the percentage varies.

In case of gram crop at the overall level it was seen that in the per hectare proportion of gap in use of N and P nutrients dose was to the extent of 19.58 and 37.87 kg respectively, which in indicates that the use of phosphorus was highest through Maruti Fertochem mixed fertilizer.

5.3 Factors influencing on the use of Maruti Fertochem Mixed Fertilizers.

The details regarding the factors which are responsible for influencing the use of Maruti Fertochem mixed fertilizers are discussed and tested with the help of X_i^2 criteria and summarized as below.

5.3.1 Age

5.3.2 Educational status

5.3.3 Occupational pattern

5.3.4 Annual income

5.3.5 Farming Experience

5.3.6 Area under irrigation

5.3.7 Price factor

5.3.8 Source of information

5.3.9 Form a fertilizer liked

5.3.10 NPK ingredients

5.3.1 Age

The information relating to the size groupwise association between age of users and use of Maruti Fertochem mixed fertilizer is presented in table 5.15

Table 5.15 Age groupwise distribution of users.

(Numbers)

Sr. No.	Particulars	Size groups of holdings			Total
		I	II	III	
1.	Upto 50 years	17 (56.67)	14 (46.67)	15 (50.00)	46 (51.11)
2.	51years and above	13 (43.33)	16 (53.33)	15 (50.00)	44 (48.89)
	Total	30 (100.0)	30 (100.0)	30 (100.0)	90 (100.0)
			X^2 cal.		0.6624^{NS}

N.S. = Non significant

(Figures in parentheses are percentage to the total)

Tabel 5.15 shows there is no significant association between the age group of users and use of Maruti Fertochem mixed fertilizers by the users.

5.3.2 Educational status

Table 5.16 represents the information of association between educational status of users and use of Maruti Fertochem mixed fertilizers.

Table 5.16 indicates that there is significant association between educational status of users and use of Maruti Fertochem mixed fertilizers by the users

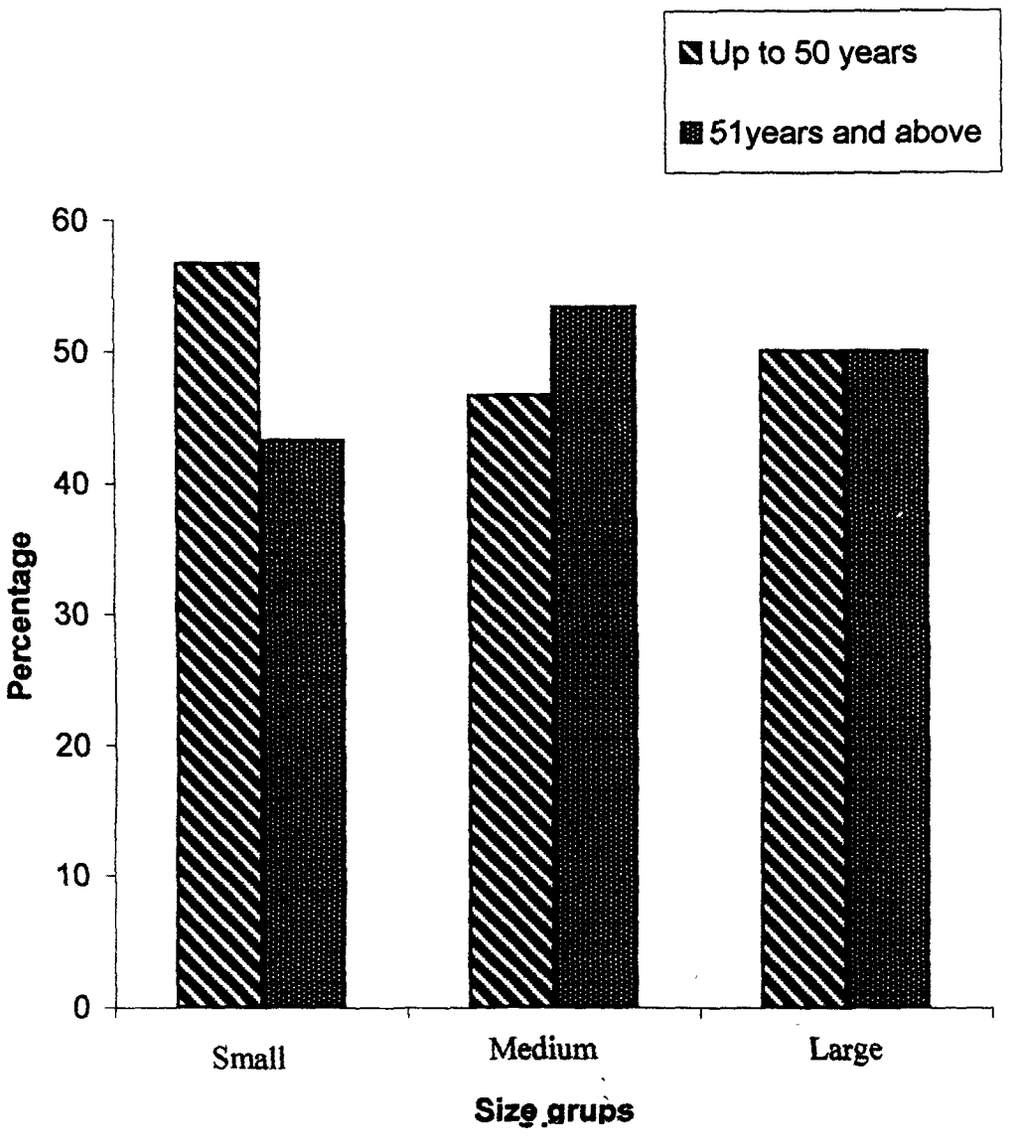


Fig. 8 Distribution of users according to age

Table 5.16 Educational statuswise distribution of users.

Sr. No.	Particulars	Size groups of holdings			Total
		I	II	III	
1.	Illiterate	1 (3.33)	2 (6.67)	5 (16.67)	8 (8.89)
2.	Primary	17 (56.67)	16 (53.33)	5 (16.67)	38 (42.22)
3.	Higher secondary	9 (30.00)	11 (36.67)	17 (56.67)	37 (41.11)
4.	Collegiate	3 (10.00)	1 (3.33)	3 (10.00)	7 (7.78)
5.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)
			X^2 cal.		16.27**

** = Significant at 5%

(Figures in parentheses are the percentage to the total)

5.3.3 Occupational pattern

The information of size groupwise occupational pattern of users and use of Maruti Fertochem mixed fertilizers is presented in table 5.17

Table 5.17 Occupational patternwise distribution of users.

(Numbers)

Sr. No.	Particulars	Size groups of holdings			Total
		I	II	III	
1.	Farming	25 (83.33)	24 (80.00)	23 (76.67)	72 (80.00)
2.	Farming + service	5 (16.67)	6 (20.00)	7 (23.33)	18 (20.00)
3.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)
			X^2 cal.		0.4165NS

N.S. = Non significant

(Figures in parentheses are the percentage to the total)

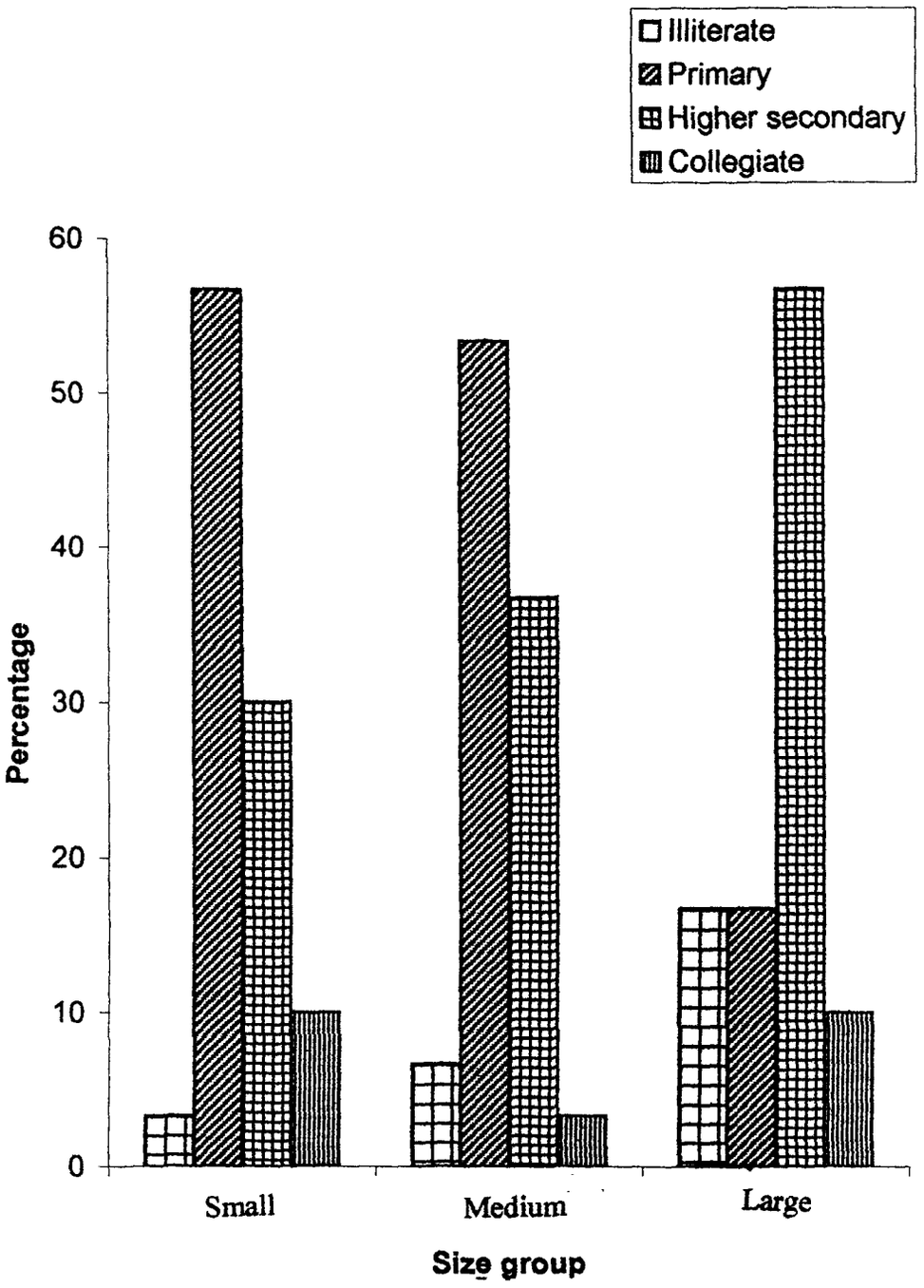


Fig. 9 Distribution of users according to educational staus

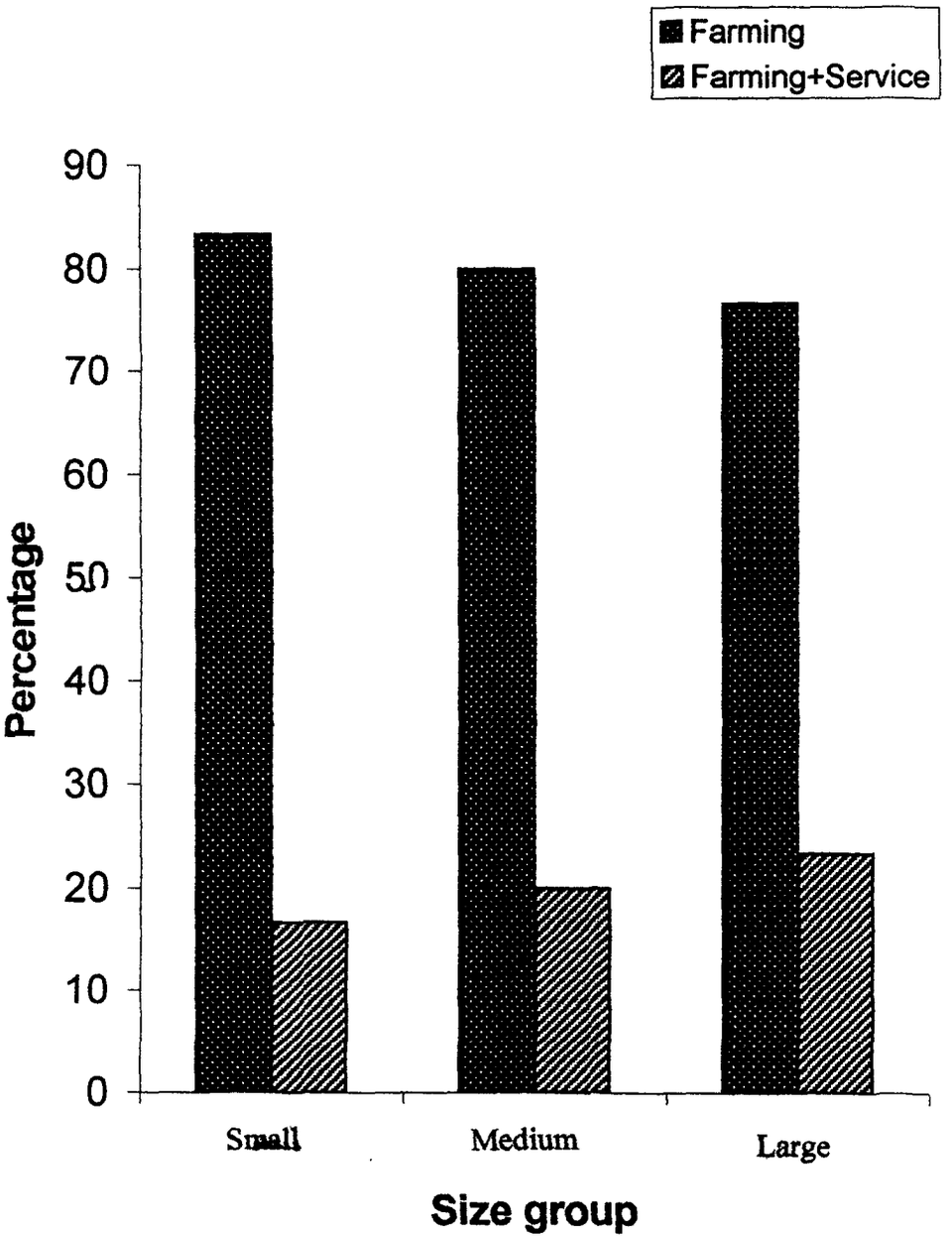


Fig. 11 Distribution of users according to occupational pattern

It can be seen from table 5.17 that at the total level and within the size group there is no significant association between occupational pattern of users and use of Maruti Fertochem mixed fertilizer by the users.

5.3.4 Annual Income

Table 5.18 gives the information relating to the size groupwise association between annual income of users and use of Maruti Fertochem mixed fertilizers.

Table 5.18 Annual incomewise distribution of users.

(Numbers)

Sr. No.	Particulars	Size groups of holdings			Total
		I	II	III	
1.	Upto 1,00,000	19 (63.33)	2 (6.66)	1 (3.33)	22 (24.44)
2.	1,00,00 to 2,00,00	9 (30.00)	20 (66.67)	3 (10.00)	32 (35.56)
3.	2,00,00 and above	2 (6.67)	8 (26.67)	26 (86.67)	36 (40.00)
4.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)
			X^2 cal.		66.84**

** Significant at 5%

(Figures in parentheses are the percentage to the total)

It is apparent form the table 5.18 that there existis highly significant association between annual income of user and use of Maruti Fertochem Mixed fertilizers by the users indicating thereby large annual income group farmer uses more Maruti Fertochem mixed fertilizer than low annual income group.

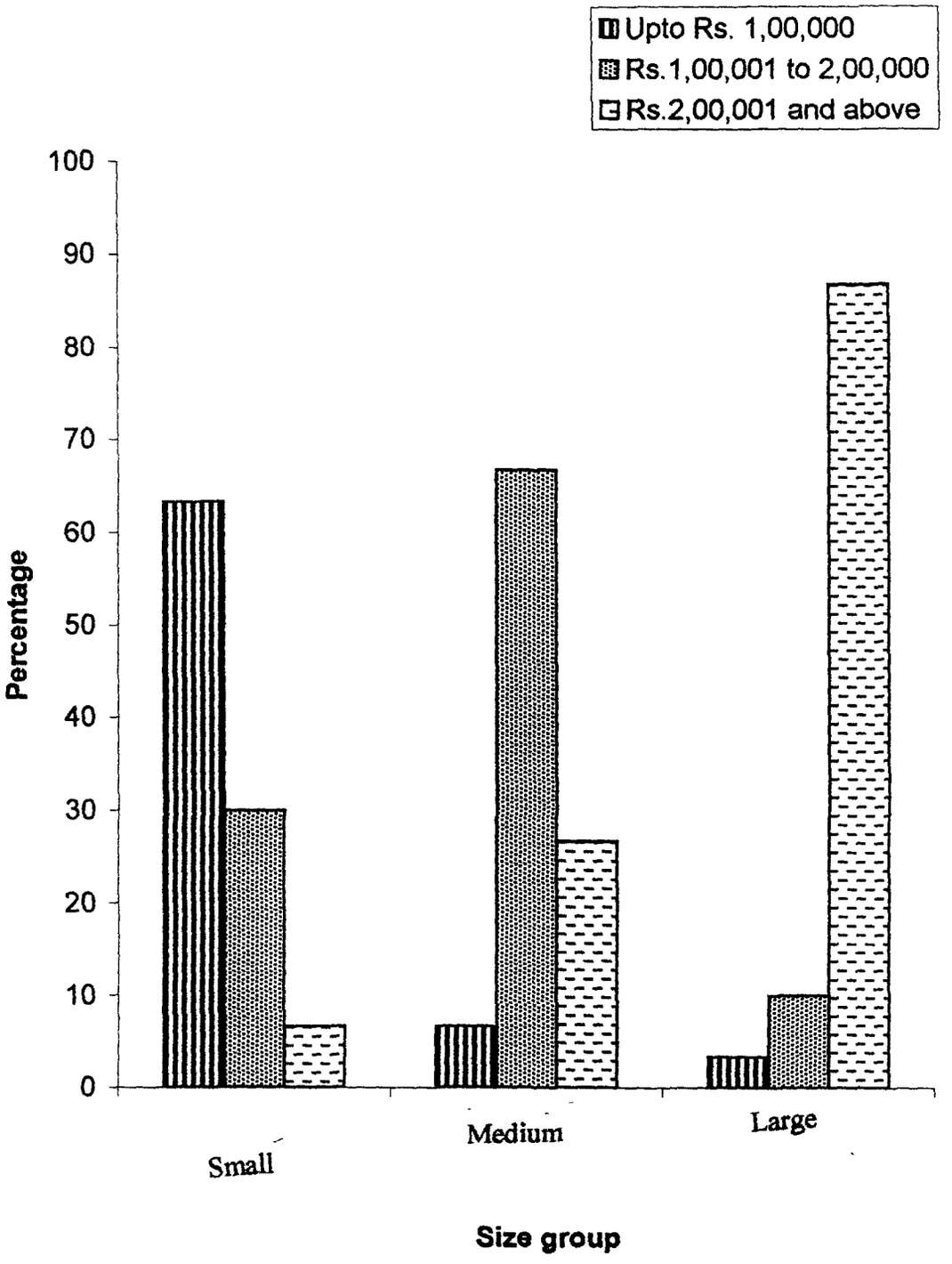


Fig. 10. Distribution of users according to annual income

5.3.5 Farming Experience

The experience of farming is one of the most important factor influencing the use of fertilizers. The information relating to size groupwise association between farming experience of users and use of Maruti Fertochem mixed fertilizers is presented in table 5.19

It is apparent from the table 5.19 that at the total level, the number of users repeated highest farming experience 26 years and above (45.56) followed by 16 to 25 years (28.89 percent). The same trend was observed within size groups of holding but the percentage share differs.

Table 5.19 Size groupwise association between forming experience of users and use of Maruti Feotochem Mixed Fertilizers.

(Number)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
1.	Upto 15 years	10 (33.33)	7 (23.33)	6 (20.00)	23 (25.85)
2.	16 to 25 years	8 (26.67)	9 (30.00)	9 (30.00)	26 (28.89)
3.	26 years and above	12 (40.00)	14 (46.67)	15 (50.00)	41 (45.56)
4.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)
			X^2 cal =		1.5483^{NS}

NS = Non significant
(Figures in parentheses are the percentage to the total)

Further, it is seen from the table 5.19 that there is no significant association between farming experience of the user and use of Maruti Fertochem mixed fertilizers by the users.

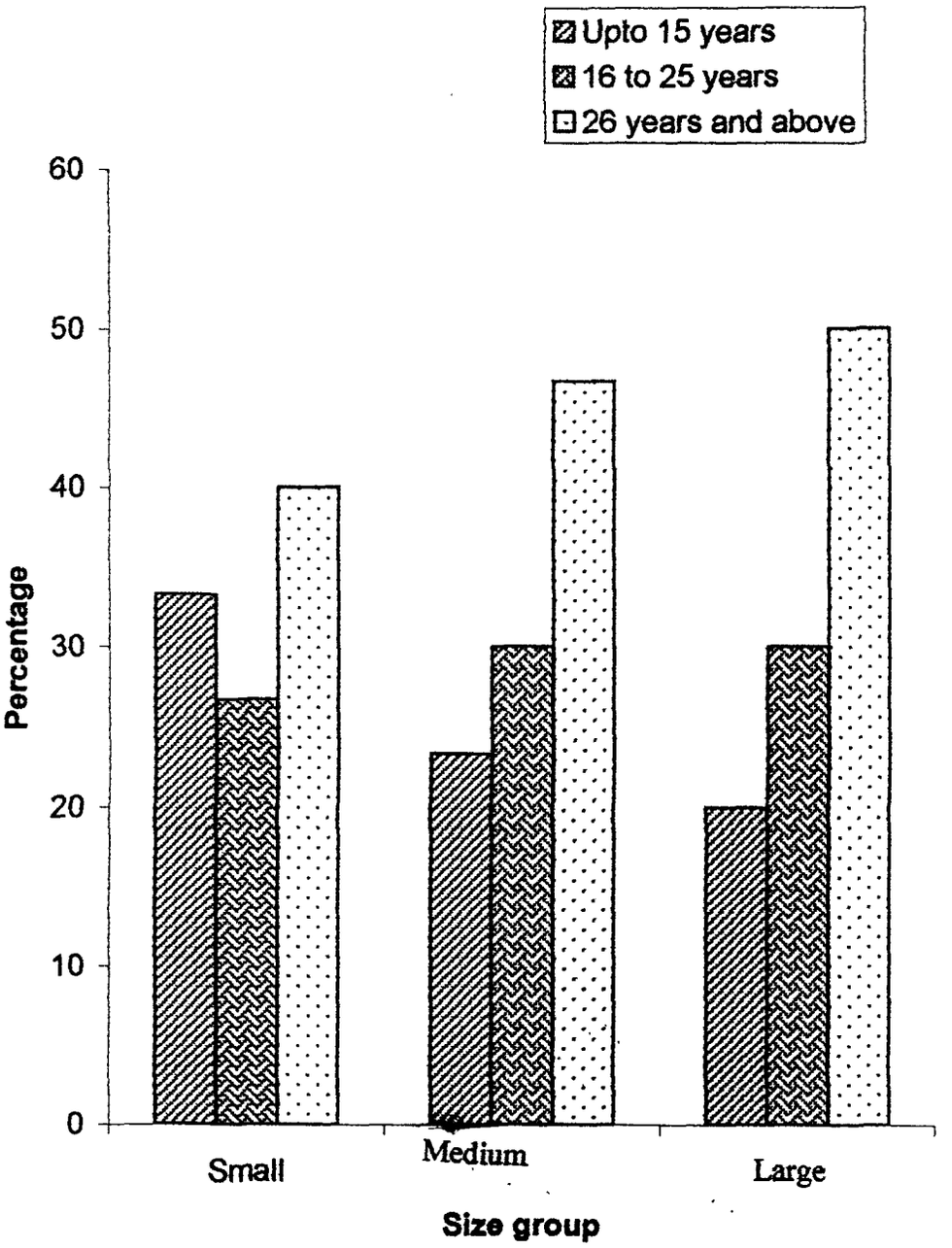


Fig. 12. Distribution of users according to farming experience

5.3.6 Area under irrigation

Table 5.20 depicts the information on size groupwise association between the percentage irrigated area and use of Maruti Fertochem mixed fertilizes.

It can be observed from the table 5.20 that 44.44 percent of total users have an percentage irrigated area upto 75-99 percent, followed by 32.22 percent users in 50-74 percentage irrigated area. Among the size groups, it can be revealed that in small size group, 56.66 percent users reported percentage irrigated area upto 75-99, while in large size group 50.00 percent users reported upto 50-74 irrigated area. Further it is apparent from the table that number of users in 75-99 percent area under irrigation showed a decreasing trend as the size of holdings increased, while it was observed reverse trend in 50-74 percent area under irrigation group.

Table 5.20 Size groupwise association between the percentage irrigated area and use of Maruti Ferlochem Mixed Fertilizers.

(Numbers)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
1.	100	1 (3.33)	7 (23.33)	4 (13.34)	12 (13.34)
2.	75-99	17 (56.66)	13 (43.34)	10 (33.33)	40 (44.44)
3.	50-74	5 (16.67)	9 (30.00)	15 (50.00)	29 (32.22)
4.	Below 49	7 (23.33)	1 (3.33)	1 (3.33)	9 (10.00)
5.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)
			X^2 cal		19.57***

*** Significant at 1%

(Figures in the parentheses are the percentage to the total)

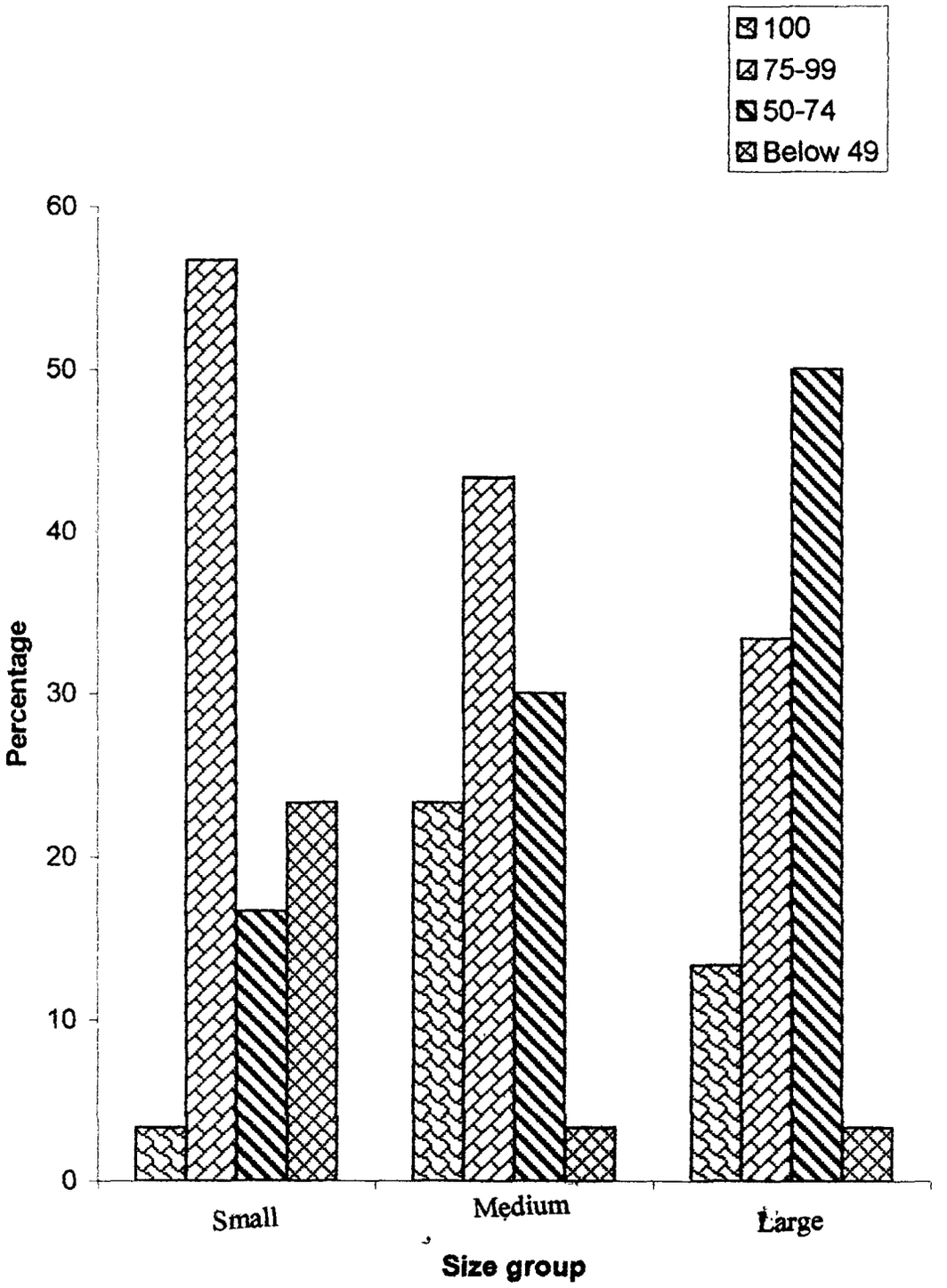


Fig. 13. Distribution of users according to area under irrigation

It is concluded from the table 5.20 that, there is a significant association between percentage area under irrigation and use of Maruti Fertochem mixed fertilizers by the users. This implies that the percentage under irrigation increases, the use of Maruti Fertochem mixed fertilizer also increases.

5.3.7 Price factor

The price of mixed fertilizer is one of the most important factor which directly influences on the purchasing power of users. The Maruti Fertochem mixed fertilizers which are available in markets at various rates viz., 18:18:10, 20:20:10 and 20:20:0 were available at the rate of Rs. 315, 345 and 340 respectively for 50 kg bag. The other fertilizers which are available at the same time and used by the users viz urea, 19:19:19, 15:15:15, IFF co, 18:46. 18:18:10 at the rate of rupees, 265, 415, 350, 400, 460, 370 respectively for per 50 kg bag. Table 5.21 depicts size groupwise association users opinion between prices of Maruti Fertochem mixed fertilizers and their use.

Table 5.21 Size groupwise association between price of Maruti Fertochem Mixed Fertilizers and their use.

(Numbers)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
1.	Remunerative	14 (46.67)	22 (73.33)	23 (76.67)	59 (65.56)
2.	High	14 (46.67)	7 (23.33)	1 (3.33)	22 (24.44)
3.	Low	2 (6.66)	1 (3.34)	6 (20.00)	9 (10.00)
4.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)
			x^2 cal		20.5**

** Significant at 5%

(Figures in the parentheses are the percentage to the total)

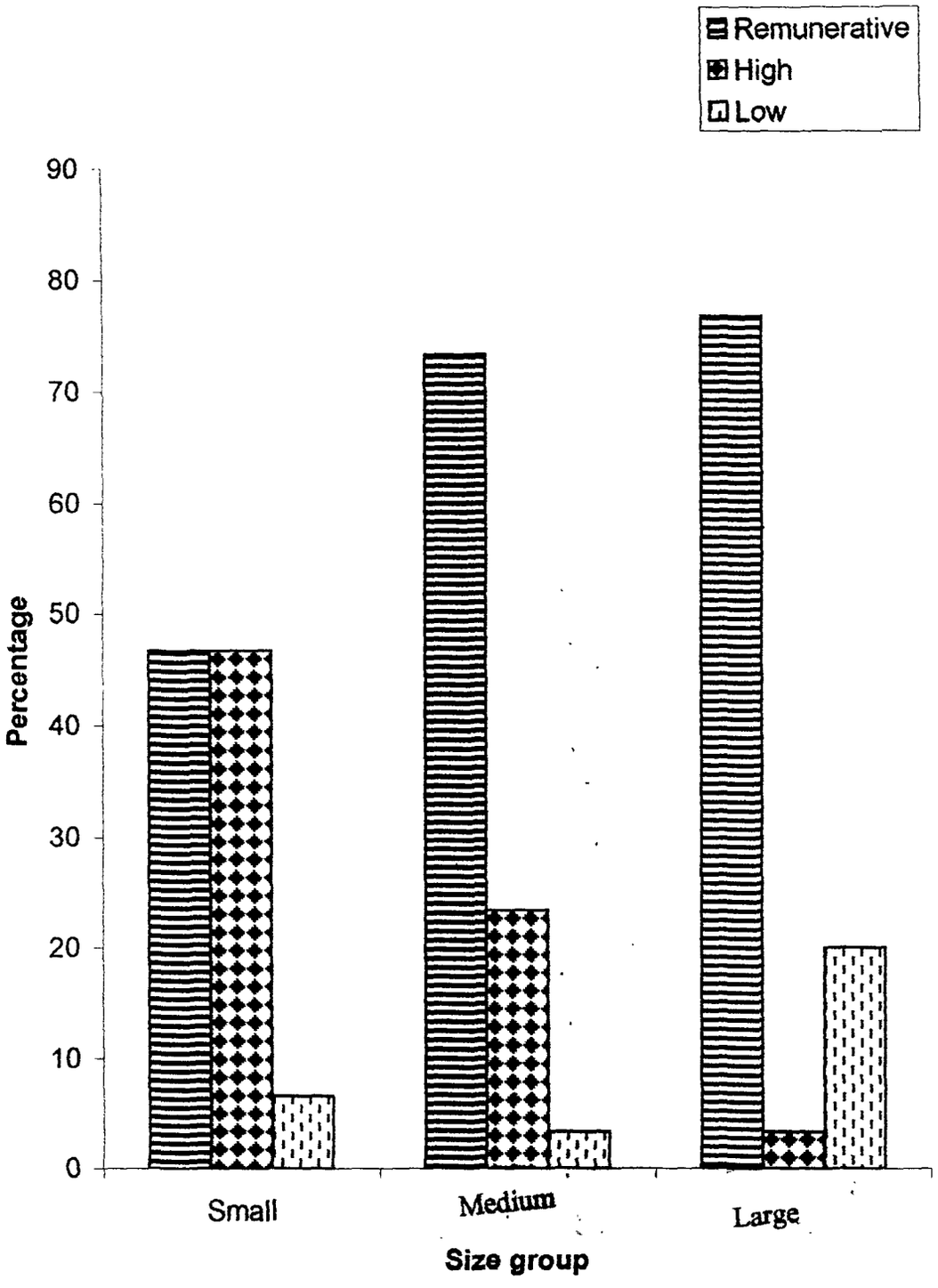


Fig.14. Distribution of users according to price factor

It is apparent from the table 5.21 that at the total level, the number of users who purchased and used Maruti Fertochem mixed fertilizers at remunerative prices were reported by 65.55 percent. It was observed that maximum number of users opioned that the prices of Maruti Fertochem mixed fertilizers were remunerative and reported by 46.67, 73.33 and 76.67 percent for small, medium and large size group of holdings, respectively. It can also be revealed that remunerative price trend showed an increasing trend as size of holdings increased.

It is concluded from the table 5.21 that there is highly significant association between price and use of Maruti Fertochem mixed fertilizers, indicating thereby an price of mixed fertilizer increases, the use of mixed fertilizers decreases and vice-versa.

5.3.8 Source of information

The source of information disseminate the information about product to the farmers and incentiate the farmers for purchase these product. Table 5.22 depicts the size groupwise association between the different source's of information and use of Maruti Fertochem mixed fertilizers by the users.

At the total, it was seen from the table 5.22 that information received through the company representative and progressive farmer combined showed 59.00 percent to the users. Among the size groups, it is seen that, information received through company representative (50.00 percent), the major source of information observed in medium size groups, followed by large size group (43.33 percent). While in small size group information received through progressive farmer is the major source of information (40.00 percent).

Table 5.22 Size groupwise association between source of information and use of Maruti Fertochem Mixed Fertilizers by the users.

(Numbers)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
1.	Company representative	6 (20.00)	15 (50.00)	13 (43.33)	34 (37.77)
2.	Boards, wall paintings	1 (3.33)	1 (3.33)	6 (20.00)	8 (8.88)
3.	Poster	1 (3.34)	3 (10.00)	6 (20.00)	10 (11.11)
4.	Progressive farmer	12 (40.00)	6 (20.00)	1 (3.34)	19 (21.11)
5.	Dealers	8 (26.67)	4 (13.34)	3 (10.00)	15 (16.66)
6.	Radio	2 (6.66)	1 (3.33)	1 (3.33)	4 (4.44)
7.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)
			x^2 cal		20.5**

** Significant at 5 %

(Figures in parentheses are the percentage of the total)

Further it can be seen that, for small size group, about (26.67 percent) received information through dealers.

It is concluded from the table 5.22 that there exists highly significant association between the various sources of information and use of Maruti Fertochem mixed fertilizers.

5.3.9 Form of fertilizers liked

The Maruti Fertochem mixed fertilizers are available in the market in various mixed forms viz, 18:18:10, 20:20:10, 20:20:0 along with other fertilizers like suphala, Sampurna, IFFCO, DAP and others.

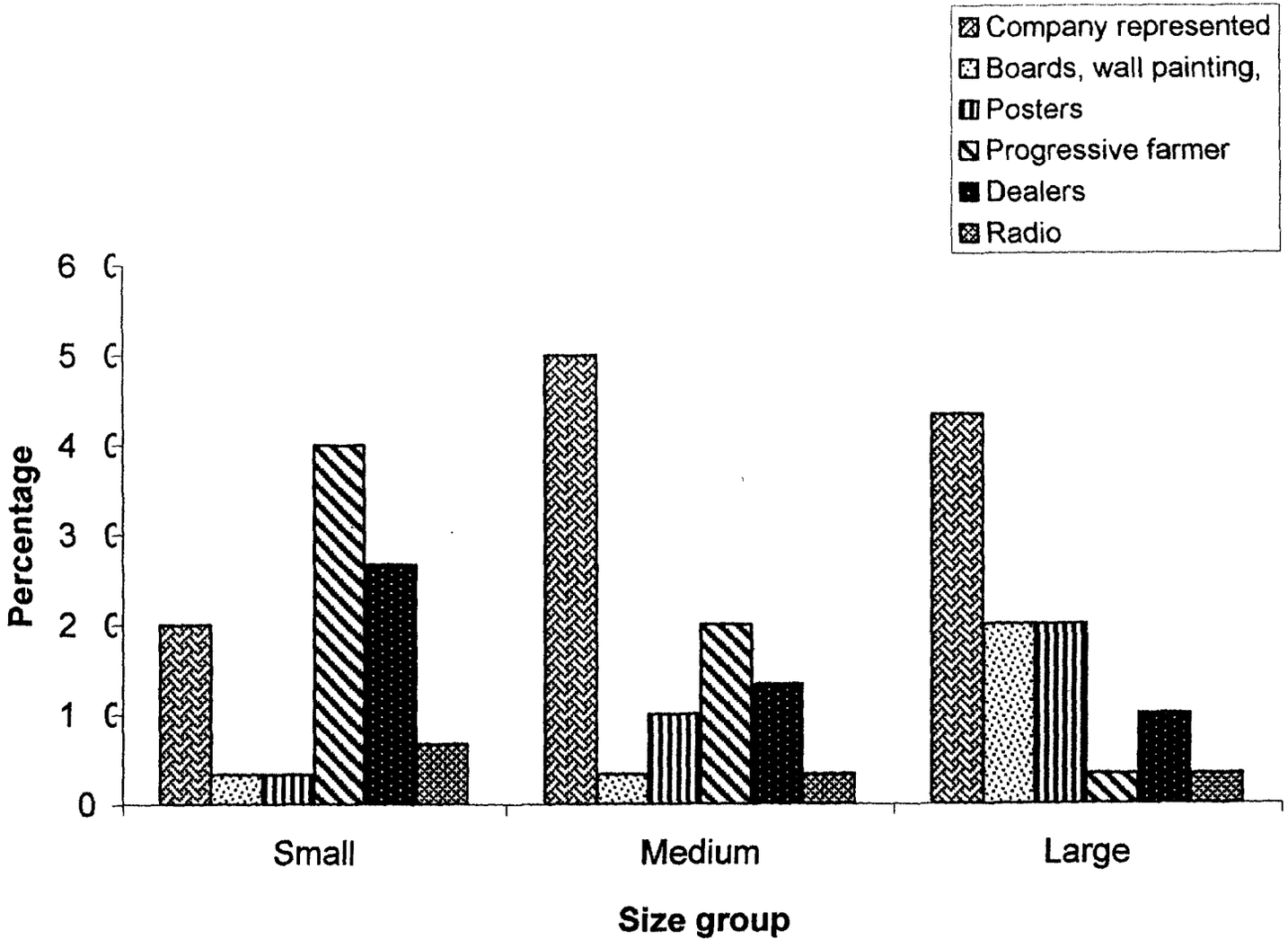


Fig.15. Distribution of users according to source of information

While urea, SSP, potash, sulphate were available in the market as straight fertilizer. The information relating to size groupwise association between form of fertilizer liked and use of Maruti Fertochem mixed fertilizers by the users is presented in table 5.23

It is apparent from the table 5.23 that at total level large number of farmers are using mixed form of fertilizer (66.67 percent). Similar trend was seen in different size groups but only percentage differs. Further it is seen that only small and large size groups farmers liked the straight fertilizers.

Table 5.23 Size groupwise association between different form of fertilizer liked and use of Maruti Fertochem Mixed Fertilizers by the users.

(Number)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
1.	Straight	9 (30.00)	1 (3.33)	6 (20.00)	16 (17.78)
2.	Mixed	18 (60.00)	19 (63.34)	23 (76.67)	60 (66.67)
3.	Both	3 (10.00)	10 (33.33)	1 (3.33)	14 (15.55)
4.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)
			x^2 cal		16.40***

*** significant at 1 %

(Figures in parentheses are the percentage to the total)

Further it is concluded from the table 5.23 there exists highly significant association between form of fertilizer liked and use of Maruti Fertochem mixed fertilizer. Majority of the users liked mixed form of fertilizers which meets the demand of users.

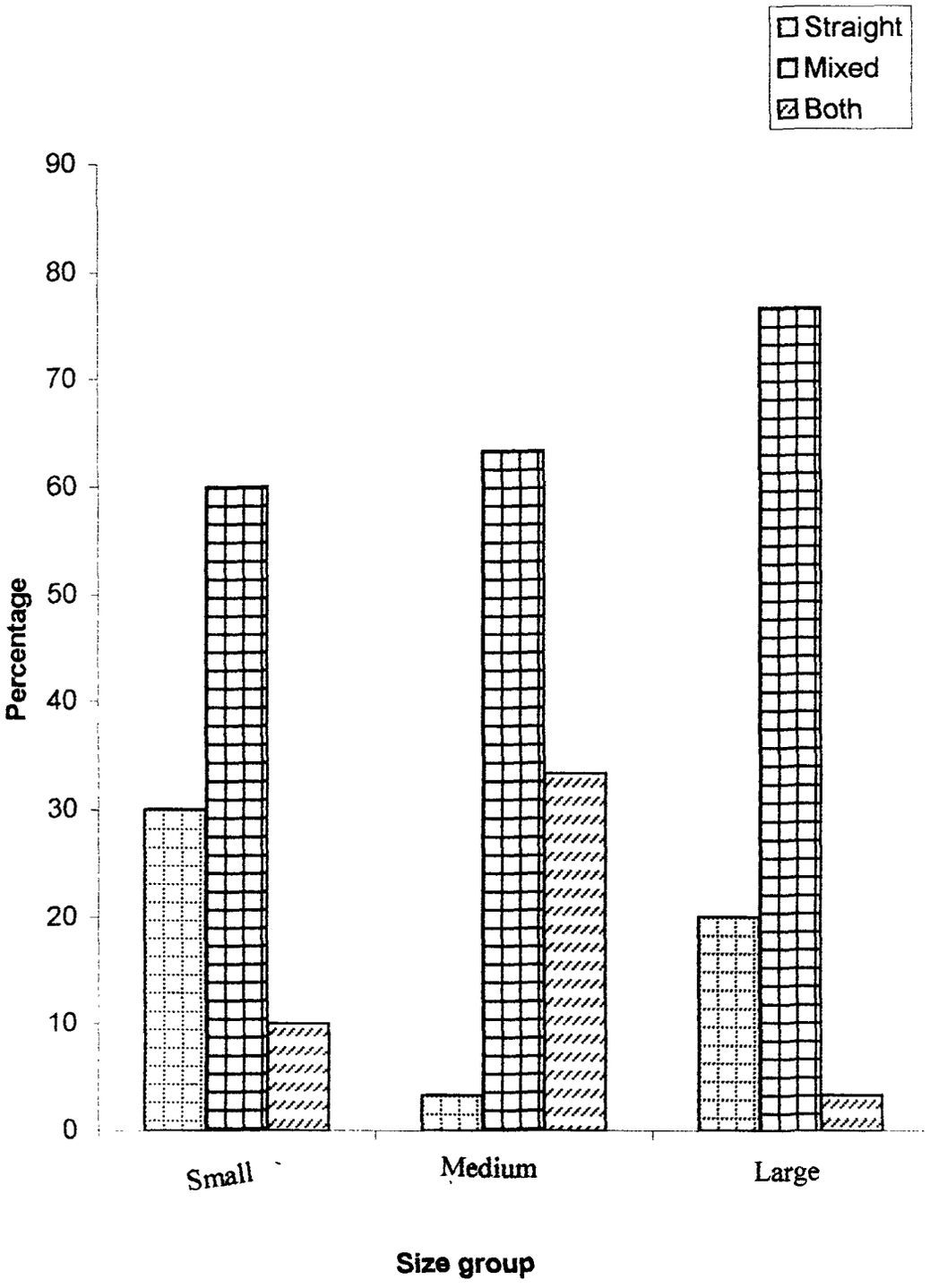


Fig. 16. Distribution of users according to form of fertilizer liked

5.3.10 Opinion regarding NPK ingredients in Maruti Fertochem mixed fertilizers

In different NPK ingredients the Maruti Fertochem mixed fertilizers are available in the market viz., 18:18:10, 20:20:10 and 20:20:0, while the other fertilizers like urea (46 kg N), suphala (15:15:15), D.A.P. (18:46), S.S.P. (16 kg P) potash (60 kg K), sulphate (20 kg N), Sampurna (19:19:19) and Samarth (10:26:26). The information relating to size groupwise association between the opinion of users regarding the NPK ingredients content in Maruti Fertochem mixed fertilizers and their use are presented in table 5.24

Table 5.24 Size goupwise association between the opinion of users regarding the NPK ingredients content in Maruti Fertochem Mixed Fertilizers.

(Number)

Sr. No.	Particulars	Size groups of holdings			Overall
		I	II	III	
1.	Very good	4 (13.33)	5 (16.66)	1 (3.33)	10 (11.11)
2.	Good	17 (56.67)	21 (70.00)	23 (93.33)	66 (73.33)
3.	Fair	9 (30.00)	4 (13.34)	1 (3.34)	14 (15.56)
4.	Total	30 (100.00)	30 (100.00)	30 (100.00)	90 (100.00)
			x^2 cal		12.419**

** Significant at 5 %

(Figures in the parentheses are the percentage to the total)

It can be observed from table 5.24 that, at the total level, the proportion of very good, good and fair was 11.11, 73.33, 15.56 percent respectively. Within the size group it is found that maximum numbers of users opioned that containing NPK ingredients in Maruti mixed fertilizers were good and contributes 56.67, 70.00 and 93.33

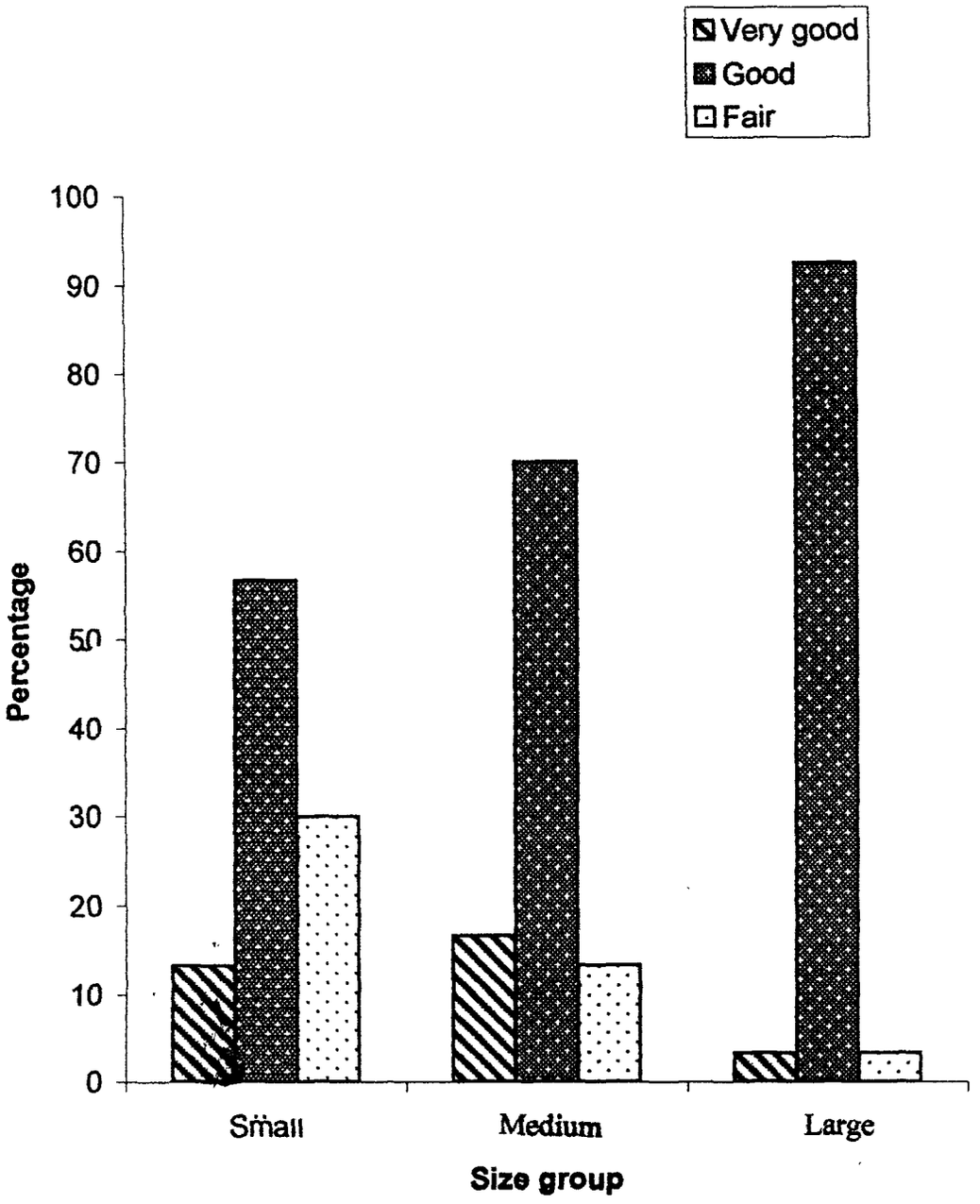


Fig. 17. Distribution of users according to their opinion regarding NPK

percent for small, medium and large group. It can be revealed that good opinion showed an increasing trend as size of holding increased.

There is significant association between containing NPK ingredients in Maruti mixed fertilizer and their use. This implies that highly NPK grade content of maruti mixed fertilizers incentives the farmers for more purchase for their use of higher side.

5.4 Functional analysis

To examine the relationship between yield of crops with use of Nitrogen, phosphorus, and potash nutrients in kilograms, the multiple linear regression equation was fitted to the data.

The form of production function employed was of the following type

$Y = a + b_1 x_1 + b_2 x 2 + b_3 x 3 + u$

Y = yield of the crops in kg/ha

X_1 = Nitrogen (N) applied through fertilizer in kg/ha

X_2 = Phosphours (P) applied through fertilizer in kg/ha

X_3 = Potash (K) applied through fertilizer in kg/ha

b_1, b_2, = Regression coefficients

a = intercept / constant

u = error term

The results of the estimated multiple linear regression function filted are for sugarcane, Wheat, Jowar and Gram presented in table 5.25 to 5.28 which gives the regression coefficients along with their significance.

5.4.1 Regression coefficient

The coefficient with respect to each particular input is the regression coefficient. These regression coefficient indicate the unit change in the total out put product associated with one unit change in the concerned input factors.

Table 5.25 Regression coefficient, intercept and coefficient of multiple determination for sugarcane on small, medium and large size groups

Size groups	Intercept	Nitrogen (X_1)	Phosphorus (X_2)	Potash (X_3)	R^2
Small N=30	7.3405	0.2548* (0.0330)	0.0353 NS (0.0342)	0.0045* (0.0017)	0.5523
Medium N=30	7.4224	0.2369** (0.0492)	0.2448** (0.1246)	0.1791 NS (0.1993)	0.6027
Large N=30	5.7409	0.1866*** (0.0931)	0.6114*** (0.3452)	0.0035* (0.013)	0.5812
Overall N=90	6.2618	0.0760* (0.0314)	0.0243** (0.0121)	0.1366*** (0.728)	0.5787

* = Significance at 1 percent level
** = Significance at 5 percent level
*** = Significance at 10 percent level

5.4.2 Sugarcane

In case of sugarcane, it is evident that [illegible] of Nitrogen fertilizer (X_1) was positive and significant at overall level. It was positive and significant at 1 percent level for small size group. For medium size group, it was positive and significant at 5 percent level. While in large size group, it was positive and significant at 10 percent level.

The [illegible] of phosphorus fertilizer (X_2) was positive and significant at 5 percent at overall level. In case of small size group, it was positive and non significant, while in medium size group, it was positive and significant at 5 percent level. In large size group it was significant at 10 percent level.

The [illegible] of potash fertilizer (X_3) was positive and significant at 10 percent at overall level. In small size group, it was positive and significant at 1 percent level. It was positive and non significant in medium size group, while in large size group, it was positive and significant at 1 percent level.

Co-efficient of multiple determination (R^2)

The values of multiple determination estimated were 0.5523, 0.6027 and 0.5812 in case of small medium and large size groups, respectively. It was 0.5787 at overall level. The value of coefficient of multiple determination thus indicate that the three resources together explanied 57.87 percent of variation in the output of the sugarcane yield.

Table 5.26 Regression coefficient, intercept and coefficient of multiple determination for wheat on small, medium and large size groups

Size groups	Intercept	Nitrogen (X_1)	Phosphorus (X_2)	Potash (X_3)	R^2
Small N=30	2.6152	0.2240* (0.0997)	0.0297 N.S. (0.0603)	0.0133*** (0.0068)	0.5037
Medium N=30	4.0354	0.2915* (0.0742)	0.0206*** (0.0108)	0.0234 N.S. 0.3211)	0.4341
Large N=30	1.9908	0.0743* (0.0337)	0.0187** (0.0091)	0.7041*** (0.3916)	0.5237
Overall N=90	3.008	0.4263*** (0.2307)	0.0359*** (0.0193)	0.0948 N.S. (0.0784)	0.4871

*, ** and *** indicate level of significance at, 1, 5 and 10 percent level of significance respectively.

* = Significance at 1 percent level
** = Significance at 5 percent level
*** = Significance at 10 percent level.

5.3.3 Wheat

In case of wheat, the regression coefficient of nitrogen fertilizer (X_1) was positive and significant at 10 percent at overall level. In case of all the size groups, it was significant at 1 percent level.

At the overall level the regression coefficient of phosphorus fertilizer (X_2) was positive and significant at 10 per cent level. In small size group, it was positive and non significant. In medium size group, it was positive and significant at 10 percent level, while in large size group, it was positive and significant at 5 percent level.

The regression coefficient of potash fertilizer (X_3) was positive and non significant at overall level. In small and large size group. It was positive and significant at 10 percent level. In medium size group, it was positive and non significant.

Coefficient of multiple determination (R^2)

The values of coefficient of multiple determination estimated were 0.5037, 0.4341 and 0.5237 in case of small, medium and large size group respectively. It was 0.4871 at overall level. The value of coefficient of multiple determination thus indicate that the three resources together explained 48.71 percent of variation in the output of the wheat yield of all the size groups of holdings.

5.3.4 Jowar

In case of jowar, it is evident that regression coefficient of Nitrogen fertilizer (X_1) was positive and significant at 5 percent at overall level. In small and large size group, it was positive and significant at 1 percent

Table 5.27 Regression coefficient, intercept and coefficient of multiple determination for jowar on small, medium and large size groups

Size groups	Intercept	Nitrogen (X_1)	Phosphorus (X_2)	Potash (X_3)	R^2
Small N=30	5.0475	0.2064* (0.0463)	0.2061** (0.1011)	0.1281*** (0.068)	0.6281
Medium N=30	9.4832	0.0565*** (0.0326)	0.3002** (0.1426)	0.0921** (0.0362)	0.6641
Large N=30	4.1833	0.0214* (0.0069)	0.2197** (0.0973)	0.0106** (0.0052)	0.5964
Overall N=90	7.6286	0.9204** (0.3910)	0.0862** (0.0453)	0.3624*** (0.1810)	0.6295

*, ** and *** indicate level of significance at, 1, 5 and 10 percent level of significance respectively.

* = Significance at 1 percent level
** = Significance at 5 percent level
*** = Significance at 10 percent level.

level, while in medium size group, it was positive and it was positive and significant at 10 percent level.

The regression coefficient of phosphorus fertilizer (X_2) was positive and significant at 10 percent at overall level. In case of all the size groups, it was positive and significant at 5 percent level.

The regression coefficient of potash fertilizer (X_3) was positive and significant at 10 percent level, at overall level. In small size group, it was positive and significant at 10 percent level, while in medium and large size group, at 5 percent level.

Coefficient of determination (R^2)

The values of coefficient of multiple determination estimated were 0.6281, 0.6641 and 0.5964 in case of small, medium and large size groups respectively. It was 0.6295 at overall level. The value of coefficient of multiple determination thus indicate that the three resources together explained 62.95 percent of variation in the output of the jowar yield of all the size groups of holdings.

5.3.5 Gram

In case of gram, it is evident that the regression coefficient of Nitrogen fertilizer (X_1) was positive and significant at 5 percent at overall level. In medium and large size group, it was positive and significant at 5 percent level, while in small size group, it was at 1 percent level.

The regression coefficient of phosphorus, fertilizer (X_2) was positive and significant at 10 percent at overall level. In small size group, it was at 1 percent, in medium size group at 10 percent and large size group at 5 percent level.

Table 5.28 Regression coefficient, intercept and coefficient of multiple determination for Gram on small, medium and large size groups

Size groups	Intercept	Nitrogen (X_1)	Phosphorus (X_2)	R^2
Small N=30	1.1654	0.2961* (0.0893)	0.0280* (0.0078)	0.5924
Medium N=30	1.8754	0.0342** (0.0144)	0.7043*** (0.3591)	0.6427
Large N=30	1.0032	0.0092*** (0.0045)	0.0082** (0.0039)	0.5812
Overall N=90	1.3791	0.1321** (0.0613)	0.1562** (0.0799)	0.5787

*, ** and *** indicate level of significance at, 1, 5 and 10 percent level of significance respectively.

* = Significance at 1 percent level
** = Significance at 5 percent level
*** = Significance at 10 percent level.

Coefficient of determination (R^2)

The values of multiple determination estimated were 0.5924, 0. 6427 and 0.5812 in case of small, medium and large size groups, respectively. The value was 0.5797 percent at overall level. The value of coefficient of multiple determination thus indicate that the two resources together explained 0.5787 percent of variation in the output of the gram yield of all the size groups of holdings.

5.5 Sales promotional strategies, tools and techniques adopted by manufacturers

Marketing management process identify customer needs, develop product and services to meet these needs, establishes pricing policies and promotional programmes and implements system of distribution to consumers. Marketing management involves decisions on four important areas which are often referred as marketing mix. They are decision on

1) Product
2) Price
3) Promotion
4) Place

5.5.1 Product decision

The primary motive of the company is to capture the market for its brand by providing quality of mixed fertilizers. The Maruti Fertochem mixed fertilizers are specially recommended for sugarcane, wheat, jowar, gram, udid, onion, cotton and other crops also. Current year of production of Maruti Fertochem mixed fertilizers is

planned on the basis previous year production and total sale. Also conduction the meetings of district officers, area managers. The strategies are decided about current year production and sale. Product life cycle stages in market are introduction, growth and development, maturity and declining stage. At present the Maruti Fertochem mixed fertilizer is in maturity stage.

5.5.2 Price decision

Price refers to the money value that the farmers has to pay for particular fertilizer in certain quantities. There are various methods of pricing viz, cost pricing, market pricing, skimming the market, discount pricing and presting pricing. The company has adopted market pricing method. The company has decided per 50 kg price of Maruti Fertochem mixed fertilizer on the basis of value of raw material used for making these fertilizers and prices existing in the market. Company provides concessions to the dealers.

i) 0 to 50 M. tonnes - No concession
ii) 51 to 200 M. tonnes - Rs. 20/-tonn
iii) 201 to 500 M. tonnes - Rs.30/-tonn
iv) 501 to 1000 M.tonnes - Rs. 40/-tonn

5.5.3 Promotional decision

Promotion is the aspect of selling and advertising or communicating the benefits of fertilizers to target farmers in order to promote them to purchase the fertilizer. These decisions are depends on product life cycle, stage of adoption, competitors action and availability of budget. Promotional activities of company are advertisement in news

paper, pamphlets, folders, posters with necessary information and distributed among farmers. Wall painting also done on farmers house, main areas in the city, stalls and city bus also. The company organises 'Shetkari Melava' and arranges debating between progressive farmers and technical persons. Thus company knows the demand of farmer and problems regarding using the fertilizers and according to demand the company make changes in their product.

5.5.4 Place decision

Place decision refers to the aspects of appropriate channels of distribution through which the physical quantity of fertilizers has to move before it reaches to farmers. It is concerned with selectin of proper marketing channel. Marketing channel should be such that fertilizers will reach to farmer at least cost. The company has followed only one marketing channel to distribute Maruti Fertochem mixed fertilizers. The marketing channel was company ⟶ dealers ⟶ farmer.

SUMMARY AND CONCLUSIONS

6. SUMMARY AND CONCLUSIONS

6.1 Summary

To feed the ever increasing population is a daunting task. Today we are self sufficient in terms of food grain production, but due to ever increasing population we will have to produce more and more. Increase in food grain production is contributed mainly to the fertilizer use. Fertilizer demand is dependent upon the price. Hence, minimization of cost is one way of increasing profit.

The other way is making higher sale of product through proper marketing. For effective marketing it is very essential to know the purchase behaviour of farmers, with this aim in view, the present research project entitled "Farmers behaviour towards the use of Maruti Fertochem Mixed fertilizers in Ahmednagar district" was undertaken with the following specific objectives :

i) To study the socio-economic characteristics of users

ii) To asses the extent of use of Maruti Fertochem mixed fertilizers and factors influencing its use.

iii) To study the various sales promotional strategies, tools and techniques on the productivity of crop.

iv) To study the effect of use of Maruti Fertochem mixed fertilizer on the productivity of crops.

The Ahmednagar district of western Maharashtra was purposively selected for the present study. In Ahmednagar district there are 14 tahsils, out of which Newase and Shrirampur tahsils contributes 31.20 and 28.20 per cent, respectively in total sale of Maruti Fertochem

mixed fertilizers, so on the basis of highest sale, these two tahsils were selected for the study. From these two tahsils, 10 villages were selected on the basis of highest sale of Maruti Fertochem mixed fertilizers. The proportion of total sale of Maruti Fertochem mixed fertilizers in the selected villages was Sonai (15.77 percent), Ghodegaon (14.20 percent), Vadala (15.60 percent), Khadki (16.20 percent), Bhenda (11.12 percent), Belapur (15.50 percent) Takli bhan (19.20 percent), Haregaon (15.32), Ashoknagar (13.70 percent), Khadki (Mahadev) (10.70 percent). The list of the Maruti Fertochem mixed fertilizers users were obtained from field officers of Maruti Fertochem mixed fertilizer from respective areas. The users were categorised into three size groups on the basis of operational holdings viz., size group-I (upto 2ha), size group-II (2.01 to 4 ha) and size group III (4.01 ha. and above). From each selected village, 3 farmers from each size group were selected randomly. Thus in all total sample for study were 90 farmers spread over two tahsils.

The data pertaining to the year 2000-2001 for various aspects of the study were collected personally from the selected users with the help of specially designed questionnaire, by the survey method. The data relating to the land use, cropping pattern, rainfall, irrigation structure etc. were collected from the secondary sources.

The data collected were compiled and analysed for interpretation of results. Both tabular and statistical analysis (chi-square test, multiple regression) were used to accomplish the objectives of the study.

The findings are briefly summarized below :

1) As regards the age of the users, it was observed at the total level that proportion of users upto 50 years age group and 51 and above 50 years group was 51.11 and 48.88 percent respectively.

2) As regards the educational status of the users, it was observed at the total level, that the illiteracy percentage among the heads of families was 8.89 while that of literacy was 91.11. Among the literate category, the proportion of users having primary, higher secondary and collegiate was 42.22, 41.11 and 7.78 percent, respectively.

3) As regards the occupational pattern of the users it was observed that at the total level the proportion of the users engaged in farming was the highest (80.00 percent), while the proportion of users doing service was (20.00 percent).

4) As regards the annual income of the users, it was observed that at the total level the proportion of families having annual income of Rs. Upto 1,00,000 Rs. 1,00,001 to 2,00,000 and Rs. 2,00,001 and above was 24.44, 35.56 and 40.00 percent, respectively.

5) The average size of holding of the users was 3.30 hectares. Average per farm irrigated land was 0.32, 2.92 and 0.55 hectares, respectively. Average irrigated percentage to the cultivated land holding was 77.87.

6) The details regarding the investment in residential buildings of pucca, kaccha and store house at the overall level was Rs. 1,93,987 Rs. 7054.66 and Rs. 4606.00 respectively.

7) At the overall level, the users made an investment in implements and machinary was to the extent of Rs. 2560.00 and Rs. 41,979.90

respectively. In farm implements, the proportion of bullock cart, drill, iron plough and harrow were 3.82, 0.64, 1.02, 0.34 percent respectively. In farm machinary, the proportion of oil engine, electric motor, tractor and pipeline were 0.12, 6.24, 80.35, 7.45 percent, respectively.

8) The details regarding land use pattern of the selected users indicated that out of the total land holding possessed 8.18 percent was uncultivable. The proportion of net cultivated land was 91.82 per cent at the overall level.

9) The cropping pattern of selected users was dominated by jowar, wheat, sugarcane and gram. The kharif, rabi and summer crops, and annual sugarcane (Adsali) were shared 27.48, 13.61, 15.06 and 43.19 respectively to the gross cropped area.

10) As regards sugarcane (Adsali) the per hectars use of NPK through Maruti Fertochem mixed fertilizers at the overall level was 200.12 kg (46.18 percent), 84.4 kg (45.65 percent), 69.14 kg (44.00 percent), while that of other fertilizer was 233.3 kg (53.82 percent), 100.5 kg (54.35 percent) 81.76 kg (56.00 percent), respectively.

11) As regards the per hectare use of NPK for wheat through Maruti Fertochem mixed fertilizers, at the overall level, was 42.66 kg (41.17 percent) 22.80 kg (43.13 percent), 28.76 kg (56.86 percent) 23.56 kg (61.53 percent) respectively.

12) As regards the per hectare use of NPK for jowar through Maruti Fertochem mixed fertilizers, at the overall level, 14.70 kg (42.42 percent), 8.64 kg (57.14 percent), 5.65 kg (35.7 percent)while that of other fertilizer was 19.26 kg (57.14 percent), 14.60 kg (42.80 percent), 9.26 kg (64.28 percent) respectively.

13) As regards the per hectare use of NPK for gram through Maruti Fertochem mixed fertiizers at the overall level, was 5.42 kg (37.22 percent), 12.13 kg (40.00 percent), while that of other fertilizer was 7.87 kg (62.38 percent), 18.41 kg (60.00 percent)

14) At the overall level, per hectare proportion of gap in use of N,P and K nutrient dose for sugarcane (Adsali) crop given through Maruti Fertochem mixed fertilizers to the total recommended dose was to the extent of 199.9, 85.6 and 100.86 kg respectively, while that of wheat was 77.34, 37.20 and 44.34 kg respectively, while that of jowar was 105.30, 51.36 and 54.35 kg.respectively. In case of gram N and P nutrient dose was 19.58 kg and 37.87 kg respectively.

15) At the total level it was observed that 25.55 percent users had the farming experience upto 15 years, followed by 28.88 percent and 45.55 percent users had farming experience between 16 to 25 years and 26 years and above.

16) At the total level it was observed that 44.44 percent of the total users were in 75-100 percentage area under irrigation group., followed by 32.22 percent 50-75 percentage area under irrigation group. In general all the users were the irrigated farmers.

17) As regards the price of Maruti Fertochem mixed fertilizers, it was observed that at the total level the majority of the users (65.55 percent) opioned that the prices were remunerative and remaining users (24.44 and 10.00 percent) opioned that prices were high and low respectively.

18) At the total level, it was observed that maximum number of users were received information regarding Maruti Fertochem mixed fertilizers through company representative reported by (37.77 per

cent) users and through progressive farmer 21.11 percent users though other sources viz, boards and wall paintings, posters, leaflets, magazines and newspapers, dealers, and radio 8.88, 11.11, 16.66 and 4.44 percent users respectively.

19) At the total level it was observed that, majority of the users liked mixed form of fertilizers (66.67 percent), followed by straight and both form of fertilizers (17.78 and 15.55 percent, respectively).

20) At the total level it was found that, maximum users (73.33 percent) opioned that content of NPK ingredients in Maruti Fertochem mixed fertilizers are good, while the remaining users opioned that very good and fair 11.11 and 15.55 percent respectively.

21) The Maruti Fertochem mixed fertilizers were found at maturity stage in the market. While in price decision the company has adopted cash and carry method of pricing. The company has followed the marketing channel as company → dealers → farmers.

6.2 CONCLUSIONS

The above findings led us to draw the following specific conclusions from the present study.

1) The study revealed that, no significant association between age of users and use of Maruti Fertochem mixed fertilizers.

2) The percentage of literacy of the head of the family increased as size of holding increased. There is significant association between education status of users and use of Maruti Fertochem mixed fertilizers.

3) The study pointed that no significant association between occupation of pattern of users and use of Maruti Fertochem mixed

fertilizers. This indicating that there is an equal influence of farming and service on use of these fertilizers.

4) The users in income group upto Rs. 1,00,000 showed an decreasing trend as the size of holding increased. The significant association was found between annual income and use of Maruti Fertochem mixed fertilizers indicating that as the annual income increases, level of use of these fertilizer also increases.

5) The proportion of waste, cultivated and irrigated land showed an increasing trend as size of holding increased in absolute terms.

6) The proportionate investment in pucca residential buildings and kaccha residential buildings showed an increasing trend as size of holding increased.

7) The investment in farm implements and machinary showed an increasing trend especially tractor as the size of holding increased.

8) The area under kharif, rabi and summer crops showed an increasing trend, while area under sugarcane crop showed increasing trend as size of holding increased.

9) The highest use of Maruti Fertochem mixed fertilizers was observed for sugarcane (45.90 percent). Followed by wheat, jowar and gram, 41.96, 40.04, 38.80 percent respectively.

10) It was found no significant association between farming experience and use of Maruti Fertochem mixed fertilizers.

11) It was observed that there was significant association between area under irrigation and use of Maruti Fertochem mixed fertilizers by the users. This implies that as the area under irrigation increased, the use of these fertilizer also increases.

12) It was noticed that there was significant association between price factor and use of Maruti Fertochem mixed fertilizer by the users. As the price of these fertilizer is remunerative, use level is maximum.

13) Farmers receive information about Maruti Fertochem mixed fertilizers from company representative and progressive farmer. It was found significant association between various sources of information and use of Maruti Fertochem mixed fertilizes.

14) It was found that there was significant association between different form of fertilizer liked and use of Maruti Fertochem mixed fertilizer. Majority of the users liked mixed form of fertilizer which meets the demand of users.

15) It was found that there was significant association between the opinion of users regarding the NPK ingredients contents in Maruti Fertochem mixed fertilizers. and their use. Most of the users opioned NPK ingredients content is good.

6.3 POLICY IMPLICATIONS (SUGGESTIONS)

1. The maximum use of Maruti Fertochem mixed fertilizer was observed case of Sugarcane, Wheat, Jowar and Gram. However, their use was not as per recommended doses of fertilizer.

2. It was observed that annual income, area under irrigation, source of information and price of fertilizer were the influencing factor for more use of Maruti Fertochem mixed fertilizers. So company should concentrate on the users having such above features and accordingly strengthen their fertilizer distribution network policy.

3. In order to popularise the Maruti Fertochem brand on large scale company should undertake aggressive advertising campaign through mass media viz., Television, Radio, News papers, etc.
4. Company should arrange expert guidance for creating awareness about recommended doses of fertilizers among the farmers.

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7. LITERATURE CITED

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APPENDICES

8. APPENDIX

Farmers behavior towards the use of Maruti Fertochem mixed fertilizers in Ahmednagar district.

1. Name of the cultivator

Village : Taluka : District :

2. Information of family members.

Sr. No.	Name of family member	Age	Education	Profession	Experience	Annual Income

3. Information of capital assets owned by farmers

a) Land

Sr. No.	Survey No.	Type of land	Waste land (ha)	Cultivable land (ha.)		
				Rainfed	Irrigated	Source of irrigation

Present value of land				
Irrigation	Rainfed	Total	Total land Revenue (Rs.)	Remarks

b) House and farm buildings

Sr. No.	Type of building	Type of constrn.	Year of Constr.	Present value (Rs.)	Repairs (Rs.)	Remaining life.
1.	House Residential Farm					
2.	Store room					
3.	Byre					
4.	Tractor shed					
5.	Others					

c) Implements, machinery

Sr. No.	Particulars	Nos.	Year of Purchase	Present value	Remaining life	Repair Remarks charges.
a)	Implements					
i)	Wooden plough					
ii)	Iron plough					
iii)	Seed drills					
iv)	Harrow					
v)	Hoe					
vi)	Bullock cart					
B)	Machinery					
i)	Electric motor					
ii)	Tractor					
iii)	Tractor drawn inplements					
iv)	Trolley					
v)	Sprayer					
vi)	Duster					
vii)	pipeline					

d) Livestock

Sr. No.	Particulars	No.s	Year of purchase	Present value
a.	Draft animals			
b.	Milch animals			
c.	Crossbreed cows			
d.	Local cows			
e.	Buffalo			
f.	Calves / Heifers			
g.	Sheep			
h.	Goat			
i.	Poultry			
j.	Other			

5. Cropping pattern

Sr. No.	Season and crop	Area (ha)		Source of irrigation			
		Rainfed	Irrigated	Well	Lift	Tubewell	Well+lift

6. Cropwise fertilizer consumption / use

Sr. No.	Trade name of fertilizer	Grade			Total quantity used in bags	Value of fertilizer
		N%	P%	K%		

b) Cropwise use and opinion of farmers regarding its effect on yield of crop.

1) Sugarcane

Quantity used	Split doses	Yield

2) Wheat

Quantity used	Split doses	Yield

3) Jowar

Quantity used	Split doses	Yield

4) Gram

Quantity used	Split doses	Yield

7. What form of fertilizer do you prefer and for which crop and why?

Quantity used	Crop	Reasons
a. Straight b. Mixed c. Both		

8. From which source you have heard about Maruti Fertochem mixed fertilizer

Sr. No.	Source	Ranking
1.	Company representative	
2.	Exhibition	
3.	Demonstration	
4.	Boards, wall paintings	
5.	Radio	
6.	Secy of society	
7.	Leaflets, posters, magazines, newspapers	
8.	Progressive farmer	
9.	Fair / Kisan mela	
10.	Others	

9. What is your opinion regarding containing the N.P.K. ingredients in these fertilizer as compared to other fertilizer ?
   a) Very good
   b) Good
   c) Fair

10. What is your opinion regarding prices of these fertilizers as compared to other fertilizers.

Particular	Others	Maruti
a. Remunerative b. High c. Low		

VITA

9. VITA

GAIKWAD SUSHILKUMAR BHIMRAO

A Candidate for the degree

Of

MASTER OF SCIENCE (AGRICULTURE)

In

AGRI-BUSINESS MANAGEMENT

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