A STUDY ON KNOWLEDGE AND ADOPTION OF PLANT PROTECTION MEASURES BY PADDY GROWERS OF RAICHUR DISTRICT

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By

MANJUNATH T.

DEPARTMENT OF AGRICULTURAL EXTENSION EDUCATION
COLLEGE OF AGRICULTURE, DHARWAD
UNIVERSITY OF AGRICULTURAL SCIENCES,
DHARWAD – 580 005

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CONTENTS

Contd.....

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIX

1. INTRODUCTION

Paddy (*Oryza sativa .L*) is one of the important cereal crops of the world and forms the staple food for more than 50 per cent of population and is known as “king of cereals”. The United Nations General assembly, in a resolution declared the year of 2004 as the “International Year of Rice”, which has tremendous significance to food security. It very eloquently upheld the need to heighten awareness about the role of rice in alleviating poverty and malnutrition (Barath and Pandey, 2005). In Asia, India has the largest area under the rice accounting for 28.5 per cent of the global rice area. World production of rice has raisen steadily from 200 million tonnes in 1960 to 431 million tonnes in 2007. The top three producers of rice are China (29% of world production), India (21% of world production) and Indonesia (8.3% of world production). World trade figures are very different, as only about 5-6 per cent of rice produced is traded internationally. The largest three exporting countries are Thailand (30% of world export), Vietnam (14% of world exports) and United States (9% of world exports), while the largest three importers are Philippines (6% of world imports), Indonesia (5% of world imports) and Bangladesh (4% of world exports) (Anon. 2008).

Rice is an important food crop of India and stands first in area and second in total food production. Among the rice growing countries, India has the largest area under rice in the world (45.50 million ha) with a total production of 96.43 million tonnes during 2007-08 and it stood next only to China in the world with respect to production. But, the yield levels in India are low at 2.20 tonnes per ha compared to other major rice producing countries *viz*., Japan (6.52 t/ha), China (6.24 t/ha) and Indonesia (4.25 t/ha). About 67 per cent of the area under paddy in India is under high yielding varieties.

In India, the highest area under paddy is in Uttar Pradesh (59.20 lakh ha), followed by West Bengal (56.90 lakh ha), Orrisa (44.50 lakh ha), Andhra Pradesh (39.80 lakh ha) and Karnataka (14.20 lakh ha). Production-wise, West Bengal stands first (147.50 lakh tonnes), followed by Andhra Pradesh (118.70 lakh tonnes), Uttar Pradesh (111.20 lakh tonnes) and Karnataka (34.50 lakh tonnes). The highest yield is observed in the state of Punjab (3870 kg/ha), followed by Assam (3360 kg/ha) and Karnataka (2464 kg/ha) (Anon., 2008).

Karnataka is one of the major rice growing states in India. It is grown in an area of 1.42 million ha with an annual production of 3.45 million tonnes during 2007-08. The area under rice production is increasing over the years. Rice is grown under varied conditions and bulk of the area is under assured rainfall and irrigated conditions of canals (60.52 % of gross area irrigated under paddy) and tanks (19.28 % of gross area irrigated under paddy). Karnataka ranks fourth in productivity and ninth in production among major rice growing states of the country. The average yield of rice is 2464 kg/ha. The important rice growing districts of the state are, Haveri, Uttar Kannada, Dharwad, Koppal, Raichur Mysore, Hassan, and Chitradurga (Anon., 2008). Paddy in the state is grown under different agro-climatic (upland, low land and rainfed) conditions and the crop is damaged by more than 100 species of insect pests of which about dozen are of significance in India. Some of important diseases of paddy crop in India include fungal, bacterial and viral diseases. Among them blast, brown spot, bacterial blight, foot rot, stem rot and false smut are important. The coordinated network trials conducted at different centers of India have indicated that controlling insect pests alone increases yield by around one tonne per hectare.

In other words, plant protection plays a vital role in modern agriculture. Fertilizers, plant protection measures, irrigation and improved seeds are the key elements of modern agriculture. The new technology is associated with the high pests and disease incidences. In the absence of adequate plant protection measures, the positive contribution of improved seeds, fertilizers and irrigation to output could completely nullify and farmers may incur heavy losses.

District-wise major paddy growing areas of Karnataka

Sl. No.	Districts	Area (thousand ha)	Production (thousand tons)
1.	Raichur	178.1	408.8
2.	Shimoga	133.59	321.19
3.	Davangere	130.42	438

Although, scientific research in agriculture is moving fast and new techniques are being added continuously, so far only 20 per cent of the available technology has been adopted by farmers that too only among 10 per cent of farming population. It is seen that productivity levels of different crops are very low. In order to increase the crop yields, the level of adoption improved farm practices has to be enhanced. Knowledge of the recommended technologies is a pre-requisite to adoption process.

The basic input for achieving higher productivity in the assimilation of technological knowledge is one of the important components of behaviour and as such it plays a major role in covert and overt behaviour of human beings. Knowledge of the technology is the basic requirement as it gives impetus to adopt technology. The adoption of any technologies depends on the individual development and acceptance of modern agricultural technology is the prime attention for increasing crop production. It is generally observed that all farmers do not use recommended practices.

It is the experience of the extension workers that many practices including plant protection measures inspite of their merits are not accepted widely by the farmers. Some technologies record very slow rate of adoption. It is therefore, a question as to why one practice is more readily adopted than the other. One of the possible answers is some innate characteristics of the practice, which may speed up or retard its rate of adoption. The differential rate of adoption of farm technologies by farmers is generally attributed to some of the personal and socio-economic characteristics of farmers, as reported by Chand and Gupta (1966), Basaram and Cofenor (1968) and Rogers (1968).

It is essential that after using all the inputs such as improved seeds, irrigation, fertilizers *etc.* the farmers must protect the crop from ravages of pests and diseases. In order to derive higher production the crops need to be protected from all the ill effects of pests and diseases and therefore plant protection should be regarded as “Investment Protection”.

The productivity of paddy is far from satisfactory levels. The results of the past research studies indicated that there is a vast scope to enhance the yield potentiality of the paddy by using recommended plant protection measures. The thorough knowledge of plant protection measures by the farmers would help them in obtaining higher yields.

Hence, the present study is intended to address the following specific objectives.

1. To ascertain the knowledge level of farmers regarding plant protection measures in paddy cultivation,
2. To analyze the adoption level of plant protection measures by paddy growers,
3. To study the relationship between profile characteristics of paddy growers and their knowledge and adoption level, and
4. To enlist the problems of farmers in undertaking plant protection measures in paddy cultivation.

Scope of the study

The study would indicate the knowledge and adoption of plant protection measures and constraints experienced by farmers in adoption of recommended plant protection measures. Further, attempt made to study the socio-economic characteristics of paddy growers may be useful to the extension functionaries in addressing the problems of paddy growers.

It may help the future researchers to get an insight into the problems of adoption of recommended plant protection measures in paddy crop, so that they may analyze the problems in greater depth and suggest appropriate strategies for raising the knowledge and adoption level of paddy growers.

The study is purely based on the opinions expressed by paddy growers, which are necessary from an individual point of view. The data generated may be helpful to the various research and developmental organizations in understanding the knowledge and adoption of plant protection measures in paddy cultivation and problems experienced by farmers.

Limitations of the study

The present study is an effort to evaluate the impact on knowledge and adoption of plant protection measures on paddy. The study was restricted to farmers of Raichur district, because of time limit and limited resources of the student researcher, so the findings obtained can not be generalized to other paddy growing areas in the state.

2. REVIEW OF LITERATURE

A review of literature was undertaken keeping in view the specific objectives of the study. As adequate research literature exclusively related to recommended plant protection measures of paddy crop was not available, other studies related to cultivation aspect of other plantation crops are also reviewed and presented under following heads.

2.1 Knowledge level about plant protection measures of paddy crop

2.2 Adoption of plant protection measures

2.3 Personal and socio-economic characteristics of the farmers

2.4 Relationship between selected independent variables and their knowledge and adoption

2.5 Problems faced by the farmers in the adoption of improved cultivation practices

2.1 Knowledge level about plant protection measures of crops

Basavaraj (1987) conducted a study on adoption of improved farm technology by farmers under a minor irrigation programme financed by a Grameena Bank, Chitradurga district, Karnataka state and observed that majority of the respondents were having medium overall knowledge about different aspects of improved farm technology. These farmers had the knowledge about simple low cost practices like seed rate, sowing time, spacing and only a few farmers had the knowledge about complex, costly practices like use of chemical fertilizers, seed treatment and plant protection chemicals.

Patil (1988) conducted a study on the knowledge, attitude and adoption behaviour of the sunflower growers in Raichur district of Karnataka state and reported that sunflower growers had relatively higher knowledge about simple practices. Knowledge level was comparatively low in case of complex and important sunflower cultivation practices like plant protection measures, fertilizer application, use of chemicals *etc.*

Mehta *et al.* (1989) conducted a study on knowledge of farmers in respect of selected agricultural practices of rice and mango crops and observed that only 25 per cent of the farmers knew two improved varieties of paddy, 22 per cent and 85 per cent of them had got the purpose of seed treatment and method of planting the seedlings, respectively. They also found that the knowledge about weedicide application to nursery, names of nitrogenous fertilizers and important diseases of rice and control measures for blast disease was less.

Vinayak Reddy (1991) conducted a study on knowledge and adoption level of registered cotton seeds growers in Chitradurga district of Karnataka and found that relatively very low percentage of the respondents had knowledge regarding pest and disease control in hybrid seed cotton production.

Dube and Sawarkar (1992) conducted a study on knowledge and adoption of rice production technology among small and marginal farmers and observed that 50 per cent of the small farmers and marginal farmers had partial knowledge about rice production practices.

Puranik and Varma (1992) while studying adoption of sweet potato technology noticed that the knowledge index was 100 in diseases and pest control by chemicals in case of sweet potato growers in Wardha district of Maharashtra state.

Borkar *et al.* (2000) conducted a study on Characteristics of farmers influencing their knowledge about use of bio-fertilizers in Maharashtra state as Bio-fertilizers and reveals that more than fifty per cent of farmers (58.67) had medium knowledge on Bio-fertilizers, followed by (34.67) and (18.66 %) of them with high and knowledge of Bio-fertilizers.

Chupke (2000) conducted a study on Knowledge and adoption of farmers about biocontrol measures in Akola district of Maharashtra and found that majority of the respondents had medium level of knowledge (75.91%) about bio-control measures, followed by high (16.05%) and low level (8.04%), respectively.

Gogoi *et al.* (2000) conducted a study on impact of farmers training programme on adoption of rice production technology by farmers reported that the level of knowledge of the trained framers on recommended practices of rice was significantly higher than non-trained farmers.

Vijaykumar (2000) conducted a study on knowledge and adoption behaviour of sugarcane growers in Belgaum district of Karnataka and revealed that majority (69.01%) of the respondents had medium level of knowledge about recommended sugarcane cultivation practices, whereas 18.66 per cent and 13.33 per cent of the respondents had high and low level of knowledge, respectively.

Babanna (2002) in his study on Information source consultancy and training needs of farmers in arecanut cultivation under Tungabhadra command area in Shimoga district of Karnataka revealed that 44.2 per cent of the respondents were having medium level of knowledge regarding mother palm selection, manuring, plant protection practices, 35 and 20.8 per cent were having high ad low level of knowledge on mother palm selection, manuring and plant protection measures.

Partha Sarathi and Santha Govind (2002) in their study conducted in Thiruvannamalai district of Kerala reported that majority rice growing farmers possessed the knowledge of IPM practises (78.6 %) among the IPM components competitively more number of farmers have knowledge of cultural methods (42.37%) , followed by chemical methods (31.24%), Biological methods and physical methods (11.67%) in the cultivation of rice crop.

Vedamurthy (2002) in his study on management of areca gardens and marketing pattern preferred by the arecanut farmers of Shimoga district in Karnataka revealed that the knowledge level of arecanut growers regarding the recommended cultivation practices. A majority of the arecanut growers categorized under medium knowledge category, 46 per cent of the arecanut growers grouped under low knowledge category, while only 20 per cent of the arecanut growers grouped under high knowledge category.

Vinaykumar (2005) in his study on knowledge and adoption of rose growing farmers in Karnataka indicated that almost equal number of rose growers had high (43.3%) and medium (42.50%) level of knowledge and only 14.17 per cent of them had low level of knowledge. He further revealed that 85.80 per cent of the respondents had knowledge about varieties, followed by major pests and diseases of rose crop (85.00%) and their control (83.33%), respectively.

By observing the above reviews, it could be concluded that majority of the growers had medium level of knowledge of recommended plant protection measures in different crops.

2.2 Adoption of plant protection measures

Jaiswal and Sharma (1990) conducted a study on constraints in adoption of improved technology of rice and reported that with regard to adoption of fertilizer, 72 per cent of the farmers were using nitrogen, 49 per cent used phosphorus and only 18 per cent used potash, although the farmers were convinced regarding balanced use of fertilizers.

Keerthy Kumar (1992) while studying marketable surplus, marketing pattern and sources of information consulted by paddy farmers of Malavalli taluk, Mandya district reported that, 48 per cent of small farmers and 78 per cent of big farmers adopted IR-20 variety of paddy and 32 per cent of small and 38 per cent of big farmers adopted of Jaya variety and very less numbers of farmers adopted recommended seed rate, and, 50 per cent of big and small farmers have adopted recommend quantity of farmyard manure.

Savant and Nirban (1992) in their study on acceptance of gall-midge resistant varieties of paddy in Maharashtra, found that majority (76 %) of farmers were non adopters and only 23 per cent of farmers adopted gall-midge resistant variety of paddy.

Balamatti (1993) conducted a study on paddy cultivation in Yellapur taluk of Uttar Kannada and reported that majority of the farmers growing local paddy variety applied FYM while none followed plant protection measures.

Chandranaik (1993) conducted a study on integrated programme of rice development, its impact on knowledge and adoption behaviour of beneficiaries and non-beneficiaries and reported that non-beneficiaries of Integrated Programme for Rice Development have mostly adopted the simple and non-cash practices, while complex and costly practices were partially adopted.

Gopikrishna (1993) while studying the yield gap and adoption of improved practices of paddy under different irrigation systems observed that 80 per cent of the respondents had adopted improved varieties under canal irrigation system in contrast to cent per cent of farmers adopting improved varieties under tank and well irrigation systems.

Meti and Hanchinal (1994) conducted a study in Raichur district and reported that majority (68%) of the respondents come under medium adoption category with respect to sunflower cultivation practices. It was found that 41 per cent adopted recommended variety, 64.66 per cent used seed drill and 76.66 per cent did not follow recommended spacing whereas, 43.33 per cent applied more than recommended quantity of fertilizers, 68.66 per cent applied fertilizers at desired time and 55.00 per cent of respondents used recommended plant protection chemicals.

Balasubramani (1997) conducted a study on Study on knowledge and adoption behaviour of rubber growers and revealed that a considerable number of rubber growers (40%) had medium level of adoption of improved practices like herbicides, smoking of rubber sheet, cover crops and insect and disease control practices. However, it was noted that equal percentage of growers (30%) were in low and high categories of adoption in South Canara district of Karnataka.

Raghavendra (1997) while studying knowledge and adoption behaviour of arecanut farmers found that all the arecanut farmers of South Canara district in Karnataka adopted practices namely weeding, harvesting and processing. Majority of the farmers adopted the practices namely application of green leaf and compost, plant protection measures, irrigation, drainage and right spacing.

Chothe and Borkar (2000) while studying constraints faced by farmers in adoption of bio-fertilizers in Maharashtra state revealed that 63.00 per cent of farmers had medium adoption of bio fertilizers, followed by 42.00 and 39.00 per cent of them were having high and low adoption of bio fertilizers, respectively.

Vasantha Kumar (2000) in his study on knowledge, adoption and economic performance of coffee growers of Virajpet taluk of Coorg district revealed that majority of the small farmers had not adopted the recommended variety (58%), control measures against pests (50%), irrigation (60%), drying yard specification (58%) and recommended moisture content (55%), whereas higher percentage of both big (72%) and small (82%) growers had not adopted control measures against diseases. He also revealed that nearly half of the big growers (47%) had high overall adoption level followed by less per cent of respondents under medium (40%) and low (13%) overall adoption level category. On the other hand, a greater proportion of small growers were under medium (42%) to low (30%), overall adoption level category followed by mere (28%) of respondents under high overall adoption category.

Vijaykumar (2000) revealed that majority (78.00%) of the respondents had medium level of adoption about recommended sugarcane cultivation practices, whereas 14.66per cent and 7.33 per cent of the respondents had low and high level of adoption, respectively.

Wase (2001) while studying Knowledge and adoption of farmers about Jayanti chilli cultivation observed that majority of the respondents (56.67 %) were medium level of adoption about Jayanti chilli cultivation technology. The percentage of the respondents having high level of adoption was 23.33 per cent and 20.00 per cent of respondents were having low level of adoption.

Darling and Vasantha Kumar (2004) in the study on knowledge and adoption of botanical pesticides in Kanyakumari district of Tamil Nadu indicated that more than half of the respondents (15.66%) were found that followed by medium (43.44%) level of regarding adoption of botanical pesticides.

Vinaykumar (2005) in his study on knowledge and adoption of rose growing farmers in Karnataka indicated that, almost half of the rose growers (49.7%) had high adoption level of recommended practices. Whereas, 34.17 per cent and 16.67 per cent of the rose growers had medium and high adoption level, respectively.

2.3 Personal and socio-economic characteristics of farmers

2.3.1 Age

Joshi (1992) conducted a study named “A study on paddy cultivation by Tibetan rehabilitants and their socio-economic characteristics, Mundgod taluk, Karnataka” and revealed that half of the respondents belonged to middle age category, where as about 31.00 per cent and 19.00 per cent of the respondents were in old and young age category.

Arun (1993) conducted a study on paddy cultivation pattern of siddhi farmers and their socio-economic characters in Yellapur of Karnataka. He reported that majority (72.50%) of the respondents were in the middle age group when compared to young and old aged groups.

Vinod Gupta (1999) conducted a study on the knowledge and adoption behaviuor of rice growers in jammu district of jammu and Kashmir state and reported that 46.67 per cent of the respondents were middle aged followed by old age (40.00%) and young age (13.33%) respectively.

Bheemappa (2001) while studying the knowledge and technological gap in adoption of paddy and cotton cultivation practices between migrant and non-migrant farmers of TBP command area reported that 10 per cent of migrant and 24.17 per cent non-migrant farmers were young aged, majority (83.33% and 74.17%) of migrant and non-migrant farmers were middle aged respectively and 6.67 per cent migrant and 1.66 per cent non-migrant farmers belonged to old age category.

Nilkanthrao and Rajput (2003) in their study on adoption of university recommended rice production technology by rice growers conducted in Bhandara district of Maharashtra state concluded that majority of the respondents were middle aged.

Ruyosu and Kharub (2003) in their study named “farmers knowledge and adoption of rice production technology in Nagaland” revealed that the majority of the respondents were of middle to old aged.

Chandra Mauli Pandeli (2005) in his study on entrepreneurial behavior of farmers in Raichur district of Karnataka revealed that majority of the respondents (46.67%) were under middle age category followed by young age (36.66%) and old age (16.67%).

Nagadev and Venkataramaiah (2007) while studying the characteristics of integrated pest management (IPM) dry paddy farmers in Maharashtra state reported that majority (66.00%) of respondents were middle aged, followed by old (19.33%) and young (14.67%) respectively.

2.3.2 Education

Joshi (1992) based on his study concluded that 58.33 per cent of the respondents were illiterates, 33.53 per cent were educated upto primary level and a lesser 4.16 per cent of respondents persued high school and college level education each.

Arun (1993) while studying paddy cultivation pattern of siddi farmers and their socio economic charactestics yellapur. Karnataka reported that majority (62.50%) of the respondents were illiterates followed by 25.80 per cent were educated upto primary level, while 9.17 per cent studied upto middle school and 2.50 per cent studied upto high school.

Vinod Gupta (1999) while studying knowledge and adoption behavior of rice growers in Jammu district of Jammu and Kashmir state revealed that 43.34 per cent of respondents were educated upto middle school followed by primary school and high school (19.33%), 11.33 per cent were educated upto higher secondary and 6.00 per cent were illiterates.

Bheemappa (2001) revealed that 5 per cent migrant and 10 per cent non-migrant farmers were illiterates followed by 32.50 per cent, 24.17 per cent, 31.67 per cent of migrant farmers with a education level of primary school, middle school, high school and pre university respectively as against the 52.50 per cent, 23.33 per cent and 5.00 per cent of non-migrant farmers.

Nilkanthrao and Rajput (2003) concluded that majority of the farmers were having the education up to college level.

Ruyosu and Kharub (2003) reported that majority of the farmers belonged to primary level of education group.

Chandra Mauli Pandeli (2005) reported that majority of the farmers were illiterates (31.67%), followed by education upto primary school, middle school, high school, graduation, higher secondary school and post-graduation with 21.66, 14.16, 14.16, 7.50 and 1.66 per cent respectively.

Nagadev and Venkataramaiah (2007) found that about 16.67 per cent sample respondents were illiterates, while 83.33 per cent of sample respondents were literates in different groups.

2.3.3 Land holding

Joshi (1992) concluded that majority (67.50%) of the respondents were small farmers, whereas 25.00 and 7.50 per cent of the respondents were marginal and large farmers respectively.

Arun (1993) reported that a large chunk of siddhi respondents had marginal land holding (64.16%) and another 31.67 per cent had small holding leaving only 4.17 per cent in the big land holding category

Vinod Gupta (1999) based on his study concluded that 52.66 per cent of the respondents families had a land holding upto 2.5 acres followed by 41.33 per cent with land holding 2.6 to 7.5 acres (medium farms) and only 9 per cent had land holding more than 7.5 acres.

Nilkanthrao and Rajput (2003) revealed that the majority of the respondents were possessing small land holding of upto 1 – 2 ha.

Shashidhar (2003) in his study on socio- economic profile of drip irrigation farmers in Shimoga and Davangere district of Karnataka state revealed that, comparatively more number of farmers (46.67%) belonged to semi-medium category followed by medium (32.22%) and small land holding category, respectively.

Sunilkumar (2004) in his study on farmers knowledge and adoption of production post harvest technology in tomato crop of Belgaum district in Karnataka reported that 40.00 per cent of the respondents were having big land holding, nearly an equal per cent of the respondents belonged to medium (25.83%) and small farmers (24.16%) category.

Suresh (2004) in his study observed that 40.00% of the respondents had big land holding followed by high (19.175) and low (12.08%) size of land holding.

Thiranjangowda (2005) conducted a Study on knowledge and adoption level of soil and water conservation practices by farmers in north Karnataka and observed that 42.25 per cent were medium farmers followed by semi medium (28.12%), small (20.31%), big farmers (14.06%) and marginal farmers (6.25%).

Nagadev and Venkataramaiah (2007) based on their study reported that 39.33 per cent of respondents fall under semi medium category, 20.00 per cent had medium land holding while 26.67 per cent possessed small land holding and marginal of 12.00 per cent, only meager number (2.00%) had large land holding.

2.3.4 Family size

Joshi (1992) revealed that 55.83 per cent of Tibetan families were medium sized (upto 5 to 8 members), 18.33 per cent of families were small sized (upto 4 numbers) and 25.84 per cent of them were large sized (above 9 members) families.

Arun (1993) based on his study entitled ”A study on paddy cultivation pattern of siddhi farmers and their socio-economic characters in Yellapur of Karnataka” revealed that majority of the respondents belonged to big family size category (62.50%) Whereas 37.50 per cent had small sized families.

Hanumanaikar (1995) conducted a study on knowledge, adoption and marketing behaviour of sunflower growers in Dharwad district and revealed that 34.50, 31.50 and 34.00 per cent of the farmers belong to small, medium and large size families, respectively.

Raghunandan (2004) based on his study on knowledge and adoption level of soil and water conservation practices by farmers in northern Karnataka reported that majority of the respondents belong to medium sized families (62.85%), followed by big families (25%) and small families (13.75%).

Devalatha (2005) in a study conducted at Gadag district on women self help groups of North Karnataka reported that majority of the respondents (71.76%) were young aged, while 25.00 per cent of them were middle aged and remaining belonged to old aged category (3.33%).

Joseph and Easwaran (2006) conducted a study conducted at Aizawal district of Mizoram on Rural Development Programme and reported that majority of the respondents were aged between 40 and 60 years, followed by 30.77 per cent falling below 40 years and 15.38 per cent falling above 60 years. The mean age of members was found to be 48 years.

2.3.5 Annual income

Joshi (1992) revealed that majority (71.67%) of the respondents belonged to medium categories of annual income and about 12 per cent of respondents were in low income group.

Arun (1993) concluded that majority of the respondents were in the medium income category (66.66%) drawing gross income ranging between Rs. 6400 to Rs. 15000 per year.

Chandran (1997) in his study on tapioca found that 33.33% of the respondents belonged to low income category while, 40.00% and 26.67% were under medium and high income categories respectively.

Bheemappa (2001) revealed that 20 per cent of migrant and 11.67 per cent of non-migrant farmers belonged to high family income, 65.83 per cent migrant farmers and 76.06 per cent non-migrant farmers constituted medium income category and 11.17 per cent of migrant farmers and 11.67 per cent of non-migrant farmers belonged to low family income category.

Deepak (2003) conducted a Study on perception of beneficiaries and non beneficiaries towards WYTEP programme in Dharwad district and revealed that 36.00 per cent of the beneficiaries and non beneficiaries belonged to semi medium income group, respectively.

Nilkanthrao and Rajput (2003) reported that were earning an income of Rs. 25,000 to Rs. 50,000 annually.

Shashidhar (2003) in his study revealed that 42.44 per cent of respondents belonged to medium level of income (Rs. 1-2 lakhs) and in low income category, 30 per cent of respondents were noticed, whereas 27.70 per cent of the farmers belonged to high income group.

Suresh (2004) reported that most of the respondents were in medium income group with 80.33% followed by high and low income group *i.e.* 15.00 and 4.17 per cent, respectively.

Chandra Mauli Pandeli (2005) in his study revealed that majority of the respondents (50.83%) were in high income group followed by semi-medium, medium and low income groups with 25.84, 12.50 and 10.83 per cent respectively.

2.3.6 Extension contact

Joshi (1992) reported that village leader was given first rank by majority by the respondents (75.00%) followed by friends and relatives (18.33%), agricultural assistant (4.16%). About 35 and 26 per cent of the respondents consulted village leader weekly and fortnightly respectively.

Arun (1993) revealed that slight majority of the respondents (45.00%) sought information on agriculture and other problems from their friends and neighbors followed by agricultural assistants (37.50%).

Ramanna *et al.* (2000) conducted a study on Motivation factors and constraints of hybrid sunflower seed growers and revealed that 70.00 per cent of the respondents had medium level extension agency contact and 30.00% of the respondents had high level extension agency contact.

Bheemappa (2001) while studying the knowledge and technological gap in adoption of paddy and cotton cultivation practices between migrant and non-migrant farmers of TBP command area concluded that 100.00 per cent migrant and 99.17 per cent non-migrant were aware of Agricultural assistants of which 3.36 per cent non-migrant farmers were only found to contact Agricultural Assistants once in a week and 74.17 per cent migrant and 74.49 per cent non-migrant farmers contacted once in a month.

Sophia (2001) based on the study knowledge and adoption of sustainable cultivation practices in sugarcane and cotton by farmers in Cuddlore district of Tamil Nadu revealed that all the sugarcane farmers were aware of the sugarcane officers, among them 97.50% contacted them regularly, 73.75% of cotton farmers are aware of agricultural development officer.

Gandhi (2002) in his study on knowledge level and adoption behaviour of vegetable growers with respect to integrated pest management of tomato crop in Kolar district revealed that, 73.33 per cent of the respondents contacted agricultural officers whenever they had a

problem, followed by 4.67 per cent of the respondents once in a week, ADA was contacted by 8.67 per cent of the respondents whenever they had a problem.

Nilkanthrao and Rajput (2003) concluded that majority of the respondents were belonged to moderate extension contact.

Ruyosu and Kharub (2003) in their study reported that about half of the respondents had low extension contact.

2.3.7 Extension participation

Vinod Gupta (1999) revealed that 74.00 per cent were aware of training programmes, 56.00 per cent were aware of field visits (32.00%) and field days (28.66%). One-third of respondents have participated in training programmes (36.00%) and only 4.66 per cent took participation in demonstrations.

Bheemappa (2001) found out that 80.00 per cent of migrant and 83.33 per cent of non-migrant farmers had participated in group meetings. Similarly 9.17 per cent, 31.67 per cent, 5.83 per cent and 5 per cent of migrant farmers had participated in farmers' trainings, farmers' discussion meetings, demonstrations / trails and field days / krishimela, as against 11.67 per cent, 13.33 per cent, 4.17 per cent and 2.50 per cent of non-migrant farmers.

Shashidhara (2004) conducted a study on drip irrigation farmers of Bijapur district and revealed that, 45.83 per cent of the respondents participated in group meetings followed by exhibition (41.66%) and 18.33 per cent of the respondents participated in krishimela.

Chandra Mauli Pandeli (2005) revealed that majority (42.50%) of the respondents belonged to low extension participation category followed by medium (29.16%) and high (28.33%) extension participation categories respectively.

Thiranjanagowda (2005) observed that 73.43 per cent of the cut flower growers had extension participation regarding demonstration occasionally while 26.43 per cent participated regularly.

2.3.8 Mass media participation

Arun (1993) based on his revealed that 46.67 per cent of literate respondents read newspapers, negligible number of respondents read agricultural publications. Most of the respondents possessed radio (58.33%) and majority (54.29%) of respondents listen to agricultural programmes occasionally, 47.14 per cent listened to entertainment programmes quite occasionally.

Vinod Gupta (1999) reported that cent per cent of the respondents possessed radio, 86.66 per cent possessed TV and 21.33 per cent were subscribers to daily newspapers. 72.00 per cent of respondents regularly listened agricultural programmes on radio, 47.70 per cent and 40.77 per cent of the respondents regularly watched agricultural programmes and general programmes respectively on TV.

Bheemappa (2001) in his study conducted in TBP command area reported that 35.83 per cent of migrant and 10.83 per cent of non-migrant farmers who were subscribing to the news papers; were having regular reading habit to the extent of 86.05 per cent and 100.00 per cent. The subscription of agricultural magazines was found with 46.67 per cent of migrant farmers of which 36.67 per cent and 47.50 per cent respectively exhibited regular and occasional reading. About 98.33 per cent migrant farmers possessed radios with 93.22 per cent of them are occasional listeners, 81.67 per cent non-migrant farmers possessed radio with 96.94 per cent of them were occasional listeners. The TV was possessed by 72.50 per cent migrant and 21.67 per cent non-migrant farmers of which 43.68 per cent of migrant farmers were regular viewer of agricultural programmes.

Chandra Mauli Pandeli (2005) revealed that majority (44.17%) of the respondents belonged to medium mass media participation category. Whereas, 29.16 and 26.67 per cent of farmers belonged to high and low mass media participation category respectively.

Nagadev and Venkataramaiah (2007) in their study revealed that majority (74.00%) of respondents had medium media utilization, followed by low (16.00%) and high (10.00%) respectively.

2.3.9 Social participation

Patil (1990b) while studying technological gap and constraints in the adoption of improved rice cultivation practices in konkan region of Maharashtra state noticed that majority (79.00%) of the paddy growers were found in medium social participation category, and 14.00 per cent of farmers in low social participation followed by high social participation (2.50%) whereas only 4.50 per cent of farmers had not participated in social activities

Sawant and Nirban (1992) in a study on acceptance of gall-midge resistant varieties of rice revealed that majority of paddy growers in Sindhurdurg district of Maharashtra had expressed the problems like lack of knowledge about the availability of recommended varieties (63.5%), followed by untimely supply of seeds, high cost of seeds and non suitability of recommended verities for not adopting the recommended high yielding paddy verities.

Saikrishna (1998) conducted a study in raichur district on Andhra migrant farmers and reported that 6.00 per cent of respondents were members of milk co-operative society, only 1.33 per cent of farmers were office bearers. Only 3.33 per cent of farmers were the members of village panchayat and no one was its office bearer, two per cent of migrant farmers were members of youth club and co-operative bank.

Vijay Kumar (2000) conducted a study on sugarcane growers in Belgaum district of Karnataka and found that 29.00 per cent of the respondents were members of co-operative society and 2.00 per cent were office bearers. Whereas, 8.00 per cent of the farmers were members of youth club and 5.33 per cent of the respondents were members of gram panchayat.

Chandracharan (2003) in a study on Sujala watershed project beneficiary farmers in Dharwad district, reported that, only 4.00 and 2.66 per cent of the farmers were members and office bearers, respectively of gram panchayats whereas 30.00 per cent and 43.33 per cent of the respondent farmers attended the meetings regularly and occasionally, respectively.

2.3.10 Innovative proneness

Kumar (1998) conducted a study on banana growers in Bangalore district in Karnataka and pointed out that 40 per cent of the banana growers had less innovative proneness followed by 37 per cent of them had medium and 23 per cent of them had high innovative proneness.

Babanna (2001) conducted a study on arecanut growers in Shimoga district in Karnataka and focussed that 34.10 per cent farmers were of medium innovative proneness category followed by 33.33 per cent of them having high and 32.66 per cent of them possessed low innovative proneness.

Natikar (2001) conducted a study on atttidues and use of farm journal by the subscriber farmers and their profile North Karnataka revealed that 73.75 per cent of the subscriber farmer belonged to medium innovativeness category followed by low (15.63%) and high (10.62%) innovativeness category.

Shashidhara (2003) in his study on socio-economic profile of drip irrigation farmers in Shimoga and Davangere district of Karnataka found out that, majority of the farmers belonged to medium innovativeness category (47.50%0 followed by low (31.66%) and high (20.83%) innovativeness category, respectively.

Suresh (2004) conducted a study on entrepreneurial behaviour of milk producers in Chittoor district of Andhra Pradesh and indicated that the milk producers in the district had medium, high and low innovativeness in the order of 55.00, 24.58 and 20.42 per cent, respectively.

2.3.11 Economic motivation

Sheela (1991) in her study on dairy practicing women of Bidar district reported that majority (67.00%) of the respondents had medium level of economic motivation, only 18.5 and 15.0 per cent of the respondents had low and high level of economic motivation.

Srinivasareddy (1995) conducted a study on knowledge and adoption of recommended mango cultivation practices among farmers of Kolar district in of Karnataka state and reported that 40.00 per cent of the mango growers had high level of economic motivation followed by medium (34.0%) and low (26.0%) economic motivation, respectively

Chandran (1997) in his study on knowledge and adoption of farmers cultivating tapioca growers in Ernakulam district of Kerala state revealed that, 46.66 per cent of the respondents belonged to medium economic motivation category.

Sawant (1999) in his study on effect of different modes of presentation of information of mushroom cultivation on Maharashtra state reported that, 78 per cent of the respondents belonged to medium economic category

Bheemappa (2001) conducted a study in TDP command area of Karnataka and reported that 15.83 per cent of migrant and 11.56 per cent of non migrant farmers, and medium level of economic motivation was exhibited by 64.17 per cent migrant and 69.17 per cent of non migrant farmers and only 20.00 per cent migrant and 19.17 per cent of non migrant farmers were having low economic motivation.

Sandesh (2004) in his study on profile of Kannada farm magazine readers in Karnataka reported that, majority (51.67%) of the respondents belonged to medium level of economic motivation. Whereas, 28.33 per cent and 20.00 per cent of the respondents belonged to high and low level of economic motivation categories, respectively.

2.3.12 Material possession

Gangappa (1975) conducted a study of adoption behavior, consultancy pattern and information source credibility of small farmers in Mysore district of Karnataka and reported that small farmers lacked the most important implements, which were required for satisfactory level of production he also identified that material possession was positively and significantly associated with adoption level of small and marginal farmers. It was also reported by kittur (1976)

Shanmukappa (1978) conducted a study on the adoption behaviour and value orientation of arecanut grower of Shimoga district in Karnataka State and found that there was significant relationship between material possession and adoption of improved practices in areca nut cultivation

Dwarakanth (1987) conducted a study titled an analysis of intermediate technology adopted by small farmers in Tumkur district of Karnataka and found that there was no significant relationship between material possession and adoption of intermediate technology

2.4 Relationship between selected independent variables and their knowledge and adoption

2.4.1 Relationship between selected independent variable with their knowledge

Variables, author and year	Respondents	Dependent variables	Nature of relationship
Age			
Yoganand (1992)	Coconut growers	Knowledge level	Non-significant
Balasubramani (1997)	Rubber growers	Knowledge level	Highly significant
Raghavendra (1997)	Arecanut growers	Knowledge level	Non-significant
Education			
Yoganand (1992)	Coconut growers	Knowledge level	Significant
Balasubramani (1997)	Rubber growers	Knowledge level	Significant
Raghavendra (1997)	Arecanut growers	Knowledge level	Significant
Land holding			
Pandya and Venkaria (1994)	Banana growers	Knowledge level	Significant
Balasubramani (1997)	Rubber growers	Knowledge level	Significant
Raghavendra (1997)	Arecanut growers	Knowledge level	Significant
Kumar (1998)	Banana growers	Knowledge level	Non-significant
Resmy (1998)	Coconut and banana growers	Knowledge level	Negatively significant
Annual income			
Pandya and Venkaria (1994)	Banana growers	Knowledge level	Significant
Raghavendra (1997)	Arecanut growers	Knowledge level	Significant
Resmy (1998)	Coconut and banana growers	Knowledge level	Positively significant
Vedamurthy (2002)	Arecanut growers	Knowledge level	Significant
Mass media			
Yoganand (1992)	Coconut growers	Knowledge level	Significant
Balasubramani (1997)	Rubber growers	Knowledge level	Positive and significant
Raghavendra (1997)	Arecanut growers	Knowledge level	Non-significant
Lakshmisha (2000)	Cashew growers	Knowledge level	Significant

Social participation			
Pandya and Venkaria (1994)	Banana growers	Knowledge level	Significant
Balasubramani (1997)	Rubber growers	Knowledge level	Positive and significant
Kumar (1998)	Banana growers	Knowledge level	Significant
Vasantha Kumar (2000)	Coffee growers	Knowledge level	Positive and significant
Babanna (2002)	Arecanut growers	Knowledge level	Positive and significant
Economic motivation			
Nityashree (1992)	Coffee growers	Knowledge level	Non-significant
Resmy (1998)	Coconut and banana growers	Knowledge level	Positive and significant
Chandrashekhar (1999)	Coffee growers	Knowledge level	Significant
Vasantha Kumar (2000)	Coffee growers	Knowledge level	Positive and significant

2.4.2 Relationship between selected independent variable with their adoption

Variables, author and year	Respondents	Dependent variables	Nature of relationship
Age			
Yoganand (1992)	Coconut growers	Adoption level	Non-significant
Nagabhushan and Guruprasad (1994)	Coconut growers	Adoption level	Positive and highly significant
Singh (1996)	Coconut growers	Adoption level	Non-significant
Balasubramani (1997)	Rubber growers	Adoption level	Non-significant
Raghavendra (1997)	Arecanut growers	Adoption level	Non-significant
Education			
Yoganand (1992)	Coconut growers	Adoption level	Significant
Nagabhushan and Guruprasad (1994)	Coconut growers	Adoption level	Significant

Singh (1996)	Coconut growers	Adoption level	Positive and highly significant
Balasubramani (1997)	Rubber growers	Adoption level	Positive and highly significant
Raghavendra (1997)	Arecanut growers	Adoption level	Significant
Land holding			
Nagabhushan and Guruprasad (1994)	Coconut growers	Adoption level	Positively significant
Singh (1996)	Coconut growers	Adoption level	Non-significant
Balasubramani (1997)	Rubber growers	Adoption level	Positive and significant
Raghavendra (1997)	Arecanut growers	Adoption level	Positive and significant
Annual income			
Raghavendra (1997)	Arecanut growers	Adoption level	Positive and significant
Resmy (1998)	Coconut growers	Adoption level	Significant
Kumar (1998)	Banana growers	Adoption level	Significant
Sindhu Sadanandan (1998)	Coffee growers	Adoption level	Highly significant
Mass media			
Yoganand (1992)	Coconut growers	Adoption level	Positive and significant
Balasubramani (1997)	Rubber growers	Adoption level	Significant
Raghavendra (1997)	Arecanut growers	Adoption level	Positive and highly significant
Lakshmisha (2000)	Cashew growers	Adoption level	Significant
Extension participation			
Yoganand (1992)	Coconut growers	Adoption level	Significant
Nityashree and Siddaramaiah (1993)	Coffee growers	Adoption level	Significant
Balasubramani (1997)	Rubber growers	Adoption level	Significant
Raghavendra (1997)	Arecanut growers	Adoption level	Non-significant

Social participation			
Yoganand (1992)	Coconut growers	Adoption level	Non-significant
Kumar (1998)	Banana growers	Adoption level	Significant
Resmy (1998)	Coconut growers	Adoption level	Positive and significant
Lakshmisha (2000)	Cashew growers	Adoption level	Positive and significant
Vasantha Kumar (2000)	Coffee growers	Adoption level	Positive and significant
Economic motivation			
Nityashree (1992)	Coffee growers	Adoption level	Significant
Resmy (1998)	Coconut growers	Adoption level	Positive and significant
Chandrashekhar (1999)	Coffee growers	Adoption level	Significant
Vasantha Kumar (2000)	Coffee growers	Adoption level	Positive and significant

2.5 Problems faced by the farmers in the adoption of improved cultivation practices

Sawant and Nirban (1992) in a study conducted on acceptance of gall-midge resistant varieties of rice revealed that majority of paddy growers in Sindhudurg district of Maharashtra had expressed the problems like knowledge about the availability of recommended varieties (63.51%), followed by untimely supply of seeds, high cost of seeds and non suitability of recommended varieties for not adopting the recommended high yielding paddy varieties.

Yogananda (1992) conducted a study on knowledge level, adoption behaviuor and training needs of coconut growers and reported that lack of knowledge and guidance were the major constraints in the adoption of recommended practices of coconut cultivation. Other factors like high cost of inputs, no water, lack of rainfall, no transportation and lack of equipment were the constraints which come in the way of adoption of the recommended practices.

Shivanarayan and Jayarama Reddy (1993) while studying technology constraints in adoption of improved paddy practices by small and marginal farmers of diversified farming found that the paddy farmers of Guntur district of Andhra Pradesh had the constraints like non availability of green manure, lack of knowledge and lack of time to grow green manure crops for not incorporating the green manure in the paddy fields whereas the lack of knowledge was the sole reason for partial adoption of recommended seeds rate and not practicing of urea coating were noticed with the majority of farmers, lastly for not practicing chemicals weedicide the respondents highlighted the reasons like of knowledge, high cost of chemicals and non availability of weedicide in time

Raghavendra (1997) a study on knowledge and adoption behaviour of arecanut farmers of South Canara district of Karnataka state reported that non-availability of labour (88%), damage due to high wind speed during rainy season (67%), scracity of water during summer (49%), irregularity in the supply of electrical and heavy power cuts during summer (38%), problems of koleroga diseases (22%), problem of tender nut drop (16%), price fluctuation (17%), non-availability of green leaves for manuring (12%), problem of excess rain (12%), problem of pests (7%), loss due to thunder shocks, marketing problem, theft and animal grazing (2% each) were important problems perceived by arecanut growers of South Canara district in Karnataka state.

Krishnamurthy *et al* (1998) in the study on adoption of recommended practices sugarcane cultivation by farmers conducted in Mandya district of Karnataka had reported the constraints like costly weedicide, its harmful effects to the crops as well as to the animals, health hazards to human beings and chemical weedicide in paddy.

Amaranth and Jeyalakshmi (1999) conducted a study on adoption of improved technology in north Arcot district of Tamil Nadu and noticed that lack of expertise, lack of conviction and non availability of weedicide as the major constraints for not adopting the weedicide in paddy

Lakshmisha (2000) while studying impact of cashew demonstration on knowledge and adoption and yield levels farmers in Dakshina Kannada district noticed that the commonly observed constraints in the adoption of the improved production practices were severity of pest incidence, non-availability of quality grafts, high cost of labour and poor nutrient status of soil. The other farmers expressed in addition to above lack of technical guidance as the major constraints in adoption of improved cashew production practices.

Resmy *et al.* (2001) conducted a study on sustainability of coconut and banana intercropping in Kerala and revealed that the farmers are not adopting the sustainable practices due to lack of knowledge, technical guidance and lack of information sources. The three main problems *viz.,* lack of knowledge, lack of information sources and technical guidance can be attributed to lack of efforts made by the extension workers at gross root level.

Babanna (2002) pointed out that the major problems faced by respondents were such as identification and control of pests and diseases, getting proper remunerative price and availability of intime labour.

Vedamurthy (2002) while studying the management of areca gardens and marketing pattern preferred by the arecanut growers of Shimoga district in Karnataka observed that the main constraints faced by the arecanut growers were price fluctuation, non-availability of labour, lack of finance and lack of knowledge.

3. METHODOLOGY

The material and methods used in the present study are presented under the following heads.

3.1 Research design

3.2 Population of the study

3.3 Locale of the study

3.4 Description of the study area

3.5 Selection of villages

3.6 Selection of respondents

3.7 Measurement of dependent variables

3.8 Quantification of independent variables

3.9 Collection of data

3.10 Analysis of data

3.1 Research design

The research design adopted for this study was ex-post-facto research technique, since the phenomenon has already occurred.

Ex-post-facto research is systematic empirical enquiry in which the researcher does not have control over independent variables as their manifestation has already occurred or as they are inherently non manipulatable. Thus, inferences about relation among variables were made without direct intervention from concomitant variation of independent and dependent variables (Kerlinger, 1973).

3.2 Population of the study

All the paddy growers who had knowledge and adopted one or more plant protection measures constituted the population for the study.

3.3 Locale of the study

The study was conducted in the randomly selected villages of taluks of Raichur district during 2009-2010 (Fig. 1). Manvi and Sindhanur taluks were purposively selected since these taluks are having more number of paddy growers and occupy more area under paddy cultivation as compared to the other taluks in the district and also based on the criteria of high diseases and pest infestation level.

3.4 Description of the study area

3.4.1 Location

Raichur is one of the administrative districts of Karnataka with its head quarter at Raichur town. The district is bounded by the Krishna River on the north and the Tungabhadra River on the south. The wedge of land between the rivers is known as the Raichur Doab, after the city of Raichur. Bijapur and Gulbarga districts lie to the north across the Krishna River. Bagalkot and Koppal districts lie to the east. Across the Tungabhadra lies Bellary District of Karnataka to the southwest and Anantapur District of Andhra Pradesh to the southeast. Kurnool District of Andhra Pradesh state lies to the east, and includes the lower portion of the Raichur Doab.

Raichur district comes under North-Eastern dry Zone of the Agro-climatic zones classified in the state which lies in the 16.15" N of north latitude and 77.0^{o} of east longitude. The district has varied climatic, topographical, soil and water resources and cropping systems and has an altitude of 398l.23 mts from MSL. The district comprises of five talukas namely Raichur, Deodurga, Lingsugur, Sindhanur and Manvi

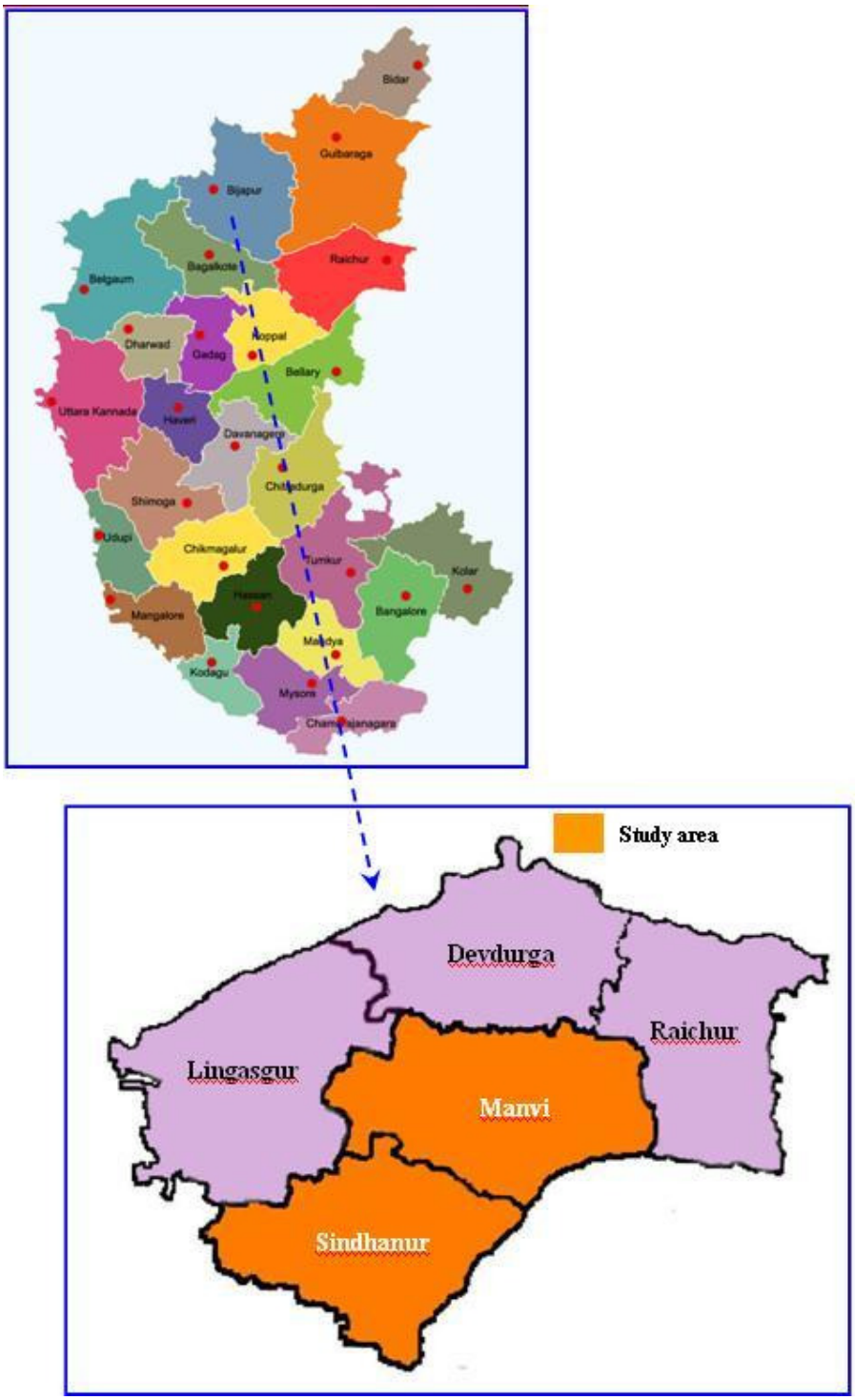


Fig.1.Map showing the study area

3.4.2 Demographic features

Raichur district has a population of 13, 51,800 of which includes 6,83,220 and 6,68,600 male and female population, respectively. The district comprises of 878 villages under 168 gram panchayats, 7 municipal limits and 37 hobalies.

3.4.3 Literacy rate

According to 2001 census, the literacy rate of Raichur district was 40.53 per cent.

3.4.4 Topography

The district is bestowed with varied soil resources comprising 57.6 per cent black and 42.4 per cent red soils. Within the black soils, 44.2 per cent is deep black soils followed by 41.6 per cent medium black and 14.2 per cent shallow soils. Among the red soils, 48.9 per cent area is constituted by loamy soils while remaining 51.1 per cent comprises of sandy soils. The soils are poor in nitrogen, phosphorous, zinc and iron but rich in potassium.

Raichur district has the advantage of growing a variety of field and horticultural crops owing to its varied soil and climatic conditions. Traditionally crops like green gram, red gram, groundnut, sunflower, bajra *etc.* are grown under rainfed situation in *kharif* season while under irrigated situation, the district is known for intensive cultivation of paddy and cotton. During rabi season, crops like jowar, chickpea, safflower, sunflower *etc.* are grown extensively while groundnut and paddy are grown under irrigated conditions. Besides, in several pockets of the district, fruit crops like mango, sweet orange, fig and sapota are grown while cultivation of jasmine and crossandra has picked up of late

3.5 Selection of villages

A list of all the paddy growers in Manvi and Sindhanur talukas were prepared with the help of concerned Assistant Director of Agriculture, Department of Agriculture.

Four villages from Sindhanur and three villages from Manvi talukas where paddy was cultivated by more number of farmers were selected in consultation with the Assistant Director of Agriculture in Sindhanur and Manvi. The villages selected were Somalapur, Gandhi Nagar, Gorebhal, and Jalihal of Sindhanur taluk and Ballatigi, Byatagi and Bagalwada of Manvi taluk.

3.6 Selection of respondents

In each village, list of farmers cultivating paddy crop during 2009-2010 was prepared. From each village 25 farmers were selected randomly. Thus, 175 paddy growing farmers spread over seven villages of Sindhanur and Manvi taluks constituted the sample for the study.

3.7 Measurement of dependent variables

Knowledge and adoption were the dependent variables of the study.

3.7.1 Knowledge

This refers to the farmers' understanding of the different recommended plant protection measures of paddy cultivation or it refers to the body of information understood and retained by the farmers about recommended paddy plant protection measures.

For the present study, the procedure followed for knowledge measurement was by using the scale developed by Thippeswamy (2007) employed to measure the knowledge of the respondents with slight modifications. All the important operations of paddy cultivation including the additional aspects were listed in consultation with the experts in the field.

A total number of 20 common recommended practices were selected based on the judgement of specialists. The relevant answers for these items were obtained with the help of package of practices and cereal crop experts of the University of Agricultural Sciences, Dharwad. Each correct knowledge item was credited with one score and zero score was given to wrong answer. Thus, the maximum score that one could get was 20 and the minimum being zero.

The total knowledge score for each respondent was calculated by summing up the number of items correctly answered by an individual respondent after computing knowledge level score, the respondents were grouped into low, medium and high categories based on the mean and standard deviation as described below.

Category	Score
Low	Upto <Mean- 0.425*SD
Medium	Mean $\pm$ 0.425*SD
High	>Mean+ 0.425*SD

3.7.2 Adoption

It refers to the use of all the recommended plant protection measures of Paddy cultivation by the farmers as recommended by the extension workers.

The partial adoption technique suggested by Supe (1969) and Kolte (1974) was followed with necessary modification for scoring plant protection measures adopted by the respondents as indicated in the table below.

Item	Score
Full adoption	2
Partial adoption	1
Non-adoption	0

Partial adoption was assigned at taking into account of any deviation from the normal recommendation.

All the important plant protection measures in Paddy cultivation including additional aspects were listed. A total number of 20 recommended plant protection measures were selected based on the judgement of experts. The proper answers for these items were obtained with the help of package of practices and Paddy experts of University of Agricultural Sciences, Dharwad. Each full adopted practice was credited with two score, one score for the partially adopted practice and zero score for non-adoption. Thus, the maximum score that one could get was 40 and the minimum being zero.

Depending upon the total score obtained by each of the respondent, they were grouped into three categories with mean and standard deviation as measures of check and expressed below.

Category	Score
Low	<Mean – 0.425*SD
Medium	Mean $\pm$ 0.425*SD
High	>Mean + 0.425*SD

3.8 Quantification of independent variables

3.8.1 Age

Age was operationalzed as the chronological age of the paddy growers in completed years at the time of investigation. The respondents were categorized into three age groups based on the procedure followed by Karpagam (2000).

Category	Age (years)
Young	Less than 31 years
Middle	31 to 50 years
Old	More than 50 years

3.8.2 Education

Education refers to the number of years of formal schooling obtained by the paddy growers. It was quantified by using the items and weights used by Shashidhara (2003) as indicated in table.

Level of education	Score
Illiterate	0
Primary school	1
Middle school	2
High school	3
PUC	4
Degree	5

3.8.3 Annual income

It is the total income generated by an individual in a year by all known sources of income in that family.

Annual income of each respondent was determined by considering the total income earned from all the sources in a year and expressed interms of rupees. The respondents were categorized taking mean and standard deviation as measures of check (Malagi, 1985 and Joshi, 1992).

Category	Rupees
Low	<Rs. 49,310
Medium	Rs. 49,310 – Rs. 1,21,217
High	>Rs. 1,21,217

3.8.4 Family size

Family was taken as a group of closely related persons living together in a single household with a common kitchen. It was measured as the absolute number of members in the household sharing the same economic unit. Beneficiary families are classified into three categories. Procedure followed by Usha Rani (1999) was used in this study.

Size of the family	Number
Small family	<5 members
Medium family	5-8 members
Large family	>8 members

3.8.5 Extension participation

It refers to the extent of participation of the farmers in different extension activities like participation and demonstration, participation in extension meetings, field days *etc.* conducted during the last one year in the area. The variable was quantified by following procedure suggested by Ravikumar (1979) with modified pattern. A list of extension activities was prepared and respondents were asked to indicate their participation is each one of them. The scoring procedure was as detailed below.

Sl. No.	Extension activities	Degree of Participation		
		Regular	Occasionally	Never
1.	Training programme			
2.	Demonstrations			
3.	Educational tour			
4.	Field day			
5.	Group discussion			
6.	Agricultural exhibitions			
7.	Krishimela			

3.8.6 Mass media participation

This refers to the exposure of an individual to different mass media and the degree of participation in them. The different mass media sources were listed and the respondents were asked to indicate as to how often they participate in each of these activities. The procedure suggested by Byarareddy (1971) was used in assigning weightage as detailed below.

Sl. No.	Organizations	Regularly	Occasionally	Never
1.	Reading newspaper	2	1	0
2.	Listening to radio			
3.	Do you read farm magazines/ leaflets and other related literature on agriculture/Paddy			
4.	Viewing Krishidharshan programmees on TV			

The maximum score that could be obtained by each respondent was ten.

3.8.7 Social participation

It is the degree of involvement of the respondents from mere member or holding organizational positions and their active participation in local formal organizations like Zilla parishad, Taluk panchayat, Mandal panchayat, Village panchayat, service Co-operative Society *etc.* The following scoring procedure was adopted by Venkateshprasad (1995).

Sl. No.	Organizations	Non-member	Member	Officer bearer	Member participation		
					Reg.	Occ.	Never
1.	Zilla parishad	0	1	2	2	1	0
2.	Taluk panchayat						
3.	Mandal panchayat						
4.	Village panchayat						
5.	Service Co-op. Society						

6.	Land Development Bank						
7.	Farmers Service Co-operative society						
8.	Milk Co-operative Society						

3.8.8 Land holding

It is the actual land owned by the family of farmers in acres. The conversion procedure as specified in the notification brought out by Government of India circular on 280-12/16/19-RD-III-Vol-X dated 15 November, 1991 (Anonymous, 1992) was used. Accordingly one acre of wet land is to three acres of dry land. The respondents were categorized based on the procedure followed by Hiremath (2000).

Category	Area (acres)
Marginal farm	Upto 2.50
Small farm	2.51 – 5.00
Semi-medium farm	5.01 – 10.00
Medium farm	10.01 – 25.00
Big farm	More than 25.00

3.8.9 Innovative proneness

It is referred to as a socio-psychological orientation of an individual to get linked or closely associated with change, adopting innovation ideas and practices.

Prasad (1983) has used innovative proneness scale developed by feaster (1968) with slight modifications in the scoring pattern to measure the innovativeness of rice growing farmers. The same procedure was followed in the present investigation to know the innovative proneness of farmers adopting plant protection measures in the field. In this scale, statements were included with three response categories as 'Yes' 'undecided' and 'No'. For the positive first four statements a score of two was given for 'Yes' a score of one for decided and 0 score for 'No' response. The scoring procedure was reversed in the case of negative statements. The summation of the scores obtained by the respondent for all the eight statements indicated his innovative proneness score. The total score ranged from 0 to 16. The following scoring procedure adopted to quantify this variable.

Sl. No.	Statements	Response		
		Yes	Undecided	No
1.	Do you want to learn the new ways of PP measures	2	1	0
2.	If the extension worker gives a talk on plant protection aspects would you attend?			
3.	If the government would help you to increase your yield level by providing subsidy to purchase PP chemicals, would you move?			
4.	Do you want a change in your way of life?			
5.	A farmer should try to farm the way his parents did?			
6.	Do you want your son to be farmers?			
7.	It is better to enjoy to day and let tomorrow take care of itself			
8.	A man's future is in the hands of god			

3.8.10 Material possession

It refers to the possession of various household materials and farm implements such as bicycle, scooter, radio, television and gobar gas, wooden plough, iron plough, seed drill, seed-cum-fertilizer drill, power tiller, sprayer/duster and tractor utilized for agricultural operations in the farm by an individual farmer. The data was presented in frequency and percentage.

3.8.11 Economic motivation

Economic motivation refers to the extent to which an individual is oriented towards achievement of the maximum economic ends such as maximization of profits.

Supe (1969) has developed a scale to measure this variable. Prasad (1983) used this scale with modified scoring pattern of dichotomous pattern of responses (Yes/No) instead of a five point continuum of response as used by Supe (1969). For the present investigation, the statements considered by the above researchers were not suitable. Therefore, same number of statements which are suitable for the farmer respondents were developed and used in the present study. The first four statements were positive, while the last two were negative. A score of one was assigned for the 'Yes' response and 0 score for 'No' response in case of positive statements. The scoring procedure was reversed in the case of negative statements. The scores obtained on each statements were summed up to obtain the total scores for a respondent on this variable. The maximum score obtainable by a respondent was 6 and the minimum was 0. The following scoring procedure adopted to quantify this variable.

Sl. No.	Statements	Response	
		Yes	No
1.	Farmer should work towards larger yield and economic profits through adoption of Plant protection measures	1	0
2.	The most successful farmer is one who makes the highest profit by minimizing pest/disease damage in crop.		
3.	A farmer should try and new ideas relating to PP measures, which may earn him more money		
4.	A farmer should grow cash crops to increase monetary profits in comparison to growing of food crops for own consumption		
5.	It is difficult for the farmers children to make good start unless he provides them with economic assistance		
6.	A farmer must earn his living but the most important thing in life can not be defined in the economic terms		

3.8.12 Extension contact

Extension contact has been operationally defined as the frequency of contact of respondent with the different extension personnel, line departments and extension agencies for seeking information about cultivation practices.

This variable was measured considering the frequency of meeting of farmers with various extension functionaries *viz.*, Village Level Worker (VLW), Agricultural Officer (AO), Private Agency Extension Personnel *etc.*

For quantification of the variables same procedure as followed by Venkataramulu (2003) was used with some modifications.

Scoring procedure for frequency of contact was as follows.

Frequency of contact	Score
Never	0
Whenever problem occurs	1
Once in a month	2
Once in a fortnight	3
Once in a week	4

The score for individual respondents extension contact was the summation of the scores for all the extension personnel contacted by him. The higher score reveals higher contacts with extension personnel by the respondent.

3.9 Collection of data

The data was collected by using a structured interview schedule based on experience gained, the interview schedule was modified wherever needed and finalized. The final interview schedule was used to elicit the information from the respondents by personal interview method.

3.10 Analysis of data

The data was analysed by using appropriate statistical tools. The statistical tools such as mean, standard deviation, frequency, percentage and correlation were employed wherever found appropriate and data were analysed to draw valid inferences.

4. RESULTS

The results of the investigation are presented under the following headings.

4.1 Knowledge level of the respondents about plant protection measures in paddy cultivation

4.2 Adoption level of plant protection measures in paddy cultivation by the respondents

4.3 Socio-economic and psychological characteristics of the respondents

4.4 Relationship between selected socio-psychological characteristics of paddy growers and their knowledge and adoption level of plant protection measures

4.5 Constraints faced in adoption of plant protection measures

4.1 Overall knowledge level of the paddy growers regarding plant protection measures

The results presented in Table 1 indicated that considerable percentage of the respondents (37.14%) belonged to high knowledge level group whereas, only 35.42 per cent of the farmers belonged to low knowledge level group followed by 27.42 per cent belonged to medium knowledge level category.

4.1.1 Knowledge level of paddy growers about plant protection measures

The results presented in Table 2 depicts that the knowledge level of farmers about various plant protection measures of paddy crop. With regard to pests, cent per cent of farmers had knowledge about the stem borer. Majority of the farmers (88.57% and 62.85%) had absolute knowledge about brown plant hoppers and ear head cutting caterpillar or army worm. About 52.57 per cent of them had the knowledge about gundhi bug. With regard to pesticides, 77.14 per cent of the farmers knew about Phorate which was used for stem borer control, 73.14 per cent of the farmers did know the dimethoate for control of brown plant hoppers. Similarly, 54.28 per cent of the farmers had knowledge about the methyl parathion for gundhi bug control and cent per cent of them did know about the Endosulfan 35 EC for army worm control. In case of diseases, majority of the farmers (93.71%) did know about the blast diseases, whereas 88.00 per cent of them had knowledge about brown spot. Whereas, 79.42 and 48.57 per cent of the farmers did know about the sheath blight and false smut.

Regarding fungicides, 83.42 per cent of the farmers had the knowledge about Mancozeb 75 WP in case of brown spot, whereas 51.42 per cent of the farmers had the knowledge of Bavistin for blast control and 48.57 per cent did now about Blitox for contol of false smut.

4.2 Adoption level of plant protection measures

The results presented in Table 3 indicated that as high as 62.85 per cent came under medium adopter group followed by 24.57 percentage of the respondents belonged to low adoption group and least percentage of respondents (12.57 %) came under high adoption group of plant protection practices of paddy cultivation.

4.2.1 Extent of adoption of important plant protection practices

The data in Table 4 projects the extent of adoption of plant protection measures by paddy growers. It was observed that 46.85, 34.28, 21.71 and 74.28 per cent of the farmers had adopted Furadon granules, Dimecron, Methyl parathion and Endosulfan for control of stem borer, brown plant hopper, gundhi bug and army worm, respectively.

Table 1: Overall knowledge level of the paddy growers regarding plant protection measures

(n=175)

Knowledge level	Frequency	Percentage
Low	62	35.42
Medium	48	27.42
High	65	37.14
Mean = 26.04		SD=6.62

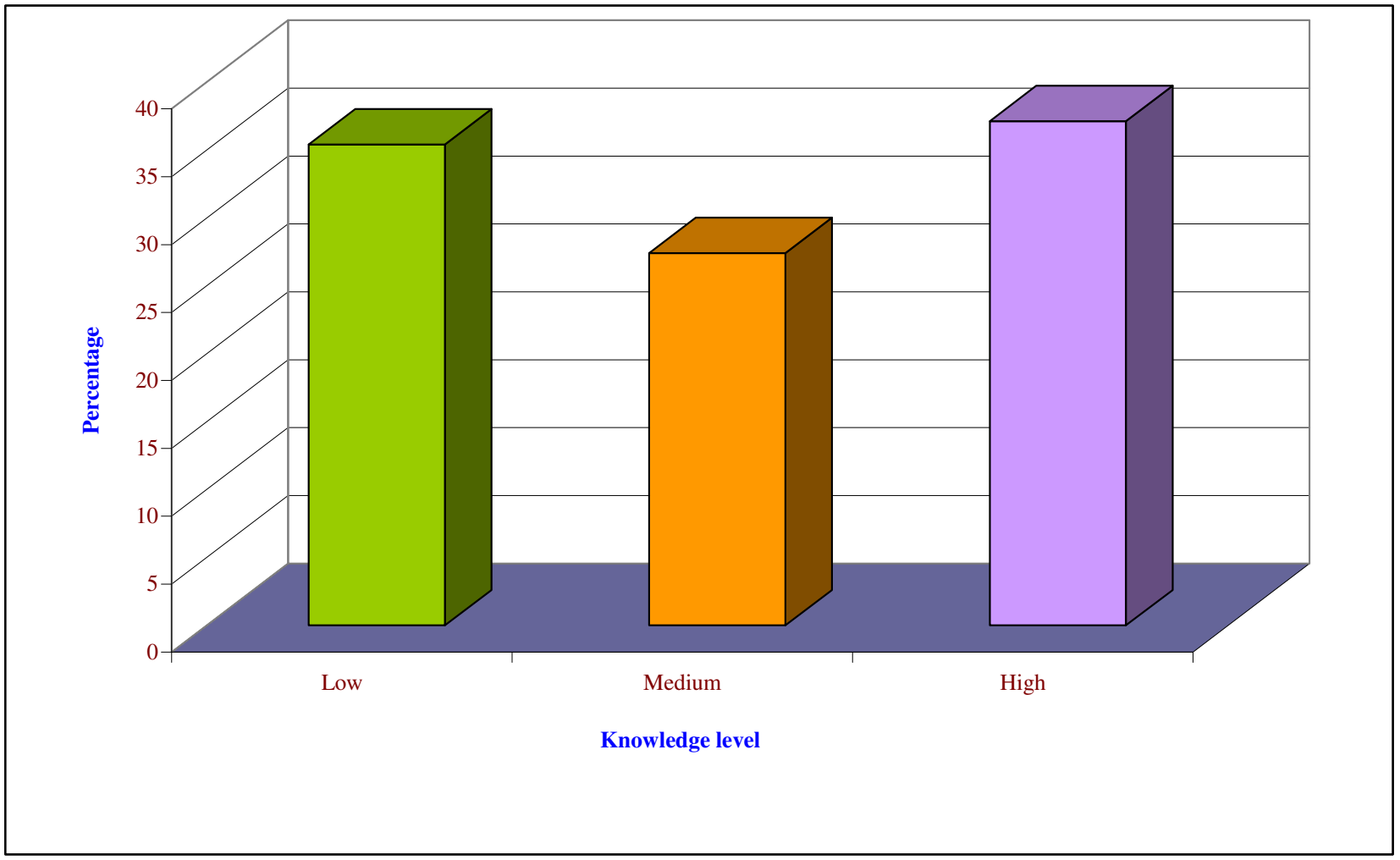


Fig. 2: Overall knowledge level of the paddy growers regarding plant protection measures

Table 2: Knowledge level of paddy growers about plant protection measures

(n=175)

Sl. No.	Knowledge level	Frequency	Percentage
1	Pests		
a	Stem Borer	168	96.00
b	Brown Plant hoppers	155	88.57
c	Gundhi Bug	92	52.57
d	Ear Head Cutting Caterpillar or Army Worm	110	62.85
2	Pesticides		
a	Carbofuron or Phorate (Stem Borer)	135	77.14
b	Phosphamidon or Dimethoate (Brown Plant hoppers)	128	73.14
c	Methyl parathion (Gundhi Bug)	95	54.28
d	Endosulfan 35 EC(Ear Head Cutting Caterpillar or Army Worm)	154	88.00
3	Disease		
a	Blast	164	93.71
b	Brown Spot	154	88.00
c	False Smut	85	48.57
d	Sheath Blight	139	79.42
4	Fungicides		
a	Carbendizime (Blast)	90	51.42
b	Mancozeb 75 WP (Brown Spot)	146	83.42
c	Copper oxy chloride (False Smut)	85	48.57
d	Carbendizime (Sheath Blight)	62	35.42

Figures in parenthesis indicate percentage to the total

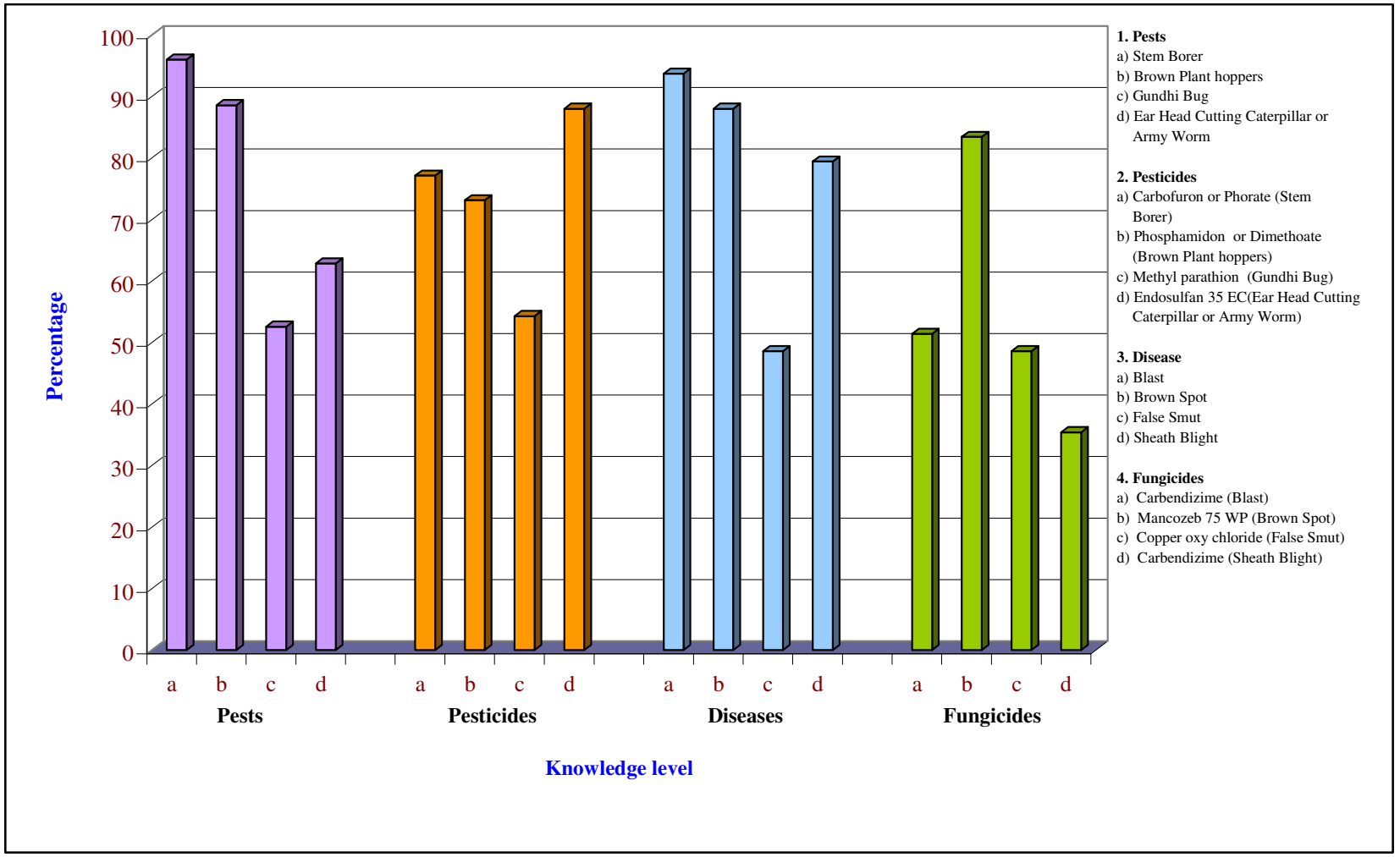


Fig. 3: Knowledge level of paddy growers about plant protection measures

In case of concentration of the pesticide, 17.14 and 21.71 per cent of the farmers adopted in correct concentration of 1.75 ml in 1 litre of water, whereas 58.28 per cent of the farmers had adopted Endosulfan 35 EC in correct concentration of 1.25 ml in 1 litre of water.

With regard to fungicides, 37.14 per cent of respondents fully adopted application of bavistin for the control of blast, whereas 33.71 per cent of the farmers partially adopted it and 29.14 per cent of the farmers did not use bavistin for the control of disease. Similarly, 47.42 per cent of the farmers fully adopted the use of mancozeb 75 WP to control the brown spot disease, 34.28 per cent of them partially adopted it and only 18.28 per cent of them did not use mancozeb 75 WP to control the brown spot disease. However, 33.14 per cent of the farmers fully adopted blitox for control of false smut, 26.85 per cent of the farmers partially adopted blitox for control of false smut disease and maximum of 40.00 per cent of the farmers did not use blitox for control of false smut disease.

About 37.71 per cent of the farmers fully adopted the application of bavistin for control of sheath blight, whereas 29.14 per cent of them partially adopted the application of bavistin for control of sheath blight and maximum of 33.14 per cent of the farmers did not use bavistin for control of sheath blight.

In case of concentration of the fungicides, 27.42 per cent of the farmers fully adopted the application of Carbendizime with the concentration of 0.1 per cent, whereas 33.71 per cent of the farmers partially adopted the application of Carbendizime with the concentration of 0.1 per cent and 38.85 per cent of the farmers had not adopted the mentioned concentration. However, 26.85 per cent of the farmers adopted Mancozeb 75 WP for brown spot with the concentration of 0.2 per cent, followed by 22.28 per cent of the farmers partially adopted the application of Mancozeb 75 WP for brown spot with the concentration of 0.2 per cent and a maximum of 50.85 per cent of the farmers did not use the Mancozeb 75 WP.

Similarly, 18.28 per cent of the farmers had adopted the application of Carbendizime (Bavistin) at the rate of 1 Kg per ha in 1000 litres of water for the control of sheath blight disease. Whereas, 30.85 per cent of the farmers partially adopted the application of Carbendizime (Bavistin) at the rate of 1 Kg per ha in 1000 litres of water for the control of sheath blight disease and a maximum of 50.85 per cent of the farmers did not use the application of Carbendizime (Bavistin).

4.3 Socio-economic profile of paddy growers

4.3.1 Age

The data presented in Table 5 indicated that majority of the respondents (58.85%) belonged to middle age group. Whereas, 6.85 and 23.75 per cent of them belonged to young age and old age, respectively.

4.3.2 Education

In respect of formal education level obtained, it is observed that 36.57 per cent were illiterates, whereas 13.14 per cent of them had received primary education, followed by 25.71 per cent of them had received middle school education, more over only 18.28 per cent of them had received high school education, while 4.00 per cent and 2.28 per cent of the respondents had education up to PUC and degree level, respectively.

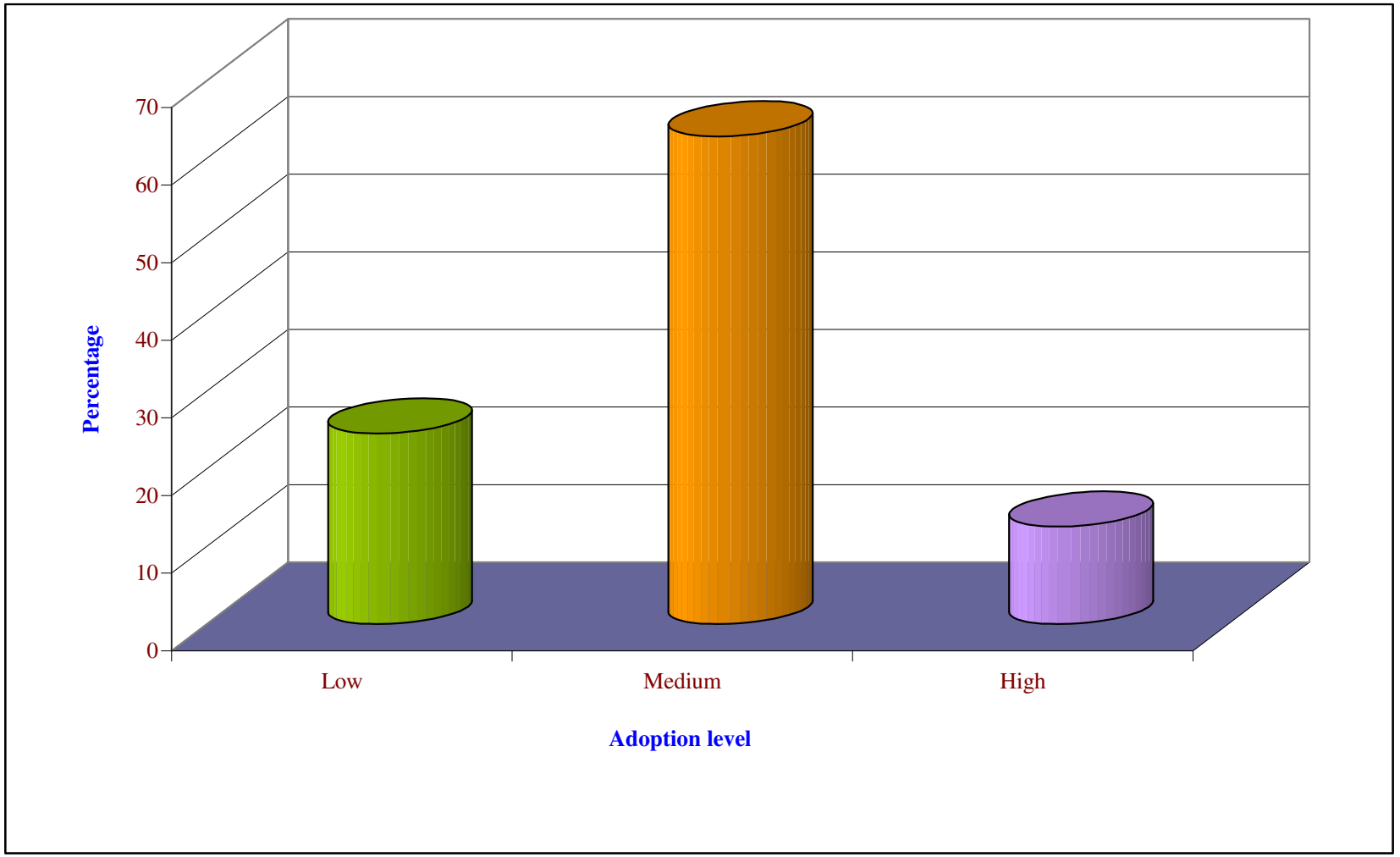
4.3.3 Land holding

The data revealed that medium land holders were more (32.57%), followed by 23.42 per cent of them were semi-medium land holders, 17.71 per cent were small land holders. While, 14.28 and 12.00 per cent of the respondents were marginal and big land holders, respectively.

Table 3: Overall adoption level of plant protection measures by the paddy growers

(n=175)

Adoption level	Frequency	Percentage
Low	43	24.57
Medium	110	62.85
High	22	12.57
Mean = 26.4	SD= 1.75	



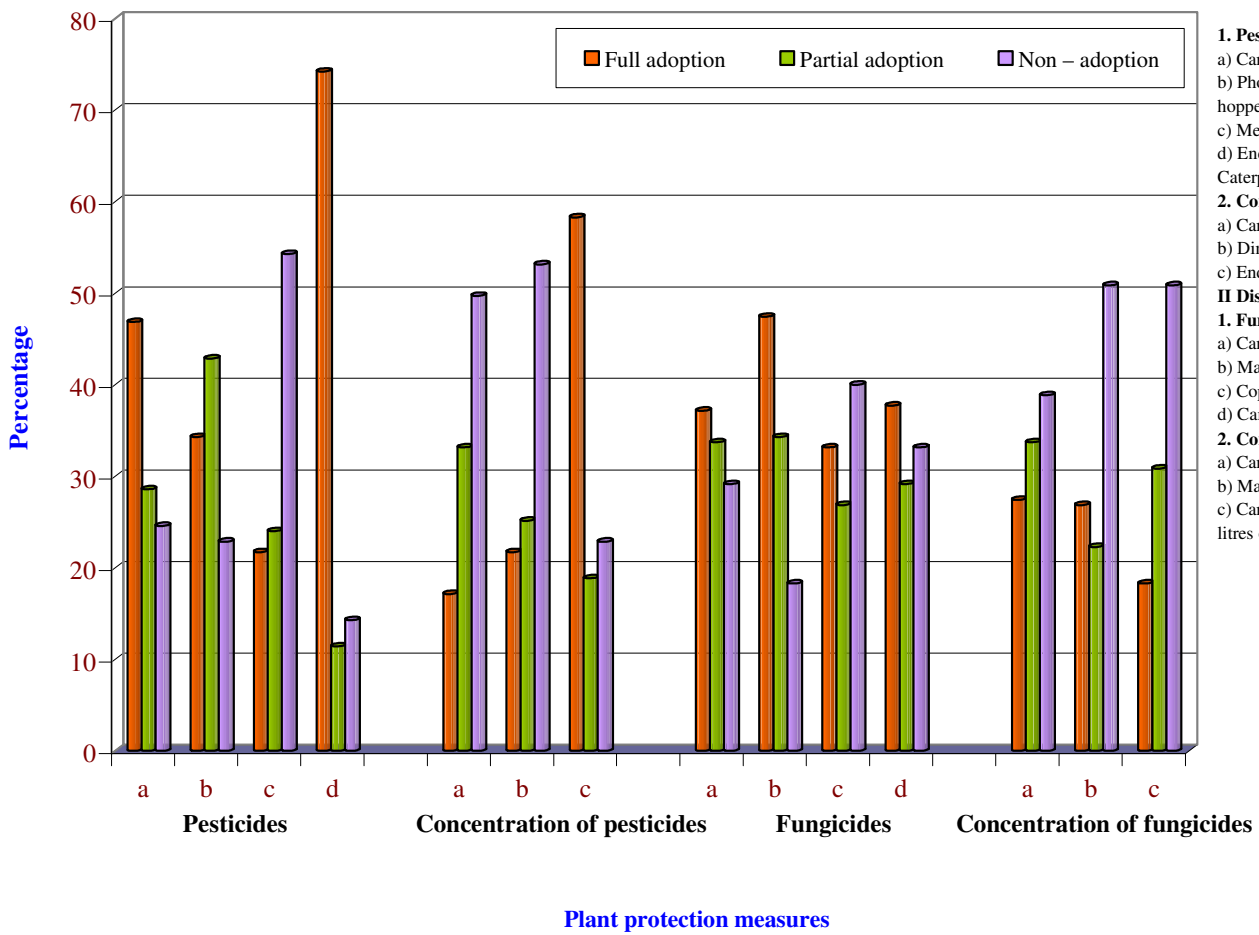
B

Fig. 4: Overall adoption level of plant protection measures by the paddy growers

Table 4: Extent of adoption of plant protection measures

(n=175)

Sl. No	Plant protection measures	Adoption respondents					
		Full adoption		Partial adoption		Non – adoption	
		No.	%	No.	%	No.	%
I	Pests						
1	Pesticides						
a	Carbofuron or Phorate (Stem Borer)	82	46.85	50	28.57	43	24.57
b	Phosphamidon or Dimethoate (Brown Plant hoppers)	60	34.28	75	42.85	40	22.85
c	Methyl parathion (Gundhi Bug)	38	21.71	42	24.00	95	54.28
d	Endosulfan 35 EC(Ear Head Cutting Caterpillar or Army Worm)	130	74.2	20	11.42	25	14.28
2	Concentration of pesticides						
a	Carbofuron (30-33 Kg of granules per ha)	30	17.14	58	33.14	87	49.71
b	Dimethoate (1.75 ml in 1 litre of water)	38	21.71	44	25.14	93	53.14
c	Endosulfan 35 EC (1.25 ml in 1 litre of water)	102	58.28	33	18.85	40	22.85
II	Diseases						
1	Fungicides						
a	Carbendizime (Blast)	65	37.14	59	33.71	51	29.14
b	Mancozeb 75 WP (Brown Spot)	83	47.42	60	34.28	32	18.28
c	Copper oxy chloride (False Smut)	58	33.14	47	26.85	70	40.00
d	Carbendizime (Sheath Blight)	66	37.71	51	29.14	58	33.14
2	Concentration of fungicides						
a	Carbendizime(0.1percent of Carbendizime)	48	27.42	59	33.71	68	38.85
b	Mancozeb 75 WP (0.2 per cent of Mancozeb)	47	26.85	39	22.28	89	50.85
c	Carbendizime (Bavistin)(1 Kg per ha in 1000 litres of water)	32	18.28	54	30.85	89	50.85



1. Pesticides
a) Carbofuron or Phorate (Stem Borer)
b) Phosphamidon or Dimethoate (Brown Plant hoppers)
c) Methyl parathion (Gundhi Bug)
d) Endosulfan 35 EC(Ear Head Cutting Caterpillar or Army Worm)
2. Concentration of pesticides
a) Carbofuron (30-33 Kg of granules per ha)
b) Dimethoate (1.75 ml in 1 litre of water)
c) Endosulfan 35 EC (1.25 ml in 1 litre of water)
II Diseases
1. Fungicides
a) Carbendizime (Blast)
b) Mancozeb 75 WP (Brown Spot)
c) Copper oxy chloride (False Smut)
d) Carbendizime (Sheath Blight)
2. Concentration of fungicides
a) Carbendizime(0.1percent of Carbendizime)
b) Mancozeb 75 WP (0.2 per cent of Mancozeb)
c) Carbendizime (Bavistin) (1 Kg per ha in 1000 litres of water)

Fig. 5: Extent of adoption of plant protection measures

Table 5: Socio-economic profile of paddy growers

(n = 175)

Sl. No.	Variable	Category	Respondents	
			Frequency	Percentage
1	Age	Young age (upto 30 years)	12	6.85
		Middle age (31 - 50 years)	103	58.85
		Old age (> 51 years)	60	34.28
2	Education	Illiterate	64	36.57
		Primary school	23	13.14
		Middle school	45	25.71
		High school	32	18.28
		PUC	07	4.00
		Graduate	04	2.28
3	Land holding(acres)	Marginal (upto 2.50)	25	14.28
		Small (2.51-5.00)	31	17.71
		Semi-medium (5.01-10.00)	41	23.42
		Medium (10.01-25.00)	57	32.57
		Big (>25.00)	21	12.00
4	Annual income	Low income (< Rs. 49,310)	68	38.85
		Medium income (Rs. 49,310 - 1,21,217)	62	35.42
		High income (> Rs. 1,21,217)	45	25.71
5	Family size	Small (< 5)	100	57.14
		Medium (5-8)	55	31.42
		Large (>8)	20	11.40
6	Innovative proneness	Low (<12.30)	85	48.57
		Medium (12.30-13.06)	53	30.28
		High (>13.06)	37	21.14
		Mean=12.68, SD=0.90		
7	Economic motivation	Low (<5.68)	45	25.71
		Medium (5.68-6.02)	100	57.14
		High (>6.02)	30	17.14
		Mean=5.85, SD=0.40		

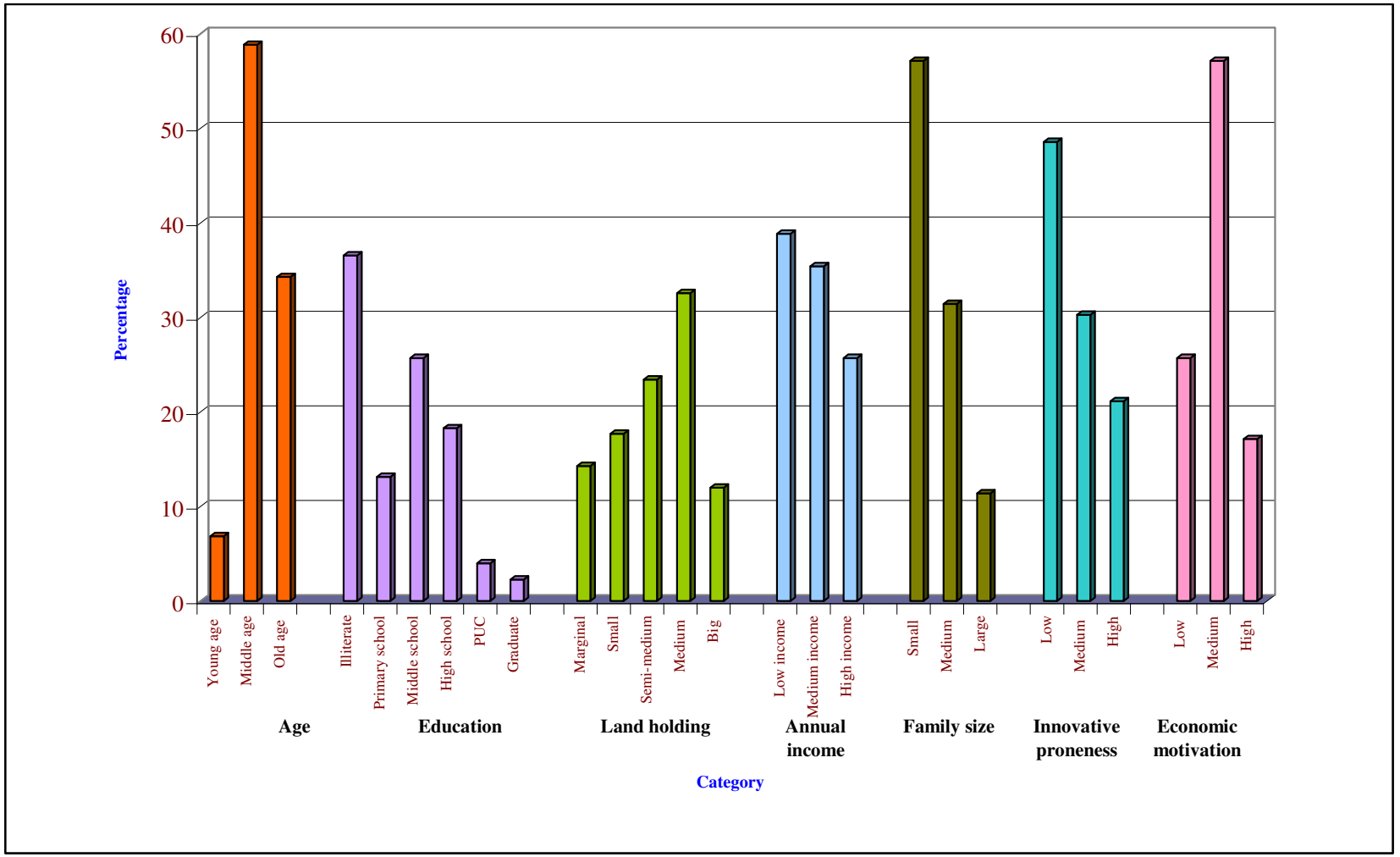


Fig. 6: Socio-economic profile of paddy growers

4.3.4 Annual income

The analysis of economic position of the families of the respondents indicated that only 38.85 per cent of them had annual income below Rs. 49,310.43, followed by 35.42 per cent of them had an annual income between Rs. 49310 to Rs. 1,21,217 and rest of the respondents (25.71%) had an income more than Rs. 1,21,217, annually.

4.3.5 Family size

It is clear from Table 5 that majority (57.14%) of the respondents belonged to small family, followed by medium family (31.42%) and remaining 11.40 per cent belonged to large family.

4.3.6 Extension participation

The contents expressed in Table 6 clearly indicate that 41.14 per cent of the respondents had participated regularly in krishimela, followed by 40.00 per cent of them participated in educational tour occasionally and least of them participated in demonstration, respectively.

4.3.7 Mass media utilization

The data in Table 7 depicts the mass media use pattern of the respondents. Forty four per cent and 38.28 per cent of the respondents regularly and occasionally read newspapers, respectively. Whereas, 61.14 and 22.28 per cent of them regularly and occasionally listened to radio. Again, 50.85 and 34.28 per cent of them regularly and occasionally viewed Krishidarshan programme on TV, respectively.

4.3.8 Social participation

It could be observed from Table 8 that 26..28 per cent of the respondents were members in milk cooperative society and 13.14 per cent of them participated occasionally, followed by 18.85 per cent of them were members in farmers cooperative society and only 2.28 per cent of them participated occasionally. Whereas, 2.28 per cent of them were members in Zilla Parishad and only 2.28 per cent of them participated occasionally, respectively.

4.3.9 Innovative proneness of the paddy growers

The data in Table 5 depicts the innovative proneness of the respondents. Majority of paddy growers were distributed in low (48.57%) innovative proneness category, followed by 30.28 and 21.14 per cent of them distributed in the medium and high categories, respectively.

4.3.10 Material possession

A cursory look at the Table 9 indicated that high majority (96%) of the respondents possessed television. Vehicles, sprayers and dusters were possessed by 90.85 and 89.71 per cent of the respondents, respectively. Agricultural implements and radio were possessed by 64 and 48 per cent of the respondents, respectively. Only 19.42 per cent of them were having bullock cart.

4.3.11 Economic motivation of the paddy growers

The data presented in the Table 5 indicated that majority of paddy growers were distributed in medium (57.14%) economic motivation category, followed by 25.71 percentage of low category of farmers and rest 17.14 per cent of respondents distributed in high economic motivation category, respectively.

Table 6: Extension participation of paddy growers

(n=175)

Sl. No.	Extension activities	Degree of Participation					
		Regular		Occasionally		Never	
		F	%	F	%	F	%
1.	Training programme	43	24.57	52	29.71	80	45.71
2.	Demonstrations	18	10.28	46	26.28	111	63.42
3.	Educational tour	57	32.57	70	40.00	48	27.42
4.	Field day	30	17.14	46	26.28	99	56.57
5.	Group discussion	41	23.42	53	30.28	81	46.28
6.	Agricultural exhibitions	32	18.28	39	22.28	104	59.42
7.	Krishimela	72	41.14	48	27.42	55	31.42

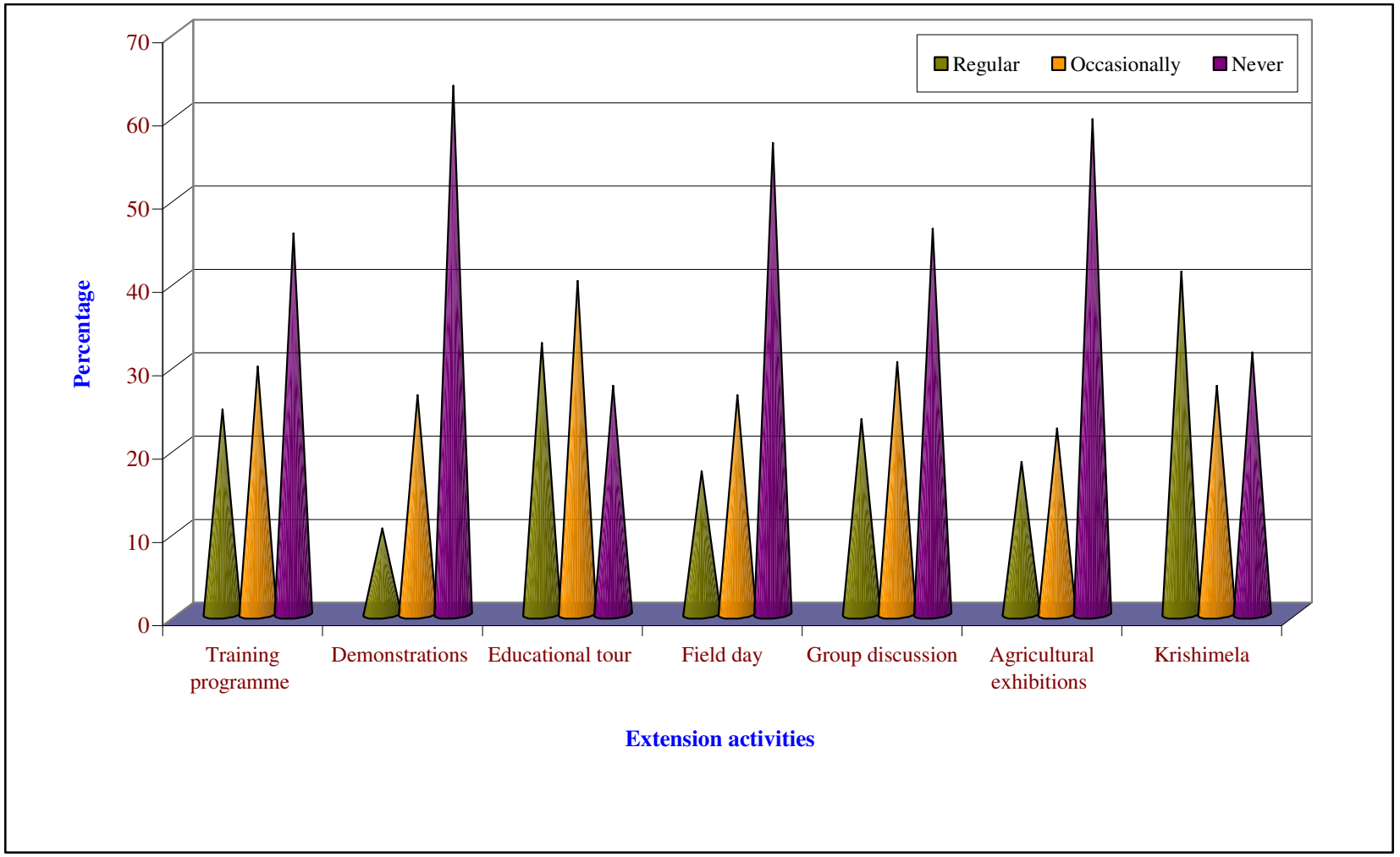


Fig. 7: Extension participation of paddy growers

Table 7: Mass media utilization of paddy growers

(n=175)

Sl. No.	Media	Regular		Occasionally		Never	
		F	%	F	%	F	%
1.	Reading newspaper	78	44.57	67	38.28	30	17.14
2.	Listening to radio	107	61.14	39	22.28	29	66.85
3.	Do you read farm magazines/ leaf lets and other related literatures on agriculture	26	14.85	32	18.28	117	66.85
4.	Viewing Krishidarshan programme on TV	89	50.85	60	34.28	26	14.85

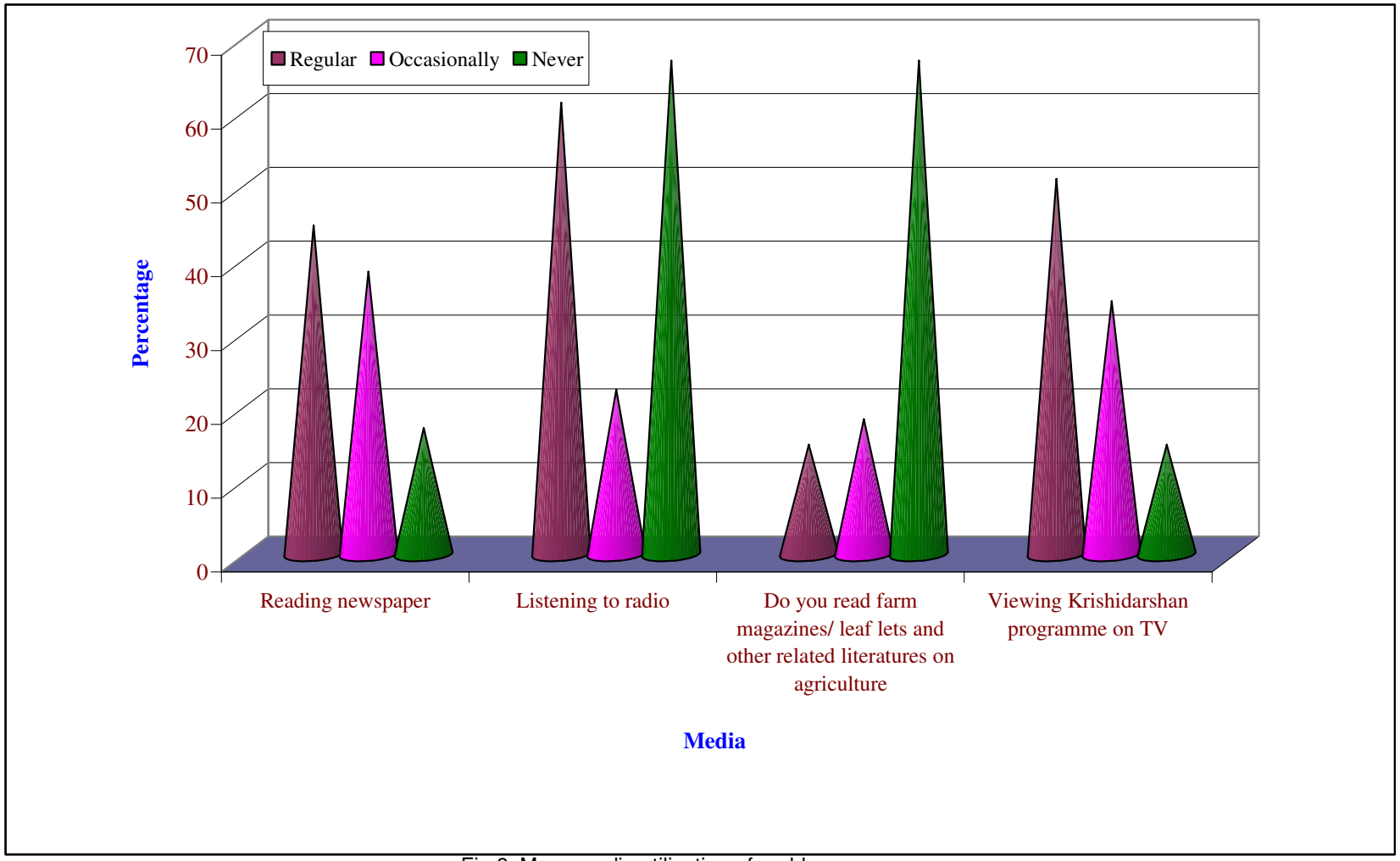


Fig.8. Mass media utilization of paddy growers

Table 8: Social participation of paddy growers

(n=175)

Sl. No.	Organisation	Member			Member participation		
		Non-member	Member	Office bearer	Regularly	Occasionally	Never
1	Zila parishad	171 (97.71)	4 (2.28)	-	-	4 (2.28)	171 (97.71)
2	Village panchayat	168 (96.00)	7 (4.00)	-	2 (1.14)	5 (2.85)	168 (96.00)
3	Farmers service cooperative society	142 (81.14)	33 (18.85)	7 (4.00)	2 (1.14)	4 (2.28)	169 (96.57)
4	Land development bank	159 (90.85)	16 (9.14)	3 (1.71)	6 (3.42)	10 (5.71)	159 (90.85)
5	Milk cooperative society	129 (73.71)	46 (26.28)	10 (5.71)	15 (8.57)	23 (13.14)	137 (78.28)

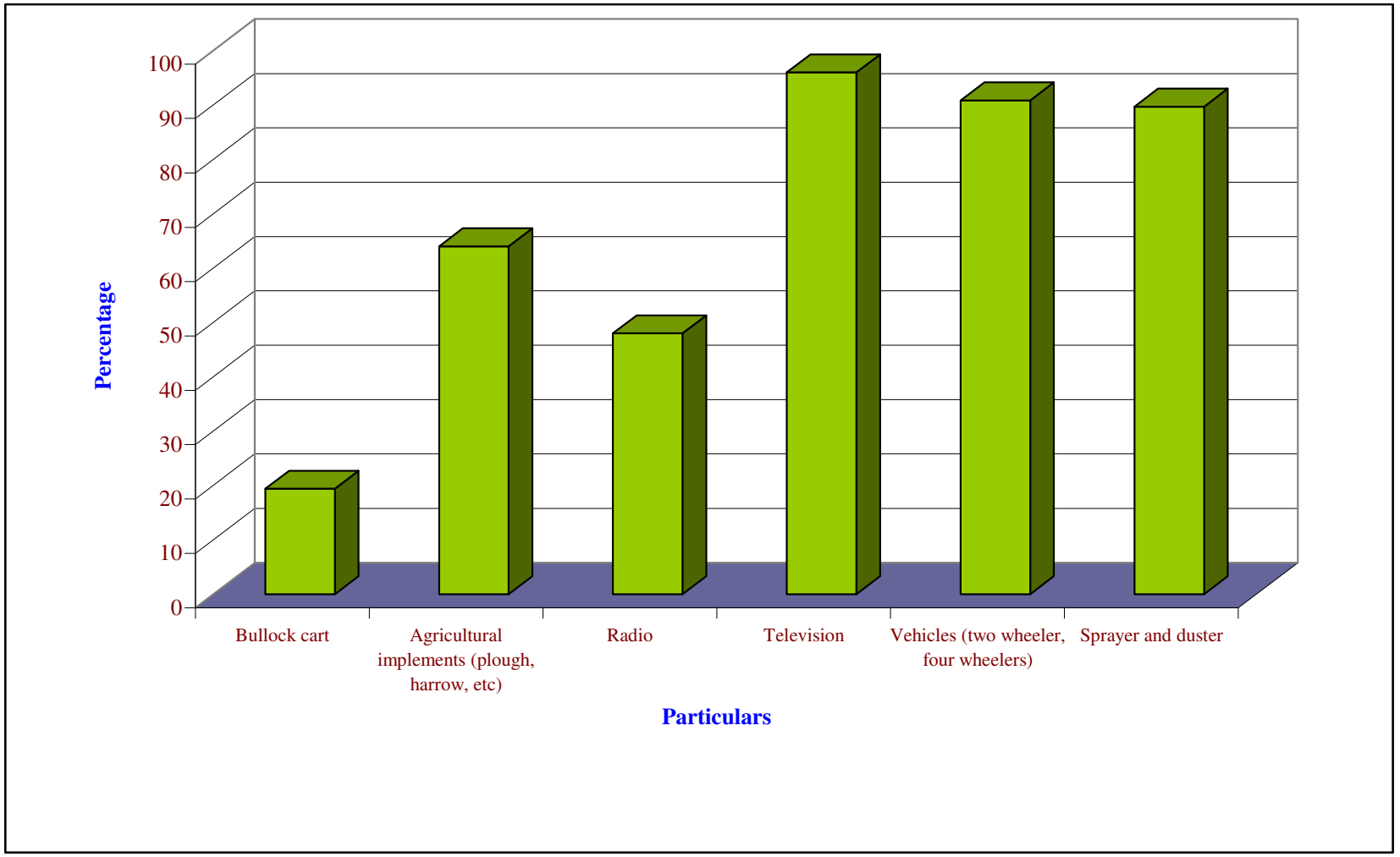


Fig. 9: Material possession of paddy growers

Table 9: Material possession of paddy growers

(n=175)

Sl. No	Particulars	Frequency	Percentage
1	Bullock cart	34	19.42
2	Agricultural implements (plough, harrow, etc)	112	64
3	Radio	84	48
4	Television	168	96
5	Vehicles (two wheeler, four wheelers)	159	90.85
6	Sprayer and duster	157	89.71

4.3.12 Extension contact of the paddy growers

The contents expressed in Table 10 clearly indicates that, considerable per cent (40.00%) of the respondents had contact with Agricultural Assistant once in two weeks, followed by 23.42 per cent of them had contact with Asst. Agricultural Officers once in a month and 24.00 per cent of the respondents had contact with Scientists of UAS whenever problem arises, respectively.

4.4 Relationship between selected profile characteristics of paddy growers and their knowledge and adoption level of plant protection measures

4.4.1 Knowledge level of plant protection measures

The results presented in Table 11 revealed the relationship of independent variables with knowledge level of the respondents about plant protection measures of paddy crop. The variables such as education, annual income, social participation, extension participation, mass media utilization, extension contact, economic motivation and innovative proneness exhibited positively significant relationship with the knowledge level of plant protection measures of paddy crop. The variables like and land holding showed non-significant relationship with knowledge level with respect to plant protection measures of paddy crop.

4.4.2 Adoption level of plant protection measure

The results presented in Table 12 revealed the relationship of independent variables with adoption level of the respondents about plant protection measures. The results presented in Table 12 revealed the relationship of independent variables with adoption level of the respondents about plant protection measures. The variables such as education, land holding, annual income, social participation, mass media participation, extension participation,

Table 10a: Extension contact of paddy growers

(n=175)

Sl. No.	Extension worker	Frequency of contact									
		Once in a week		Once in a two week		Once in a month		Whenever problem arises		Never	
		F	%	F	%	F	%	F	%	F	%
1.	Agricultural Assistant	20	11.42	70	40.00	34	19.42	28	16.00	23	13.14
2.	Asst. Agricultural officers	00	00.00	20	11.42	41	23.42	57	32.57	57	32.57
3.	Asst. Director of Agriculture	00	00.00	8	04.57	26	14.85	13	07.42	128	73.14
4.	Extension guide	00	00.00	00	00.00	12	06.85	18	10.28	145	82.85
5.	Scientists of UAS	00	00.00	20	11.42	16	09.14	42	24.00	97	55.42
8.	Others (Extension worker/ private consultancy)	22	12.57	65	37.14	20	11.42	24	13.71	44	25.14

Table 10b: Distribution of the paddy growers according to extension contact

(n=175)

1.	Extension contact	Low (<2.31)	96	54.85
		Medium (2.31-4.35)	44	32.59
		High (>4.35)	35	20.00
		Mean=3.33, SD=2.40		

Table 11: Relationship between independent variables on knowledge level of plant protection measures

(n=175)

Sl. No.	Socio-psychological characteristics	'r ' value
1	Age	0.098NS
2	Education	0.207**
3	Land holding	0.142NS
4	Annual income	0.25**
5	Extension participation	0.28**
6	Mass media utilization	0.32**
7	Social participation	0.24**
8	Innovative proneness	0.256**
9	Economic motivation	0.301**
10	Extension contact	0.348**

* - Significance at 5% level of probability

** - Significance at 1% level of probability

NS – Non-significant

Table 12: Relationship between independent variables of adoption level of plant protection measures

(n=175)

Sl. No.	Socio-psychological characteristics	'r ' value
1	Age	-0.272NS
2	Education	0.197*
3	Land holding	0.260**
4	Annual income	0.206**
5	Extension participation	0.194*
6	Mass media utilization	0.230**
7	Social participation	0.310**
8	Innovative proneness	0.291**
9	Economic motivation	0.310**
10	Extension contact	0.304**

* - Significance at 5% level of probability

** - Significance at 1% level of probability

NS – Non-significant

extension contact, economic motivation and innovative proneness exhibited positive and significant relationship with the adoption level of plant protection measures of paddy crop. Similarly, the variable age showed non-significant relationship with adoption level of plant protection measure of paddy crop.

4.5 Constraints and suggestions for greater adoption of plant protection measures

The data presented in Table 13 indicated the information about the constraints faced in adoption of plant protection technology by farmers. Lack of knowledge about chemicals (43.42%), lack of knowledge about to number of sprays (62.85%), lack of knowledge in recognizing the symptoms (18.28%), lack of knowledge with regard to technology application (83.42%). Farmers feel that high cost of chemicals (76.00%), high cost of equipments (51.42%). lack of knowledge about the names of chemicals (62.85%), poisons to cause ill effect to cattle and human beings (41.14%), Increased cost of chemicals and equipments (34.28), non-availability of plant protection equipments nearby places (43.42%). Damage to the crop due to plant protection measures (37.14%), traditional system seems to be better (70.28%) and spraying equipments non-availability (26.28%) were the main constraints expressed by the farmers in the adoption of the plant protection chemicals in cultivation of paddy plantation.

Table 13: Constraints experienced by the paddy growers in adoption of plant protection measures

(n=175)

Sl. No.	Problems	Frequency	Percentage
1.	Lack of knowledge regarding plant protection measures		
	a) Chemicals	76	43.42
	b) Number of sprays	110	62.85
	c) Identification of symptoms	32	18.28
	d) Methods of application	146	83.42
2.	High cost of chemicals	133	76.00
3.	High cost of equipments	90	51.42
4.	Complicated name of chemicals	110	62.85
5.	Lack of repairing facility at nearby places	86	49.14
6.	Poisons to cattle and human being	72	41.14
7.	Non-availability of plant protection equipments nearby places	76	43.42
8.	Damaged to the crop due to plant protection measures	65	37.14
9.	Problem in transportation	123	70.28
10.	Spray equipments not available	46	26.28

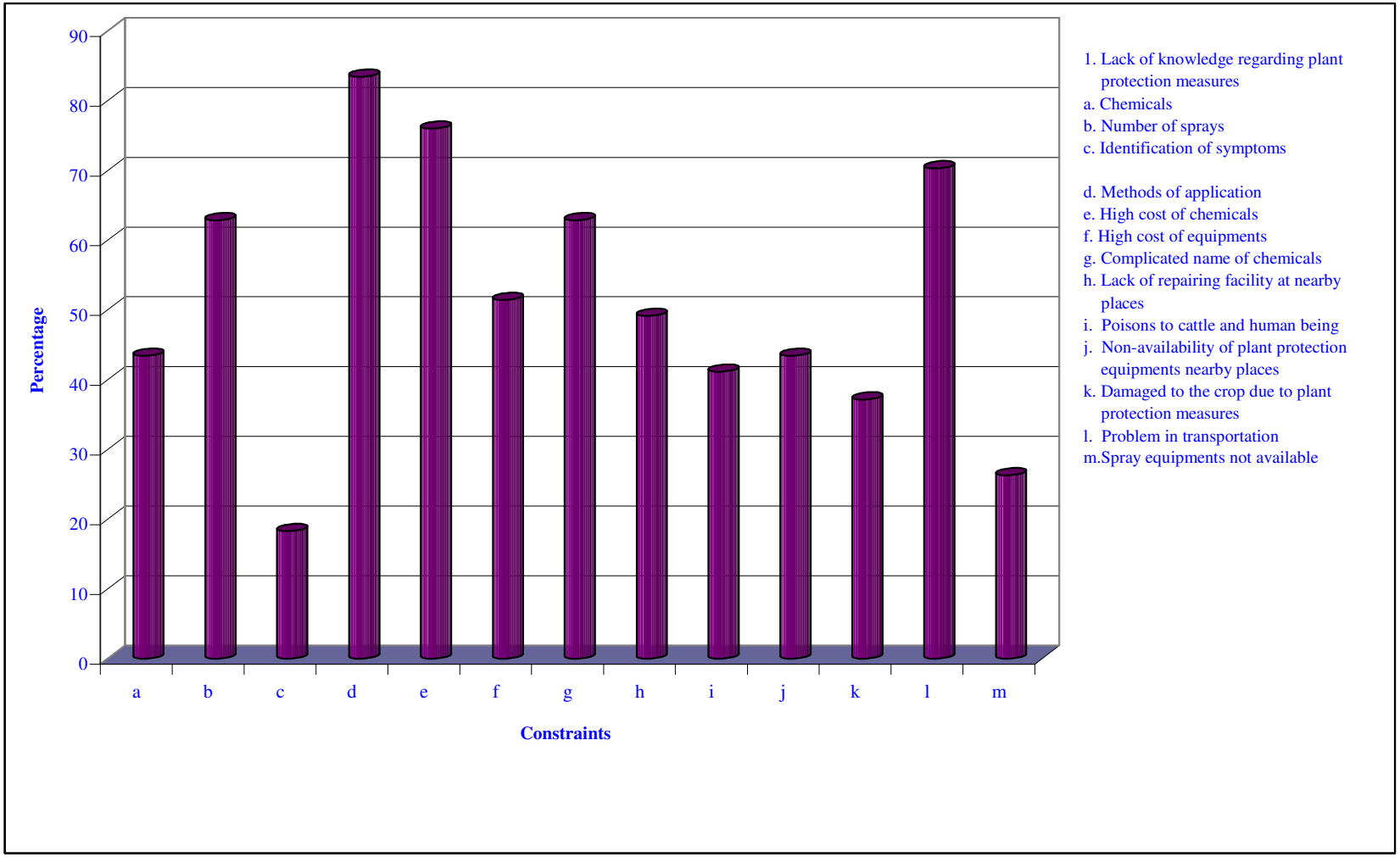


Fig. 10: Constraints experienced by the paddy growers in adoption of plant protection measures

5. DISCUSSION

The discussion of the findings of the present study is presented in this chapter under the following headings.

5.1 Knowledge level of the respondents about plant protection measures in paddy cultivation

5.2 Adoption level of plant protection measures in paddy cultivation by the respondents

5.3 Socio-economic and psychological characteristics of the respondents

5.4 Relationship between selected socio-psychological characteristics of paddy growers and their knowledge and adoption level of plant protection measures

5.5 Constraints faced in adoption of plant protection measures

5.1 Knowledge level of the respondents about plant protection measures in paddy cultivation

The results presented in Table 1 indicated that more number of the respondents (37.14%) belonged to high knowledge level groups whereas, 35.42 per cent of the farmers belonged to low knowledge level group and only 27.42 per cent belonged to medium knowledge level group. As majority of the respondents were illiterates (36.57%), the variables like economic motivation, social participation, extension participation and extension contact might have influenced the knowledge level of farmers about plant protection measures.

5.1.1 Knowledge of individual component of plant protection measures in paddy cultivation

The results presented in Table 2 depicts that the knowledge level of farmers about various plant protection measures of paddy crop. With regard to pests, cent per cent of farmers had knowledge about the stem borer. Majority of the farmers with 88.57 per cent and 62.85 per cent had absolute knowledge about brown plant hoppers and ear head cutting caterpillar. About 52.57 per cent of farmers had the knowledge of gundhi bug.

With regard to pesticides 77.14 per cent of the farmers knew about Phorat which was used for stem borer control, 73.14 per cent of the farmers did know the dimethorate for control of brown plant hoppers. Similarly, 54.28 per cent of the farmers had knowledge about the methyl parathion for gundhi bug control and cent per cent of the farmers did know about the Endosulfan 35 EC for army worm control. In case of diseases, majority of the farmers (93.71%) did know about the blast diseases, whereas 88.00 per cent of the farmers had knowledge about brown spot. Whereas, 79.42 and 48.57 per cent of the farmers did know about the sheath blight and false smut. The reason may be that the paddy is an important crop grown by farmers in this region. The attack of pests and diseases is also said to be more in paddy. Hence, farmers have better knowledge about paddy cultivation practices, pests and diseases to overcome problem for getting higher yields. Reasons for the lack of knowledge about the pesticide and fungicide may be illiteracy among farmers, lack of technical know how about pesticides, insufficient knowledge about recommended dosage of pesticides, high cost of chemicals, lack of skill involved in spraying of pesticides may be the reason on the part of farmers.

Regarding fungicides, 83.42 per cent of the farmers had the knowledge about Mancozeb 75 WP in case of brown spot, whereas 51.42 per cent of farmers had the knowledge about Bavistin for blast control and 48.57 per cent did now about blitox for contol of false smut. It is better to acquire knowledge in every practices as it enhances better adoption level. The findings were in confirmity with the findings of Kantharaju (1989), Balasubramani (1997), Raghavendra (1997) and Kubde *et al.* (2000).

5.2 Adoption level of plant protection measures in paddy crop by the respondents

The adoption of plant protection measures depends on various factors such as farmers knowledge, situational factors, extent of support of change agent efforts, personal and socio-psychological characteristics of farmers, the characteristics of innovation itself, complexity of practices, timely availability of inputs etc. However, it is true that all the recommended practices will not be adopted to a level of degree by all the members in a given social system. The findings of the present study are also in line with this fact with respect to adoption of plant protection measures in paddy cultivation by the respondents which are presented in Table 4. The results presented in Table 3 indicated that least percentage of respondents (24.57%) were belonged to low adoption category of plant protection measures of paddy cultivation. As high as 75.42 per cent came under medium adopters group.

This could be due to lack of proper knowledge, high cost of chemicals, lack of possession of irrigation pumpset and non-availability of water sources. Further, lack of technical guidance could be the reason for non-adoption and lack of contact with extension personnel may have resulted in lower overall adoption level of paddy growers with respect to plant protection measures. The farmers had good knowledge regarding plant protection measures but they had low level of adoption. The pests and diseases are more severe in the study area so the respondents had good knowledge regarding pests and diseases. The adoption of plant protection measures depends on various factors so that majority 75.42 per cent of paddy growers had medium level of overall adoption. The findings are in line with Thimmappa (1981), Kantharaju (1989) and Thippeswamy (2007).

5.2.1 Extent of adoption of important plant protection practices in paddy crop

Considerable percentage (46.85%) of the paddy growers have applied the furadan pesticide for control of stem borer, 28.57 per cent of the farmers partially adopted the furadan and only 24.57 per cent of the farmers did not apply the furadan pesticide for control of stem borer.

Similarly, 34.28 per cent of them applied the dimecron for the control of brown plant hopper, 42.85 per cent of the respondents were partially apply the dimecron for the control of brown plant hopper, and only 22.85 per cent did not apply the dimecron.

Similarly, 54.28 per cent of the respondents did not apply methyl parathion for the control of gundhi bug, 24.00 per cent of them were partially applied methyl parathion for the control of gundhi bug and least of 21.71 per cent of the respondents were apply methyl parathion for the control of gundhi bug, respectively. Similarly, majority of the respondents (74.28%) were found to applyendosulfan 35 EC pesticide for the control of army worm, 14.28 per cent did not apply endosulfan 35 EC pesticide for the control of army worm and 11.42 per cent of them were partially apply endosulfan 35 EC pesticide for the control of army worm.

Regarding fungicides, 37.14 per cent of the respondents were applying bavistin for the control of blast, 33.71 per cent of them were found to partially apply bavistin for the control of blast and only 29.14 per cent of them did not apply bavistin for the control of blast. Similarly, 47.42 per cent of the farmers fully adopted the use of mancozeb 75 WP to control the brown spot disease, 34.28 per cent of the farmers had partially adopted the use of mancozeb 75 WP to control the brown spot disease and only 18.28 per cent of the farmers did not use mancozeb 75 WP to control the brown spot disease. However, 33.14 per cent of the farmers fully adopted the use of blitox for control of false smut, 26.85 per cent of the farmers partially adopted the use of blitox for control of false smut disease and maximum of 40.00 per cent of the farmers did not use the blitox for control of false smut disease. About 37.71 per cent of the farmers fully adopted the application of bavistin for control of sheath blight, whereas 29.14 per cent of the farmers partially adopted the application of bavistin for control of sheath blight and maximum of 33.14 per cent of the farmers did not use bavistin for control of sheath blight.

The inference that could be drawn from the above findings that large number of farmers did not adopt recommended plant protection chemicals. Results presented in Table 4 draw support from the statement that problems of non-availability of plant protection inputs/equipments. The other reason for low adoption of plant protection might be the lack of extension support to educate and providing knowledge to the farmers regarding plant protection measures and sever consequences of indiscriminate use of chemical pesticides.

In case of concentration of the pesticides, only 17.14 per cent of the respondents adopted the application of exact concentration of Carbofuran and 33.14 per cent of them partially adopted the application of exact concentration of the chemical.

Application of recommended concentration of Dimethoate and Endosulfan 35 EC were adopted by only 21.71 and 58.28 per cent of respondents. 53.14 and 22.85 per cent of them not adopted the application of exact concentration.

In case of concentration of the fungicides, 27.42 per cent of the farmers fully adopted the application of Carbendazim with the concentration of 0.1 per cent, whereas 33.71 per cent of the farmers partially adopted the application of Carbendazim with the concentration of 0.1 per cent and 38.85 per cent of the farmers had not adopted the mentioned concentration. However, 26.85 per cent of the farmers were adopted the use of Mancozeb 75 WP for brown spot with the concentration of 0.2 per cent, followed by 22.28 per cent of the farmers partially adopted the application of Mancozeb 75 WP for brown spot with the concentration of 0.2 per cent and a maximum of 50.85 per cent of the farmers did not use the Mancozeb 75 WP.

Similarly, 18.28 per cent of the farmers had adopted the application of Carbendazim (Bavistin) at the rate of 1 Kg per ha in 1000 litres of water for the control of sheath blight disease. Whereas, 30.85 per cent of the farmers partially adopted the application of Carbendazim (Bavistin) at the rate of 1 Kg per ha in 1000 litres of water for the control of sheath blight disease and a maximum of 50.85 per cent of the farmers did not use the application of Carbendazim (Bavistin).

The reason might be high cost of plant protection chemicals and equipments and lack of acquired knowledge about use of recommended plant protection measures. The facts implied that the extension agency therefore need to conduct method demonstration group discussion, meetings, exhibitions and field days to convince the farmers regarding benefits of adopting recommended plant protection measures.

Adoption of the plant protection measures is complex one as it involves skills, it involves more risk. Since, the more number of farmers were small land holders, their income is very low. Hence, they are not ready to take risk. And for many other reasons like non-availability of plant protection inputs, lack of technical knowledge regarding plant protection were responsible low adoption of plant protection measures. The findings of the study was in accordance with the findings of Vasanthakumar (2000).

5.3 Socio-economic and psychological characteristics of the respondents

A glance at the contents of Table 5 revealed the socio-economic and psychological characteristics of farmers.

5.3.1 Age

The data presented in Table 5 indicated that majority of the respondents (58.85%) belonged to middle age group. Whereas, 6.85 and 23.75 per cent of them belonged to young age and old age, respectively. Usually, farmers of middle aged are enthusiastic having more responsibility and are more efficient than the younger and older ones. Further, respondents between 31 to 45 years of age group have more physical vigour and also more responsibility towards family than the younger ones. This might be the important reasons to find that majority of the respondents in the age group of 31 to 45 years. The results are in line with the

research findings reported by Reshmy(1998), Lakshmisha (2000), Babanna (2002) and Vedamurthy (2002).

5.3.2 Education

In respect of formal education level obtained, it is observed that 36.57 per cent were illiterates, whereas 13.14 per cent of the respondents had received primary education, followed by 25.71 per cent of respondents had received middle school education, more over only 18.28 per cent of respondents had received high school education, while 4.00 per cent and 2.28 per cent of the respondents had education upto PUC and degree level, respectively. Non-realization of the influence of formal education in one's life, illiteracy of the parents might have come in the way of getting them better education by their parents. Another contributing reason could be the rural social environment might not have encouraged their parents to provide education to their children. As the rural people have still traditional orientation they generally do not prefer to send their children to assist in farm and household activities. The distance of higher study centres from the villages and need for more investment also might have prevented the parents from providing higher education to their children. The above findings got support from the studies conducted by Yogananda (1992), Balasubramani (1997), Raghavendra (1999), Reshmy(1998), Lakshmisha (2000), Babanna (2002) and Vedamurthy (2002).

5.3.3 Land holding

The results expressed that medium land holders category was more (32.57%), followed by 23.42 per cent of them were semi-medium land holders, 17.71 per cent of respondents were small land holders. With a least of 14.28 and 12.00 per cent of the respondents were marginal and big land holders, respectively. The possible reason that could be attributed was those who had agriculture profession as the main occupation of the family and depend on their land for their living, so they always to possess more acres of land. It could also be their ancestors property. On the other hand, only 14.28 per cent of them had marginal land holdings. The possible reason might be that the ancestor land was fragmented into smaller and smaller sized land holdings, those who had other occupations other than agriculture might have less acres of land holdings since they did not find sufficient time to devote for agriculture which is the labour intensive activity. The other possible reason for the existence of marginal land holdings could be some of the respondents were agricultural labours.

5.3.4 Annual income

The economic position of the families of the respondents indicated that 25.71 per cent of the respondents had annual income higher than Rs. 1,21,217/- followed by annual income in between Rs. 49,310 to Rs. 1,21,217/- (35.42%). The possible reason that could be attributed was their better socio-economic conditions. As the result showed that majority (32.57%) of the respondents families were medium land holders. This might be one of the important reason for having higher income. The other possible reasons that could be attributed to non-farm occupation respectively like dairy to support their income. The existence of families size of 2 to 3 members where number of earning members were found engaged in different occupation other than agriculture might also be considered as another reason. The economic position of families of the respondents indicated that 38.85 per cent of them had low income below Rs. 49310/-. It may be due to their lower socio-economic status, the results in this regard showed that less than 14.28 per cent of the respondents had land holding upto 2.5 acres as a result income earning would be naturally lower and they did not have any additional source of income.

The results were in confirmity with the findings of Balasubramani (1997) and Raghavendra (1997), Lakshmisha (2000) and Vedamurthy (2002).

5.3.5 Family size

It is clear from Table 5 that majority (57.14%) of the respondents belonged to small family, followed by medium family (31.42%) and remaining 11.40 per cent belonged to large family. The probable reasons behind these findings could be that young and middle aged people would prefer to live in nuclear families and old age people prefer joint family. Further, awareness and formal education of respondents might have helped them to maintain the small size family.

5.3.6 Extension participation

The contents expressed in Table 6 clearly indicate that 41.14 per cent of the respondents had participated regularly in krishimela, followed by 40.00 per cent of them participated in educational tour occasionally and least of them participated in demonstration ,respectively. Majority of the respondents participated in field trips organized for the benefit of farmers. Similarly, most of the respondents were participated in krishimela, exhibitions to acquire more knowledge as well as to update the knowledge. The participation of the respondents in other activities was comparatively less. The results implied that the participation in various extension activities was low because of lack of motivation and less interest and less educational level of the respondents might be the reason for the low participation in the extension activities. The results were in line with the results of Thimmaraju (1981), Nityashree (1999) and Balasubramani (1997), who found that majority of the farmers participation in extension activities was very low.

5.3.7 Mass media utilisation

The data in Table 7 depicts the mass media use pattern of the respondents. More than forty four per cent and 38.28 per cent of the respondents regularly and occasionally read newspapers, respectively. Whereas, 61.14 and 22.28 per cent of them regularly and occasionally listened to radio. Again, 50.85 and 34.28 per cent of them regularly and occasionally viewed Krishidarshan programme on TV, respectively. Television, the most popular mass media was possessed by majority of the respondents. Even though, the cost of television is high, its possession indicated the social status, the television viewing behaviour when analysed it showed that this mass media was mainly used for the purpose of entertainment, as all the television owners viewed the news, film songs, serials and cinema regularly. Majority of them viewed agricultural programmes (Krishidarshan) occasionally. Lack of time, interest, language profiles and inconvenient timings of the programme might be attributed to this trend. Reading newspapers were utilised by few of the rspondents.This might be due to lack of interest and poor financial status. The above findings got support from the studies conducted by Raghavendra (1997), Lakshmisha (2000) and Vedamurthy (2002), who reported that mass media considered as credible source of information by majority of the respondents studied.

5.3.8 Social participation

It was witnessed in Table 8 that 26..28 per cent of the respondents were members in milk cooperative society and 13.14 per cent of them participated occasionally, followed by 18.85 per cent of them were members in farmers cooperative society and only 2.28 per cent of them participated occasionally. Whereas, 2.28 per cent of them were members in Zilla Parishad and only 2.28 per cent of them participated occasionally, respectively. Co-operative and voluntary organizations take an active role in rural development and are struggling very hard to bring the people under one roof at the local level. This implied that the participation in milk co-operative society was very high as compared to other selected organizations. It clearly indicated that the interest of the farmers to enrol themselves in milk co-operatives. This might be mainly because, co-operative work on the “principle of democracy” and “service is the main motto”.

5.3.9 Innovation proneness

In case of innovation proneness majority of the respondents (48.57%) had low proneness. This might be due to majority of the respondents were illiterates and had middle school education level because of that paddy growers were with low innovation proneness.

5.3.10 Material possession

With respect to materials possessed by respondents, high majority (96%) of the respondents possessed television. Vehicles and sprayers and dusters were possessed by 90.85 and 89.71 per cent of respondents, respectively. Agricultural implements and radio were possessed by 64 and 48 per cent of the respondents, respectively. Only 19.42 per cent of them were having bullock cart. Better economic conditions of the respondents, regular use of agricultural implements and others in cultivating crops might have made respondents to possess the required materials.

5.3.11 Economic motivation of the respondents

The data presented in the Table 5 indicated that majority of paddy growers were distributed in medium (57.14%) economic motivation category, followed by 25.71 percentage of low category of farmers and least of 17.14 per cent of respondents distributed in high economic motivation category, respectively.Economic motivation was medium among 57.14 per cent of the growers followed by 25.71 per cent in the low category. It is imperative that the paddy growers were high in their economic motivation. Since, they cultivate this crop with an expectation of high economic returns. The findings of the study are in accordance with the findings of Reshmy (1998), Chandrashekhar (1999).

5.3.12 Extension contact of the paddy growers

The contents expressed in Table 10 clearly indicates that, majority (40.00%) of the respondents had contact with Agricultural Assistant once in a two weeks, followed by 23.42 per cent of them had contact with Asst. Agricultural officers once in a month and 24.00 per cent of the respondents had contact with Scientists of UAS whenever problem arises, respectively. As mentioned earlier, majority (36.57%) of the respondents were illiterates. The data indicated that, majority of respondents never contacted Agricultural Assistant because of non-availability of this official, since his office is located at taluk level. Further, 55.42 per cent of the respondent farmers ‘never’ contacted the subject matter specialists of Department of Agriculture and University of Agricultural Sciences specialists as they are located at a distant place which might have prevented them to contact frequently.

5.4 Relationship between selected socio-psychological characteristics of paddy growers and their knowledge and adoption level of plant protection measures

5.4.1 Knowledge level of plant protection measure

The variables pertaining to relationship between selected socio-psychological characteristics of paddy growers on their knowledge and adoption level of plant protection measures are discussed with respect to significant results obtained.

5.4.1.1 Education

The results indicated positive and significant relationship of education with the knowledge level of plant protection measures in paddy crop. The probable reason might be that the plant protection measures being complex in nature could be understand better by persons having higher education level. It is an established fact that an educated person is in a better position to gather information, better understanding capacity and interpret even

complex information related to his enterprises. Obviously the gain and retention of knowledge is more among the educated people and they become more receptive to the innovative compare the less educated or illiterates farmers. The findings were in consonance with the research findings of Kantharaju (1989), Yogananda (1992), Balasubramani (1997), Raghavendra (1997), who found that there was a significant and positive relationship between education and knowledge level.

5.4.1.2 Annual income

The results revealed that annual income exhibited positively significant relationship with knowledge level about plant protection measures in paddy crop. The possible reason might be that persons with more resources are in better position to acquire knowledge through extension contacts and participation in extension activities as well as through their easy access to mass media and had more risk taking ability. These facts might have motivated the farmers on plant protection measures from higher income group to seek more information regarding plant protection measures approaches resulting in the positive and significant relationship with this variable. The findings were in consonance with the findings of Sindhu Sadanandan (1998), Kumar (1999) and Thippeswamy (2007).

5.4.1.3 Social participation

Results revealed that there was a significant association between social participation and knowledge level of plant protection measures. The findings are in confirmity with findings of Balasubramani (1997), Babanna (2002) and Pandya and Thippeswamy (2007). The reason might be that through social participation farmers will come to know about the organizations like co-operative society, paddy market etc. wherein they will contact many farmers from other locality and they will come to know about the plant protection measures that are prevailing in their respective region.

5.4.1.4 Mass media utilization

There was significant association between mass media utilization and knowledge on plant protection measures. The findings were in line with the findings reported by Yogananda (1992), Balasubramani (1997) and Kumar (1998). Mass media provide reinforcement, as experiences of successful farmers are also narrated on radio, TV and newspapers. Increased mass media participation enhances the ability of farmers to get more information, which might have helped the farmers to understand and analyse the benefits of plant protection measures, leading to higher knowledge.

5.4.1.5 Extension participation

There was significant association between extension participation and knowledge of plant protection measures. The findings are in confirmity with the findings of Balasubramani (1997) and Lakshmisha (2000). The participation in extension activities provides opportunities for contrived experiences and serves as reinforcement in gaining knowledge about plant protection measures pre vailing in other region or locality.

5.4.1.6 Economic motivation

It is observed that there was positive significant association between economic motivation and knowledge level of plant protection measures. The finding was in confirmity with the findings of Nityashree (1992), Reshmy (1998) and Chandraskhekar (1999). The reason might be economic motivation is an indication that the individuals is oriented towards achievement of maximum economic returns like maximization of farm profits. However, this variable found to influence the farmers to acquire more information on plant protection measures.

5.4.1.7 Innovative proneness

Innovative proneness is significantly related to knowledge level on plant protection measures by the farmers. The farmers who are prone to innovations generally will have higher orientation towards risks, scientific and technology. These factors do naturally influence ones knowledge level and hence these factors might have established a significant association with the knowledge level of paddy plant protection measures. The findings are in agreement with Chandrashekar (1999), Vasanthakumar (2000), Babanna (2002) and Thippeswamy (2007).

5.4.1.8 Extension contact

Extension contact is significantly related to knowledge level on plant protection measures by the farmers. Regular conact of extension personnel of various development departments, NGOs and others provides opportunities for the farmers to get more and more knowledge about plant protection measures and it also enables them to learn new things.

Several social-psychologists, management experts and economists have confirmed that factors such as economic status, education, income etc. of an individual can modify the adoption behaviour and farm income generation. In other words, one's extent of adoption of plant protection technology can not be understood and accounted for without reference to his social environment and interpersonal relations. Therefore, the relationship of socio-psychological characteristics of farmer respondents with the extent of adoption of plant protection practices was studied and presented here under.

5.4.2 Adoption level of plant protection measure

5.4.2.1 Education level of farmers

Adoption level of farmers with respect to plant protection measures in paddy crop had positive and significant relationship with their educational level. Education exposes farmers for more communication media or methods for more perception and comprehension which could be observed among better educated farmers than others. Further, an individual gathers information and relates himself to his environment. Acquisition of formal education may also help to interpret ideas in a rational manner, resulting in programmatic decision making. Thus, education provides persistent orientation to the farmers wherein they gradually learn about innovations and change on to better entrepreneur ultimately reflecting on better management of the enterprises. Therefore, the present findings seemed to be logical and this finding is in agreement with the findings of Yogananda (1992), Nagabhushan and Guruprasad (1994) and Singha (1996).

5.4.2.2 Land holding

The land holding was positively and significantly correlated with level of adoption of plant protection measures by the paddy growers. The probable reason for this kind of result may be that farmers with larger holdings will have more opportunities and potentialities to try and adopt large number of technological innovations. As a result, it is quite possible that farmers with larger holdings evince keen interest to know about new farm practices and be more receptive to such ideas, skills and other management factors, which inturn on their extent of adoption of plant protection measures. Therefore, land holding must have positive relationship with the extent of adoption of plant protection measures. Nagabhushan and Guruprasad (1994), Singha (1996), Balasubramani (1997) and Thippeswamy (2007) observed positive and significant relationship between size of land holdings and the adoption.

5.4.2.3 Annual income

Annual income of the paddy growers was found to have positive and significant relationship with their adoption level of plant protection measures. Income of farmers has influenced the adoption of plant protection measures, the farmers with low annual income were low adopters while those with high annual income were high adopters. Generally, the

farmers have to invest more when they have to adopt new technology or to follow scientific farm operations. It is also true when it is question of using inputs like fertilizers and chemicals at recommended levels. These inputs cost more than the traditional inputs used by the farmers. Hence, farmers with higher income status can afford investing on such items and adopt most of the plant protection measures, while farmers with low income resources can not afford. This might be possible reason for better adoption of plant protection measures by paddy growers of high economic status. Similar findings has been reported in the past Raghavendra (1997) and Reshmy (1998).

5.4.2.4 Social participation

Positive and significant relationship was found between level of adoption of plant protection measures and social participation of the farmers. Reshmy (1998) and Lakshmisha (2000) reported positive relationship of social participation with the adoption of improved agricultural practices. It is obvious that farmers with the higher level of participation in social organizations are generally pre-disposed to acquire more information, skills and other factors relating to enterprise, consequently raising their level of adoption of plant protection measures. Thus, in this study, positive and significant relationship must have been established between social participation and the level of adoption of plant protection measures in paddy.

5.4.2.5 Mass media utilization

There exists a positive and significant relationship of exposure to mass media with the extent of adoption of plant protection measures in paddy. Higher level of exposure to mass media would facilitate the individual to develop habits of gathering more information about innovation through television, radio, newspaper and literature related to agriculture. Such individuals will be readiness to accept the practices than others, who do not have exposure to mass media. In other words, exposure to mass media develops modern orientation among farmers, make them more efficient in acquiring technology among farmers, retaining and evaluating the effectiveness factors of farm management. Mass media also provides enormous opportunity of repeated exposure to new technologies, motivating farmers to require and take positive steps relevant for the farmer. This view could be supported by Festinger's (1957) dissonance theory, which states, that due to accumulation information in the individual, dissonance state is created and in order to maintain homeostasis, the individual will be motivated to adopt technologies. Thus, the findings of present study seemed to be on right lines. Similar findings was reported by Kantharaju (1989), Yogananda (1992), Raghavendra and Lakshmisha (2000).

5.4.2.6 Extension participation

Extension participation of paddy growers found to have positive and significant relationship with the adoption of plant protection measures, extension participation provides opportunity for gaining contrived experiences, which necessarily act as a strong motivational factor for higher adoption. By this, they come closer with change agents and try to confirm the results of new technology in fields. This might have contributed to some extent for such significant relationship between the extension participation and the adoption level of paddy growers. Thus, the findings of the present study are in confirmity with the results of studies reported by Kantharaju (1989) and Balasubramani (1997).

5.4.2.7 Economic motivation

Economic motivation was found to be positive and significantly related to extent of adoption of plant protection measures by the farmers in paddy cultivation. A common explanation that would fit in for observed relationship with paddy crop was that economic motivation, the basic character upon which other motives, drives and other attributes are built, psychologically conditions an individual to orient himself to achieve higher income. Agriculture enterprise, being an highly remunerative enterprise, one could set higher levels of economic motivation and want to achieve it. Thus, he would strive hard and seek himself about different aspects of managing enterprise besides aiming at profit maximization. Hence, it is quite

natural to expect this type of relationship. Similar findings were reported by Nityashree (1992) and Reshmy (1998).

5.4.2.8 Innovative proneness

The innovative proneness was found to have positive and significant relationship with the level of adoption plant protection measures. Similar findings were reported by Kumar (1998), Vasanthakumar (2000) and Babanna (2002). The most important cause of innovative proneness is an underlying willingness to change and to try new ideas. This is treated as a psychological trait which manifests itself in all behavioural aspects of farmer, which also serve as an indicator of the farmers orientation to excel in farm enterprise and succeed in his activities. Further, the individual who is prone to innovation generally will have higher orientation towards risks, scientific technology and competition. These factors do naturally influence one's extent of adoption of plant protection measures. Thus, innovative proneness has established positive and significant relationship with the level of adoption of plant protection measures.

5.4.2.9 Extension contact

The Extension contact was found to have positive and significant relationship with the level of adoption plant protection measures. Through regular contact with the extension personnel of developmental departments, NGOs and other organizations farmers come closer with change agents and try to confirm the results of new technology in fields. This might have contributed to some extent for such significant relationship between the extension contact and the adoption level of paddy growers.

5.5 Constraints in the adoption and suggestions for greater adoption of plant protection measures

With regard to constraints in adoption of plant protection measures, the respondents expressed the following constraints : About 43.42 per cent of the farmers were expressed lack of knowledge about chemicals (43.42%), lack of knowledge about to number of spray (62.85%), lack of knowledge in recognizing the symptoms (18.28%), lack of knowledge with regard to technology application (83.42%). Farmers feel that high cost of chemicals (76.00%), high cost of equipments (51.42%). lack of knowledge about the names of chemicals (62.85%), poisonous to cause ill effect to cattle and human beings (41.14%), Increased cost of chemicals and equipments (34.28),non-availability of plant protection equipments nearby places (43.42%). Damage to the crop due to plant protection chemicals (37.14%), problems of transportation system (70.28%) and spraying equipments non-availability (26.28%) were the main constraints expressed by the farmers in the adoption of the plant protection chemicals in cultivation of paddy plantation.

The findings of this part of the study is on par with the study conducted by Thimmaraju (1989), Nityashree (1992), Balasubramani (1997), Achuta Raju and Radha Krishnamurthy (2000) and Thippeswamy (2007).

6. SUMMARY AND POLICY IMPLICATIONS

Rice is an important food crop of India and stands first in area and second in total food production. Among the rice growing countries, India has the largest area under rice in the world (45.50 million ha) with a total production of 96.43 million tonnes during 2007-08 and it stood next only to China in the world with respect to production. In India, the highest area under paddy is in Uttar Pradesh (59.20 lakh ha) followed by West Bengal (56.90 lakh ha), Orrisa (44.50 lakh ha), Andhra Pradesh (39.80 lakh ha) and Karnataka (14.20 lakh ha). Production-wise West Bengal stands first (147.50 lakh tonnes) followed by Andhra Pradesh (118.70 lakh tonnes), Uttar Pradesh (111.20 lakh tonnes) and Karnataka (34.50 lakh tonnes).

Karnataka is one of the major rice growing states in India. It is grown on an area of 1.42 million ha with an annual production of 3.45 million tonnes during 2007-08. The area under rice production is increasing over the years. The important rice growing districts of the state are, Haveri, Uttar Kannada, Dharwad, Koppal, Raichur Mysore, Hassan, and Chitradurga (Anon., 2008).

Plant protection plays a vital role in modern agriculture. Fertilizers, plant protection measures, irrigation and improved seeds are the key elements of modern agriculture. It is essential that after using all the inputs such as improved seeds, irrigation, fertilizers *etc.* the farmers must protect the crop from ravages of pests and diseases. In order to derive higher production the crops need to be protected from all the ill effects of pests and diseases and therefore plant protection should be regarded as “Investment Protection”.

The productivity of paddy is far from satisfactory levels. The results of the past research studies indicated that there is a vast scope to enhance the yield potentiality of the paddy by using recommended plant protection measures. The thorough knowledge of plant protection measures by the farmers would help them in obtaining higher yields.

Hence, the present study was taken up to address the following specific objectives.

1. To ascertain the knowledge level of farmers regarding plant protection measures in paddy cultivation,

2. To analyze the adoption level of plant protection measures by paddy cultivating farmers,

3. To study the relationship between profile characteristics of paddy growers and their knowledge and adoption level and

4. To enlist the problems experienced by the farmers in undertaking plant protection measures in paddy cultivation.

The study was conducted in the randomly selected villages of taluks of Raichur district during 2009-2010 (Fig. 1). Manvi and Sindhanur taluks were purposively selected since these taluks are having more number of paddy growers and occupy more area under paddy cultivation as compared to the other taluks in the district and also based on the criteria of high diseases and pest infestation level. A list of all the paddy growers in Manvi and Sindhanur talukas were prepared with the help of Assistant Director of Agriculture, Department of Agriculture for each taluk. Four villages from Sindhanur and three villages from Manvi talukas where paddy was cultivated by more number of farmers were selected in consultation with the Assistant Director of Agriculture in Sindhanur and Manvi. The names of selected villages are Somalapur, Gandhi Nagar, Gorebhal, and Jalihal of Sindhanur taluk and Ballatigi, Byatagi and Bagalwada of Manvi taluk.

In each village, list of farmers cultivating paddy crop during the year 2009-2010 was prepared, From each village 25 farmers were selected randomly. Thus, 175 paddy growing farmers spread over seven villages of Sindhanur and Manvi taluks constituted the total sample for the study.

Major findings of the study

1. Considerable per cent of the respondents (37.14%) belonged to high knowledge level group whereas, 35.42 per cent of the farmers belonged to low knowledge level group.

2. As high as 75.42 per cent of the respondents were under medium adopters group.

3. Cent per cent of farmers had knowledge about the stem borer. Majority of the farmers (88.57 % and 62.85%) had knowledge about brown plant hoppers and ear head cutting caterpillar. While 52.57 per cent of farmers had the knowledge about gundhi bug.

4. Majority (77.14%) of the farmers knew about Phorate which is used for stem borer control, 73.14 per cent of them did know about dimethorate for control of brown plant hoppers. Similarly, 54.28 per cent of the farmers had knowledge about the methyl parathion for gundhi bug control and cent per cent of them did know about the Endosulfan 35 EC for army worm control.

5. Majority of the farmers (93.71%) did know about the blast diseases, whereas 88.00 per cent of them had knowledge about brown spot. Whereas, 79.42 and 48.57 per cent of them did know about the sheath blight and false smut.

6. Majority of the respondents (80.00%) had knowledge about the symptoms of stem borer, followed by brown plant hoppers (70.28%). Whereas, only 51.42 and 45.71 per cent of them had knowledge about the symptoms of army worm and gundhi bug.

7. About 46.85 per cent of the farmers adopted furadan pesticide for control of stem borer, followed by 34.28 per cent of them who adopted dimecron for the control of brown plant hopper, 21.71 per cent adopted methyl parathion for the control of gundhi bug and 74.28 per cent of them had adopted endosulfan 35 EC pesticide for the control of army worm.

8. Only 17.14 and 21.71 per cent of them adopted proper concentration of Carbofuran and Dimethoate, whereas 58.28 per cent of the farmers had adopted proper concentration of Endosulfan 35 EC.

9. Thirty seven per cent of the farmers were fully adopted application of bavistin for the control of blast, 47.42 per cent of them fully adopted the use of mancozeb 75 WP to control the brown spot disease, and 33.14 per cent of the farmers fully adopted the use of blitox for control of false smut.

10. Majority of the respondents (58.85%) belonged to middle age group.

11. Almost 37.00 (36.57) per cent were illiterates, 13.14 per cent of them had received primary education, followed by 25.71 per cent of the respondents had received middle school education, only 18.28 per cent of respondents had received high school education, while 4.00 and 2.28 per cent of them had education up to PUC and degree level, respectively.

12. About 32.57 per cent of the respondents belonged to medium land holders category, followed by semi-medium land holders (23.42%), small land holders (17.71%), marginal (14.28%) and big land holders (12.00%).

13. About 38.85 per cent of the respondents had annual income below Rs. 49,310.43, followed by 35.42 per cent of them had an annual income between Rs. 49310 to Rs. 1,21,217 and rest of the respondents (25.71%) had an income more than Rs. 1,21,217.

14. Majority (57.14%) of the respondents belonged to small family.

15. About 37.14 of the respondents had high extension participation. Whereas, 31.42 per cent each of the respondents had medium and low extension contact, respectively.

16. Majority of the respondents (60.57%) had medium level of mass media utilization.

17. Considerable per cent (45.71%) of the respondents had low and medium level of social participation.

18. Majority of the paddy growers were distributed in low (48.57%) innovative proneness category, followed by 30.28 and 21.14 per cent of the respondents distributed in the medium and high innovation category, respectively.

19. High majority (96%) of the respondents possessed television sets. Vehicles and sprayers and dusters were possessed by 90.85 and 89.71 per cent of the respondents, respectively. Agricultural implements and radio were possessed by 64 and 48 per cent of the respondents, respectively.

20. Majority of the paddy growers were distributed in medium (57.14%) economic motivation category.

21. About 55 per cent (54.85%) of the respondents had low extension contact. Whereas, 32.59 and 20.00 per cent of them had medium and high extension contact, respectively.

22. The variables such as education, land holding, annual income, social participation, mass media participation, extension participation, extension contact, economic motivation and innovative proneness exhibited positive and significant relationship with the adoption level of plant protection measures of paddy crop. Similarly, the variable age showed non-significant relationship with adoption level of plant protection measure of paddy crop.

23. Lack of knowledge about chemicals, lack of knowledge about to number of spray and lack of knowledge with regard to technology application were the major constraints as expressed by 43.42, 62.85 and 83.42 per cent of respondents, respectively. High cost of chemicals and high cost of equipments were also the major constraints expressed by 76.00 and 51.42 per cent of respondents.

Implications and recommendations

Based on the findings of the present study, the following implications are drawn

1. The findings of the study indicated that only 37.14 per cent of respondents had high level of knowledge about plant protection measures of paddy crop. Hence it is imperative that State Department of Agriculture, University of Agricultural Sciences and other NGOs should make integrated and concerted extension efforts to provide required knowledge about plant protection measures to paddy growers.

2. Majority of the paddy growers belonged to low and medium category in adoption of plant protection measures. Hence, farmers need to be educated, convinced about the importance of plant protection measures, and effect of indiscriminate use of insecticides on health hazards, pest resistance etc. So that, they can be improved in respect of their adoption level.

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APPENDIX

Appendix II: Interview schedule (English)

A STUDY ON KNOWLEDGE AND ADOPTION LEVEL OF PLANT PROTECTION MEASURES BY PADDY GROWERS OF RAICHUR DISTRICT

Respondent No. :

PART - A

I. General information

1. Name of the farmer :

2. Village :

3. Taluk :

4. District :

II. Profile characteristics

1. Age : _____years

2. Education : a) Illiterate

b) Primary school

c) Middle school

d) High school

e) PUC

f) Graduate

3. Annual income

Sl. No.	Source	Income (Rs.)
1.	From agriculture	
2.	Subsidiary	
3.	Other sources	
	Total	

4. Family size

Sl. No.	Particulars	Males	Age	Females	Age	Total(M+F)
1	Adults					
2	children's					

5. Extension participation

State your participation in various extension activates

Sl. No.	Extension activities	Degree of Participation		
		Regular	Occasionally	Never
1.	Training programme			
2.	Demonstrations			
3.	Educational tour			
4.	Field day			
5.	Group discussion			
6.	Agricultural exhibitions			
7.	Krishimela			
8.	Others			

6. Mass media utilization

State your extent of use of various mass media

Sl. No.	Media	Regular	Occasionally	Never
1.	Reading newspaper			
2.	Listening to radio			
3.	Listening to rural radio programmes			
4.	Do you read farm magazines/ leaf lets and other related literatures on agriculture			
5.	Viewing Krishidarshan programme on TV			

7. Social participation

a. Indicate whether you are member of any of the organizations Yes/No

b. If yes, indicate your extent of participation in the following organization

Sl. No.	Organization	Non-member	Member	Office bearer	Participation		
					Regular	Occasionally	Never
1.	Zilla parishad						
2.	Taluk panchayat						
3.	Mandal panchayat						
4.	Village panchayat						
5.	Co-operative society						
6.	Bank						
7.	Farmers service co-operative society						
8.	Milk co-operative society						

8. Land holding

Sl. No.	Land holding (acres)	Dryland	Irrigated land	Total
1.	0 – 10 acres			
2.	11 – 30 acres			
3.	31 and above			

9. Innovative proneness

Here are eight statements, you may please go through each statement and indicate your response

Sl. No.	Statements	Response		
		Yes	Undecided	No
1.	Do you want to learn the new ways of PP measures			
2.	If the extension worker gives a talk on plant protection aspects would you attend?			
3.	If the government would help you to increase your yield level by providing subsidy to purchase PP chemicals, would you move?			
4.	Do you want a change in your way of life?			
5.	A farmer should try to farm the way his parents did?			
6.	Do you want your son to be farmers?			
7.	It is better to enjoy to day and let tomorrow take care of itself			
8.	A man's future is in the hands of god			

10. Material possession

Sl. No.	Materials	Possessing	Not possessing
1	Bullock cart		
2	Improved Agricultural implements		
3	Radio		
4	TV		
5	Vehicle for transport		
6	Sprayer / duster		
7	Any other		

11. Economic motivation

Indicate your response as 'Yes' or 'No' for the following statements.

Sl. No.	Statements	Response	
		Yes	No
1.	Farmer should work towards larger yield and economic profits through adoption of PP measures		
2.	The most successful farmer is one who makes the highest profit by minimizing pest/disease damage in crop.		
3.	A farmer should try and new ideas relating to PP measures, which may earn him more money		
4.	A farmer should grow cash crops to increase monetary profits in comparison to growing of food crops for own consumption		
5.	It is difficult for the farmers children to make good start unless he provides them with economic assistance		
6.	A farmer must earn his living but the most important thing in life can not be defined in the economic terms		

12. Extension contact

Sl.No.	Source	Know/ do not know	Frequency of contact					
			Twice/ more in a week	Once in a week	Once in a fortnight	Once in a month	Whenever problem occur	never
1.	Agril assistant.							
2.	Assist.agril officer.							
3.	Extension guide.							
4.	Extension leader.							
5.	Private agency.							
6.	Extension officer.							
7.	Any other.							

PART- II

Knowledge

Knowledge of farmers about plant protection measures.

I. Pests

1. Name of the major pests that attack paddy crop.

Sl. No.	Pests	Yes	No
1.	Stem Borer		
2.	Brown Plant hoppers		
3.	Gundhi Bug		
4.	Ear Head Cutting Caterpillar or Army Worm		

2. Indicate the major symptoms of pest attacking paddy

Sl. No.	Pests	Symptoms	Yes	No
1.	Stem borer	Caterpillar bore into stem and make the growing tip to dry		
		White panicles are developed during panicle initiation		
2.	Brown plant hopper	Adults and larva suck the sap from the stem above the water level		
		Leaves of infected plant turn to brown and appeared to be burnt like		
3.	Gundhi bug	Adults and larva suck the sap from stem and seeds during milky stage		
		Infected straw also give bad odour		
4.	Army worm	Caterpillar eats leaf and leaf sheath during night time		
		During day time larva hides at ground level		

3. Mention the pesticide you used to control major pests

Sl. No.	Pests	Pesticides used	Yes	No
1.	Stem Borer	Carbofuran (Furadan) or Phorat (Thimet)		
2.	Brown Plant hoppers	Phosphamidon (Dimecron) or Dimethorate (Rogor)		
3.	Gundhi Bug	Methyl paration		
4.	Ear Head Cutting Caterpiller or Army Worm	Endosulfan 35 EC		

II. Diseases

1. Name the major diseases that attack paddy

Sl. No.	Pests	Yes	No
1.	Blast		
2.	Brown Spot		
3.	False Smut		
4.	Sheath Blight		

2. Indicate the major symptoms of disease attacking paddy

Sl. No.	Diseases	Symptoms	Yes	No
1.	Blast	Brown spots on leaf		
		Central part of the spot turns to ash colour and surrounded buy brown colour		
2.	Brown leaf spot	Brown spots on leaf, leaf sheath and seeds		
		Spots may grow upto 1 cm and have ash colour or white at the centre		
3.	False smut	In infected plant instead of panicles, scented stick like stalk appears		
		Suck stalk do not bear seeds instead they have fungus particles		
4.	Sheath blight	5 – 10 mm sized greenish yellow spot appears on leaf tip		
		Those spots cover entire leaf		

3. Mention the fungicides you used to control major diseases

Sl. No.	Disease	Chemical used	Yes	No
1.	Blast	Carbendazim (Bavistin)		
2.	Brown Spot	Mancozeb 75 WP		
3.	False Smut	Copper oxy chloride (Blitox)		
4.	Sheath Blight	Carbendazim (Bavistin)		

PART – III - ADOPTION

Adoption of plant protection measures

I. Pests

1. Which pesticide you used to spray for major pests?

Sl. No.	Pests	Pesticide	Adoption response		
			Fully adopted	Partially adopted	Non-adopted
a.	Stem Borer	Carbofuran			
b.	BrownPlant hoppers	Dimethoate			
c.	Ear Head Cutting Caterpiller or Army Worm	Endosulfan 35 EC			

2. What is the concentration of pesticide you used for control major pests of paddy

Sl. No.	Pesticides	Concentration of pesticide	Adoption response		
			Fully adopted	Partially adopted	Non-adopted
a.	Carbofuran	30-33 Kg of granules per ha			
b.	Dimethoate	1.75 ml in 1 litre of water			
c.	Endosulfan 35 EC	1.25 ml in 1 litre of water			

3. During what time of the day you applied pesticide?

Sl. No.	The time of application	Adoption response	
		Fully adopted	Not adopted
a.	Morning		
b.	Noon		
c.	Evening		

II. Diseases

1. Which fungicide you sprayed to control major diseases

Sl. No.	Diseases	Fungicide	Adoption response		
			Fully adopted	Partially adopted	Non-adopted
a.	Blast	Carbendazim (Bavistin)			
b.	Brown Spot	Mancozeb 75 WP			
c.	Sheath Blight	Carbendazim (Bavistin)			

2. What is the concentration of fungicide you used for control of major diseases of paddy?

Sl. No.	Fungicide	Concentration of fungicide	Adoption response		
			Fully adopted	Partially adopted	Non-adopted
a.	Carbendazim (Bavistin)	0.1 per cent of Carbendazim			
b.	Mancozeb 75 WP	0.2 per cent of Mancozeb			
c.	Carbendazim (Bavistin)	1 Kg per ha in 1000 litres of water			

3. At what time of the day you applied the fungicide

Sl. No.	The time of application	Adoption response	
		Fully adopted	Not adopted
a.	Morning		
b.	Noon		
c.	Evening		

PART – IV

Constraints in adoption of plant protection measures

Which of the following constraints you have experienced in adoption of PP measures to your crop.

Sl. No.	Items	Yes	No
1.	Lack of knowledge regarding plant protection measures a) Chemicals b) Number of sprays c) Identification of symptoms d) Methods of application		
2.	High cost of chemicals		
3.	High cost of equipments		
4.	Complicated name of chemicals		
5.	Lack of repairing facility at nearby places		
6.	Poisons to cattle and human beings		
7.	Non-availability of plant protection equipments nearby places		
8.	Damaged to the crop due to plant protection measures		
9.	Problems in transportation		
10.	Spray equipments not available		

ರಾಯಚೂರು ಜಿಲ್ಲೆಯಲ್ಲಿ ಭತ್ತದ ಬೆಳೆಗಾರರು ಸಸ್ಯ ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳ ಬಗ್ಗೆ ಹೊಂದಿರುವ ತಿಳುವಳಿಕೆ ಮತ್ತು ಅವುಗಳ ಅನುಸರಣೆ ಕುರಿತ ಒಂದು ಅಧ್ಯಯನ

Appendix II: Interview Schedule (Kannada)

ಸಂದರ್ಶನ ಪ್ರಶ್ನಾವಳಿ

ಭಾಗ 1. **ಸಂದರ್ಶನ ಸಂಖ್ಯೆ :**_____

ದೂರವಾಣಿ ಸಂಖ್ಯೆ :_____

1. ಸಾಮಾನ್ಯ ಮಾಹಿತಿ

1. ರೈತನ ಹೆಸರು : _____
2. ಗ್ರಾಮ : _____
3. ತಾಲ್ಲೂಕು : _____
4. ಜಿಲ್ಲೆ : _____

2. ವೈಯಕ್ತಿಕ ಗುಣಗಳು :

1. ವಯಸ್ಸು : _____
2. ವಿದ್ಯಾರ್ಹತೆ : ಅ) ಅನಕ್ಷರಸ್ಥ
   ಬ) ಪ್ರಾಥಮಿಕ ಶಿಕ್ಷಣ
   ಕ) ಮಾಧ್ಯಮಿಕ ಶಿಕ್ಷಣ
   ಡ) ಹಿರಿಯ ಪ್ರಾಥಮಿಕ
   ಗ) ಪದವಿ ಪೂರ್ವ
   ಡ) ಪದವಿ ಮತ್ತು ನಂತರದ ಹೆಚ್ಚಿನ ಶಿಕ್ಷಣ

3. ವಾರ್ಷಿಕ ವರಮಾನ :

ಅ. ಸಂ	ಆದಾಯ ಮೂಲಗಳು	ವರಮಾನ
1	ಕೃಷಿ ಮೂಲ	
2	ಉಪಕಸುಬು	
3	ಇತರೆ	
	ಒಟ್ಟು	

4. ಕುಟುಂಬದ ಗಾತ್ರ. :

ಅ. ಸಂ	ವಿವರ	ಪುರುಷರು	ವಯಸ್ಸು	ಮಹಿಳೆಯರು	ವಯಸ್ಸು	ಒಟ್ಟು
1	ವಯಸ್ಕರು					
2	ಮಕ್ಕಳು					

5. ವಿಸ್ತರಣಾ ಚಟುವಟಿಕೆಗಳಲ್ಲಿ ಭಾಗವಹಿಸುವಿಕೆ :

ಈ ಕೆಳಕಂಡ ವಿಸ್ತರಣಾ ಚಟುವಟಿಕೆಗಳಲ್ಲಿ ಹಿಂದಿನ ವರ್ಷ ಎಷ್ಟರಮಟ್ಟಿಗೆ ಭಾಗವಹಿಸಿದ್ದೀರಿ ತಿಳಿಸಿ?

ಅ. ಸಂ	ವಿಸ್ತರಣಾ ಚಟುವಟಿಕೆಗಳು	ಭಾಗವಹಿಸುವಿಕೆಯ ಮಟ್ಟ		
		ಯಾವಾಗಲೂ	ಆಗಾಗ	ಇಲ್ಲ
1	ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮಗಳು			
2	ಪ್ರಾತ್ಯಕ್ಷಿಕೆಗಳು			

3	ಶೈಕ್ಷಣಿಕ ಪ್ರವಾಸ			
4	ಕ್ಷೇತ್ರೋತ್ಸವ			
5	ಗುಂಪು ಚರ್ಚೆ			
6	ಸ್ಥಿರ ಚಿತ್ರ ಪ್ರದರ್ಶನ			
7	ಕೃಷಿ ವಸ್ತು ಪ್ರದರ್ಶನ			
8	ಕೃಷಿ ಮೇಳ			
9	ಆಂದೋಲನ			
10	ಇತರೆ			

6. ಸಮೂಹ ಮಾಧ್ಯಮಗಳ ಬಳಕೆ :

ಈ ಕೆಳಕಂಡ ಸಮೂಹ ಮಾಧ್ಯಮಗಳನ್ನು ಎಷ್ಟರಮಟ್ಟಿಗೆ ಉಪಯೋಗಿಸುತ್ತೀರಿ ತಿಳಿಸಿ?

ಅ. ಸಂ	ಮಾಧ್ಯಮ	ಯಾವಾಗಲೂ	ಆಗಾಗ	ಇಲ್ಲ
1	ದಿನ ಪತ್ರಿಕೆ ಓದುವುದು			
2	ರೇಡಿಯೊ ಆಲಿಸುವುದು			
3	ನೀವು ಕೃಷಿಗೆ ಸಂಬಂದಿಸಿದ ವಾರ ಪತ್ರಿಕೆ, ಮಾಸ ಪತ್ರಿಕೆ ಅಥವಾ ಇನ್ನಿತರ ಪತ್ರಿಕೆಗಳನ್ನು ಓದುತ್ತೀರಾ			
4	ದೂರದರ್ಶನದಲ್ಲಿ ಕೃಷಿ ಸಂಬಂದಿತ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ನೋಡುತ್ತೀರಾ			

7. ಸಾಮಾಜಿಕ ಸಂಘ ಸಂಸ್ಥೆಗಳಲ್ಲಿ ಭಾಗವಹಿಸುವಿಕೆ :

ಅ) ನೀವು ಯಾವುದಾದರೂ ಸಂಘ ಸಂಸ್ಥೆಗಳಿಗೆ ಸದಸ್ಯರಾಗಿದ್ದೀರಾ ಹೌದು /ಇಲ್ಲ

ಆ) **"ಹೌದು"** ಆದರೆ ಕೆಳಕಂಡ ಸಂಸ್ಥೆಗಳಲ್ಲಿ ಎಷ್ಟರ ಮಟ್ಟಿಗೆ ಭಾಗವಹಿಸಿದ್ದೀರಿ

ಅ ಸಂ	ಸಂಘ ಸಂಸ್ಥೆಗಳು	ಸದಸ್ಯನಲ್ಲ	ಸದಸ್ಯ	ಪದಾಧಿಕಾರಿ	ಭಾಗವಹಿಸುವಿಕೆ		
					ಯಾವಾಗಲೂ	ಆಗಾಗ	ಇಲ್ಲ
1	ಜಿಲ್ಲಾ ಪರಿಷತ್						
2	ತಾಲ್ಲೂಕು ಪಂಚಾಯತಿ						
3	ಮಂಡಲ ಪಂಚಾಯತಿ						
4	ಗ್ರಾಮ ಪಂಚಾಯತಿ						
5	ಸಹಕಾರಿ ಸಂಘಗಳು						
6	ಬ್ಯಾಂಕ್						
7	ರೈತರ ಸಹಕಾರಿ ಸಂಘಗಳು						
8	ಸಹಕಾರಿ ಹಾಲು ಉತ್ಪಾದಕರ ಸಂಘ						

8.: ಭೂ ಹಿಡುವಳಿ :

ಅ ಸಂ	ಹಿಡುವಳಿ ವಿವರ	ಖುಷ್ಕಿ ಭೂಮಿ	ನೀರಾವರಿ	ಒಟ್ಟು
1	0–10 ಎಕರೆ			
2	11–30 ಎಕರೆ			
3	30 ಮತ್ತು ಮೇಲ್ಪಟ್ಟು			

9. ನಾವಿನ್ಯತಾ ಪ್ರವೃತ್ತಿ :

ಈ ಕೆಳಕಂಡ ಎಂಟು ವಾಕ್ಯಗಳನ್ನು ಸರಿಯಾಗಿ ಓದಿ ನಿಮ್ಮ ಅಭಿಪ್ರಾಯವನ್ನು ತಿಳಿಸಿ

ಅ ಸಂ	ಅಭಿಪ್ರಾಯಗಳು	ಪ್ರತಿಕ್ರೀಯೆ		
		ಹೌದು	ನಿರ್ಧರಿಸಿಲ್ಲ	ಇಲ್ಲ
1	ನೀವು ಹೊಸ ಸಸ್ಯ ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳನ್ನು ತಿಳಿದುಕೊಳ್ಳಲು ಬಯಸುತ್ತೀರಾ ?			
2	ಕೃಷಿ ವಿಸ್ತರಣಾ ಅಧಿಕಾರಿಗಳು ಸಸ್ಯ ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳ ಬಗ್ಗೆ ಭಾಷಣವನ್ನು ಏರ್ಪಡಿಸಿದರೆ ಅದರಲ್ಲಿ ನೀವು ಭಾಗವಹಿಸಲು ಇಚ್ಚಿಸುತ್ತೀರಾ ?			
3	ಸಸ್ಯ ಸಂರಕ್ಷಣಾ ರಾಸಾಯನಿಕಗಳನ್ನು ಕೊಳ್ಳಲು ಸರಕಾರವು ಸಹಾಯಧನವನ್ನು ನೀಡಿ ನಿಮ್ಮ ಇಳುವರಿಯನ್ನು ಹೆಚ್ಚಿಸಲು ಮುಂದೆ ಬಂದರೆ ನೀವು ಪಡೆಯಲು ಮುಂದೆ ಬರುವಿರಾ ?			
4	ನಿಮ್ಮ ಜೀವನ ಶೈಲಿಯನ್ನು ಬದಲಾಯಿಸಿಕೊಳ್ಳಲು ಬಯಸುತ್ತೀರಾ ?			
5	ಹಿರಿಯರು ನಡೆಯಿಸಿಕೊಂಡು ಬಂದ ರೀತಿಯಲ್ಲಿಯೇ ರೈತರು ವ್ಯವಸಾಯವನ್ನು ಮಾಡಬೇಕೆ ?			
6	ನಿಮ್ಮ ಮಗನೂ ರೈತನಾಗಬೇಕೆಂದು ಬಯಸುತ್ತೀರಾ?			
7	ಈ ದಿನವನ್ನು ಆಸ್ವಾದಿಸುವುದೇ ಉತ್ತಮ, ನಾಳೆ ತನ್ನಷ್ಟಕ್ಕೇ ತಾನೇ ಸಂರಕ್ಷಿಸಿಕೊಳ್ಳುತ್ತದೆ			
8	ಒಬ್ಬ ಮನುಷ್ಯನ ಭವಿಷ್ಯವು ದೇವರಕೈಯ್ಯಲಿದೆಯೇ ?			

10. ಸಾಮಗ್ರಿಗಳ ಒಡೆತನ

ಅ)

ಅ ಸಂ	ಸಾಮಗ್ರಿಗಳು	ಇದೆ	ಇಲ್ಲ
1	ಎತ್ತಿನಗಾಡಿ		
2	ಸುಧಾರಿತ ಕೃಷಿ ಉಪಕರಣಗಳು		
3	ರೆಡಿಯೊ		
4	ದೂರದರ್ಶನ		
5	ವಾಹನ ಸೌಲಭ್ಯ		
6	ಸ್ಪ್ರೇಯರ್/ ಡಸ್ಟರ್		
7	ಇನ್ನಿತರ		

11.ಆರ್ಥಿಕ ದೃಷ್ಟಿಕೋನ :

ಕೆಳಕಂಡ ವಾಕ್ಯಗಳಿಗೆ ನಿಮ್ಮ ಅಭಿಪ್ರಾಯವನ್ನು ತಿಳಿಸಿ

ಅ. ಸಂ	ಅಭಿಪ್ರಾಯಗಳು	ಪ್ರತಿಕ್ರೀಯೆ	
		ಹೌದು	ಇಲ್ಲ
1	ಸಸ್ಯ ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳನ್ನು ಅಳವಡಿಸಿಕೊಳ್ಳುವುದರ ಮೂಲಕ ರೈತರು ಹೆಚ್ಚು ಇಳುವರಿಯನ್ನು ಮತ್ತು ಲಾಭವನ್ನು ಪಡೆಯುವತ್ತ ಕೆಲಸ ಮಾಡಬೇಕು		
2	ರೋಗ ಕೀಟ ಬಾಧೆಯನ್ನು ಕಡಿಮೆ ಮಡುವುದರ ಮೂಲಕ ಅತೀ ಹೆಚ್ಚು ಲಾಭ ಪಡೆಯುವ ರೈತನೇ ಪ್ರಗತಿಪರ ರೈತ		
3	ರೈತನು ಸಸ್ಯ ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳಿಗೆ ಸಂಬಂದಿಸಿದ ಹೊಸ ತಾಂತ್ರಿಕತೆಗಳು/ ಅವಿಷ್ಕಾರಗಳನ್ನು ಅಳವಡಿಸಿಕೊಳ್ಳುವುದರ ಮೂಲಕ ಅತೀ ಹೆಚ್ಚು ಹಣವನ್ನು ಸಂಪಾದಿಸುತ್ತಾನೆ		
4	ಸ್ವಂತಕ್ಕಾಗಿ ಆಹಾರ ಧಾನ್ಯಗಳನ್ನು ಬೆಳೆಯುವುದರ ಜೊತೆಗೆ ರೈತನು ವಾಣಿಜ್ಯ ಬೆಳೆಗಳನ್ನು ಬೆಳೆಯುವುದರ ಮೂಲಕ ಹೆಚ್ಚು ಲಾಭವನ್ನು ಪಡೆಯಲು ಸಾಧ್ಯ		
5	ಹಣಕಾಸಿನ ನೆರವು ನೀಡದ ಹೊರತು ರೈತರ ಮಕ್ಕಳು ಕೃಷಿಯಲ್ಲಿ ಉತ್ತಮ ಪ್ರಾರಂಭವನ್ನು ಮಾಡಲಾರರು		
6	ರೈತನ ಸ್ಥಿತಿಗತಿಯನ್ನು ಕೇವಲ ಹಣಕಾಸಿನ ವಿಚಾರದಿಂದ ಅಳಯಲಾಗುವುದಿಲ್ಲ. ತನ್ನ ಜೀವನಕ್ಕೆ ಬೇಕಾದುದನ್ನು ತಾನೇ ದುಡಿದುಕೊಳ್ಳಬೇಕು		

12. ವಿಸ್ತರಣಾ ಕಾರ್ಯಕರ್ತರೊಡನೆ ಸಂಪರ್ಕ :

ಅ. ಸಂ	ಮೂಲಗಳು	ಗೊತ್ತಿದೆ/ ಗೊತ್ತಿಲ್ಲ	ಸಂಪರ್ಕದ ಅಂತರ					
			ವಾರಕ್ಕೆ ಎರೆಡು / ಹೆಚ್ಚು ಬಾರಿ	ವಾರಕ್ಕೆ ಒಂದು ಬಾರಿ	15 ದಿನಕ್ಕೊಮ್ಮೆ	ತಿಂಗಳಿಗೊಮ್ಮೆ	ಸಮಸ್ಯೆ ಬಂದಾಗ	ಇಲ್ಲ
1	ಕೃಷಿ ಸಹಾಯಕ							
2	ಕೃಷಿ ಸಹಾಯಕ ಆಧಿಕಾರಿ							
3	ವಿಸ್ತರಣಾ ಅಧಿಕಾರಿ							
4	ವಿಸ್ತರಣಾ ಮಾರ್ಗದರ್ಶಿ							
5	ವಿಸ್ತರಣಾ ನಾಯಕ							
6	ಖಾಸಗಿ ಸಂಸ್ಥೆ							
7	ಇತರೆ							

ತಿಳುವಳಿಕೆ :

ಸಸ್ಯ ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳ ಬಗ್ಗೆ ರೈತರಲ್ಲಿ ಇರುವ ತಿಳುವಳಿಕೆ :

1. ಕೀಟಗಳು

ಅ) ಭತ್ತದ ಬೆಳೆಯನ್ನು ಬಾಧಿಸುವ ಪ್ರಮುಖ ಕೀಟಗಳು ಯಾವವು ?

ಅ. ಸಂ	ಕೀಟಗಳು	ಹೌದು	ಇಲ್ಲ
1	ಕಾಂಡ ಕೊರೆಯುವ ಹುಳು		
2	ಕಂದುಜಿಗಿ ಹುಳು		
3	ಗಂದಿ ತಿಗಣೆ		
4	ಸೈನಿಕ ಹುಳು		

ಆ) ಭತ್ತದ ಪ್ರಮುಖ ಕೀಟಗಳ ನಿರ್ವಹಣೆಗೆ ನೀವು ಉಪಯೋಗಿಸುವ ಕೀಟನಾಶಕಗಳು ಯಾವವು ?

ಅ. ಸಂ	ಕೀಟಗಳು	ಕೀಟನಾಶಕಗಳು	ಹೌದು	ಇಲ್ಲ
1	ಕಾಂಡ ಕೊರೆಯುವ ಹುಳು	ಕಾರ್ಬೋಪ್ಯೂರಾನ್, ಫೋರೇಟ್		
2	ಕಂದುಜಿಗಿ ಹುಳು	ಫಾಸ್ಫೋಮಿಡೋನ್ ಡೈಮಿಥೋರೈಟ್		
3	ಗಂದಿ ತಿಗಣೆ	ಮಿಥೈಲ್ ಪ್ಯಾರಾಥಿಯೋನ್		
4	ಸೈನಿಕ ಹುಳು	ಎಂಡೋಸಲ್ಫಾನ್		

2. ರೋಗಗಳು :

ಅ) ಭತ್ತದ ಬೆಳೆಯನ್ನು ಬಾಧಿಸುವ ಪ್ರಮುಖ ರೋಗಗಳು ಯಾವವು ?

ಅ. ಸಂ	ರೋಗಗಳು	ಹೌದು	ಇಲ್ಲ
1	ಬೆಂಕಿ ರೋಗ		
2	ಕಂದುಚುಕ್ಕೆ ರೋಗ		
3	ಊದುಬತ್ತಿ ರೋಗ		
4	ದುಂಡಾಣು ಮಚ್ಚೆ ರೋಗ		

ಅ) ಭತ್ತದ ಪ್ರಮುಖ ರೋಗಗಳ ನಿರ್ವಹಣೆಗೆ ನೀವು ಉಪಯೋಗಿಸುವ ಶಿಲೀಂಧ್ರ ನಾಶಕಗಳು ಯಾವವು ?

ಅ. ಸಂ	ರೋಗಗಳು	ಶಿಲೀಂಧ್ರ ನಾಶಕಗಳು	ಹೌದು	ಇಲ್ಲ
1	ಬೆಂಕಿ ರೋಗ	ಕಾರ್ಬನ್ ಡೈಜೀಮ್		
2	ಕಂದು ಚುಕ್ಕಿ ರೋಗ	ಮ್ಯಾಂಕೋಜೆಬ್		
3	ಊದಬತ್ತಿ ರೋಗ	ಕಾರ್ಬೋಆಕ್ಸಿಕ್ಲೋರೈಡ್		
4	ದುಂಡಾಣು ಮಚ್ಚೆ ರೋಗ	ಕಾರ್ಬನ್ ಡೈಜೀಮ್		

3. ಕೀಟಗಳು ಮತ್ತು ಅವುಗಳ ನಿಯಂತ್ರಣ :

ಅ) ಭತ್ತದಲ್ಲಿ ಕಾಂಡಕೊರೆಯುವ ಹುಳುವಿನ ಮುಖ್ಯ ಲಕ್ಷಣಗಳನ್ನು ( ) ಗುರುತಿಸಿ

ಅ. ಸಂ	ಮುಖ್ಯ ಲಕ್ಷಣಗಳು	
1	ಸುಳಿ ಒಣಗುವಿಕೆ /ಬಿಳಿತೆನೆ	
2	ಕುಡಿಯ ಭಾಗದಿಂದ ಕೊರೆಯಲು ಆರಂಭಿಸುತ್ತವೆ	

ಆ) ಕಂದುಚುಕ್ಕೆ ಹುಳು ನಿಯಂತ್ರಣಕ್ಕೆ ಬಳಸುವ ಕೀಟನಾಶಕ :

ಅ ಸಂ	ರಾಸಾಯನಿಕಗಳ ಪ್ರಮಾಣ	
1	ಕಾರ್ಬೋಫ್ಯೂರಾನ್ ಶೇಖಡಾ 3ರ ಪ್ರಮಾಣದ ಗುಳಿಗೆಗಳು ಪ್ರತಿ ಹೆಕ್ಟೇರಿಗೆ 33 ಕೆಜಿ	
2	ಒಂದು ಲೀಟರ್ ನೀರಿನಲ್ಲಿ 1.75 ಮಿ.ಲಿ. ಕೀಟನಾಶಕ	

ಇ) ಕಾಂಡ ಕೊರೆಯುವ ಹುಳು, ಕಂದುಚುಕ್ಕೆ ಹುಳು, ಗಂದಿ ತಿಗಣೆ, ಮತ್ತು ಸೈನಿಕ ಹುಳು ಭಾದೆ ಕಂಡು ಬಂದಾಗ ಯಾವ ಹಂತದಲ್ಲಿ ಸಸ್ಯ ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳನ್ನು ತೆಗೆದುಕೊಳ್ಳಬೇಕು ?

ಅ. ಸಂ	ಹಂತಗಳು	
1	ಕೀಡೆಗಳು ಕಾಂಡವನ್ನು ಕೊರೆದು ತಿಂದ ನಂತರ	
2	ಗಿಡಗಳು ಹಳದಿ ಬಣ್ಣಕ್ಕೆ ತಿರುಗಿ ಒಣಗಿದ ನಂತರ	
3	ಹಾಲುಗಾಳುಗಳಿಂದ ರಸ ಹೀರಿದ ನಂತರ	
4	ಎಲೆಗಳ ರಸಹೀರಿ ಉಳಿದ ಭಾಗ	

4. ರೋಗಗಳು :

1. ಬೆಂಕಿರೋಗದ ಸರಿಯಾದ ಹಾನಿಯ ಲಕ್ಷಣಗಳನ್ನು ಗುರುತಿಸಿ ( )

ಅ. ಸಂ	ರೋಗದ ಲಕ್ಷಣಗಳು	
1	ಎಲೆಯ ಮೇಲೆ ಕಂಡುಬಂದ ಚುಕ್ಕೆಗಳು	
2	ತೆನೆಯ ಕತ್ತಿನ ಭಾಗವು ಸೊಂಕಿಗೋಳಗಾಗಿ ಕಂದು ಬಣ್ಣದಿಂದ ಕಪ್ಪು ಬಣ್ಣಕ್ಕೆ ತಿರುಗುವುದು	

2. ಬೆಂಕಿ ರೋಗ ಕಾಣಿಸಿದಾಗ ಯಾವ ಹಂತದಲ್ಲಿ ಶಿಲೀಂಧ್ರನಾಶಕವನ್ನು ಸಿಂಪಡಿಸಬೇಕು

ಅ. ಸಂ	ಹಂತ	
1	ಚಿಕ್ಕ ಕಂದುಬಣ್ಣದ ಚುಕ್ಕೆಗಳಿಂದ ಎಲೆಗಳೆಲ್ಲ ಸಂಪೂರ್ಣ ಸುಟ್ಟಂತೆ ಕಂಡಾಗ	
2	ತೆನೆಯ ಕತ್ತಿನ ಭಾಗವು ಸೊಂಕಿಗೋಳಗಾಗಿ ಕಂದು ಬಣ್ಣದಿಂದ ಕಪ್ಪು ಬಣ್ಣಕ್ಕೆ ತಿರುಗಿದಾಗ	

3. ದುಂಡಾಣು ಮಚ್ಚೆರೋಗ ನಿಯಂತ್ರಣಕ್ಕೆ ಕೆಳಗಿನವುಗಳಲ್ಲಿ ಯಾವ ಶಿಲೀಂದ್ರನಾಶಕ ಪರಿಣಾಮದಾಯಕ ?

ಅ. ಸಂ	ಶಿಲೀಂದ್ರನಾಶಕ	
1	ಕಾರ್ಬನ್‌ಡೈಜಿನ್	
2	ನೈಟ್ರೋಜನ್‌ನ ಸಮತೋಲನ ಉಪಯೋಗ	

4. ದುಂಡಾಣು ಮಚ್ಚೆರೋಗ ನಿಯಂತ್ರಿಸಲು ಎಷ್ಟು ಪ್ರಮಾಣದ ಕಾರ್ಬನ್‌ಡೈಜಿನ್‌ಅನ್ನು ಉಪಯೋಗಿಸಿ ಸಿಂಪರಣಾ ದ್ರಾವಣವನ್ನು ತಯಾರಿಸಬೇಕು ?

ಅ. ಸಂ	ಕಾರ್ಬನ್‌ಡೈಜಿನ್ ಸಿಂಪರಣಾ ದ್ರಾವಣ	
1	1,000 ಲೀ. ನೀರಿನಲ್ಲಿ 1 ಕೆ. ಜಿ. ಕಾರ್ಬನ್‌ಡೈಜಿನ್	
2	1,000 ಲೀ. ನೀರಿನಲ್ಲಿ 1.5 ಕೆ. ಜಿ. ಕಾರ್ಬನ್‌ಡೈಜಿನ್	

ಅನುಸರಣೆ :

1. ಕೀಟಗಳು :

ಅ) ಭತ್ತದ ಕೀಟಗಳನ್ನು ನಿಯಂತ್ರಿಸಲು ನೀವು ಯಾವ ಕೀಟನಾಶಕಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತೀರಿ ?

ಅ. ಸಂ	ಕೀಟಗಳು	ಕೀಟನಾಶಕಗಳು	ಅಳವಡಿಕೆಯ ಪ್ರತಿಕ್ರೀಯೆ		
			ಸಂಪೂರ್ಣ ಅಳವಡಿಕೆ	ಭಾಗಶಃ ಅಳವಡಿಕೆ	ಅಳವಡಿಸಿಲ್ಲ
1	ಕಾಂಡ ಕೊರೆಯುವ ಹುಳು	ಕಾರ್ಬೋಫ್ಯೂರಾನ್			
2	ಕಂದುಜಿಗಿ ಹುಳು	ಡೈಮಿಥೋರೇಟ್			
3	ಸೈನಿಕ ಹುಳು	ಎಂಡೋಸಲ್ಫಾನ್			

ಆ) ಭತ್ತದ ಕೀಟಗಳನ್ನು ನಿಯಂತ್ರಿಸಲು ನೀವು ಉಪಯೋಗಿಸುವ ಕೀಟನಾಶಕದ ಪ್ರಮಾಣವೆಷ್ಟು ?

ಅ. ಸಂ	ಕೀಟನಾಶಕಗಳು	ಪ್ರಮಾಣ	ಅಳವಡಿಕೆಯ ಪ್ರತಿಕ್ರೀಯೆ		
			ಸಂಪೂರ್ಣ ಅಳವಡಿಕೆ	ಭಾಗಶಃ ಅಳವಡಿಕೆ	ಅಳವಡಿಸಿಲ್ಲ
1	ಕಾರ್ಬೋಫ್ಯೂರಾನ್	ಪ್ರತಿ ಹೆಕ್ಟೇರಿಗೆ 30 ರಿಂದ 33 ಕೆ. ಜಿ. ಗುಳಿಗೆಗಳು			
2	ಡೈಮಿಥೋರೇಟ್	ಒಂದು ಲೀ. ನೀರಿನಲ್ಲಿ 1.75 ಮಿ.ಲೀ.			
3	ಎಂಡೋಸಲ್ಫಾನ್	ಒಂದು ಲೀ. ನೀರಿನಲ್ಲಿ 1.25 ಮಿ.ಲಿ.			

ಇ) ದಿನದ ಯಾವ ಸಮಯದಲ್ಲಿ ಕೀಟನಾಶಕಗಳನ್ನು ಸಿಂಪಡಿಸಬೇಕು ?

ಅ. ಸಂ	ಸಮಯ	ಅಳವಡಿಕೆಯ ಪ್ರತಿಕ್ರೀಯೆ	
		ಸಂಪೂರ್ಣ ಅಳವಡಿಕೆ	ಅಳವಡಿಸಿಲ್ಲ
1	ಮುಂಜಾನೆ		
2	ಮಧ್ಯಾಹ್ನ		
3	ಸಂಜೆ		

2. ರೋಗಗಳು

ಅ) ಭತ್ತದ ರೋಗಗಳನ್ನು ನಿಯಂತ್ರಿಸಲು ಯಾವ ಶಿಲೀಂದ್ರನಾಶಕಗಳನು ಉಪಯೋಗಿಸುತ್ತೀರಿ ?

ಅ. ಸಂ.	ರೋಗಗಳು	ಶಿಲೀಂದ್ರನಾಶಕಗಳು	ಅಳವಡಿಕೆಯ ಪ್ರತಿಕ್ರೀಯೆ		
			ಸಂಪೂರ್ಣ ಅಳವಡಿಕೆ	ಭಾಗಶಃ ಅಳವಡಿಕೆ	ಅಳವಡಿಸಿಲ್ಲ
1	ಬೆಂಕಿರೋಗ	ಕಾರ್ಬನ್ ಡೈಜೀನ್			
2	ಕಂದುಚುಕ್ಕಿ ರೋಗ	ಮ್ಯಾಂಕೋಜೆಬ್			
3	ದುಂಡಾಣುಮಚ್ಚೆ ರೋಗ	ಕಾರ್ಬನ್ ಡೈಜೀನ್			

ಆ) ಭತ್ತದ ರೋಗಗಳನ್ನು ನಿಯಂತ್ರಿಸಲು ನೀವು ಉಪಯೋಗಿಸುವ ಶಿಲೀಂದ್ರನಾಶಕದ ಪ್ರಮಾಣವೆಷ್ಟು ?

ಅ ಸಂ	ಶಿಲೀಂದ್ರನಾಶಕಗಳು	ಪ್ರಮಾಣ	ಅಳವಡಿಕೆಯ ಪ್ರತಿಕ್ರೀಯೆ		
			ಸಂಪೂರ್ಣ ಅಳವಡಿಕೆ	ಭಾಗಶಃ ಅಳವಡಿಕೆ	ಅಳವಡಿಸಿಲ್ಲ
1	ಕಾರ್ಬನ್ ಡೈಜೀನ್	1 ಪ್ರತಿಶತ (%)			
2	ಮ್ಯಾಂಕೋಜೆಬ್	2 ಪ್ರತಿಶತ (%)			
3	ಕಾರ್ಬನ್ ಡೈಜೀನ್	1,000 ಲೀ. ನೀರಿನಲ್ಲಿ 1 ಕೆ ಜಿ			

ಇ) ದಿನದ ಯಾವ ಸಮಯದಲ್ಲಿ ಶಿಲೀಂದ್ರನಾಶಕಗಳನ್ನು ಸಿಂಪಡಿಸಬೇಕು?

ಅ. ಸಂ.	ಸಮಯ	ಅಳವಡಿಕೆಯ ಪ್ರತಿಕ್ರೀಯೆ	
		ಸಂಪೂರ್ಣ ಅಳವಡಿಕೆ	ಅಳವಡಿಸಿಲ್ಲ
1	ಮುಂಜಾನೆ		
2	ಮಧ್ಯಾಹ್ನ		
3	ಸಂಜೆ		

4. ಸಸ್ಯ ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳನ್ನು ಅನುಸರಿಸುವಾಗ ನೀವು ಅನುಭವಿಸಿದ ತೊಂದರೆಗಳು ಯಾವವು ?

ಅ ಸಂ	ಹೇಳಿಕೆಗಳು	ಹೌದು	ಅಲ್ಲ
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			

A STUDY ON KNOWLEDGE AND ADOPTION OF PLANT PROTECTION MEASURES BY PADDY GROWERS OF RAICHUR DISTRICT

MANJUNATH T. 2010 Dr.L. MANJUNATH
Major Advisor

ABSTRACT

The study was conducted in the randomly selected villages of taluks of Raichur district during 2009-2010. Manvi and Sindhanur taluks were purposively selected since these taluks are having more number of paddy growers and occupy more area under paddy cultivation as compared to the other taluks in the district and also based on the criteria of high diseases and pest infestation level. Cent per cent of farmers had knowledge about the stem borer. Majority of the farmers (88.57 % and 62.85%) had knowledge about brown plant hoppers and ear head cutting caterpillar. Majority (77.14%) of the farmers knew about Phorate which is used for stem borer control, 73.14 percent of them did know about dimethorate for control of brown plant hoppers. Whereas, only 51.42 and 45.71 per cent of them had knowledge about the symptoms of army worm and gundhi bug.

About 47.00 (46.85) per cent of the farmers adopted furadan pesticide for control of stem borer. Only 17.14 and 21.71 per cent of them adopted proper concentration of Carbofuran and Dimethoate, whereas 58.28 percent of them had adopted proper concentration of Endosulfan 35 EC. About 38.85 percent of the respondents had annual income below Rs.49,310.43, followed by 35.42 per cent of them between Rs. 49310 to Rs. 1,21,217 and rest of them (25.71%) had an income more than Rs.1,21,217. Majority of the respondents (60.57%) belong to medium level of mass utilization category. High majority (96%) of the respondents possessed television sets. Vehicles, sprayers and dusters were possessed by 90.85 and 89.71 per cent of the respondents, respectively. Lack of knowledge about chemicals, lack of knowledge about to number of spray and lack of knowledge with regard to technology application were the major constraints as expressed by 43.42, 62.85 and 83.42 percent of respondents, respectively.