PROMOTIONAL STRATEGY FOR INTEGRATED PEST MANAGEMENT IN RICE IN THRISSUR DISTRICT AN EXPERIMENTAL STUDY

By

DEEPA . C. B

THESIS

Submitted in partial fulfilment of the requirement
for the degree of

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Faculty of Agriculture
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Department of Agricultural Extension
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1999

DECLARATION

I here by declare that the thesis entitled " **Promotional Strategy for Integrated Pest Management in rice in Thrissur district – An experimental study"** is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title, of any other University or society.

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CERTIFICATE

We, the under signed members of the Advisory Committee of **Ms. Deepa.C.B,** a candidate for the degree of **Master of Science In Agriculture** with major in **Agricultural Extension,** agree that the thesis entitled **"Promotional Strategy for Integrated Pest Management in rice in Thrissur district – An experimental study"** may be submitted by Ms. Deepa. C.B, in partial fulfillment of the requirement for the degree.

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CHAPTER I

INTRODUCTION

The protection of plants by combating the negative effects of pests on crop production is of major importance for food security in developing countries. This is particularly true for areas where increased productivity is needed to achieve adequate food supply for the many that are malnourished.

With the increasing demands for food and fiber, today's world is witnessing an exploitation of the land as never seen before. The exploitation has allowed unprecedented standards of living in many parts of the world, yet with the human population growing at exponential rates, the need for improved agriculture has never been greater.

Shortly after World War II pest control shifted largely from a biological disciplines to chemical one. This era of unlimited dependence on pesticides (particularly insecticides) provided, indeed good pest control and subsequently weed control. There has also been an unilateral effort to develop crop varieties concentration only on yields, rather than on resistance to pests. Also, the lack of co-ordination among the scientists in the fields of crop production and crop protection resulted in serious impacts. The consequences invited attention of the scientists toward a new and united approach towards pest control namely the Integrated Pest Management(IPM).

Significant improvements in pest control could result in vast gain in human welfare through limiting pest impact. Pest Management has been one of the most important developments in pest control, since the advent of modern organic pesticides. One of the foremost needs is to develop truly integrated pest management programmes that span the pest disciplines.

The world-wide pre harvest crop losses caused by pests are estimated by FAO to be in the order of 30-35%. With the rapid growth of pesticide resistance in insects, pathogens and weeds, these losses are likely to increase. To combat this trend , it is essential to design programs of pest management that depend on the intelligent integration of various control measures and not on chemical alone. The increased awareness of the environment and the need to implement sustainable agricultural production method, and the occurrence of accidents with pesticides, support this strive against the injudicious use of pesticides.

In 1967, the FAO panel of experts on Integrated Pest Management defined "Integrated control " as follows:

" A pest management system that in the context of the associated environment and the population dynamics of the pest species, utilizes all suitable techniques and methods in a compatible manner as possible and maintain the pest population at levels below those causing economic injury."

India is one of the largest rice growing country in the world and it is one of the major food crops. Coming to Kerala, it is the staple food of the population and is the major crop cultivated. An alarming trend noticed in Kerala is that the area under rice has reduced to almost half over last three decades. Poor returns and increasing costs of pesticides and other inputs have repelled the farmer from rice cultivation. In this context eco-friendly

and sustainable rice farming will have to be promoted by emphasising the role of integrated pest management (IPM) through various extension strategies.

Effective communication has attained greater importance in any extension programme. A successful extension worker should have a thorough understanding about communication methods and also have the ability to choose the appropriate method in transfer of technology. Different combinations of extension teaching methods and audio- visual aids were tried and used successfully. Marks (1955) reported that most people retained 10-15 percent of what they had read, 20-25 percent of what they had heard and 30-35 percent of what they had seen and 50 percent of what they had seen and heard at the same time.

The study is aimed at formulate a strategy for popularising IPM among rice growers. To facilitate this, idea of IPM is transferred with the help of different extension methods like group discussion, lecture and audio-visual aids like slides. The effectiveness of these combinations in farmer's knowledge, attitude and symbolic adoption was assessed, with the following specific objectives:

1. To formulate a promotional strategy for IPM in rice cultivation.
2. To assess the relative efficiency of selected extension methods in spreading the concept of IPM among rice growers.
3. To assess the level of farmers knowledge, attitude and symbolic adoption towards the concept and practices of IPM in rice and,
4. To study the constraints in the use of IPM practices in rice.

Scope of the study

The study proposal is an attempt to formulate a strategy for popularizing IPM among rice growers and it is hoped that the results of the study would be of immense use for planners, policy makers and practitioners in agriculture.

Awareness in health and environmental hazards, had forced the pest control agencies and consumers to choose a better alternatives. This has resulted in a number of eco friendly and non toxic botanical and plant based pesticides coupled with good management practices involving lessening in the use of chemical pesticides. The effective promotional strategy of IPM is of greater importance in that respect also.

Limitations of the study

The present research work forms a part the Post graduate programme, which was undertaken by a single student and hence it had all the limitations including time, finance, mobility and other resources. Moreover the study was confined to one Grama panchayat of the district. So it may be difficult to generalise the results obtained for the whole area. With these limitations, every effort has been made to make the study effective to suit the objectives.

Presentation of the thesis

The thesis is presented in five chapters including the present topic. This covers the scope, objective and limitations of the study.

The second chapter deals with the review of relevant literature, which helped in the conduct the present study. The details of the study area, selection of respondents, procedures for development of indices, selection and operationalization of dependent and independent variables, tools of data collection and statistical techniques used are covered in the third chapter.

The fourth chapter deals with the results of the study and discussion of the results in detail is given in the fifth chapter.

The sixth and final chapter presents the summary and conclusions of the study. The relevant references, appendices and the abstract of the thesis are given at the end.

CHAPTER II

THEORETICAL ORIENTATION

Main objective of this section is to develop a theoretical framework based on the review and findings of earlier research works carried out on various related topics regarding problem under study. A review of this kind enables the researcher to point out the variables that are relevant to the specific area of present study and to predict and justify the possible relationship between them. An attempt is made to present the available literature, which are either directly or indirectly related to the topic.

These are presented under the following sub-divisions:

2.1 Concept of Integrated Pest Management (IPM)

2.2 Studies on Integrated Pest Management.

2.3 Level of knowledge of the farmers about IPM in rice and its relationship with selected socio-economic characters of respondents.

2.4 Attitude of farmers towards Integrated Pest Management in rice and its relationship with selected socio-economic characteristics of respondents.

2.5 Symbolic adoption of the farmers towards Integrated Pest Management in rice and the relationship of attitude with selected socio-economic characteristics of respondents.

2.6 Studies on effectiveness of different extension teaching methods.

2.7 Constraints in the adoption of recommended technology.

2.8 Conceptual framework of the study.

Theoretical Orientation

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2.8 Conceptual framework of the study.

2.1 Concept of Integrated Pest Management (IPM)

Integrated Pest Management is a broad approach of pest control employing all methods and techniques namely cultural, mechanical, biological and chemical in a compatible manner to keep pest population below economic threshold level.

Chathopadyay (1991) conceive this as the adjustment or manipulation of agro-ecosystem so that the pests are maintained at a sub-economic level of population, so as not to cause any extensive injury.

Meera (1995) developed a strategic model integrating the salient findings of her study and points out the importance of popularizing effective plant protection technology among the farmers in ecologically sensitive rice and vegetable production systems in Kerala. She also emphasized the need of adequate training to farmers as well as extension workers on IPM practices.

KAU (1996) while formulating the package of practices for rice cultivation in Kerala gave thrust to the use of Integrated Pest Management taking into consideration the agro-edaphic and ecological significance of rice lands.

2.2. Studies on Integrated Pest Management

Adolla and Role (1988) reported that the level of knowledge and perception of farmers regarding pests and their subsequent damage to crops was relatively low. In addition, farmers knowledge about pest control appear very limited that even natural enemies are being sprayed at sight.

Deepa (1992) noted that alternate wetting and drying or rice crops improves the soil and microbial activities, also helps in vigorous root growth in ineffective tillers.

Govind (1992) reported that there was wide variation in the adoption level of cultural chemical and specific IPM practices of selected pests among IPM and non-IPM for paddy cultivation.

Vijayalakshmi (1993) reported that knowing about and using traditional plant protection measures will help in a way of continuing with high yield farming without poisoning the soil, water and air that occur while using chemical fertilizers and pesticides.

While delineating the constraints in transfer of technology in Kerala, Bhaskaran (1994) observed that concepts like the IPM were yet to become popular among the farmers.

In another study Vivekananda (1994) reported that neem cake contain alkaloids and this will repel the rice pests like green leaf hoppers.

Meera (1995) revealed that the farmer of Thiruvananthapuram and Alappuzha districts were ignorant about biological, physical and integrated methods of plant protection methods.

Preetha (1997) revealed that indigenous practices like growing leguminous crops like couper in the summer fallows will reduce toxicity, and increases nitrogen fixation. She also reported that spray solutions of asafoetida, and pepper during panicle emergence and grain setting stages of paddy controls infestation.

Sumathi and Alagasan (1998) reported that majority of small and marginal farmers of Sankari and Thruchengod taluks of Salem district, adopted only limited IPM practices when compared to big farmers and they need to be motivated to adopt all the IPM practices followed in Ground nut cultivation.

2.3 Level of Knowledge about Integrated Pest Management and its relation with selected socio-psychological characteristics of the respondents.

English and English (1958) defined knowledge as a body of understood information possessed by an individual or by a culture.

Bhaskaram and Mahajan (1968) reported that young farmer and middle aged farmers retained slightly more knowledge as compared to old group.

Kaleel (1978) noted a positive and significant influence of education on knowledge of paddy growers.

Nagaraja(1979) reported that farmers with high organisational and high mass media participation were significantly better in respect of gain in knowledge.

Kamarudeen (1981) observed that a significant association existed between farm size and knowledge level about various farm implements among rice farmers.

Hariprasad (1982) reported a positive and significant relationship between annual income and knowledge of paddy farmers about improved farming practices.

Alexander (1985) revealed that management orientation had positive and significant correlation with level of knowledge of small rubber growers.

Nagaraja and Reddy (1985) reported that lecture and tape recorded lecture did not differ in their influence on gain in knowledge and retention when combined with slide show and flannel graph.

Selvaraj and Knight (1985) reported that mass media participation had no significant influence in the gain of knowledge.

Viju (1985) reported that the non-significant relationship between farm size and knowledge level of paddy growers about the improved

knowledge among dry land farmers.

Guruswamy *et al* (1990) in their work related rationally in decision-making process of dry land farm women found that Innovativeness was positively and significantly related with the knowledge level of farm women.

Satheesh (1990) reported a positive and significant relationship between the level of knowledge and area under cultivation.

Santhosh (1990) reported that cosmopoliteness of respondents had significant and positive correlation with the gain in knowledge, when combinations of audio-visual aids were used.

While studying the adoption level of vegetable growers, Bonny (1991) found that majority (67%) of vegetable growers had medium level of knowledge on improved vegetable cultivation.

Gopala (1991) observed that majority of vegetable growers had medium level of knowledge on improved vegetable cultivation.

Julian *et al* (1991) reported that most of the marginal and small farmers possessed only medium level of knowledge about IPM practices.

Tantray and Nanda (1991) found that annual income showed a non significant relationship with level of knowledge of rice farmers.

While studying the adoption behaviour of high yielding varieties in rainfed chilli and jowar, Chaudhari and Makode (1992) revealed that there was a positive relationship between economic motivation and knowledge level.

Govind (1992) also reported that annual income and risk preference showed a non-significant relationship with level of knowledge of rice farmers with respect to Integrated Pest Management practices.

Ramachandran(1992) reported that no significant relationship between farm size and knowledge level of rice farmers. He also pointed out a positive relationship between scientific orientation and knowledgelevel of rice farmers.

Janadevan (1993) reported a positive and significant relationship of economic motivation and with knowledge of coconut farmers, also in another study Nirmala (1993) found that innovativeness was positively significant with the level of knowledge of farmers on bio fertilizers.

Sumathi and Annamalai (1993) found a significant influence of education on knowledge level of paddy farmers.

In similar study, Suresh (1994) observed that risk orientation was positively significant with the knowledge level of farm women.

Babu (1995) reported that education was significantly correlated with the education level of farmers.

Philip (1995) concluded that farm size had maximum direct favorable effect towards knowledge gain.

Manju (1997) revealed that education was significantly and negatively correlated with the knowledge and stated that farming experience was positively and significantly related with indigenous knowledge.

Basavaprabhu *et al* (1997) revealed that among the total vegetable growers studied 31% of the farmers had high knowledge level, 41% has medium knowledge and 24 % has low level of knowledge regarding IPM practices. They also reported that land holding, extension participation and innovation proneness and scientific orientation were significantly related to overall knowledge of the farmers.

In another study Jeyakumar and Manoharan (1999) observed a gain in knowledge among farm women,due to video education programmes.

Ravishankar (1999) observed that 43% of potato farmers belonged to medium category in respect of the knowledge on improved practices followed by the group belonging to low category (34%). Only 23% belonged to the high category.

2.4 Attitude of farmers towards Integrated Pest Management and its relationship with selected socio-economic characteristics of the respondents.

Allport (1935) defined attitude as a mental and neural state of readiness organised through experience, exerting a direction or dynamic influence upon the individual response to all subjects and situations with which it is related.

Thurstone (1946) defined attitude as the degree of positive or negative affect associated with some psychological object towards which people can differ in varying degrees.

Kamarudeen (1981) stated cosmopoliteness was not significantly related with the attitude of farmer. Also revealed that degree of contact with the extension agency had positive and significant relationship with the attitude of the farmer.

In his study, Naik (1981) reported significant association between risk preference and attitude of farmers towards Intensive Agricultural Extension System in Andra Pradesh.

Cherian (1984) reported significant association between risk preference and attitude of farmers.

Syamala (1988) found that innovation proneness exhibited positive but non-significant relationship with attitude of demonstrator farmer towards National Demonstration Program (NDP).

Fatimabi (1993) found a positive and significant relationship between economic motivation and attitude of agricultural labourers towards the Kerala Agricultural Workers Welfare Fund Scheme (KAWWFS)

Varma (1996), in her study on multi-dimensional analysis of self employment among farm women, revealed a negative correlation with attitude of farm women towards self-employment.

Mercykutty (1997) reported that 76.67% and 71.33% respondents were in low category with respect to their attitude towards use of bio fertilizer and knowledge in bio fertilizers respectively.

In another study, Jose (1998) found that the total independent variables studied, economic motivation, progressiveness , scientific orientation and risk orientation were positively and significantly correlated with attitude.

Negabushanam and Nanjaiyan (1998) concluded that farm women had favorable attitudes towards institutional training, which influenced by their education level, innovativeness, and decision making pattern.

Varma and Kishore Kumar (1999) observed that education, farm size, income and media participation showed significant relationship with attitude of farm women towards self employment.

2.5 Symbolic adoption of the farmers towards Integrated Pest Management and its relationship with selected socio-economic characteristics of the respondents.

Symbolic adoption is the mental acceptance of an idea or an innovation feeling that the innovation is appropriate for adoption .Such a decision is presumed to lead to trial use and eventually to continued use adoption.

Sashidharamurthy (1979) observed that the treatment of wall newspaper plus slide show found superior over wall newspaper plus flannel graph and wall newspaper plus flash cards in influencing the symbolic adoption behaviour of dairy farmers.

Narasaraj (1981) concluded that in order to attain changes in symbolic adoption behaviour of farmers, any one of the three combinations methods, namely folder plus chart, folder plus slide show and chart plus slide show can be used as they do not differ in their impact.

Chandrakandan (1982) reported that education had significant positive correlation towards symbolic adoption.

Sadaqath (1987) revealed that the education, family income had a negative correlation with symbolic adoption of the respondents.

Ambasta (1986) defined symbolic adoption as the decision made by the farmers to adopt innovations with respect to summer paddy and dwarf wheat.

Umamahesha and Channegowda (1989) reported that education extension contact, extension participation, social participation, social participation, mass media utility are the intervening variables known to influence the farmers behaviour to develop symbolic adoption.

Singh and Singh (1990) revealed that education explained variation in symbolic adoption to the extent of 50percent. Also reported that risk preference and extension contact has more to contribute to symbolic adoption.

Malleshagowda (1993) reported 75percent symbolic adoption with combining film shows and group meeting as extension teaching methods in a field experiment.

Jayesubramanian (1996) reported a non significant relationship with the education level of respondents and symbolic adoption. He also stated that farming experience and annual income has no association with their symbolic adoption.

Jose (1998) obtained a significant positive correlation of social participation, innovativeness, and risk orientation with symbolic adoption of farmers towards plant based pesticides.

Jeyakumar and Manoharan (1999) reveals that about two thirds (68.33%) of the total respondents had symbolically accepted to adopt sericulture enterprise, through video education.

2.6 Studies on effectiveness of different extension teaching methods.

Dent (1949)) observed that each aid has its place and there is a place of each in nearly every situation. He further mentioned that effective use of the aids can be brought out by following the principle of the right aid in the right way at the right time to the right people for giving the right message by the right person.

Hass and Packer (1955) says that use of single slide can vitalise entire teaching session. One slide can make a topic or a lesson remain vividly in the memory of the learner.

Weaver and Bollinger (1963) elaborated the role of slides by stating that, slides can never be best when motion is necessary. Slides are very helpful during a lecture or discussion to amplify a point or clinch essential facts. There is limitless amount of subject matter that may be placed on slides which does not involve for complete understanding.

Bhaskaram and Mahajan (1968) found that the combination of extension methods with flash cards plus method demonstration was very effective in imparting knowledge and adoption in cotton farmers.

In their work, Pandey and Roy (1977) reported that discussion mode was found to be more effective in ensuring gain and retention of the knowledge than straight talk in farm broadcast.

Suryaprakash (1979) reported that exhibition with slide show was not effective to increase the of knowledge level among young farmers.

Bharadwaj and Hansra (1983) reported that printed matter followed by discussion were found to be more effective in imparting knowledge to the members of ladies 'charcha mandals'.

Roy and Khanna (1985) reported that the three mode of communication namely straight talk, discussion and drama resulted in distinct gain in knowledge. They concluded that three modes may therefore be used for communicating message to rural home makers.

Shah and Gupta (1986) studied the effectiveness of three visual aids namely flash cards, slides and puppets and found that flash cards were significantly superior to the other two in imparting knowledge in non-formal education programme.

Malviya and Verma (1987) reported after conducting a field experiment to study media must effectiveness, and the results have confirmed that flip chart plus flash card in combination with lecture or demonstration have proved to be most effective for five messages on improved home practices.

Study conducted by Singh and Verma (1987) concluded that there was a significant gain in knowledge through the slide stories.

Hosamani (1988) revealed that the combination lecture plus overlay chart plus IPC was better than lecture plus over lay chart in an experiment study conducted to study knowledge and adoption level of tribal farmers.

Sadaquath (1989) reported, that group meeting plus flip chart or group meeting plus specimen had significant influence on the participation groundnut farmers of Dharwad taluk to acquire significantly more information to Dh-8 groundnut crop than the control. He also says that group meeting plus flip chart was more effective than other combination in retention of knowledge.

Santhosh (1990) reported that slide was most effective visual aid in terms of gain in knowledge when used in combination with lecture method.

Malleshagowda (1993) says that the combination of film show plus group meeting was better than single treatment on attaining knowledge and symbolic adoption of farmers.

Jose (1998) reported that, the most effective combination of extension method was lecture plus group discussion plus method demonstration to enhance the knowledge level with respect to plant based pesticides.

Biradar and Sundaraswamy (1998) revealed that knowledge gain was doubled by the combination pamphlet plus video show as compared to knowledge gain by lecture alone.

2.7 Constraints in adoption of recommended technology

Nair (1969) in his experiment reported that lack of knowledge, non availability of inputs, high cost of fertilizers, insufficient labour supply and erratic rainfall as the important reasons for non adoption and partial of the practices of paddy cultivation.

Pandya and Trivedi (1980) defined constraints as those items or difficulties or problems faced by individual in the adoption of a technology.

Prakash (1989) identified high wage rate, small sized holdings, incidence of pest and diseases and non-availability of inputs in time as major constraints in rice cultivation.

Govind (1992) observed that lack of assured irrigation was found to be the most serious constrain among both the IPM and non IPM farmers. Inadequacy of inputs was another constraint experienced by a large percentage of farmers.

Ramachandran (1992) reported that lack of input supply in time, lack of timely guidance and supervision, lack of information regarding package of practices recommendation of the variety and poor quality of seeds.

Geethakutty (1993) while analysis of the fertilizer use behaviour or rice farmers in Kerala revealed lack of knowledge, about fertilizer use, lack of assured irrigation facilities, high cost of fertilizers, high rate of labour wages and increased incidence of pest and disease as the major constraints.

Bhaskaran and Sushama (1994) cited lack of infrastructural facilities, absence of technological options and inadequate training for farmers as constraints in transfer of technology.

Manju (1997) reported that emergence of new pest and diseases, increased pest and diseases and low productivity were the most important constraints perceived by the farmers in the case of indigenous technology adoption.

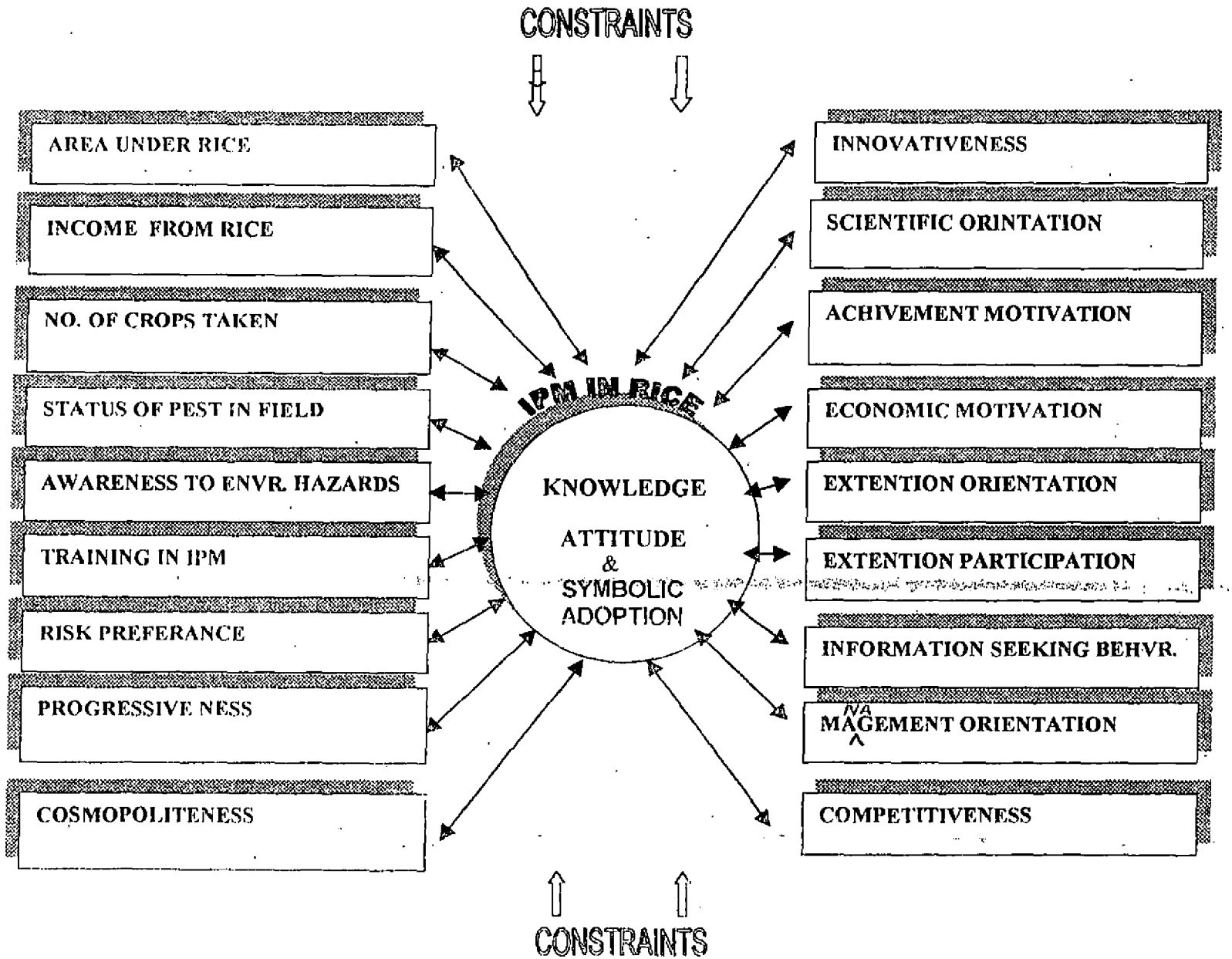
In his study, Manoj (1998) observed that increase use of plant protection chemicals, difficulty in preparation/adoption of plant protection chemicals difficulty in the selection of alternate chemicals, inadequacy of capital, non-availability of labour and lack of knowledge about technology are the major constraints faced by vegetable farmer.

2.8 **Conceptual framework of the study**

The main objective of the conceptual framework developed in this study is to provide an abstract view of the knowledge, attitude and symbolic adoption of the respondents on Integrated Pest Management in rice cultivation and their interaction with personal, socio-economic and psychological characteristics. The framework is expected to facilitate theoretical and empirical analysis of the dependent variable i.e. knowledge, attitude and symbolic adoption.

It is an accepted fact that the dependent variables are influenced by the independent variables which are the personal, socio-economic and psychological characteristics of the respondents. These factors are invariably associated with each other and hence a wholistic view of all these factors would give a clear picture of dependent variables under study.

CONCEPTUAL FRAME WORK OF THE STUDY



Methodology

CHAPTER III

METHODOLOGY

The methodology chapter includes the following heads.

3.1 Locale of the study
3.2 Selection of sample
3.3 Operationalization and measurement of variables
3.4 Methods used for data collection
3.5 Statistical tools used for the study

3.1 Locale of the study

The study was conducted in Thrissur district. Pananchery, one of the predominant rice growing Panchayat in the district was selected for the study. Map showing the area is presented in Fig.2

For study purpose the major pests and disease that are encountered in the season were identified, after with the help of farmers, Agricultural officer and experts from the Kerala Agricultural University. Leaf folder was the major pest identified and the disease include blight and blast. Slides were prepared, showing the stages, symptoms and control aspect. The expert scientists from the Kerala Agricultural University were invited to handle the lectures,; and to help the farmers with their doubts in the discussion section.

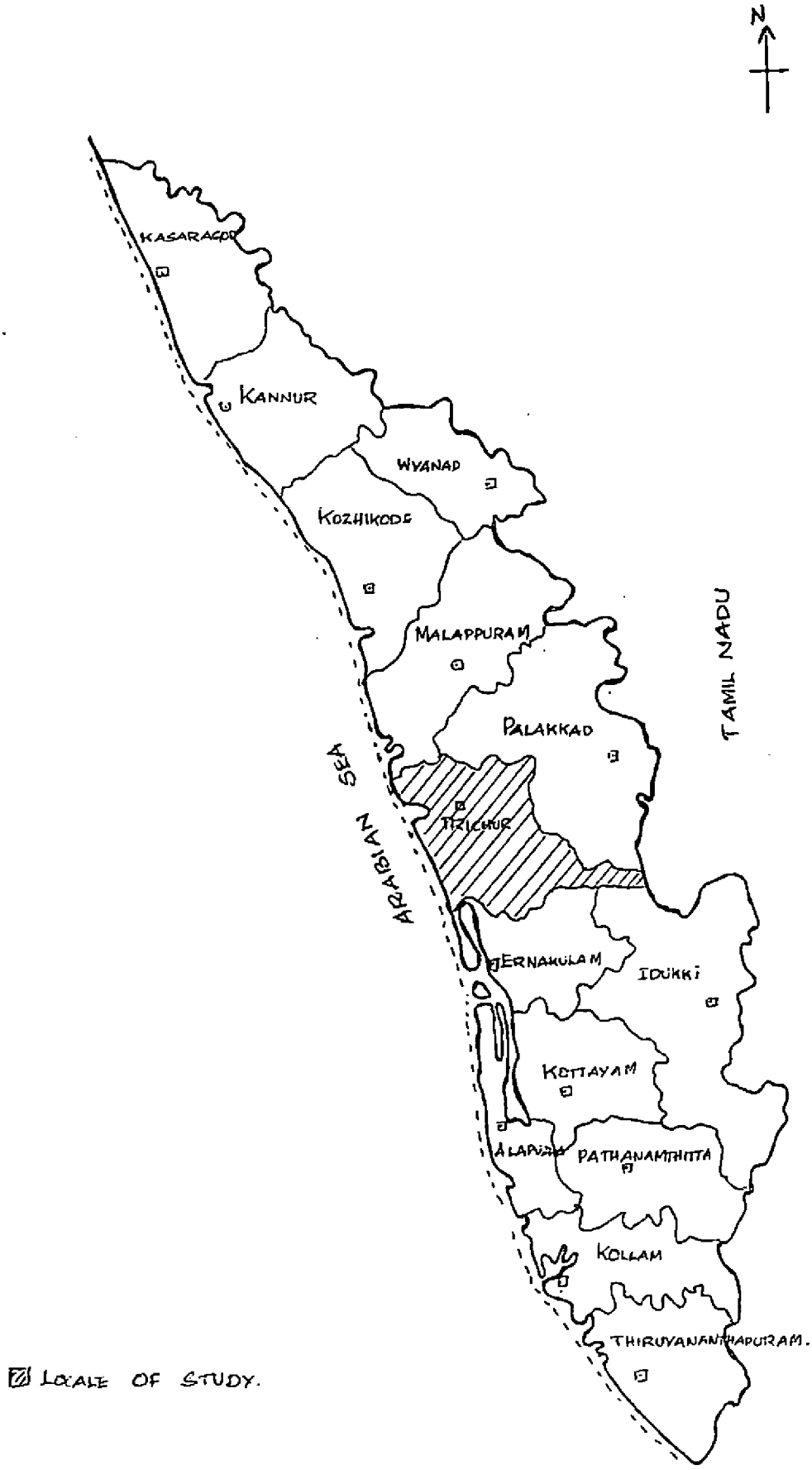


FIG 2(a) MAP OF KERALA SHOWING THRISSUR DISTRICT

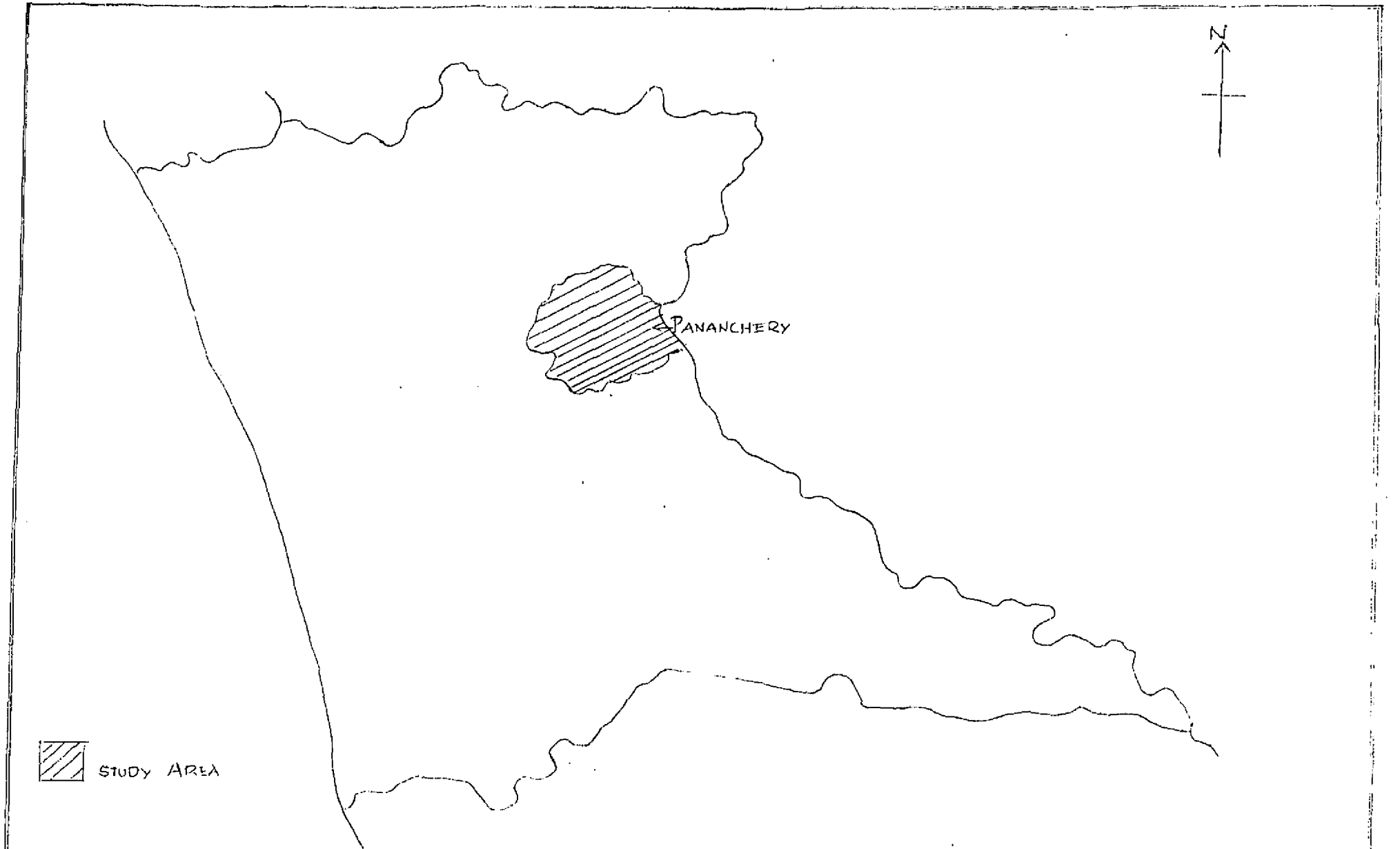


FIG 2(b) MAP OF THRISSUR DISTRICT

3.2 Selection of the sample

List of rice growers in the Panchayat was prepared after consulting the Agricultural officer, Padasekharam Samithis etc. A sample size of 120 was selected from this. To divide these 120 farmers in 4 non-overlapping clusters of 30 each, a pilot study was undertaken.

Homogeneous samples based on location were selected and the treatments were administered to these samples.

Research design

The study was conducted with an experimental research design with before and after treatments of the identified stimuli.

Number	Treatment
T1	Lecture alone
T2	Lecture + slide
T3	Lecture + slide + discussion
T4	Control

The respondents were introduced to the concept of IPM and the IPM methods used to control important pest & disease during the first crop season; with the help of experts in Agrl. Entomology and Plant Pathology.

Before the treatments are booted data were collected on the major dependent variables namely knowledge, attitude and symbolic adoption separately for each group and the results were compared.

3.3 Operationalisation and measurement of variables under study

3.3.1 Operationalisation and measurement of independent variables

3.3.1.1 Area under rice

This was operationally defined as the extent of land cultivated under rice. This is expressed in cents

3.3.1.2 Income from Rice Cultivation

This was operationally defined as the net income derived from rice cultivation for one year. It is expressed in Rupees.

3.3.1.3 Economic Motivation

Economic motivation refers to the extent to which an individual is oriented towards achieving maximum economic ends such as maximisation of the product. This variable was measured using the scale developed by Supe (1969) to measure economic motivation. The scale has four statements which were scored in three point continuum as follows;

Category	Score
Agree	3
Undecided	2
Disagree	1

The scoring pattern was reversed in the case of negative statements.

3.3.1.4 Cosmopoliteness

Rogers (1962) defined cosmopoliteness as the degree to which an individual's orientation is extended to a particular social system.

In the present study it was operationalized as the tendency to be in contact with outside world, under the belief, that all needs if individual cannot be satisfied within his own limits.

This variable measured using scale developed by Desai (1981) with slight modification. Two dimensions of the scale were :

a. Frequency of visits to the nearest town

b. The purpose of visit to the town in a month.

Scoring Pattern

a. Frequency

Item	Score
Every day	6
Twice or more a week	5
Once a week	4
Once a fortnight	3
Once in a month	2
Very rarely	1
Never	0

b. Purpose of visit to the nearest town

Item	Score
To get more exposure and maintain social relation	2
Purchase/sale	1
Entertainment	0

The total score of cosmopoliteness for each respondent was calculated by adding the score of the two dimensions of cosmospoliteness.

3.3.1.5. Extension Orientation

This was operationally defined as the extent of contact of a farmer with different extension agencies. The method followed by Kareem (1984) was used for quantifying this variable. The extension orientation was measured as the frequency of farmer's contact with extension personals

The categories of extension personnel included in the study are Assistant Director of Agriculture, Agricultural Officers, Agricultural Assistant, Scientists, Panchayat President, Bank officials.

frequency of contacts was measured by using scoring procedure of Kareem (1984)

Category of response	Score
Twice or more a week	4
Once a week	3
Once a fortnight	2
Once a month	1
Never	0

3.3.1.6 Extension Participation

Extension Participation was operationalized as the frequency of participation of the individual respondent in different extension activities conducted for the past one year. Extension activities conducted to evaluate the extension participation of the respondents were study tours, farm fair, meetings, demonstrations and others.

The respondents participation in the above extension activities for the past one year was the index used to arrive at extension participation score as below.

Category of response	Score
Attended whenever conducted	2
Attended occasionally	1
Never attended	0

3.3.1.7 Progressiveness

This refers to relative receptivity of the farmer towards modern values and practices.

The scale used by Balasubramaniam (1992) was adopted here to measure progressiveness. The scale consisted of four statements and the respondents were asked to state whether they agree or disagree in three point continuum.

Response	Score
Agree	3
Undecided	2
Disagree	1

3.3.1.8 Competitiveness

Competitiveness was operationalized as the degree to which a farmer is oriented to place himself in a competitive situation in relation to other for projection her excellence in farming.

In the present study, the scale developed by Singh (1981) was used to determine competitive orientation of respondents with slight modification to suit the study. Instead of a five point continuum, farmers state of agreement to the response was taken.

Response	Score
Agree	1
Disagree	0

The score obtained thus was summed up to obtained total score of the respondents competitiveness.

3.3.1.9 Innovativeness

This was operationalized as the degree of which the respondent was relatively earlier in adoption new ideas. The procedure followed by Singh and adopted by Selvanayagan (1986) was used to measure the innovativeness of the farmer.

In this procedure, a question was asked as to when the farmer would like to adopt an improved practice in farming.

Response	Score
As soon as it is brought to my knowledge	3
After I have seen other farmers tried successfully in the farm	2
I prefer to wait and take my own time	1

3.3.1.10 Management Orientation

Management Orientation was operationalized as the degree to which rice farmers are oriented towards the concept of IPM, comprising planning, production and marketing function.

Scale developed by Samantha (1977) was used which, consists of five statements, from planning, production and marketing functions.

Under each group, positive and negative statements are mixed retaining at the same time more or less psychological order of the statements. Positive statements were assigned a score 1 and 0 for the negative statements. The scores are summed up corresponding the response pattern, which gives the score for Management Orientation of the respondent.

3.3.1.11 Achievement Motivation

McClelland (1961) defined achievement motivation as the desire to do well, not so much for the sake of social recognition or prestige, but to attain an inner feeling of personal accomplishment.

In this study, achievement motivation was measured using the scale developed by Singh (1974). The scale has five items. Each items in the scale has five alternative response and the responses to each item in the scale were scored to 1 to 5. The score of respondents were obtained by adding up the scores corresponding to their response patterns.

3.3.1.12 Scientific Orientation

Supe (1969) operationalized scientific orientation as the degree to which a farmer is oriented to the use of scientific methods in decision making in farming.

For the measurement of this variable, scale developed by Supe(1969) was followed with slight modification to suit the purpose of the present study. The scale contains five statements in which some are positive and some are negative. The statements were suggested to respondents in the following scores.

Category	Score
Agree	3
Undecided	2
Disagree	1

In the case of negative statement, scoring system was reversed.

3.3.1.13 Risk Orientation

Risk orientation was operationally defined as the degree to which a farmer is oriented towards risk and uncertainty and portrayed the courage to face problems in farming.

To measure this variable, the scales adopted by Selvanayagam (1986) was used with suitable modification to suit the purpose of present study. Four statements are given. These statement were suggested to the respondents on the following scoring continuum.

Category	Score
Agree	3
Undecided	2
Disagree	1

The scoring pattern was reversed in the case of negative statements.

3.3.1.14 Rationality in decision making

Rationality in decision making can be operationally defined as the quality or the state of the respondent of being logical and high acceptability of reasonableness as perceived by the respondent. This covered the discriminating ability of a farmer to say, what, when, where, to whom and to what extent.

The scale developed by Vipinkumar (1994) was used in this study. The dimension was measured by using three multiple choice question, each with scoring pattern ranging from 1 to 0. The individual scores were added upto get the total score for rationality.

3.3.1.15 Training in IPM

Training in IPM was operationally defined as the type, number and duration of training received by a farmer related to IPM for the period of 3 to 4 years. This variable was quantified using the scale developed by Shah with slight modification to suit the present situation.

Depending on the duration of training the scores were assigned as

Duration	Score
More than four	4
Three times	3
Two times	2
Only once	1
Never	0

3.3.1.16 Awareness of Environmental Hazards

It was operationalized, as the farmers view about environmental hazards, its negative effects and other drawbacks.

Awareness of environmental hazard was measured using the scale developed by Supe (1969). The respondents were presented with 8 statements, regarding environmental hazards and are asked to mark their opinion in a three point continuum. The scoring pattern are as follows.

Item	Score
Agree	2
Undecided	1
Disagree	0

The total score is calculated and it was taken as the score for the variable for the respondent.

3.3.1.17 Status of pest in the field

Status of pest was operatonalized as the degree of pest infestation observed by the farmer in his field, based on which any plant protection measure was adopted.

this an arbitrary scale with three options are given to the respondent. The score were given as follows.

Item	Score
Very low	3
Low	2
High	1

3.3.1.18 Information seeking Behavior

This was operationalized as the extent to which a farmer seek information regarding IPM in rice from different source of communication.

Information seeking behavior referred to as the source and channels from where the respondent got technological information regarding the cultivation practices of the crop.

The procedure followed by Nair (1969) was adopted with modification to suit the specific requirement of the study. It was measured in terms of frequency of use of source channels for seeking information range from 4 to 1.

Scoring Pattern

Frequency	Score
Regularly	4
Sometimes	3
Rarely	2
Never	1

3.3.2 Operationalization of dependent variables

3.3.2.1 Knowledge level of farmers towards Integrated Pest Management in Rice

Knowledge about Integrated Pest Management was operationalized as the extent of information possessed by a farmer regarding the concept and implementation of Integrated Pest Management practices in Rice. Level of knowledge in terms of awareness, principle and procedure was also recorded.

In the present study, the gain in knowledge was measured using the procedure used by Sureshkumar (1994). A simple teacher made test comprising of yes or no question, and 'name the following' type were prepared based on the review of relevant topic and discussion with experts.

A set of 12 questions, four each from awareness, principle and procedure side was used. The total number of correct answer in each section gives the total score of knowledge.

3.3.2.2 Attitude of farmers towards Integrated Pest Management in rice

Attitude was operationalized as the degree of positive or negative effect of the farmer associated with the practices of Integrated Pest Management in rice.

Attitude scales have been constructed by different researchers to suit their own side. A well constructed attitude scale consists of a number of items that have been just as carefully edited and selected with certain criteria as the items contained in any standardized psychological test. Tripathi *et al* (1982) used Likert (1932) techniques of five point rating scale for measuring the attitude of gram sevaks towards Community Development Programme. Mercykutty (1997) followed Likerts summated rating techniques while studying transfer to technology of bio fertilizers, to construct attitude scale. The same method was followed by Jose (1998) to find out the attitude of farmers towards plant based pesticide.

In the present study also Likerts summaries rating technique was adopted. The first step was collection of statements regarding different aspects of Integrated Pest Management in rice on the basis of review of literature and discussion with experts of Kerala Agricultural University. Care was taken to develop a universe of context following the criteria explained by Likert. The collected statements were edited by comparing against the criteria described by Edwards (1957). Out of the 50 statements, 19 were selected after editing. Care was taken to include both positive and negative

statements on IPM in rice.

The edited statements are administered to 30 non- sample respondents. They were asked to respond to each statement in terms of their own agreement or disagreement with the statements on a five-point continuum as follows.

Strongly agree	(SA)
Agree	(A)
Undecided	(UD)
Disagree	(DA)
Strongly disagree	(SDA)

After collecting the responses from the farmers, these statements were subjected to item analysis. The purpose of item analysis is to examine how well each statement discriminates between respondents with different attitudes.

The procedure involved in item analysis as suggested by Edwards (1957) was followed. The total score of each respondent was found out by summing up the scores obtained for all the statements in the list. The various responses were assigned numerical weights such as 'strongly agree'-4, agree-3, undecided-2, disagree-1 and strongly disagree-0 for positive statements and reversed in the case of negative statements. Thus the total score of individual was the summation of numerical weights assigned to the responses. The responses were arranged in the descending order of the total scores. From these 25 per cent of the subjects with the highest total score were taken up for item analysis. It was assumed that these two groups provide the criterion groups in terms of which one can evaluate the individual statement. The following formula was

used for evaluating the responses of high and low group of each statement.

$$t = \frac{X_H - X_L}{\sqrt{\frac{S_H^2}{nH} + \frac{S_L^2}{nL}}}$$

Where

X_H = the mean score as a given statement for the high group

X_L = the mean score as a given statement for the low group

S_H^2 = The variance of the distribution of responses of the high group statement.

S_L^2 = the variance of the distribution responses of the low group to the statement

nH = The number of subjects in high group

nL = the number of subjects in the low group

The value of 't" is a measure of the extent to which a given statement differentiates between the high and low groups.

Statements with 't' value were arranged in ascending order of magnitude and twelve statements having the maximum t values were selected for the final scale which was considered six positive and six negative statements. The statements with their 't ' values were appended.

To measure the attitude towards the use of IPM practices in rice, the respondents were asked to express their opinion in these statements.

The responses to these statements were collected on a five point continuum.

Category	Score
Strongly agree	4
Agree	3
Undecided	2
Disagree	1
Strongly disagree	0

For negative statements, the scoring pattern was reversed. The total score was obtained by summing up the score for each statement, which gave the attitude of farmer towards Integrated Pest Management in rice.

3.3.2.3 Symbolic adoption of farmers towards IPM

Symbolic adoption was operationalized as the mental acceptance of a technology, by the farmer when he was provided with an appropriate technology.

Extent of symbolic adoption was measured using the scale developed by Ramkumar (1982).

To know the symbolic adoption, the farmer were introduced to a set of practices, and asked to respond whether they are ready to adopt or not adopt the technique or practice if a chance is given.

For each practice, a score of one for symbolic adoption and zero for non adoption was given.

$$\text{Symbolic adoption index} = \frac{\text{Respondent's score}}{\text{Total Score}} \times 100$$

3.3.3 Measurement of Intervening Variable

3.3.3.1 Constraints in the adoption of plant based pesticides

Based on the discussion with farmers and also through relevant literature, constraint faced by farmers were listed.

The list contained these constraints were presented to the respondents.

The response was scored in a three point continuum namely "agree", "undecided ", "disagree" with points 3,2 and 1 respectively. Scores obtained for each constraint was added and ranked.

3.4 Methods used for data collection

Basic data was collected by conducting a bench mark survey using structured schedules. Besides, data was collected periodically before and after exposing the farmers to the experiment using a pre tested structured interview schedule. All the three treatments were administered in three experimental group within a time span of seven days

3.5 Statistical tools used in this study

The statistical tools used in this present study are as follows:

1. Correlation analysis

Correlation coefficient is a measure of the association between two variables. The correlation coefficient (*r*) was worked out to arrive at the relation between the dependent variables and the selected socio- economic variables of the respondents.

Students t - test at (n-2) degrees of freedom was used to test the significance of the observed correlation coefficient.

2. Multiple regression analysis

Multiple regression analysis was done to determine the net contribution of each selected socio- economic variables to the dependent variable and to know the percentage of variation that a set of independent variables jointly explain in the dependent variable.

A significant value for R^2 suggest the reliability of the regression model in predicting the dependent variables . The test of significance of regression coefficients was carried out with the help of t- values computed

3. Percentage analysis

Percentage were calculated for making simple comparisons among the different groups.

4. "t" test

The "t" test was used to test the significance of the difference between means of knowledge, attitude and symbolic adoption before and after exposure to various treatments.

Results

CHAPTER IV

RESULTS

The major findings of the present study is furnished under the following heads:

4.1 Distribution of respondents based on knowledge, attitude and symbolic adoption about Integrated Pest Management in rice.

4.2 Distribution of respondents based on selected socio-economic variables of respondents about Integrated Pest Management in rice.

4.3 Influence of respondents selected socio-economic and personal variables on knowledge about IPM in rice

4.4 Influence of respondents selected socioeconomic and personal variables on attitude about IPM in rice.

4.5 Influence of Respondent personnel and socio- economic and personal variable on symbolic adoption of IPM in rice.

4.6 Impact of audio- visual aids and extension methods on the knowledge, attitude and symbolic adoption of respondent towards IPM in rice.

4.7 Constraints in the use of IPM practices in rice.

4.1 Distribution of respondents based on knowledge, attitude and symbolic adoption about Integrated Pest Management In rice.

The distribution of respondents based on knowledge attitude and symbolic adoption of integrated pest management practices in rice cultivation is expressed in frequency and percentage. The results are shown below

TABLE . 1 Distribution of respondents based on knowledge, attitude and symbolic adoption about Integrated Pest Management In rice.

n=120

Sl. No	Items	Category	Score	Frequency	%
1	Knowledge about IPM in rice	High	> 42.7&above	66	55
		Low	< 42.7	54	45
2	Attitude towards IPM in rise	High	> 11.43& above	34	28
		Low	< 11.43	86	72
3	Symbolic adoption of IPM in rice	High	> 44.6& above	45	38
		Low	< 44.6	75	62

Out of the total 120 respondents studied 55 % were under high knowledge category. In the case of attitude and symbolic adoption, 72% and 62% of the respondents were under low category respectivel

4.2. Distribution of respondents based on selected socio-economic variables of respondents about Integrated Pest Management in rice

The distribution of respondents based on the selected independent variables are arrived at with the help of simple percentage analysis ;and are furnished below.

TABLE 2 Distribution of respondents based on selected socio-economic variables of respondents about Integrated Pest Management in rice. n=120

S.No	Items	Category	Score	Frequency	%
1	Area under rice	High	>112.36& above	78	65
		Low	< 112.63	42	35
2	Income from rice	High	> 2.7 & above	50	42
		Low	< 2.7	70	58
3	No. of crops taken	High	> 2.28 & above	16	13
		Low	< 2.28	104	87
4	Innovativeness	High	> 1.96 & above	36	30
		Low	< 1.96	84	70
5	Scientific orientation	High	> 10.52 & above	40	33
		Low	< 10.52	80	67
6	Achievement motivation	High	> 11.54 & above	44	37
		Low	< 11.54	76	63
7	Economic motivation	High	> 9.3 & above	40	33
		Low	< 9.3	80	67
8	Risk preference	High	> 9.14 & above	77	64
		Low	< 9.14	43	36
9	Progressiveness	High	> 7.56 & above	56	47
		Low	< 7.5 6	64	53
10	Extension orientation	High	> 5.46 & above	54	45
		Low	< 5.46	66	55
11	Extension participation	High	>9.27 & above	43	36
		Low	< 9.27	77	64
12	Cosmopoliteness	High	> 9.47 & above	45	38
		Low	< 9.47	75	62
13	Information seeking behavior	High	> 9.47 & above	48	40
		Low	< 9.47	72	60
14	Management orientation	High	> 27.91 & above	45	38
		Low	< 27.91	75	62
15	Status of pest in field	High	> 2.39 & above	87	73
		Low	< 2.39	33	27
16	Competitiveness	High	> 2.38 & above	59	49
		Low	< 2.38	61	51
17	Training in I P M	High	>1.29 & above	85	71
		Low	< 1.29	35	29
18	Awareness to environmental hazards	High	> 20.52 & above	52	43
		Low	< 20.52	68	57

Distribution of respondents based on the selected independent variables showed that the majority of respondents were low regarding number of crops taken (87%), Innovativeness (70%), scientific orientation (67%), achievement motivation (63%), economic motivation (67%), progressiveness (53%), extension orientation (55%),extension participation (64%), cosmopoliteness (62%), information seeking behavior (60%), management orientation (62%), competitiviness (51%), income from rice (58%) and awareness to environmental hazards (57%)

The respondents were high regarding training received on IPM (71%), risk preference (64%) and area under rice (65%).

4.3 Influence of respondents personal and socio- economical variables on knowledge about IPM in rice cultivation.

The respondents of the present study was divided into four homogeneous groups of 30 each.

A set of 18 variables were studied to establish their relationship with the dependent variable knowledge.

4.3.1 Simple correlation analysis of knowledge about integrated pest management in rice.

The results of simple correlation revealed that out of 18 variables studied, 11 of them were positively and significantly related with the knowledge. High correlation was noticed with six variables. Non significant relation was obtained with seven independent variables

TABLE .3 Simple correlation analysis of knowledge about integrated pest management in rice. **(n=120)**

S.I. No	Independent Variables	Correlation Coefficient
1	Area under rice	0.2503 NS
2	Income from rice	0.1832 NS
3	No. of crops taken	-0.0124 NS
4	Innovativeness	-0.074 NS
5	Scientific orientation	0.4654 * *
6	Achievement motivation	0.4735 * *
7	Economic motivation	0.4450 * *
8	Risk preference	0.0569 NS
9	Progressiveness	0.4497 * *
10	Extension orientation	0.1761 NS
11	Extension participation	0.5618 * *
12	Cosmopoliteness	0.4821 * *
13	Information seeking behavior	0.5930 * *
14	Management orientation	0.6014 * *
15	Status of pest in field	0.6176 * *
16	Competitiveness	0.5256 * *
17	Training in I P M	0.5618 * *
18	Awareness to environmental hazards	0627 NS

* Significant at 5% level

** Significant at 1% level N S Not significant

The result indicated that the independent variables scientific orientation, achievement motivation, economic motivation, progressiveness, extension participation, cosmopolitness, information seeking behavior, management orientation, status of pest in field, competitiveness and training in IPM showed a positive and significant correlation with knowledge. All other four variables were non significant.

4.3.2 Results of multiple regression analysis of knowledge on IPM in rice and selected socio- economic variables under study.

Results of multiple regression analysis of knowledge on IPM in rice and selected socio- economic variables under study are given in table - 4

TABLE.4 Results of multiple regression analysis of knowledge on IPM in rice and selected socio- economic variables under study

(n=120)

S.I. No	Independent Variables	Regression Coefficient	Standard error	"t" value
1	Area under rice	-0.038331	0.031900	-1.202 NS
2	Income from rice	4.193132	1.637799	2.560*
3	No. of crops taken	-4.205960	1.619943	-2.596*
4	Innovativeness	0.214842	0.008248	-0.108 NS
5	Scientific orientation	-0.988451	1.310039	-0.775 NS
6	Achievement motivation	0.134349	0.957179	0.140 NS
7	Economic motivation	1.245561	0.986427	1.263 NS
8	Risk preference	-1.925477	0.694750	-2.771**
9	Progressiveness	1.852120	0.939022	1.972*
10	Extension orientation	0.341638	1.79712	0.290 NS
11	Extension participation	-0.195449	0.495018	-0.395 NS
12	Cosmopoliteness	-1.376330	1.060102	-1.298 NS
13	Information seeking behavior	0.655164	0.37760	1.734 NS
14	Management orientation	1.684130	0.622291	2.706**
15	Status of pest in field	4.047573	2.22982	1.815 NS
16	Competitiveness	2.081587	1.764882	1.197 NS
17	Training in I P M	-0.912945	0.531569	-1.717 NS
18	Awareness to environmental hazards	1.219080	0.551397	2.211*

* Significant at 5 % level

** Significant at 1 % level NS Not significant R. Square =0.64609 F- value = 10.24349

**

The results of multiple regression analysis of knowledge level on IPM practices in rice cultivation and selected socio-economic variables revealed that, 64% variation was explained by all the selected variables. Managenent orientation, risk preference, income from rice, number of crops taken, progressiveness and awareness about environmental hazards were positively contributed to the variation in the knowledge level of the farmers with respect to IPM practices in rice cultivation.

4.4 Influence of respondents socio- economic variables under study on attitude about I P M in rice.

4.4.1 Simple correlation analysis of attitude about I P M in rice

Among 18 variables studied 14 of them showed a positive and significant relationship with the attitude of respondents towards I P M in rice. Four of the variable showed a non- significant relationship with the attitude.

The salient findings are presented in the table below

TABLE.5 Results of simple correlation analysis of respondents attitude towards IPM in rice

n = 120

S.I. No	Independent Variables	Correlation Coefficient
1	Area under rice	0.3047**
2	Income from rice	0.2459*
3	No. of crops taken	0.0124 NS
4	Innovativeness	0.0637 NS
5	Scientific orientation	0.5636**
6	Achievement motivation	0.5243**
7	Economic motivation	0.4492**
8	Risk preference	0.2624*
9	Progressiveness	0.5300**
10	Extension orientation	0.5418**
11	Extension participation	0.6050**
12	Cosmopoliteness	0.6028**
13	Information seeking behavior	0.6680**
14	Management orientation	0.7200**
15	Status of pest in field	0.6682**
16	Competitiveness	0.6691**
17	Training in I P M	0.1969 NS
18	Awareness to environmental hazards	0.1530 NS

* Significant at 5% level ** Significant at 1% level N S Not significant

The result indicated that the independent variables scientific orientation, area under rice, achievement motivation economic motivation,

progressiveness, extension participation, cosmopolitness, information seeking behavior, management orientation, status of pest in field, competitiveness, income from rice, risk preference and extension orientation showed a positive and significant correlation with attitude. The variables, no. of crops taken, Innovativeness, training in IPM and awareness to environmental hazard were non significant.

4.4.2 Multiple regression analysis of the dependent variable, attitude with selected socio- economic variable of respondents on I P M in rice.

The results of the multiple regression analysis of the dependent variable, attitude with selected socio- economic variable of respondents on IPM in rice are given in table- 6

TABLE.6 Results of multiple regression analysis of the dependent variable, attitude with selected socio- economic variable of respondents on I P M in rice

(n=120)

S.I. No	Independent Variables	Regression Coefficient	Standard error	"t" value
1	Area under rice	-0.005141	0.007779	-0.661 NS
2	Income from rice	-0.765460	0.399410	1.916*
3	No. of crops taken	-0.437234	0.395055	-1.107 NS
4	Innovativeness	-0.684681	0.485585	-1.410 NS
5	Scientific orientation	-0.702301	0.319479	-2.198*
6	Achievement motivation	0.364455	0.233427	1.561 NS
7	Economic motivation	0.622298	0.240560	2.587**
8	Risk preference	-1.085506	0.169429	-6.407**
9	Progressiveness	0.457463	0.228999	1.998*
10	Extension orientation	-0.491932	0.258527	-1.903*
11	Extension participation	0.093350	0.129634	0.720 NS
12	Cosmopoliteness	-0.010628	0.120720	-0.088 NS
13	Information seeking behavior	0.094665	0.092124	1.028 NS
14	Management orientation	0.274441	0.151758	1.808 NS
15	Status of pest in field	1.390545	0.543786	2.557**
16	Competitiveness	-0.256650	0.430401	-0.596 NS
17	Training in I P M	0.018924	0.287696	0.066 NS
18	Awareness to environmental hazards	0.078477	0.134469	0.584 NS

* Significant at 5 % level ** Significant at 1 % level NS Not significant

R. Square =0.64841 F- value = 10.34833 **

The results indicated a positive and significant relation with economic motivation, progressiveness and status of pest in field. Negative and significant relation were obtained with scientific orientation, risk preference and extension orientation; all others being non significant.

4.5 Influence of respondent's personal and socio- economic variables on symbolic adoption of I P M in rice

4.5.1 Simple correlation analysis of symbolic adoption of respondent's towards IPM in rice.

The results indicated that 14 of the 18 independent variables studied were positively correlated with the symbolic adoption of the respondent towards IPM in rice. Four of them were non- significant.

Result of simple correlation analysis are given in table-7

TABLE. 7 Results of simple correlation analysis on symbolic adoption of respondent's with selected independent variables **(n=120)**

S.I. No	Independent Variables	Correlation Coefficient
1	Area under rice	0.3909**
2	Income from rice	0.1925 NS
3	No. of crops taken	0.0506NS
4	Innovativeness	0.0351 NS
5	Scientific orientation	0.7534**
6	Achievement motivation	0.7131**
7	Economic motivation	0.6822**
8	Risk preference	0.4648**
9	Progressiveness	0.0290 NS
10	Extension orientation	0.7148**
11	Extension participation	0.7330**
12	Cosmopoliteness	0.7186**
13	Information seeking behavior	0.7688**
14	Management orientation	0.4952**
15	Status of pest in field	0.4618**
16	Competitiveness	0.2463*
17	Training in I P M	0.2733*
18	Awareness to environmental hazards	0.4468**

* Significant at 5% level ** Significant at 1% level N S Not significant

The result revealed that the independent variables scientific orientation, area under rice, achievement motivation, extension participation, cosmopolitness, information seeking behaviour, management orientation, status of pest in field, competitiveness, ,risk preference ,

extension orientation, training in IPM and awareness to environmental hazards showed a positive and significant correlation with attitude. The variables, no. of crops taken, Innovativeness, training in IPM and awareness to environmental hazard were non significant.

4.5.2 Multiple regression analysis of symbolic adoption and selected independent variables of the study.

The results of the multiple regression analysis of symbolic adoption and selected independent variables of the study are given in table- 8.

TABLE. 8 Results of multiple regression analysis of symbolic adoption and selected independent variables of the study.

n=120

S.I. No	Independent Variables	Regression Coefficient	Standard error	"t" value
1	Area under rice	0.033586	0.037281	0.901 NS
2	Income from rice	-0.433083	1.378723	-0.314 NS
3	No. of crops taken	-2.540680	1.893220	-1.342 NS
4	Innovativeness	-2.138408	2.327066	-0.919 NS
5	Scientific orientation	0.940585	1.531036	0.614 NS
6	Achievement motivation	-0.974744	1.118651	-0.871 NS
7	Economic motivation	3.447911	1.152833	2.991**
8	Risk preference	-0.899448	0.811951	-1.108 NS
9	Progressiveness	-0.392458	0.644415	-0.609 NS
10	Extension orientation	1.078830	1.238936	0.871 NS
11	Extension participation	-0.182065	0.621242	-0.293 NS
12	Cosmopoliteness	-0.17985	0.578525	-0.031 NS
13	Information seeking behavior	-0.034145	0.441487	-0.077 NS
14	Management orientation	1.836699	0.727268	2.525**
15	Status of pest in field	6.371738	2.605980	2.445*
16	Competitiveness	-0.145623	2.062609	-0.071 NS
17	Training in I P M	5.566283	1.914088	2.908**
18	Awareness to environmental hazards	0.455018	1.097431	0.415 NS

* Significant at 5 % level ** Significant at 1 % level NS Not significant

R. Square =0.76545 F- value = 18.31222 **

The multiple regression analysis showed a positive and significant relation with economic motivation, management orientation, status of pest and training in IPM with the symbolic adoption of the respondent.

4.6 Impact of Extension methods and audio visual aids on knowledge, attitude and symbolic adoption of IPM in rice.

The four groups selected were exposed to different treatments like T1 ie lecture alone, T2 with lecture + slide show and T3 with lecture + slide show discussion, T4 being the control

The results are furnished below as Table-9.

TABLE 9. The mean values of respondents knowledge, attitude e and symbolic adoption before and after the treatments

Treatment	Dependent variable	Before treatment	After treatment	t- value
T1	Knowledge	43.9	56.5	12.8708**
	Attitude	46.9	54.4	7.4923**
	Symbolic adoption	11.53	13.6	10.7983**
T2	Knowledge	46.2	79.7	13.3754**
	Attitude	48.2	82.3	10.7965**
	Symbolic adoption	11.43	14	10.8457**
T3	Knowledge	40.5	82.5	23.0481**
	Attitude	50.8	87.5	21.8952**
	Symbolic adoption	11.87	15	14.9659**

** Significant at 1% level

The results indicated all the treatment were significant with respect to the t-values. Maximum knowledge gain, increase in attitude and symbolic adoption was noted in T3.

4.6.1 Pooled analysis of three treatments

TABLE. 10 Pooled analysis

	Knowledge			**Attitude**	**Symbolic adoption**	
Treatment	Before	After	Before	After	Before	After
T1	43.9	56.5	46.9	54.4	11.53	13.6
T2	46.2	79.7	48.2	82.3	11.87	14
T3	40.5	82.5	50.8	87.5	11.43	15

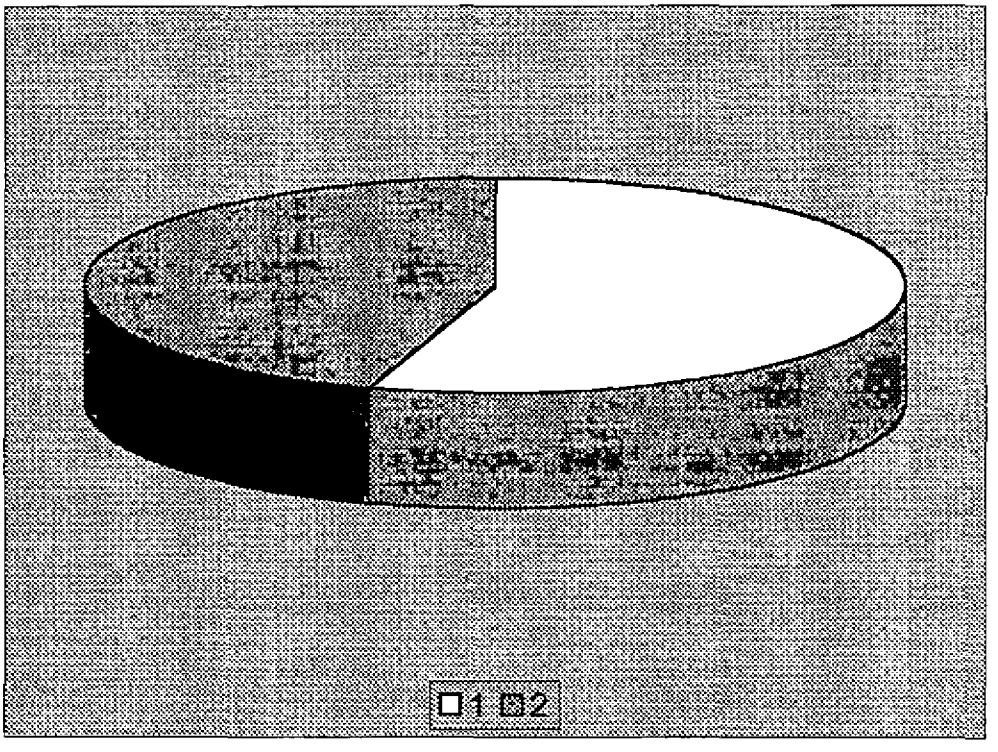
4.7 Constraints in the adoption of I P M in rice

The major constraints experience by the farmers are presented below . In the rank order based on the importance with which they were felt by the farmers.

TABLE 11 Constraints in the adoption of I P M in rice

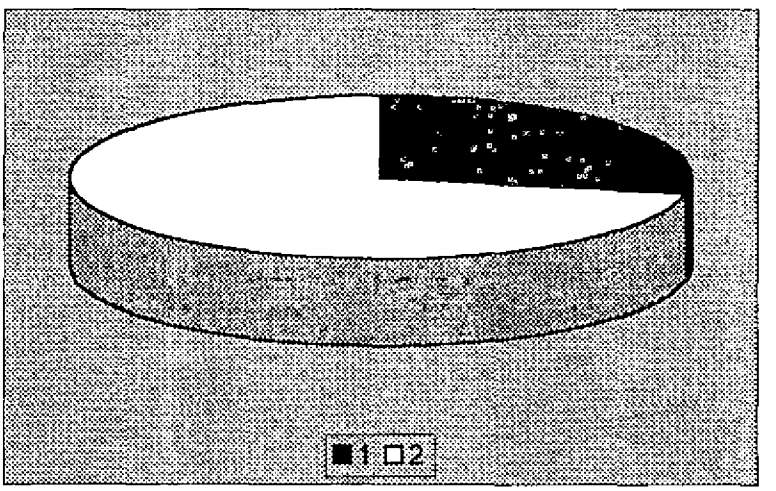
Sl No	Constraints	Score	Rank
1	Lack of expert guidance	270	I
2	Occurrence of too many pest at a time	266	II
3	Difficulty in identifying the natural enemies of specific pests	254	III
4	Non availability of labour	220	IV
5	Lack of knowledge among farmers	186	V
6	Absence of immediate results	160	VI
7	Lack of pest monitoring skill	146	VII
8	Over reliability on pesticides and chemicals	130	VIII

Fig:3 Pie diagram showing distribution of respondents based on their knowledge



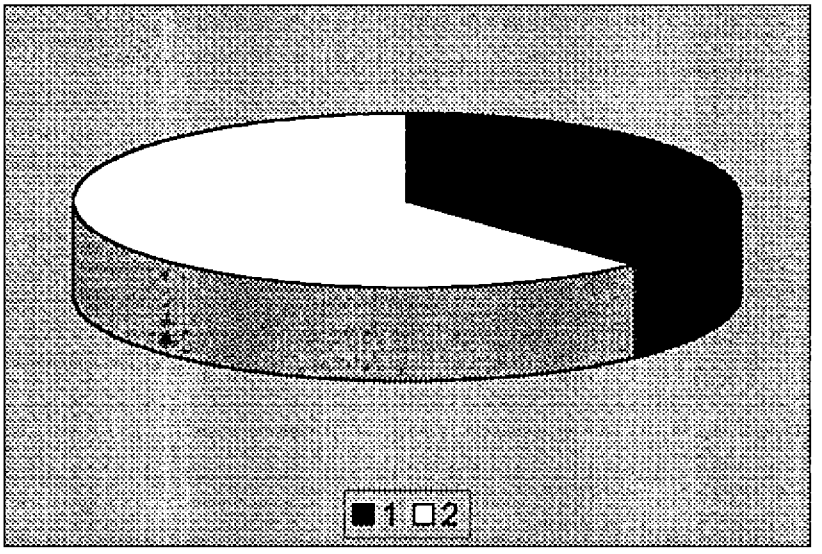
1	HIGH GROUP	55%
2	LOWGROUP	45%

Fig:4 Pie diagram showing the distribution of respondents based on their attitude



1	HIGH GROUP 28%
2	LOW GROUP 72%

Fig.5: Pie diagram showing distribution of respondents based on their symbolic adoption



1 HIGH GROUP 38%
2 LOW GROUP 62%

Discussion

CHAPTER V

DISCUSSION

The result of present study is furnished in the Chapter IV. The conclusions derived from the results of the study is presented in this chapter in the following heads:

5.1 Distribution of respondents based on knowledge, attitude and symbolic adoption about Integrated Pest Management in rice.

5.2 Distribution of respondents based on their socio-economic and personal variables under study.

5.3 Influence of selected socio economic and personal variables of knowledge about IPM in rice.

5.4 Influence of selected socio-economic and personal variables on attitude about IPM in rice.

5.5 Influence of selected socio-economic and personal variables on symbolic adoption of IPM in rice.

5.6 Impact of selected audio-visual aids and extension methods on the knowledge, attitude and symbolic adoption of IPM interests.

5.7 Constraints in the use of IPM practices in rice.

5.8 Empirical models of the study.

5.1 Distribution of respondents based on knowledge, attitude and symbolic adoption about IPM in rice.

The distribution of respondents based on knowledge, attitude and symbolic adoption of IPM in rice showed that about 55% of the respondents were in high category regarding the knowledge. In the case of attitude and symbolic adoption, majority of the respondents were in the low category i.e. 72% and 62% respectively.

Majority of the respondents in high category in the knowledge can be due to their contact with extension agencies, and participation in various activities organised by the extension agencies. Low attitude towards the concept inspite of the high knowledge can attribute to the low symbolic adoption.

In this area of rice cultivation, generally, the pest and disease problem is relatively high in the nursery as well as in the main field in the first crop season. The high rainfall, as well as high humidity levels resulting in the crop damage due to the pest and disease demands regular and intensive extension efforts on plant protection. The pest and disease control measures popularised by the extension agencies might have contributed in the increase levels of knowledge among the farming community, while the high cost of most of the inputs might have contributed in lowering attitude towards the control measures. Even in the case of Integrated Pest Management practices, the availability of bio-control measures, the cost of bio-pesticides and difficulties in carrying out the practices might also be another factor in lowering the attitude and the symbolic adoption of pest control practices.

5.2 Distribution of respondents based on their socio-economic and personal variables.

The results revealed that the respondents were high in terms of area under rice, risk preference (64%), status of pest in the field (73%), training in IPM (71%). All the other variables studied were under low category as per the table 2.

The profile of the sample indicated that, the area under rice for the respondents were relatively high along with higher incidents of pest and diseases. These observations have justified the previous findings.

The locale of the study being an area adjoining the Thrissur town, it is only natural, to get most of the farmer respondents not fully oriented towards farming, as indicated by the lower levels of their number of crops taken, scientific orientation, extension participation. With the decline in status of rice cultivation as a general feature in the state, the farmers have lesser orientation to the cultivation practices or management aspects of rice farming as reflected in the sample of the study evidence from this table. Generally education level of the respondents are high which can be attributed to the high risk preference level.

5.3 Influence of selected socio-economic and personal variables on knowledge about IPM in rice.

Simple correlation analysis of knowledge on selected independent variables of the respondents showed that out of the 18 variables studied, 11 of them were significant. Seven variables showed non significant relationship with the depending variable, knowledge. Independent variables such as scientific orientation, achievement motivation, economic motivation, progressiveness, extension orientation, extension participation, information

seeking behavior ,management orientation, status of pest in field, competitiveness and training in IPM showed significance at 1% level and area under rice at 5%level

The variables like income from rice, number of crops taken, Innovativeness, risk preference, extension orientation and awareness to environmental hazards were found to be non-significant.

It could be observed from the results that the status of pest in the field, management orientation, information seeking behavior and extension participation were highly significant among all the variables studied, in their relationship with knowledge of IPM. The cognitive needs of an individual is always fostered by the problems he is confronted within the life situations, which will help him to shape his cognitive styles. The rice farmers of this area generally effected by the pest problems often show higher degree of management orientation, information seeking behavior and extension participation, establishing significant positive relationship with their knowledge on IPM. Further, it is only natural to find the significant relationship between knowledge and training in IPM, competitiveness, cosmopoliteness, progressiveness, scientific orientation, achievement motivation and economic motivation, as these behavior also will encourage any individual in his information or in his knowledge acquisition mechanism.

In the present study, area under rice showed a positive correlation with knowledge, which is in confirmation with the results of Satheesh (1990),

Multiple linear regression results showed an R^2 value of 0.646, which means 65%of variation was explained by the significant variables related to knowledge. The results showed that out of the 18 variables subjected to analysis, six of them were significantly contributing to the knowledge level of farmers. The variables were :no of crops taken, risk preference,

progressiveness, income from rice, management orientation and awareness to environmental hazards. Out of these risk preference showed a negative significance.

The contribution of variables to the tune of 65% indicated that, these were the most important variables affecting the knowledge of IPM in rice farmers in the area. Out of all the variables studied, management orientation was found to be the most important variable contributing to change in the dependent variable. Integrated Pest Management, being a managerial skill demanding practice, involving a combination of techniques with definite time and dose sequences requires a certain level of managerial ability. Acquisition of the proper knowledge on IPM is, hence, very much influenced by these variables. Probably impairing the management orientation of the farmers may be the pre-requisite factor in popularising such Integrated management practices on pest control or crop growing or even resource utilisation as evident by the present study.

5.4 Influence of selected socio-economic and personal variables on attitude about IPM in rice.

Simple correlation of the independent variables with attitude of the respondents revealed that, out of the 18 variables studied, 14 of them were significantly related, others were not significant. The significant variables includes such as area under rice, income from rice, scientific orientation, achievement motivation, economic motivation, risk preference, progressiveness, extension orientation, extension participation, cosmopoliteness, information seeking behavior, management orientation, status of pest in field and competitiveness.

In the case of attitude towards IPM also, management orientation followed by competitiveness, status of pest in the field and information seeking behavior turned out to be highly correlated variables. The attitude formation was not found to be related to the number of crops taken, innovativeness, training, awareness to environmental hazards. Since the respondent group generally expressed a lower profile, on most of the variables as evidenced in Table-3 it is quite natural to get a positive and significant relationship between these variables and the attitude for which also the sample had a low group majority.

The multiple linear regression results revealed that variables such as income from rise, economic motivation, progressiveness, status of pest and in the field were having positive and significant relation with the attitude. Variation in the dependent variable to the tune of 64.8% was explained by the independent variable selected for this study, Status of pest in field was turned out to be the most important factor contributing to the variation in attitude towards IPM among the respondents.

Obviously, the felt problems of an individual and his life experiences are shaping the attitudes towards any psychological object. As a farmer, when a serious pest hazards, coupled with managerial disabilities tempt the individual to reinforce the lower levels of attitudes formed towards the technological options. This can be the possible reasons for the present observation in the analysis.

5.5 Influence of selected socio-economic and personal variables on symbolic adoption of IPM in rice.

Simple correlation analysis showed that out of 18 variables studied, 14 of them showed positive and significant correlation. Others are found to be non-significant.

Information seeking behaviour followed by scientific orientation, and extension participation were the most significantly related variables with the symbolic adoption of IPM practices. As explained by the adoption process models of Rogers, the information acquisition is always a preceding factor leading the mental acceptance of the innovation. Whenever information seeking behavior leading to its acquisition is high, the chances of symbolic adoption will also be relatively better. The scientific orientation of the individuals as well as the participation in extension activities also help to reinforce the cognitive domains, strengthened by information seeking. Glaringly, these three factors are turned out to be the most influensive variables, with a positive and significant relationship with symbolic adoption as evidenced in the results presented in Table-8.

Results of multiple linear regression showed a positive and significant relation with economic motivation, management orientation and training in IPM.

The R square value was 0.7654, indicating that 77% of the variation in the dependent variable could be explained by the independent variables selected for the study.

The most significantly contributing factors such as economic motivation, management orientation and training in IPM are complementary to one another. The agricultural enterprise taken up by any individual

including that of a food crop like rice, is certainly a cost benefit oriented and economic determinants always decide the fate of the enterprise. This is always supplemented by the managerial abilities of the individual to lead the enterprise into a success when this is supported by skill development through necessary training, invariably which leads to the mental acceptance of the innovations. These complimentary conditions naturally contribute to the symbolic adoption.

5.6 Impact of selected audio visual aids and extension methods in the knowledge, attitude and symbolic adoption of IPM practices in rice.

The mean values of farmers knowledge, attitude and symbolic adoption before and after treatment T1 i.e. lecture alone showed significant results in terms of t-value which showed a significant gain in terms of knowledge; similarly T2 and T3 were also effective in imparting knowledge gain increase symbolic adoption and attitude towards IPM practices.

From the analysis of the different treatments given in Table-9 it could be observed that there were substantial improvements in knowledge attitude and symbolic adoption at 1% level of significance due to the treatment stimuli.

Among the treatments, T3, involving lecture, slide show and discussion, was the most effective one. Involvement of more number of senses increase the participation of the respondents thereby reinforcing the concept more in the third treatment compared to other two.

This result is in conformity with that of Santhosh (1990) who got a significant effectiveness using slides as an alternate visual aid to flannel graphs.

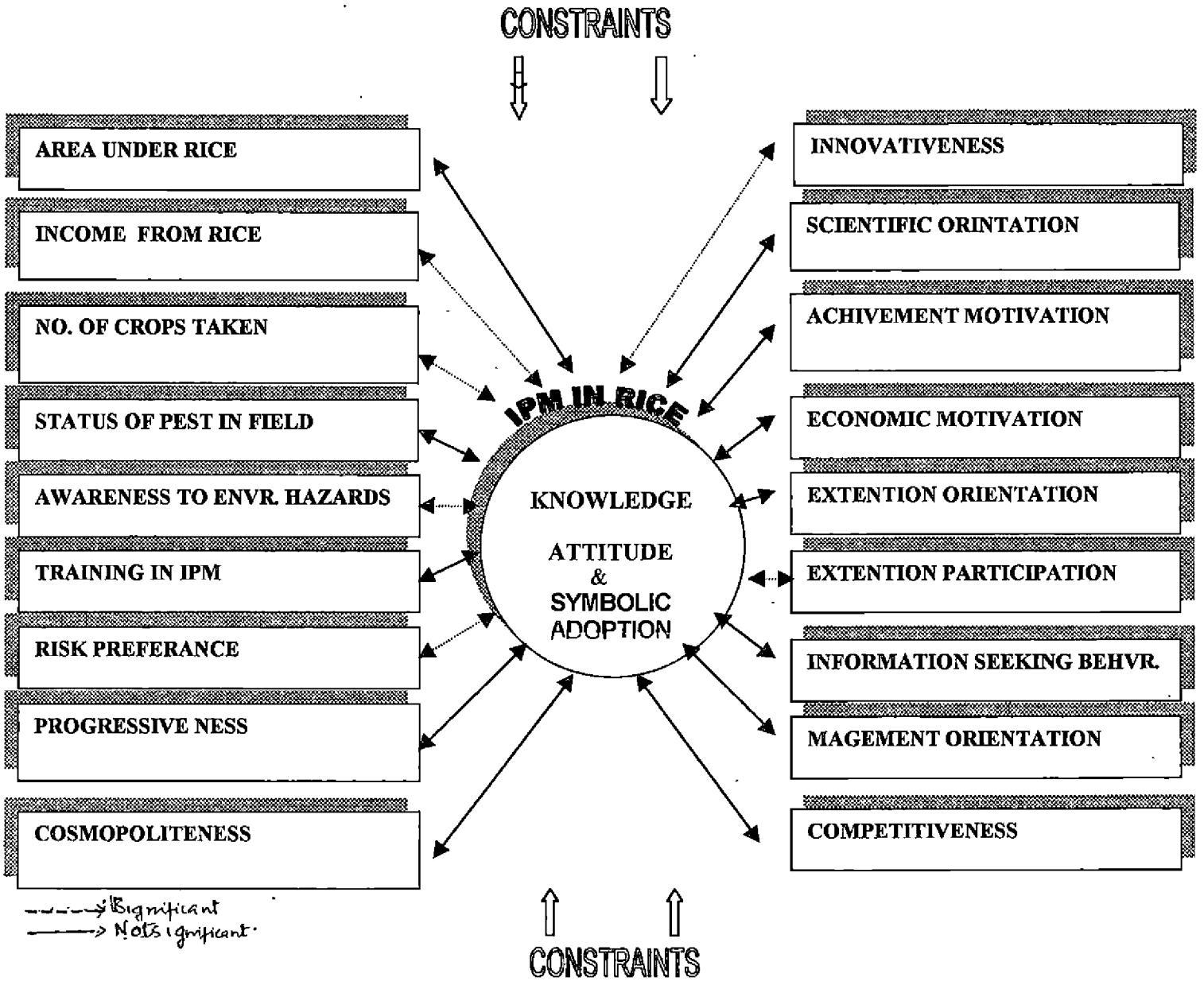
A similar study on plant based pesticides is also in line with the results obtained in the present study. Jose (1998) reported that when lecture was used in combination with method demonstration and discussion gain in knowledge, attitude and symbolic adoption was noticed.

5.7 Constraints in the adoption of IPM practices.

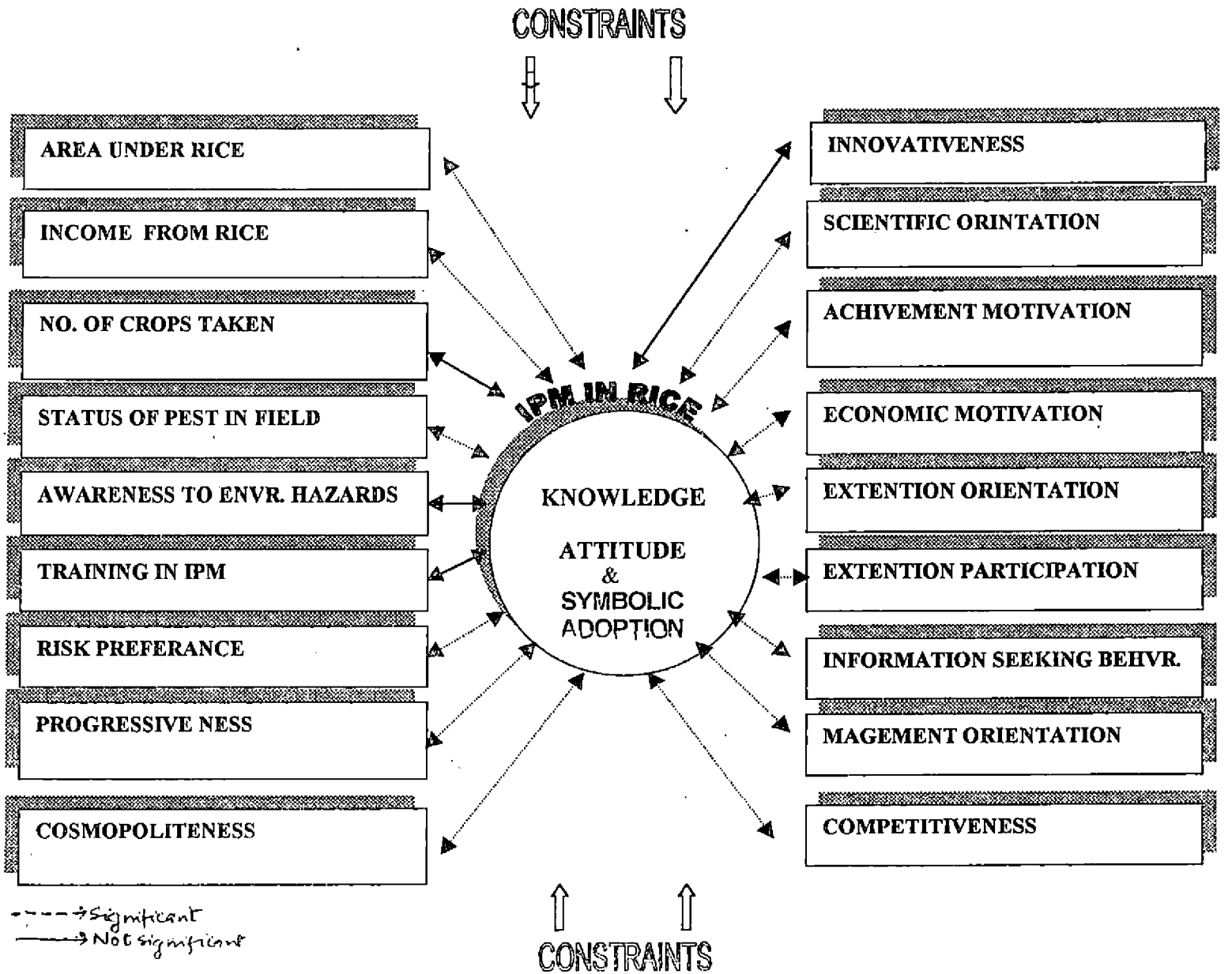
The major constraint encountered by the farmers was the lack of expert guidance regarding the practice. Majority of them were aware of the environmental hazards caused by the pesticides and chemicals, but lack of time, non-availability of labour were preventing them to go for simple and non-toxic cultural and mechanical methods of pest management offered by IPM practices.

Occurrence of too many pests at a time is another constraint identified by the farmers; for which a single chemical was often used. This resulted in suppression of natural enemies, an emergence of a new pest. In this condition, the farmer was forced to use all type of chemicals which were available at that time, the result being more pests resurgence and worsening the situation. All these factors might have contributed to the increase in symbolic adoption and favorable attitude towards Integrated Pest Management practices.

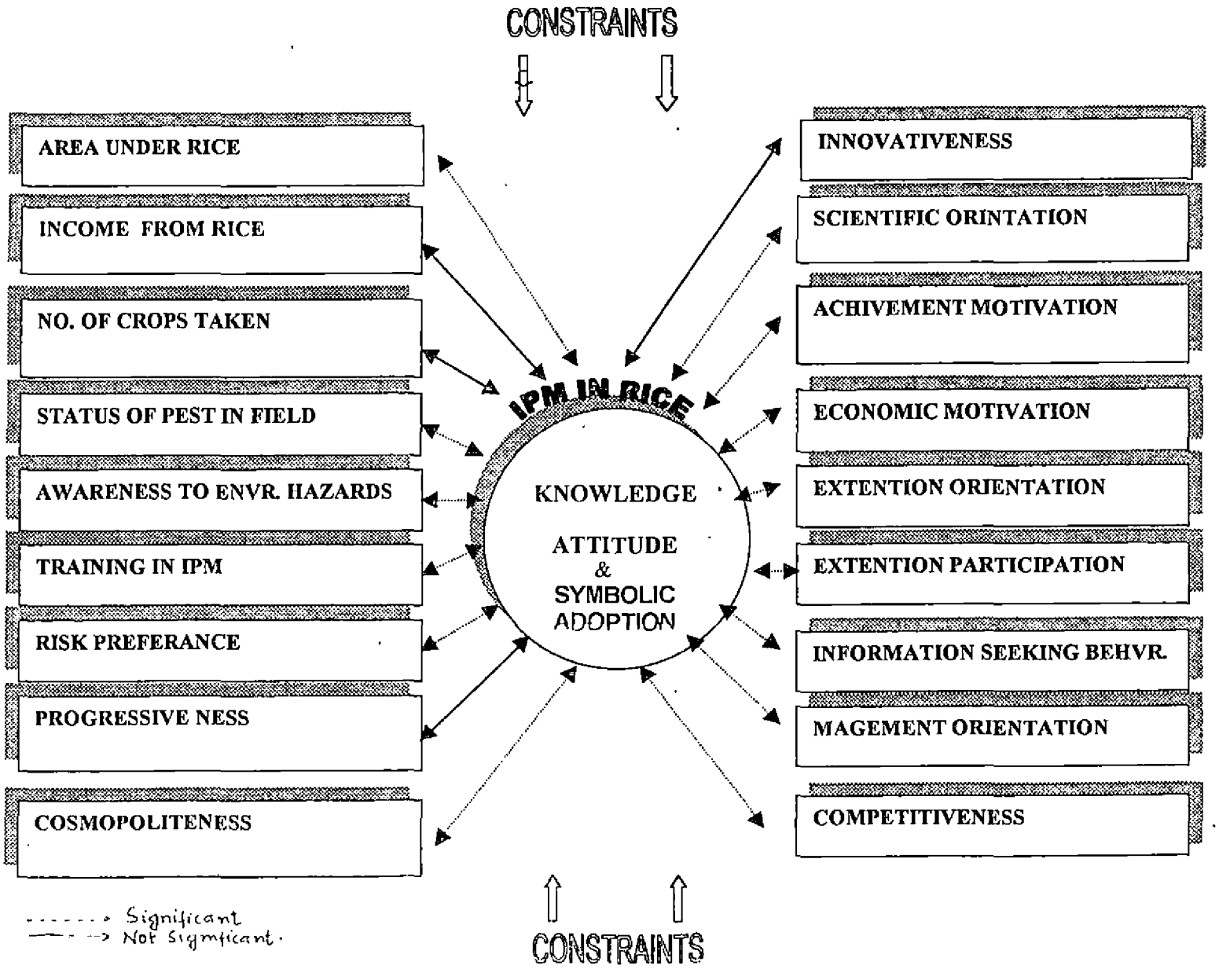
EMPIRICAL MODEL OF THE STUDY SHOWING THE RELATIONSHIP BETWEEN KNOWLEDGE AND SELECTED INDEPENDENT VARIABLES



EMPIRICAL MODEL OF THE STUDY SHOWING THE RELATIONSHIP BETWEEN ATTITUDE AND SELECTED INDEPENDENT VARIABLES



EMPIRICAL MODEL OF THE STUDY SHOWING THE RELATIONSHIP
BETWEENSYMBOLIC ADOPTION AND SELECTED INDEPENDENT VARIABLES



Summary

CHAPTER VI

SUMMARY

Increased use of high yielding varieties as an impact of green revolution subsequently increased the use of chemical fertilizers over bio fertilizers. This ultimately increased the incidence of pest and disease. The present strategy of agriculture production aiming at sustainability with effective resource use and more managerial input. IPM is one such strategy which emphasizes on integration of mechanical, biological and chemical control measures with rational use of the available resources. An intensive extension strategy on educating the IPM practices is also needed in the contemporary agricultural scenario, for which different schemes are launched by the extension agencies involving agriculture development. However the systematic analysis of the promotive extension strategies particularly in relation to imparting IPM skills have not been formulated.

In this background an experimental study on promotional strategy for Integrated Pest Management in rice among the rice growers of Thrissur district was taken up. Pananchery, one of the predominant rice growing panchayath was selected for the study.

The study was aimed at popularising the Integrated Pest management practices among the rice growers of Thrissur district and to formulate a strategy to facilitate the idea using the best combination of extension method and audio visual aids. The effectiveness of different treatments in terms of gaining knowledge, attitude and symbolic adoption were arrived at.
The study was conducted with the following objectives:

1. To formulate a promotional strategy for IPM in rice

2 To assess the relative efficiency of selected extension methods in spreading the concept of IPM among rice growers

3 To assess the level of farmers knowledge, attitude and symbolic adoption towards the concept and practices of IPM in rice.

4 To study the constraints in adoption of IPM in rice.

A sample of 120 farmers were selected and were divided in to four groups of thirty each. With the help of experts various treatments were administered to these group. The treatments include T1 ie. Lecture alone, T2 lecture + Slid show and T3 with lecture, Slide show and discussion. The forth group was kept as control without any treatments. The data was collected before and after the experiments and the findings were recorded.

The dependent variables of the study are knowledge attitude and symbolic adoption. A set of 18 independent variable was included in the study. The statistical tools use for the study were the correlation analysis, multiple regression analysis, percentage analysis and t- test

The important findings are furnished below:

1. The distribution of respondents based on dependent variables showed that majority of the respondents where in high category regarding knowledge and in low category regarding attitude and symbolic adoption regarding IPM rice.

2 Out of 18 independent variable studied 11 of them were significantly and positively correlated with knowledge. seven variables showed non significant relation

3 Multiple regression analysis showed 65% variation with the variables related to knowledge.

4 Correlation analysis of attitude showed a significant and positive relation with 14 variables out of 18 variables study. The most important being scientific orientation, progressiveness, extension participation, cosmopolitness, information seeking behavior, management orientation, status of pest in field and competitiveness.

5 Multiple regression analysis results showed a significant R- square value of 0.648 explained 65% variations. The most important being: status of pests, progressiveness

6 Correlation analysis of symbolic adoption revealed that out of 18 variables studied 14 were positively correlated with symbolic adoption. The most important variables being : scientific orientation, achievement motivation, economic motivation, extension participation, extension orientation, cosmopolitness, information seeking behavior.

7 The multiple linear regression analysis showed that 76% of the variation was explained by the selected independent variables. The variables economic

motivation, management orientation, status of pest in field and training in IPM were positively significant.

8 t- test carried out to compare the changing knowledge, attitude and symbolic adoption of farmers after exposing to different treatments. Significant changes were noticed after each treatment. Maximum changes were observed after T 3. That is lecture, slid show and discussion.

9 The major constrain observed by the farmers was the lack of expert guidance regarding IPM practices.

Implications of the study

Based on the results of the study a strategy to promote the concept of IPM in rice was arrived at.

The main objective of the study was to find out the relative effectiveness of audio-visual and extension teaching methods in order to facilitate betted dissemination of a farm technology in a desired manner.

Rice cultivation as perceived by majority of the farmers is not a profitable one ; the result being more and more areas get converted to other purposes. High cost of cultivation, pest and disease problem, lack of labour during curtial stages are the major r problems encountered by the rice growers of the state. In this circumstances a study of this kind is relevant .

IPM calls for group action rather than individual effort. Conventional lectures on a particular subject as practiced in many of the situations, are proved to be less efficient in group situations. Utilization of all the senses can improve the effectiveness of any messages. The present study also revealed

the same fact. Combination of audio-visual aids with lecture can make the message more clear and to make impressions in the minds of the receiver. Dissemination of a novel idea can be effectively done through participatory group approach. In this approach every individual is committed to the decisions and activities suggested by the group.

In the present study all the audio-visual combinations used were proved to be effective, highlighting the need for a audio-visual package for the transfer of any new technology. The officials of the Agricultural Department should made use of the opportunities provided by the Gram Panchayats should be fully utilized. Moreover the State Agricultural department must make this a Policy in order to preserve its rice field and rich heritage.

Suggestions for further research.

1. The study was confined to one gram panchayat. Therefore a comprehensive study including farmers from a wider geographic area should be undertaken.

2. A comparative study of this kind should be undertaken to compare the knowledge, attitude and symbolic adoption of farmers in different rice growing areas.

3. Studies of similar nature may also be undertaken in other agricultural crops.

4. Impact of more audio-visual combination should also be undertaken in future.

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Appendices

APPENDIX I

KERALA AGRICULTURAL UNIVERSITY

Dr. RANJAN S. KARIPPAI
Associate Professor

Dept. of Agricultural Extension
College of Horticulture
Vellanikkara, 27.1.1998

Sir,

Ms. Deepa, C.B., M.Sc(Ag. Extn) student working under my guidance, is undertaking a research study entitled – "Promotional strategy for integrated pest management in rice – An experimental study", as a part of her thesis work. She has identified some personal and socio-economic variables that may influence the knowledge, attitude and adoption of the farmers regarding integrated pest management in rice.

In view of your personal experience and expertise, you have been identified as a judge for rating the relevancy of the variables selected for this study. You may check the relevance of the included variables influencing the knowledge, attitude and adoption behaviour of the farmers towards IPM in rice in the three point continuum.

I request you to kindly spare some of your valuable time for this purpose. You are also requested to add more relevant variables, if any, to this list. Kindly return the proforma after making the rating at the earliest in the enclosed stamped envelope.

Soliciting your kind co-operation,

Yours sincerely,

(RANJAN S. KARIPPAI)

Kindly put a check mark in the appropriate column

S.No	Variables	Relevant	Some what Relevant	Irrelevant
1.	Age			
2.	Education			
3.	Type of family			
4.	Area under rice			
5.	Total cultivable land			
6.	Main occupation			
7.	Farming experience			
8.	Material possession			
9.	Irrigation potential			
10.	Labour availability			
11.	Infra-structural facility			
12.	Annual Income			
13.	Income from rice cultivation			
14.	Credit Utilization			
15.	Socio-economic status			
16.	Level of aspiration			
17.	Cosmopoliteness			
18.	Change proneness			
19.	Level of optimism			
20.	Self reliance			
21.	Competitiveness			
22.	Progressiveness			
23.	Innovativeness			

24. Risk preference'

25. Personal guidance on better Farming

26. Social orientation

27. Extension orientation

28. Economic motivation

29. Achievement motivation

30. Management orientation

31. Scientific orientation

32. Mass-media exposure

33. Interpersonal source utilisation

34. Information seeking behaviour

35. Rationality in decision making

36. Family labour participation

37. Knowledge on scientific rice Cultivation

38. Status of pest in the field

39. Nature of consumption (quantity for own use/sales)

40. Extent of farm mechanisation

APPENDIX II

Interview schedule for collecting data from the respondents for the project- " promotional strategy for Integrated Pest Management in rice in Thrissur district – An experimental study "

1. Name and Address of the farmer :
2. Area under rice : (cents)
3. Income from rice cultivation :
4. Economic motivation

Statements	Response
1. A farmer should work towards Large yields and economic profit	Agree/ Undecided/Disagree
2. A farmer should try any new method, that will earn him more profit	
3. Farmer will be unable to support his family and their growing needs, if he sticks on to older practices	
4. The most successful farmer is one Who makes maximum profit out of his farm.	

5. Cosmopoliteness

   a. frequency of the visits to the nearest town

Items

Every day
Twice or more a week
Once a week
Once a fortnight
Once in a month
Very rarely
Never

   b. Purpose of visit to the nearest town

Items

To get more exposure and maintain social relation
Purchase/ Sale
Entertainment

6. Extension orientation

Category of personnel	Frequency of contact
1. Asst. Director of Agriculture	Twice or more a week / once a week / once a fortnight/ once a month / never
2. Agrl. Officer	
3. Agrl.Assistant	
4. Bank Officer	
5. Panchayat President	
6.Others(specify)	

7. Extension participation

Activities	Attend Whenever Conducted	Occasionally	Sometimes	Never
1. Study tour				
2. Seminar				
3. Farm fair				
4. Meeting of groups				
5. Demonstrations				
6. Others (specify)				

8. Progressiveness

Please indicate your agreement with the following statements

Statements	A	UD	DA
1. Children must be given freedom to choose their life partners			
2. There is no need to provide reservation for women			
3. Inter-cast marriages should be encouraged to improve social relationship between different religion			
4. The only way to restore peace and harmony is through religion			

9. Competitiveness

Statements	A	UD	DA
1. A farmer may not reveal the reason for his success for other's			
2. There is no need to know what other farmers are doing			
3. Crop competitions are a must			
4. Better actions are recognised by others			
5. It is not advisable for a farmer to be more ambitious			

10. Innovativeness

When do you prefer to adopt an improved practice in farming

1. As soon as it is brought to my knowledge
2. After observing other farmers success
3. Prefer to wait and take my own time

11. Management orientation

Statements	A	DA	UD
a) Planning orientation			
1. each year one should think of a fresh crop to be cultivated in each type of land.			
2 It is not necessary to make prior decision about the variety of the crop to be cultivated.			
3. It is now necessary to think ahead of the cost involved in raising a crop			
4. one need not consult any agricultural expert for planning			
5. It is possible to increase yield through farm Production.			
b) Production orientation			
1. Timely planting of a crop ensure good yield			
2. Determining fertilizer dose by soil testing Saves time			
3. For timely weed control one should even use suitable weedicides			
4. Seed rate should be given as recommended by Experts			
5. Regular monitoring of pest and diseases must be there to avoid crop loss by pest and disease infestation			
c) Market orientation			
1. Market is not so useful to a farmer			
2. A farmer can get good price by grading his produce			
3. One should sell his produce to the nearest market irrespective of price			
4. One should grow those crops which have more market demand			
5. Processing facilities can help a farmer to get better price for his produce			

12) Achievement motivation

Give the opinion about the following

1. success brings belief of further determination and not just pleasant

feelings (Strongly agree / Agree /Undecided/ Disagree/Strongly disagree).

2. How true is to say that your efforts are directed towards avoiding
   failure (quite untrue / not very true / fairly true /quite true)
3. Would you hesitate to undertake something might lead to failure
   (hardly ever /seldom / about half the time/ frequently /nearly always)
4. How often do you take chances to excel (hardly ever / seldom / about half the time /frequently/ nearly always)

13) Scientific orientation

Statement	A	UD	DA
1. new methods gives better results to a farmer than old methods			
2. Old and traditional methods are the best methods even today			
3. A good farmer must try modern techniques in his Field.			
4.Traditional methods should be removed to get more profit out of farming			
5. Farmers with more farming experience must try the new methods of farming			

14) Risk orientation

Statement	A	UD	DA
1. A farmer should grow large no: crops to avoid greater risk involved in growing one or two			
2. Trying a new practice in farm involves greater risk, but is worthy			
3. It is good for a farmer to take risks when he knows his chance of success is very high			
4. It is better not to try any new practices, unless someone proves to a success method			

15) Rationality in decision making

Choose any one of the alternatives

1. when you speak agricultural aspects with other farmers
   a) You speak only about necessary and needed information
   b) Sometimes unnecessary topics may also enter
   c) Most of the time diverted from the topics

2. When you realize that other farmers does not have much time

to spare

a) you use to describe the matter briefly
b) you will postpone the discussion
c) without bothering you will explain everything

3.. When the relevance of the topic is seemed to be lost

a) you used to speak about the topic through out it is not relevant at that time
b) you won't utter a single word about it
c) just mention about the topic and stop

16. Training in IPM

Duration

1. More than four
2. Three times
3. Two times
4. Only once
5. Never

17. Awareness of environmental hazards

Statements	A	UD	DA
1. increase use of chemicals are harmful for both soil and produce			
2. Botanicals will reduce environmental pollution			
3. Recommended doses of fertilizers & chemicals will reduce pollution			
4. Pesticides and chemicals will pollute the water bodies			
5. The residual toxicity of some chemicals will create problems in future			
6. Even a small amount of chemical and pesticide residue can be fatal in future			
7. These chemicals are equally dangerous for both Flora and fauna			
8. Some chemicals can fatal diseases in living org_ Isms including man			

18. Status of pest in field

1. Very low – no use of pesticides
2. Low - use of low amount of pesticides
3. High - use of pesticides often
4. Very high – when there is heavy crop loss

19. Information seeking Behavior

Source	Frequency
1. Mass media source	Regularly /sometimes / rarely / Never
T.V	
Radio	
Films	

News paper
Farm publication
Agrl. Exhibitions

2.. Personal – Cosmopolite sources

Research Scientist
Agrl. Officers
Agr. Assistants
Others(specify)

3.. Personal localite Sources
Progressive farmers
Neighbors
Friends
Relatives
Others(specify)

20. Knowledge about IPM in rice
    1. IPM includes cultural methods only- true /False
    2. IPM employs both chemical and natural plant protection agents-True/ False
    3. Give the names of botanicals used against pest in rice fields
    4. Proper cultural and mechanical practices can reduce the application of pesticides and chemicals- True/ false
    5. Name any two natural enemies of pest you come across in the field, that can be used in bio-control
    6. Clearing bunds will reduce the attack of the leaf folder-true /false
    7. Name any one mechanical control used in the field against pest
    8. Planting recommended no: plants per hill will reduce the attack of pest and diseases and increases the yield- true / false
    9. Name any one organism that can be used for controlling disease causing pathogens in rice
    10. Certain bacteria and viruses can be applied in the soil to control pathogens – True / False
    11. Extract of garlic can control certain diseases – True/ False
    12. The pest that can be controlled using kerosinated ropes

21. Attitude towards IPM in rice

Statements	SA	A	UD	DA	SDA
1. IPM practices require an expert's help					
2. I have no time to go after these complicated practices, so I adopt chemical practices					
3. Chemical control will give quick quick results so I am not in favor of IPM					

4. With the help of IPM practices, our environment can be maintained in a healthy way
5. What ever be the benefit , I am interested in my old practices
6. IPM measures are profitable in long run
7. IPM will help to keep natural enemy-pest complex in balanced ratio
8. IPM practices should popularised by Government
9. Natural enemies of the pest are difficult to be identified by the farmers
10. IPM is nothing but putting old wine in new bottle.
11. IPM is the only practice that must be recommended for the future
12. Pesticides companies must go for bio-pesticides instead of chemicals

22. Symbolic adoption towards IPM in rice

Are you willing to use the following practices if you are provided with adequate facilities (Yes/NO)

1. light traps
2. Clearing of bunds
3. Use of pesticides
4. Transplanter
5. Bio-insecticides
6. Use of farmyard manure
7. Three seedlings per hill
8. Use of neem based insecticides
9. Pest monitoring
10. Soil testing
11. Vermicompost
12. Bio fertlizers
13. Use of green leaf manuers
14. Harvesting machine
15. Seed treatment
16. Recent varieties
17. Mixing neem cake and urea
18. Use of thrushers
19. Using bacteria for controlling pest
20. Use of micro organism

23. Constraints in the adoption of IPM practices in rice

Constraints	Rank
1. Lack of expert guidance	
2. Occurrence of too many	

pest at a time
3. Difficulty in identifying the natural enemies of the pest
4. Non availability of labor
5. Over reliability on pesticides and chemicals
6. Lack of pest monitoring skills
7. Absence of immediate results
8. Lack of knowledge among farmers

APPENDIX –111

The statements selected for developing the scale for measuring the attitude towards IPM in rice.

. Statement Statements		Score
1. IPM practices require an expert's help	*	6.3
2. IPM practices are very useful		3.90
3. I have no time to go after these complicated practices, so I adopt chemical practices	*	4.3
4. IPM practices are time consuming		
5. Chemical control will give quick quick results so I am not in favor of IPM	*	5.02
6. With the help of IPM practices, our environment can be maintained in a healthy way	*	7.1
7. What ever be the benefit , I am interested in my old practices	*	4.24
8. IPM measures are profitable in long run	*	6.03
9. IPM will help to keep natural enemy-pest complex in balanced ratio	*	4.20
10. IPM practices should popularised by Government	*	7.00
11. Natural enemies of the pest are difficult to be identified by the farmers	*	5.8
12. IPM is nothing but putting old wine in new bottle.	*	4.23
13. IPM is the only practice that must be recommended for the future	*	6.76
14. Pesticides companies must go for bio-pesticides instead of chemicals	*	5.00
15. IPM practices are time consuming		2.11
16. I am in favour of IPM practices because I am using the produce for myself		0.89
17. IPM practices will spoil our crops		1.024
18. IPM practices are the best method in Controlling pests in rice		
19. I will stick on to my old practices irrespective Of the benefits offered by IPM practices		3.04

* Selected statements

PROMOTIONAL STRATEGY FOR INTEGRATED PEST MANAGEMENT IN RICE IN THRISSUR DISTRICT - AN EXPERIMENTAL STUDY

By

DEEPA . C. B

ABSTRACT OF THE THESIS

Submitted in partial fulfilment of the requirement
for the degree of

Master of Science in Agriculture

(AGRICULTURAL EXTENSION)
Faculty of Agriculture
Kerala Agricultural University

Department of Agricultural Extension
COLLEGE OF HORTICULTURE
VELLANIKKARA ,THRISSUR
KERALA
1999

ABSTRACT

The study was aimed at popularising the Integrated Pest management practices among the rice growers of Thrissur district and to formulate a strategy to facilitate the idea using the best combination of extension method and audio visual aids. The effectiveness of different treatments in terms of gaining knowledge, attitude and symbolic adoption were arrived at. The study was conducted among 120 rice growers of Pananchery Grama Panchayat of Thrissur district. The respondents were divided into groups of 30 each

The dependent variables of the study were the knowledge about IPM in rice, attitude towards IPM practices and symbolic adoption. The independent variables included the personal, socioeconomic and psychological characteristics of the farmers.

The distribution of respondents based on dependent variables showed that majority of the respondents where in high category regarding knowledge and in low category regarding attitude and symbolic adoption regarding IPM rice.

Out of 18 independent variable studied 11 of them were significantly and positively correlated with knowledge. Seven variables showed non significant relation.
Multiple regression analysis showed 65% variation with the variables related to knowledge.

Correlation analysis of attitude showed a significant and positive relation with 14 variables out of 18 variables studied. The most important being scientific orientation, progressiveness, extension participation, cosmopolitness, information

seeking behavior, management orientation, status of pest in field and competitiveness. Multiple regression analysis results showed a significant R-square value of 0.648 which explained 65% of the variation. The most important variables status of pests, progressiveness

Correlation analysis of symbolic adoption revealed that out of 18 variables studied 14 were positively correlated with symbolic adoption. The most important variables being scientific orientation, achievement motivation, economic motivation, extension participation, extension orientation, cosmopolitness and information seeking behavior. The multiple linear regression analysis showed that 76% of the variation was explained by the selected independent variables. The variables like economic motivation, management orientation, status of pest in field and training in IPM were positively significant.

Student's t- test was carried out to compare the changing knowledge, attitude and symbolic adoption of farmers after being exposed to different treatments. Significant changes were noticed after each treatment. Maximum changes were observed after T 3. ie lecture+ slide show + discussion.

The major constraint observed by the farmers was the lack of expert guidance regarding IPM practices.