A STUDY OF FACTORS AFFECTING THE ADOPTION OF SELECTED AGRICULTURAL PRACTICES

BY

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THESIS

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D E C L A R A T I O N

I hereby declare that this thesis entitled " A STUDY OF FACTORS AFFECTING THE ADOPTION OF SELECTED AGRICULTURAL PRACTICES" is a bonofide 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, associateship, fellowship or other similar title, of any other University or society.

Rajendran

(P. RAJENDRAN)

Vellayani,
16th August, 1978.

C E R T I F I C A T E

Certified that this thesis entitled " A STUDY OF FACTORS AFFECTING THE ADOPTION OF SELECTED AGRICULTURAL PRACTICES" is a record of research work done independently by Shri.P.RAJENDRAN, under my guidence and supervision and that it has not previously formed the basis for the award of any degree fellowship or associateship to him.

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C O N T E N T S

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INTRODUCTION

INTRODUCTION

Kerala is relatively rich in the endowment of agricultural resources. Sunlight and temperature are available with short range variation throughout the year. The state receives on an average 300 cms. of rainfall spread over 6 to 7 months against the national average of 120 cms. limited to 4 - 5 months. The sharp features of hills and valleys create two major agronomic environments - the dry lands and wet lands - which are obtained throughout the length and breadth of the state. The agro-climatic conditions of the state offer very congenial environment for the successful cultivation of crops from moisture preferring rice to drought tolerent tapioca and cashewnut and other perennial cash crops. Rice occupies the pride of place in the state both in terms of area covered by the crop and quantity consumed by the people.

Rice plays a significant role in the cultural, religious, social and economic life of the people of Kerala. It is cultivated in Kerala from time immemorial. It is the

Staple food of the people of the state and will continue to be so for many more years to come.

Another important feature of rice cultivation in Kerala is the relatively small size of holdings of the cultivators. The distribution of operational holdings according to size in Kerala is given in table-1.

Table:-1. Distribution of operational holding according to size in Kerala *

Size of holding (acres)	No. of holding ('000)	Percentage of total
Less than 1.00	1480.00	59.7
1.00 - 2.50	547.60	22.1
2.50 - 5.00	250.20	10.1
5.00 - 10.00	138.70	5.6
10.00 - 15.00	37.10	1.5
15.00 - 20.00	9.10	0.4
20.00 - 25.00	5.00	0.2
25.00 and above	11.40	0.4
Total	2479.10	100.0

* Source : Farm Guide, 1978, Kerala.

From the table it is evident that over 90 per cent of theholdings are below 5 acres in extent and about 60 per cent of the holdings are less than one acre in extent.

A number of development programmes have been introduced and implemented in Kerala since independence with a view to increasing the rice production in the state. Some of the important development programmes implemented in the State

for increasing agricultural production were :-

1. Intensive Area Development Programme,
2. Intensive Agricultural Area Programme,
3. High yielding varieties programme,
4. Intensive Paddy Development Units,
5. Small Farmer's Development Agency,
6. Special Agricultural Development Unit and
7. Kerala Land Development Corporation.

Of the above programmes the first four were mainly focussed on the improvement in production and productivity of rice.

The Problem

The area under rice in Kerala rose from 7.99 lakh hectares in 1966 to 8.54 lakh hectares in 1976 (even though it once rose to 8.85 lakh hectares in 1975), while the total production registered an increase by a little over 3 lakh metric tonnes between 1966 and 1976. The trend in area, production and average yield of rice in Kerala are given in Appendix-1.

It can be noticed that the per-unit yield is almost static around 1,500 Kg./hectare during the past 5 years after a steady increase in productivity from 1,356 Kg./hectare in 1966 to 1,575 Kg./hectare in 1972. The total production of rice in the state also remained static around 13 lakh metric tonnes during the last 6 years.

Kerala is deficient in its rice production by about 50 per cent. Rice occupies 29.5 per cent (8.81 lakh hectares) of the total cropped area in the state. The scope of increasing the net area under rice in rather limited. The fact that

more than 50% of the cropped land is devoted to perennial cash crops further limits the scopes for expansion of net area under rice. It is evident from the above that increased production of rice employing intensive cultivation on the available area involving scientific management and improved technology has to be the major strategy in the rice development programmes in the state.

Though improved practices in rice cultivation used to be diffused among rice farmers of Kerala by the agricultural extension agencies from time to time, the introduction of High Yielding Varieties Programme in 1966 marked a breakthrough in new technology in rice cultivation. High Yielding Varieties with the attendent improved practices sparked off a rise in the total production, though the productivity is not yet high compared to any other important rice growing states. The high yielding variety coverage in rice in the state is given in Appendix-II.

It is significant that inspite of about a decade's intensive effort to spread the high yielding varieties in rice, the coverage under these varieties is only 26.5 per cent of the total rice area. The spread of high yielding varieties among small farmer holding is still less.

In the light of the above it can be safely presumed that the adoption of new rice technology, including the use of high yielding varieties, cannot be achieved by providing the necessary infrastructure, supplies and

services etc., alone. The human factor influences the adoption of new technology more than the other factors. What is the extent of this influence in the adoption behaviour of the farmers ?. Heady et al (1972) have rightly pointed out that " the reasons for differential adoption of improved agricultural practices by farmers have ranged from difference in ability to bear risks to difference in political power enjoyed by the farmers, from resource constraints on small farms to the initial diversity of income and differences in absolute and marginal behaviour of the farmer".

To find answers to the problems related to the differential adoption of new agriultural technology by the rice farmers, it is important to have deep insight into the various constraints, including the human factor, standing in the way of adoption of new technology by the large majority of rice farmers. No empirical study has been undertaken so far in Kerala among the small farmers who form the bulk of rice farming community in Kerala. Thus, the present study was undertaken with the broad objective of understanding the adoption of improved practices of rice cultivation by the small farmers.

Objectives of the study

The specific objectives of the study are:-

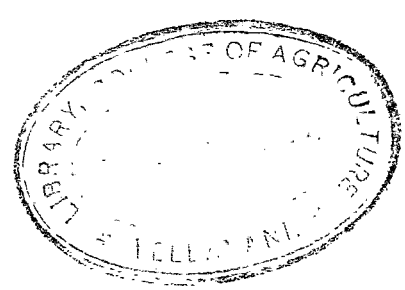
1. to study the general adoption pattern of rice cultivating small farmers,

2. to find out the association of adoption behaviour of small farmers with the selected variables,
3. to study the extent of adoption of individual improved practices by rice cultivating small farmers,
4. to find out the relationship of the adoption of individual improved practices of rice with the selected variables, and
5. to identify the constraints in the adoption of improved practices of rice by small farmers.

Limitation of the study

A study of this nature requires considerable amount of time, men and other resources. Due to the limited resources available with the present investigator, he was forced to restrict the variables and sample size. However, no efforts have been spared to make the study as objective as possible. The results of this study are not intended to provide projections for the entire farming community in thestate. Neverthless, they will provide sufficient insight into the problems related to the adoption of improved agricultural practices by the small farmers cultivating rice.

REVIEW OF LITERATURE



REVIEW OF LITERATURE

A review of researches conducted in the area of study aids the investigator to get acquinted with the various empirical procedures adopted in previous studies and also the findings obtained by these studies. Such a critical review helps to identify the basis of the theoretical frame-work forthe study also.

In this Chapter the review is presented under the following heads.

a) Theoretical orientation, including the explanations of dependent variable, identification of specific variables general and theoretical concepts and definitions of the independent variables.

b) Review of the results of the studies related to the selected variables.

c) Review of the studies on constraints in the adoption of agricultural technology.

d) Hypotheses.

e) Conclusion.

a) Theoretical orientation

Human behaviour

Behaviour is not a chance or random phenomenon. It is a responde to a cause or stimulus and it is purposeful and goal oriented; It is intended to accomplish some objective which in turn would satisfy or at least reduce some need of the individual. Drever (1952) termed behaviour as 'the total responses, motor and glandular, which an organism makes to any situation with which it is faced'. According to Skinner (1952) behaviour is 'all forms of processes, adjustments, activities and experiences of the organism". Sherif and Sherif (1956) considered experience and behaviour together and conceptualised them as 'an outcome of interacting influences stemming from the individual himself and impringing from outside'. According to Deway and Humber (1956) human behaviour involves three components namely man's biological heritage, the environment and the acquired variables. Combs and Snygg (1958) pointed out that 'all the behaviour, without exception, is completely determined by, and pertinent to, the perceptual field of behaving organism'. The perceptual field means the entire universe, including himself, as it is experienced by the individual at the instant of action. Whatever the person does became his behaviour according to Cooper and Mc Gaugh (1970). Parson and Shills (1971) pointed out that 'behaviour is oriented towards attaining ends or goals and other

anticipated state of affairs, takes place in situations by means of normatively regulated expenditure of effort or motivation'. Dandekar (1976) defined behaviour as the expression of one's experience. It includes not only motor activities like jumping, running, or writing but also such activities which give us knowledge and emotional activities.

For the purpose of this study the concepts of human behaviour is explicited to the lower levels of adoption behaviour. Wilkening (1953) postulated the adoption of an innovation as 'a process composed of learning, deciding and acting over a period of time. The adoption of a decision to act havea series of actions and thought decisions'. Emery and Oeser (1958) viewed adoption of farm practice as a 'consequence of communication'. Adoption has been defined as 'an activity of the farmer taking place over a period of time' by Copp, Sill and Brown (1958). They viewed adoption of a farm practice as 'a bundle of related events flowing through time, not an instantaneous metamorphosis'. Adoption behaviour, according to Ramsey et al (1959) involves two components - behaviourial which involves the actual use of the practice and cognitive which includes obtaining knowledge and critical evaluation of the practices in terms of the individual situations. According to Rogers (1962) adoption process is the mental process through which an individual passess from first hearing about an innovation to its final adoption. Katz, Lewin and Hamitton (1963) defined diffusion

adoption process is ' the acceptance over time of some specific item - an idea or practice - by an individual, group or adopting unit linked to specific channels of communications to a social structure and toagiven system of values or culture'. According to Chattopadyaya (1963) adoption is the stage in the adoption process where decision making is complete regarding the use of a practee and actions with regard to such a decision commences. Rogers and Shoemakers (1971) defined adoption as ' a decision to continue full use of an innovation as the best course of action'.

Adoption research became part of the main stream of rural sociology in the early 1940's. Hoffer's (1942) study included a control sample and a treatment sample in his experimental design. He found his respondents values on fragality were a major barrier to the adoption of new ideas. The social characterestics of the respondents were considered more important by Ryan and Gross (1943). They also recognised three stages in the adoption process as awareness, trial and adoption. Here adoption was taken as hundred per cent use of a new idea. This study made important advances in the adoption research and later ' factor related-to-innovativeness' approach have been followed greately.

Anthropologists like Suttle (1951) and Sharp (1952) attempted to emphasize the social consequences of innovations and their effects on adoption. Socio-psychological approach

was the main criterian in Wilkening's (1952) researches.In his studies, Barnett (1953) was mainly concerned with psychological level of farmers. His discussions on why individuals adopt new ideas is more theoretical than empirical. Lionberger (1955) was more interested in tracing the importance of community norms, social factors and optimum leadership in his researches on adoption. Sociometric analysis was utilised by Coleman(1955) in his study on adoption of soil conservation practices by farmers. He observed that the adoption of farm practices was influenced by social, psychological and economic factors of the individual respondents. Rogers (1958) analysed technological change by conceptual variable analysis and postulated that anticedent factors which include the person's identity, his perception of the situation, the economic constraints and incentives and the characterestics of the social unit affected the adoption behaviour.

While studying the innovation and entrepreunial decision in Indian Paddy enterprise, Satish Chandra Jha (1960) rightly emphasised the importance of psychological principles involved in the decision making and the social and economic conditions underwhich the decisions took place. Sawhney (1961) examined the factors and forces contributing towards the wide difference in adoption and enhancing the process of acceptance and found that they can be explained better from social, psychological and economic points of view. Gurcharan S. Basaram (1966) carried out a study on motivational and resistance forces

related to the acceptance of the new ideas in Indian farming and concluded that sociological, psychological and economic variables of the farmers are important in explaining their attitude towards new ideas and techniques and the final adoption of them.

From the above discussions it may be found that adoption behaviour is a multivariate phenomenon. The general review of the adoption behaviour points out the various determinants of the behaviour and emphasized the role of social psychological and economic variables on the adoption behaviour. In this study an attempt was made to explain the adoption behaviour of rice farmers with respect to their social, psychological and economic factors.

Variables

According to Travers (1964) ' the variables that are used for making predictions are referred to as the independent variables of research. It is not the nature of the variables that makes them dependent or independent but the way in which they are used'. Rogers (1962) defined ' a dependent variable as the main factor investigated in a research study. The independent variables are those related to the dependent variable in the research study'. The variable selected for the study were categorised as 'dependent variable' and 'independent variables'.

The procedure followed for the selection of variables for the present study are included under Materials and Methods.

Following were the selected variables:-

A. Dependent variable - Adoption behaviour (or adoption)

B. Independent variables.

a) Social variables

1. Main occupation
2. Education
3. Experience
4. Social participation.

b) Psychological variables

1. Economic motivation
2. Risk orientation
3. Level of aspiration

c) Economic variables

1. Size of holding
2. Labour input.

i) Concepts and definitions of independent variables.

a) Social variables

1. Main occupation

According to Webster's new International Dictionary occupation is one's principal business, vocation or that which occupies or engages the time and attention. It is clear from the above that occupation is some vocation which demands one's time and attention. Therefore, the amount of time spent and attention paid to a vocation by an individual decides whether that vocation is his main occupation or not. If an individual spends a major part of his time and attention for a particular vocation, that enterprise can be considered as his main occupation.

Income secured from a vocation is another factor to be

reckoned with in deciding the main occupation. That occupation from which one's major share of his income is derived can be conceived as his main occupation.

For the purpose of this study, main occupation was defined as the vocation in which a respondent spends major part of his time and attention.

2. Education

According to Chamber's Dictionary (1976) education is 'bringing up or training, instructing, strengthening of power of body or mind or culture'.

Adoption of an improved practice by an individual is necessarily based on his capacity to acquire and absorb information about new techniques and also on his capacity to translate this knowledge into action. Education equips the individual to acquire new knowledge. It helps to develop a bent of mind to learn new things and to have new experiences.

For the purpose of this study, the definition provided in Chamber's Dictionary was used.

3. Experience

According to Sherif and Sherif (1956) 'the experiences of an individual cannot be observed directly but are inferred from some overt behaviour by the individual such as his words, a movement or act. Human experience is not always followed immediately by overt behaviour, but

later behaviour may be understandable only in terms of that earlier experience'.

Chamber's Dictionary (1976) explained experience as practical acquitance with any matter gained by trial or wisdom derived from the changes and trials of life.

Newcomb et al (1965) stated ' human action is a function of the interaction of three variables namely; experience current values and attitudes and current situations.'

According to Ishwar Dayal (1970) 'an ddult individual acquires his own personality composed of a set of values about right or wrong, notions about different people and objects and what these means to him, his prejudices, hisdeeper fears and anxieties about his own abilities, and acceptance or rejection of him by others, his own needs and aims through his experience or interaction in his family and in his environment'.

An individual has personal experiences which are unique to him and which deeply influence his behaviour. From these experiences he builds up ideas and behaviour pattern, also more or less unique to him, or in any case different from those of other members of society. The need for new experience has served as a motivation or incentive to seek new knowledge. Satish Chandra Jha(1960) made it clear - ' the joint operation of psychological principles and social and economic conditions lead to imitation. Bad experience with former imitation will

tend to limit further imitative behaviour. Their past experience of profit and loss in imitating new practice becomes the guiding force in determining their future steps of imitating the new practices'.

The definition given by Chamber's Dictionary (1976) for experience was followed for this study with respect to farming.

4. Social participation

According to Rogers and Shoemakers (1971) 'participation is the degree to which members of a social system are involved in the decision making process. Member satisfaction with, and acceptance of, collective innovation decision is positively related to the degree of participation in the decision by members of the social system'.

Participation in social activities does not start or stop at any specific age in the life of an individual. However, the intensity of social participation appears to influence the decision making of the individual. Membership in formal organisations help farmers to come into contact with different individuals, agencies and information sources. By this the individuals are likely to be more progressive and receptive to new ideas and practices.

Based on the review of definitions, social participation was defined as the participation of farmers in the various organisations and institutions, for this study.

b) Psychological variables

1. Economic motivation

Nair (1969) defined economic motivation of farmers as their attitude towards farming as a profit oriented enterprise.

The economic value can be conceptualised as those characterestics which place high importance on economic ends and alternatives. Every one is eager about his future and wants to be on sound financial footing. Several studies have been carried out in the past on the influence of economic aspects on the adoption of innovations.

The definition given by Nair (1969) was followed in this study.

2. Risk orientation

Heady and Jensen (1954) pointed out that the term risk orientation commonly refers to all outcomes which leads to losses of realisation from expectation.

Nair (1969) conceptualised risk orientation of farmers as their perception on the improved practices which they are not secured about the results by virtue of their past experience and knowledge.

Agriculture being a biological activity is subject to the vagaries of nature. It is a seasonal industry where production come out only at specific periods during the year. While using the traditional practices the farmer

feels secured about the possible results as he can predict by virtue of his past experience, knowledge etc., Farmers perceive risk in the use of improved practices due to their inability to predict the outcome of their use becamse of their inadequate capital resources, knowledge and experience.

Risk orientation, conceptualised by Nair (1969) was followed for this study.

3. Level of aspiration

The concept of levels of aspiration was first introduced by Dempo (Gardner, 1940) with reference to the degree of difficulty of the goal which a person is striving to achieve.

Lewin (1951) has defined level of aspiration as the degree of difficulty of the goal towards which a person is striving.

According to Cantril and Free (1962) level of aspiration of an individual is 'his own over all assessment of his concern for wishes and hopes for the future or for the fears and worries about the future in his own reality world'.

Aspiration is the degree to which the individual gets his goals realistically in relation to his physical and mental attributes and in accordance with his environment.

Farming aspiration means the farmer's level of wishes and hopes to attain high standards of farming.

c) Economic variables

1. Size of holding

Land is the primary resource in farming. It is a scarce resource. The importance of land as a factor for adoption needs no over emphasis. In this study the land holding limit was identified on the basis of ownership of holdings, ownership being taken to mean transferable or heritable rights. The family was treated as a unit and family unit was taken as those normally living together as a household.

2. Labour input

Ghosh (1975) defined labour as 'the physical and mental human effort directed towards economic activity or creation of utility'.

The new agricultural technology demands frequent application of water, fertilizers, insecticides and has resulted in double cropping, higher out turn, larger volume of transportation, marketing etc., and all these in turn add to the demand for more labour. Temporary labour is employed during the peak seasons when the farmer is not able to cope up with the operations on the farm with his family labour force. Due to lack of expertise in the proper management of labour farmers tend to avoid labour intensive innovations.

For the purpose of this study, the definition given by Ghosh (1975) was adopted.

ii) Small farmer

According to Mosher (1966) 'the basic difference between native vegetation and wild animal life on the one hand and agriculture on the other in the presence of a farmer. The energy of the sun hits on the surface of the earth everywhere, whether any human being is present or not. Whereever the temperature is right and moisture is present, plants grow and animals live. It is man who takes control of this situation, learning to use the products of plant and animal life, modifying plants and animals and the nature of the soil to serve his purpose better and the man who does this is the farmer'.

The farmer plays a pivotal role in agricultural development. It is he who tends crops and livestock and make decisions about how his farm is to be used. It is he who must learn and adopt the new methods that are necessary to make farming more productive.

The concept of small farmer is still under debate. Many criteria are considered for defining a small farmer.

According to Government of India, 'Small farmer is one who is potentially viable to become surplus producer with improved technique input support, irrigation etc.,' No uniform definition is laid down in terms of size of holding for this category. Doulat Singh and Srivastava (1970) viewed small farmers as a producer - consumer cultivator and chracterised by small and fragmented holding. The

income derived from such areas is not enough to maintain himself and his family or to provide them with full time employment.

Dantwala (1971) defined a small farmer as a farmer having ' a holding below 5 acres at the present intensity of cultivation'. He has taken the total area under cultivation in his definition. According to Page (1971) a small farmer is 'one holding land below 5 acres or with revenue assessment not exeeding Rs.10/- and whose total farm and nonfarm income does not exeed Rs.1,800/- per anum.

From the above it is clear that various criteria such as size of holding, income from the farm etc., can be used in identifying a small farmer. The labour content of the farming business can also be considered as a criterion. But size of holding seems to be the more convenient and tangible criterion for this. The small farmers development agency defind 'cultivators having land holding upto 2 hectares (5 acres)' small farmers. This definition was taken as the criterion for defining small farmer in this study.

b) Review of the results of the studies related to the selected variables.

1. Main occupation

Das and Sarkar (1970) observed a direct relationship between primary occupation and adoption behaviour of farmers. Sen Gupta (1970) studied main occupation as a variable for adoption and concluded that adoption is correlated with efficiency in farming andmain occupation is correlated

with adoption in turn.

Based on the above review it can be postulated that the individual with main non farm occupation will adopt innovation much better than the individual who confines to his farm.

2. Education

Several researchers have shown that the educational level of individuals was positively associated with their adoption behaviour. Notable among the early workers are Ryan and Gross (1950), Wilkening (1953), Wilson and Gallup (1955), Van Den Ban (1957), Lionberger (1960), Rahim (1960), Reddy (1962), Pandit (1964), Rai (1965), Dhaliwal and Sohal (1965), Ratan Chand and Gupta (1966), Ghoudhary and Maharaja (1966) and Rajendra (1968), Patel and Singh (1970) also observed that farmers with higher education accepted improved practices more readily than farmers with lower education. Das and Sarkar (1970) found direct association of educational status of farmers with their adoption behaviour. Subramanyan and Lekshmanna (1973) revealed that adoption increased with rise in educational level.

In the light of the above, it can be expected that adoption will be positively related with the educational level.

3. Experience

Grewal and Sohal (1971) showed that much richer

previous experience of the farmers showed significant relationship with their adoption of improved practices. Anbalagan (1974) studied the influencing factors on adoption of package of practices for high yielding variety of paddy and found that the experience of the farmer was an important variable of adoption. Adopters possessed more previous farm experience than non adopters.

It can be postulated from the above review that with higher farming experience the rate of adoption will also be increased.

4. Social participation

Several reserachers have revealed that the social participation of the farmers positively influenced their adoption behaviour. Notable among them are Van Den Ban(1957) Rehim (1960), Reddy (1962), Ratan Chand and Gupta (1966) and Reddy and Kivilin (1968).

Ram Iqbal Singh et al (1968) reported that adopters belonged to high social status category with high social participation. Das and Sarkar(1970) showed that social participation influenced the farmers to adopt the farming practices mainly for economic gains. Karim and Mahboob(1974) found that social participation of the farmers positively influenced their adoption behaviour.

From the above review, it can be hypothesised that social participation will have a positive relationship with adoption behaviour.

5. Economic motivation

Hobbs (1964) reported that there was a positive relationship between the economic motivation of the farmers and their adoption behaviour. Beal and Sibley (1967) and Singh (1967) reported positive relationship between economic motivation and adoption of improved practices. Das and Sarkar (1970) attempted in their study to ascertain the extent of economic motivation in influencing the adoption of improved agricultural practices and found that :

i) farmers adopted improved practices for economic gains
ii) the socio-cultural factors influenced farmers to adopt improved practices only for economic gains.
iii) higher the economic motivation more favourable the attitude towards adoption of improved farming practices would be.

Singh and Singh (1970) reported that economic motivation was positively contributing to the adoption of improved practices by farmers.

Based on the above review, it can be postulated that with a higher level of economic motivation higher will be the adoption of innovations.

6. Risk orientation

Early research studies have revealed that the risk taking capacity of the farmers positively influenced their adoption bahviour. Notable among them are Hoffer and Strangland (1958), Ramsey et al (1959), Fliegal (1959)

Rogers and Havens (1961) and Bobelen and Beal (1966), Sinha (1963) found positive relationship between risk taking willingness with adoption behaviour. Hobbs (1964) reported positive relationship between risk orientation of farmers with adoption of improved practices. Singh (1966) showed positive and significant influence between risk preference and adoption behaviour. Nair (1969) reported that risk orientation was an important variable that affected the adoption of high yielding varieties of paddy among the Kerala farmers. Singh and Singh (1970), and Roshan Singh and Singh (1970) also reported similar relationships. Binswanger (1978) showed risk as an important factor in the adoption of new technology by the rural households.

In the light of the above, it is postulated that there will be a direct relationship between farmers risk orientation and their adoption of innovations.

7. Level of aspiration

Cantril and Free (1962) and Wilkening (1962) found that level of aspiration of a farmer influenced his adoption of innovations. Muthayya (1971) reported that one's personal and socio-economic attributes to a great extent contributed to one's level of aspiration which increased the adoption of new ideas.

Based on the above review, it is hypothesed that farmers possessing a high level of aspiration will adopt improved practices better than those with low level of aspiration.

8. Size of holding

Numerous studies were conducted on the relationship of size of farm land with the adoption behaviour abroad and in India. The notable among the researches from abroad are Wilkening (1952), Wilson and Gallup (1955), Copp (1956) and Rahim (1960). All these studies revealed that size of holding had a positive relationship with adoption. The notable researches conducted in this area in India are by Pandit (1964), Rai (1965), Thakur (1966), Desai and Patel (1967), Rao (1968) and Nair (1969). These researches have also revealed positive and significant relationship for size of holding to adoption of new ideas. Patel and Singh (1970) observed that with larger size of holding, the acceptance of new practices was greater than otherwise. Subramanyan and Lekshmanna (1973) reported that farm size had consistantly proved to be related positively and significantly to adoption behaviour.

In the light of the above, it can be expected that the adoption of practices will increase with the increase in thesize of holding of the farmers'.

9. Labour input

Programme Evaluation Organisation (1968 c) in their report mentioned high labour input as a reason for non-adoption of high yielding varieties of paddy. Pandey (1972) observed that human labour was the main item of input both for high yielding varieties andlocal varieties. He also

found that the average input cost of labour to be higher for high yielding varieties. Raju (1975) found that the human labour input contributed positively and significantly in varying gross income of the adopters and their adoption. Clay (1975) suggested that a reduction in labour share and shifts to cash contract payments were associated with the spread of new varieties and purchased inputs. Shakuntla Mehra (1976) reported that the spread of the seed-fertilizer based technology moderating the overall increase in labour use per unit of cultivated area. According to Varadarajan(1977) ' compared on per acre basis, requirement of labour was significantly higher in progressive (ie. with high yielding varieties) farms than in traditional (farms without high yielding varieties) farms. Vyas and Mathai (1978) reported that in the case of small farms per hectare labour use in labour intensive cropping patterns and greater cropping intensity entail greater cash expenditure.

Based on the above review it is postulated that there will be negetive relationship between increase in labour input and adoption behaviour.

c) Constraints in the adoption of improved technology

Rai (1965) studied the diffusion of information and farmer's response to an improved practice in respect of hybrid maize and found that lack of finance was the most important reason for non adoption. Basram and Capner (1968) revealed that lack of knowledge and lack of finance were the main

reasons for non adoption of recommended practices. Parameswaran (1973) reported lack of knowledge, poor efficiency, unsuitability of soil and lack of conviction among the farmers as the important reasons for non adoption of package of programme. Anbalagan (1974) also reported that lack of knowledge, lack of conviction were the reasons for non adoption of package of practices for high yielding varieties of paddy. Sundaraswamy and Duraiswamy (1975) revealed that lack of knowledge and finance were main reasons for non adoption and/or partial adoption of recommended practices. Viswanathan (1975) in his study of impact of high yielding varieties of rice on small farmers revealed that the high cost of cultivation was the main limiting factor in the adoption process. The next impediment to the adoption was incidence of pests and diseases and soil injury due to alkalinity and salinity. There was also a feeling that the high yielding varieties of rice were not good for consumption.

d) Hypotheses

1. There will be a positive relationship between main occupation and general adoption hebaviour of farmers.
2. There will be a positive relationship with farmer's educational status and their adoption behaviour.
3. There will be a positive relationship with farmer's experience in farming and their general adoption behaviour.

4. The extent of social participation of farmers will be positively related with their general adoption behaviour.
5. There will be a positive relationship between farmer's economic motivation and their general adoption behaviour.
6. Farmer's risk orientation will be positively related with their general adoption behaviour.
7. There will be a positive relationship between farmer's level of aspiration and their general adoption behaviour.
8. There will be a positive relationship between farmer's adoption behaviour and their size of holding, and
9. There will be a negetive relationship between the labour input employed by them and their general adoption behaviour.

In the case of adoption of individual improved practices also same trend of relationship will be expected.

e) Conclusion

The review of literature furnished in this chapter helped the investigator to acquaint himself with the various independent variables related to adoption of farming practices. Majority of the studies revealed that adoption behaviour is a multivariate phenomenon affected by the social, psychological and economic factors of the individual farmer. The review also revealed that only very few studies have taken into consideration the operation of these variables in the socio-cultural and economic context of Kerala.

MATERIALS AND METHODS

MATERIALS AND METHODS

The prime aim of this study was to find out the small farmers adoption behaviour and to explore its relationship with some selected variables. With this major aim in mind the study has been undertaken by using the exploratory type of research design. This chapter deals with the materials used and methods adopted in this study and also includes a review of the methods used for quantifying the variables. This chapter is presented in the following sections.

1. Location and period of the study
2. Selection of sample.
3. Empirical measures used.
4. Methods used for data collection.
5. Statistical methods used.

1. Location and period of the study

Trivandrum district was selected for this study. This is the southern most district of Kerala and is bounded by the arabian sea on the west, Quilon district of Kerala on the north and Tirunalveli and Kanyakumari districts of Tamil Nadu state on the east and south. Various organisations and agencies related to agriculture are situated in this district. More important of these are:

1. As the capital of Kerala is situated in this district the headquarters of various development

departments are located in this district.

2. Kerala Agricultural University's agricultural campus is situated in this district.
3. Trivandrum is a district where Small Farmer's Development Agency is operated.
4. A farmer's training centre is functioning in this district.

More than 16 per cent of the total cropped area in the district only is put under rice. About 95 per cent of the farmers in this district are small farmers. The distribution of land holding in the district is given in table.2.

Table: 2. Distribution of operational farm holding according to size in Trivandrum District.*

Size of holdings (acres)	No. of holdings ('000)	Percentage to total
Less than 1.00	167.0	66.6
1.00 - 2.50	56.6	22.6
2.50 - 5.00	15.2	6.1
5.00 -10.00	8.8	3.5
10.00-15.00	2.9	1.2
15.00-20.00	0.1	..
20.00-25.00	..	..
25.00 and above	0.1	..
Total	250.7	100.0

* Source: Small Farmers Development Agency, Trivandrum.

From the table it may be noted that over 95 per cent of the farm holdings are less than 5 acres in extent. About 70 per cent of the holdings are less than 1 acre in extent.

The data for this study was collected during the months of March and April, 1978. The data collected relate to the Winter (Mundakan) rice crop of 1977 ended by February - March.

2. Selection of Sample

In order to select the unit for analysis - the small farmer cultivating rice - a multi stage sampling procedure was adopted.

Trivandrum district is constituted by four taluks. As the first step, two taluks were selected. The taluk which registered the highest mean yield of paddy and the taluk which registered the lowest mean yield of paddy during the immediate past winter crop season were selected. Following table gives the average mean yield of dry paddy of Trivandrum district, Taluk wise (Table-3)

Table:3 * Average mean yield of dry paddy (Kg./Hectare) of Trivandrum District during the Winter from 1971 to 1975.

Taluk	Average mean yield of paddy (Kg./ha.)
Neyyattinkara	2271.0
Trivandrum	2292.6
Nedumangad	2468.2
Chirayinkil	2415.0

* Source: Bureau of Economics & Statistics, Kerala.

The taluks thus selected for the study were Neyyattinkara and Nedumangad.

The selection of villages within each taluk was done by the method of sampling with probability proportional to size (p.p.s sampling). The list of the rice growing villages of the selected taluks were obtained from the concerned taluk Offices. In each taluk there were twenty villages. The area under rice in each village was obtained and two villages were selected from each taluk. The list of villages from which final selection was made is given as Appendix-III. Following four villages were thus selected.

1. Vembayam 2. Karakulam	Nedumangad taluk
3. Pallichal 4. Parassala	Neyyattinkara taluk

The next stage in sampling was the selection of farmers which was done by random sampling method. The Unit of analysis of this study was theindividual small farmer. A list of small farmers cultivating rice in the selected villages was obtained from the rice cultivators register (Register No.II) maintained by the concerned village office. From the list, 30 farmers from each village were selected using random numbers and the total number of respondents for the study was 120.

The distribution of selected small farmers according to size of holding is presented in table-4.

Table-4. Distribution of selected small farmers according to size of holding.

Size of holdings (Acres)	No. of respondents	Percentage to total
Below - 0.50	26	21.4
0.50 - 1.00	35	29.2
1.00 - 1.50	20	16.7
1.50 - 2.00	14	11.7
2.00 - 2.50	6	5.0
2.50 - 3.00	8	6.7
3.00 - 3.50	6	5.0
3.50 - 4.00	1	0.9
4.00 - 4.50	1	0.9
4.50 - 5.00	3	2.5
Total	120	100.0

(ii) Selection of improved practices

Nair (1969) defined improved agricultural practices as those practices which increased productivity more than the traditional ways of farming.

As explained in the first chapter, the investigator was constrained to select only the most important improved practices recommended for rice. Selection of the practices was made in consultation with the relevent literature including the Package of Practices recommended by Kerala Agricultural University and the list of practices was

administered to a panel of farmers and subject matter experts. Each practice was given equal weightage (1 score each). Based on the opinion of the panel of judges the following five improved practices with the highest score were selected.

1. High yielding variety seed.
2. Seed Treatment
3. Chemical fertilizers
4. Plant protection measures.
5. Artificial irrigation.

iii) Selection of variables

As explained during the review of literature, adoption behaviour (or adoption) was taken as the dependent variable for this study. As the new technology had enough time to spread since its introduction in 1966, the stage concepts of adoption was not considered. The adoption of a practice was taken as the use of that particular practice by the farmer during the reference season (winter - 1977)

The independent variables in this study included social, psychological and economic variables of the social system. For the final selection of variables a list of social, psychological and economic factors which can influence the adoption behaviour of farmers were prepared after reviewing the relevent literature. This list was then made into a continuam developed for this study and

sent to a panel of judges (Appendix-IV). The continuam consisted of four degree of importance from most important to not important. The scoring adopted was :

Degree of response	Most important	Important	Less important	Not important
Score	5	3	1	0

The response of the judges was collected and the scores obtained for each item was added up and the mean score was found out. Nine variables with the highest mean score were finally selected for the study. The independent variables thus selected were :

a) Social variables: 1. Main occupation
2. Education
3. Experience
4. Social participation.

b) Psychological variables:
1. Economic motivation
2. Risk orientation
3. Level of aspiration

c) Economic variables:
1. Size of holding
2. Labour input.

3. Empirical measures used

This part includes a review of methods already used for measuring variables and the empirical measures used in this study.

A. Dependent variable

Adoption behaviour (or adoption) was taken as the dependent variable for this study.

a) Adoption behaviour

Sundaraswamy and Duraiswamy (1975) used 'adoption quotient' developed by them to measure the adoption behaviour. They took 13 practices and the farmers were classified as low adopters (AQ 10-40%) medium adopters (AQ 40-80) and high adopters (AQ 80-100%)

Subramanyam and Lekshmanna (1975) used the 'adoption quotient' in a little different way. Adotpion of a practice for three or more years, two yemrs, and one yeer was suitably quantified by arbitarily assigning a score value of six, two and one respectively. Fourteen practices were selected. Farmers whose adoption score was 37 and above were rated as high adopters while those scoring less than 37 categorised as low adopters.

Chandrakandan (1975) used 'adoption index' for measuring the adoption behaviour. The total number of practices taken was 6. For every year of adoption of each practice, an adoption index score of 1 was given. On limiting the number of years of adoption to 3, the total adoption index score for each farmer ranged from 0-18. Based on the total adoption score, the farmers were then categorised as low adopters (0-6), medium adopters (7-12) and high adopters(13-18)

For the purpose of this study, the method used by Chandrakandan (1975) was employed with slight modification.

The selected practices were given equal weightage and adoption of each practice was given an adoption index score of 1. The total adoption index score for each farmer ranged from 0-5. Based on the total adoption score, the farmers were then categorised as low adopters (0-1), medium adopters (2-3) and high adopters (4-5).

b) Extent of adoption of individual practices

Mundra and Batham (1967) studied the extent of adoption of selected improved practices using the following indices.

1. Acceptance index = $\frac{\text{No. of people adopted new practices} \times 100}{\text{Total number of respondents.}}$

2. Area index = $\frac{\text{Area covered under new practices} \times 100}{\text{Total area under particular crop.}}$

For the purpose of this study, the acceptance index used by Mundra and Bathem (1967) was used for measuring the extent of adoption of selected improved practices of rice. Thus the extent of adoption of new practices was given by

Extent of adoption of the practice =

$$\frac{\text{No. of respondents adopted the practice} \times 100}{\text{Total number of respondents.}}$$

c) Practice adoption

Wilkening (1952) used an index for measuring the adoption of improved practices. The index of adoption used was the percentage of practices adopted to the total number of practices applicable for that operator.

Duncan and Kreetlow (1954) used a 25 - item index of farm practice adoption, adopted from the index developed

by Wilkening.

Marsh and Coleman (1955) used a practice adoption score computed as the percentage of applicable practice adopted.

Fliegal (1956) constructed an 'index of adoption' of farm practices using the correlation of several adoption variables; non adoption was given a value of and adoption a score of 1.

Beal and Rogers (1960) developed an 'adoption scale' for measuring the adoption of a practice. They studied in detail the adoption of two farm practices. This scale was computed which credited an individual with 1 score for adoption and 0 score for non adoptio n of the practice.

The other notable studies to quantify adoption o f improved practices are by Ramsey et al (1959) Copp (1956) Supe (1969), Chattopadyaya (1963) and Jayarama Reddy and Bhaskar Reddy (1972).

For the purpose of this study the adoption scale developed by Beal and Rogers (1960) was used to measure the practice adoption of farmers. For each of the selected improved practices, practice adoption score of 1 and practice non adoption score of 0 were given. The respondents were categorised as adopters and non adopters for each practice.

B. Independent variables

a) Social variables

1. Main occupation

Oliver et al (1975) studied the reading habits of farm news by farmers and he categorised farmers as part time agriculturists and full time agriculturists Menon and Annamalai (1975) used the criterian of farming to categorise the farmers as agriculturists and non-agriculturists based on their main occupation.

In this study main occupation of the farmers was decided on the basis of the time spent by a farmer on farming and the respondents were categorised as full time farmers and part time farmers. A respondent spending major portion of his time and attention in farming was taken as full time farmer and one spending major portion of his time on non-agricultural occupations was considered as part time farmer.

2. Education

For measuring the educational levels of farmers, Pareek and Trivedi (1965) developed a socio-economic status scale.

Oliver and Annamalai (1975) used educational categories as illiterate, primary, school, high school and collegiate and credited them with scores based on number of years of schooling.

For the purpose of the present study, the farmers were categorised based on their level of schooling. The farmers without any school experience were taken as out of school group and those having school education, starting from primary onwards, were considered as school group farmers.

3. Experience

Sreenivasan (1974) measured the experience in farming as number of years when the respondent assumed theactual entrepreunial responsibility. Same type of measurement of experience was used by Anbalagan (1974).

In this study, experience of the farmer was measured in terms of the total number of years the farmer had been engaged in farming. The total experience in number of years, of the respondents was worked out and the mean value was found out. Below mean value was taken as low experience and above mean as high experience.

4. Social participation

Trivedi (1963) used a socio-economic status scale for measuring the social participation of farmers. It was based on the scores obtained by a farmer by virtue of his participation in formal organisations.

For the purpose of this study, social participation was taken as the extent of participation of farmers in the various institutions and formal organisations. Non membership and membership in only one organisation was described as low social participation. Membership in two or more

institutions or organisations was treated as high social participation. The scores assigned to low was 0 and for high was 1.

b) Psychological variables

1. Economic motivation

Moulick (1965) developed a scale for measuring the economic motivation of farmers.

In this study economic motivation of the farmer was measured using the scales developed by Supe (1969). This scale consisted of six items against a five point range from 'strongly agree to 'strongly disagree'. There were five positive items and one negative item. The scoring adopted was as follows:-

Response	Strongly agree	Agree	Neutral	Dis agree	Strongly disagree
Positive item Score	7	5	4	3	1
Negative item Score	1	3	4	5	7

The total scores of the respondents and mean were taken. Above mean was taken as high economic motivation and below mean as low economic motivation.

2. Risk Orientation

Supe (1969) developed a risk orientation scale for measuring the risk orientation of farmers. The scale consisted of six items against a 5 point response range from 'strongly agree' to'strongly disagree'. There were four positive and two negative statements.

The scoring adopted was as follows:-

Responses	Strongly agree	Agree	Nutral	Disagree	Strongly disagree
Positive items (Score)	7	5	4	3	1
Negative items (score)	1	3	4	5	7

For the purpose of this study, the risk orientation scale developed by Supe (1969) was employed. The total scores of the respondents and mean were taken. Above mean value was taken as high risk orientation and below mean value as low risk orientation.

3. Level of aspiration

Chattopadyaya (1963) used a semistructured projective technique to measure level of aspiration of farmer.

Cantril and Free (1962) developed a self anchoring striving scale for measuring the general level of aspiration. This method was also known as the 'ladder technique'

For the purpose of this study, "ladder technique" developed by a Cantril and Free (1962) was used to obtain a measure of the level of aspiration. According to this technique the respondent was asked to define in his own terms his hopes and fears for the future or the components of the 'best' and 'worst' possible life for him. This provided a subjective frame of reference against which the respondent could evaluate his personal value satisfactions in life. After these subjective points were obtained, the respondent was asked to imagine a symbolic ladder of life,

the top of which representing the best possible life for him as he defined it. He was then asked to state where on the ladder of his life he felt he belonged to at present. The step number chosen from the ladder, ranging from 0-10 represented his score of the present. He was then asked to state where on the ladder he felt he stood five years ago and where he thought he would be five years later. The steps choosen for past and future represented his score of past and future. Thus for each respondent three types of scores, for past, present and future were obtained. The difference between past and present scores represented the level of striving (past). The difference between present and future scores represented the level of striving (future). These two levels of striving constituted the total level of aspiration of the respondent.

The scores of the respondents and mean were calculated. Above mean represented high levels of striving and below mean represented low level of striving.

c) Economic variables

1. Size of holding.

The variable was taken as the total land holding of the respondents in acres. This included both wet and dry lands. Table-4 shows that about 50 per cent of the respondents have holding below 1 acre in extent. For the purpose of this study, small farmers were categorised into (i) Submarginal farmers (those with holding below

1 acre) and (ii) marginal farmers (those with holding above 1 acre).

2. Labour input

Labour input, in this study was taken as the total number of human labour days used in the cultivation of rice measured as man days/acre during the reference season. This included both family and hired labour.

The respondes of the respondents were collected in man days/acre and mean value was calculated. The below mean value was taken as low labour input and the above mean value as high labour input.

c) Inter relationship between the independent variables

The variables selected from among the multitude of possible adoption variables as independent variables are not strictly independent. They are connected in a web of inter-dependent relationships and therefore an attempt was made to find out the inter relationships between the selected variables.

For the purpose of this study the inter correlation between the selected independent variables was found out.

d) Constraints in the adoption of selected practices of rice cultivation

Based on the review of studies and a piglot investigation a list of constraints for each practice was prepared and given in the schedule (Appendix-V). The respondents were asked to state the constraints they faced in the order of various preferences, based on their own past experience in rice cultivation.

The following scores were assigned to various preferences as used by Nair (1969).

First preference - 3 scores

Second preference - 2 scores

Third preference - 1 score.

The rank order was determined on the basis of mean score earned by a constraint. To determine the relative interactions of these constriants with respect of adoption the analysis of variance teachnique was used.

4. Methods used for data collection

This study employed the following methods for data collection.

1. Participant observation.

2. Scheduled interview.

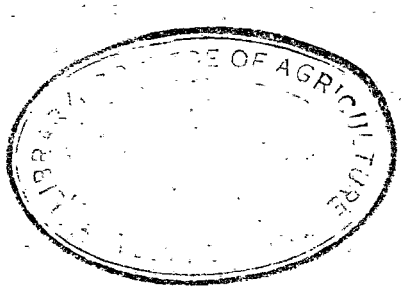
The researcher stayed in the village, built up rapport with the respondents and observed the behavioural patterns and the economic and social processes. The respondents were interviewed individually using an interview schedule prepared for this study. For the preparation of this schedule a draft schedule was prepared on the basis of the review of literature taking into account the different independent variables. This was administered to judges including extension agents and subject matter experts. In the light of the opinions of the judges, modifications were made and the orginal schedule was finalised in English (Appendix-V). Interview was conducted in Malayalam.

5. Statistical methods used

In the selection of sample, multistage random sampling was adopted wherein the selection of villages within each taluk was with probability proportional to size and the selection of small farmers within the villages by simple random sampling.

For testing the association of variables with adoption behaviour and adoption of theselected practices, the Chi-square test was utilized. The inter relationship between the independent variables are found out by correlation using the Micro system (Mini Computer) of the College of Agriculture, Vellayani. The analysis of scores for the constraints in adoption was done by the analysis of variance technique.

RESULTS



RESULTS

In this chapter the results of the study are presented in the following heads :

1. General adoption behaviour of rice cultivating small farmers.
2. Distribution of farmers according to independent variables.
3. Relationship of general adoption behaviour of small farmers with selected variables.
4. Inter relationship between the independent variables.
5. Extent of adoption of individual improved practices in rice cultivation by small farmers.
6. Relationship of adoption of individual improved practices with selected variables.
7. Constraints in the adoption of individual practices in rice cultivation as perceived by small farmers.

1. General adoption behaviour of rice cultivating small farmers.

The adoption index was used for measuring adoption behaviour. The selected improved practices namely high yielding varieties, seed treatment, chemical fertilizers, plant protection measures and artificial irrigation were given equal weightage assigning one score for each practice. Adoption of each practice was given an adoption index score of 1. The total adoption index score for each farmer ranged from 0-5. The farmers were categorised as low adopters, medium adopters and high adopters. The distribution of general adoption category is presented in table-5.

Table-5. Distribution of farmers according to adoption category

Adoption category	Adoption index score range	Frequency	Percentage
Low adopters	0 - 1	42	35
Medium adopters	2 - 3	45	38
High adopters	4 - 5	33	27

Table 5 revealed that 35 per cent of the respondents were low adopters of improved agricultural practices. Only 27 per cent of the farmers were high adopters of the selected practices.

The data also revealed that more farmers were medium adopters of the selected improved practices. As much as 38 per cent of them fall in this category with an adoption index score range of 2 - 3.

The distribution of farmers according to the number of practices adopted are presented in table-6.

Table-6. Distribution of farmers according to the number of practices adopted .

No. of practices adopted	Frequency	Percentage
0	16	13.3
1	26	21.7
2	27	22.5
3	18	15.0
4	24	20.0
5	9	7.5
Total	120	100.0

The above table illuminated the erratic nature of the adoption of individual practices by the farmers. It is significant to note that 16 farmers did not adopt any practice while only 9 farmers adopted all the practices as a package.

2. Distribution of farmers according to independent variables.

The distribution of farmers according to the different

categories of independent variables is presented in table-7.

Table-7. Distribution of farmers according to different independent variables

Variable and Category	No. of respondents	
	Frequency	Percentage
Main occupation		
Full time farmer	103	86
Part time farmer	17	14
Education		
Out of School group	43	36
School group	77	64
Experience		
Low experience	39	33
High experience	81	67
Social participation		
Low social participation	82	68
High social participation	38	32
Economic motivation		
Low economic motivation	57	48
High economic motivation	63	52
Risk orientation		
Low risk orientation	56	47
High risk orientation	64	53
Level of aspiration		
a) Level of striving (future)		
Low level	80	67
High level	40	33
b) Level of striving (past)		
Low level	34	28
High level	86	72
Size of holding		
Sub marginal	61	51
Marginal	59	49
Labour input		
Low labour input	45	38
High labour input	75	62

Mean scores: Experience - 12.6, Economic motivation - 27.5, Risk orientation - 23.8, Labour input - 61. Level of aspiration (a) level of striving (future) - 1.30 and (b) level of striving (past) - 0.85.

Table 7 presents the distribution of respondents (N = 120) according to the different categories based on the independent variables. This table reveals that majority of the respondents were full time farmers (86 per cent). Farmers with school education formed the majority with respect to education (64 per cent). About 67 per cent of the respondents had high experience in farming. In the case of social participation, 68 per cent of the respondents had only low level of social participation More than half of the respondents had high level of both economic motivation and risk orientation (52 percent and 53 per cent) respectively. The distribution according to level of striving (future) recorded that 67 per cent of farmers had only low level of striving for future where as only 28 per cent accounted for low level of striving (past). The sub marginal farmers (51 per cent) were found to be slightly more than the marginal farmers. The labour input in rice cultivation was found to be high in the case of 62 per cent of the respondents.

3. Relationship of general adoption behaviour of small farmers cultivating rice with selected variables.

Table - 8 depicts the relationship of the general adoption behaviour of small farmers with the selected independent variables.

Table-8. Relationship of general adoption behaviour of small farmers cultivating rice with selected variables.

Variable & Category	Adoption category: Low adopters Frequency	%	Medium adopters Frequency	%	High adopters Frequency	%	Chi-square
A. Social variables							
a) Main occupation							
Full time farmer	36	35	43	42	24	23	6.847*
Part time farmer	6	35	2	12	9	53	
b) Education							
Out of school group	23	53	14	34	6	13	11.737*
School group	19	25	31	40	27	35	
c) Experience							
Low experience	15	38	11	28	13	34	2.996
High experience	27	33	34	42	20	25	
d) Social participation							
Low ,, ,,	35	43	31	38	16	19	8.918*
High ,, ,,	7	18	14	37	17	45	
B. Psychological variables							
e) Economic motivation							
Low ,, ,,	22	39	21	37	14	24	11.613*
High ,, ,,	20	32	24	38	19	39	
f) Risk Orientation							
Low ,, ,,	26	46	23	41	7	13	11.613*
High ,, ,,	16	25	22	34	26	41	
g) Level of aspiration							
a) Level of string (future) Low level	32	40	26	33	22	27	3.312
High level	10	25	19	48	11	27	
b) Level of striving (past) Low level	17	50	12	35	5	15	5.466
High level	25	29	33	38	28	33	
C. Economic variables							
h) Size of holding							
Sub marginal	33	54	16	26	12	20	21.103*
Marginal	9	15	29	49	21	36	
i) Labour input							
Low labour input	16	36	17	38	12	26	0.000
High labour input	26	35	28	37	21	28	

* Significant at 0.05 level.

From the table-9 it is seen that all the social variables except experience exhibited significant relationship with the general adoption behaviour of respondents.

Among the psychological variables, economic motivation and risk orientation showed significant and positive relationship with the adoption behaviour. In this group level of aspiration showed no significant relationship with the adoption of improved practices.

Among the two economic variables, size of holding alone had positive and significant relationship with the general adoption behaviour. Labour input did not have significant relationship with adoption.

4. Inter relationship between the selected independent variables.

The inter relationship between the selected independent variables is presented in table-9. From the table it is seen that the variable, main occupation exhibited significant relationship with education, experience, social participation, risk orientation and level of aspiration at 0.05 level. The relationship with experience was negative. Education, social participation and level of striving (past) showed significance even at 0.01 level.

Education showed significant relaionship with social participation and level of aspiration at 0.05 level while labour input exhibited negative relationship at 0.01 level.

Table-9. Inter relationship between the selected independent variables.

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
X_1		0.2536*	-0.1978**	0.3015*	0.1737	0.1820**	0.2325**	0.2738*	-0.0505	0.0543
X_2			-0.0994	0.2114**	0.1086	0.1398	0.2291**	0.2199**	0.1061	- 0.9010
X_3				0.0234	-0.0362	-0.0074	-0.2744*	0.0323	0.0896	- 0.0239
X_4					0.1553	0.0705	0.1323	0.2842*	0.2974	- 0.2319**
X_5						0.0654	0.1905**	0.0592	0.0303	0.0956
X_6							0.2407**	0.2224**	-0.1069	0.1020
X_7								0.3215*	-0.0887	- 0.0501
X_8									-0.0902	- 0.1147
X_9										- 0.0902
X_{10}										

* Significant at 0.05 level of probability
** Significant at 0.0$ level of probability

X_1 - Main Occupation
X_2 - Education
X_3 - Experience
X_4 - Social participation
X_5 - Economic motivation
X_6 - Risk orientation
X_7 - Level of striving (future)
X_8 - Level of striving (past)
X_9 - Size of holding
X_{10} - Labour input.

Experience not only did not show significant relationship with any of the other factors, but exhibited negative relationship with economic motivation, risk orientation level of striving (future) (significant at 0.01 level) and labour input.

Social participation showed significant relationship with the economic variables and also to level of aspiration (level of striving (past) only).

Economic motivation showed significant relationship with the respondents' level of striving (future) only.

Risk orientation exhibited significant relationship with the level of aspiration of the respondents.

In the case of level of aspiration, the level of striving (past) is related with their level of striving (future).

5. Extent of adoption of individual improved practices of rice.

In table-10 the extent of adoption of the individual improved practices, measured as acceptance index, by the small farmers is presented.

The table reveals that only 46 per cent of the respondents adopted High yielding varieties of seeds and only 9 per cent adopted seed treatment. The distribution of farmers according to the use of chemical,

fertilizers, irrespective of the quality and time of application, showed that as high as 80 per cent of them applied chemical fertilizers to their crop.

Table-10 Distribution of farmers according to extent of adoption of improved practices.

Improved practices	Practice adoption Category (N = 120)			
	Non adopters		Adopters	
	Frequency	%	Frequency	%
High yielding variety seeds	65	54	55	46
Seed treatment	109	91	11	9
Chemical fertilizers	24	20	96	80
Plant protection measures	66	55	54	45
Artificial irrigation	59	49	61	51

Majority of the farmers (55 per cent) did not employ plant protection measures in rice cultivation. Artificial irrigation is seem practiced by 51 per cent of the farmers.

6. Relationship of adoption of selected improved practices with selected variables.

The relationship of the five selected improved practices with the social, psychological and economic variables are presented in this part.

a) Relationship of the adoption of High yielding variety seed with the selected variables.

Data from the field study were analysed and the

relationship are presented in the table-11.

Table-11. Contingency table for adoption of high yielding variety seeds and the selected variables.

Variable and Category	Adoption Category: Non adopters Frequency	%	Adopters Frequency	%	Chi-square
1. Main occupation					
Full time farmer	60	58	43	42	17.731**
Part time farmer	5	29	12	71	
2. Education					
Out of school group	29	67	14	33	4.756*
School group	36	47	41	53	
3. Experience					
Low experience	20	51	19	49	0.169
High experience	45	56	36	44	
4. Social participation					
Low social participation	51	62	31	38	6.722**
High social participation	14	37	24	63	
5. Economic motivation					
Low economic motivation	35	61	22	39	2.290
High economic motivation	30	48	33	52	
6. Risk orientation					
Low risk orientation	39	70	17	30	10.120**
High risk orientation	26	41	38	59	
7. Level of aspiration					
a) Level of striving (future)					
Low level	45	56	35	44	0.419
High level	20	50	20	50	
b) Level of striving (past)					
Low level	21	62	13	38	1.103
High level	44	51	42	49	
8. Size of holding					
Sub marginal	46	75	15	25	22.550**
Marginal	19	32	40	68	
9. Labour input					
Low labour input	27	60	18	40	0.985
High labour input	38	51	37	49	

* Significant at 0.05 level
** Significant at 0.01 level

From the above table it is seen that all the social variable except experience showed significant influence on the adoption

of high yielding variety seeds by the small farmers.

Risk orientation, the psychological variable and size of holding, the economic variable showed significant and positive influence on adoption of high yielding variety seeds.

The chi-square values for experience, economic motivation, level of aspiration and labour input were not significant at 0.05 level of probability. It is further noticed that main occupation, social participation, risk orientation and size of holding showed positive and significant relationship even at 0.01 level of probability.

b) Relationship of the adoption of seed treatment with the selected variables .

The relationship of the adoption of seed treatment with the selected variables is presented in table-12.

The table reveals that only main occupation had significant relationship with adoption at the 0.05 level of probability. None of the other social variables, psychological and economic variables showed any significant relationship at the 0.05 level of probability.

Table-12. Contingency table for adoption of seed treatment and selected variables

Variable & Category	Adoption category: Non adopters Frequency	%	Adopters Frequency	%	Chi-square
1. Main occupation					
Full time farmer	96	93	7	7	5.004*
Part time farmer	13	76	4	24	
2. Education					
Out of school group	39	91	4	9	0.435
School group	70	91	7	9	
3. Experience					
Low experience	36	92	3	8	0.150
High experience	73	90	8	10	
4. Social participation					
Low social participation	77	94	5	6	2.929
High social participation	32	84	6	16	
5. Economic motivation					
Low economic motivation	54	95	3	5	1.986
High economic motivation	55	87	8	13	
6. Risk orientation					
Low risk orientation	52	93	4	7	0.516
High risk orientation	57	89	7	11	
7. Level of aspiration					
a) Level of striving (future)					
Low level	72	90	8	10	0.200
High level	37	93	3	7	
b) Level of striving (past)					
Low level	32	94	2	6	0.614
High level	77	90	9	10	
8. Size of holding					
Submarginal	58	95	3	5	2.689
Marginal	51	86	8	14	
9. Labour input					
Low labour input	40	89	5	11	0.326
High labour input	69	92	6	8	

* Significant at 0.05 level.

c) Relationship of the adoption of chemical fertilizers with the selected variables.

The relationship of the adoption of chemical fertilizers

with the selected variables is presented in table-13.

Table-13. Contingency table for adoption of chemical fertilizers and the selected variables.

Variable & Category	Adoption category: Non adopters Frequency	%	Adopters Frequency	%	Chi-square
1. Main occupation					
Full time farmer	22	21	81	79	0.840
Part time farmer	2	12	15	88	
2. Education					
Out of school group	12	28	31	72	6.007*
School group	12	16	65	84	
3. Experience					
Low experience	13	33	26	67	6.419*
High experience	11	14	70	86	
4. Social participation					
Low social participation	18	22	64	78	0.616
High social participation	6	16	32	84	
5. Economic motivation					
Low economic motivation	15	26	42	74	2.706
High economic motivation	9	14	54	86	
6. Risk orientation					
Low risk orientation	11	20	45	80	0.008
High risk orientation	13	20	51	80	
7. Level of aspiration					
a) Level of striving (future)					
Low level	17	21	63	79	0.234
High level	7	18	33	82	
b) Level of striving (past)					
Low level	8	24	26	76	0.369
High level	16	19	70	81	
8. Size of holding					
Submarginal	40	66	21	34	9.636**
Marginal	26	44	33	56	
9. Labour input					
Low labour input	11	24	34	76	0.888
High labour input	13	17	62	83	

* Significant at 0.05 level
** Significant at 0.01 level

Education and experience showed significant relationship

with the adoption of chemical fertilizers. None of the psychological variables showed relationship while the size of holding showed significant and positive relationship at the 0.01 level of probability. Labour input showed non significant relationship with the adoption of chemical fertilizers.

d) Relationship of the adoption of plant protection measures with the selected variables.

Table-14 depicts the relationship of the adoption of plant protection measures with the selected variables. The table reveals that all the variables except two social variables, namely, education and experience, one psychological variable, namely economic motivation and one economic variable namely, labour input are significantly related to the adoption of plant protection measures. Main occupation and social participation have positive and significant relationship with the adoption of plant protection measures at the 0.01 level. Two of the psychological variables, namely risk orientation and level of aspiration showed significant relationship. While risk orientationa and level of striving (future) showed significant at 0.01 level, the level of

striving (past) and size of holding exhibited significance only at 0.05 level.

Table-14. Contingency table for adoption of plant protection measures and the selected variables.

Variable & Category	Adoption category: Non adopters Frequency	%	Adopters Frequency	%	Chi-square
1. Main occupation					
Full time farmer	62	60	41	40	7.925**
Part time farmer	4	24	13	76	
2. Education					
Out of school group	35	81	8	19	1.880
School group	31	40	46	60	
3. Experience					
Low experience	19	49	20	51	0.921
High experience	47	58	34	42	
4. Social participation					
Low social participation	52	63	30	37	7.408*
High social participation	14	37	24	63	
5. Economic motivation					
Low economic motivation	35	61	22	39	1.798
High economic motivation	31	49	32	51	
6. Risk orientation					
Low risk orientation	38	68	18	32	7.012**
High risk orientation	28	44	36	56	
7. Level of aspiration					
a) Level of striving (future)					
Low level	51	64	29	36	7.429**
High level	15	38	25	62	
b) Level of striving (past)					
Low level	25	74	9	26	6.581*
High level	41	48	45	52	
8. Size of holding					
Submarginal	40	66	21	34	5.604*
Marginal	26	44	33	56	
9. Labour input					
Low labour input	26	58	19	42	0.224
High labour input	40	53	35	47	

* Significant at 0.05 level
** Significant at 0.01 level.

e) Relationship of the adoption of artificial irrigation with the selected variables

The contingency table which shows the relationship of adoption of artificial irrigation facilities with the selected variables is presented below: (Table-15)

Table-15. Contingency table for adoption of artificial Irrigation and the selected variables

Variables & Category	Adoption category				Chi-square
	Non adopters		Adopters		
	Frequency	%	Frequency	%	
1. Main occupation					
Full time farmer	54	52	49	48	3.092
Part time farmer	5	29	12	71	
2. Education					
Out of school group	26	60	17	40	3.42
School group	33	43	44	57	
3. Experience					
Low experience	17	44	22	56	0.719
High experience	42	52	39	48	
4. Social participation					
Low social participation	46	56	36	44	4.909*
High social participation	13	34	25	66	
5. Economic motivation					
Low economic motivation	29	51	28	49	0.117
High economic motivation	30	48	33	52	
6. Risk orientation					
Low risk orientation	33	59	23	41	4.003*
High risk orientation	26	41	38	59	
7. Level of aspiration					
a) Level of striving (future) Low level	40	50	40	50	0.066
High level	19	48	21	52	
b) Level of striving (past) Low level	23	68	21	32	1.770
High level	36	42	50	58	
8. Size of holding					
Submarginal	38	62	23	38	8.550**
Marginal	21	36	38	64	
9. Labour input					
Low labour input	20	44	25	56	0.642
High labour input	39	52	36	48	

* Significant at 0.05 level
** Significant at 0.01 level

Table 15 reveals that among the social variables social participation alone showed significant relationship with the adoption of artificial irrigation. The psychological variables risk orientation also shows significant relationship at 0.05 level. Size of holding has significant relationship at 0.01 level of probability.

The other variables namely main occupation, education experience, economic motivation, levelof aspiration and labour input showed non significance with the adoption of artificial irrigation

7. Constraints in the adoption of individual practices of rice cultivation as selected by the farmers.

The abstract of analysis of variance used for findings the variation in adoption due to the constraints. on the selected improved practices is presented in table-16.

Table-16. Abstract of ANOVA - Constraints in the adoption of selected improved practices.

Source	H.Y.V. Seeds		Seed treatment		Chemical fertilizers		P.P measures		Irrigation	
	df.	MS	df.	MS	df.	MS	df.	MS	df.	MS
Constraints	5	4.946**	3	3.083**	2	2.479**	3	5.306**	1	2.259**
Error	266	0.773	223	0.535	66	0.534	237	0.630	111	0.441

** Significant at 0.01 level.

The table shows that the constraints mentioned by the

respondents were significant at 0.01 level for the selected improved practices.

a) Adoption of the high yielding variety seeds

The important constraints reported by the respondents in the adoption of high yielding variety seeds after ranking is given in table-17.

Table-17. Constraints in the adoption of high yielding variety seeds.

Rank	Constraint	Mean score
1.	High requirement of chemical fertilizers	2.39
2.	Lack of financial assistant	2.35
3.	Low straw yield and straw not suited for cattle feeding	2.22
4.	Lack of irrigation facilities	2.14
5.	Higher labour input	1.91
6.	High incidence of pests and diseases	1.51

Table-17 very clearly reveals that the higher dose of chemical fertilizers required for High yielding variety seeds is the constraint considered as mot important by the respondents. Lack of financial assistance ranked next in the order of importance. Low straw yield and unsuitability of the straw as cattle feed, lack of irrigation facilities higher labour input and high incidence of pests and

diseases are felt as important constraints by the farmers in that order.

b) Seed treatment withchemicals

Table-18 shows the ranked constraints mentioned by the respondents for the adoption of seed treatment with chemicals.

Table-18. Constraints in theadoption of seed treatment.

Rank	Constraints	Mean score
1.	Not aware of the practice	2.72
2.	Technique not known	2.38
3.	Local measure sufficient	2.36
4.	Chemicals not available	2.25

From the above table it is seen that most of the farmers were not aware of this practice. They also mentioned they are not conversant with the technique of seed treatment.

c) Chemical fertilizers

The major constraints in the use of chemical fertilizers suggested by the respondents according to their ranking are presented in table-19.

Table-19. Constraints in theadoption of Chemical fertilizers.

Rank	Constraints	Mean score
1.	High cost of fertilizers	2.708
2.	Non availability in time	2.333
3.	Non timely management is required	2.047

The table reveals that the high cost of fertilizers ranked first among the barrier for adoption of this input. Non availability in time and the requirement of timely management ranked next in that order.

d) Plant protection measures

The table-20 presents the constraints ranked by the respondents in the adoption of plantprotection measures.

Table-20. Constraints in the adoption of plant protection. measures.

Rank	Constraints	Mean score
1.	High expenditure	2.552
2.	Non availability of chemical in time	2.151
3.	Non availability of chemicals	1.978
4.	Non availability of plant protection equipment	1.901

From the above table it is clear that the high expenditure involved in the use of plant protection measures accounts for the low adoption of this practice. The non availability of chemicals in time rank next. Non availability of chmicals and plant protection equipment were also suggested as important constraints.

e) Artificial irrigation

The constraints faced by the respondents in the

adoption of artificial irrigation facilities is given in table-21.

Table-21. Constraints in the adoption of artificial irrigation

Rank	Constraints	Mean score
1	High Expenditure	2.740
2	Non availability of minor irrigation facilities	2.457

The highexpenditure involved in the adoption of artificial irrigation stands out as the most important barrier on the adoption of this practice. The non availability of minor irrigation facilities compels the poor farmer not to use this important input.

DISCUSSION

DISCUSSION

In this chapter the results obtained are discussed and interpreted under the following sections:

1. General adoption behaviour of rice cultivating small farmers.
2. Relationship of general adoption behagiour with the selected variables and their inter relationship.
3. Extent of adoption of individual improved practices.
4. Relationship of adoption of individual improved practices with variables and the constraints in the adoption of these practices as perceived by the farmers.

1. General adoption behaviour of rice cultivating small farmers.

Majority of farmers were either low adopters or medium adopters (Table-5). Only 27 per cent of the respondents were in the high adopter category. Table-6 revealed that out of the total 120 respondents 16 respondents did not adopt any of the improved practices while 26 respondents adopted only any one of the selected improved practices. It is significant that only 9 respondents (7.5%) fully adopted all the selected practices (high yielding variety seeds, seed treatment, chemical fertilizers, plant protection measures and artificial irrigation) as a package.

The number of practices adopted by 42 respondents vary from 3 to 4. This erratic adoption behaviour might be due to the violent variation in the socio-economic and personal characterestics of the respondents. This was evidenced in the relationship between the general adoption behaviour and selected variables which was already been discussed elsewhere in this chapter.

2. Relationship of general adoption behaviour with the variables and their inter relationship.

The independent variables, selected for the present study were main occupation, education, experience and social participation (social variables), economic motivation, risk orientation and level of aspiration (psychological) variables) and size of holding and labour input (economic) variables).

Table-8 depicted the relationship of general adoption behaviour of the farmers with the independent variables. Table-9 presented the inter relationship of the independent variables.

All the social variables, except experience exhibited positive and significant relationship with the general adoption behaviour of the respondents. Of the three psychological variables economic motivation and risk orientation had positive and significant relationship with

the generaladoption behaviour of the respondents. Among economic variables, size of holding of the respondents showed positive and significant relationship with the adoption behaviour of small farmers.

a) Main occupation

Table-8 further revealed that 53 per cent of the part time farmers were high adopters while only 23 per cent were high adopters among full time farmers. Though the part time farmers constituted only 14 per cent of the respondents their higher rate of adoption should be reckoned with because of the indicated positive influence of their occupation on the adoption. The part time farmers might have had better command over financial resources and also better contact with both localite and cosmopolite sources of information than thefull time farmers. Further, part time farmers will have more risk bearing capacity as the losses likely to be incurred in the farm front can be absorbed by the income from their non farm occupations. These reasons might have contributed for the higher adoption by the respondents with non agricultural vocation as their main occupation. This findings are in agreement with the results obtained by Rajendran (1974) Oliver et al (1975) and Menon and Annamalai (1975). Therefore the hypothesis that there will be a positive relationship between main occupation and adoption is accepted.

Main occupation was found to have positive and significant inter relationship with education, social participation, risk orientation and level of aspiration whereas the relationship with experience was significantly negetive (Table-9). Individuals with higher levels of education are likely to have more social participation, better risk orientation and higher level of aspiration due to the innate capacity of education to produce individuals with better capacity for sound decision making sociability, self confidence etc.,. This cumulative effect of education might in turn influence the selection of a gainful employment. Better social participation, higher risk orientation and higher level of aspiration by themselves also equip an individual to select the most remunerative enterprise. With various educational activities undertaken by various linking agencies, it is possible for an individual without any experience in any vocation to get exposed to new ideas. Therefore experience is farming is not a decisive factor in the selection of occupation.

b) Education

The educational status of the respondents showed positiv and significant relationship with the general adoption behaviour of farmers (Table-8). Among the school group, 35 per cent were high adopters while only 13 per cent of the farmers in out of school group were high adopters. Over 50 per cent of farmers in out of school group (53%) were

low adopters of improved agricultural practices. Table-8 further revealed that in the case of medium adopters also school group constituted more than the non school group(40% and 34% respectively). These results indicated higher adoption of improved practices among the individuals with higher levels of education. Formal education might have helped the farmers to obtain more knowledge about the new practices than the farmers in the non school group. Educated farmers can naturally make better use of print media and can understand and comprehenced new ideas faster and better than the other group of farmers. Further, education develops mental ability of individuals,which in turn, aids in taking better decisions, in rational thinking, and in correctly analysing and interpreting new ideas. Also, higher education helps the farmers to develop more initiative and drive which will encourage them to get in touch with various organisations and agencies to acquire more information on new technology. All these might have constributed in the higher adoption of improved practices, by school educated small farmers. Hence the hypothesis that the educational status will have positive relationship with adoption is accepted. This finding is an agreement with the studies of Das and Sarkar (1970), Patel and Singh (1970), Subramanyan and Lekshmanna (1973) and Jayarama Reddy and Bhaskar Reddy (1972).

Table-9 revealed that education was positively and significantly inter related to social participation and level of aspiration whereas its relationship with labour input was significantly negetive. Educated farmers are likely to have cosmopolitan outlook and may tend to acquire information on farming from as many sources as possible. For this, they come into contact with a number of formal organisations and participate in their activities. The level of aspiration persumably increase with education, as education widens the outlook of life which induces the individuals to strive for a better, still better and richer life. The labour input showed significant and negetive relationship with education. This might be due to the fact that a particular cultivation practice requires the same amount of labour whether done by educated farmer or illiterate farmer. And, educated farmers will be in a better position to maneuver and manipulate the available situation and recources so as to reduce the expenditure on this component.

c) Experience

Results presented in Table-8 revealed that farming experience was not a discriminating factor in the adoption behaviour of farmers. Therefore the hypothesis that experience had a positive relationship with adoption is rejected. This indicates that adoption of improved practices is not directly related to experience in farming. Farmers

with low level of experience are likely to be young farmers who constituted 33 per cent of the respondents. This category of farmers will be more innovative, enterprising and willing to take calculated risks than the older farmers. These characterestics of young farmers, thoughhaving only low experience in farming might have influenced them to adopt improved practices. This result is in agreement with the findings of Sreenivasan (1974) and Seaudeen and Rajagopalan (1977).

Experience of the farmers did not show positive and significant inter relationship with any of the other variables except main occupation and level of striving (future) which showed negetive relationship (Table-9). The reasons for positive relationship between experience and main occupation have already been explained. The negetive relationship with level of striving (future) might be due to the consistant use of traditional methods of cultivation by the farmers and due to their inadequate exposure to the modern technology through adequate extension activities.

d) Social participation

Social participation scores of the respondents showed positive and significant relationship with their adoption behaviour. The hypothesis that there will be positive relationship between these variables is accepted. Table-8 revealed that 45 per cent of the farmers withhigh social participation were high adopters while only 19 per cent

of the farmers with low social participation were high adopters. It is significant that 68 per cent of the respondents were having only low social participation. It is also revealed that 43 per cent of the farmers with low social participation were low adopters of improved practices. These results indicate that the higher the social participation the higher will be the rate of adoption. Membership in formal organisations and institutions help the farmers to come into contact with different individuals, agencies and localite and cosmopolite information sources. Such contacts improve the technical knowledge of the farmers and make them more receptive to new ideas and practices. Social participation also help the farmers to acquire supplies and services necessary for putting new ideas into practice. Acquisition of the knowledge input and physical inputs result in better and higher adoption of improved practices. The findings obtained are in conformity with the studies of Ratan Chand and Gupta (1966), Reddy and Kivilin (1968) and Karim and Mahboob (1974).

Table-9 displayed that both the economic variables, namely size of holding and labour input, had positive and significant inter relationship with social participation of farmers. Level of striving (past) also showed the same trend. Increased size of holding is likely to increase the economic level of farmers. Farmers with better control over economic resources will have more participation in

various localite and cosmopolite organisations. Better participation in organisations broaden the outlook on various aspects of farming which include effective management of labour also. In the light of the recent trend in organised labour and specialization in the different items of work by labour force and also the non availability of adequate labour during peak seasons in the state, it is necessary to maintain cordial and healthy working relationship with the labour force for the mutual benefit of the farmers and the labour community. Higher and better participation of farmers in organisations will equip them to maintain such a relationship with labourers. This might be the reason for the positive relationship of social participation with labour input. The significant inter relationship between level of striving (past) and social participation indicates the conviction of the farmers about the necessity for social participation to make improvements in farming.

e) Economic motivation

Higher rate of adoption was demonstrated by farmers with high economic motivation (Table-8). The hypothesis that there will be a positive relationship between these two variables is accepted. Sixty eight per cent of the farmers with high economic motivation were either medium adopters or high adopters, while only thirty two percent were low adopters. In the case of farmers with low economic

motivation, 39 per cent were low adopters. With the introduction of new technology, agriculture has assumed the characterestics of a business enterprise rather than a way of life as in thepast. Therefore economic gain will be the prime consideration of farmers in adopting a new practice. Economic motive has been indicated by Roshan Singh and Singh (1970) as the single most effective factor for the adoption of most of the improved farming practices. Das (1968) also reported similar results. He has also found that farmers were adopting improved practices for economic gains. The results of this study are also in agreement with the above studies. Similar results were also reported by Das and Sarkar (1970) and Singh and Singh (1970) and Saikia and Bora (1975).

Economic motivation was found to have positive and significant relationship with level of striving (future) only (Table-9). This again shows that economic motivation is the most important factor in the adoption of new technology as a package. This might be the reason forthe above relationship This relationship underlines the necessity to consider the economic gain obtainable from a new technology realistically before the technology is introduced for diffusion among the farmers.

f) Risk orientation

Risk orientation was found to have positive and significant relationship with the general adoption behaviour of the respondents (Table-8). Fifty three per cent of the respondents

were found to have high risk orientation. Among these farmers 41 per cent and 34 per cent were high adopters and medium adopters respectively whereas only 25 per cent were low adopters. This trend is seen reversed in the case of farmers withlow risk orientation who constituted 47 per cent of the respondents. As the risk orientation of the farmers increase,the capacity to take more risk in the adoption of new technology also increases. This might be the reason for higher adoption by farmers with high risk orientation. This finding is in agreement with the results obtained by Sinha (1963), Hobbs (1964), Singh (1966), Nair (1969) and Singh and Singh (1970).

Risk orientation did not show significant relationship with other factors except level of aspiration (Table-9). Farmers with high level of aspiration are likely to bear more risks to obtain more income and the resultant conveniences and comforts in life.

g) Level of aspiration

The level of aspiration in the present study did not show significant association with the adoption behaviour of farmers (Table-8). Results obtained by Chattopadyaya (1963) corroborate the above findings. Therefore, the hypothesis that there will be a positive relationship between these variables is rejected. The negetive association of the level of aspiration with adoption might be due to the fatalistic nature of the respondents, characterestic of the majorityIndian Farmers.

The inter relationship exhibited between level of striving (future) and level of striving (past) Table-9) indicates the complementary role of these two factors in constituting the level of aspiration.

h) Size of holding

Size of holding exhibited positive and significant relationship with the adoption behaviour of farmers (Table-8). The hypothesis that there will be a positive relationship between size of holding and adoption is accepted. The distribution of sub marginal (below 1 acre) and marginal (1-5 acres) farmers among the respondents were almost equal (51% and 49% respectively). Table-8 revealed that in the marginal garmer group, 85 per cent were either medium adopters or high adopters where as in the case of sub marginal farmers the corresponding figure was only 46 per cent. Further, 54 per cent of the sub marginal farmers were low adopters. These results indicate that the size of holding influences the adoption of new farm technology by the farmers cultivating rice. Most of the sub marginal farmers might not be spending all their time in cultivating their own land probably due to the inability of the small bits of land to sustain them. Therefore, they might turn to off farm means of income resulting in diluted attention in farming in their own land. The sub marginal farmer farmers also will not be

in a position to adopt recommended practices even if they posses adequate knowledge on the practices because of their limited economic means. These might be the reasons for the low level of adoption of improved practices by the sub marginal farmers. The marginalfarmers might have had better control over economic resources and therefore, mighthave been more enthusiastic about the improved practices. Therefore, they readily translate the new ideas they gain into action. Similar results were obtained by Das and Sarkar (1970) Patel and Singh (1970) and Subramanyam and Lekshmanna (1973).

i) Labour input

The labour input was not found to be a discriminating factor in the adoption of improved practices by the respondents (Table-8). The results obtained by Nair (1969) and Singh (1968) support this finding. The respondents of the present study is constituted by the sub marginal and marginal farmers who, by and large, utilise only family labour and do not employ hired labour for farming operations. Therefore , under such a situation the labour component of an agricultural practice does not particularly incluence the adoption of that practice by the small holders. In fact, labour intensive agricultural practices are a blessing for the small farmers because of their potentiality to provide more employmentfor the farm families who are normally under employed. These

reasons account for the negetive relationship between the labour input with the adoption behaviour of farmers.

3. Extent of adoption of individual improved practices.

Table-10 depicted the extent of adoption of individual improved practices selected for this study. Violent variation was observed in the adoption of individual improved practices by the respondents. While only 9 per cent of the respondents adopted seed treatment, 80 per cent of them used chemical fertilizers.

In the case of high yielding variety seeds, only 46 per cent of the respondents adopted this practice. Besides the socio-economic and personal factors, the increased requirement of plant nutrients and the infra structural facilities by the high yielding variety seeds coupled with financial incapability of farmers might have stood in the way of adopting this particiular practices. As pointed out earlier, seed treatment was adopted by only 9 per cent of the respondents which may be attributed to the lack of knowledge and convction about the necessity of the practice and also lack of skill required in adopting this practice. Use of chemical fertilizers was conspicous by its adoption by 80 per cent of the farmers. Such a high rate of adoption in this case was obtained presumably because the information collected on this mainly concerned with the use or non use of fertilizers only during the reference season. The quantity or kind

of fertilizers used were not taken into consideration. Therefore, this high percentage does not indicate the adoption of this practice at recommended levels. The number of farmers who have adopted high yielding variety seeds and plant protection measures are almost the same (46% and45% respectively). This indicates that only those who had adopted high yielding variety seeds also had adopted plant protection measures, probably because of the conviction that plant protection measures are particularly important for high yielding varieties. Almost the same trend was seen in the case of artificial irrigation also. Only 51 per cent of the farmers have adopted artificial irrigation. Reasons explaind in the case of plant protection measures might hold good in the case of this practice also. This underlines the need for exploiting our irrigation potentiality.

4. Relationship of the adoption of individual practice with the variables and the constraints in the adoption of these practices as perceived by the farmers.

In this part the results obtained on the relationship of the adoption of individual practices with the selected variables are presented. A comparison of the relationship between the general adoption and the adoption of individual practices with selected variables has also been made.

In the present study an attempt was also made to find out the perception of the farmers about the constraints

in the adoption of individual practices. The constraints identified by the farmers in respect of all the selected practices were found to be highly significant (Table-16). The constraints in respect of individual practices are also dealt with in this part.

a) High yielding variety seeds

Out of the 120 respondents, 46 per cent adopted high yielding variety seeds in their rice cultivation during the reference season (Table-10). All variables examined in this study, except farming experience, economic motivation level of aspiration and labour input were found to positively and significantly influenced the adoption of high yielding variety seeds.

The relationship of the adoption of high yielding variety seeds with the selected variables (Table-11) was positive and significant and was found to be the same as exhibited in the case of general adoption behaviour except in the case of economic motivation. Economic gain is the basis consideration of the farmers in adopting improved agricultural practices. But economic advantage is obtained only when all the practices of a crop are adopted as a package. Therefore adoption of an individual practice isolated from other practices does not result in the desired economic advantage. This might have been the reason for non significant relationship between adoption of high yielding variety seeds and economic motivation.

The understandable importance assigned by the farmers to economic considerations in the adoption of high yielding variety seeds is conspicously exhibited in their perception about the constraints in the adoption of this input also. The high dose of chemical fertilizers required by these variables has been perceived as the most important constraint (Table-17). The higher requirement of chemical fertilizers naturally demand high financial expenditure. Other constraints identified by the small farmers are lack of financial assistance, low straw yield which is unsuitable as cattle feed, lack of irrigation facilities, higher labour input and high incidence of pests and diseases in this order.

b) Seed treatment

The relationship of seed treatment practice with main occupation, experience, level of aspiration and labour input showed the same relationship of general adoption with these variables (Table-12). Significant relationship was exhibited by main occupation only with this practice and general adoption behaviour. Education social participation, economic motivation, risk orientation and size of holding were not found to be discriminating factors in the adoption of this practice. Theoretically, higher education, better social participation, higher economic motivation, higher risk

orientation etc., should mentally equip the farmers to adopt a new practice. Therefore, the non significant relationship of these factors with seed treatment might have been due to physical non availability of inputs required to adopt this practice. Lack of awareness of the practice and knowledge about the technique have been felt as the important constraints by most of the farmers Table-18). The conviction about the sufficiency of local measures has also been pointed out as an important constraint. Non availability of chemicals for seed treatment is yet another factor perceived by the respondents. All these rightly underline the immediate necessity fo r intensive extension efforts not only to impart the knowledge and skill associated with this practice but also to convince the farmers about the superiority of this practice.

c) Chemical fertilizers

As divorc ed from the relationship obtained in the case of ganeral adoption behaviour and independent variables, use of chemical fertilizers as a practice showed non significant relationship with main occupation, social participation, economic motivation, risk orientation and significant relationship with experience. The non significant relationship of this practice with main occupation mightbe due to the conviction of the respondents

that chemical fertilizers increase yields of crops and also due to the use of this input to some extent by the farmers, though not at the recommended level, irrespective of their main occupation. Experience in farming had significant relationship with use of chemical fertilizers. This might be due to the fact that long and combinuous experience in the use of fertilizers is necessary to obtain maximum effort from the fertilizers. Lack of such experience results in the wastage of this input.

The non significant relationship of social participation economic motivation, and risk orientation might not be due to the irrelevence of these factors for the adoption of this practice. But might be that the farmers are already sufficiently participating in the activities of organisations economically motivated and risk oriented. The fact that 80 per cent of the respondents adopted this practice (Table-9) is a sufficient indication of the above.

High cost of fertilizers ranked first among the barriers of adoption of this input as identified by the farmers (Table-18). This is followed by, non availability of fertilizers in time and the requirement of better water and management of land, in that order.

Though 80 per cent of the respondents were found to use this input, thedosage adopted by them has been very often far below the recommended dosage. This supports the views

expressed by the respondents in respect of the cost of fertilizers, non availability in time etc.

d) Plant protection measures

Unlike in the case of general adoption behaviour education and economic motivation revealed non significant relationship with this practice where as level of aspi ration showed significant relationship. The non significant relationship obtained between this practice and education and experience might be due to the conviction of the farmers about the superiority of this practice. The educated and experienced farmers might not be using this practice because of various other reasons.

The constraints in the adoption of this practice as perceived by the farmers indicate that high experience involved in the adoption of this practice is the most important factor standing against the wide scale use of this practice. Non availability of chemicals in time, non availability of the chemicals at all, and non availability of plantprotection equipment were also perceived as important bottlenecks in the adoption of this practice.

e) Artificial irrigation

All the independent variables except social participation risk orientation and size of holding had non significant relationship with this practice as against the non significant relationship obtained in the case of general adoption

behaviour with experience, level of aspiration and labour input only. The non significant relationship of most of these variables with irrigation might be partially due to the dependence of the farmers on rain for irrigating their crop and also due to the high cost involved on the establishment of artificial irrigation system. Very often this practice cannot be adopted by an individual farmer alone, particularly in the case of the respondents of this study, namely the small farmers. This requires not only economic investments but also the cooperation, involvement and participation of a number of farmers. This is am'ply evidenced by the significant relationship obtained between social participation and this practice.

The results presented in table-21 revealed that there were factors other than the above, which related to the non adoption of this practice as per the perception of the farmers. High expenditure involved in either engaging enough labour for watering or for installing the necessary equipment have been suggested as most important reasons for the non adoption of this practice.

SUMMARY

SUMMARY

Rice is the staple food of the people of Kerala. But Kerala is deficient in its rice production by about 50 per cent. All most all the cultivable area has already been brought under the plough. Therefore, the scope for increasing the area under rice is rather limited. The fact that more than 50 per cent of the cropped area is devoted for perinnial cash crops further limits the scope for expansion of area under rice. Besides 60 per cent of the holdings are less than 1 acre in extent. Therefore, the only possibility to increase rice production is to increase the gross area under rice by resorting to scientific cultivation practices.

A number of development programmes particularly focused on rice production have been introduced and implemented in the state. Improved technology required for stepping up rice production was also diffused with great vigour and enthusiasm. Inspite of intensive efforts to spread the high yielding varieties and associated improved practices ever since their introduction in 1966, the coverage under these varieties is only 26.5%, which

clearly indicates the low adoption of improved rice technology by the rice farmers of Kerala. The extent of adoption is likely to be still low in the case of small farmers who constitute a considerable section of the rice farmers in the state. There may be various technical, administrative and human factors associated with the non adoption and/or low adoption of improved rice cultivation practices. The human factor involved in the adoption or non adoption is the least churned area under the socio-economic context of Kerala. Therefore, the present investigation was undertaken to find out the general adoption pattern of improced rice technology by the rice cultivating small farmers of the state, and to identify the constraints in the adoption of improved practices of rice.

The study was conducted in four villages in Trivandrum District of Kerala. Multistage sampling technique was adopted to select 120 small farmers who constituted the sample population. The data for the study related to the Winter rice crop of 1977. The adoption behaviour of the farmers was the dependent variable and was measured by 'Adoption Index' following Chandrakandan (1975) with modifications. Extent of adoption of selected individual improved practices was measured using 'acceptance index' used by Mundra and Batham (1967). The individual practice

adoption was measured using the 'adoption scale' developed by Beal and Rogers (1960). Improved practice and independent variables were selected using judges rating technique. The practices selected for the study were high yielding variety seeds, seed treatment, chemical fertilizers, plant protection measures and artificial irrigation. Independent variables selected were main occupation, education, experience and social participation (social variables), economic motivation, risk orientation and level of aspiration (psychological variables) and size of holding and labour input (Economic variables). Main occupation was decided on the basis of the time and attention spent by the respondents, education on the basis of school education, experience as number of years spent in actual farming and social participation as participation in the activities of formal organisations and institutions. Economic motivation and risk orientation were measured using the respective scales developed by Supe (1969). Level of aspiration was measured using 'ladder technique' developed by Cantril and Free (1962). Size of holding was taken as the total land holding of the respondents in acres and labour input as the total number of human labour days used measured as man days/acre. Data were collected using a pre-tested structured interview schedule.

Chi-square, correlation and analysis of variance were employed for analysing the data.

Following results were obtained:-

1. General adoption behaviour of rice cultivating small farmers and its relation with independent variables

Majority of the small farmers were either low adopters or medium adopters of improved rice technology. Only 27 per cent were high adopters. The adoption behaviour was very erratic as far as individual practices were concerned. Only 7.5 per cent of the respondents fully adopted all the five selected practices as a package. Over 13% of the farmers did not adopt any practice at all.

Main occupation, education, social participation, economic motivation, risk orientation and size of holding were found to have positive and significant relationship with the adoption behaviour of small farmers. Majority of the part time farmer were high adopters (53%) whereas only 23 per cent of the full time farmers were high adopters. Respondents with formal education exhibited higher adoption (35%) than those without formal education (13%). Participation in the activities of formal organizations was found to influence adoption. About 70 per cent of the farmers with high economic motivation were either medium adopters or high adopters. Risk orientation

were also had positive and significant relationship with general adoption behaviour. Among the respondents with high risk orientation 41 per cent were high adopters. As far as the influence of size of holding on the adoption of farmers was concerned, 54 per cent of the sub marginal farmers were low adopters. Level of aspiration experience in farming and labour input were not found to be discriminating factors in the adoption of improved practices of rice by the small farmers.

2. Extent of adoption of individual improved practices and their relationship with independent variables.

Wide variation was observed in the adoption of individual improved practices by the respondents. The adoption of individual practices ranged from 9 per cent of the respondents in the case of seed treatment to 80 per cent in the cass of chemical fertilizers. The percentage of farmers who have adopted high yielding varity seeds, plant protection measures and artificial irrigation were 46, 45 and 51 respectively.

All the variables except experience and economic motivation had positive and significant influence on the adoption of high yielding variety seeds. In the case of seed treatment, main occupation alone significantly influenced the adoption of this practice. The use of chemical fertilizers as a practice showed positive and

significant relationship with education, experience and size of holding only. Adoption of plant protection measures exhibited positive and significant relationship with main occupation, social participation, risk orientation, level of aspiration and size of holding. In the case of artificial irrigation social particiption, risk orientation and size of holding showed significant relationship.

3. Constraints in the adoption of selected improved practices as perceived by the rice cultivating small farmers.

The constraints perceived by the farmers as most important in adopting high yielding variety seeds were the requirement of high dose of chemical fertilizers for the high yielding variety seeds, lack of financial assistance, low straw yield which was also unsuitable as cattle feed, lack of irrigation facilities, higher labour input and high incidence of pests and diseases. Lack of awareness of the practice as well as inadequate skill in using the technique were felt by the farmers as the majo r constraints in adopting seed treatment. Non availability of chemicals was yet another constraint mentioned by them in this context.

High cost of fertilizers ranked first among the barriers standing in the way of adoption of this input

followed by non availability of fertilizers in time and the requirement of better water and land management. Higher expenditure involved in adopting plant protection measures followed by non availability of chemical in time and non availability of equipment were mentioned by the respondents as constraints in the adoption of this practice. High expenditure involved and non availability of minor irrigation facilities were felt as constraints in the adoption of artificial irrigation by the respondents.

It is significant that only 7.5 per cent of the small farmers fully adopted all the recommended practices as a package. This fact conclusively points out that the fruits of agricultural development activities have not so far reached the large majority of small farmers. This unequivocally underlines the necessity for paying urgent attention to small farmers if social justice due to them has to be done. Only 23 per cent of the full time farmers were high adopters while 53 per cent of the part time farmers were high adopters. This indicates the subsistance nature of agriculture followed by the large majority of small farmers which again under scores the immediate necessity for paying social attention to this section of the farming population in the state. Inadequate oppertunities for social participation of the small farmers was indicated by the fact that 68 per cent of the respondents

were having only low social participation. This is indicative of either the existance of social barriers that prevent the small farmers in participating in the activities of formal organisations or in the inadequate facilities provided for them to participate in such activities. In either case, appropriate corrective measures are necessary. Labour intensive crops like high yielding varieties are a blessing in disguise to the small farmers as this provides more employment opportunities to the small farmers. As the experience in farming was not found to be a discriminating factor the younger farmers were found to adopt improved practices more then the older farmers. This indicates the necessity to give adequate support by extension agencies to the young farmers in spreading agricultural innovations. The extent of adoption of improved agricultural practices by small farmers was not comenurate to their gain in knowledge, participation in extension activities, economic motivation, risk orientation and educational level. This situation calls for concerted efforts to over come the financial, physical, technical and administrative constraints identified by the farmers. The infrastructural facilities and supplies and services necessary to translate the knowledge input into action need immediate streamlining.

The findings of this study revealed that informatin obtained are not adequate to project the results of this

study for the entire state. Therefore, a more comprehensive study taking the whole state as the universe which would yield results that can be projected for the entire state is suggested. Further, the problems felt by the farmers at field level have to be studied in depth.

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APPENDICES

APPENDIX - 1

Trend in area, production and yield/ha from 1966 to '76 *
in Kerala.

Year	Area (lakh/h)	Production (lakh.M.T)	Yield (Kg./ha)
1966	7.99	10.17	1356
1967	8.10	11.21	1388
1968	8.74	12.51	1432
1969	8.74	12.26	1403
1970	8.15	12.78	1484
1971	8.75	13.52	1544
1972	8.74	13.76	1575
1973	8.75	12.04	1437
1974	8.82	13.34	1513
1975	8.85	13.65	1520
1976	8.54	13.29	1431

* Source: Bureau of Economics and Statistics Trivandrum.
Economic Review, 1977, Government of Kerala, Trivandrum.

APPENDIX - II

High Yielding Varieties Coverage in Kerala State from 1969 to '76

Year	H.Y.V (Coverage) ('000 H)
1969	130.00
1970	159.20
1971	167.80
1972	223.10
1973	248.30
1974	167.66
1975	230.10
1976	234:00

Source: Bureau of Economics and Statistics, Kerala.

APPENDIX - III

List of villages and the area under wet lands in each villages of Neyyattinkara and Nedumangad Taluk of Trivandrum district *

Neyyattinkara Taluk		Nedumangad Taluk	
Name of village	Total wet land area (in acres)	Name of village	Total wet land area (in acres)
Kulathoor	825.56	Vamanapuram	741.37
Chengal	754.88	Kallara	726.45
Parassala @	759.16	Pullampara	635.47
Kollayil	606.90	Nellanad	545.37
Kunnathukal	973.16	Manikkal	1028.56
Vellarada	560.12	Vembayam @	790.14
Ottasekharamangalam	492.32	Panavoor	455.33
Kallikkad	215.08	Anad	672.71
Peringadavila	411.89	Palode	591.49
Kezhavoor	615.40	Peringamala	666.39
Neyyattinkara	833.30	Vithura	533.59
Athiyanoor	754.79	Tholikode	662.31
Thirupuram	351.34	Nedumangad	1130.27
Karimkulam	19.14	Karakulam @	831.51
Kottukal	568.21	Vellanad	974.30
Pallichal @	561.67	Uzhamalakkal	488.92
Vilappil	967.64	Aryanad	611.96
Marukil	634.59	Perumkulam	483.63
Maranalloor	914.96	Veerankavu	706.89
Kulathummal	827.48	Mannoorkara	530.66

* Source: Respective Taluk Office

@ Selected villages.

APPENDIX - IV

PROFORMA

FACTORS AFFECTING THE ADOPTION BEHAVIOUR OF FARMERS

Sl. No.	Variables	Most important	Important	Less important	Not important	Remarks
1.	Age					
2.	Caste					
3.	Main occupation					
4.	Subsidiary Occupation					
5.	Education					
6.	Farm Size					
7.	Ownership of land					
8.	Family size					
9.	Experience					
10.	Saving Habit					
11.	Social participation					
12.	Indebtedness					
13.	Empathy					
14.	Aspiration					
15.	Risk bearing					
16.	Income Status					
17.	Brief system					
18.	Value orientation					
19.	Reference group influence					
20.	Extension methods					
21.	Sources of information					
22.	Practice attributed					
23.	Cultural aspects					
24.	Motivational forces					
25.	Social structure					
26.	Labour input					
27.	Poverty					
28.	Traditionalism					
29.	Capital.					
30.	Others (please specify)					

APPENDIX - V

A STUDY OF FACTORS AFFECTING THE ADOPTION OF SELECTED AGRICULTURAL PRACTICES OF RICE BY FARMERS OF KERALA

....

No.

Date:

Department of Agricultural Extensio
College of Agriculture, Vellayani
Trivandrum.

INTERVIEW SCHEDULE

Part-A

1. Name and address of the respondent :

2. Occupation: Main :
   Subsidiary :

3. Education:
   (Whether you have gone to school or not : School
   Out of school

4. Size of holding (acres)

Type	Land owned	Land leased out	Land leased in	Others (specify)	Total
Irrigateed					
Non irrigated					
Total					

5. How long have you been farming ?

Year	Area under farming (acres)	Crops grown

6. Social participation

Institutions	Member/Not	Office bearer (specify)	Others (specify)
Cooperative Society			
Cooperative Bank			
Land Mortgage Bank			
Marketing Cooperatives			
Panchayath			
Block Committee			
Ela Committee			
Farmer's Club			
Radio forum			
Political			
Religious			
Educational			
Others (specify)			

7. Economic motivation

Please give your opinion about the following statements:-

No.	Statements	SA	A	UD	D	SD
1.	A farmer should work toward larger yields and economic profits					
2.	The most successful farmers is one who makes the most profit					
3.	A farmer should try any new farming idea which may earn him more money					
4.	A farmer should grow cash crops to increase monetary profits in comparision to growing of food crops for home consumption.					
5.	It is difficult for the farmers children to make good start unless he provides them with economic assistance.					
6.	A farmer must earn his living but the most importantthing in life cannot be defined the economic terms.					

8. Labour input / acre

No.	Operation	Family labour		Wage labour		Total	
		M	F	M	F	M	F
1.	Preparation of land						
2.	Sowing/planting						
3.	Manuring						
4.	Weeding						
5.	Application of plant protection chemicals						
6.	Harvesting and threshing						

9. Risk Orientation

Please give your opinion about the following statements

No.	Statements	SA	A	UD	D	SD
1.	A farmer should grow larger number of crops to avoid greater risks in growing one or two crops					
2.	A farmer should rather take more of a chance in making a big profit than to be content with a smaller, but less risky profits.					
3.	A farmer who is willing to take greater risks than theaverage farmer usually dose better financially.					
4.	It is good for a farmer to take risks when he knows his change of success in fairly high					
5.	It is better for a farmer not to try farming methods unless mot other farmers have used most them with success.					
6.	Trying an entirely new method in farming by a farmer involves risks but it is worth it.					

10. Level of aspiration

i) All of us want certain things out of life. If you imagine your future as a farmer in the best possible way what would your life look like these if you are to be happy ? What are your hopes for the future.

1.
2.
3.
4.

ii) On the contrary, if you imagine your future in the worst possible lightwhat would your life look like ? What are your fears and worries for the future ?

1.
2.
3.
4.

iii) Here is a ladder. Suppose we may that the top of the ladder represents the best possible life for you and thebottom represents the worst possible life. In the light of the hopes and fears for the future.

a) Where on the ladder do you feel you personally stand at the present time ? Step No.....
b) Where on the ladder would you say you stand five years ago ? Step No.....
c) Where on the ladder you think you would be five years from now ? Step No.....

PART - B

I. Do you use high yielding variety seeds ? Yes/No

i) If no what is the reason for non adoption ?
1. Non availability of seeds.
2. Non availability of seeds in time
3. High incidence of pests and diseases
4. High requirement of chemical fertilizers
5. Frequent renewal of seeds is required
6. Lack of irrigation facilities
7. Low straw yield
8. Not suited to soil condition
9. Lack of financial assistance
10. Others (specify)

Appendix-V continued

ii) If yes, what are the varieties usually used ?

Season	Area	Varieties	Since when adopted

2. Do you adopt treatment of seeds with chemicals ?

Yes/No

i) If no, what is the reason for non adoption ?
1. Not effective
2. Not available
3. Technique not known
4. Not aware of the practice
5. Others (specify)

ii) If yes, what are the chemicals used ?

Chemical	Quantity	Since when adopted

3. Do you use chemical fertilizers in your farming ?

Yes/No

If no what is the reason for non adoption ?

1. High cost
2. Organic menure is as good as chemical fertilizers
3. Non availability
4. Non availability in time
5. Makes the crops susceptible to pests and diseases.
6. High cost of application
7. More timely management is required
8. Others (specify)

ii) If yes, what are the chemical fertilizers used ?

Season	Area	Variety	Name of fertilizers	Qnty	Since when adopted

4. Do you adopt plant protection measures ? Yes/No

i) If no, what is the main reason for non adoption ?

1. Non availability of chemicals
2. Non availability of chemicals in time
3. Non availability of equipment
4. Non availability of equipment in time
5. High expenditure
6. It is dangerous to use it
7. Others (specify)

ii) If yes the details of plant protection chemicals used ?

Season	Area	Name of chemical	Qnty.	Since adopted

5. Do you artificially irrigate your crops ? Yes/No

i) If no, what is the main reason for non adoption ?

1. Non availability of sufficient water
2. Non availability of minor irrigation facilitied
3. High expenditure
4. Others (specify)

ii) If yes, give details :

iii) Are the natural irrigation facilities sufficient ?

Yes/No

6. Any other reason for non adoption of improved practices in rice cultivation ? (specify)

A B S T R A C T

An investigation was undertaken in Trivandrum District Kerala to study the factors affecting the adoption of selected improved practices in rice cultivation by the small farmers and to identify the constraints in the adoption of improved practices of rice cultivation. The study revealed that majority of the small farmers were either low adopters or medium adopters of improved rice technology. Main occupation, education, social participation, economic motivation, risk orientation and size of holding had positive and significant relationship with the adoption of small farmers.

Wide variation was observed in the adoption of individual improved practices (high yielding variety seeds, seed treatment, chemical fertilizers, plant protection measures and artificial irrigation) by the respondents. The adoption of individual practices ranged from 9 per cent of the respondents in the case of seed treatment to 80 per cent in the case of chemical fertilizers. The adoption of every selected practice exhibited relationship with at least one variable.

Among the constraints in the adoption of improved practices in the cultivation of rice, perceived by the small farmers, the high cost involved in the adoption of

a particular practice stood out. Non-availability of supplies and services at the proper time in adequate quantities was another constraint highlighted by the farmers in the case of almost all theimproved practices. Lack of awareness and lack of adequate skill in using the technique were also pointed out as problems in certain cases. The above constraints bring out the problems felt by the farmers as most important. The farmers have also perceived bottlenecks in the case of each of the selected practices.

The findings of the study reveal the necessity for a more comprehensive study covering the entire state and also for an indepth study of the physical, financial, technological and administrative constraints in the adoption of improved technology by farmers.