TRANSFER OF TECHNOLOGY ON PULSES AND OIL SEED CULTIVATION IN THE ONATTUKARA TRACT OF KERALA

BY

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THESIS

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DECLARATION

I hereby declare that this thesis entitled "TRANSFER OF TECHNOLOGY ON PULSES AND OILSEEDS CULTIVATION IN THE ONATTUKARA TRACT OF KERALA" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title of any other University or Society.

Vellayani,
17th APRIL, 1989.

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CERTIFICATE

Certified that this thesis entitled "TRANSFER OF TECHNOLOGY ON PULSES AND OILSEED CULTIVATION IN THE ONATTUKARA TRACT OF KERALA" is a record of research work done independently by Miss. P. Anitha Kumari under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to her.

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

CHAPTER I

INTRODUCTION

Technology alone will not help, to solve any problems in agriculture. When the maximum number of potential adopters understands, accepts and actually practices the major part of an item of technology with the minimum timelag and with the maximum possible material and financial benefit, then effective transfer of technology in question can be said to have been accomplished. Judged by these criteria, India's agricultural technology is far from being adequately transferred, despite the fairly impressive production of recent years. This factor is especially true in the case of pulses and oilseeds. Although malnutrition is widely prevalent in Indian villages and pulses are important cheap sources of protein, transfer of technology is not as required.

Besides their nutritional value, pulse crops are endowed with unique property of maintaining and restoring soil fertility through biological nitrogen fixations from atmosphere as well as of conserving and improving physical properties of soil by virtue of their deep and well spread roots system. But the per capita availability of pulses was 40 g in 1985-86 as against World Health Organisation's recommendation of minimum pulse requirement of 80 g per

capita. From the year 1986-87, the National Pulses Development Project, has come in operation. The basic objective is to increase production of pulses by adopting location specific technology, within a time frame. All pulses taken together are reported to account for just about 1 per cent of total fertilizer consumption in the country. The major task therefore lies in motivating farmers to raise crop yields. The proposed strategy in Eighth plan includes area expansion under pulses, increasing productivity, developing research technology; mainly evolving suitable varieties of pulse crops to meet the challenges and provide respectable yield, to make credit available to farmers, to intensify strong extension support, supply of needed plant nutrients, irrigation and price support.

India is facing scarcity in edible oil supply, even for internal consumption. So for attaining self sufficiency in edible oil, extension activities should be encouraged intensively, as we are not lacking technology. The technology mission on oilseeds will be the instrument for increasing oilseeds production to 16 - 18 million tonnes by 1989-90 and will be able to substantially reduce the high level of imports of edible oils. Edible oil imports were of the order of Rs.800 crore per year.

The thrust areas for self-reliance in oilseeds would include development of more productive and profitable crop technology, a more efficient post-harvest technology, transfer of technology and supply of farm inputs to farmers and strong price support to the producers and processing industry.

Swaminathan (1989) remarked the following:

Oilseeds and pulses grown largely without irrigation have traditionally been lagging behind. The pricing policy is a very important instrument in oilseeds. Farmers' participation in drawing up block-level production strategies will be central to success. He continues, oilseed crops require considerable amount of balanced soil nutrition. They also require a different methodology of pest management because many pesticides dissolve in oil.

He cautions us that soil health monitoring and pesticide monitoring have become important today. The youth should take up this challenge.

Farming is both way a life and means to livelihood. The way of life continues, but means to livelihood are becoming difficult for farmers. It is a struggle because of the cost, risk and return structure of farming. Therefore, it becomes imperative to bestow adequate attention simultaneously on all the interacting systems in agricultural

production to ensure effective transfer of technology. Not only the research and extension system should be strengthened, but also the supporting and client system.

Sesamum and cowpea are important oilseed and pulse crop cultivated in Kerala. In this context, it would be worthwhile to know to what extent farmers accept the generated technologies and what are the factors affecting their adoption. The present study is an attempt in this direction.

Need for the study

Encouragement is given today to pulses and oilseed cultivation and their increased production, as emphasized in the Twenty Point Programme of the country. The productivity of these crops also, has been dependent mostly on the adoption of improved farm technologies. In Kerala the productivity of pulse crop was as low as 137.29 kg/ha in 1985-86. For sesamum it was only 78.45 kg/ha (1985-86) and 86.7 kg/ha (1984-85).

There are a number of studies regarding adoption of improved practices in Kerala. But no systematic study has been undertaken on sesamum or cowpea, so far. In Onattukara tract, which is famous for its sesamum crop, considerable area is under sesamum and cowpea. So, it

would be worthwhile to study the adoption of practices of cowpea and sesamum in this area, and the related factors, to ensure solutions and to enhance productivity of these crops.

Objectives of the study

The specific objectives of the study were

1. To ascertain the extent of adoption of improved agricultural practices by the pulse and oilseed farmers of Onattukara Tract.

2. To find out the communication and infrastructural factors influencing the adoption of messages of pulse and oilseed cultivation, in Onattukara tract.

3. To determine the relationship between various personal, socio-psychological, economic, infrastructural and communication variables and extent of adoption of improved farm technology by the pulses and oilseed farmers in the region.

4. To study the constraints, if any in adopting improved technologies, in oilseed and pulse cultivation of Onattukara region.

Scope and limitation of the study

The study was confined to three taluks of Quilon

and Alleppey districts, viz. Karunagapally, Karthikeppally and Mavelikkara, which constitutes the Onattukara region. A wider coverage of all areas in Kerala, where cowpea/ sesamum is cultivated, was not possible, due to shortage of time and resources, at the disposal of the investigator as this study was undertaken as part of the requirement for M.Sc.(Ag.) programme. Hence the findings of the study cannot be generalised. In spite of these limitations, it is expected that the results would contribute valuable information which could be of great use to those people who are engaged in extension work among sesamum and pulse farmers.

Organisation of the thesis

The study is presented in six chapters. The second chapter, deals with the theoretical frame work of the study. The third chapter presents the methods and procedures employed in the study. The fourth chapter deals with the results of the study. In the fifth chapter, the findings have been discussed. In the concluding chapter, the study is summarised and conclusions are drawn. The references and appendices are given at the end.

THEORETICAL ORIENTATION

CHAPTER II

THEORETICAL ORIENTATION

This chapter explains the theoretical perspective adopted for this study and tries to link it with the relevant findings of other research studies.

The review of literature is presented under the following headings.

I. Adoption behaviour of farmers
II. Adoption of practices of pulses/oilseeds
III. Factors affecting adoption
IV. Variables selected
V. Review of selected variables
VI. Constraints in adoption of practices
VII. Hypotheses

I. Adoption Behaviour Of Farmers

Adoption of agricultural practices form the focal point of this study.

Adoption is defined by Rogers (1968) as a decision to continue full use of an innovation. It can be considered as an overt behaviour, which is intented to accomplish some objective which in turn would satisfy or at least reduce some need of the individual.

Rogers and Shoemaker (1970) defined adoption as a decision to make full use of an innovation.

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 decision to act have a series of actions and decisions.

Transfer of technology starts with the perfection of a technology. Science leads to technology and technology creates a need for its transfer, but its transmit has been strangled by various non technological factors.

Leagans (1965) stated that Adoption behaviour tends to be specific to particular innovation, individuals and environments. But there are some characteristics in general such as:

1. It is an adult behaviour and as such idiosyncratic. Individually circumstances may vary, so adoption behaviour also.

2. Effect of communication:- i.e., what, why, and how of the technical ideas - is a component.

3. Traditional socio-economic factors such as size of farm, age, education, income, family size etc. generally influence the adoption of agricultural innovation.

4. Socio-psychological factors significantly involved in adoption of an innovation.

He explains the macro and micro environment as a complex infrastructure - technically, physically, economically, socially, educationally and politically.

Thus at the basic level of conceptualization adoption of an innovation is a type of action or behaviour. The individuals, as the members of society always interact with each other; which is basic to social change. But as Rogers (1983) pointed out individual innovativeness is affected by individual's characteristics, and by the nature of social system in which the individual is a member.

Sen (1981) pointed out that in the process of transfer of technology, the most important component is the farmer himself, who decides ultimately to accept an innovation or not.

All innovations are considered to be composed of ideational components and some include material components (Ramsey et al., 1959). Potential adopters face at least two decisions, acceptance and use.

Due to the continuous exposure to different sources of communication, it may be expected that a considerable proportion of non-adopter farmers change their cognitive

level of behaviour. This may not be reflected in actual behaviour because of certain infrastructural and economic deficiencies. Majumder and Son (1977) empirically identified such a category of farmers, and termed them "symbolic adopters".

Galraj (1977), recognised that effective transfer of technology can be facilitated by an appropriate communication strategy which aims to bring about a cognitive behaviour change, as well as by restructuring the agricultural infrastructure which will produce an overt change in behaviour.

In this study, adoption is considered as the overt end action of using the recommended agricultural practices in the cultivation of sesamum/cowpea by the farmers.

Adoption of practices of pulses/oilseeds

Researches have shown that the adoption of scientific cultivation practices for pulses and oilseeds vary from crop to crop, farmer to farmer and area to area.

A review of studies of the adoption of practices for pulses and oilseeds is presented below:

Table 1. Research studies showing Extent of Adoption of different practices of pulses and oilseeds

Sl. No.	Name of researchers	Year	Extent of adoption of practices	Crop
1.	Balasubramanian	1985	High Yielding Variety-76.71% Seed rate-76.71% Rhizobium treatment-46.88% Plant protection measures-58.9%	Pulses
2.	Bhaskaran and Praveena	1982	Only recommended practice adopted by 2/3rd of respondents was; use of improved seeds	Castor
3.	Nagabhushnam and Basha	1981	High Yielding Variety-0% Fertilizer application-0% Plant protection-15.78% Hand weeding-100%	Groundnut
4.	Satapathy	1991	Majority adopted high yielding variotios. Rhizobium culture-0%	Pulses

			Chemical fertilizer-17% Plant protection measure-16%	
5.	Sen and Das	1986	High Yielding Variety-100%. Seed rate-Majority. Organic manure-34.40% Groundnut farmers- Organic manure-10-19% Chemical fertilizers for groundnut-82.84%	Rapeseed Mustard Ground-nut
6.	Thiagarajan	1981	High Yielding Variety-100% Full seed rate-61% Rhizobium culture-70%	Pulses

From the above review it can be concluded that there is significant variation in adoption from crop to crop, farmer to farmer and from practice to practice.

The reasons for such variations can only be explained, if we study the different factors which are found to influence adoption.

III Factors Affecting Adoption

There were a number of studies which indicate that adoption is a multivariate phenomenon. Singh (1981) in his paper presented in the National workshop on Management of the Transfer of Farm Technology conducted by the NIRD,

listed the following factors, which are significantly associated with the adoption behaviour.

1. Age
2. Caste
3. Religion
4. Education
5. Agricultural training
6. Knowledge and skill
7. Change proneness
8. Innovation proneness
9. Attitude towards practice
10. Secular orientation
11. Credit orientation
12. Planning orientation
13. Self reliance
14. Values

15.1. Progressiveness
15.2. Conservatism-liberalism
15.3. Fatalism-scientism
15.4. Localism-cosmopoliteness
15.5. Venturesomeness

16. Empathy
17. Tisk taking willingness
18. Degree of felt need
19. Income aspiration
20. Achievement aspiration
    1. For past
    2. For present
    3. For future
21. Farm size
22. Tenure status
23. Commercial orientation
24. Specialisation index
25. Farm efficiency
26. Market perception
27. High income
28. Decreasing income from non-farm source
29. Social status
30. Economic status
31. Socio-economic status
32. Level of living
33. Organisational membership
34. Political knowledge
35. Group norms

Client Environmental Factors

1. Population
2. Literacy
3. Caste structure
4. Factional disputes
5. Traditional organisation
6. Irrigation potential
7. Fragmentation
8. Material possession
9. Agrarian structure
10. Occupational diversification
11. Transport
12. Electricity
13. Pumps
14. Distance from
    1. Co-operatives
    2. Youth clubs
    3. Post office
    4. VLW's' HQ
    5. Godown

Stimulus factors-Characteristics of practice

1. Profitability
2. Cost
3. Simplicity-complexity
4. Compatibility
    a. Cultural
    b. Physical
5. Communicability
6. Divisibility
7. Labour saving time

Communication variables

1. Geographical isolation
2. Year of start of Extension service institution
3. Service experience of Extension agent
4. Contact with VLW
5. Media exposure
6. Degree of help received
7. Agricultural agency access
8. Agent's choice of media
9. Mass media access
10. Extension contact

Sherif and Sherif (1963) have conceptualized four major categories of factors as (1) factors related to site and facilities (2) factors related to individuals (3) factors related to problem, task or activity and (4) relationship among the preceding three sets of factors.

Thus it is evident that adoption of a practice is affected by a plethora of factors. Any study on adoption should consider the important factors to explain the variation in adoption among farmers.

IV. Variables selected for the study

From among the possible set of factors that can influence adoption, a manageable number of factors were selected for this study based on the discussion with experts and based on the results of a pilot study conducted by the researcher in the study area. The variables selected for this study to test the relationship with extent of adoption of practices which is the dependent variable are:

1. Age	2. Educational status
3. Annual income	4. Occupational status
5. Farm size	6. Social participation
7. Scientific orientation	8. Economic orientation
9. Risk orientation	10. Innovativeness
11. Information source utilisation	12. Infrastructure facilities

13. Knowledge level of farmers
14. Perception about practices and
15. Attitude towards improved practices

V Review of Selected Variables

A detailed review of the relationship of the above factors with adoption is presented below.

a. Age

It refers to the total years completed by an individual respondent at the time of interview. Studies, which took age as one of the variable, are reviewed below:-

Table 2. List of researches which studied the influence of age on Extent of adoption

Sl. No.	Name of the researcher	Year of study	Relationship with adoption
1.	Abdul	1987	Young farmers (25-40 year) were good adopters.
2.	Anbalagan	1976	Young farmers were found to be good adopters.
3.	Balasubramanian	1985	Negative and significant
4.	Dudhani et al.	1987	Not significant
5.	Krishnamoorthi	1984	Positive and significant
6.	Ogunfiditimi	1981	Positive relationship
7.	Prasannan	1987	Negative correlation
8.	Pandit	1964	Positive relationship
9.	Pillai	1978	Negative and significant
10.	Sivaramakrishnan	1981	Not significant
11.	Wilkening	1952	Negative and significant

The above review reveals that, age of farmers is an important factor which influenced adoption behaviour. So in this study it is assumed that age will have influence with the rate of adoption of pulses/oilseed practices.

b. Educational status

Formal education expands the ability of an individual to use modern communication media. Boal and Sibley (1967) have pointed out that the individual's ability to read and write and the amount of formal education he possesses will affect the manner in which he gathers data and relate himself to his environment. Thus, more the farmers are literate and educated, better will be their proneness to accept innovations in agriculture. Many researchers studied the association of education with adoption. A review of such studies are presented below.

Table 3. Review of research studies which reported relationship of education status and extent of adoption

Sl. No.	Name of researcher	Year of study	Relationship with adoption
1.	Abdul	1987	Little influence
2.	Bhaskaran	1978	No relationship
3.	Cherian	1984	Positive and significant
4.	Chandrakandan	1973	Positive and significant
5.	Grewal and Sohal	1971	Significant

6.	Kamble	1973	Positive and significant
7.	Malgaco et al.	1981	Related
8.	Mohankumar	1985	Positive and significant
9.	Manivannan	1980	Positive and significant
10.	Mathew	1980	Not significant
11.	Naik	1981	Positive and significant
12.	Perumal	1970	Positive and significant
13.	Prakash	1980	Positive and significant
14.	Pemamurthy	1973	Positive and significant
15.	Sangle	1984	Significant
16.	Singh	1982	Influences adoption
17.	Sakthivel	1979	Positive and significant
18.	Surendran	1982	Not significant
19.	Supe and Salodo	1975	Significant
20.	Vellapandian	1974	Positive and significant

Majority of the above studies reported positive relationship of level of education and adoption behaviour.

In this study, it is postulated that there will be a positive relationship between level of education and rate of adoption.

c. Occupational Status

According to Webster's Dictionary, occupation is

one's principal vocation which occupies or engages his time and attention.

In this study the extent of time spend by an individual on agriculture and related activities, is taken as an index of his occupational status. An individual who spends full time or most of his time on farming is considered as a 'full time farmer' while others who spent less time on farming is considered as an 'absentee farmer'.

Nair (1983), while analysing the prospects and potential of rice production in Kerala, has stated that one of the major constraints in increasing rice production is the 'Absentee farmers'. Many farmers devote very little time to supervise or undertake agricultural operations. Their major time is spent on other activities than agriculture, though they are classified under the group 'farmers'. The rate of adoption of improved practices will be less in the case of such farmers.

The following are some of the studies which reported occupation as a factor in the adoption of agricultural practices.

Table 4. Review of studies showing relationship of occupation and extent of adoption

Sl. No.	Name of the researcher	Year of study	Relationship with adoption
1.	Bhaskaran	1978	No relationship
2.	Balasubramanian	1985	Positive and significant
3.	Rajendran	1978	Positive and significant
4.	Congupta	1970	Found significantly affecting adoption

In this study, it is postulated that the time spent by a farmer in farming, will have a positive influence in the adoption of improved practices of pulses/oilseeds.

d. Annual income

Many researchers have pointed out that the total income obtained by a farmer in an year from all possible sources influenced his adoption behaviour. The review of such studies is presented below.

Table 5. Review of studies showing relationship of annual income and adoption

Sl. No.	Name of researcher	Year of study	Relationship with adoption
1.	Abdul	1987	Positive relationship
2.	Al-Mogel	1985	Positive and significant

3.	Balasubramanian	1985	Positive and significant
4.	Chandrakandan	1973	Positive and significant
5.	Dudhani et al.	1987	Not significant
6.	Hussain	1971	Positive and significant
7.	Kamarudeen	1981	Positive and significant
8.	Lionberger	1960	Positive and significant
9.	Melgaco et al.	1981	Related
10.	Manivannan	1980	Positive and significant
11.	Perumal and Duraiswamy	1972	Positive and significant
12.	Pillai	1978	Positive and significant

The review shows positive relationship of annual income of the farmer with adoption level in most of the studies. In this study also, a positive relationship of annual income and adoption is assumed.

c. Farm size

Land is the primary resource in farming, so it is an important factor in adoption. It is a vital and natural factor related with all production activities of man. Research studies have reported the relationship of farm size and adoption. A review is presented below.

Table 6. Review of studies which reported association of farm size and adoption behaviour

Sl. No.	Name of researcher	Year of study	Relationship with adoption
1.	Al-Nogel	1985	Positive and significant
2.	Abdul	1987	Not related

3.	Balasubramanian	1985	Negative and significant
4.	Bhaskaran	1978	Not related
5.	Jagne and Patel	1981	Significant
6.	Jaiswal et al.	1970	Not significant
7.	Koteswara Rao	1978	Not significant
8.	Karim and Mahboob	1974	Significant
9.	Muthiah Manoharan	1979	Significant
10.	Mohan Kumar	1985	Positive and significant
11.	Ogunfiditimi	1981	Negative correlation
12.	Pillai	1978	Negative and significant
13.	Qureshi and Chaudhary	1978	No positive relationship
14.	Raj	1978	Positive and significant
15.	Rajendran	1978	Positive and significant
16.	Rai	1964	Positive and significant
17.	Singh and Singh	1970	Highly related to adoption behaviour
18.	Vijayakumar	1983	Positive and significant

Positive relationship between farm size and adoption was seen in majority of the studies. In this study also it is assumed that the farm size will have a positive influence with the adoption.

f. Social participation

Many studies have shown a positive relationship of

social participation and adoption. Some of the studies which studied the association of social participation and adoption are reviewed below.

Table 7. Review showing relationship of social participation and adoption of practices

Sl. No.	Name of researcher	Year of study	Relationship with adoption
1.	Anbalagan	1974	Positive and significant
2.	Balasubramanian	1985	Negative and significant
3.	Bhaskaran	1978	Not significant
4.	Dudhani et al.	1987	Not significant
5.	Jagne and Patel	1981	Significant
6.	Krishnamoorthi	1985	Positive and significant
7.	Mohankumar	1985	Positive and significant
8.	Prasannan	1987	Significant
9.	Rajendran	1968	Related
10.	Ramamurthy	1973	Positive and significant
11.	Ravichandran	1989	Positive and significant
12.	Sadamate	1978	Positive and significant
13.	Supe and Salode	1975	Not significant
14.	Vasant et al.	1985	Significant

In this study also, it is assumed that social participation will have a positive influence in adoption.

g. Scientific Orientation

Scientific orientation is the degree to which a farmer is oriented to the use of scientific methods in decision making in farming.

Some of the studies which reported relationship of scientific orientation and adoption are reviewed below.

Table 8. Review of research studies stating relationship of scientific orientation and adoption of practices

Sl. No.	Name of researcher	Year of study	Relationship with adoption
1.	Beal and Sibley	1967	Positive and significant
2.	Krishnamoorthi	1984	Positive and significant
3.	Manivannan	1980	Positive and significant
4.	Prasannan	1987	Positively related
5.	Sakthivel	1979	Not significant
6.	Supe and Salode	1975	Positive and significant
7.	Reddy and Kivlin	1968	Positive and significant
8.	Wilson and Chaturvedi	1985	Significant

The review shows positive relationship of scientific orientation with adoption. The more of the farmer is scientifically oriented, the more will be his adoption of modern agricultural practices. The same trend is anticipated in this study also.

h. Economic motivation

The economic motivation is the attitude towards farming as a profit oriented enterprise. Economic motivation would naturally vary with the different enterprises the farmer undertakes. The economic value can be conceptualised as those characteristics which place high importance on economic ends and alternatives.

The following are some of the studies which reported association between economic motivation and adoption of agricultural practices.

Table 9. Review of research studies showing relationship between economic motivation and adoption of practices

Sl. No.	Name of researcher	Year of study	Relationship with adoption
1.	Balan	1987	Significant
2.	Boal and Sibley	1967	Positive
3.	Das and Sarkar	1970	Related
4.	Hobbs et al.	1964	Positive
5.	Krishnamoorthi	1984	Positive and significant
6.	Raj	1978	Positive relationship
7.	Nair	1969	Positive relationship
8.	Prasannan	1987	Not significant
9.	Shukla	1980	Significant

10. Singh & Singh	1970	Significant
11. Singh and Ray	1985	Positive and significant
12. Somasunderam	1976	Positive relationship

Those studies show positive relationship of economic motivation and adoption. The more the farmer's orientation for a high profit the more will be his adoption of new practices to maximise his yield and income. The same pattern of relationship is anticipated in this study also.

i. Risk orientation

The term 'risk' refers to all outcomes which leads to losses or deviation of realisation from expectations. Particularly in agriculture, which is much dependent on natural climate, it is difficult to force risks and provide against uncertainties.

Risk preference is the degree to which a farmer is oriented towards risk and uncertainty in farming. While using traditional practices, the farmer feels secured about the possible results as he can predict by virtue of his past experience, knowledge etc. The farmer could have his own perception of risk in cultivating a crop and there can be differences in the risk orientation of farmers growing different crop, depending on the vulnerability of the crop

to the risks. Some of the studies which studied risk orientation are the following:

Table 10. Review of studies growing relationship between risk orientation and adoption behaviour

Sl. No.	Name of researcher	Year of study	Reported relationship
1.	Cherian	1984	Positive and significant
2.	Earnest	1973	Positive and significant
3.	Jaiswal	1965	Positive and significant
4.	Kamarudeen	1981	Positive and significant
5.	Molgaco et al.	1981	Related
6.	Naik	1981	Positive and significant
7.	Ogunfiditimi	1981	Negative correlation
8.	Prasannan	1987	Positive
9.	Rajendran	1978	Positive and significant
10.	Ramachandran	1974	Positive and significant
11.	Pillai	1983	Positive and significant
12.	Sakthivel	1979	No relationship
13.	Tripathy	1977	Positive and significant

Most of the above studies revealed positive relationship of risk orientation and adoption. If a farmer is willing to take risk, he will be more ready to adopt modern agricultural practice. A positive relationship of risk orientation and adoption is anticipated in this study also.

j. Information Source Utilisation

Through various information sources the farmers can expose themselves to more knowledge. Studies which reported the relationship of information source utilisation and adoption are reviewed below:

Table 11. Review of literature showing relationship of Information source utilisation and adoption behaviour

Sl. No.	Name of researcher	Year of study	Reported result
1.	Amalraj and Prasad	1984	Fertilizer dealer-96.8% Extension officer-24.2% Other farmers- 24.2.
2.	Ambastha and Singh	1975	Radio-most widely based channel by farmer
3.	Al-Vogel	1985	Positively significant
4.	Balasubramanian	1985	VLWS-88.75% of farmer referred AOIs-83.33% Contact farmers-85% Friends & relatives-60.53%
5.	Dudhani et al.	1987	Not significant related
6.	Jagne and Patel	1985	Significant
7.	Krishnamoorthi	1984	Positive and significant

8.	Yoteswara Rao	1978	No influence
9.	Mathur and Singh	1974	Dominance of interpersonal localite source
10.	Nair	1969	Communication variables as such might not contribute but only when other predisposing factors are present
11.	Osuji	1980	Positively related
12.	Padharia and Patel	1975	Found that main source of information for farmers were VLWs.
13.	Prasannan	1987	Positive relationship
14.	Ranganathan	1976	Found gramasevaks as first information source of farmers
15.	Sakthivel	1979	Positive and significant
16.	Singh & Ray	1985	Positive and significant
17.	Salunkhe et al.	1975	Found that small farmers were using personal localities for farm information
18.	Shukla	1980	Significant relationship
19.	Singh and Singh	1970	Highly significant relationship
20.	Tyagi and Sohal	1984	Non significant, negative relationship

Most of the above studies revealed the importance of information source use. In this study also, the anticipation is that more the information source utilization, more will be the adoption.

1. Innovativeness

It is the degree of an individual's interest and desire to seek changes in farming techniques and to introduce such changes into his own farm operations when found practical and feasible.

Some of the studies which reported relationship of innovativeness and adoption are reviewed below:

Table 12. Review of literature showing relationship of innovativeness and extent of adoption

Sl. No.	Name of researcher	Year of study	Reported relationship
1.	Bhilegaonker	1980	Positive association
2.	Haque and Ray	1983	Significant
3.	Moulik	1965	Positive
4.	Ravi	1974	Positive and significant
5.	Ravichandran	1980	Non-significant
6.	Selunke and Thorat	1975	Significant

m. Infrastructure facilities

Infrastructure is the institutions or organisations and facilities both public and private, which provide physical and capital resources and services. They have a significant effect, directly or indirectly, upon the economic functioning of the individual farm, but which are external to it.

Studies showing association of infrastructural facilities and adoption are presented below.

Table 13. Review of studies which reported association of infrastructure facilities and adoption of practices

Sl. No.	Name of researcher	Year of study	Reported results
1.	Al-Mogel	1985	No relationship (Extension, credit and loan services)
2.	Arul Raj & John Knight	1977	No relationship (Availability of inputs)
3.	Abonyi	1979	Agricultural progress of rural areas were aggravated by infrastructural development
4.	Gaurha	1977	Infrastructural facilities had a crucial role in agricultural development
5.	Mohammad	1978	Availability of inputs had a significant impact on adoption

6.	Palaniswamy	1984	Positive and significant association
7.	Pillai	1978	Positive influence (financial availability)
8.	Singh and Ray	1985	Positive and significant (Irrigation facilities)
9.	Sen and Das	1986	Related (Inputs, credit and marketing)
10.	Wilson and Chaturvedi	1985	Highly significant

Mostly the studies have shown positive relationship of infrastructure facilities and adoption of practices. In this study it is assumed that the farmer's favourable perception about the infrastructure facilities will have a positive influence on adoption of modern agricultural technology.

n. Knowledge level of agricultural practices of farmers

Knowledge is a body of understood information possessed by a person. Proper knowledge of a farmer is the indication of effective transfer of information. Knowledge about an innovation is a prerequisite for its adoption.

Some of the studies which reported relationship between knowledge and adoption of improved practices are reviewed below.

Table 14. Review of studies showing relationship of farmer knowledge about agricultural practices and adoption behaviour

Sl. No.	Name of researcher	Year of study	Relationship with adoption
1.	Bhaskaran and Praveena	1982	Related
2.	Earnest	1973	Positive and significant
3.	Jha	1974	Positive and significant
4.	Kaleel	1978	Positive and significant
5.	Muthiah Mancheran	1979	Significant relationship
6.	Prasad	1978	Positive and significant
7.	Pillai	1978	Positive and significant
8.	Raj	1978	Positive and significant
9.	Rahim and Sharma	1983	Related
10.	Somasundaram	1976	Positive and significant
11.	Sethy et al.	1984	Reported knowledge as basic to adoption
12.	Shukla	1980	Significant related
13.	Sinha and Ray	1985	Positive and significant
14.	Tripathy	1977	Positive and significant

Majority of the studies reviewed showed positive relationship of knowledge of the farmer with adoption of improved practice of cultivation. Knowledge can be considered

as a pre-requisite in adopting an innovation. In this study also a positive relationship of knowledge and adoption is postulated.

n. Perception of characteristics of practices

Farmers perceive the characteristics of recommended practices in different ways. This differential perception may lead to varying rates of adoption of the practices.

Rogers and Shoemaker (1971) stated that it is the receiver's perception of the attributes of innovations that affects their rate of adoption. The innovation attributes can be perceived differently by different individuals. Here, the concept 'perception' refers to the ways by which the individual receives, interprets and responds to the stimuli picked up by his sense organs.

Profitability is viewed as the intensity of reward in economic terms, resulting from the adoption of the recommended practices in a crop. Suitability refers to the appropriateness of recommended practices to the existing soil and climatic conditions of that locality. The degree of difficulty perceived by the farmers in adopting recommended practices will affect their adoption behaviour.

Studies which reported relationship of perception of practices and their adoption are the following.

Table 15. Review of studies showing relationship of perception and extent of adoption

Sl. No.	Name of researcher	Year of study	Relationship observed
1.	Bhaskaran	1978	No relationship (Risk, profitability)
2.	Mulay and Roy	1968	Positively significant (Profitability)
3.	Ray	1976	Important motivational factor for adoption
4.	Raj and Knight	1977	Highly significant relationship (Profitability)
5.	Nair	1969	Positive relationship (Profitability)
6.	Sakthivel	1979	Positively significant (Profitability)

Most studies revealed the positive relationship of perception about the practices by farmers with their adoption. In this study also it is postulated that if perception is positive, the adoption will be more.

o. Attitude towards improved agricultural practices

Attitude is the degree of positive or negative affect associated with some psychological object. Attitudes are learned responses and they play an important role in determining human behaviour. Thus, when the attitude of a person

is known, it is possible to indicate his probable reactions to certain stimuli. Attitude towards improved technology has been constantly found to have significant influence on the acceptance of such innovations. According to Wilkening (1952), "the acceptance of practices is affected by the ideas and attitudes of farmer with respect to the practices themselves, the agencies which promote the practices and with respect to their own goals and aspirations". Studies which reported relationship between attitudes towards improved practices and adoption are reviewed below.

Table 16. Review of studies showing relationship of attitude and adoption behaviour of farmers

Sl. No.	Name of researcher	Year	Reported relationship
1.	Balan	1987	Significantly correlated
2.	Mohanadasan	1979	Positive and significant
3.	Nair	1969	Positive and significant
4.	Pillai	1978	Positive and significant
5.	Samad	1979	Significant influence
6.	Sinha et al.	1984	Related
7.	Sinha and Ray	1985	Positive and significant
8.	Shukla	1980	Significant relationship
9.	Somasundaram	1976	Positive and significant
10.	Surendran	1982	Positive and significant

Above studies show positive relationship of attitude towards improved practices and adoption. In this study also a positive relation between attitude and adoption is postulated.

VI. Constraints perceived by farmers

Studies which reported constraints of adoption of agriculture technology with special reference to pulses/ oilseeds are reviewed below.

Table 17. Review of literature showing constraints in adopting improved practices of pulses and oilseeds

Sl. No.	Name of researcher	Year	Reported constraints
1.	Jain	1973	1. Long duration of pulse overlapping with cereals growing season
2.	Kanwar	1975	1. Low yield of legumes 2. Yield instability 3. Lack of adequate research in breeding, entomology, quality and consumer's acceptance 4. Inadequate genetic collection
3.	Kalkat	1979	1. Poor management of pulses 2. Lack of proper agronomic practices 3. Changed attitude of farmers unfavourable high yielding varieties 4. Lack of fertilizer response varieties

4.	Nagabhushnam & Basha	1981	1. Misconception of improved variety of groundnut 2. Difficulty in marketing 3. Lack of local demand for high yielding varieties 4. High price of fertilizers 5. Shortage of capital 6. Lack of knowledge of plant protection
5.	Ram	1980	1. Non availability of HYV resistant to pest and diseases 2. Lack of adequate understanding of pulse technology 3. Poor management 4. Competition of HYV of cereals
6.	Thiagarajan	1981	1. High labour cost 2. Low rate of returns from pulse crops 3. High cost of inputs
7.	Fertilizer association of India	1980	1. Severe competition of pulses and oilseeds with HYV of cereals and, cash crops 2. Do not thrive well in soil of low fertility 3. Apathy of farmers towards this crop 4. Researchers certainly and not paid much attention to pulses than that of cereals

The review revealed that the constraints were not of a uniform nature. They varied from place to place, crop to crop and farmer to farmer.

VII. Hypotheses

Based on the above review and discussion the following null hypotheses were formulated to examine the relationship of adoption with the selected independent variables.

Ho-1 There would be no significant relationship between extent of adoption and age of the farmers.

Ho-2 There would be no significant relationship between extent of adoption and education status of the farmers.

Ho-3 There would be no significant relationship between extent of adoption and occupational status of the farmers.

Ho-4 There would be no significant relationship between extent of adoption and farm size of the farmers.

Ho-5 There would be no significant relationship between extent of adoption and annual income of the farmers.

Ho-6 There would be no significant relationship between extent of adoption and social participation of the farmers.

Ho-7 There would be no significant relationship between extent of adoption and scientific orientation of the farmers.

Ho-8 There would be no significant relationship between extent of adoption and economic motivation of the farmers.

Ho-9 There would be no significant relationship between extent of adoption and risk orientation of farmers.

Ho-10 There would be no significant relationship between extent of adoption and innovativeness of farmers.

Ho-11 There would be no significant relationship between extent of adoption and extent of information sources use by the farmers.

Ho-12 There would be no significant relationship between extent of adoption and perception of infrastructure facilities of the farmers.

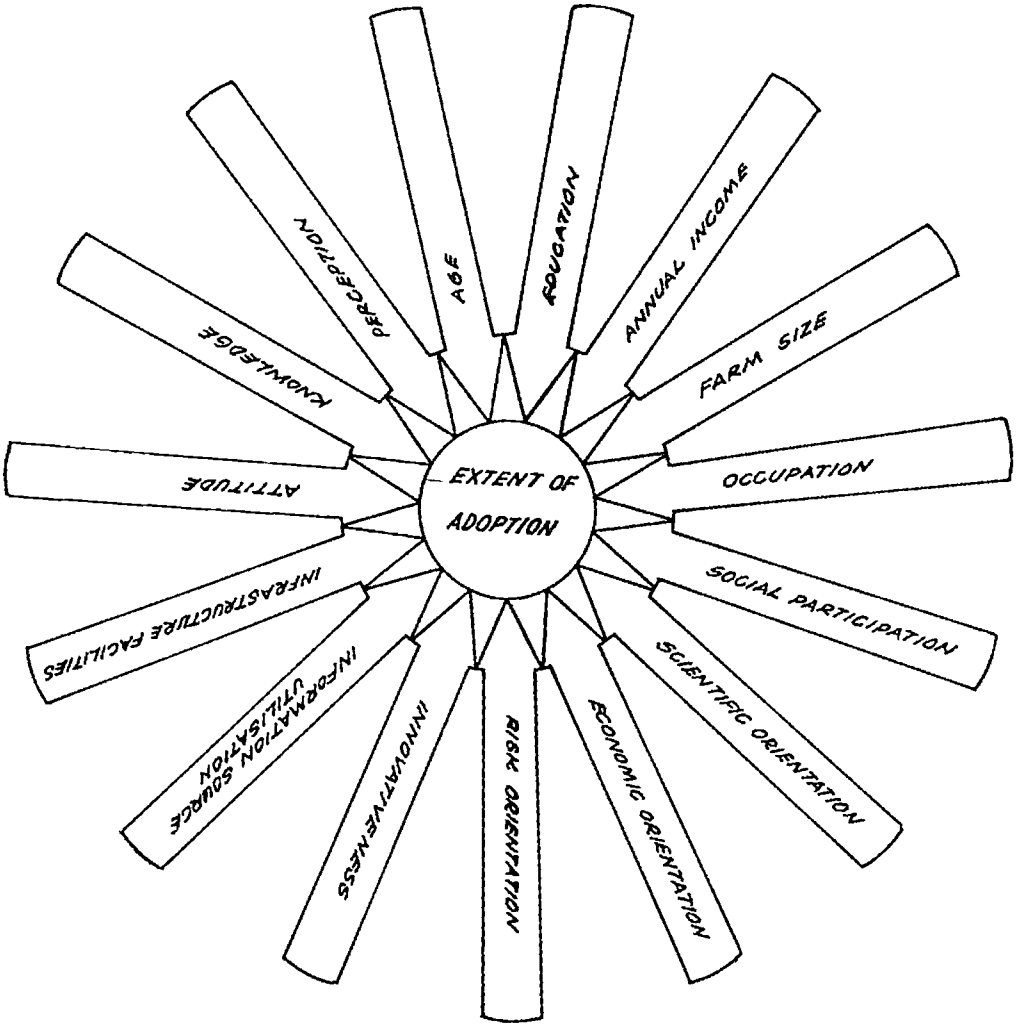
Ho-13 There would be no significant relationship between extent of adoption and attitude of the farmers towards improved practices.

Ho-14 There would be no significant relationship between extent of adoption and farmers perception of profitability, suitability and difficulty of improved practices.

Ho-15 There would be no significant relationship between extent of adoption and farmers knowledge about the practices.

The conceptual model developed for the study on the basis of the above discussion and review is shown in Fig. 1.

FIG 1 CONCEPTUAL MODEL OF THE STUDY



METHODOLOGY

CHAPTER III

METHODOLOGY

This chapter deals with the methods employed in the study which are presented under the following heads:-

1. Sample and sampling procedures
2. Measurement of variables
   A. Dependent variable
   B. Independent variable
3. Data collection procedure
4. Statistical tools used in the study

1. Sample and sampling procedure

The study was confined to Onattukara region of Kerala. The Onattukara region falls into Quilon and Alleppey Districts of Kerala. In Quilon District it is located at Karunagappally Taluk and in Alleppey District it falls into Mavelikkara and Karthikappally Taluks. The total geographical area of this agricultural region is estimated to be about 725.7 km^2. The soil in this region is of sandy nature and is considered highly suitable for sesamum cultivation. Sesamum is an important crop in this area. Cowpea is also cultivated in this region.

A two stage random sampling technique was used for selection of respondents from this area. In the first stage

from the three taluks, a total of 15 panchayats/krishibhavans - five panchayats from each taluk, were selected by simple random sampling. The list of sesamum and cowpea cultivators of these selected krishibhavans was prepared with the help of concerned Agricultural Officers. From this list ten farmers each were selected by random process - five cowpea cultivators and five sesamum cultivators - from each krishibhavan. Thus a total of 150 farmers were selected.

Measurement of variables

A. Dependent variable

The dependent variable of this study was: Extent of adoption of improved farm technology of pulses and oilseeds. Here adoption refers to the actual practicing of improved practices of cultivation of cowpea and sesamum; recommended by Kerala Agricultural University.

The extent of adoption was measured using the Adoption quotient suggested by Singh and Singh (1974) which is a modification of the procedure followed by Chattopadhyay (1963). Five improved sesamum cultivation practices and six improved cowpea cultivation practices were chosen from the Package of Practices (1986), recommended by the Kerala Agricultural University, which are applicable to the third crop season of the selected area. The level of adoption or the Adoption Quotient of each respondent was calculated

using the formula:-

$$\text{Adoption Quotient} = \frac{e1/_{p1} + e2/_{p2} + \ldots\ldots + en/_{pn}}{N} \times 100$$

where

$$e1/_{p1} = \frac{\text{extent of adoption of a practice}}{\text{potentiality of adoption of that practice}}$$

N = Total number of practices applicable to the respondent

The potentiality of adoption is conceived as the maximum degree to which a farmer can adopt a particular practice, depending on the maximum of resources which he command or can command. Extent of adoption is conceived as the degree to which a farmer has actually adopted a practice. When the extent of adoption equals the potentiality, the adoption is maximum, and when the extent is nil, adoption is nil.

D. Independent variables

On the basis of the review of past research studies conducted and on the basis of a pilot study, the following independent variables were selected for this study.

1. Age
2. Educational status
3. Annual income

4. Social participation
5. Occupational status
6. Farm size
7. Scientific orientation
8. Economic motivation
9. Risk orientation
10. Innovativeness
11. Information source utilization
12. Attitude towards improved practices
13. Perception about the practice
14. Knowledge level of farmers
15. Infrastructure facilities

B. 1. Age

It refers to the total years completed by an individual respondent at the time of interview. The respondents were asked to mention their age in terms of completed years.

B. 2. Education status

It refers to the formal education obtained from school, to the University level by the farmer respondents. The data pertaining to educational qualification were collected by asking them to indicate their educational level or qualification.

The scoring was as follows.

Illiterate - 0, literate - 1, primary school - 2, middle school - 3, High school - 4, College education and above - 5.

B. 3. Annual Income

It indicates the total income of the farmer derived from all possible sources. The following scoring was followed in this study.

Sl. No.	Income (Rs.)	Scores assigned
1.	Below 5000	1
2.	5000 - 10,000	2
3.	10,000 - 15,000	3
4.	More than 15,000	4

B.4. Social participation

Social participation indicates the degree of involvement of farmers in social organisations as a member or as an office bearer and the regularity in attending the meetings of these organisations.

The procedure developed by Lokhande (1974) was used in this study. For the purpose of measuring social partici-

pation the scoring pattern was as follows:

Sl. No.	Items	Scores
1.	No membership	0
2.	Membership in one organisation	1
3.	Membership in more than one organisation	2
4.	Office bearer in one organisation	3
5.	Office bearer in more than one organisation	4
6.	Distinctive features (MLA, MP, Panchayat President	5

Attendance in meetings either as a member or as an office bearer was considered important, and the scoring was the following.

Sl. No.	Frequency of participation	Scores assigned
1.	Regularly	2
2.	Occasionally	1
3.	Never	0

To obtain the final score of a respondent, the scores secured as a member or office bearer were multiplied with the scores secured for attendance in meetings and added up.

B.5. Occupational Status

In this study as explained in the theoretical orientation, occupation is considered as a vocation, for which the farmers spent their time and energy.

Some farmers are spending their major time on farming by directly supervising or involving in farming operations. Their main occupation can be considered as agriculture. But others who are rarely or occasionally engaged in agriculture may be considered as an absentee cultivator. Thus there can be great variations among persons in the time spent by them in activities for cultivation. In this study the time spent for farming by the farmers is taken as a measure of his occupation, as farming.

The scoring pattern was as follows.

Sl. No.	Time spent on farming	Scores assigned
1.	Full time	4
2.	Most often	3
3.	Occasionally	2
4.	Rarely	1

B.6. Farm size

Farm size refers to the area of land possessed by the farmer respondent. It was measured by asking the respondent to indicate the total area of land in cents that he possessed at the time of interview.

B.7. Scientific orientation

It is the degree to which a farmer is oriented to the use of scientific methods in the day to day activities.

In this study to measure scientific orientation the scale developed by Supe (1969) was used. This scale consists of six items. Response were collected in a three point continuum, with the response categories being Agree, undecided and disagree. A scoring of 3, 2 and 1 was allotted to the response categories of positive statements and 1, 2 and 3 for negative statements. The total score was taken by adding up the scores obtained by the farmer for the different statements. The maximum and minimum score were 18 and six respectively.

B.8. Economic motivation

It refers to the attitude of farmers towards farming as a profit oriented enterprise.

The economic motivation scale developed by Supe (1969) was adopted in this study. The scale consists of six statements. The response continuum ranged from agree, undecided and disagree. The scores allotted were 3, 2 and 1 for positive statements and 1, 2 and 3 for negative statements. The total economic motivation score was obtained by adding up the scores, for each items. Scores ranged from six to 18.

B.9. Risk Orientation

It is the degree to which a farmer is oriented towards risk and uncertainty in farming.

Farming is usually affected by many uncontrollable factors, like, climatic variations, pests and diseases etc. All farmers may not take up the risk involved practices in farming.

It was measured with the help of scale developed by Supe (1969). This scale consists of six items. These items have been rated in three point response continuum; Agree, undecided and disagree. The scores allotted was 3, 2 and 1 positive statements and 1, 2 and 3 for negative statements.

B.10. Innovativeness

It is the degree to which an individual is relatively

earlier in adopting new idea than the other members of the farming communities. An innovative farmer will be eager to seek changes in farming techniques and to introduce them in his own farm, when found feasible and practical.

As this variable denote overt behaviour it was measured in terms of covert behaviour closely associated with change. Innovativeness scale of Reastor (1968) with the modification as done by Prasad (1983) was adopted in this study.

The scale consists of eight statements. For the first four statements, a score of 3, 2 and 1 was assigned to 'Yes' 'Undecided' and 'No' responses respectively. The scoring procedure was reversed in the case of last four statements. The summation of the scores obtained by a respondent for all the eight statements indicated the innovativeness score. The score ranged from eight to 24.

B.11. Information source utilization

Sources for obtaining information on agricultural technology were listed and the respondents were asked to indicate the frequency of use. Three response categories, regularly, occasionally and never were used. The scores assigned were 2,1 and 0 respectively.

The score of the different information scores were added upto obtain the total score. The scores ranged from 'zero' to 28.

B.12. Infrastructure facilities

Adoption of a technology, requires certain facilities. The main requirements that are important to successful sesamum/cowpea cultivation are:

1. High Yielding Variety seeds
2. Fertilizers
3. Plant Protection Chemicals and Equipments
4. Credit

Labour was also been found to be another component, which is provided by the social system, which had influence on the adoption of practices. There are institutions to provide inputs and services. Adequate quantity of all these inputs should be available in time at reasonable cost and good quality. The adoption rate can be positively influenced if adequate quantity of good quality inputs are available in time and at reasonable cost.

Eventhough infrastructural facilities needed for the farmers may be available in the location, the farmers may not perceive it as available and that may affect his adoption behaviour. So in this study, the perception of the

farmers about the infrastructural facilities has been taken into account, to study its relationship with adoption of improved practices. The factors considered for measuring infrastructural facilities were timeliness, adequacy in availability, cost and quality as perceived by farmers. If the answer is positive, for the checked item, a score of one was given. The scores were then added up for each of the items to get the total score of infrastructural index. The score ranged from 0 to 24.

B.13. Perception about the practices

It refers to the process of becoming aware of objects or events or characteristics by means of sensory operations. Perception influences behaviour. In this study, the respondents were asked to indicate their perception about the characteristics of improved cultivation methods of cowpea/sesamum viz. difficulty, suitability and profitability, in a three point continuum.

The scoring was as follows:-

Response categories	Score
Very much profitable Very much suitable to the soil and climatic conditions Not at all difficult	3
Profitable, Difficult, Suitable	2
Not profitable Not suitable Very difficult	1

B.14. Knowledge

It is a body of understood information possessed by a farmer about cultivation of cowpea and sesamum. In this study, a teacher made knowledge-test was used, with questions pertaining to the improved practices of cowpea and sesamum - each separately. If the answer to a particular question was correct a score of '2' and if the answer is incorrect a score of '1' was given. All such scores were totalled up for each respondent to get his knowledge score. A total of seven questions were asked to sesamum cultivators and ten questions to cowpea cultivators.

Knowledge score for cowpea cultivation ranged from 10 to 20 and for sesamum cultivators the scores ranged from 7 to 14.

B.15. Attitude towards improved practices

For this study attitude had been defined to as the farmer's degree of positive or negative affect associated with improved practices of cowpea or sesamum cultivation like improved seeds, application of chemical fertilizers, plant protection measures and rnizobium treatment.

Attitude towards improved practices of cultivation of cowpea/sesamum was measured with the help of the attitude scale developed using Likert method of attitude scale construction.

Likart Method of Summated Ratings

All possible statements which will discriminate the positive and negative attitudes of the respondents towards HYV, chemical inputs etc. were collected through discussion and review of literature. The statements were edited following the procedure suggested by Edwards (1957). A total of 20 statements were selected concerning improved practices of sesamum, and 23 statements for cowpea. These statements were given to 60 respondents, who were asked to respond to each of the item, in any one of the five categories; Strongly agree, Agree, Undecided and Disagree and Strongly disagree. For positive statements a scoring of 4, 3, 2, 1 and 0 and for negative statements a scoring of 0, 1, 2, 3 and 4 were given. The score of each respondent was found out. Item analysis was made for rejecting those items which could not discriminate between positive and negative attitudes. The subjects were then arranged in the descending order of total scores obtained by them. 25 per cent of the subjects with the highest total scores and 25 per cent of the subjects with lowest total scores were selected, and the 't' value was calculated for each statements using the formula

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{S_H^2}{n_H} + \frac{S_L^2}{n_L}}} \quad \text{where}$$

$\bar{X}H$ = the mean score on a given statement for the high group

$\bar{X}L$ = the mean score on the same statement for the low group

SH^2 = the variance of the distribution of responses of the high group to the statement

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

nH = the number of subjects in the high group

nL = the number of subjects in the low group

The value of 't' is a measure of the extent to which a given statement differentiates between the high and low groups. The statements with 't' value equal to or greater than 1.75, were selected. Thus for sesamum a total of 10 statements and for cowpea a total of 12 statements were selected. The 't' values of statements are given in Appendix II.

By using test-retest method the reliability of the scale was assessed. The correlation coefficient was found to be 0.74.

The scale was administered to the farmer respondents. The responses were obtained in a continuum ranging from Strongly agree, Agree, Undecided, Disagree and Strongly disagree. The attitude scores of cowpea ranged from 0 to 48 and for sesamum the range was from 0 to 40.

Constraints in cowpea/sesamum cultivation

Farmers experience many problems while deciding to adopt improved practices of sesamum/cowpea cultivation. The problems and constraints in adopting the different practices may not be the same. So, in this study, the constraints faced by the farmers in adopting improved practices like HYV, applying chemical fertilizers and plant protection measures and rhizobium culture etc. were studied. Open end questions were used for the purpose of assessing the constraints as perceived by the farmers. The suggestions perceived by the farmers were also assessed through open end questions.

3. Data collection procedure

A schedule with the above procedures for measuring the different variables selected for the study was prepared. Pre-testing of the schedule was done among 25 non-sample respondents. Necessary modifications were made on the basis of pre-testing. The data collection was done by personally interviewing the respondents during the months December 1988 and January 1989. The interview schedule used is given in Appendix I.

4. Statistical tools used in the study

Associated relationships between adoption level and

other independent variables were analysed by means of zero order correlation.

Path analysis was used to isolate the direct and indirect effects of the causative factors.

Besides these statistical tools, percentages and average have been used in appropriate situations.

RESULTS

CHAPTER IV

RESULTS

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

I. Extent of adoption of improved practices of cowpea and sesamum, by the farmers of Onattukara region.

II. The communication and infrastructural factors affecting adoption of practices.

III. Characteristics of sesamum and cowpea cultivators.

IV. A. Relationship of selected characteristics with adoption of improved practices of sesamum and cowpea.

B. Intercorrelation among independent variables.

C. Direct and Indirect effects of causative factors

V. Constraints in the cultivation of cowpea and sesamum, as perceived by farmers and their suggestions of solutions.

I. Extent of adoption of improved practices of cowpea and sesamum, by the farmers of Onattukara region.

The data pertaining to the extent of adoption of recommended improved practices of sesamum and cowpea cultivation by the farmers of Onattukara region are given in Table 18.

Table 18. Extent of adoption of practices of sesamum and cowpea N = 150

Sl. No.	Adoption scores	Percentage of farmers	
		Sesamum (N = 75)	Cowpea (N = 75)
1.	0	NA	5.33
2.	0.01 - 10	4.00	
3.	10.01 - 20	6.67	21.33
4.	20.01 - 30	12.00	17.33
5.	30.01 - 40	25.33	28.00
6.	40.01 - 50	22.67	10.66
7.	50.01 - 60	13.33	10.66
8.	60.01 - 70	5.33	4.00
9.	70.01 - 80	9.33	0.00
10.	80.01 - 90	1.33	0.00
11.	90.01 - 100	0.00	0.00
	Mean score	45.33	30.88

The maximum adoption score of sesamum was 90 while for cowpea the maximum was 70. Majority of farmers in both the groups had adoption scores ranging from 20 to 50. The mean adoption score for sesamum growers was 45.33 and for cowpea growers, it was 30.88.

The data regarding the adoption of the different practices of sesamum are given in Table 19.

Table 19. Adoption of different practices of sesamum

N = 75

Sl. No.	Practices	Full adopters (percentage)	Partial adopters (percentage)	Non-adopters (percentage)
S_1	Selection of HYV seeds	25.33	45.33	29.34
S_2	Correct seed rate	73.33	0.00	26.67
S_3	Organic manure application	20.00	73.33	6.67
S_4	Chemical fertilizer application	18.67	45.33	36.00
S_5	Plant protection measures	4.00	0.00	96.00

From the table 19 it could be seen that the extent of adoption of different improved practices vary very much among farmers. The only recommendation adopted by a large majority i.e. 73.33 per cent, was the use of correct seed rate. Majority of the farmers adopted application of organic manure, but only 20 per cent of them applied the recommended dose. Majority of the sesamum farmers did not adopt plant protection measures. None of the sesamum farmers adopted the full package of practices as recommended by Kerala Agricultural University.

The data regarding the adoption of different practices of cowpea are given in Table 20.

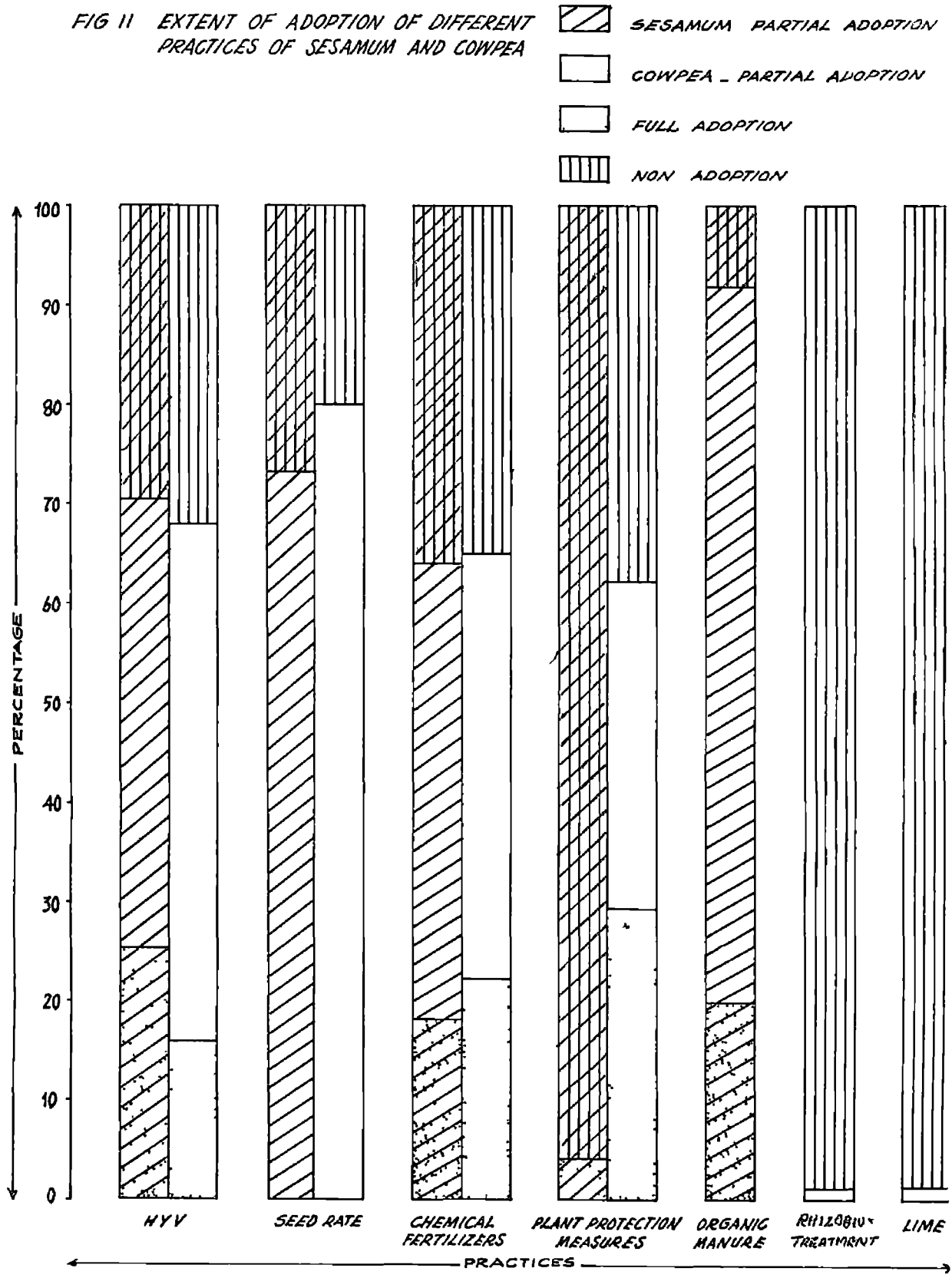
Table 20. Adoption of different practices of cowpea

N = 75

Sl. No.	Practices	Full adoption (percentage)	Partial adoption (percentage)	Non-adoption (percentage)
C_1	Selection of HYV	16.00	52.00	32.00
C_2	Correct seed rate	80.00	0.00	20.00
C_3	Rhizobium culture treatment	1.33	0.00	98.67
C_4	Application of chemical fertilizers	22.67	42.67	34.66
C_5	Lime application	1.33	0.00	98.67
C_6	Plant protection measures	29.33	33.33	37.34

It can be noticed that correct seed rate was adopted by 80 per cent of the farmers. The adoption of other two important practices - rhizobium culture treatment and lime application were very less. Only one farmer had adopted lime application and rhizobium culture treatment. Farmers adopting high yielding variety seeds, application of chemical fertilizers and plant protection measures were 52, 42.67 and 33.33 per cent respectively.

FIG II EXTENT OF ADOPTION OF DIFFERENT PRACTICES OF SESAMUM AND COWPEA



The adoption of different practices of sesamum and cowpea is presented in Fig. II.

II. The communication and infrastructural factors affecting adoption of practices

a. Communication factors

The data regarding the usage of information sources by the cowpea and sesamum farmers are furnished in Table 21.

From Table 21, it can be seen that the widely used source for both cowpea and sesamum farmers was "Other farmers". The other important sources in the order of extent of use from which the cultivators received information on agricultural technology were Newspapers, Radio, Relatives and friends, Agricultural Demonstrators, Fertilizer dealers and Agricultural Officers. The least used sources were 'other Officers of Agricultural Department' and 'Agricultural Scientists' Sources like Television, Magazines, Exhibitions, Training and Demonstrations were used by only a few farmers.

b. Infrastructure facilities

Infrastructure facilities were studied taking into consideration different dimensions like timeliness, adequacy, cost and quality. The data regarding the farmers perception of the timeliness, adequacy, cost and quality of the inputs are presented below.

Table 21. Information source use of Sesamum and Cowpea farmers

N = 150

Sources	Extent of use					
	Sesamum farmers (N = 75)			Cowpea farmers (N = 75)		
	Regular	Occasional	Never	Regular	Occasional	Never
Radio	13.34	76.00	10.66	13.34	73.34	13.62
Newspaper	41.33	49.33	9.34	33.33	57.33	9.33
Television	0.00	6.66	93.33	0.00	2.67	97.33
Magazines	8.00	4.00	88.00	6.66	12.00	81.34
Exhibition	0.00	5.33	94.67	0.00	0.00	100.00
Training	0.00	1.34	98.66	0.00	0.00	100.00
Demonstration	0.00	13.34	86.66	2.66	1.34	96.00
Agricultural officers	1.33	60.00	38.66	2.66	56.00	41.34
Agricultural Demonstrators	2.66	76.00	21.34	5.33	77.33	17.34
Other Officers	0.00	0.00	100.00	0.00	1.33	98.67
Agricultural Scientists	0.00	2.66	97.34	0.00	0.00	100.00
Fertilizer dealers	0.00	70.67	29.33	0.00	66.67	33.33
Other farmers	76.00	20.00	4.00	82.66	13.34	4.00
Relatives and friends	8.00	73.33	18.67	0.00	80.00	20.00

b.1. Seeds of New Varieties

The data regarding the farmer's perception about the various dimensions of the availability of seeds of new varieties of sesamum and cowpea are given in Table 22.

Table 22. Data regarding the farmers perception about various dimensions of HYV seeds of sesamum/ cowpea

Sl. No.	Dimensions	Percentage of farmers perceiving	
		sesamum	cowpea
1.	Seeds are available in time	56.00	66.67
2.	Seeds are available in adequate quantity	22.67	16.00
3.	Seeds are available at reasonable price	57.33	54.67
4.	Seeds supplied are of good quality	50.67	62.67

The table 22 shows that majority of the farmers perceived that high yielding variety seeds of sesamum/ cowpea are available in time. But only about 16 to 23 per cent felt that they are available in adequate quantity. More than fifty per cent of the farmers had a favourable perception about the price and quality of the seeds.

b.2. Chemical fertilizers

The data regarding the farmers perception about the availability and cost of the chemical fertilizers are given in Table 23.

Table 23. Data regarding the perception of farmers about various dimensions of chemical fertilizers

Sl. No.	Dimensions	Percentage of farmers perceived	
		Sesamum	Cowpea
1.	Fertilizers are timely available	59.67	48.00
2.	Fertilizers are available in adequate quantity	72.00	74.67
3.	Fertilizers are available at reasonable/affordable cost	16.00	20.00
4.	The fertilizers available are of good quality	65.33	62.67

The data presented reveals that though 72 to 75 per cent of farmer respondents perceived that chemical fertilizers are available adequate quantity, only 48 to 59 per cent of them felt that they are available in time. Only 16 to 20 per cent of farmers perceived that chemical fertilizers are available at reasonable cost. Sixty two to 65 per cent of respondents felt that the quality of the

available fertilizers are good.

b.3. Plant protection chemicals

Data regarding the perception of availability, cost and quality of plant protection chemicals are presented in Table 24.

Table 24. Data showing perception of farmers about various dimensions of plant protection chemicals

Sl. No.	Dimensions	Percentage of farmers perceiving	
		Sesamum	Cowpea
1.	Plant protection chemicals are available timely	73.33	80.00
2.	Plant protection chemicals are available in adequate quantity	74.62	64.00
3.	Plant protection chemicals are available at affordable cost	18.66	22.67
4.	The available plant protection chemicals are of good quality	77.33	74.67

Data explains that majority of the farmers perceived that plant protection chemicals are available in time and in sufficient quantities. But only less than 23 per cent of the farmers perceived that they are of

reasonable cost. Majority of them reported that the plant protection chemicals available are of good quality.

b.4. Plant Protection Equipments

The data regarding the perception about the various dimensions of plant protection equipment is given in Table 25.

Table 25. Data showing the perception of farmers about the various dimensions regarding plant protection equipments

Sl. No.	Dimensions	Percentage of farmers perceiving	
		Sesamum	Cowpea
1.	Plant protection equipments available in time	6.60	9.30
2.	Plant protection equipments are available in required quantity	1.00	5.30
3.	They are available at reasonable cost/rent	30.67	37.33
4.	The available equipments are in good condition	0.00	5.33

The table 25 reveals that only very few farmer respondents perceived that plant protection equipments are available in time, in required quantity and in good condition.

b.5. Credit

The data regarding the perception about the various dimensions of credit are given in Table 26.

Table 26. Data showing the perception of farmers about the various dimensions of credit for agricultural purposes

Sl. No.	Dimensions	Percentage of farmers perceived	
		Sesamum	Cowpea
1.	Credit is available in time	22.67	24.33
2.	Adequate credit is available	33.33	36.33
3.	Interest rate is reasonable for agricultural loans	34.67	32.67
4.	Credit is available without difficulty	36.00	34.67

The table 26 shows that about 23 to 24 per cent of farmers perceived that credit is available in time only 34 to 36 per cent of the farmers felt that adequate credit is available. 33 per cent of the farmers reported that interest for agricultural loans are reasonable and 35 per cent of farmers felt that credit is available without difficulty.

b.6. Labour

Data regarding different dimensions of labour are given in Table 27.

Table 27. Data showing farmers' perception about the various dimensions regarding labour

Sl. No.	Dimensions	Percentage of farmers perceiving	
		Sesamum	Cowpea
1.	Labour is available timely	8.00	9.30
2.	Labourers are available in adequate number	6.67	10.67
3.	The labour charges are reasonable	0.00	0.00
4.	The labourers are efficient	0.00	0.00

The table 27 indicates that cent per cent of the farmer respondents perceived that labour charges are high and the labourers are inefficient. Only very few farmer respondents reported timely and adequate availability of labour.

III. Characteristics of sesamum and cowpea cultivators

Data regarding the selected characteristics of sesamum and cowpea farmers are furnished below.

1. Age

The data regarding distribution of the farmers according to their age is given in Table 28.

Table 28. Distribution of sesamum/cowpea farmers according to their age

N = 150

Sl. No.	Age group	Percentage of farmers	
		Sesamum N = 75	Cowpea N = 75
1.	20 - 40	21.34	13.34
2.	41 - 60	49.33	56.00
3.	61 - 80	28.00	30.66
4.	More than 80	1.33	0.00

Table 28 indicates that majority of the cowpea and sesamum farmers were found to be in the age group between 41-60. In both the groups the percentages of young farmers (below 40) were less.

2. Education status

The data regarding the distribution of farmers according to their education level is given in Table 29.

Table 29. Distribution of farmers according to their level of education

N = 150

Sl. No.	Education status	Percentage of farmers	
		Sesamum N = 75	Cowpea N = 75
1.	Illiterate	4.00	1.34
2.	Literate	17.33	10.66
3.	Primary school	10.67	12.00
4.	Middle school	6.67	14.66
5.	High school	34.66	33.34
6.	College	26.67	28.00

From the table 29, it is evident that about 35 per cent of farmer respondents had high school education, while 27 per cent of them had college education. Only a negligible fraction of the sample farmers were illiterate.

3. Occupational Status

Data regarding the percentage of cowpea and sesamum farmers according to their occupational status are given in Table 30.

Table 30. Distribution of farmers according to their occupational status

N = 150

Sl. No.	Occupational status	Percentage of farmers	
		Sesamum N = 75	Cowpea N = 75
1.	Full time	17.66	21.33
2.	Most often	64.00	64.00
3.	Occasionally	16.00	13.34
4.	Rarely	2.34	1.33

Sixty four per cent of the cowpea and sesamum farmers were utilising most of their time for farming. About 15 to 18 per cent of farmers were "absentee farmers".

4. Farm size

Data regarding the distribution of farmers according to their farm size in cents is given below in Table 31.

Table 31. Distribution of farmers according to their farm size

N = 75

Sl. No.	Farm size (in cents)	Percentage of farmers	
		Sesamum	Cowpea
1.	Upto 100	42.67	56.00
2.	100 - 200	44.00	30.67
3.	200 - 300	5.33	8.00
4.	More than 300	8.00	5.33
Mean		145.69	133.76

From the above table, we can see that 43 to 57 per cent of farmers were having farm size below 100 cents. About 5 to 8 per cent of the farmers possessed farm size of more than 300 cents. The mean farm size was 145.69 cents for sesamum and 133.76 cents for cowpea.

5. Social participation

Data regarding the distribution of farmers according to their level of social participation is furnished in Table 32.

Table 32. Distribution of farmers according to their level of social participation

N = 150

Sl. No.	Social participation	Percentage of farmers	
		Sesamum N = 75	Cowpea N = 75
1.	Membership in co-operative society	48.00	52.00
2.	Membership in co-operative society and other organisations	34.67	20.00
3.	Not in any organisation	17.34	28.00
	Office bearer of any organisation	4.00	2.33

The table 32 shows that approximately 50 per cent of the sample farmers were members of co-operative society. About 20 to 35 per cent of farmers were members of co-operative societies as well as other organisations. Very few farmers were office bearers of any organisation.

6. Income

Data regarding the annual income of the farmers are given in Table 33.

Table 33. Table showing the distribution of respondents according to their level of annual income

N = 150

Sl. No.	Annual Income (Rupees)	Percentage of farmers	
		Sesamum N = 75	Cowpea N = 75
1.	Upto 5000	36.00	22.67
2.	5000 - 10000	38.67	55.00
3.	10000 - 15000	13.33	9.00
4.	More than 15000	12.00	13.33

Majority of the farmers had annual income below Rs.10,000. Twelve per cent of the sample farmers had annual income more than Rs.15,000.

7. Scientific Orientation

Data regarding the scientific orientation level of farmers are given in Table 34.

Table 34. Distribution of farmers regarding to their scientific orientation score

N = 150

Sl. No.	Sesamum (N = 75)		Cowpea (N = 75)	
	Category	Percentage of farmers	Category	Percentage of farmers
1.	Below mean	54.67	Below mean	45.33
2.	Above mean	45.33	Above mean	54.67
	Mean score	14.53	Mean score	15.00

The table 34 reveals that 54.67 per cent of sesamum cultivators were below mean score and the same per cent of cowpea cultivators were above mean score. The mean score of scientific orientation was 14.53 for sesamum farmers and 15.00 for cowpea farmers.

8. Economic motivation

The data regarding the distribution based on the economic motivation score are given in Table 35.

Table 35. Distribution of farmers according to their economic motivation scores

Sl. No.	Sesamum (N = 75)		Cowpea (N = 75)	
	Category	Percentage of farmers	Category	Percentage of farmers
1.	Below mean	66.67	Below mean	60.00
2.	Above mean	33.33	Above mean	40.00
	Mean score	11.13	Mean score	11.54

About 60 per cent of cowpea farmers and 67 per cent of sesamum farmers were below mean economic motivation scores of the respective groups. The mean economic motivation score was 11.13 for sesamum farmers and 11.54 for cowpea farmers.

9. Risk orientation

Table 36 presented below shows the data regarding the distribution of sesamum and cowpea farmers based on their risk orientation scores.

Table 36. Distribution of sample farmers based on their risk orientation score

N = 150

Sl.No.	Sesamum (N = 75)		Cowpea (N = 75)	
	Category	Percentage of farmers	Category	Percentage of farmers
1.	Below mean	62.67	Below mean	52.00
2.	Above mean	37.33	Above mean	48.00
	Mean score	12.11	Mean score	12.55

The data presented indicated that 62.67 per cent of sesamum farmers and 52 per cent of cowpea farmers were below mean risk orientation score of the respective groups. The mean score of risk orientation for sesamum farmers was 12.11 and for cowpea farmers it was 12.55.

10. Innovativeness

The data regarding the farmers' innovativeness are presented in Table 37.

Table 37. Distribution of farmers based on their innovativeness scores

N = 150

Sl. No.	Sesamum (N = 75)		Cowpea (N = 75)	
	Category	Percentage of farmers	Category	Percentage of farmers
1.	Below mean	64.00	Below mean	48.00
2.	Above mean	36.00	Above mean	52.00
	Mean score	19.09	Mean score	17.72

The table 37 reveals that 64 per cent of sesamum farmers were below mean innovativeness score of the group. Forty eight per cent of cowpea farmers were found to be below mean innovativeness score. The mean innovativeness score for sesamum farmers was 19.09 and for cowpea farmers it was 17.72.

11. Information source utilisation

The data regarding the information source utilisation of the respondents are given in Table 38.

Table 38. Distribution of farmers according to their information source utilisation score

N = 150

Sl. No.	Sesamum (N = 75)		Cowpea (N = 75)	
	Category	Percentage of farmers	Category	Percentage of farmers
1.	Below mean	54.67	Below mean	65.33
2.	Above mean	45.33	Above mean	34.67
	Mean score	8.22	Mean score	8.01

The data presented above shows that in both cases more than 50 per cent of sample farmers had lower mean information source utilisation score of their respective group. Only 34.67 per cent of cowpea farmers had above mean information source utilisation use score. Mean score of information source utilisation of sesamum farmers was 8.22 and mean score for cowpea farmers was 8.01.

12. Intrastructure facilities

The data pertaining to the perception of infrastructural facilities, of respondents are presented in the following Table 39.

Table 39. Distribution of sample farmers based on their score of perception of infrastructural facilities

N = 150

Sl. No.	Sesamum (N = 75)		Cowpea (N = 75)	
	Category	Percentage of farmers	Category	Percentage of farmers
1.	Below mean	54.67	Below mean	40.00
2.	Above mean	45.33	Above mean	60.00
	Mean score	15.45	Mean score	14.96

The table 39 reveals that 55 per cent of sesamum farmers had score above mean. Sixty per cent of cowpea farmers had scores less than the mean infrastructural score of their group. Mean infrastructural index score of sesamum farmers was 15.45 and for cowpea farmers it was 14.96.

13. Knowledge level of farmers

The table 40 presents the data on the knowledge about improved practices of cultivation recommended by Kerala Agricultural University.

The data presented in the table clearly show that, most of the farmers (i.e., 94.67 per cent and 81.33 per cent for sesamum and cowpea respectively) knew about the correct

Table 40. Knowledge level of farmers about recommended practices

Sl. No.	Practices	Percentage of farmers	
		Sesamum	Cowpea
1.	HYV seeds	65.33	38.67
2.	Correct seed rate	94.67	81.33
3.	Application of chemical fertilizers as per recommended dose	13.33	9.33
4.	Application of plant protection chemicals as per recommendation	33.33	37.33
5.	Organic manure as per recommendation	18.67	NA
6.	Rhizobium culture treatment	NA	2.67
7.	Lime application	NA	1.33

NA = Not Applicable

seed rate. Knowledge about important practices like rhizobium treatment and lime application for cowpea was practically nil among the sample respondents.

14. Perception about the practices

The data were collected about the suitability, profitability and difficulty of various improved practices as

perceived by farmer respondents. The following table shows the data regarding; distribution of farmers based on their perception score.

Table 41. Distribution of cowpea and sesamum farmers based on their perception score

N = 150

Sl. No.	Sesamum (N = 75)		Cowpea (N = 75)	
	Category	Percentage of farmers	Category	Percentage of farmers
1.	Below mean	44.67	Below mean	42.67
2.	Above mean	55.03	Above mean	57.33
	Mean score	9.92	Mean score	9.54

The table 41 shows that 44.67 per cent of sesamum farmers and 42.67 of cowpea farmers were below mean perception score. The mean perception score of sesamum farmers was 9.92 and mean score for cowpea farmers was 9.54.

15. Attitude towards improved practices

The data in Table 42 show the frequency of farmers according to their attitude scores.

Table 42. Distribution of farmers according to their attitude scores

N = 75

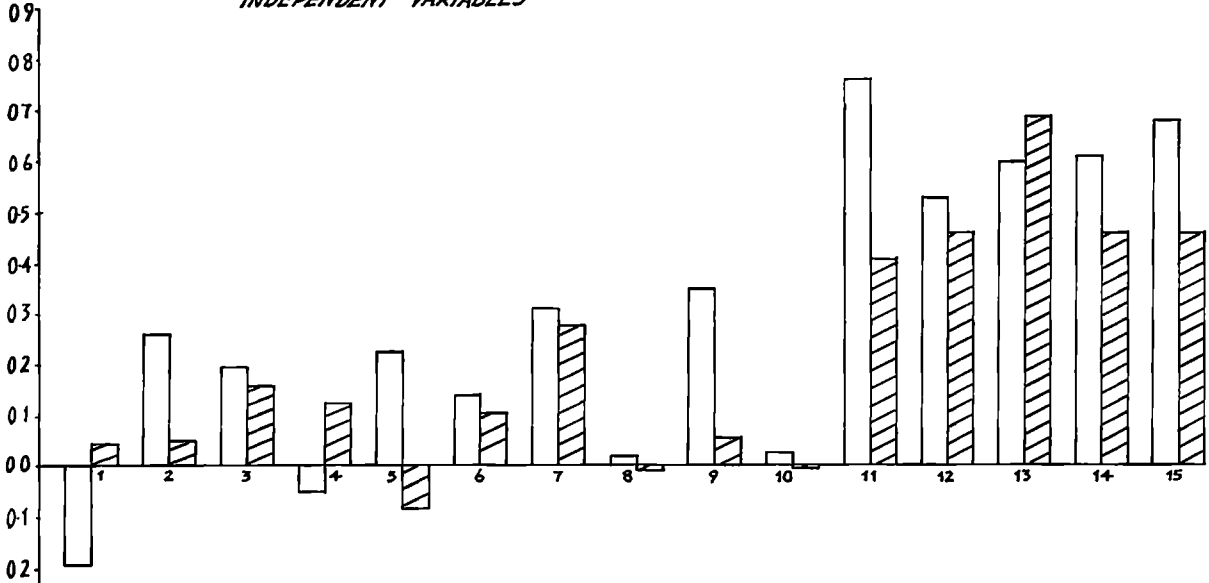
Sl. No.	Sesamum		Cowpea	
	Category	Percentage of farmers	Category	Percentage of farmers
1.	Below mean	57.33	Below mean	57.33
2.	Above mean	42.67	Above mean	42.67
	Mean score	20.28	Mean score	26.01

The table 42 shows that 57.33 per cent of sample farmers had attitude scores below mean. The mean attitude score of sesamum farmers was 20.21 and mean attitude score of cowpea farmers was 26.01.

IV. A. Relationship of selected characteristics with adoption of improved practices of sesamum and cowpea

The results of correlation analysis to find out the relationship of the selected independent variables with adoption of recommended practices of sesamum and cowpea; are presented in Table 43. Diagramatic representation of results of correlation was given in Fig. III.

FIG III CORRELATION BETWEEN EXTENT OF ADOPTION AND SELECTED INDEPENDENT VARIABLES



1 AGE
2 EDUCATION
3 ANNUAL INCOME
4 OCCUPATION
5 FARM SIZE
6 SOCIAL PARTICIPATION
7 SCIENTIFIC ORIENTATION
8 ECONOMIC MOTIVATION
9 RISK ORIENTATION
10 INNOVATIVENESS
11 INFORMATION SOURCE UTILISATION
12 INFRASTRUCTURAL FACILITIES
13 KNOWLEDGE ABOUT PRACTICES
14 PERCEPTION ABOUT PRACTICES
15 ALTITUDE

□ COWPEA
▨ SESAMUM

Table 43. Correlation between dependent variable and independent variables (r values)

Independent variables		Adoption of Improved Practices	
		Cowpea	Sesamum
Age	X_1	-0.1998	0.0453
Education	X_2	0.2698*	0.0481
Annual income	X_3	0.1913	0.1687
Occupation	X_4	-0.0537	0.1317
Farm size	X_5	0.2241	-0.0948
Social participation	X_6	0.1388	0.1010
Scientific orientation	X_7	0.3089**	0.2722*
Economic motivation	X_8	0.0165	-0.0059
Risk orientation	X_9	0.3426*	0.0601
Innovativeness	X_{10}	0.0264	-0.0049
Information source	X_{11}	0.6517**	0.4028**
Infrastructural facilities	X_{12}	0.5281**	0.4558**
Knowledge	X_{13}	0.5966**	0.6853**
Perception	X_{14}	0.6015**	0.4520**
Attitude	X_{15}	0.6799**	0.4352**

* Significant at 5% level

** Significant at 1% level

1. Age

From the table 43 it could be seen that age had no significant relationship with the adoption for both cowpea and sesamum farmers. A negative relationship, though not significant, was seen in respect of cowpea cultivation.

Based on the results, the null hypothesis Ho-1 was accepted.

2. Education status

Education had positive relationship with extent of adoption in both the group of farmers. But the relationship was not significant in respect of sesamum cultivators.

Hence, the null hypothesis Ho-2 was rejected in the case of cowpea farmers and it was accepted in the case of sesamum farmers.

3. Annual Income

The table 43 indicates that there was no significant relationship between annual income and extent of adoption of cowpea and sesamum.

The null hypothesis Ho-3 was accepted for cowpea and sesamum farmers.

4. Occupational Status

No significant relationship was seen between the occupational status and extent of adoption for both the group of farmers. So the null hypothesis Ho-4 was accepted.

5. Farm size

The table 43 shows no significant relationship of farm size and adoption of practices of sesamum and cowpea farmers.

The null hypothesis Ho-5 was accepted.

6. Social participation

The table 43 indicates that there was no significant relationship between social participation and the dependent variable under study.

Based on this result, the null hypothesis Ho-6 was accepted.

7. Scientific Orientation

Table 43 reveals a positive and significant relationship of scientific orientation with the extent of adoption.

The null hypothesis Ho-7, for both the groups of farmers, was rejected.

8. Economic Motivation

There was no significant association between economic motivation and extent of adoption of recommended cowpea and sesamum practices by the respondents.

Hence, the null hypothesis Ho-8 was accepted.

9. Risk Orientation

It is evident from table 43, that in the case of cowpea farmers, there was significant positive relationships of risk orientation and extent of adoption; while, though the relationship is positive, it was not significant in the case of sesamum farmers.

Based on this result, the null hypothesis Ho-9 was rejected for cowpea growers and accepted for sesamum growers.

10. Innovativeness

Table 43 shows no significant association of innovativeness of farmers and extent of adoption of cowpea and sesamum cultivation practices.

The result justifies the acceptance of null hypothesis Ho-10.

11. Information source utilisation

Table 43 reveals positive and highly significant

relationship, between information source utilisation of farmers and their extent of adoption of recommended practices.

The null hypothesis Ho-11 was rejected.

12. Infrastructure facilities

The 'r' values in table 43, indicates a positive and highly significant relationship between infrastructural facilities and extent of adoption of practices.

The result supports the rejection of null hypothesis Ho-12 for cowpea and sesamum farmers.

13. Knowledge level of farmers

Table 43 shows positive and highly significant relationship of knowledge and extent of adoption of sesamum and cowpea practices of farmers.

Result justifies the rejection of null hypothesis, Ho-13 for sesamum and cowpea farmers.

14. Perception about practices

Correlation results indicate that there was highly significant positive relationship between farmers' perception about various practices and extent of adoption.

The null hypothesis Ho-14 was rejected based on the results.

15. Attitude towards improved practices

Table 43 showing results of correlation analysis, indicates highly significant and positive relationship between attitude of farmers towards improved practices and extent of adoption for both cowpea and sesamum growers.

So the null hypothesis Ho-15 was rejected for both sesamum and cowpea farmers.

IV. B. Inter correlation among independent variables

Coefficients of correlation among the independent variables selected for the study were computed to test interrelationships among the 15 independent variables, pertaining to the farmer respondents. The correlation coefficients are furnished in Table 44 and Table 45 for sesamum and cowpea farmers respectively.

In the case of sesamum farmers, Age (X_1) was found to be correlated negatively and significantly with 'Education' and 'Risk-Orientation'. Education (X_2) was found to be correlated positively and significantly with 'Annual income', Occupational status, Social participation, Information source utilisation, infrastructure facilities,

Table 44 Intercorrelation matrix of selected variables for sesamum farmers

X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}
1 0000														
-0 2815	1 0000													
0 2097	0 3045	1 0000												
0 1224	0 3368	0 2492	1 0000											
0 0160	0 284	0 2050*	0 1817	1 0000										
0 0097	0 4135	0 1456	0 0924	0 1393	1 0000									
0 2199	0 1833	0 0425	0 0799	-0 0321	0 1165	1 0000								
0 1254	0 0595	-0 0100	-0 1372	0 0024	0 1193	0 3087*	1 0000							
0 3266*	0 1636	0 0489	-0 1053	0 1689	0 2246	0 1192	0 3080*	1 0000						
0 1084	0 1494	0 0426	0 1608	0 0948	0 1716	0 2407*	0 1503	0 5219	1 0000					
-0 1543	0 2572	0 1682	0 1836	0 0348	0 1572	0 4382*	0 2188	0 2398	0 1045	1 0000				
-0 0703	0 3668	0 2680	0 0665	0 0779	0 2011	0 1308	0 1668	0 0292	-0 0051	0 4022	1 0000			
0 1528	0 2023*	0 2716*	0 0428	0 0025	0 1825	0 4571*	0 0686	0 2080	0 0368	0 5400*	0 3467	1 0000		
0 0644	0 3040	0 0347	0 1498	0 1437	0 3219*	0 2713*	0 0656	0 0296	0 0617	0 2239	0 4102	0 4043*	1 0000	
0 0774	0 1395	0 0723	0 0410	-0 1037	0 1392	0 3864*	0 0313	0 1001	0 1522	0 3985	0 1600	0 5169*	0 4542*	1 000
0 0453	0 0481	0 1687	0 1317	-0 0848	0 1010	0 2722*	-0 0059	0 0601	-0 0049	0 4026*	0 4558	0 5853*	0 4520*	0 4352*

X_1 Age
X_2 Education status
X_3 Annual Income
X_4 Occupational status
X_5 Farm size
X_6 - Social participation
X_7 - Scientific orientation
X_8 - Economic motivation
X_9 Risk orientation
X_{10} Innovativeness
X_{11} - Information source utilisation
X_{12} - Infrastructure facilities
X_{13} Knowledge of farmers
X_{14} - Perception about practices
X_{15} Attitude towards improved practices
Y_1 Extent of Adoption

Table 45 Intercorrelation matrix of elected variables for cowpea farmers

X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}
1 0000														
0 2882	1 0000													
0 0309	0 2553*	1 0000												
0 1174	0 2657*	0 2438+	1 0000											
0 1275	-0 0023	0 2760	0 0912	1 0000										
0 0296	0 2360	0 0099	0 0801	0 0057	1 0000									
-0 0314	0 1612	-0 0543	0 0497	0 1455	0 2541	1 0000								
0 0825	0 0659	0 0716	0 0586	0 1727	0 2251	0 1801	1 0000							
0 2299	0 1728	0 1751	-0 0804	0 1437	0 0798	0 3464*	0 3422*	1 0000						
0 0200	0 0738	0 0617	0 0249	0 1758	0 1145	0 1822	0 1434	0 2399*	1 0000					
-0 0707	0 2635*	0 1014	0 0885	0 3283*	0 2589	0 3602*	0 1630	0 4960*	0 2386*	1 0000				
0 2414*	0 2424*	0 0631	0 0831	0 1435	0 1479	0 2567*	-0 1768	0 1949	0 1891	0 5922*	1 0000			
0 1240	0 4086*	0 2500*	0 2137	0 1613	0 1430	0 3734*	0 0649	0 2441*	0 2128	0 5120*	0 4410*	1 0000		
-0 0655	0 2827*	0 1878	0 1325	0 2611*	0 2246*	0 4152*	0 2310*	0 2164	0 1488	0 4844*	0 4823*	0 4288*	1 0000	
0 0810	0 1169	0 2702	0 0563	0 1620	0 0945	0 2204*	0 1539	0 3114*	0 2021*	0 5363*	0 5529*	0 2086*	0 6828*	1 0000
0 1998	0 2698*	0 1913	0 0537	0 2241	0 1389	0 3039*	0 0165	0 3426*	0 0264	0 6517	0 5281*	0 2966	0 6015*	0 6799*

X_1 - Age
X_2 - Education status
X_3 - Annual Income
X_4 - Occupational status
X_5 - Farm size
X_6 - Social participation
X_7 - Scientific orientation
X_8 - Economic motivation
X_9 - Risk orientation
X_{10} - Innovativeness
X_{11} - Information source utilisation
X_{12} - Infrastructure facilities
X_{13} - Knowledge of farmers
X_{14} - Perception about practices
X_{15} - Attitude towards improved practices
Y_1 - Extent of Adoption

knowledge and perception. Annual income (X_3) was found to be correlated negatively and significantly with occupation and correlated positively and significantly with farm size, information source utilisation and infrastructure facilities. Occupational Status (X_4) was found to have no significant correlation with any other independent variable, other than education and annual income.

Farm size (X_5) was found to have no correlation with any of the independent variables selected for the study. Social participation (X_6) was found to be correlated significantly with perception only. Scientific orientation (X_7) was found to be correlated significantly and positively with risk orientation, innovativeness, information source utilization, perception and attitude of farmers towards improved practices. Economic motivation (X_8) was found to be correlated positively and significantly with risk orientation only. Risk orientation (X_9) was found to be correlated positively and significantly with innovativeness and information source utilisation. Innovativeness (X_{10}) was found to be correlated with none of the variables. Information source utilization (X_{11}) was found to be correlated with infrastructural facilities, knowledge, perception and attitude towards improved practices. Infrastructure facilities (X_{12}) was found to be correlated positively and significantly

with knowledge and perception. Knowledge (X_{13}) was found to be correlated positively and significantly with perception and attitude. Perception (X_{14}) was found to be correlated significantly with attitude.

In the case of coupea farmers, Age (X_1) was found to be correlated with education, risk orientation and infrastructure facilities negatively and significantly. Education (X_2) was found to be correlated with annual income, occupational status, social participation, information source utilisation, infrastructure facilities, knowledge and perception of which only occupation was correlated negatively and significantly. Annual Income (X_3) was found to have negatively significant correlation with occupational status and positively significant relationship with farm size, knowledge and attitude towards improved practices. Occupational status (X_4) was found to be correlated with none of the variables. Farm size (X_5) was found to have positive and significant correlation with information source utilization and perception. Social participation (X_6) was found to have positive significant relationship with scientific orientation, information source utilisation and perception. Scientific orientation (X_7) was related positively and significantly with risk orientation, information source utilisation, infrastructure facilities, knowledge, perception and attitude towards improved practices.

Economic motivation (X_8) had positive and significant relationship with risk orientation and perception. Risk orientation (X_9) had positive significant relationship with innovativeness, information source utilization, knowledge and attitude. Information source utilization (X_{11}) was found to have positive significant relationship with infrastructure facilities, knowledge, attitude and perception. Infrastructure facilities (X_{12}) was found to have positive significant correlation with knowledge, perception and attitude towards improved practices. Knowledge (X_{13}) had positive and significant relationship with perception and attitude. Perception (X_{14}) had positive relationship which was significant with attitude.

IV. C. Direct and indirect effects of causative factors

The results of correlation analysis showed that, out of the 15 independent variables selected for the study only six variables were correlated significantly with the extent of adoption of practices of sesamum and eight variables were found to be correlated significantly in the case of cowpea. Eventhough 'education' was also found to be significantly correlated with extend of adoption of cowpea farmers, as its correlation coefficient value was very low, it was not considered for path analysis. Path analysis was done to find out the direct and indirect effects of these variables.

The direct and indirect effects of the variables are given in Table 46 and Table 47 for sesamum and cowpea respectively.

Table 46. Results of path analysis showing direct and indirect effects of independent variable on extent of adoption of sesamum farmers

Independent Variables	X_7	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	Correlation coefficient (Total)
X_7	-0.03689	0.01570	0.03092	0.16919	0.03893	0.05434	0.2722
X_{11}	-0.01616	0.03584	0.09508	0.19988	0.03213	0.05604	0.4028
X_{12}	-0.00462	0.01441	0.23639	0.12833	0.05686	0.02263	0.4558
X_{13}	-0.01686	0.01935	0.08196	0.37014	0.05801	0.07269	0.6853
X_{14}	-0.01001	0.00802	0.09697	0.14965	0.14349	0.06388	0.4520
X_{15}	-0.01425	0.01428	0.03804	0.19133	0.06517	0.14064	0.4352

X_7 - Scientific Orientation
X_{11} - Information source utilisation
X_{12} - Infrastructure facilities
X_{13} - Knowledge
X_{14} - Perception
X_{15} - Attitude

Table 47. Results of path analysis showing direct and indirect effects of independent variables on extent of adoption of cowpea farmers

Independent Variables	X_7	X_9	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	Total (r values)
X_7	-0.06349	0.01179	0.10340	0.00480	0.08810	0.07335	0.09095	0.3089
X_9	-0.02199	0.03404	0.14238	0.00395	0.05759	0.03823	0.08340	0.3426
X_{11}	-0.02287	0.01688	0.28706	0.01201	0.12080	0.08559	0.15224	0.6513
X_{12}	-0.01503	0.00663	0.17000	0.02028	0.10426	0.08521	0.15675	0.5281
X_{13}	-0.02371	0.00831	0.14698	0.00896	0.23593	0.07576	0.14438	0.5966
X_{14}	-0.02636	0.00737	0.13905	0.00978	0.10117	0.17667	0.19303	0.6015
X_{15}	-0.02034	0.01060	0.15395	0.01120	0.11990	0.12063	0.28382	0.6799

X_7 = Scientific Orientation
X_9 = Risk Orientation
X_{11} = Information source utilisation
X_{12} = Infrastructure facilities
X_{13} = Knowledge
X_{14} = Perception
X_{15} = Attitude

From the table 46 it could be seen that maximum direct effect, in the case sesamum farmers, was found for X_{13} (knowledge 0.37014) followed by X_{12} (Infrastructure facilities 0.23639). The direct effect of scientific orientation was found to be negative (-0.03689). The direct effect of information source utilisation, perception and attitude towards improved practices; were 0.035334, 0.14349 and 0.14064 respectively.

The indirect effect on extent of adoption by scientific orientation was seen channelled mainly through the variable X_{13} (knowledge about improved practices 0.16919). The indirect effect of information source utilization was also mainly routed through knowledge of improved practices X_{13} (0.19988). Again the variables like infrastructure facilities, perception and attitude towards improved practices were found to be routed through X_{13} - knowledge of improved practices mainly. The corresponding indirect effects are 0.12833, 0.14965 and 0.19133 respectively. The indirect effect of the variable knowledge of improved practices - X_{13} was found to be routed through X_{12} - infrastructure facilities (0.08196).

The table 43 reveals that the highest direct effect among the independent variables selected for path analysis on extent of adoption of practices in cowpea was for information source utilization (0.28706) and the indirect effect

was highest for the variable X_{12} = infrastructure facilities (0.50782).

The direct effect of scientific orientation on extent of adoption of improved practices of cowpea was very low and negative (-0.06349). The indirect effect was routed through "Information source utilization" (X_{11}, 0.10340). Its total indirect effect was 0.37239, which was much higher than its direct effect.

The direct effect of risk orientation on extent of adoption of improved practices was 0.03404 which was very low. The indirect effects of this variable was also mainly routed through the variable X_{11}, information source utilization (0.14238). The total indirect effect of this variable (0.30856) was considerably higher than the direct effect.

The total direct effect of the information source utilization was found to be 0.28706. Its indirect effects were mainly routed through "Attitude-X_{15}" (0.15224) and "Knowledge-X_{13}" (0.12080). The total indirect effect was 0.36464.

The total direct effect of the infrastructural facilities was 0.02028 which was the lowest direct effect on extent of adoption of improved practices of cowpea cultivation. Its indirect effects on extent of adoption were routed

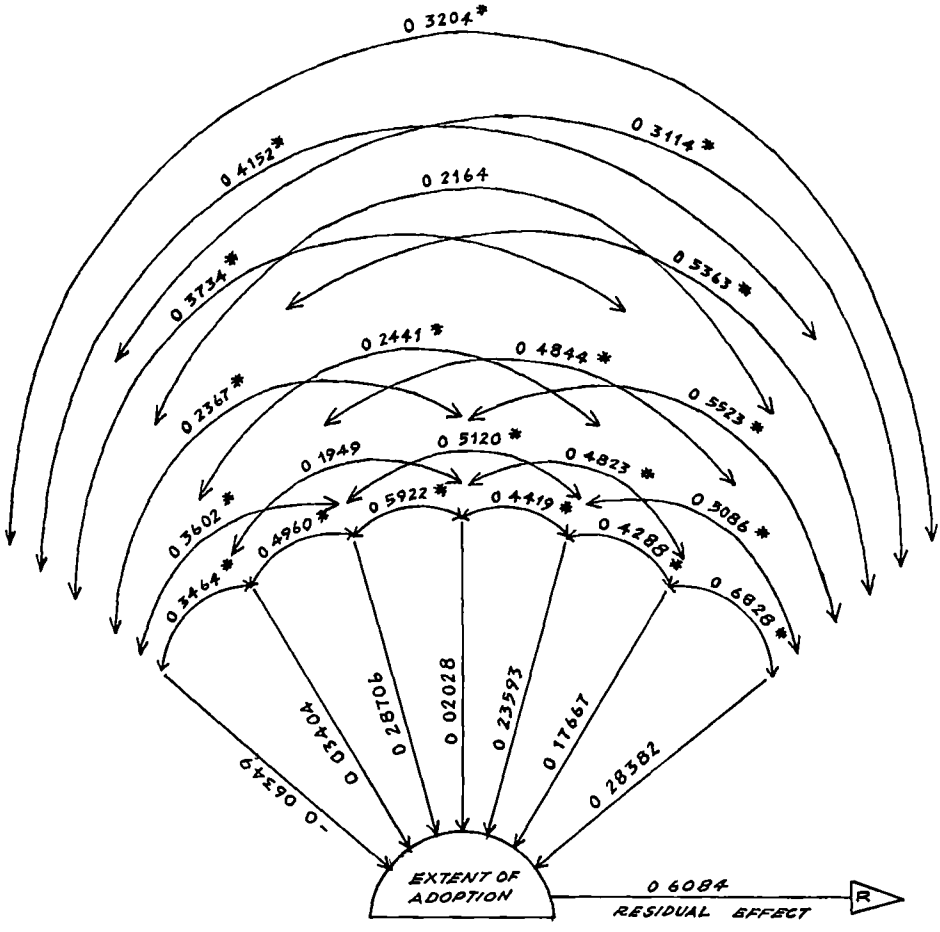
through variables; X_{11}-information source utilization (0.17), X_{15}-Attitude towards improved agricultural practices (0.15675) and X_{13}-knowledge (0.10426). The total indirect effect of this variable was the highest among all other variables i.e., 0.50782.

The total direct effect of knowledge was found to be 0.23593. The indirect effect of this variable was mainly routed through X_{11}. Information source utilization (0.14690) and X_{15}-Attitudes towards improved agricultural practices (0.13905). The indirect effect of this variable was 0.36068, which was slightly higher than its direct effect.

The direct effect of perception on the extend of adoption was 0.17667. The indirect effect was routed mainly through variables like; X_{16}-Attitude towards improved practices (0.19383), X_{11}-Information source utilization (0.13905) and X_{13}-Knowledge of improved practices (0.10117). The indirect effect of this variable on extent of adoption was 0.42484 which was considerably higher than its direct effect.

The direct effect of Attitude on extent of adoption was 0.28382. Its indirect effects were mainly routed through X_{11}-Information source utilization (0.15395), X_{14}-Perception (0.12063) and X_{13}-Knowledge (0.1190). The total direct effect was 0.39594 which was slightly higher than its direct effect.

FIG V PATH DIAGRAM OF THE SELECTED INDEPENDENT VARIABLES OF COWPEA FARMERS

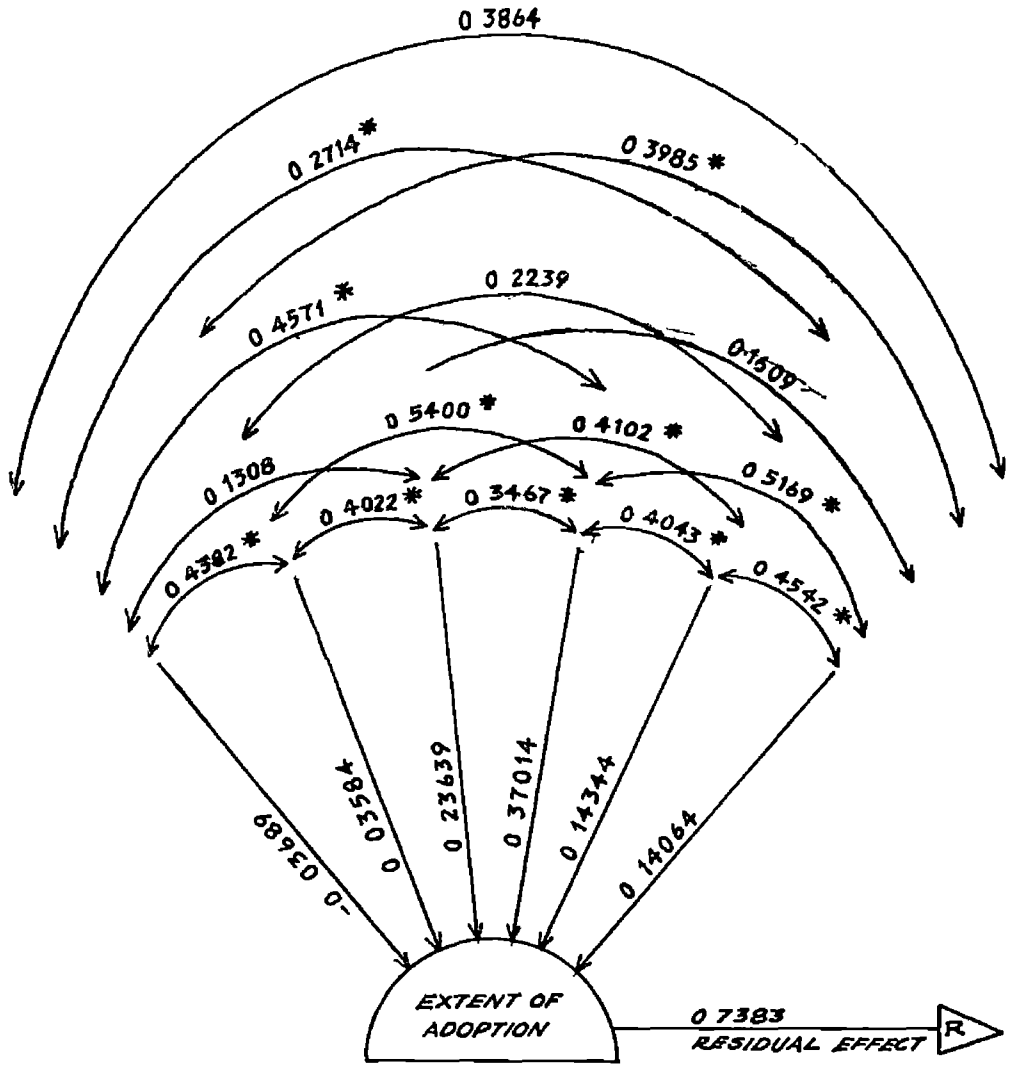


⟶ DIRECT EFFECT

⟷ CORRELATION AMONG CHARACTERS

* SIGNIFICANT AT 5/ LEVEL

FIG IV PATH DIAGRAM OF THE SELECTED INDEPENDENT VARIABLES OF SESAMUM FARMERS



→ DIRECT EFFECT

↔ CORRELATION AMONG CHARACTERS

* SIGNIFICANT AT 5/ LEVEL

It was revealed that knowledge about improved practices, Attitude towards improved practices and information source utilization had direct as well as indirect effects on determining the extent of adoption, whereas infrastructure facilities, scientific orientation, perception, attitude towards improved practices and risk orientation had high indirect effects through other variables, in determining the extent of adoption. We can thus conclude that direct effect was highest for information source utilization and the maximum indirect effect was for infrastructural facilities, on the extent of adoption of improved practices recommended by Kerala Agricultural University for cowpea.

The diagramatic representation of the results of path analysis of sesamum and cowpea farmers are given in Fig. IV and Fig. V respectively.

IV. Constraints in the cultivation of cowpea and sesamum as perceived by farmers and their suggestions of solutions

The data regarding the constraints experienced by farmers in adopting the different recommended practices are presented below:-

The constraints perceived by farmers are given in Table 48.

Table 48. Constraints perceived by farmers in adopting HYV of sesamum and cowpea

Sl. No.	Constraints	Percentage of farmers	
		Sesamum	Cowpea
1.	Lack of timely and adequate availability of seed	63.3	67.6
2.	Lack of knowledge about high yielding varieties of sesamum/cowpea	32.6	71.7
3.	Perfect management is needed for high yielding varieties which needs more investment, unlike local varieties	31.2	40.5
4.	Lack of interest among farmers	29.9	27.1
5.	Low germination of high yielding varieties	22.3	24.7
6.	Lack of soil moisture	23.4	20.8
7.	Lack of consistent yield of high yielding variety	21.4	18.1

2. Application of Organic Manure

The constraints perceived by the farmers, in adopting organic manure as recommended were the following:-

Table 49. Constraints perceived by sesamum farmers in adopting organic manure

Sl. No.	Constraints	Percentage of farmers
1.	Difficulty in transporting	83.6
2.	Lack of knowledge about recommended dose	81.4
3.	Lack of adequate and timely availability	75.3
4.	High cost of organic manure	67.5
5.	High labour need to transport organic manure	46.2

3. Adoption of chemical fertilizers

The farmers perceived the following major constraints in adopting recommended dose of chemical fertilizers.

Table 50. Constraints perceived in adopting chemical fertilizers

Sl. No.	Constraints	Percentage of farmers	
		Sesamum	Cowpea
1.	High cost of fertilizers	74.0	80.0
2.	Lack of soil moisture	58.1	44.2
3.	Perception that cowpea and sesamum needs only residual fertilizers of previous crop	37.6	38.4
4.	Lack of timely availability	58.6	48.0
5.	Lack of credit in time	24.8	19.7
6.	Perception that once the chemical fertilizers are applied that field will need continuous application of chemical fertilizers	20.1	17.0

4. Plant Protection Measures

For adopting plant protection measures, the perceived constraints were:

Table 51. Constraints in adopting plant protection measures

Sl. No.	Constraints	Percentage of farmers	
		Cowpea	Sesamum
1.	Lack of knowledge about recommended dose of chemicals	91.6	86.7
2.	Lack of skill in spraying	93.4	92.5
3.	Lack of availability of sprayers in time	91.6	93.3
4.	High cost of chemicals	62.7	69.3
5.	Difficulty in getting insecticides in small quantities	51.2	43.4

Other constraints were high cost of chemicals, lack of availability of proper plant protection equipments and difficulty in getting insecticides in small quantities.

5. Rhizobium culture treatment

During the survey the following constraints were observed, which hinders adoption of rhizobium culture treatment.

Table 52. Constraints in adopting Rhizobium Culture Treatment for cowpea

Sl. No.	Constraints	Percentage of farmers
1.	Lack of knowledge	100
2.	Lack of proper guidance	100
3.	Lack of timely and adequate availability	100
4.	Lack of conviction among farmers	100

6. Lime application for cowpea

Almost hundred per cent of the farmers were found to have lack of knowledge and lack of conviction, in adopting lime application for cowpea.

7. The other general constraints perceived by farmers are listed below:

1. High labour charge and labour inefficiency (100 %)
2. Unfavourable climate (86.3 %)
3. Pests and diseases of cowpea (84.5%)
4. Storage of seeds difficult (73.3%)
5. Research and extension activities are highly focussed on cereals and cash crops (45.4 %)
6. Construction of canals, roads etc. across the field which resulted in increased acidity and lack of drainage (47.8%)
7. Power shortage at the time of harvest of sesamum, for the extraction of oil in mills (31.3 %)
8. Pods of Kayamkulam-2, do not mature uniformly so yield will be reduced (16.1%)

The important suggestions of solutions proposed by farmers were:

1. Timely and adequate supply of inputs.
2. Intensive measures, using various media, should be taken to transfer farm informations to farmers.
3. Sufficient demonstration plots should be there for package of practices.
4. Arrangements should be made for timely and adequate availability of organic manure.
5. Varieties that can thrive climatic variations are needed.
6. Minor water harvesting techniques should be improved; eg. ponds, canals etc.
7. Cost of inputs and price of produce should be balanced by proper policies.
8. Low cost technology should be evolved.
9. Mechanisation should be made in co-operative basis.
10. Viable farming should be made possible with subsidiary occupation based on the agricultural products.

DISCUSSION

CHAPTER V

DISCUSSION

The discussion on the findings of the study is presented under the following heads:

1. Extent of adoption of practices.
2. Communication and infrastructural factors affecting extent of adoption of practices.
3. Selected characteristics of farmers and their relationship with adoption.
4. Intercorrelation of selected independent variables.
5. Constraints in the adoption of recommended practices of sesamum and cowpea.

1. Extent of adoption of practices

The study revealed that there was significant difference in the extent of adoption of practices among the two crops studied viz. cowpea and sesamum.

The analysis of data showed that mean adoption score of sesamum (45.33) was higher than the mean adoption score for cowpea (30.88). The data also showed that the maximum adoption score for sesamum was 90 and for cowpea it was 70. Sesamum is a traditional crop of the study area. But cowpea was not cultivated traditionally in this region. During the survey, most of the farmers indicated that sesamum is more

profitable than cowpea. So it is natural that the sesamum farmers adopted more practices than in cowpea, to increase their income. But in cowpea almost 30 per cent of the farmers had adoption score below 20. This might be due to the fact that high yielding variety seeds of cowpea are not easily available as seeds of new sesamum varieties.

Only 25.33 per cent of sesamum farmers and 16 per cent of cowpea farmers adopted fully high yielding varieties in their field, while 45.33 per cent of sesamum farmers and 52 per cent of cowpea farmers partially adopted new varieties. This clearly indicates that non-availability of adequate quantity of seeds is a factor which limit its adoption, which was stated by 63 per cent of farmers as a constraint. But correct seed rate was adopted by 80 per cent of cowpea farmers and 73.33 per cent of sesamum farmers. The studies of Balasubramaniam (1985), Bhaskaran and Praveene (1982), Satapathy (1981) and Thiagarajan (1981) also showed that majority of the farmers adopted high yielding varieties of pulses and oilseeds and their correct seed rate.

The data further indicates that only 4 per cent of sesamum farmers adopted plant protection measures, while 29.33 per cent of cowpea farmers fully adopted plant protection measures. This may be because, cowpea was infested by a number of pests and diseases unlike sesamum. It can

be seen from the data, that non-adopters of chemical fertilizers was almost same (35%) for both the groups, but full adopters was 18 per cent for sesamum and 22.67 per cent for cowpea. Low level of soil moisture and high cost of fertilizers play a crucial role here.

Lime application and rhizobium culture treatment are two important practices recommended by Kerala Agricultural University for cowpea. But the adoption levels were the least for these two practices. This might be due to the fact that farmers are not convinced about these practices, when compared to other practices like HYV, chemical fertilizers etc. The data also showed that less than 3 per cent of farmers only had knowledge about these practices. Satapathy (1981) observed 100 per cent non-adoption of rhizobium culture treatments of pulses. All the respondents were ignorant about the use of rhizobium culture. Besides, the researcher also noticed non-availability of rhizobium culture, at the time of survey, eventhough it was sowing time for cowpea.

Eventhough only 20 per cent of the farmers applied recommended dose, a total of 93.33 per cent of the farmers applied organic manure in their field. Farmers reported that they applied chemical fertilizers to make the inadequacy of organic manure. More than 75 per cent of farmers reported

that there was not enough organic manure to be applied. They also reported the high cost of transporting the organic manure as a reason for not adopting the full recommended dose.

2. Communication and Infrastructural Factors affecting adoption

A. Communication factors

It was observed that the most frequently used source of farm information was "Other farmers" (97.33%). The result of the study by Amalraj and Prasad (1984) indicated that only 24.2 per cent of the farmers used "Other farmers" as a source of information, which is not in line with the findings of this study. The predominant use of "Other farmers" was also in confirmity with the studies of Mathur and Singh (1974) and Salunkhe et al. (1975). Almost 95 per cent of the farmers reported that they consulted other farmers as they attach high credibility to this source. Farmers like sharing of ideas and experiences with his peer group members.

Ninety per cent of the sample farmers reported using newspapers as their source of information, which may be unique to Kerala, due to its exceptionally high literacy level. In Onattukara region the literacy level was 74 per cent. The high percentage of use of newspapers was mainly

due to the exclusive "Karshikarangam" page in Malayalam dailies. Forty one per cent of the farmers regularly used newspapers to get farm information, but those who listen radio regularly for information was only 13.33 per cent. But studies by Qureshi and Chaudhary (1978), Jagne and Patel (1981) and [illegible] revealed that radio was used by majority of farmers. The effective media television, exhibition, demonstration and training were used only by a few farmers; mainly due to the lack of availability and accessibility.

Fertilizer/pesticide dealers were consulted for farm informations by 70.67 per cent of sample farmers. Amalraj and Prasad (1984) also indicated use of fertilizer/pesticide dealers as one of the main source of information by farmers.

B. Infrastructure facilities

Infrastructure facilities are necessary components which triggers the adoption of practices. The perception of farmes about the existing facilities differ considerably. There was no significant variation in perception between the two groups of sesamum and cowpea farmers.

It was found that the availability of seeds was inadequate. The farmers are not getting the quantity of seed of new varieties they need. Seed is the cornerstone

around which the new technology is built. The availability of requisite quantity of seed is possible only when there is well organised set up among the farmers itself, for production and distribution. Location specific research should also try to evolve improved strains of seeds, appropriate to that situation. The NIRD workshop on Management of Transfer of Farm Technology (1981) also reported that supply of seeds was inadequate.

The data also indicate that, majority of the farmers perceived that the fertilizers and pesticides are not available at reasonable cost, though 65-75 per cent of them reported adequate availability. Almost 65 per cent of the sample farmers perceived that pesticides available are of good quality. Forty eight to fifty nine per cent of farmers reported timely availability of fertilizers, while 70-80 per cent reported timely availability of pesticides. The fertilizer/pesticide organisation had a strong net work of field workers to advertise and make available the products.

Only a small percentage (5-9%) of farmers perceived timely and adequate availability of good quality plant protection equipments. Farmers pointed out that the only source of plant protection equipments, is the Krishibhavan. Here, proper and timely repair works are not being done and most of the Krishibhavan had only 2-5 sprayers in good condition.

Thirty to thirty five per cent of the sample farmers perceived adequacy, reasonable interest rate and easy availability of credit, but only 22-24 per cent perceived timely availability of credit. Gurcharan (1966) and Thangavelu (1979) in their study pointed out the importance of timely credit in adoption of improved practices.

High labour charge and inefficiency of labourers were perceived by cent per cent of the sample respondents and only a few farmers reported timely and adequate availability of labourers. Thus labour has emerged as an important factor which inhibits the initiative of farmer to increase the production.

Cent per cent of sesamum farmers indicated that they marketted their produce to middle men. Other marketting channels were not available. Palanyswamy (1974) study supports this result.

3. Selected farmer characteristics and their relationship with adoption

1. Age

It was found that only a few farmer respondents were below 40 years of age. This may be due to the lack of enthusiasm of young generation to take up agriculture as their occupation.

Age had no significant relationship with the adoption behaviour of farmers in both the groups. The finding of this study was in conformity with Dudhani et al. (1987) and Sivaramakrishnan (1981). The result of studies by Krishnamoorthi (1984) and Ogunfiditimi (1981) were contradictory. But in this study a negative relationship was observed in respect of cowpea, while a positive relationship in case of sesamum farmers. This might be due to the fact that sesamum is a crop traditional of this area and cowpea is not as common as sesamum. So the old farmers will be resistant to accept the new farming practices of cowpea.

2. Education status

Majority of the farmers in this area had high school education and above. It was revealed that education had significant positive relationship with extent of adoption of cowpea practices. Though there was a positive relationship in case of sesamum farmers it was not significant. Mohanakumar (1985), Manivannan (1980), Pongle (1984), Chorian (1984), Chandrakanden (1973), Grewal & Sohal (1971), Kamble (1973), Naik (1981), Perumal (1970) and Vellapandian (1974) supports the significant relationship and studies of Abdul (1987), Bhaskaran (1978) and Mathur and Singh (1974) supports the non significant relationship.

3. Annual Income

Annual income showed no significant relationship with extent of adoption. Majority of the farmers had annual income below Rs.10,000. The result of this study was supported by Dudhani et al. (1987). But significant relationship was observed by Al-Mogel (1985), Molgaco et al. (1980) and Abdul (1987). Acceptance of technology would be decided by many factors. Annual income may not be always related with adoption of agricultural practices. The influence may vary depending upon the influence of other factors.

4. Occupational Status

Occupational status did not show any significant relationship with extent of adoption. Sixty four per cent of the farmers spent most of their time for farming. The result obtained by Bhaskaran (1978) supports the finding of this study. But Sengupta (1970), Rajendran (1978) and Balasubramanian (1985) indicate significant relationship of occupation and adoption of practices.

Farming requires much care and attention of crop plants. Though full time farmers spent most of their time in the field, their extent of adoption of improved practices will depend on many other factors like availability of

inputs at affordable cost, knowledge, positive attitude etc.

5. Farm size

Most of the farmers (40-60 per cent) had farm size below 100 cents. This is an indication that majority of sample farmers are marginal farmers. The result reveals a non significant relationship of farm size and extent of adoption. The result of this study is supported by Bhaskaran (1978), Koteswara Rao (1978), Qureeni and Chaudhary (1970), Jaiswal et al. (1970) and Abdul (1987). The farmer with more farm size, had their plots not as a contiguous unit, but highly fragmented. So the farmers may not be able to adopt new practices in a uniform manner. Also when farm size becomes big, more inputs and labour are needed, which are difficult to be met. So the farmers may become reluctant to adopt improved practices in the whole area they cultivate.

6. Social participation

Almost 80 per cent of sample farmers were members of co-operative societies. The result revealed a non significant relationship between social participation and extent of adoption. This result is supported by studies of Dudhani et al. (1982), Bhaskaran (1978) and Dupe and Salode (1975).

7. Scientific orientation

Forty five to fifty five per cent of the farmers were below the mean scientific orientation score of their respective group. The result indicated positive significant relationship of scientific orientation with extent of adoption. The result is in line with studies by Krishnamoorthi (1984), Manivannan (1980), Prasannan (1987), Beal and Sibley (1967), Supe and Salode (1975), Reddy and Kivlin (1968) and Wilson and Chaturvedi (1985). It is very logic that a farmer who is scientifically oriented will adopt improved cultivation practices more readily.

8. Economic motivation

Economic motivation of 60-67 per cent of the sample farmers were below the group mean score of economic motivation. The result showed non significant relationship of economic motivation and extent of adoption. Studies of Das and Sarkar (1970) and Prasannan (1987) supports the result of this study. Unlike other crops like paddy or coconut, sesamum and cowpea are being cultivated as a third crop or catch crop to utilise the residual nutrients and moisture. Many farmers use the produce for home consumption, especially cowpea. So it is natural that economic motivation had a lesser role in adoption of practices, in these cases.

9. Risk orientation

Fifty to sixty per cent of the farmers were below the group mean score of risk orientation. The result showed significant positive relationship of risk orientation and extent of adoption of cowpea and a non significant positive relationship with sesamum. Similar significant relationship was found also by Rajendran (1978), Ramachandran (1974), Cherian (1984), Earnest (1979), Jaiswal (1965), Naik (1961), Pillai (1983) and Tripathy (1977), Sharma and Nair (1974). But Sa.thivel (1979), Melgaco et al. (1981) and Prasannan (1967) revealed non significant relationships of risk orientation and adoption. Sesamum is being cultivated in Onattukara region as a routine and it is affected by risks like drought, pests and diseases etc. only to a limited extent, unlike in cowpea. This might be the reason of non significant relationship of risk orientation of sesamum farmers and their extent of adoption of improved practices.

10. Innovativeness

The result showed no significant association of innovativeness and extent of adoption. But Thilagaon.ar (1980), Haque and Ray (1983) and Ravi (1974) indicated significant relationship of innovativeness and extent of adoption. But the result of Pavichandran (1980) is in line

with the finding of this study. Innovativeness is not the only factor affecting adoption and it may not be related to adoption in all situations.

11. Information source utilisation

The result reveals, positive and highly significant relationship of information source utilisation and the extent of adoption. Results obtained by Krishnamoorthi (1984), Al-Mogel (1985), Jagne and Patel (1985), Osu (1980), Sakthivel (1979), Singh and Ray (1995), Singh and Singh (1970) and Shukla (1980) supports this finding. Only through various sources of information, could farmers acquire knowledge about improved practices of cultivation. So if the farmers are exposed to more sources, reinforcement of information will be more and his knowledge and attitude will become positive which will result in higher rate of adoption of new practices.

12. Infrastructural facilities

The result indicates a positive significant relationship of infrastructure facilities and extent of adoption. This finding is in line with the results obtained by Palaniswamy (1984) and Singh and Ray (1985). A farmer with positive attitude towards improved practices of cultivation may not be able to adopt, because of the lack of necessary

facilities. So if the needed inputs of good quality are available timely and adequately at reasonable cost farmers will naturally accept more innovations in farming.

14. Farmers knowledge level about improved farm practices

The findings of this study reveals significant and positive relationship of knowledge and extent of adoption. This was supported by Earnest (1973), Jha (1974), Kaleel (1978), Prasad (1978), Pillai (1978), Shukla (1980), Sinha & Ray (1985), Muthiah Mancharan (1979), Raj (1978), Rahim and Sharma (1983) and Sakthivel (1979). Knowledge is a predisposing factor for adoption. Modern technology involves more details. So if a farmer has proper knowledge he can evaluate the practice more logically and adopt it.

14. Perception about practices

This study reveals positive and significant relationship of perception and extent of adoption of farmers. This was supported by result of studies by Sakthivel (1979), Ray (1976), and Tripathi and Singh (1974). If a practice recommended is perceived as profitable, suitable to the local conditions and easy to practice, farmers will definitely adopt that practice.

15. Attitude towards improved practices

The findings indicates positive and significant relationship of attitude of farmers and extent of adoption of improved practices. The results obtained by Balan (1987), Mohanadasan (1979), Nair (1969), Pillai (1978), Somasundaram (1976), Surendran (1982), Samad (1979), Sinha and Ray (1985) and Shukla (1980) were in line with the result of this study. Farmer's attitude towards a practice will be dependent on many factors. A farmer with positive attitude will be inclined to adopt that practice.

4. Inter correlation and direct and indirect contribution of selected independent variable

Of the 15 selected variables for the study, scientific orientation and information source utilisation, and knowledge were found to be significantly related with maximum number of other variables in the case of sesamum farmers. In case of cowpea farmers education, scientific orientation, risk orientation, information source used, infrastructure facilities, perception and attitude were found to be significantly related with maximum number of other variables.

The indirect effect on extent of adoption, of the selected variables like scientific orientation, information source utilisation and infrastructure facilities, perception

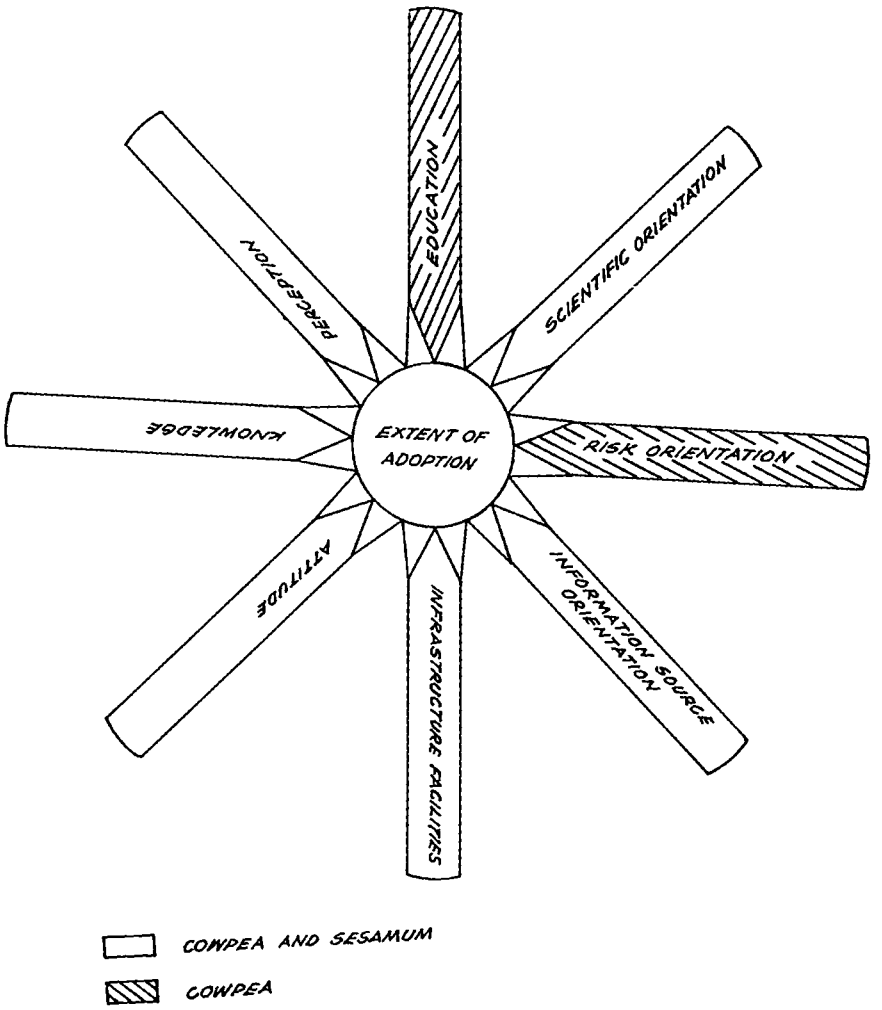
and attitude towards improved practices was mainly channelled through the variable knowledge about improved practices. While in the case of cowpea the indirect effect on extent of adoption of the selected variables was mainly routed through the variable "information source utilisation" and "knowledge about improved practices".

5. Constraints in the adoption of recommended practices of sesamum and cowpea

The major constraint in adopting high yielding variety seeds was lack of timely and adequate availability of seeds. The farmers also reported instability in yield of high yielding variety. These may be the reasons for low percentage (23%) of full adoption of high yielding variety by farmers. Kanwar (1975) also reported yield instability as a reason for non adoption.

Transporting difficulty and non availability were the most important constraints in regard to organic manure application. Only 20 per cent of sample farmers applied organic manure as per recommendation. High cost of chemical fertilizers was the most important constraint perceived by farmers. This was also reported by Nagabhushnam and Sasha (1981) and Thiagarajan (1981).

FIG VI EMPIRICAL MODEL OF THE STUDY



Lack of knowledge about recommended dose of chemicals, lack of skill in spraying and lack of availability of sprayers were major constraints in adopting plant protection measures. This was supported by the findings of Nagabhushnam and Basha (1981) and Ram (1980).

In the case of rhizobium culture treatment and lime application, lack of knowledge and lack of proper guidance and non availability of rhizobium culture were the major constraints in adopting these practices. The same reasons were indicated by Ram (1960) also.

SUMMARY

CHAPTER VI

SUMMARY

Farmers play the crucial role in increasing productivity of crops. Technology developed, unless timely transferred to farmers and accepted by them, becomes meaningless. Increasing agricultural productivity mainly depends on human motivation and without this there will be no solution.

Only a few studies have been undertaken about the technology acceptance by sesamum or cowpea farmers. In Kerala no research work has been undertaken on this aspect. In this context, the present study was undertaken with the following specific objectives:-

1. To ascertain the extent of adoption of improved agricultural practices by the pulses and oilseed farmers of Onattukara Tract.

2. To find out the communication and infrastructural factors influencing the adoption of messages of pulses and oilseed cultivation, in Onattukara tract.

3. To determine the relationship between various personal, socio-psychological, economic, infrastructural and communication variables and extent of adoption of

improved farm technology by the pulses and oilseed farmers in the region.

4. To study the constraints, if any, in adopting improved farm technologies, in oilseed and pulse cultivation of Onattukara region.

The study was confined in Onattukara region of Alleppey and Quilon districts. Two stage random sampling procedure was followed for selecting the cowpea and sesamum cultivating respondents for the study. One hundred and fifty farmers were selected for this study.

Extent of adoption of improved practices was the dependent variables for this study. On the basis of the review of relevant literature and pilot study, 15 independent variables viz. age, education status, occupational status, annual income, farm size, social participation, scientific orientation, economic motivation, risk orientation, innovativeness, information source utilization, infrastructure facilities, knowledge, attitudes towards improved practices and perception about improved practices were selected to establish their relationship with the dependent variable.

Extent of adoption was measured by using Adoption Quotient by Singh and Singh (1974). Age and farm size

(in cents) was taken as such. For education status, occupational status, annual income, information source utilization, infrastructure facilities, knowledge, perception and attitude towards improved practices - methods were developed. Scientific orientation, economic motivation and risk orientation were measured using the scale developed by Supe (1969) and innovativeness was measured by the scale of Foster (1968), modified by Prasad (1983).

The data collection was done through personal interview using a structured schedule developed for the purpose. Data were analysed using correlation and path analysis. The salient findings of the study are summarised and presented below:

1. Extent of adoption of practices recommended by Kerala Agricultural University was at a low level. For both sesamum and cowpea, majority of the farmers adopted correct seed rate. The important practices like plant protection for sesamum, lime application and rhizobium treatment for cowpea were the least adopted.

2. Regarding communication factors "Other farmers", followed by newspaper, radio, agricultural demonstrators and fertilizer dealers were the most used farm information sources.

3. Regarding infrastructural facilities majority of farmers perceived problems like inadequate availability of high yielding variety of seeds, high cost of chemicals, labour inefficiency, lack of timely and adequate labour availability, high labour charge, lack of timely credit, lack of timely availability of agricultural equipments like sprayers etc.

4. Age, annual income, occupational status, farm size, social participation, economic motivation and innovativeness of farmers had no significant relationship with extent of adoption.

5. Education status of cowpea farmers were found to be positively and significantly related with their extent of adoption. But in the case of sesamum farmers education was found to have positive relationship, but not significant.

6. Scientific orientation of the farmer respondents was positively and significantly related with adoption in the case of cowpea and sesamum farmers.

7. Economic motivation and innovativeness of the farmers were also not significantly related with adoption.

8. Risk orientation of cowpea farmers showed positive and significant relationship with the extent of adoption

of practices. It was not significant in the case of sesamum cultivators.

9. Variables such as information source utilization, infrastructure facilities, knowledge, perception about the practices and attitude towards improved practices showed highly significant positive relationship with the extent of adoption of practices of sesamum and cowpea.

10. The results of path analysis revealed that the maximum indirect effect, among the independent variables in the study, in the case of sesamum cultivators was by the variable "knowledge about the improved practices" followed by "attitude towards improved practices". In the case of cowpea farmers, the maximum indirect effect was routed through the variable "information source utilization" followed by the variable "knowledge about improved practices".

11. Among the constraints perceived by the farmers the most
    ir of adequate and timely availability
    of le climatic conditions, high cost
    of owledge, pests and diseases and
    di ations. (High labour charge, lack
    of quate availability and low labour
    in

12. Major suggestions of solutions according to the farmers were:- Arrangements for timely and adequate availability of inputs at affordable cost, mechanisation in co-operative basis and better and integrated marketing facilities involving co-operatives and civil supplies.

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APPENDIX-I

Transfer of Technology on Pulses and Oilseeds in The Onattukara Tract of Kerala

A. Schedule for sesamum farmers

Date:
Serial No:
Panchayat:

1. Name and address

2. Age (in completed years)

3. Education: Illiterate/Can read and write/primary school/ Middle school/High school/College

4. Annual Income: Below 5000/- (Rupees)
5000 - 10,000/-
10,000 - 15,000/-
More than 15,000/-

5. Please indicate the extent of time you spent for farming

Full time	Most often	Occasionally	Rarely

6. Area under sesamum cultivation _____ cents

Time of sowing	Variety used	Area cultivated

7. Are you a member/office bearer of any organisation(s)? (Co-operative society, co-operative society and other organisations, none)

Do you participate in meetings of organisations? Yes/No
If yes, how often? Often/Occasionally/Never

8. Scientific Orientation

Various opinions are there, regarding scientific agriculture. Give your opinion for the following statements.

Statements	Agree	Undecided	Disagree
1. New methods of farming give better results to a farmer than the old methods.			
2. The way of farming by our forefathers is still the best way to farm today.			
3. Even a farmer with lot of farm experiences should use new methods of farming.			
4. A good farmer experiments with new ideas in farming.			
5. Though it takes time for a farmer, to learn new methods in farming, it is worth the efforts.			
6. The traditional methods of farming have to be changed in order to raise the standard of living of a farmer.			

9. Economic Motivation

Agriculture is mostly profit oriented for many. Indicate your opinion about the statments given as follows:

Statements	Agree	Undecided	Disagree
1. A farmer should work towards larger yield and economic profits.			
2. The most successful farmer is one who makes the most profit.			
3. A farmer should try new farming idea which may earn him more money.			
4. A farmer should grow cash crops to increase monetary profits in comparison to growing of food crops for home consumption.			
5. It is difficult for the farmer's children to make good start, unless the provides them with economic assistance.			
6. A farmer must earn his living, but the most important thing in life cannot be defined in economic terms.			

10. Risk Orientation

Indicate your opinion about the following statements:-

Statements	Agree	Undecided	Disagree
1. A farmer should grow large number of crops to avoid greater risks involved 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 the average farmer usually does better financially.

4. It is good for a farmer to take risks when he knows his chance of success is fairly high.

5. It is better for a farmer not to try new farming methods unless most other farmers have used them with success.

6. Trying an essentially new method in farming by a farmer involves risk, but it is worth it.

11. Innovativeness

Please indicate your opinion regarding the following statements.

Statements	Yes	Undecided	No
1. Do you want to learn new ways of farming?			
2. If the agricultural extension worker gives a talk on improved cultivation aspects, would you attend?			

3. If the Government would help you to establish a farm elsewhere, would you move?

4. Do you want a change in your life?

5. A farmer should try to farm the way his parents did.

6. Do you want your sons to be farmers?

7. It is better to enjoy today and let tomorrow take care of itself.

8. The future of a man lies in the hand of God.

12. Information source utilisation

Please indicate the sources of information, its availability, according to your perception

	Frequency of use		
	Often	Occasional	Never
1. Radio			
2. Newspaper			
3. Television			
4. Agricultural publications/ magazines			
5. Exhibitions			
6. Training			
7. Demonstration			
8. Agricultural Officer			
9. Agricultural Demonstrator			

10. Other Officers of Agriculture Department
11. Agriculture Scientists
12. Fertilizer/Pesticide dealers
13. Other Farmers
14. Friends/Relatives/ family members

13. Infrastructure facilities

	Available Timely		Available in adequate quantities		Reasonable/ Affordable cost		Good quality	
	Yes	No	Yes	No	Yes	No	Yes	No
1. High Yielding Variety Seeds								
2. Chemical fertilizer								
3. Plant Protection Chemicals								
4. Plant Protection Equipments								
5. Credit								
6. Labourers								

13. Perception about practices

Please indicate your perception of profitability, suitability and difficulty of recommended practices.

Practices	Profitability			Suitability			Difficulty		
	Very much profitable	Profitable	Not profitable	Very much suitable	Suitable	Not suitable	Not at all difficult	Difficult	Very Difficult
1. High Yielding Variety seeds									
2. Chemical fertilizers									

3. Plant protection measures
4. Organic manure

14. Attitude Towards Improved Practices

Different people had different opinion about new agricultural practices. Give your extent of agreement/disagreement with the statements.

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. To increase production of sesamum in Kerala, new varieties should be cultivated.					
2. Local varieties of sesamum are as good as new varieties.					
3. To have better yield and profit, all sesamum farmers should cultivate new varieties of sesamum.					
4. Chemical fertilizer application in sesamum will destroy the structure and quality of soil.					
5. Chemical fertilizers will reduce the natural resistance of sesamum towards pests/ diseases.					
6. Chemical fertilizers will not help to increase yield/ profit in sesamum.					

7. Chemical fertilizer application in sesamum.
8. Organic manures are much suited for sesamum.
9. For better cultivation of sesamum plant protection chemicals are necessary.
10. Use of plant protection chemicals will increase yield and profit of sesamum.

15. Knowledge about improved farm practices.

Please answer the following questions.

1. Give the names of some high yielding varieties of sesamum?
   1.
   2.
   3.
2. What should be the seed rate for one cent of sesamum?
3. How much organic manure should be applied per cent of sesamum?
4. (a) Give the names of fertilizers which will supply:-
   1. Nitrogen
   2. Phosphorus
   3. Potassium

   (b) Give the quantity of fertilizers to be applied per cent of sesamum.

Name of chemicals	Dosage	Time of application
1. Nitrogen		
2. Phosphorus		
3. Potassium		

5. Give the control measures for the important pests and diseases of sesamum.

	Pests/Disease	Name of chemical	Dose
1.			
2.			
3.			

16. Extent of Adoption of practices

Answer the following with regard to your sesamum cultivation

1. Area under high yielding variety (in cents)
2. Seed rate quantity (in kg)
3. Organic manure

Manure	Quantity applied

4. Chemical fertilizers

	Name of fertilizer	Quantity applied
N		
P		
K		

5. Plant protection

Give the chemical control of pests/diseases adopted (if any)

Pest/disease	Chemical	Dose

17. Please indicate the constraints you come across in adopting practices recommended for cultivation.

1. High Yielding Variety Seeds
2. Organic manure application
3. Chemical fertilizer application
4. Plant protection measures

18. Please give your suggestions of solutions to overcome the constraints you perceived in adopting recommended cultivation practices in sesamum.

Transfer of Technology on Pulses and Oilseeds in The Onattukara Tract of Kerala.

A. Schedule for cowpea farmers

Date:
Serial No:
Panchayat:

1. Name and address
2. Age (in completed years)
3. Education: Illiterate/Can read and write/primary school/ Middle school/High school/College
4. Annual Income: Below 5000/- (Rupees)
   5000 - 10,000/-
   10,000 -15,000/-
   More than 15,000/-
5. Please indicate the extent of time you spent for farming.

Full time	Most often	Occasionally	Rarely

6. Area under cowpea cultivation _____ cents

Time of sowing	Variety used	Area cultivated

7. Are you a member/office bearer of any organisation(s)? (Co-operative society, co-operative society and other organisations, none)

   Do you participate in meetings of organisations? Yes/No

   If yes, how often? Often/Occasionally/Never

8. Scientific Orientation

Various opinions are there, regarding scientific agriculture.

Give your opinion for the following statements.

Statements	Agree	Undecided	Disagree
1. New methods of farming give better results to a farmer than the old methods.			
2. The way of farming by our forefathers is still the best way to farm today.			
3. Even a farmer with lot of farm experiences should use new methods of farming.			
4. A good farmer experiments with new ideas in farming.			
5. Though it takes time for a farmer, to learn new methods in farming, it is worth the efforts.			
6. The traditional methods of farming have to be changed in order to raise the standard of living of a farmer			

9. Economic Motivation

Agriculture is mostly profit oriented for many. Indicate your opinion about the statements given as follows:

Statements	Agree	Undecided	Disagree
1. A farmer should work towards larger yield and economic profits.			
2. The most successful farmer 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 comparison to growing of food crops for home consumption.			
5. It is difficult for the farmer's children to make good start, unless the provides them with economic assistance.			
6. A farmer must earn his living, but most important thing in life cannot be defined in economic terms.			

10. Risk Orientation

Indicate your opinion about the following statements:-

Statements	Agree	Undecided	Disagree
1. A farmer should grow large number of crops to avoid greater risks involved 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 risk than the average farmer usually does better financially.

4. It is good for a farmer to take risks when he knows his chance of success is fairly high.

5. It is better for a farmer not to try new farming methods unless most other farmers have used them with success.

6. Trying an essentially new method in farming by a farmer involves risk, but it is worth it.

11. Innovativeness

Please indicate your opinion regarding the following statements.

Statements	Yes	Undecided	No
1. Do you want to learn new ways of farming?			
2. If the agricultural extension worker gives a talk on improved cultivation aspects, would you attend?			

3. If the Government would help you to establish a farm elsewhere, would you move?

4. Do you want a change in your life?

5. A farmer should try to farm the way his parents did.

6. Do you want your sons to be farmers?

7. It is better to enjoy today and let tomorrow take care of itself.

8. The future of a man lies in the hand of God.

12. Information source utilisation

Please indicate the sources of information, its availability and credibility, according to your perception.

	Frequency of use		
	Regularly	Occasional	Never
1. Radio			
2. Newspaper			
3. Television			
4. Agricultural publications/ magazines			
5. Exhibitions			
6. Training			
7. Demonstration			
8. Agricultural Officer			
9. Agricultural Demonstrator			

10. Other Officers of Agriculture Department
11. Agriculture Scientists
12. Fertilizer/Pesticide dealers
13. Other farmers
14. Friends/Relatives/Family members

13. Infrastructure facilities

	Available Timely		Available in adequate quantities		Reasonable/ Affordable cost		Good quality	
	Yes	No	Yes	No	Yes	No	Yes	No
1. High Yielding Variety Seeds								
2. Chemical Fertilizer								
3. Plant Protection Chemicals								
4. Plant Protection Equipments								
5. Credit								
6. Labourers								

(b) Schedule for cowpea farmers

13. Perception about practices

Please indicate your perception of profitability, suitability and difficulty of recommended practices.

Practices	Profitability			Suitability			Difficulty		
	Very much profitable	Profitable	Not profitable	Very much suitable	Suitable	Not suitable	Not at all difficult	Difficult	Very difficult
1. High Yielding Variety seeds									

2. Chemical fertilizer application
3. Plant protection measures
4. Lime application
5. Rhizobium culture treatment

14. Attitude Towards Improved Practices

Different people had different opinion about new agricultural practices. Give your extent of agreement/ disagreement with the statements.

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. Local cowpea varieties are as good as new cowpea varieties.					
2. For better yield and profit, all farmers should cultivate new varieties of cowpea.					
3. Application of chemical fertilizers for cowpea will destroy the quality and structure of soil.					
4. Application of chemical fertilizers will reduce the tolerance of cowpea towards pests/diseases.					
5. Application of chemical fertilizers will not increase the yield/profit.					
6. Organic manures are better than chemical fertilizers.					
7. Chemical fertilizers are not at all essential for cowpea.					

8. For better cowpea cultivation pesticides are essential.

9. Application of pesticide will increase the profit from cowpea.

10. All farmers should adopt rhizobium culture treatment for cowpea.

11. Rhizobium culture treatment will increase the yield of cowpea and improves the structure of soil.

12. Rhizobium culture treatment will help to increase yield with less investment.

15. Knowledge about improved farm practices.

Please answer the following questions.

1. Give the names of some high yielding varieties of cowpea?

   1.

   2.

   3.

2. What should be the seed rate for one cent of cowpea?

3. Do you know about seed treatment of cowpea with rhizobium culture?

   If so, Quantity Method of applying

4.(a) Give the names of fertilizers which will supply.

   1. Nitrogen

   2. Phosphorus

   3. Potassium

   (b) Give the quantity of fertilizers to be applied per cent of cowpea.

Name of chemicals	Dosage	Time of application
1. Nitrogen		
2. Phosphorus		
3. Potassium		

5. Do you know about lime application in cowpea? Yes/No

If yes, Quantity Time of application

6. Give the control measures for the important pests and diseases of cowpea.

Pests/diseases	Name of chemical	Dose
1.		
2.		
3.		

16. Extent of Adoption of Practices.

Answer the following with regard to your cowpea cultivation.

1. Area under high yielding varieties (in cents)

2. Seed rate Quantity (in kg)

3. Rhizobium treatment

	Quantity	How it is applied?

4. Organic manure

	Manure	Quantity applied

5. Chemical fertilizers

	Name of fertilizer	Quantity applied
N		
P		
K		

6. Lime application

	Quantity	Time of application

7. Plant protection

Give the chemical control of pests/diseases adopted (if any).

Pests/diseases	Name of chemical	Dose

17. Please indicate the constraints you come across in adopting practices recommended for cultivation.

1. High Yielding Variety Seeds
2. Rhizobium treatment of seeds
3. Chemical fertilizer application
4. Lime application
5. Plant protection measures

18. Please give your suggestions of solutions to overcome the constraints you perceived in adopting recommended cultivation practices in cowpea?

APPENDIX-II

(a) 't' Values of Selected Statements for Measuring Attitude Towards Improved Practices in Sesamum Cultivation.

Statements	't' value
1. To increase production of sesamum in Kerala, new varieties should be cultivated.	1.69
2. Local varieties of sesamum are as good as new varieties.	1.90
3. To have better yield and profit, all sesamum farmers should cultivate new varieties of sesamum.	2.31
4. Chemical fertilizer application in sesamum will destroy the structure and quality of soil.	1.82
5. Chemical fertilizers will reduce the natural resistance of sesamum towards pests/diseases.	1.77
6. Chemical fertilizers will not help to increase yield/profit in sesamum	1.79
7. Chemical fertilizer application in sesamum is an unnecessary practice.	2.24
8. Organic manures are much suited for sesamum.	1.76
9. For better cultivation of sesamum, plant protection chemicals are necessary.	1.80
10. Use of plant protection chemicals, will increase yield and profit of sesamum.	1.78

(b) 't' Values of Selected Statements for Measuring Attitude Towards Improved Practices in Cowpea Cultivation.

Statements	't' value
1. Local cowpea varieties are as good as new cowpea varieties.	1.77
2. For better yield and profit, all farmers should cultivate new variation of cowpea.	2.23
3. Application of chemical fertilizers for cowpea will destroy the quality and structure of soil.	1.76
4. Application of chemical fertilizers will reduce the tolerance of cowpea towards pests/disease	2.14
5. Application of chemical fertilizers will not increase the yield/profit.	2.25
6. Organic manures are better than chemical fertilizers.	1.76
7. Chemical fertilizers are not at all essential for cowpea.	3.24
8. For better cowpea cultivation, pesticides are essential.	1.78
9. Application of pesticides will increase the profit from cowpea.	1.76
10. All farmers should adopt rhizobium culture treatment for cowpea.	1.79
11. Rhizobium culture treatment will increase the yield of cowpea and improves the structure of soil.	1.82
12. Rhizobium culture treatment will help to increase yield with less investment.	1.78

ABSTRACT

The study on the transfer of technology of pulses and oilseeds was designed to find out the extent of adoption of improved technology among the crops – sesamum and cowpea – cultivated in the Onattukara tract of Kerala. It also envisaged the study of the factors contributing to adoption and constraints in the adoption of improved practices of cultivation in the crops. The investigation was conducted among two groups of farmers. A total of 150 farmers, from 15 panchayats formed the sample. Five panchayats, each were selected from the three taluks, viz., Karunagappally, Karthikappally and Mavelikara which constitutes the Onattukara region. Data were collected, by using a structured interview schedule, during the months, December 1988 and January 1989.

The important findings of the study were the following:

The extent of adoption of different improved practices vary among farmers. Majority of the farmers adopted the correct seed rate. But only a few farmers adopted plant protection measures in sesamum and rhizobium culture treatment and lime application in cowpea. None of the sample farmers adopted full package of practices.

Farmers reported "other farmers" as the main source of farm information. The other important sources of information in the order of importance were newspapers, radio, relatives and friends, agricultural demonstrators, fertilizer dealers and agricultural officers. Regarding infrastructure facilities, the major gaps farmers perceived were, lack of adequate availability of seeds, high cost for fertilizers and pesticides, lack of timely and adequate availability of plant protection equipments in good condition, high labour charges and labour inefficiency and lack of adequate and timely availability of labourers.

Scientific orientation, Information source utilisation, Infrastructure facilities, Knowledge, perception and Attitude towards improved practices were found to be positively and significantly related with extent of adoption of practices in cowpea and sesamum. But in the case of cowpea, education status and risk orientation also were found to be positively and significantly correlated with extent of adoption of practices.

The results of path analysis indicated that in the case of sesamum indirect effect of the selected variables (which were significantly related with extent of adoption), were mainly routed through the variable "Knowledge level of farmers". The maximum direct effects was also by the

same variable. In the case of cowpea, the indirect effect of the selected variables, were mainly routed through information source utilisation. The maximum direct effects on extent of adoption was also by this variable.

Lack of timely and adequate availability of inputs, High cost of inputs, unfavourable climate, lack of knowledge about recommended practices, high labour charges and incidence of pests and diseases were the main constraints perceived by the farmers. They suggested solutions laying out like; timely and adequate supply of inputs, demonstration plots, improved varieties with high yield potential that can thrive climatic variations and proper price policies; to overcome the constraints in adopting improved farm technologies.