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**FACTORS INFLUENCING  
THE DEVELOPMENT OF AGRICULTURE  
AMONG THE 'KANIKKAR' TRIBE OF KERALA**

5



**BY**

**M. M. JALEEL B.Sc. (Ag)**

**THESIS**

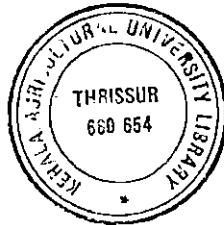
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VELLAYANI  
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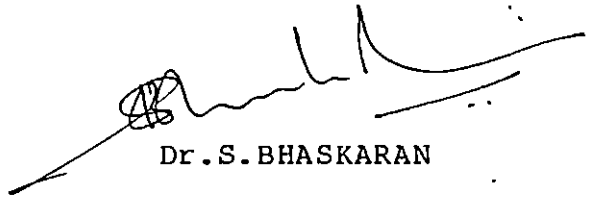
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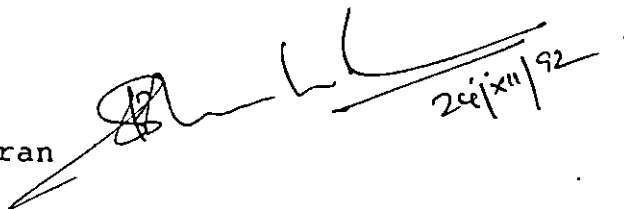
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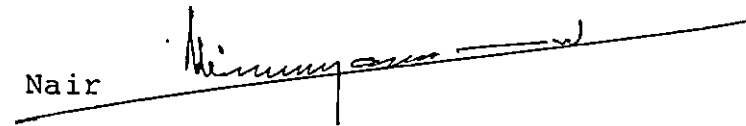
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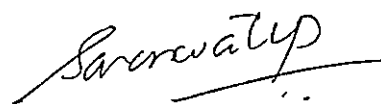
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## **INTRODUCTION**

## CHAPTER I

### INTRODUCTION

In the post-independent period, agricultural research in India is oriented towards achieving the objective of accelerated agricultural development. As a result of the scientific breakthroughs achieved in the field of agriculture, newer farming technologies are now available.

Although a lot of sophisticated know-how is available in our research stations for augmenting production, most of the farmers are still practising the primitive, age-old, traditional agriculture. This is primarily because of the extension gap.

As society develops, it becomes imperative that the technology necessary for development should be passed on to the new generations. It is not only the new technology, but the capacity of the user to understand and assimilate the technology, which matters much. Therefore, the transfer of the already evolved technology is an equally important task for boosting production and in turn, the nation's prosperity. If only one has a clear idea about the factors influencing the development of agriculture, then only the transfer of technology could be made easier.

The people in India include a very large number of primitive tribes, who subsist on hunting, fishing or by simple forms of agriculture. India has probably the largest tribal population than any other nation in the world. The tribal people are an important group among the economically weaker sections of the population of India. The planned efforts made towards the social and economic development of the tribes have not resulted in much perceptible change in the living condition of the vast majority of the tribal population. The tribal people are still centuries behind their metropolitan counterparts. Thus, the milieu in which the tribal people in India have been placed is a major concern of the development administration during recent times.

Developing the tribal areas is a stupendous task on account of the fact that they are remote, secluded and have meagre communications. The cost of construction of infrastructure is very high, and the transportation charges are exorbitant. But with the advancement of communication and with the implementation of welfare programmes by the government, drastic changes have been brought about in the lives of tribals, and they are marching towards modernity.



According to the census of 1981, 48 tribal communities are available in Kerala State, out of which 35 are scheduled tribes and the rest are denotified tribal communities. "Kanikkars" are one among the notified tribal communities available mostly in the southern districts of Thiruvananthapuram and Kollam. The word "Kanikkar" means "hereditary proprietor of land"

Since the Kanikkars are directly or indirectly associated with agriculture and allied avocations, the approach for their development should be oriented to these aspects. Earlier, most of them were shifting cultivators. But the increase in population and the stringent forest land legislations forced them to go for settled agriculture.

Viju (1985) revealed that the Kanikkars were found to practice shifting cultivation within their holdings only. According to him, of those tribals who are engaged in agriculture in one way or other, 52 per cent were cultivators, while the rest were agricultural labourers. Again, among the tribal cultivators, 69 per cent cultivated their own land, while nine per cent cultivate

partly owned and partly leased lands. Rest of the tribal cultivators (22%) cultivate on leased-in lands.

Subramoniam (1986) stated that a few Kanikkars are still practising shifting cultivation within their holding. According to him, eventhough the Kanikkars are more progressive than the other tribal communities of Kerala, they are still less progressive, compared to the non-tribals of the state. For their socio-economic upliftment, the improvement in the farming system is imperative. It is possible only through systematic education and dedicated extension efforts.

This study is aimed at determining the factors influencing the development of agriculture among the 'Kanikkar' tribe of Kerala. In Kerala, especially among the 'Kanikkars, the tribal economy is mostly a subsistence economy. Agriculture is the most important occupation. Their main crops are Coconut, Banana, Tapioca, Pepper and Rubber. Hunting has become a less important activity among these tribals, than it was before they became cultivators. Agriculture among them is quite traditional and primitive because of a number of constraints prevalent. If favourable development is happened, the tribal farmers could also join with the mainstream.

### Need for the Study

Tribes contribute to about 1.03 per cent of the population of Kerala. They form an important group among the economically weaker sections of the State. Their upliftment is highly essential and urgent actions have to be under-taken.

Due to the poor literacy percentage, poverty, backwardness and poor exposure to modern agricultural technologies, the tribal people are still practising primitive agriculture. New agricultural technology is not recognised by the tribal farmers as an essential element. That is why they mainly practice traditional subsistence farming. Shifting cultivation is also being practised by the tribals. This leads to deforestation, soil erosion and such other serious environmental problems.

The per capita income and living standard of this group of population could be increased only through the modernisation of agriculture, achieved by the adoption of improved agricultural technology. Modern techniques can be introduced in agriculture only through the formulation of proper development programmes, for which, there is a great need for identifying the agricultural development

indicators, factors influencing agricultural development and the constraints affecting agricultural development. Hence, a study on the "factors influencing the development of agriculture among the 'Kanikkar' tribe of Kerala" was carried out with the following specific objectives.

1. To study the characteristic profile of the tribal people.
2. To identify the agricultural development indicators in tribal areas.
3. To assess the extent of agricultural development in tribal areas.
4. To identify the factors influencing agricultural development in tribal areas.
5. To identify the constraints affecting agricultural development in tribal areas. and
6. To find out the association between the agricultural development indicators and the selected socio-economic characteristics of Kanikkars.

#### Scope of the study

This study will throw more light in preparing micro-level development plans in the tribal areas. The identification of indicators would help to adopt new

extension approach for the tribal people. The results would help to develop eco-based development strategies and ensure economic returns to the tribal people from agriculture. The factors and constraints would lead to evolving agricultural technologies, which would be suitably tailored to the immediate needs of the tribes. Moreover, the per capita income and living standard of this group could be improved and would enable them to join the mainstream without much disturbance in their culture.

The methodology proposed to be followed in the identification and standardisation of agricultural development indicators as part of this study would be a contribution to the body of research in agricultural extension. Moreover, the results on the factors influencing the level of agricultural development can be generalised to other similar tribal settlements also.

#### Limitations of the study

The present study had the limitations of time and other resources, as it was undertaken as part of the requirements for the M.Sc (Ag) programme. Hence it was not possible for the researcher to explore the area in greater depth and in a more comprehensive manner. The study was

confined only to the Kanikkars of Nedumangad Taluk and therefore, the results can not be generalised for other tribals in Kerala or other parts of India, as the crop grown, cultivation practices etc differ greatly from that of other parts. In spite of these limitations, it is strongly believed that the findings of the study can be of much use in preparing the frame for agricultural development programmes for the Kanikkars of Kerala.

#### Presentation of the study

The presentation of the remaining chapters of the thesis is as follows:

Chapter II deals with the definition of concepts and the theoretical orientation.

Chapter III deals with the Methodology, in which the location of the study, sampling procedure, selection and empirical measurement of variables, techniques of data collection and statistical methods used are explained.

In chapter IV, Results are presented and the Discussion is given in Chapter V.

Chapter VI deals with Summary of the research work emphasising the salient findings.

The references and appendices are given at the end.

## **THEORETICAL ORIENTATION**

CHAPTER II  
THEORETICAL ORIENTATION

For any research study, perusal of the available literature is absolutely essential to have a vivid picture of the study undertaken. The objective of this chapter is to discuss in broad outlines, the conceptual frame of references used for this study. This will provide a theoretical basis for the empirical investigation. Review of literature helps to understand the given field thoroughly. This helps in summarising what is already known regarding the problem under investigation. The discussion will be useful to select relevant variables and to develop a set of hypotheses, against which the empirical evidence can be interpreted.

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

The review of the past studies have been presented under the following headings.

1. Concept of Agricultural Development Indicators.
2. Relationship between the dependent variables and the various independent variables.



3. Factors influencing Agricultural Development.
4. Constraints affecting Agricultural Development.
5. Hypotheses.

## 1. Agricultural Development Indicators

### 1.1 Indicator

The term indicator has been defined by different authors in connection with various fields of activities.

As the two terms viz indicator(s) and index (indices) always go hand in hand, they can seldom be defined separately.

Theodorson and Theodorson (1969) defined index as any measurable or observable phenomena that is used to indicate the presence of another phenomenon, that can not be measured directly or conveniently.

According to them, indicator refers to a single measure of an observable phenomenon, reserving the term index for a more complex combination of indicators.

Wolman (1973) stated that an index is a sign or number indicative of change in magnitude or point to a state or fact.

Moffat (1976) said that indicator is a statistic which can be used, usually with other indicators, to reach a conclusion regarding the economy, such as prediction of future activity.

According to Kerlinger (1983), Indices are most important in scientific analysis. They simplify comparisons. Indeed, they enable the research workers to make comparisons that otherwise could not be made or that could be made only with considerable difficulty.

Hence it may be concluded that index is the indicant and indicator is the signal or measure.

### 1.2. Agricultural Development

Rogers and Shoemaker(1971) defined agricultural development as a type of social change, in which innovations are introduced into village systems in order to produce higher per capita incomes and levels of living through more modern production methods and improved social organisation.

According to them agricultural development consists of more than just economic development. It means food, jobs and a more equitable distribution of incomes.

Shankaraiah and Riethmuller (1977) reported that, agricultural development has been an outcome of developing people's ability to set up goals, make decisions and carrying out their plans.

### 1.3 Agricultural Development Indicators

Roy (1965), in his study on progressiveness of farmers, included aspects like response to innovation, social participation, leadership capacity, attitude, use of information sources and rationality.

For studying the differential communication patterns in progressive and non-progressive villages, Shankaraiah (1969) adopted the following two adoption indices viz. Adoption Index of High Yielding Variety and Adoption Index of Fertiliser Consumption.

Sinha (1969) observed that the conditions of the houses, wells, cattle, "charis" (feeding pots) and the fields were a good index of prosperity or backwardness of a village.

Singh and Sahay (1970), while studying the communication behaviour of Kosi farmers, adopted the following criteria in the selection of progressive and non-

progressive villages viz - Extent of adoption of high yielding varieties of crops in terms of area under cultivation; consumption of chemical fertilisers in terms of N,P and K; consumption of pesticides and adoption of improved farm implements.

Rogers and Shoemaker (1971) opined that the improved methods of agricultural production consist of such innovations as fertilisers, insecticides, new seeds, mechanisation etc.

Jaiswal and Dave (1972) measured the progressiveness in farming of individual farmers by taking into consideration the components of progressiveness such as knowledge, conviction, number of improved practices, adoption quotient, innovativeness, net profit gained and total production in farm enterprises.

Singh et al (1972) regarded "Agricultural Progressiveness" as a strong indicator of rural development.

Singh (1973) reported that progressiveness of individual refers to higher receptivity of modern values and practices.

Singh and Prasad (1974), while studying the communication behaviour of young farmers, classified the progressive and non-progressive villages, based on the adoption of high yielding varieties, fertiliser consumption and advancement of rural institution.

Kalamegam (1975) concluded that the adoption of improved practices by small farmers was found relatively high in the progressive village, than in the less progressive village.

Alphonsa (1978) opined that possession of implements is a major indicator of agricultural wealth of the scheduled castes.

Bhaskaran (1978) and Shilaja (1981) conceptualised progressiveness as follows - "A progressive farmer is up-to-date in practising latest technology in high yielding variety cultivation, by adopting improved recommended package of practices, early adoption, leadership quality and frequent contact with extension agencies."

For classifying progressive and non-progressive villages, Panneerselvam (1978) utilised the independent

variables like age, education, occupation, social participation, farm size and socio-economic status.

Balakrishna et al (1982) identified 14 indicators of village development viz. food and nutrition, clothing and footwear, housing, possessions, savings and investments, employment and wages, agriculture, transport and communication, recreation and cultural activities, participation, education, health, community level amenities and status of women.

As per the Indian Statistical Outline (1984), the indicators of agricultural production are classified as follows.

A. Food grains    B. Non-food grains.

Food grains are further classified into (a) Cereals and (b) Pulses. Cereals include Rice, Wheat and Coarse Cereals.

Non-food grains include Oilseeds, Fibres, Plantation crops, and Miscellaneous crops including Sugarcane.

In this publication, the government has also provided the index numbers of agricultural production.

Sharma and Sastri (1984) observed that a development indicator describes trends, diagnoses a particular development situation and evaluates the progress.

Keigsper (1986) used three forms of indicator as evaluation criteria for a developmental study in Bangladesh. They are, cultural emancipation by means of non-formal education, political emancipation by means of organisations and economic emancipation by means of access to means of production.

Mohan et al (1986) developed a modernisation index using the following indicators - stepping up of cropping intensity, larger area under high yielding varieties, increase in the per acre application of fertilisers, increased expenditure per acre on plant protection measures, increase in area brought under new crops, increase in capital investments in the shape of irrigation, ploughing and other farm inputs.

Chauhan et al (1987) observed that majority of the farmers had taken loan for agricultural purpose, which is a good indication of development of agricultural enterprise.

Baysan (1988), in order to develop an agricultural development index for the Islamic countries, did incorporate six indicators of agricultural production, five of them being food items, two indicators of agricultural wealth, represented by stock variables and two indicators of agro-technological inputs.

Parida (1988) chose to measure rural development with the following indicators of development viz. cropping intensity, area under HYV paddy, fertiliser consumption, the area under non-food crops and number of workers in non-agricultural activities.

Intodia (1989) opined that the exercise of popularisation of farm technology has been confined mostly to the progressive farmers, who are financially well, academically sound, have better contact with extension agencies, adequate farm resources and having greater social participation.

World Bank (1989) considered the following indicators for agriculture viz food aid in cereals and fertiliser consumption.



Farm Guide (1991) of the Farm Information Bureau, Government of Kerala considered the following selected indicators of progress in agriculture sector: cultivators as percentage of main workers, percapita (rural) income from agriculture, production of food grains, annual growth rate of food grains, production of rice, average yield of HYV rice, average Yield of non-HYV rice, average yield of irrigated rice, average yield of rice in unirrigated area, percapita food grains production, per hectare yield of total food grains, percapita gross cropped area (rural), percentage share of state income from agriculture, average size of operational holdings, area under food crops, gross cropped area, gross irrigated area, gross irrigated area as percentage to total cropped area, net area sown, net area sown as percentage to total, net irrigated area, net irrigated area as percentage of net area sown, irrigated area of rice as percentage to total area, irrigation potential created, percentage area under food crops to total area, percentage area under non-food crops, production of milk, production of egg, production of fish, fertiliser consumption per hectare of gross cropped area, percapita power consumption for agricultural purpose alone, value of forest production per hectare of forest area, membership of primary agricultural credit co-operative

societies, percentage of borrowing members, loans overdue as percentage of loans outstanding, number of livestock and income generated in agriculture per hectare of gross cropped area.

From the above review, it is clear that different authors viewed different dimensions under Agricultural Development Indicators and the common and general dimensions for Agricultural Development Indicator are knowledge, adoption of various practices, attitude of farmers, infrastructure facilities, standard of living of people etc.

#### 1.4 Agricultural Development Indicator with respect to tribals

Bhattacharya and Vyas (1979) considered the following indicators of agricultural development for the tribal farmers viz Quality of land, extent of subdivision and fragmentation, share of double cropped land, means of irrigation, intercultural operations, manuring, agricultural implements, agricultural output per acre (ie. productivity), pattern of input and output and response to innovations.

Reddy and Ramaiah (1982) reported that the tribal farmers using fertilisers obtained increased yields of paddy per hectare on irrigated farms by 78%, as compared to unfertilised farms.

Pachauri (1984) opined that for measuring rural development and the sources of welfare programmes, there are always certain indicators, which can be utilised for measuring changes in a rural economy. According to him, the basic indicators are agriculture, health and education.

For the indicator viz. Agriculture, he had included the dimensions like high yielding varieties, modern practices, lift irrigation schemes and average size of holding.

The agricultural development indicators stated by him were. average size of holding, percentage of households possessing land, percentage of land cultivated, percentage of area under food crops, percentage of area under commercial crops, percentage of area irrigated, average income per household from agriculture, average expenditure per household, average loan per household, adoption of high yielding varieties and adoption of modern practices.

Kumar (1985) reported the following major indicators: yield per acre, percapita income from agriculture and total annual income from agriculture.

Nagadevara and Gopaldaswamy (1985) observed that there was significant increase in soil conservation measures, cropping intensity, crop yield and establishment of fruit orchards due to ITDP. (Integrated Tribal Development Programme)

Viju (1985) noted that Kanikkars of Nedumangad Taluk were less progressive when compared to the non-tribals of the state. But they are more progressive as compared to other tribal communities. He also opined that it was possible to improve their farming and consequently their socio-economic conditions by systematic education and dedicated extension work.

Thakur (1986) considered land use pattern as a major indicator for development of agriculture in tribal areas.

Oberoi and Sharma (1989) followed the agro-socio economic indicators given below viz., size of holding,

cultivated area, per capita land, percent of cultivated area, percent of area under irrigation and percentage of family members engaged in agriculture.

Randev et al (1990) utilised the following variables to assess the resource use efficiency among the tribals of Himachal Pradesh: Agricultural production, number of trees, human labour, manures and fertilisers, fungicides and insecticides and fixed capital.

From the above review, it can be generalised that most of the researchers have pointed out knowledge, attitude and adoption of tribal farmers as the prime indicators with respect to their crop cultivation. Hence in this study, knowledge, attitude and adoption of tribal farmers have been taken as the leading indicators as far as agricultural development is concerned.

## 2. Relationship between the dependent variables and the various independent variables

### 2.1 Knowledge

One of the main tasks of extension education is to provide or improve the knowledge of the people about the

improved practices, because knowledge as a component of behaviour play an important role in the total behaviour of the individual.

Greater knowledge of improved practices would lead to higher adoption. Once knowledge is acquired and retained in the mind, it undergoes and produce changes in the thinking process and a sort of "mental alchemy" will take place. The result of this active functioning of knowledge may sometimes be seen in the overt behaviour of the individual, ie in the action or in the decision taken.

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

According to them, knowledge is knowing what to do next, skill is knowing how to do it and virtue is doing it.

Knowledge refers to the fact or condition of knowing things with a considerable degree of familiarity gained through experience or contact or association with the individual or things known.

Viju (1985) reported that majority of the 'Kanikkars' had medium level of knowledge about improved agricultural practices.

## 2.2. Attitude

According to Allport (1935), attitude is a mental and neural state of readiness organised through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related.

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

Krech and Crutchfield (1948) defined attitude as an enduring organisation of motivational, emotional, perceptual and cognitive processes with respect to some objects of an individual's world.

Newcomb (1950) speaks of attitude as a state of readiness for native arousal and an individual's attitude towards something in his pre-disposition to perform, perceive, think and feel in relation to it.

Katz and Scotland (1959) defined attitude as a tendency or disposition to evaluate an object or symbol of the object in a certain way.

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Dahama (1970) opined that attitudes are learned responses and that since they are always found in relation to objects, ideas and persons, they play an important role in determining human behaviour.

Sharma (1972) defined attitude as a personal disposition, which impels an individual to react to some object or situations.

Prakash (1980) revealed that tribal communities of the Kerala state exhibit an unfavourable attitude towards farming.

Kuppuswamy (1984) stated that attitudes are learned in the course of life experience which make the individual behave in characteristic ways, towards persons, objects or issue to which they get related.

Viju (1985) revealed that majority of the Kanikkars had a medium level of attitude towards farming.

### 2.3 Adoption

Wilkening (1952) postulated the adoption of an innovation as a process composed of learning, deciding and acting over a period of time. The adoption or a decision to act has a series of action and thought decisions.

Coleman (1955) in his study on adoption of soil conservation practices by farmers, observed that the adoption of farm practices was influenced by social, psychological and economic factors of the individual respondents.

Copp et al (1956) stated adoption as an activity of the farmer taking place over a period of time. They reviewed adoption of farm practice as a bundle of related events flowing through time, not an instantaneous metamorphosis.

Emery and Oeser (1958) viewed adoption of farm practice as a consequence of communication.

According to Ramsey et al (1959), adoption behaviour involved two components: behavioural, which involves the actual use of the practice and cognitive, which includes obtaining knowledge and critical evaluation of the practice in terms of individual situation.

According to Rogers (1962), adoption refers to the continued use of the recommended practices by an individual. He opined that adoption process is the mental

process through which an individual process from first hearing about an innovation to its final adoption.

Chattopadhyay (1963) defined adoption as completion of decision about the use and initiation of action to make use of the innovation. He reported that "adoption" is the stage in the "adoption process", where decision making is complete, regarding the use of practice and action with regard to such a decision commences.

Katz et al (1963) defined diffusion adoption process as the acceptance over time of some specific items: an idea or practice by an individual, group or adopting unit limited to specific channels of communication to a social structure and to a given system of value or culture.

Basaram (1966) conducted a study on motivational and resistance forces related to acceptance of new ideas in Indian farming and concluded that sociological, psychological and economic variables of the farmers are important in explaining their attitude towards new ideas and techniques and final adoption of them.

Reddy (1971) stated that the adopters of fertilisers of rainfed ragi had adopted more number of

other improved farm practices than the non-adopters of fertilizers.

Rogers and Shoemaker (1971) defined adoption as a decision to make use of the innovation. They considered adoption as a decision to continue full use of an innovation as the best course of action.

Based on the degree of innovativeness expressed by the respondents, Jetley (1977) classified the adopters of agricultural innovations into five groups namely innovators, early adopters, early majority, late majority and laggards.

The study of Prakash (1980) revealed that there was significant difference in the mean adoption score of the tribes in more developed and less developed areas.

Reddy and Ramaiah (1982) found that tribal farmers using fertilisers obtained increased yields of paddy per hectare on irrigated farms by 78% as compared to the unfertilised farms.

Viju (1985) reported that majority of the Kani tribal farmers had only low levels of adoption of improved agricultural practices.

Chauhan et al (1987) considered adoption as the action to make use of the technology which has already been taken and not only initiated.

Nandakumar (1988) found a significant difference in the adoption level of recommended practices of paddy cultivation before and after the implementation of ITDP. Also there was significant difference in the adoption level of improved practices of dairy management.

## 2.4 Independent variables Vs Knowledge, Attitude and Adoption

2.4.1. Age Vs Knowledge, Attitude and Adoption

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Svensson	1942	--	--	N
2.	Wilkening	1952	--	--	N
3.	Van Den Ban	1957	--	N	N
4.	Chattopadhyay	1963	--	--	NS
5.	Rahim	1960	--	--	NS
6.	Rogers and Burdge	1961	--	N	--
7.	Ross	1961	--	N	--
8.	Pandit	1964	--	--	N
9.	Bose and Saxena	1965	--	--	NS
10.	Bhasin	1966	--	--	NS
11.	Bhatia	1966	--	--	NS
12.	Rao	1966	--	--	NS
13.	Roy	1967	--	--	P
14.	Bhaskaram and Mahajan	1968	N	--	--
15.	Danda and Danda	1968	--	--	NS
16.	Kher and Jha	1968	--	NS	--
17.	Rajendra	1968	--	--	N

18.	Reddy and Kivlin	1968	--	--	NS
19.	Singh	1968	--	NS	--
20.	Singh and Singh	1968	--	N	--
21.	Das and Sarkar	1970	--	N	--
22.	Kamalesan	1971	NS	--	P
23.	Reddy	1971	--	--	NS
24.	Tripathi	1972	N	--	N
25.	Anbalagan	1974	--	--	N
26.	Makkar and Sohal	1974	--	N	--
27.	Singh and Prasad	1974	NS	--	--
28.	Behara and Sahoo	1975	N	--	--
29.	Kennedy <u>et al</u>	1975	--	NS	--
30.	Menon and Prema	1976	N	P	--
31.	Kaleel	1978	NS	--	--
32.	Pillai	1978	--	--	N
33.	Rao	1978	--	--	N
34.	Sadamate	1978	N	--	N
35.	Sushama	1979	--	--	NS
36.	Thangavelu	1979	--	NS	--
37.	Kantharaj	1980	--	--	NS
38.	Naik	1981	--	NS	--
39.	Sainath	1982	--	--	N
40.	Batara	1983	--	--	N

41.	Singh	1983	--	--	NS
42.	Vijaya Kumar	1982	N.S.	--	--
43.	Cherian	1984	--	NS	--
44.	Siddaramaiah and Rajanna	1984	N	--	--
45.	Harish	1985	--	--	NS
46.	Naika	1985	--	--	N
47.	Khanal	1986	--	--	N
48.	Reddy and Reddy	1986	P	--	--
49.	Krishnamoorthy	1988	NS	--	--
50.	Nandakumar	1988	--	--	NS
51.	Sabapathi	1988	NS	--	--

#### 2.4.2 Education Vs Knowledge, Attitude and Adoption

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Ryan and Gross	1943	--	--	P
2.	Wilkening	1952	--	--	P
3.	Wilson and Gallup	1955	--	--	P
4.	Copp <u>et al</u>	1956	P	--	--
5.	Van Den Ban	1957	--	--	P



6.	Ramsey <u>et al</u>	1959	P	--	--
7.	Lionberger	1960	--	--	P
8.	Rahim	1960	--	--	P
9.	Bose	1961	P	--	--
10.	Reddy	1962	--	--	P
11.	Pandit	1964	--	--	P
12.	Rai	1965	--	--	P
13.	Dhaliwal and Sohal	1965	--	--	P
14.	Chand and Gupta	1966	--	--	P
15.	Choudhary and Maharaja	1966	--	--	P
16.	Rogers and Capener	1966	P	--	--
17.	Sharma	1966	P	--	--
18.	Shetty	1966	--	--	N
19.	Varma	1966	--	--	N
20.	Khan	1967	P	--	--
21.	Bhaskaram and Mahajan	1968	P	--	--
22.	Rajendra	1968	--	--	P
23.	Singh and Singh	1968	--	P	--
24.	Das and Sarkar	1970	--	P	--
25.	Menon	1970	P	--	--
26.	Perumal	1970	--	--	P
27.	Sarkar	1970	--	P	--
28.	Prasad and Sinha	1971	--	--	P

29.	Reddy	1971	--	--	P
30.	Thangamani	1972	--	--	NS
31.	Viswanathan	1972	--	--	P
32.	Chandrakandan	1973	--	--	P
33.	Kamble	1973	--	--	P
34.	Ramamurthy	1973	--	--	P
35.	Makkar and Sohal	1974	--	P	--
36.	Vellapandian	1974	--	--	P
37.	Supe and Salode	1975	P	--	--
38.	Thomaskutty	1975	--	P	--
39.	Somasundaram	1976	P	--	--
40.	Janakiramraju	1978	P	--	--
41.	Kaleel	1978	P	--	--
42.	Gangadharappa	1979	--	--	P
43.	Kantharaj	1980	--	--	NS
44.	Manjunatha	1980	P	--	--
45.	Mathew	1980	--	NS	--
46.	Prakash	1980	--	--	P
47.	Ahamed	1981	P	--	P
48.	Kamarudeen	1981	--	P	--
49.	Naik	1981	--	P	--
50.	Haraprasad	1982	P	--	P
51.	Sainath	1982	--	--	P
52.	Surendran	1982	NS	P	--

53.	Balachandran	1983	P	--	--
54.	Kappattanavar	1983	--	--	P
55.	Vijayakumar	1983	--	P	--
56.	Cherian	1984	--	P	--
57.	Phillip	1984	NS	--	--
58.	Harish	1985	--	--	NS
59.	Naika	1985	--	--	P
60.	Viju	1985	P	P	--
61.	Khanal	1986	--	N	P
62.	Krishnamoorthy	1988	P	--	--
63.	Sabapathi	1988	N	--	--
64.	Intodia	1989	P	--	--

#### 2.4.3 Farming experience Vs Knowledge, Attitude and Adoption

There is a general saying - "Practice makes man Perfect"

and 'practice' is achieved through 'experience'

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Grewal and Sohal	1971	--	--	P
2.	Reddy	1971	--	--	P
3.	Anbalagan	1974	--	--	P
4.	Bute <u>et al</u>	1981	--	--	P
5.	Chandrasekaran	1981	N	--	--

6.	Nidagundi	1981	--	---	NS
7.	Arumugam	1983	N	---	--
8.	Kumbar	1983	--	---	P
9.	Alexander	1985	N	---	--
10.	Sabapathi	1988	NS	---	--

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#### 2.4.4. Organisation participation Vs Knowledge, Attitude & Adoption

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Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Copp <u>et al</u>	1949	P	--	--
2.	Roy <u>et al</u>	1968	--	--	P
3.	Das and Sarkar	1970	--	P	--
4.	Reddy	1971	--	---	P
5.	Sundaraswamy	1971	--	---	NS
6.	Rao	1972	--	---	NS
7.	Viswanathan	1972	---	---	NS
8.	Chandrakandan	1973	--	---	P
9.	Ramamurthy	1973	--	---	P
10.	Ambalagan	1974	--	---	P
11.	Jothiraj	1974	--	---	P
12.	Karim and Mahaboob	1974	--	---	P

13.	Singh and Prasad	1974	P	--	--
14.	Saini	1975	--	--	P
15.	Supe and Salode	1975	--	--	NS
16.	Bhilegaonkar	1976	--	--	P
17.	Kappse	1976	--	--	P
18.	Vijayakumar	1976	--	--	P
19.	Joshi	1978	--	--	NS
20.	Kaleel	1978	P	--	--
21.	Palanisamy	1978	--	--	P
22.	Panneerselvam	1978	--	--	NS
23.	Rajendran	1978	--	--	P
24.	Sadamate	1978	--	--	P
25.	Sakthivel	1979	--	--	NS
26.	Subhadra	1979	--	--	NS
27.	Thangavelu	1979	--	NS	--
28.	Kantharaj	1980	P	--	NS
29.	Mathew	1980	--	NS	--
30.	Mishra and Sinha	1980	--	--	--
31.	Ravichandran	1980	--	--	P
32.	Kamarudeen	1981	--	--	P
33.	Haraprasad	1982	P	--	P
34.	Pillai	1983	--	--	P
34.	Vijayakumar	1983	--	P	--
36.	Cherian	1984	--	P	--

37.	Viju	1985	P	--	--
38.	Khanal	1986	P	--	P
39.	Subramoniam	1986	P	--	--
40.	Krishnamoorthy	1988	P	--	--
41.	Nandakumar	1988	--	--	NS
42.	Sabapathi	1988	NS	--	--

#### 2.4.5. Risk orientation Vs Knowledge, Attitude and Adoption

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Fliegal	1956	--	--	P
2.	Ramsey <u>et al</u>	1959	--	--	P
3.	Rogers and Havens	1961	--	--	P
4.	Hobbs	1964	--	--	P
5.	Jaiswal	1965	--	--	P
6.	Bohlen and Beal	1966	--	--	P
7.	Rogers and Shoemaker	1971	--	--	P
8.	Ernest	1973	--	--	P
9.	Ramachandran	1974	--	--	P
10.	Singh	1975	--	--	P
11.	Tripathy	1977	--	--	P

12.	Rajendran	1978	--	--	P
13.	Kamarudeen	1981	--	P	--
14.	Naik	1981	--	P	--
15.	Pillai	1983	--	--	P
16.	Cherian	1984	--	P	--
17.	Viju	1985	P	--	--

#### 2.4.6. Credit orientation Vs Knowledge, Attitude and Adoption

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Reddy	1971	--	--	P
2.	Singh <u>et al</u>	1972	--	--	P
3.	Suryawanshi <u>et al</u>	1978	--	--	P
4.	Manjunatha	1980	--	--	P
5.	Venkateswaralu and Bhalerao	1980	--	--	P
6.	Reddy and Kumar	1982	--	--	P
7.	Nandakumar	1988	--	--	NS

## 2.4.7. Cosmopolitaness Vs Knowledge, Attitude and Adoption

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Fliegal	1960	--	--	NS
2.	Dhaliwal	1963	--	--	P
3.	Gupta	1963	--	--	P
4.	Patnaik	1963	--	--	P
5.	Varma	1966	--	--	P
6.	Tripathi	1972	--	--	P
7.	Knight and Singh	1975	P	--	--
8.	Troisi	1975	--	--	P
9.	Chauhan and Sinha	1976	--	--	NS
10.	Kittur	1976	--	--	P
11.	Somasundaram	1976	P	--	--
12.	Chanegowda	1977	--	--	P
13.	Kalamegam and Menon	1977	--	--	P
14.	Reddy and Reddy	1977	--	NS	--
15.	Thangavelu	1979	--	NS	--
16.	Mathew	1980	--	NS	--



17.	Ahamed	1981	--	--	P
18.	Kamarudeen	1981	P	--	P
19.	Balachandran	1983	P	--	--
20.	Ferreira <u>et al</u>	1983	--	--	P
21.	Siddaramaiah and Rajanna	1984	P	--	--
22.	Viju	1985	P	--	--
23.	Subramoniam	1986	P	--	--
24.	Krishnamoorthy	1988	NS	--	--
25.	Sabapathi	1988	NS	--	--

#### 2.4.8. Extension participation Vs Knowledge, Attitude and Adoption

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Manjunatha	1980	--	--	P
2.	Gavi	1983	--	--	P
3.	Palvannan	1985	--	--	P
4.	Krishnamoorthy	1988	NS	--	--
5.	Nandakumar	1988	--	--	NS

#### 2.4.9. Extension contact Vs Knowledge, Attitude and Adoption

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Ryan and Gross	1943	--	--	P
2.	Gross	1949	--	--	P

3.	Wilkening	1952	--	--	P
4.	Lionberger	1960	--	--	P
5.	Bose	1961	--	--	P
6.	Sawhney	1961	--	--	P
7.	Dhaliwal	1963	--	--	P
8.	Jaiswal	1965	--	--	P
9.	Rogers and Capener	1966	--	--	P
10.	Sharma	1966	--	--	P
11.	Supe	1969	--	--	P
12.	Reddy	1971	--	--	P
13.	Kalamegam	1975	--	--	P
14.	Knight and Singh	1975	P	--	--
15.	Saini	1975	--	--	P
16.	Sundaraswamy and Duraiswamy	1975	--	--	P
17.	Kappse	1976	--	--	P
18.	Vijayakumar	1976	--	--	P
19.	Joshi	1978	--	--	P
20.	Kaleel	1978	P	--	--
21.	Panneerselvam	1978	--	--	P
22.	Prasad	1978	--	--	P
23.	Sohal and Tyagi	1978	P	--	--
24.	Somasundaram and Singh	1978	P	--	--
25.	Subhadra	1979	--	--	P

26.	Sushama	1979	--	--	NS
27.	Kantharaj	1980	---	---	NS
28.	Osuji	1980	--	--	P
29.	Prakash	1980	--	--	P
30.	Grozovinski	1981	P	---	---
31.	Kamarudeen	1981	P	P	P
32.	Dhanyakumar	1982	--	---	P
33.	Haraprasad	1982	P	---	P
34.	Sainath	1982	--	---	P
35.	Sivakumar	1983	P	P	P
36.	Krishnamoorthy	1988	NS	---	---
37.	Nandakumar	1988	--	---	NS

#### 2.4.10. Mass media participation Vs

#### Knowledge, Attitude and Adoption

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Lerner	1958	--	P	---
2.	Roy <u>et al</u>	1968	---	P	---
3.	Rogers and Svenning	1969	--	P	---
4.	Singh and Sahay	1970	--	---	P
5.	Murthy	1971	---	P	---

6.	Reddy	1971	--	--	P
7.	Gangappa	1975	--	--	P
8.	Joshi	1978	--	--	P
9.	Mahadevaswamy	1978	--	--	P
10.	Mahapatra	1978	P	--	--
11.	Panneerselvam	1978	--	--	P
12.	Sohal and Tyagi	1978	P	--	--
13.	Sripal	1978	P	--	--
14.	Mohanadasan	1979	--	NS	--
15.	Kantharaj	1980	--	--	NS
16.	Manjunatha	1980	--	--	P
17.	Geethakutty	1982	--	--	P
18.	Haraprasad	1982	P	--	P
19.	Sainath	1982	--	--	P
20.	Singh	1983	--	--	P
21.	Raju	1984	--	--	P
22.	Krishnamoorthy	1988	NS	--	P
23.	Nandakumar	1988	--	--	NS

#### 2.4.11. Land possession Vs Knowledge, Attitude and Adoption

Sl. No.	Author(s) who stated the relationship	Year	<u>Relationship with the dependent variables</u>		
			Knowledge	Attitude	Adoption
1.	Hagerstrand	1952	--	--	N
2.	Coleman	1955	--	--	P
3.	Van Den Ban	1957	--	--	P

4.	Pandit	1964	--	--	P
5.	Chand and Gupta	1966	--	--	P
6.	Sinha and Parshad	1966	NS	--	--
7.	Sawhney	1967	--	P	--
8.	Das and Sarkar	1970	--	P	--
9.	Hussain	1971	--	--	P
10.	Pathak and Dargan	1971	--	--	NS
11.	Reddy	1971	--	--	P
12.	Singh	1971	--	P	--
13.	Singh and Singh	1971	--	P	--
14.	Rao	1972	--	--	P
15.	Chandrakandan	1973	P	--	--
16.	Nanjaiyan	1973	NS	--	--
17.	Sharma and Nair	1974	--	P	P
18.	Subramaniam and Lekshmana	1973	--	--	P
19.	Karim and Mahboob	1974	--	--	P
20.	Ramakrishnan	1974	--	--	NS
21.	Chandrakandan and Subramanyam	1975	--	--	P
22.	Supe and Salode	1975	NS	--	NS
23.	Kappse	1976	--	--	P
24.	Menon and Prema	1976	--	P	--
25.	Vijayakumar	1976	--	--	P
26.	Kaleel	1978	--	--	NS

27.	Pillai GB	1978	--	P	P
28.	Pillai KGS	1978	--	--	P
29.	Rajendran	1978	--	--	P
30.	Subhadra	1979	--	--	P
31.	Sushama	1979	--	--	P
32.	Thangavelu	1979	--	P	--
33.	Kantharaj	1980	--	--	NS
34.	Prakash	1980	--	--	P
35.	Ahamed	1981	P	--	--
36.	Haraprasad	1982	P	--	P
37.	Reddy and Kumar	1982	--	--	N
38.	Singh	1983	--	--	P
39.	Venkataramu	1983	--	--	N
40.	Raju	1984	--	--	NS
41.	Alexander	1985	NS	--	--
42.	Harish	1985	--	--	P
43.	Nandakumar	1988	--	--	NS
44.	Sabapathi	1988	NS	--	--

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P - Positively Significant  
NS - Non-significant  
N - Negative relation

### 3. Factors influencing agricultural development

Chamber's Dictionary defines the term 'factor' as a doer or transactor of business for another.



chemicals, extent of use of agricultural implements, contact with extension agency, extent of small farmers as adopters of improved practices, an effective co-operative society, consumption of electricity for agricultural purpose, transport facilities, educational status, use of marketing facilities, extent of farmers' participation, percentage of farmers cultivating their own land, consolidation of land holdings and means of mass communication.

Peacock (1973) opined that local availability of modern inputs was found to be the important predictor of innovativeness.

Kalamegam (1975) while studying the communication behaviour of small farmers classified the progressive and less progressive villages based on the following criteria : extent of cultivation of high yielding varieties in the village, intensity of land use and extent of area under assured irrigation.

Panneerselvam (1978) made use of five criteria for classifying progressive and non-progressive villages namely extent of cultivation of high yielding variety, intensity of land use, extent of area under assured irrigation, an effective co-operative society and means of mass communication.



Mohsin (1985) mentioned the following factors influencing Agricultural Development. They are : major and minor irrigation, extent of area under dry farming, size of holdings, use of modern inputs, percentage of land irrigated by various sources, intensity of cropping, extent of tenancy and extent of loans.

Rangacharyulu and Rao (1986) had mentioned three factors of agricultural development viz fertilizer depot, seed store and agricultural pump repair. The other related factors were credit co-operative bank under credit and storage and warehousing and daily market under marketing.

Intodia (1989) conducted a study among the tribal farmers of Rajasthan taking into consideration the following factors viz size of land holding, knowledge about improved farm practices, use of chemical fertilizers, farm power possession, control of pests and diseases in crops by P.P. measures, extent of soil reclamation, adoption of post harvest technology, irrigation facilities, timely availability of inputs, storage of food grains, marketing of surplus farm produce, extent of orchard cultivation, timely advise for technical knowledge by expert in agriculture, installation of pumpsets (both electric and diesel) and bringing new land under cultivation.

From the above review, it could be understood that the important factors influencing the development of agriculture include cropping intensity, assured irrigation facility, effective credit co-operative society, marketing facility, input facilities, extent of farmers' participation, extent of area under dry farming, adoption of post harvest technology and timely advise for technical knowledge by expert in agriculture.

#### 4. Constraints affecting agricultural development

According to Chamber's Dictionary, constraint is a 'restricting condition'.

Dar (1970) reported that, tribal attitudes, tradition and religion made it difficult for the tribals to accept restrictions on shifting cultivation. The isolation of the tribal areas from being exposed to new ideas made them extremely tradition bound.

Goswami and Saika (1970) observed that the social and cultural backgrounds made the introduction of modern agriculture in the tribal areas a difficult task.

Singh (1970) opined that the lack of participation by the tribals was one of the short-comings of the tribal development scheme.

Sundaraswamy (1971) reported that lack of knowledge and lack of money were the main constraints in the adoption of recommended farm practices.

Dutta (1972) pointed out lack of adequate communication facilities as one of the major reasons for agricultural backwardness of tribal villages.

Ambalagan (1974) found that, the major limiting factors for the adoption of paddy practices were : lack of knowledge, non-availability of inputs and high cost of cultivation.

Mathur (1977) revealed that the most important causes of indebtedness among the tribals of Kerala were their primitive agricultural technology, illiteracy, low wages, absence of marketing infrastructure and their social and religious obligations.

He also reported that, those tribals, who had improved seeds and modern technology of cultivation were

Tripathy (1977) reported that the institutional constraints leading to technological gap in the adoption of new technology as pointed out by farmers were : absence of liberal credits, high rates of interest, complicated procedure and unauthorised charges for getting credit.

Mahapatra (1978) observed that the diffusion of knowledge of improved agriculture is limited by the communication gap in tribal society.

Puri (1978) reported that land alienation, indebtedness, low educational status, inadequate supply of essential consumer goods, low agricultural production and productivity, inadequate marketing facilities etc. as major problems of tribal areas.

Sadamate (1978) opined that the various socio-psychological, economic and communication constraints were found to be related to the attitude towards farming of the tribals.

Prakash (1980), in his study among the tribals of Wynad district pointed out the significant fact that even

if the tribes are favourably disposed towards agricultural innovations, their socio-economic and cultural barriers deter them from translating these into action.

Sripal (1981) reported that, the factors responsible for the non-adoption of improved practices in cotton cultivation were: not in practice, not profitable, high cost, not known, and no effect. He stated that the main problem was the high rise in the price of inputs.

The reasons for non-adoption of recommended practices in the dryland agricultural technology, as stated by Bhaskaran and Praveena (1982) were : lack of knowledge, lack of guidance, high cost, risky, lack of time, lack of communication, no felt need, lack of credit, poor weather, not profitable etc.

Waghmare and Pandit (1982) stated that it would be worthwhile to study the causes hindering the tribal farmers in adopting new agricultural technology. Identification of the constraints faced by the tribal farmers will help to search appropriate measures to help them to adopt new agricultural technology.

They further revealed that lack of knowledge, technical guidance and inputs and small size of holdings were the important constraints in the transfer of technology process among tribal farmers.

Pillai and Prasad (1983) reported the following constraints among the "Muduvas", a tribal community of Parambikulam area of Kerala : erratic monsoon rains, non-availability of good quality seeds and seedlings, lack of technical guidance on improved farming, pest attack on rice and cardamom, lack of facilities for extracting lemon grass oil, non-availability of improved agricultural implements, low price for the produce and inadequate help from forest officials.

Viju (1985) reported that the major constraints in the adoption of improved practices, as perceived by the tribal farmers (in the descending order of magnitude) were: non-availability of inputs, inadequate financial assistance, damage to crops from wild pigs and elephants, lack of sufficient knowledge about the practices, exploitation by middlemen, absence of legal right on land, inadequate transport facilities, small size of the holding and lack of irrigation facilities.

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According to Subramoniam (1986), tribals form the decisively poorest section of Kerala's people. Their condition has become still worse owing to the lack of communication and infrastructural facilities, improper management, organisational arrangements and above all, the exploitation by non-tribal population.

Apart from these problems, tribal communities enmeshed in age-old customs, beliefs and superstitions, have continued to remain conservative and extremely tradition bound with morbid fatalism.

Nandakumar (1988) revealed that majority of the tribal respondents expressed that lack of irrigation facilities followed by inadequate and untimely supply of fertilisers and plant protection chemicals were the set backs in the adoption of recommended practices of paddy cultivation. Destruction of crops by wild animals and inadequate and untimely supply of seeds were also the major problems faced by the tribals. The other problems responsible for abstaining the tribals from adoption of recommended practices of paddy cultivation were the lack of extension education activities on improved agricultural practices, high cost of production, lack of credit facilities and lack of marketing facilities for the produce.

Ahuja (1989) reported that the middlemen and contractors often take advantage of the ignorance of the collecting households with regard to actual market prices prevailing at the user level. The tribals also suffer from the handicap of absence of storage facilities, thus making them vulnerable in having to make offerings of the collection without the ability to hold stocks. Because of ignorance and other constraints, they are unable to market through any alternative channels than those established by traders/contractors, with terms of trade heavily weighted against them.

In a study conducted among the tribals of Rajasthan, Intodia (1989) identified the constraints like unavailability of irrigation water in the wells, non-existence of input supply agencies like dealers and farmers' co-operative society, very miserable financial position of tribals (Most of them were below poverty line. In such a situation, the farmers are unable to think of purchase of improved inputs for higher agricultural production), unavailability of repairing facilities in the village, non-availability of good quality vegetable seeds and poor knowledge of the farmers about plant protection measures. In addition, the tribals also did face the problems with respect to soil reclamation, adequate and



timely advise about the know-how, marketing of surplus farm produce and orchard cultivation.

Pillai et al (1989) identified the following constraints among the 'Irulas' of Boothivazhi hamlet. They were poor economic condition, exploitation by settlers and money lenders, delay in providing electric connections, inadequate technical assistance in agriculture and animal husbandary, inadequate opportunities for regular and gainful employment and problems associated with land alienation.

Ingle et al (1990) reported that the tribal women were not free from the drudgery in various activities and work involvement. Illiteracy and ignorance about new technology, hardwork in unfavourable conditions are almost common for them. The major constraints faced by the tribal women were lack of communication facilities, dominance of males in decision-making, drudgery and hard work in agricultural operations and household activities and in collection of fuel and forest material. Illiteracy, poor economic base, meagre income, inadequate technology and knowledge.

Randev et al (1990) opined that geophysical conditions in Himachal Pradesh, particularly of the high

altitude tribal areas of the state, limit the scope of commercialising the agriculture through field crops. Although seed-fertiliser technology had opened new vistas in field crop production, particularly wheat, maize and paddy in the State, yet it had made negligible impact on the economy of these areas due to limited scope of increasing the productivity of field crops.

It is evident from the above review that the major constraints affecting agricultural development among the tribals include isolation of the tribal areas, lack of participation by the tribals, lack of money, lack of knowledge, lack of communication facilities, unavailability of inputs, primitive agricultural technology, absence of marketing infrastructure, indebtedness, socio-economic and cultural barriers, lack of technical guidance, pest attack, erratic monsoon rains, inadequate help from forest officials, crop damage by wild animals, exploitation by middle men, absence of legal right on land, lack of irrigation facilities etc.

##### 5. Hypotheses

Based on the theoretical orientation and the review of literature, the following hypotheses were formulated to test the relationship of the dependent variables with the independent variables.



Hypothesis 1

There would be significant relationship between the knowledge level of tribal farmers in terms of improved cultivation practices and the independent variable like a. age, b. education, c. farming experience, d. organisation participation, e. risk orientation, f. credit orientation, g. cosmopolitaness, h. extension participation, i. extension contact, j. mass media participation and l. land possession.

Hypothesis 2

There would be significant relationship between the attitude of tribal farmers towards farming and the independent variables like a. age, b. education, c. farming experience, d. organisation participation, e. risk orientation, f. credit orientation, g. cosmopolitaness, h. extension participation, i. extension contact, j. mass media participation and k. land possession.

Hypothesis 3

There would be significant relationship between the extent of adoption of modern techniques of cultivation by the tribal farmers and the independent variables like a. age, b. education, c. farming experience, d. organisation participation, e. risk orientation, f. credit orientation, g. cosmopolitaness, h. extension participation, i. extension contact, j. massmedia participation and k. land possession.

**METHODOLOGY**

## CHAPTER III

### METHODOLOGY

This chapter deals with the materials used and methods employed in this study, and the same are presented in the following sections.

1. Location of the study
2. Selection of the sample
3. Empirical measures used
4. Data collection procedure
5. Statistical methods

1. Location of the study

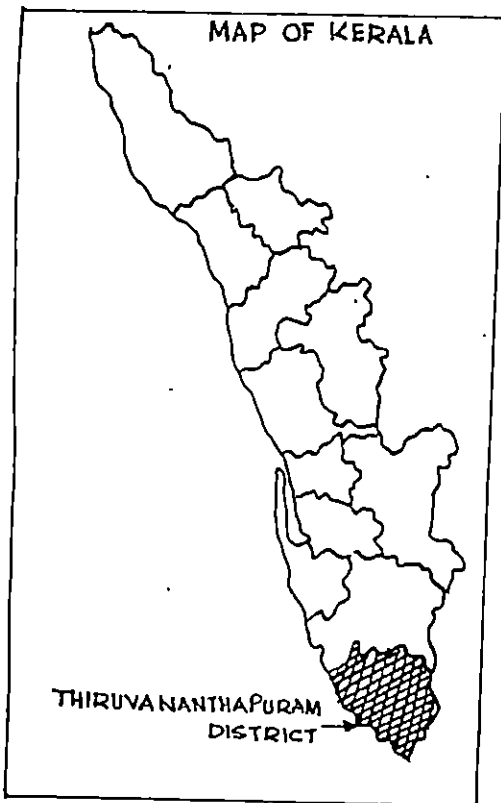
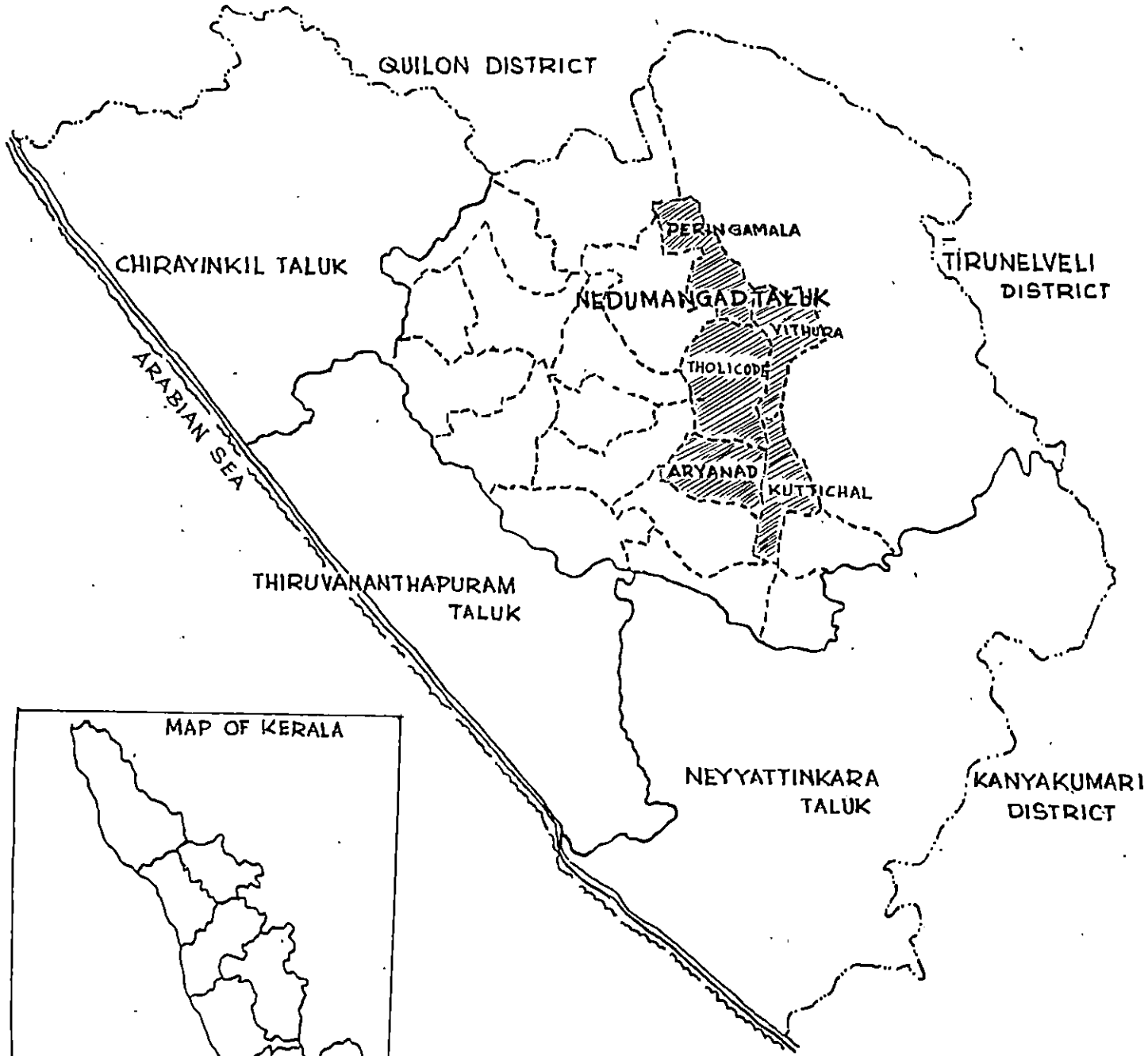
According to the 1981 census, out of the total population of 2,54,53,680 in Kerala, 2,61,475 (1.03%) belong to the Scheduled Tribes. Of the 48 tribal communities of the State, 35 are Scheduled Tribes and the rest are denotified tribal communities. Of the 35 Scheduled Tribes, the largest group in South Kerala is "Kanikkars". They form the fifth major Scheduled Tribe of the state in population. They account for 5.68 per cent of the tribals (Bureau of Economics & Statistics 1979). They are a typical community of the South and are found distributed only in

# THIRUVANANTHAPURAM DISTRICT

SHOWING TALUKS

SCALE 1cm=3.25km

RF 1:325000







-  DISTRICT BOUNDARY
-  TALUK BOUNDARY.
-  PANCHAYAT BOUNDARY
-  STUDY AREA

FIG. 2. MAP OF THE STUDY AREA.

five Taluks of Thiruvananthapuram and Kollam Districts. Their agriculture is settled in nature. Of them, 80 per cent are concentrated in Nedumangad Taluk of Thiruvananthapuram District. Of the total population of 14,145 Kanikkars in Thiruvananthapuram District, 10,783 reside in Nedumangad Taluk (76.23%). Hence, Nedumangad Taluk was selected as the locale for this study.

## 2. Selection of the sample

Nedumangad Taluk is divided into three administrative blocks namely Nedumangad, Vamanapuram and Vellanad, of which, Nedumangad Block is having only a marginal population of Kani-farmers.

Among the 21 Panchayaths of the Nedumangad Taluk, the population of tribal cultivators is more than 100 only in five Panchayats viz Peringammala Panchayat of Vamanapuram Block, Aryanad, Kuttichal, Tholicode and Vithura Panchayats of Vellanad Block. Hence the sample was purposively drawn from these five Panchayats.

One hundred Kani-farmers, which is about one per cent of the total Kani population of Nedumangad Taluk from the above said five Panchayats in proportion to the



population of tribal cultivators were selected randomly for the present study.

The sampling procedure was as follows:

Sl. No.	Panchayat	Population of Kani farmers	Sample size
1.	Peringammala	324	21
2.	Aryanad	466	31
3.	Kuttichal	138	09
4.	Tholicode	266	18
5.	Vithura	326	21
	Total	1520	100

### 3. Empirical measures used:

#### 3.0 Identification of Agricultural Development Indicators

On the basis of review of literature, discussions with experts & extension personnel and pilot study, a list of agricultural development indicators was identified and sent for judges' opinion with a five-point continuum ranging

from most important to least important and based on the criterion, indicators with score value equal to and above the mean score value were selected as agricultural development indicators. The procedure is furnished in the appendix III.

### 3.1 Measurement of dependent variables

The development indicators namely Knowledge, Attitude and Adoption were considered as dependent variables for this study.

#### 3.1.1. Knowledge about improved cultivation practices

This variable was operationalised as the extent of understanding of the Kani farmer-respondent, at the time of interview, as evident from his responses to a set of questions prepared on different aspects of cultivation of the important crops grown by the tribal farmer.

For assessing the knowledge level of the respondents, Singh and Singh (1974) adopted the scoring procedure given below, which was later followed by Sushama (1979).

$$\text{Total Knowledge Score} = \frac{\sum X_p}{n} \times 100$$

where  $X_j$  = Number of correct answers

$n$  = Total number of questions

Viju (1985), calculated Knowledge Index (K.I.) as follows

$$\text{K.I.} = \frac{\text{Total score obtained by a respondent}}{\text{Total number of statements}} \times 100$$

Hosamani (1987), in an experimental study on tribal farmers, used the following Knowledge Index.

$$\text{K.I.} = \frac{\text{Number of Correct responses}}{\text{Total number of knowledge items}} \times 100$$

Based on the pilot study, five important and predominant crops cultivated in the area were selected. They included Coconut, Banana, Tapioca, Pepper and Rubber. The improved package of practices of cultivation was considered for construction of Question for the knowledge test to assess the knowledge level of the farmer. A teacher made test was administered among the respondents.

For each crop, ten questions were prepared, out of which, seven were general questions and three were specific to that particular crop. Thus altogether, there were 50 questions for the test. But the questions were administered

only with respect to the crops grown by the respondent. For example, a farmer who was having only three crops was administered with 30 questions only. For each correct answer, a score of one was given. The total score, thus obtained was divided by the number of questions asked to that particular farmer and then this value was multiplied with 100 to get the knowledge score of the respondent.

The Knowledge Test items for each crop is given in Appendix II.

### 3.1.2. Attitude towards farming

In this study, attitude was operationalised as the Kani-farmer's degree of favourableness or unfavourableness towards farming.

Sadamate (1978) developed an attitude scale to measure the attitude of tribal respondents towards farming. The same scale was later adopted by Sabapathi (1988) and the same was pretested in the area for the validity of the scale.

The scale consisted of ten statements. Out of these, five statements were indicators of favourable

attitude, whereas the remaining five were indicators of unfavourable attitude. A three-point continuum was associated with this scale. The three points in the continuum were "Agree", "Undecided" and "Disagree", with respective weights of 3, 2 and 1 for favourable attitudes. The scoring system was reversed for the negative statements.

The final attitude score for each respondent was worked out by adding up the weightage for the ten statements. Thus, the maximum score that one could get was 30 and the minimum was 10.

The above mentioned scale was adopted for the purpose of this study.

The attitude scale used for this study is given in Appendix II.

### 3.1.3. Adoption of modern techniques of cultivation

This dependent variable was operationalised as the adoption of the important techniques of cultivation for each of the important crop, which the Kani-farmer had.

Chattopadhyay (1963) used adoption quotient for measuring the adoption behaviour. This is a ratio scale

that measures farmer's behaviour on the dimensions of applicability, potentiality, extent, time, consistency and differential nature of innovations.

Bose (1965) gave more weightage to a farmer who had adopted a practice at an earlier date. Adoption was credited with points equal to number of years during which a farmer had used it and total adoption score was obtained by summation of scores obtained on each practice.

Beal and Sibley (1967) measured adoption by using a composite score on a number of practices judged to be applicable to the farmers.

Chand and Gupta (1966) measured adoption by scoring each year of adoption of an improved practice, to any extent by a farmer as one unit point.

Majumdar and Majumdar (1967) also used number of years a farmer had adopted a selected practice as the measure of adoption behaviour.

For the purpose of this study, adoption score was worked out, using the following formula:

$$\sum_{i=1}^n \frac{e_i/p_i^o}{n} \times 100$$

Where  $e_i$  = Extent of adoption of selected practices

$p_i^o$  = Potentiality of adoption of each selected practice

$n$  = Number of practices (Total number of selected practices)

After calculating the adoption score of each respondent, based on the number of crops grown by him, the average of those scores was obtained by dividing it with the number of crops cultivated.

### 3.2. Measurement of independent variables

Based on the review of literature, the pilot study conducted and discussion with experts, 11 independent variables were selected for the study.

#### 3.2.1. Age

Age was operationalised as the completed chronological years of the Kani-farmer at the time of interview".

Palaniswamy (1978), Panneerselvam (1978), Sushama (1979). Jayavelu (1980), Prakash, (1980), Rajagopal (1986),

Hosamani (1987), Krishnamoorthy (1988), Nandakumar (1988) and Sabapathi (1988) recorded the age of the respondents as mentioned by them at the time of investigation in number of years.

For the sake of the present study, age expressed in completed years was taken as such i.e. Age of the respondents was recorded in number of years as mentioned by them at the time of investigation.

The respondents were classified into three groups viz young, middle aged and old as per Census of India (1981). This is as follows.

<u>Sl. No.</u>	<u>Category</u>	<u>Age Group</u>
1	Young	Upto 34 years
2	Middle aged	35-44 years
3	Old	45 years and above

### 3.2.2. Education

"Education was operationalised as the ability of the Kani farmer to read and write, and the extent of formal as well as non-formal education possessed by the individual respondent".



The level of education possessed by individual respondents was measured by Trivedi (1963) as follows.

<u>Sl No.</u>	<u>Category</u>	<u>Score</u>
1	Illiterate	0
2	Can read only	1
3	Can read and write	2
4	Primary school	3
5	Middle school	4
6	High School	5
7	Collegiate	6

This procedure was later adopted by Panneerselvam (1978), Sundareshan (1978), Jayavelu (1980), Sivaramakrishnan (1981), Venkataramaiah (1983), Viju (1985), Rajagopal (1986), Subramoniam (1986), Krishnamoorthy (1988) and Nandakumar (1988) with minor modifications.

Sabapathi (1988) followed the procedure given below for measuring the educational status of tribal farmers.

<u>Sl. No.</u>	<u>Level of Education</u>	<u>Score</u>
1.	Illiterate	1
2.	Can read only	2
3.	Can read and write	3

For the purpose of this study, a scoring procedure was developed as follows.

<u>Sl. No.</u>	<u>Level of education</u>	<u>Score</u>
1	Illiterate	0
2	Can read only	1
3	Can read and write	2
4	Non-formal education	3
5	Passed the first standard	4
6	Passed the second standard	5
7	Passed the third standard	6

Thus, for every successfully completed year of formal schooling, a score of + 3 was given.

### 3.2.3 Farming Experience

For the present study, farming experience was operationalised as the completed years, a Kani-farmer had involved in farming activities, especially the cropping enterprise.

Anbalagan(1974), Sreenivasan (1974), Panneerselvam (1978), Rajendran (1978), Jayavelu (1980), Padmanabhan (1981), Senthil (1983), Rajababu (1984), Rajagopal (1986)

Seema (1986) measured experience in farming in terms of total number of years, the farmer had been engaged in farming.

Chandrasekharan (1981) and Sabapathi (1988) followed the scoring procedure given below:

Sl. No	Years of experience	Score
1.	Upto 5 years	1
2.	5.01 to 10 years	2
3.	Above 10 years	3

Shilaja (1981) assigned scores to farming experience as follows:

Sl. No.	No. of years	Score
1	1-5	1
2	6-10	2
3	11-15	3
4	16-20	4
5	21-25	5
6	26-30	6
7	31-35	7
8	36-40	8
9	Above 40	9

Chandran (1988) adopted the following scoring system

Sl. No.	Years of experience	Degree of experience	Score
1	Upto 10 years	Low	1
2	11 to 20 years	Medium	2
3	Above 20 years	High	3

For the present study, farming experience of the tribal farmer expressed in completed years was taken as such, for the measurement of this variable.

#### 3.2.4 Organisation Participation

Organisation participation was operationalised as the degree of involvement of a Kani-farmer in various agricultural development organisations, either as a member or office bearer, considering his regularity of attendance in the meetings of these organisations.

For measuring organisation participation, Trivedi (1963) adopted the following scoring system.

<u>Particulars</u>	<u>Score</u>
a) Membership in one organisation	1
b) Membership in more than one organisation	2
c) Office-holder	3
d) Distinctive features (MLA, MP etc.)	6

The above procedure was later followed by Reddy (1971), Panneerselvam (1978), Hosamani (1987) and Krishnamoorthy (1988) with slight changes in items and weightages.

Shashipuri (1972) and Rajagopal (1986) adopted the following system, with two dimensions.

(i) <u>Particulars of participation</u>	<u>Score</u>
a) Member in the past	1
b) Office bearer in the past	2
c) Member at present	3
d) Office bearer at present	4
(ii) <u>Degree of participation</u>	<u>Score</u>
a) Participated in planning activities	1
b) Participated in organising activities	2
c) participated in conducting activities	3

The membership score and participation score were summed up for one organisation, to get the social participation score for that organisation. Similarly, the social participation score for all the organisations in which the respondent reported participation were found out. These scores were added to get the social participation score of the respondent.

Knight (1973) adopted a scoring procedure, which was followed by Balasubramoniam (1988) and Chandran (1988), which is as follows.

<u>Sl.No.</u>	<u>Particulars</u>	<u>Score</u>
i)	No membership	0
ii)	Member in one organisation	1
iii)	Member in more than one organisation	3
iv)	Office bearer in more than one organisation	5

Weightage                      \*                      past = 1                      present = 2

The scores on the present and past participations were summed up to arrive at the total social participation score of an individual.

The scoring procedure developed by Lokhande (1974) for measuring social participation was as follows:

<u>Sl. No.</u>	<u>Items</u>	<u>Scores</u>
i.	No membership	0
ii.	Membership in one organisation	1
iii.	Membership in more than one organisation	2
iv.	Office bearer in one organisation	3
v.	Office bearer in more than one organisation	4
vi.	Distinctive features (MLA, MP etc.)	6

Attendance in meetings either as a member or as an office bearer was considered important. For attending meetings "regularly", "occasionally" and "never", the scores given were 3, 2 and 1 respectively.

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 for all the social organisations in which the

participation was reported. The same method was followed for studies conducted among the tribals by Viju (1985), Subramoniam (1986) and Sabapathi (1988). The very same scoring system was adopted for the purpose of the present study.

### 3.2.5. Risk Orientation

The degree to which a Kani-farmer is oriented towards encountering risk and uncertainty in adopting new ideas or practices in agriculture was operationalised as risk orientation for the purpose of this study.

Supe (1969) developed a scale to measure risk orientation, which was later adopted by Viju (1985), Sundaram (1986) and Prasannan (1987).

There were six statements in the scale, of which items one and five were negative and all the others were positive. The scoring was done in a five-point continuum. The scoring procedure was as follows.

	SA	A	UD	DA	SDA
For positive statements	7	5	4	3	1
For negative statements	1	3	4	5	7



The scores obtained for all the statements by an individual were summed up to obtain the individual respondent's risk orientation score.

The Risk Orientation Scale and Scoring procedure adopted by Supe (1969) was followed for the present study.

The risk orientation scale used for this study is given in Appendix II.

#### 3.2.6 Credit Orientation

The Credit Orientation of a Kani-farmer respondent was operationalised with the help of the following questions on the need for credit, use of credit, the difficulties and problems in availing credit.

The degree to which a Kani-farmer is oriented towards the need for credit, use of credit, the difficulties and treatment in seeking credit was operationalised as credit orientation.

Beal and Sibley (1967) adopted a procedure to measure credit orientation with the help of a set of questions.

<u>Questions/Statements</u>	<u>Response</u>	<u>Score</u>
1. Do you think, a farmer like you should borrow more for agricultural purpose ?	No	0
	Yes	1
2. In your opinion, how difficult is it to secure credit for agricultural purpose ?	Very difficult	0
	Difficult	1
	Easy	2
	Very easy	3
3. How a farmer is treated when he goes to secure credit ?	Very badly	0
	Badly	1
	Fairly	2
	Very fairly	3
4. There is nothing wrong in taking credit from institutional sources for increasing farm production .	Strongly disagree	0
	Disagree	1
	Agree	2
	Strongly agree	3
5. Did you use credit in the last two years for cultivation ?	No	0
	Yes	1

The above procedure was followed in the present study for the purpose of measurement of the independent variable viz. Credit orientation.

### 3.2.7. Cosmopolitaness

In this study, cosmopolitaness was operationally defined as the tendency of the Kani-farmer to be in contact with outside world, based on the belief that all the needs of an individual can not be satisfied within his own community.

Desai (1981) followed a procedure to measure the extent of cosmopolitaness. The two dimensions of the variable measured were:

- a. The frequency of visit to the nearest town in a month  
and
- b. The purpose of visit to the nearest town in a month.

The Scoring pattern was as follows

a. Frequency of visit to the nearest town in a month

Sl.No.	Frequency of Visit	Score
i.	Twice or more a week	5
ii.	Once a week	4
iii.	Once a fortnight	3
iv.	Once a month	2
v.	Very rarely	1
vi.	Never	0

b. Purpose of visit to the nearest town in a month

Sl.No.	Purpose of visit	Score
i.	All visits relating to agriculture	5
ii.	Some visits relating to agricuclture	4
iii.	Personal or domestic matters	3
iv.	Entertainment	2
v.	All other purposes	1
vi.	No specific purpose	0

The total score of cosmopolitaness for each respondent was calculated by adding the score of the above two dimensions of cosmopolitaness.

This procedure was adopted by Sabapthi (1988) in a study conducted among tribals. For the purpose of this study also, the procedure followed by Desai (1981) was adopted.

3.2.8. Extension Participation

This variable was operationalised as the participation of the Kani farmers in the various extension

activities, after giving due consideration for the regularity of participation.

Nandakumar (1988) adopted a scoring system. Participation in five extension activities viz extension meetings, field days, farmers' tours, visit to crop demonstrations and farmers' training were considered.

The frequency of participation was given due consideration. For attending the extension activities "regularly", "occasionally" and "never", the scores given were 2, 1 and 0 respectively.

The final score for each respondent was obtained by the summation of the scores received by a respondent for participating in different extension activities. As per this system, the maximum and minimum scores that one respondent could get were 10 and Zero respectively.

The above mentioned scoring system was followed for the purpose of this study.

### 3.2.9. Extension Contact

It was operationalised as the contact of the Kani-farmer with the extension agencies for various purposes

after considering whether the respondent was aware of the extension agency or not.

Badrinarayanan (1977) followed a procedure for calculating the final score value of this variable. It was as follows.

a.	<u>Response</u>	<u>Score</u>
	Known	1
	Not known	0
b.	<u>Frequency of contact</u>	<u>Score</u>
i.	Once in a week	6
ii.	Once in a fortnight	5
iii.	Once in a month	4
iv.	Once in a quarter	3
v.	Once in 6 months	2
vi.	Once in a year	1
c.	<u>Purpose</u>	<u>Score</u>
i.	To get technical guidance	5
ii.	To avail subsidy and agricultural implements	4
iii.	To avail input assistance	3
iv.	Non-agricultural purpose	2
v.	Personal (Casual)	1

The scores for the three dimensions were summed up to get the extension agent contact score for that particular extension agent by the respondent. Such extension agent contact <sup>score</sup> for all the extension agents with whom the respondent expressed contact were pooled to get 'Contact with extension agency' score for that respondent.

The above procedure was adopted for this study.

#### 3.2.10. Mass media participation

This variable was operationalised as the regularity with which the Kani-farmer respondent read news papers, farm magazines and leaflets, listened to radio, saw agricultural films and attended/visited agricultural exhibitions.

Singh (1972) developed a scoring system. Frequency of contact with six mass media viz radio, newspapers, farm magazines, leaflets, agricultural films, and agricultural exhibitions were taken into consideration.

The scores assigned for the frequency of contact was as follows.

Sl.No.	Frequency	Score
i.	Never	0
ii.	Occassionally	1
iii.	Once in a month	2
iv.	Once in a fortnight	3
v.	Once in a week	4
vi.	Twice in a week	5
vii.	Daily	6

Scores were given for contact with each of the mass media mentioned above. The final score for massmedia participation for each respondent was computed by adding all the scores obtained with a maximum score of 36 and minimum of zero.

This scoring system was followed in the present study.

### 3.2.11. Land possession

It was operationalised as the cultivable area in acres, possessed by a Kani-farmer.



Different researchers have tried to measure farm size in various ways.

Roy et al (1968) chose the value of agricultural products raised as a measure of farm size.

Vijayaraghavan (1977) developed a weighted scoring procedure, which was followed by Panneerselvam (1978), to indicate the farm size of the farmer-respondents. The information regarding the number of acres cultivated by an individual was obtained along with the irrigation sources. The extent of land and irrigation sources were the two dimensions considered for the farm size of respondents. The weighted scoring procedure was as follows.

- i. Extent of land : One score for every  
one acre of land
- ii. Nature of irrigation :
  - a. No irrigation 1
  - b. Well irrigation 2
  - c. Well and canal irrigation 3

The scores for the extent of land was multiplied by the respective weightages for the nature of irrigation it had. This formed the score for the farm size.

Jayavelu (1980) considered the total extent of land an individual farmer possessed as his farm size. A conversion procedure of equating two acres of dryland to one acre of irrigated land was followed to arrive at the total extent of land.

In the present study, half acre of wet land was equated with one acre of dry land and this was taken into consideration, while calculating the total land possessed by the Kani-farmer.

### 3.3. Computation of Score value for Factors

From the review of literature and based on the pilot study conducted, 12 factors of agricultural development were identified for this study.

During the course of the survey, the Kani-tribal respondents were asked to express the degree of importance of each factor as perceived by them in a five-point continuum ranging from most important to least important.

Finally, for each factor, the score obtained under each point in the continuum was counted. The scale values given to each point in the continuum was as follows.

<u>Continuum</u>		<u>Weightage</u>
Most	important	5
More	important	4
	Important	3
Less	important	2
Least	important	1

After counting the score obtained under each point in the continuum, it was multiplied with the weightage and then added together to obtain the final factor score.

#### 3.4. Computation of score value for constraints

Based on the review of literature and the pilot study, eleven constraints to agricultural development were identified and selected for the purpose of this study.

The tribal respondents were asked to express the degree of importance of each constraint as perceived by them in a five-point continuum ranging from most important to least important with weightage ranging from 5 to 1.

Finally, for each constraint, the score obtained under each point in the continuum was counted and this was multiplied with the respective weightage. The final score for the constraint was worked out by adding together this value.

#### 4. Data collection procedure

Prior to collection of data, a pilot study was conducted in the area, which comprised discussions with different tribal farmers, experts and a reconnaissance survey of the project area. The interview schedule was at first prepared in English. Later, it was translated into Malayalam for easier administration among the Kani-farmers.

The interview schedule was pretested and minor modifications were made. The data collection was carried out during the period - May 1991 to July 1991. The respondents were individually contacted. Assistance of the local extension staff, school teachers, staff of the Kerala Tribal Development Research Centre (KTDR) and Tribal Volunteers was availed for locating and interviewing the tribal farmers.

#### 5. Statistical methods

##### a. Percentage analysis

Percentage analysis was done to make simple comparisons wherever necessary.

##### b. Simple correlation

Simple correlation coefficients were computed to find out the relationship between each of the three dependent variables and each of the independent variables.

c. Multiple regression analysis

Multiple regression analysis was done to find out how much, each set of characteristic variables explained the amount of variability in the knowledge, attitude and adoption of tribal farmers.

The model fitted was  $Y = b_0 + b_1x_1 + b_2x_2 + \dots + b_{11}x_{11}$

Where  $x_1, x_2, \dots, x_{11}$  representing independent variables and Y, the dependent variable.

d. Path analysis

Path analysis developed by Wright (1934) was done to find out the direct and indirect effects of independent variables on the knowledge, attitude and adoption of the respondents. It also helped to find out the substantial indirect effects of the independent variables through other variables.

e. Classification of respondents

The mean score value was worked out for each variable. The respondents who got a score value less than the mean score for that particular variable, were considered to be belonging to the low group and all those respondents who did get a score value equal to or more than the mean score with respect to a given variable were considered to belong to the high group.

**RESULTS**

## CHAPTER IV

### RESULTS

The results of the study are presented under the following sections.

1. Characteristic profile of the 'Kanikkars'.
2. Assessment of extent of agricultural development.
3. Relationship between the dependent variables and the selected characteristics of 'Kanikkars'.
4. Results of multiple regression analysis.
5. Results of path analysis.
6. Factors influencing agricultural development.
7. Constraints affecting agricultural development.

1. Characteristic profile of the 'Kanikkars'

The typical profile of the 'Kanikkars' is presented in Table 1. It reveals that about half of the sampled farmers (49%) were young, followed by middle aged and aged farmers, with 27 and 24 per cent respectively. Hence it is inferred that majority of the farmers were young.

Regarding education, it is clear that 56 per cent were having a high level of education and the remaining fell under low level of education. So it is inferred that most of the 'Kanikkars' were educated farmers.

Table 1 Characteristic profile of the 'Kanikkars'

(n = 100)

Sl. No.	Characteristic variables	Mean score	Category		
			Young upto 34 yrs in %	Middle aged 35-44 in %	Old 45 yrs & above in %
1	Age	37	49	27	24
				Low %	High %
2	Education	9.07		44	56
3	Farming experience	20.37		70	30
4	Organisation participation	3.42		68	32
5	Risk orientation	26.99		50	50
6	Credit orientation	3.62		45	55
7	Cosmopoliteness	8.07		47	53
8	Extension participation	0.71		73	27
9	Extension contact	4.69		51	49
10	Massmedia participation	10.7		32	68
11	Land possession	2.61		67	33

From the same table, it is understood that majority of the tribal respondents (70%) were having less farming experience and only about one third of the sampled farmers



had more experience in farming. Hence it could be inferred that more than two third of them had less experience in farming.

As organisation participation is concerned it is evident that a great majority of the respondents (68%) had low level of organisation participation and the remaining farmers had high level of organisation participation. So it is inferred that more than two third of the farmers had low level of organisation participation.

It was clear that the respondents were evenly distributed in low and high groups (50% in each category) with respect to risk orientation. Hence the sampled farmers were found to have high level of risk orientation.

More than half of the respondents (55%) had high credit orientation and the remaining 45 per cent had low level of credit orientation. So it is inferred that majority of the Kanikkar respondents were having a high level of credit orientation.

Regarding cosmopolitaness, it is clear from the table that, majority of the respondents (53%) belong to the high group and the remaining to low group. Hence it could

be inferred that more than half of the 'Kanikkar' respondents had higher level of cosmopolitaness.

With respect to extension participation, it was evident that majority of the respondents (73%) had only a low degree of extension participation, while the remaining 27 per cent had higher level of extension participation. Hence it is inferred that nearly three fourth of the sampled farmers had low extension participation.

Fifty one per cent of the respondents were having a low level of extension contact, while the remaining fell under high level of extension contact. So it could be inferred that more than half of the respondents belong to the low group, with respect to extension contact.

From the data it was clear that majority of the respondents (68%) belong to the high gorup, with respect to mass media participation. Hence it could be inferred that more than two third of the respondents selected for this study had better exposure to mass media.

It was evident that 67 per cent of the sampled Kanikkar farmers were having a low score with respect to land possession. Hence it could be inferred that more than

two third of the respondents had only small holdings with farm size less than 2.61 acres.

## 2. Assessment of extent of agricultural development

The assessment of the extent of agricultural development among the 'Kanikar' tribe was done utilising the agricultural development indicators selected for the purpose of this study.

### 2.0. Agricultural development indicators

Table 2 Agricultural development indicators

(n = 30)

Sl. No.	Agricultural development indicators	Score	Rank
1.	Response to innovations	2.3	7
2.	Use of information sources	2.3	7
3.	Adoption of modern techniques of cultivation	3.7	3
4.	Total Production in farm	2.47	6
5.	Conviction about the improved practices	2.63	5
6.	Attitude towards farming	3.76	2
7.	Leadership quality	2.16	10
8.	Advancement of rural institution	2.77	4
9.	Knowledge about improved cultivation practices	3.9	1
10.	Socio-political and economic emancipation	2.23	9

Mean score value = 3.03

From the Table 2. it was evident that only three agricultural development indicators viz knowledge about improved cultivation practices (3.9), attitude towards farming (3.76) and adoption of modern techniques of cultivation (3.7) obtained score value more than the mean score. Hence only these three variables were considered as agricultural development indicators for the purpose of this study.

### 2.1. Extent of knowledge about improved cultivation practices

Table 3 highlights the extent of knowledge of the 'Kanikkars' about improved cultivation practices.

Table 3 Knowledge of Kanikkars on  
improved cultivation practices

(n = 100)

Sl. No.	Category	Score	Percentage
1	Low	< 31.3	48
2	High	≥ 31.3	52

The average knowledge score was 31.3. Those Kanikkars having a mean score less than 31.3 were treated as having low knowledge and those having score equal to or above 31.3 were considered to be having high knowledge. As such majority of the tribal respondents (52%) belong to the high group, while the remaining 48 per cent fell under low group.

Hence it may be inferred that more than half of the sampled farmers had a high level of knowledge on the scientific cultivation practices.

## 2.2. Attitude of Kanikkars towards farming

The tribal respondents were grouped into two categories viz low and high attitude groups, in terms of their mean attitude score and is presented in Table 4.

Table 4 Attitude of Kanikkars towards farming

(n = 100)

Sl. No.	Category	Score	Percentage
1	Low	< 26.43	40
2	High	≥ 26.43	60

The average attitude score was found to be 26.43. It was clear from Table 4 that 60 per cent of the respondents belonged to the high group and the remaining to low group with respect to attitude towards farming.

So it is inferred that majority of the sampled farmers had a favourable attitude towards farming.

### 2.3 Extent of adoption of modern techniques of cultivation

The distribution of Kanikkar respondents based on their adoption of modern techniques of cultivation as low and high groups based on their mean score is provided in Table 5.

Table 5 Adoption of modern techniques of cultivation  
(n = 100)

Sl. No.	Category	Score	Percentage
1	Low	$< 6.04$	69
2	High	$\geq 6.04$	31

The mean adoption score was 6.04. Table 5 reveals that majority of the Kanikkars (69%) belonged to the low group, while the remaining 31 per cent fell under the high group.

Table 6 Inter-correlation Matrix

	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>	Y <sub>1</sub>	Y <sub>2</sub>	Y <sub>3</sub>
X	1.0000 <sup>ns</sup>													
X	0.6150 <sup>**</sup>	1.0000 <sup>ns</sup>												
X	0.9127 <sup>**</sup>	0.5962 <sup>**</sup>	1.0000											
X	0.0341	0.1649	0.0611	1.0000										
X	0.3525 <sup>**</sup>	0.4595 <sup>**</sup>	0.3391 <sup>**</sup>	0.3362 <sup>**</sup>	1.0000									
X	0.1512	0.0620	0.0917	0.0835	0.0792	1.0000								
X	0.1867	0.2366 <sup>**</sup>	0.1910	0.1109	0.2080 <sup>*</sup>	0.0954	1.0000							
X	0.1386	0.2588 <sup>**</sup>	0.1016	0.2914 <sup>**</sup>	0.4552 <sup>**</sup>	0.1112	0.0213	1.0000						
X	0.3758 <sup>**</sup>	0.3611 <sup>**</sup>	0.3758 <sup>**</sup>	0.3372 <sup>**</sup>	0.4945 <sup>**</sup>	0.1601	0.2124 <sup>*</sup>	0.2916 <sup>**</sup>	1.0000					
X	0.4987 <sup>**</sup>	0.6769 <sup>**</sup>	0.4933 <sup>**</sup>	0.2125 <sup>*</sup>	0.5277 <sup>**</sup>	0.0101	0.2356 <sup>*</sup>	0.3239 <sup>**</sup>	0.0192	1.0000				
X	0.0187	0.0079	0.0621	0.0492	0.1740	0.2515 <sup>*</sup>	0.0888	0.0993	0.2062 <sup>*</sup>	0.0291	1.0000			
X	0.3758 <sup>**</sup>	0.6024 <sup>**</sup>	0.3506 <sup>**</sup>	0.3426 <sup>**</sup>	0.5925 <sup>**</sup>	0.0846	0.2644 <sup>**</sup>	0.4844 <sup>**</sup>	0.4476 <sup>**</sup>	0.5399 <sup>**</sup>	0.0420	1.0000		
X	0.4533 <sup>**</sup>	0.6298 <sup>**</sup>	0.4315 <sup>**</sup>	0.2323 <sup>*</sup>	0.4665 <sup>**</sup>	0.1997 <sup>*</sup>	0.4252 <sup>**</sup>	0.2920 <sup>**</sup>	0.4536 <sup>**</sup>	0.5707 <sup>**</sup>	0.1104	0.6144 <sup>**</sup>	1.0000	
X	0.2729 <sup>**</sup>	0.2745 <sup>**</sup>	0.3075 <sup>**</sup>	0.2626 <sup>**</sup>	0.3736 <sup>**</sup>	0.1765	0.2216 <sup>*</sup>	0.2083 <sup>*</sup>	0.4159 <sup>**</sup>	0.3643 <sup>**</sup>	0.0212	0.5866 <sup>**</sup>	0.2813 <sup>*</sup>	1.0000

X - Age  
 X - Risk orientation  
 X - Extension contact  
 Y - Attitude

X. Education  
 X - Credit orientation  
 X - Mass media participation

X. Farming Experience  
 X - Cosmopoliteness  
 X - Land possession

X. Organisation participation  
 X - Extension participation  
 X - Knowledge  
 Y - Adoption

: Significant at 5% level of probability  
 : Significant at 1% level of probability

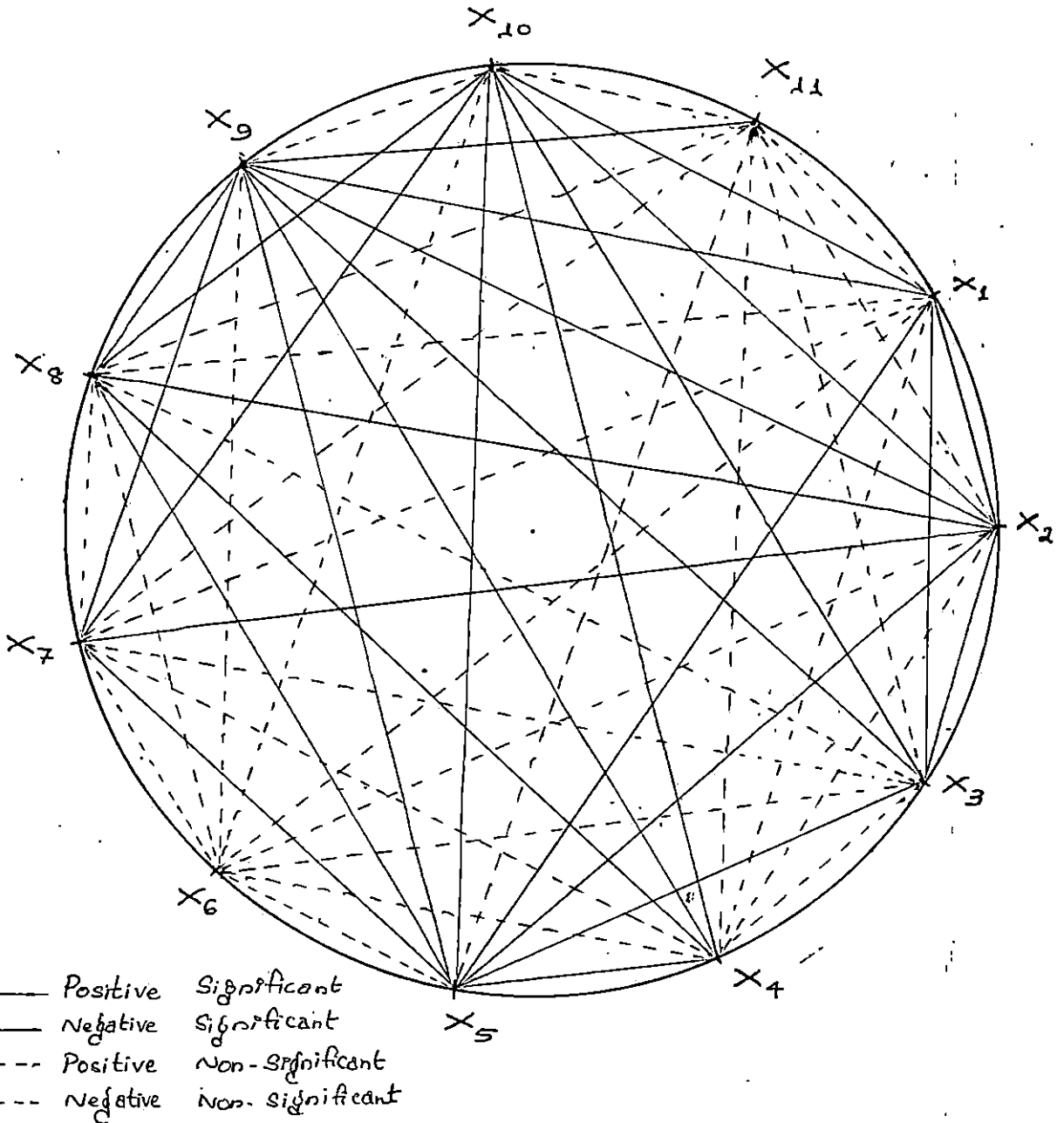


Fig. 3. Inter-correlation Diagram  
 Showing the inter-relationship  
 of independent variables.



Hence it could be inferred that more than two third of the Kanikkars had only low level of adoption of scientific cultivation practices.

3. Relationship between the dependent variables and the selected characteristics of the Kanikkars.

Table 6 gives the intercorrelation matrix which represents the inter-relationships among the variables.

3.1. Relationship between knowledge and the selected characteristics of the 'Kanikkars'

The relationship between knowledge and the selected characteristics of the Kanikkars is presented in Table 7.

Table 7 depicts that out of 11 characteristic variables studied, all variables except credit orientation and land possession were significantly correlated with knowledge at one per cent level of significance. Among the correlated variables, age and farming experience had negative and significant correlation with knowledge.

Accepting and rejecting the null hypothesis for non-significant and significant values respectively, it is inferred that knowledge is the function of age, education, farming experience, organisation participation, risk orientation, cosmopolitaness, extension participation, extension contact and mass media participation.

Table 7 Correlation of knowledge with the selected characteristics of the Kanikkars

(n = 100)

Sl.No.	Characteristics	'r' value
1	Age	- 0.3758**
2	Education	0.6024**
3	Farming experience	- 0.3506**
4	Organisation participation	0.3426**
5	Risk orientation	0.5925**
6	Credit orientation	0.0846
7	Cosmopoliteness	0.2644**
8	Extension participation	0.4844**
9	Extension contact	0.4476**
10	Mass media participation	0.5399**
11	Land possession	0.042

\*\* : Significant at 1% level of probability

This means that the knowledge level of Kani-farmers were influenced by their age, education, farming experience, organisation participation, risk orientation, cosmopoliteness, extension participation, extension contact and mass media participation.



3.2. Relationship between attitude and the selected characteristics of the "Kanikkars"

The relationship between attitude and the selected characteristics of the Kanikkars is furnished in Table 8.

Table 8 Correlation of attitude with the selected characteristics of the "Kanikkars"

(n = 100)

Sl.No.	Characteristics	'r' value
1	Age	- 0.4533**
2	Education	0.6298**
3	Farming experience	- 0.4315**
4	Organisation participation	0.2323*
5	Risk orientation	0.4665**
6	Credit orientation	0.1997*
7	Cosmopoliteness	0.4252**
8	Extension participation	0.292**
9	Extension contact	0.4536**
10	Mass media participation	0.5707**
11	Land possession	0.1104

\* : Significant at 5% level of probability

\*\* : Significant at 1% level of probability

From the Table 8, it could be observed that all the variables except land possession were significantly correlated with attitude towards farming of the Kani-tribe. Among the variables correlated, organisation participation and credit orientation were significant at five per cent level of probability and age and farming experience were negatively correlated.

Rejecting and accepting the null hypothesis for the significant and non-significant values respectively, it could be inferred that attitude of tribal farmers towards farming is a function of age, education, farming experience, organisation participation, risk orientation, credit orientation, cosmopolitaness, extension participation, extension contact and mass media participation.

It can be concluded that except age and farming experience, all the variables were directly related to the attitude of farmers towards farming, whereas age and farming experience had negative relationship.

### 3.3 Relationship between adoption and the selected characteristics of the 'Kanikkars'

Evidence regarding the relationship between adoption and the selected characteristics of the tribal farmers could be obtained from Table 9.

Table 9 Correlation of Adoption with the selected characteristics of the 'Kanikkars'

(n = 100)

Sl.No.	Characteristics	'r' value
1	Age	0.2729**
2	Education	0.2745**
3	Farming experience	0.3075**
4	Organisation participation	0.2626**
5	Risk orientation	0.3736**
6	Credit orientation	0.1765
7	Cosmopolitaness	0.2216*
8	Extension participation	0.2083*
9	Extension contact	0.4159**
10	Mass media participation	0.3643**
11	Land possession	0.0212

\* : Significant at 5% level of probability

\*\* : Significant at 1% level of probability

Table 9 reveals that except credit orientation and land possession, all other characteristic variables were significantly correlated with adoption of improved practices. Of the variables correlated, the variables

cosmopolitaness and extension participation had a significant relationship at five per cent level of probability and the variable age and farming experience had negative correlation.

Accepting and rejecting the null hypothesis for the variables not significantly correlated and significantly correlated respectively, it is inferred that adoption of improved cultivation practices is the function of age, education, farming experience, organisation participation, risk orientation, cosmopolitaness, extension participation, extension contact and mass media participation.

It may be concluded that the adoption of improved cultivation practices was positively correlated with education, organisation participation, risk orientation, cosmopolitaness, extension participation, extension contact and mass media participation whereas age and farming experience had negative relationship.

#### 4. Results of multiple regression analysis

The multiple regression analysis was done to assess the extent of influence of each independent variable on the dependent variables viz knowledge about the improved

cultivation practices, attitude of Kanikkars towards farming and adoption of modern techniques of cultivation.

4.1 Multiple Regression analysis of knowledge about improved cultivation practices on the selected characteristics of Kanikkars.

Table 10 Multiple regression of knowledge on the selected characteristics of 'Kanikkars'

Variable No.	Selected Characteristics	'b' co-efficient	't'
X <sub>1</sub>	Age	0.0493	0.2612
X <sub>2</sub>	Education	1.311	3.4877**
X <sub>3</sub>	Farming experience	0.0946	0.5469
X <sub>4</sub>	Organisation participation	0.3603	1.1699
X <sub>5</sub>	Risk orientation	0.5527	2.3924*
X <sub>6</sub>	Credit orientation	0.0173	0.0169
X <sub>7</sub>	Cosmopoliteness	1.0388	1.5218
X <sub>8</sub>	Extension participation	2.2726	2.8499**
X <sub>9</sub>	Extension contact	0.3597	1.1641
X <sub>10</sub>	Mass media participation	0.071	0.1277
X <sub>11</sub>	Land possession	0.4002	0.9222
X <sub>0</sub>	Constant	8.302(b <sub>0</sub> )	
F = 10.6979**		R <sup>2</sup> = 0.5721	

Table 10 reveals that the  $R^2$  value was 0.5721. So, the total variation explained by the 11 variables was 57.21 per cent. i.e., 57.21 per cent of the variation in knowledge may be attributed to these 11 independent variables.

The F value was significant at one per cent level of probability and the 't' value was significant for three variables viz education ( $X_2$ ), and extension participation ( $X_8$ ) at one per cent and risk orientation ( $X_5$ ) at the five per cent level of probability. Hence the predicted model is as follows:

$$\begin{aligned}
 Y_1 = & -8.302 - 0.0493X_1 + 1.311 X_2^{**} + \\
 & 0.0946X_3 + 0.3603X_4 + 0.5527 X_5^* + . \\
 & 0.0173X_6 + 1.0388X_7 + 2.2726X_8^{***} + \\
 & 0.3597X_9 + 0.071 X_{10} - 0.4002 X_{11}
 \end{aligned}$$

It is inferred that the variables education, risk orientation and extension participation were directly contributing to the dependent variable knowledge. From this, it could be concluded that every addition of one unit of education would increase one unit of knowledge, addition of two units of risk orientation would increase one unit of knowledge and every addition of one unit of extension participation would increase two units of knowledge.



It implies that, to impart any type of knowledge, the agencies should ensure the participation of tribal people in extension programmes and involve more educated farmers. The risk orientation behaviour of tribal farmers must also be increased.

#### 4.2. Multiple regression analysis of attitude of Kanikkars towards farming on their selected characteristics

Table 11 Multiple regression of attitude on the selected characteristics of Kanikkars.

Variable No.	Selected characteristics	'b' Coefficient	't'
X <sub>1</sub>	Age	0.0124	0.2205
X <sub>2</sub>	Education	0.3765	3.3626**
X <sub>3</sub>	Farming experience	0.0059	0.1147
X <sub>4</sub>	Organisation participation	0.0300	0.3267
X <sub>5</sub>	Risk orientation	0.0420	0.6106
X <sub>6</sub>	Credit orientation	0.4620	1.5202
X <sub>7</sub>	Cosmopolitaness	0.6855	3.3717**
X <sub>8</sub>	Extension participation	0.2143	0.9021
X <sub>9</sub>	Extension contact	0.1038	1.1279
X <sub>10</sub>	Mass media participation	0.2018	1.2182
X <sub>11</sub>	Land possession	0.0076	0.0585
X <sub>0</sub>	Constant	12.09 (b <sub>0</sub> )	

F = 9.99\*\*

R<sup>2</sup> = 0.5552

It is evident from Table 11 that the  $R^2$  value was 0.5552. So the total variation explained by the 11 variables was 55.52 per cent. ie. 55.52 per cent of the variation in the attitude of Kanikkars towards farming may be attributed to these 11 independent variables. However, only  $X_2$  and  $X_7$  were found to influence the attitudes significantly.

The F value was significant at one per cent level of probability and the 't' values of two variables viz education ( $X_2$ ) and cosmopolitanism ( $X_7$ ) were significant at one per cent level of probability. Hence, the predicted model is as follows.

$$\begin{aligned}
 Y_2 = & 12.09 - 0.0124 X_1 + 0.3765 X_2^{**} + \\
 & 0.0059 X_3 + 0.03 X_4 + 0.042 X_5 + \\
 & 0.462 X_6 + 0.6855 X_7^{**} + 0.2143 X_8 + \\
 & 0.1038 X_9 + 0.2018 X_{10} + 0.0076 X_{11}
 \end{aligned}$$

That is, the variables education and cosmopolitanism are directly contributing to the dependent variable viz attitude of Kanikkars towards farming. From this it could be concluded that every addition of three units of education and two units of cosmopolitanism would increase one unit of favourable attitude towards farming.

It implies that to change the attitude of Kanifarmers towards farming, the extension agencies must increase the education level and the cosmopolitaness of the Kanikkars.

4.3 Multiple regression analysis of adoption of modern techniques of cultivation on the selected characteristics of the Kanikkars.

Table 12 Multiple regression of adoption on the selected characteristics of Kanikkars.

Variable No.	Selected Characteristics	'b' Coefficient	't'
X <sub>1</sub>	Age	0.1198	-0.7502
X <sub>2</sub>	Education	-0.1368	-0.4298
X <sub>3</sub>	Farming experience	-0.1667	-1.1382
X <sub>4</sub>	Organisation participation	0.2259	0.8660
X <sub>5</sub>	Risk orientation	0.2347	1.1995
X <sub>6</sub>	Credit orientation	1.3118	1.5180
X <sub>7</sub>	Cosmopolitaness	0.5903	1.0211
X <sub>8</sub>	Extension participation	0.1289	0.1909
X <sub>9</sub>	Extension contact	0.4726	1.8059
X <sub>10</sub>	Mass media participation	-0.4274	-0.9076
X <sub>11</sub>	Land possession	-0.4218	-1.1478
X <sub>0</sub>	Constant	-16.164(b <sub>0</sub> )	

The Table 12 makes it clear that the  $R^2$  value was 0.282. ie. the total variation explained by the 11 variables was 28.2 per cent only. It implies that 28.2 per cent of the variation in the adoption of improved farming practices may be attributed to these 11 independent variables. The F test of significance showed that the fitted regression is not significant. None of the partial regression coefficients were also not significant. The predicted model is as follows.

$$Y_3 = -16.164 + 0.1198 X_1 - 0.1368 X_2 - 0.1667 X_3 + \\ 0.2259 X_4 + 0.2347 X_5 + 1.3118 X_6 + 0.5903 X_7 + \\ 0.1289 X_8 + 0.4726 X_9 + 0.4274 X_{10} - 0.4218 X_{11}$$

Hence it is inferred that all the characteristic variables combinely contribute to the dependent variable viz adoption of modern techniques of cultivation.

##### 5. Results of path analysis

Path analysis was done to assess the direct and indirect effects of independent variables on dependent variables so as to identify the crucial and important variables.

5.1 Direct and Indirect effects of the independent variables on the knowledge of the respondents.

From the results of the correlation analysis, it could be seen that out of the eleven independent variables selected for the study, only nine variables were correlated with knowledge. These nine variables were considered for studying their direct and indirect effects on knowledge. Variables thus taken to study the direct and indirect effects on knowledge were age ( $X_1$ ), education ( $X_2$ ), farming experience ( $X_3$ ), organisation participation ( $X_4$ ), risk orientation ( $X_5$ ), cosmopolitanness ( $X_7$ ), extension participation ( $X_8$ ), extension contact ( $X_9$ ) and mass media participation ( $X_{10}$ ). The direct and indirect effect of the variables are given in Tables 13 and 14.

The results of path analysis reveal that the maximum positive direct effect towards knowledge was due to the variable education, followed by extension participation and risk orientation. The maximum negative direct effect towards knowledge was due to the variable age, followed by credit orientation.

Considering the total indirect effect, the maximum positive indirect effect was due to mass media

Table 13. Direct and indirect effects of independent variables on knowledge

	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	Total Correla- tion
X <sub>1</sub>	<u>0.0418</u>	0.2312	0.0703	0.0034	0.0763	0.0020	0.0205	0.0324	0.0315	0.0109	0.3758**
X <sub>2</sub>	0.0256	<u>0.3760</u>	0.0459	0.0163	0.0995	0.0008	0.0259	0.0605	0.0303	0.0148	0.6024**
X <sub>3</sub>	0.0381	0.2242	<u>0.0770</u>	0.0660	0.0734	0.0013	0.0209	0.0237	0.0315	0.0108	0.3506**
X <sub>4</sub>	0.0014	0.0620	0.0047	<u>0.0989</u>	0.0728	0.0011	0.0122	0.0682	0.0282	0.0047	0.3426**
X <sub>5</sub>	0.0147	0.1727	0.0261	0.0333	<u>0.2166</u>	0.0010	0.0228	0.1065	0.0414	0.0116	0.5925**
X <sub>6</sub>	0.0063	0.0233	0.0071	0.0083	0.0172	<u>0.0131</u>	0.0105	0.0260	0.0134	0.0002	0.0846
X <sub>7</sub>	0.0078	0.0889	0.0147	0.0109	0.0450	0.0013	<u>0.1096</u>	0.0050	0.0177	0.0052	0.2644**
X <sub>8</sub>	0.0057	0.0973	0.0078	0.0289	0.0986	0.0015	0.0023	<u>0.2340</u>	0.0245	0.0071	0.4844**
X <sub>9</sub>	0.0157	0.1357	0.0289	0.0334	0.1071	0.0021	0.0233	0.0682	<u>0.0839</u>	0.0114	0.4476**
X <sub>10</sub>	0.0208	0.2545	0.0380	0.0210	0.1143	0.0001	0.0258	0.0758	0.0436	<u>0.0219</u>	0.5399**

Residue = 0.6573

(Underlined figures are the direct effects)

\*\* : Significant at 1% level of probability

Table 14 Results of path analysis

Substantial effects of independent variables on the knowledge of the respondents

(n = 100)

Variable No.	Name of the variable	Total correlation	Direct effect	Total indirect effect	Substantial indirect effects through the crucial variables according to rank		
					First	Second	Third
X <sub>1</sub>	Age	0.3758**	0.0418	0.334	0.2313 (X <sub>2</sub> )	0.0763 (X <sub>5</sub> )	0.0703 (X <sub>3</sub> )
X <sub>2</sub>	Education	0.6024**	0.376	0.2264	0.0995 (X <sub>5</sub> )	0.0606 (X <sub>8</sub> )	0.0459 (X <sub>3</sub> )
X <sub>3</sub>	Farming experience	0.3506**	0.077	0.4276	0.2242 (X <sub>2</sub> )	0.0734 (X <sub>5</sub> )	-0.0381 (X <sub>1</sub> )
X <sub>4</sub>	Organisation participation	0.3426**	0.0989	0.2437	0.0728 (X <sub>5</sub> )	0.0681 (X <sub>8</sub> )	0.062 (X <sub>2</sub> )
X <sub>5</sub>	Risk orientation	0.5925**	0.2166	0.3759	0.1728 (X <sub>2</sub> )	0.1065 (X <sub>8</sub> )	0.0415 (X <sub>9</sub> )
X <sub>6</sub>	Credit orientation	0.0846	0.0131	0.0977	0.026 (X <sub>8</sub> )	0.0233 (X <sub>2</sub> )	0.0171 (X <sub>5</sub> )
X <sub>7</sub>	Cosmopolitaness	0.2644**	0.1096	0.1548	0.089 (X <sub>2</sub> )	0.0451 (X <sub>5</sub> )	0.0178 (X <sub>9</sub> )
X <sub>8</sub>	Extension participation	0.4844**	0.234	0.2504	0.099 (X <sub>5</sub> )	0.0973 (X <sub>2</sub> )	0.0289 (X <sub>4</sub> )
X <sub>9</sub>	Extension contact	0.4476**	0.0839	0.3637	0.1358 (X <sub>2</sub> )	0.1071 (X <sub>5</sub> )	0.0682 (X <sub>8</sub> )
X <sub>10</sub>	Mass media participation	0.5399**	0.0219	0.519	0.2545 (X <sub>2</sub> )	0.1143 (X <sub>5</sub> )	0.0758 (X <sub>8</sub> )

Residue = 0.6573

\*\* Significant at 1% level of probability

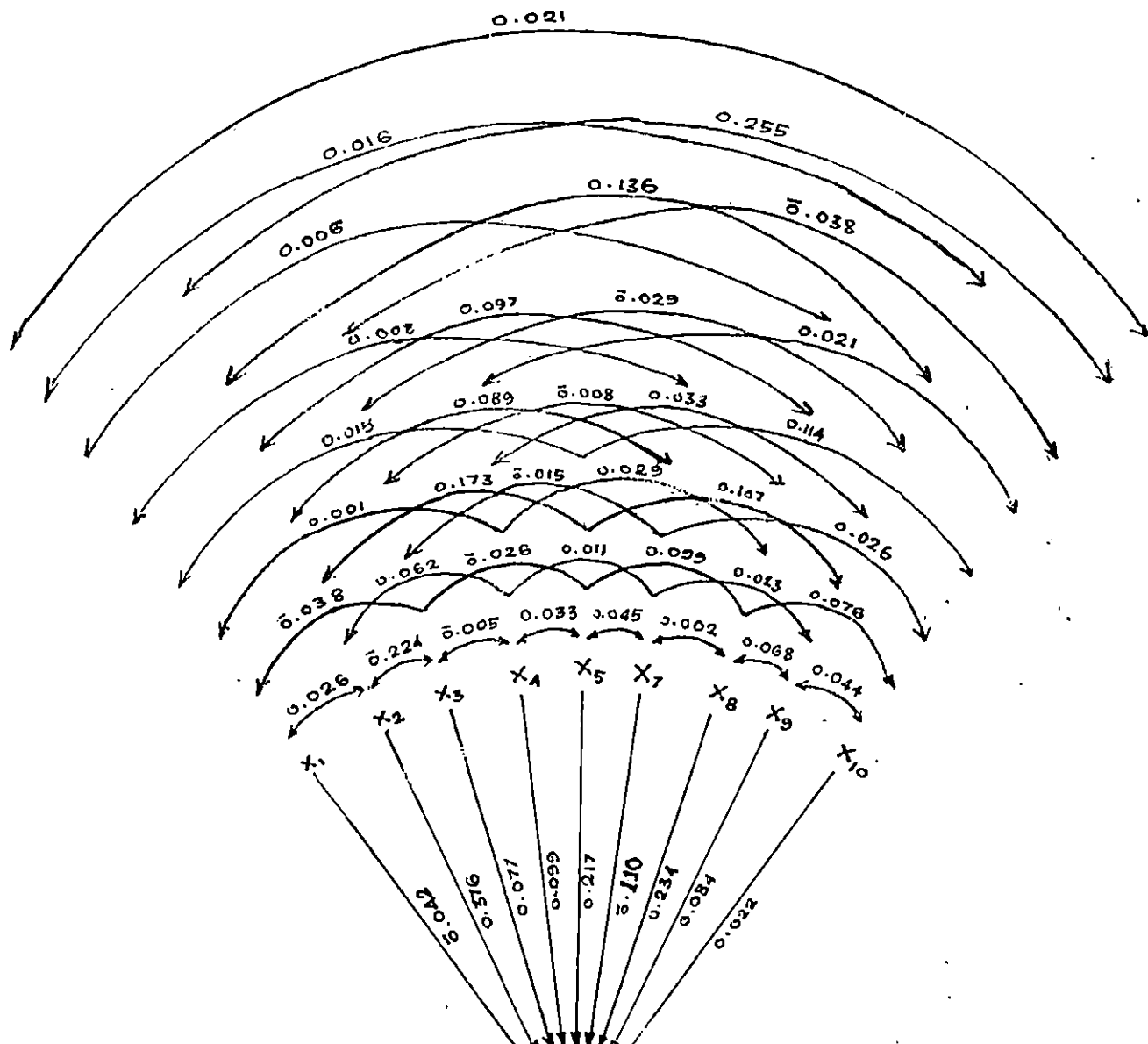
Approximately 41 per cent of the correlation of  $X_7$  with  $Y_1$  may be attributed to its direct effect (0.1096). The major indirect contributor of this correlation was  $X_2$  (0.0889). The correlation of  $X_8$  with  $Y_1$  was 0.4844 and  $X_8$  contributed about 48 per cent of this correlation directly. The major factor contributed maximum indirect effect was  $X_5$  (0.0986). The correlation of  $X_9$  with  $Y_1$  was highly significant (0.4476), but the direct contribution of  $X_9$  was only about 19 per cent.  $X_2$  and  $X_5$  were the major factors which indirectly contributed to this correlation. The high significant correlation of  $X_{10}$  with  $Y_1$  may mainly attributed to the indirect effects of  $X_{10}$  via  $X_2$  (0.2545),  $X_5$  (0.1143) and  $X_8$  (0.0758), while it directly contributed only about 4 per cent.

Hence it was inferred that education ( $X_2$ ), risk orientation ( $X_5$ ) and extension participation ( $X_8$ ) were very crucial and important variables determining the knowledge level of Kani-farmers. Only 31.27 per cent of the variation in  $Y$  may be attributed to the variables considered.

The results of path analysis is digramatically presented in Figure 4.



FIG 4 PATH DIAGRAM SHOWING THE DIRECT AND INDIRECT EFFECTS OF SELECTED INDEPENDENT VARIABLES ON THE KNOWLEDGE OF KANIKKAR ABOUT IMPROVED CULTIVATION PRACTICES



- X<sub>1</sub> - AGE
- X<sub>2</sub> - EDUCATION
- X<sub>3</sub> - FARMING EXPERIENCE
- X<sub>4</sub> - ORGANISATION PARTICIPATION
- X<sub>5</sub> - RISK ORIENTATION
- X<sub>7</sub> - COSMOPOLITENESS
- X<sub>8</sub> - EXTENSION PARTICIPATION
- X<sub>9</sub> - EXTENSION CONTACT
- X<sub>10</sub> - MASS MEDIA PARTICIPATION

5.2 Direct and Indirect effects of the independent variables on the attitude of the respondents.

The results of the correlation analysis showed that all the independent variables selected for the study except land possession were correlated with attitude. These ten variables were considered for studying their direct and indirect effects on knowledge. Age ( $X_1$ ), education ( $X_2$ ), farming experience ( $X_3$ ), organisation participation ( $X_4$ ), risk orientation ( $X_5$ ), credit orientation ( $X_6$ ), cosmopolitaness ( $X_7$ ), extension participation ( $X_8$ ), extension contact ( $X_9$ ) and mass media participation ( $X_{10}$ ) were the variables thus taken to study the direct and indirect effects on attitude. The direct and indirect effects of the variables are given in Tables 15 and 16.

The results of path analysis depict that the maximum positive direct effect towards attitude was due to the variable education, followed by cosmopolitaness. The negative direct effect towards attitude was due to the variable viz age.

Considering the total indirect effect, the maximum positive indirect effect was due to mass media participation, followed by risk orientation and extension

Table 15. Direct and indirect effects of independent variables on attitude

	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	Total Correlation
X <sub>1</sub>	<u>0.0403</u>	0.2266	0.0197	0.0009	0.0210	0.0176	0.0476	0.0104	0.0418	0.0668	0.4533**
X <sub>2</sub>	0.0248	<u>0.3685</u>	0.0129	0.0042	0.0274	0.0072	0.0603	0.0195	0.0461	0.0907	0.6298**
X <sub>3</sub>	0.0368	0.2197	<u>0.0216</u>	0.0016	0.0202	0.0107	0.0487	0.0077	0.0418	0.0661	0.4315**
X <sub>4</sub>	0.0014	0.0608	0.0013	<u>0.0256</u>	0.0200	0.0098	0.0283	0.0220	0.0375	0.0285	0.2323*
X <sub>5</sub>	0.0142	0.1693	0.0073	0.0086	<u>0.0595</u>	0.0093	0.0530	0.0343	0.0550	0.0707	0.4665**
X <sub>6</sub>	0.0061	0.2285	0.0020	0.0021	0.0047	<u>0.1168</u>	0.0243	0.0084	0.0178	0.0014	0.1997*
X <sub>7</sub>	0.0075	0.0872	0.0041	0.0028	0.0124	0.0111	<u>0.2547</u>	0.0016	0.0236	0.0316	0.4252**
X <sub>8</sub>	0.0056	0.0954	0.0022	0.0075	0.0271	0.0130	0.0054	<u>0.0753</u>	0.0334	0.0434	0.2920**
X <sub>9</sub>	0.0151	0.1331	0.0081	0.0086	0.0294	0.0187	0.0540	0.0220	<u>0.1111</u>	0.0696	0.4536**
X <sub>10</sub>	0.0201	0.2494	0.0107	0.0054	0.0314	0.0012	0.0600	0.0244	0.0578	<u>0.1340</u>	0.5707**

Residue = 0.6669  
 (Underlined figures are the direct effects)  
 \* : Significant at 5% level of probability  
 \*\* : Significant at 1% level of probability

contact. Whereas, the maximum negative indirect effect was due to farming experience, followed by age.

The direct effect of  $X_1$  on  $Y_2$  was negative. The correlation of  $X_1$  on  $Y$  was highly significant too (0.6298). This correlation was mainly due to the indirect effect of  $X_1$  via  $X_2$  (-0.2266). The maximum direct effect was contributed by  $X_2$  (0.3685), which contributed to 58.5 per cent of its correlation with  $Y_2$ . The indirect effects contributed to the remaining 41.5 per cent of the correlation. The direct effect of  $X_3$  was positive, but small, whereas its correlation with  $Y_2$  was negative. This negative correlation was mainly attributed to its negative indirect effect via  $X_2$  (-0.2197). The correlation of  $X_4$  with  $Y_2$  was positive and significant (0.2323). The direct effect of  $X_4$  only about 11 per cent of it. The remaining fraction of the correlation may be attributed to the indirect effect of  $X_4$ . About 13 per cent of the correlation of  $X_5$  with  $Y_2$  (0.4665) may be attributed to  $X_5$  directly (0.0595) and among the indirect effects,  $X_2$  contributed 36.29 per cent. The direct effect of  $X_6$  on  $Y_2$  was positive and its correlation with  $Y_2$  was significant. Nearly 60 percent of the correlation of  $X_7$  with  $Y_2$  may be attributed to its direct effect (0.2547). The major indirect contributor of this correlation was  $X_2$  (0.0872). The

Table 16 Results of path analysis

Substantial effects of independent variables on the attitude of the respondents

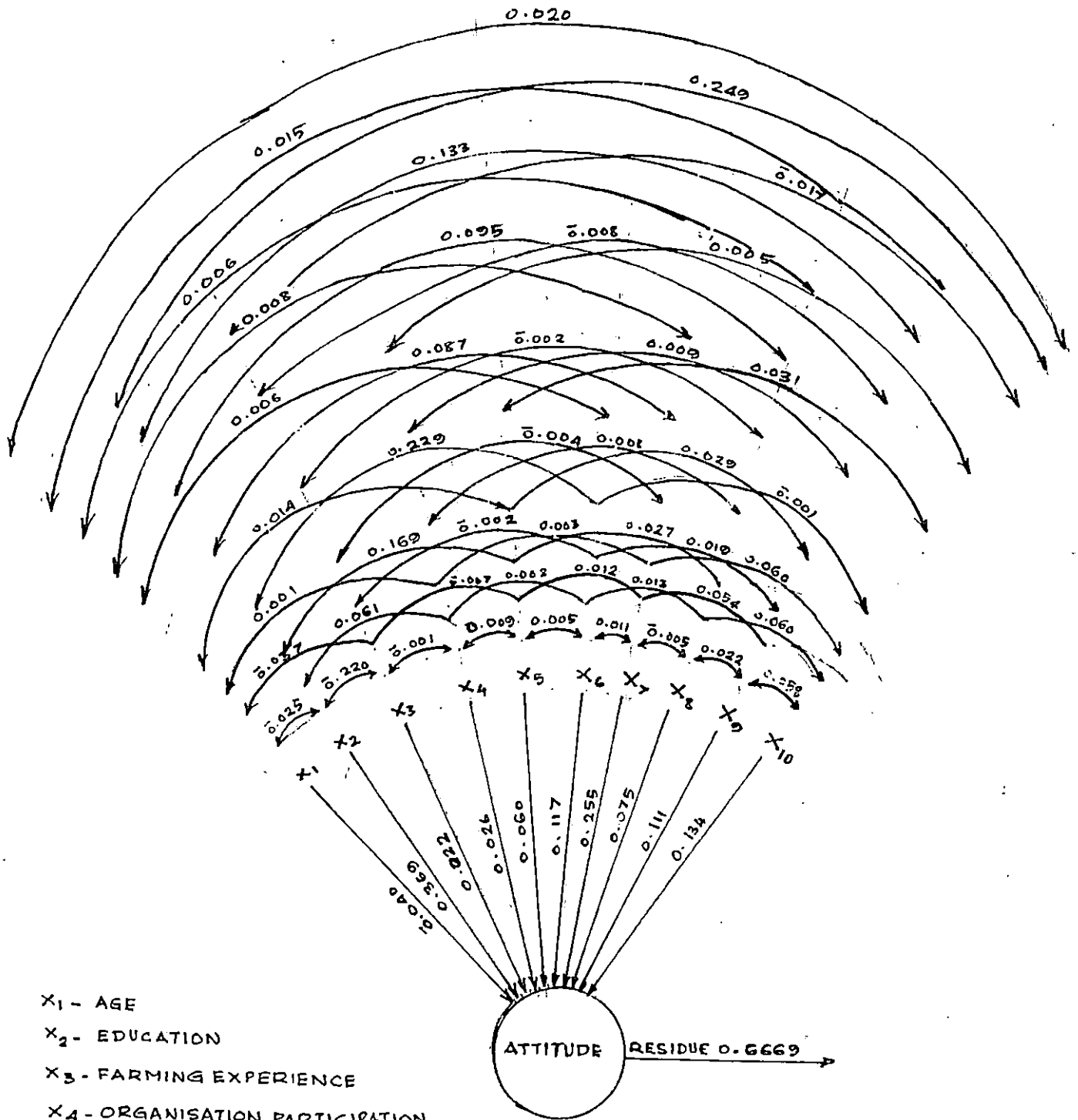
(n = 100)

Variable No.	Name of the variable	Total correlation	Direct effect	Total indirect effect	<u>Substantial indirect effects through the crucial variables according to rank</u>		
					First	Second	Third
X <sub>1</sub>	Age	0.4533**	0.0403	0.413	0.2266 (X <sub>2</sub> )	0.0668 (X <sub>10</sub> )	0.0476 (X <sub>7</sub> )
X <sub>2</sub>	Education	0.6298**	0.3685	0.2613	0.0907 (X <sub>10</sub> )	0.0603 (X <sub>7</sub> )	0.0401 (X <sub>9</sub> )
X <sub>3</sub>	Farming experience	0.4315**	0.0216	0.4531	0.2197 (X <sub>2</sub> )	0.0661 (X <sub>10</sub> )	-0.0487 (X <sub>7</sub> )
X <sub>4</sub>	Organisation participation	0.2323*	0.0256	0.2067	0.0608 (X <sub>2</sub> )	0.0375 (X <sub>9</sub> )	0.0285 (X <sub>10</sub> )
X <sub>5</sub>	Risk orientation	0.4665**	0.0595	0.407	0.1693 (X <sub>2</sub> )	0.0707 (X <sub>10</sub> )	0.055 (X <sub>9</sub> )
X <sub>6</sub>	Credit orientation	0.1997*	0.1168	0.0829	0.0243 (X <sub>7</sub> )	0.0229 (X <sub>2</sub> )	0.0178 (X <sub>9</sub> )
X <sub>7</sub>	Cosmopolitaness	0.4252**	0.2547	0.1705	0.0872 (X <sub>2</sub> )	0.0316 (X <sub>10</sub> )	0.0236 (X <sub>9</sub> )
X <sub>8</sub>	Extension participation	0.292**	0.0753	0.2167	0.0954 (X <sub>2</sub> )	0.0434 (X <sub>10</sub> )	0.0324 (X <sub>9</sub> )
X <sub>9</sub>	Extension contact	0.4536**	0.1111	0.3425	0.1331 (X <sub>2</sub> )	0.0696 (X <sub>10</sub> )	0.054 (X <sub>7</sub> )
X <sub>10</sub>	Mass media participation	0.5707**	0.134	0.4367	0.2494 (X <sub>2</sub> )	0.06 (X <sub>7</sub> )	0.0578 (X <sub>9</sub> )

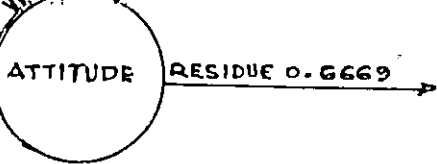
Residue = 0.6669

\* - Significant at 5% level of probability

FIG PATH DIAGRAM SHOWING THE DIRECT AND INDIRECT EFFECTS OF SELECTED INDEPENDENT VARIABLES ON THE ATTITUDE OF 'KANIKKARS' TOWARDS FARMING



- X<sub>1</sub> - AGE
- X<sub>2</sub> - EDUCATION
- X<sub>3</sub> - FARMING EXPERIENCE
- X<sub>4</sub> - ORGANISATION PARTICIPATION
- X<sub>5</sub> - RISK ORIENTATION
- X<sub>6</sub> - CREDIT ORIENTATION
- X<sub>7</sub> - COSMOPOLITENESS
- X<sub>8</sub> - EXTENSION PARTICIPATION
- X<sub>9</sub> - EXTENSION CONTACT
- X<sub>10</sub> - MASS MEDIA PARTICIPATION



correlation of  $X_8$  with  $Y_2$  was 0.292 and  $X_8$  contributed 25.78 per cent of this correlation directly. The major factor contributed maximum indirect effect was  $X_2$  (0.0954). The correlation of  $X_9$  with  $Y$  was highly significant (0.4536), but the direct contribution of  $X_9$  was only about 24.5 percent.  $X_2$  was the major factor which indirectly contributed to this correlation. The highly significant correlation of  $X_{10}$  with  $Y_2$  may mainly attributed to the indirect effects of  $X_{10}$  via  $X_2$  (0.2494), while it directly contributed only 23.5 per cent.

So it was revealed that education ( $X_2$ ), cosmopolitanness ( $X_7$ ) and mass media participation ( $X_{10}$ ) were very crucial and important variables determining the attitude of the Kanikkars towards farming. Only 33.31 per cent of the variation in  $Y_a$  may be attributed to the variables studied.

The results of path analysis is digramatically presented in Figure 5.

5.3. Direct and indirect effects of the independent variables on the adoption of the respondents.

Out of the 11 independent variables selected for the study, only nine variables were correlated with adoption (Vide Table 9). These nine variables viz age ( $X_1$ ), education ( $X_2$ ), farming experience ( $X_3$ ), organisation participation ( $X_4$ ), risk orientation ( $X_5$ ), cosmopolitaness ( $X_7$ ), extension participation ( $X_8$ ), extension contact ( $X_9$ ) and mass media participation ( $X_{10}$ ) were considered for studying the direct and indirect effects on adoption. The direct and indirect effects of the variables are given in Tables 17 and 18.

The results of path analysis reveal that the maximum positive direct effect towards adoption was due to the variable age, followed by extension contact and mass media participation. The maximum negative direct effect towards adoption was due to the variable farming experience, followed by education.

Considering the total indirect effect, the maximum positive indirect effect was due to education, followed by risk orientation and extension contact. Whereas, the maximum negative indirect effect was due to age, followed by farming experience.



Table 17. Direct and indirect effects of independent variables on Adoption

	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	Total Correlation
X <sub>1</sub>	<u>0.1814</u>	0.0356	$\bar{0}$ .2639	$\bar{0}$ .0034	$\bar{0}$ .0463	$\bar{0}$ .0187	$\bar{0}$ .0174	$\bar{0}$ .0029	$\bar{0}$ .0671	$\bar{0}$ .0699	$\bar{0}$ .2729**
X <sub>2</sub>	$\bar{0}$ .1116	<u>0.0578</u>	0.1724	0.0164	$\bar{0}$ .0604	0.0077	0.0220	0.0053	0.0647	0.0949	0.2745**
X <sub>3</sub>	0.1656	0.0345	<u>0.2891</u>	$\bar{0}$ .0061	$\bar{0}$ .0445	$\bar{0}$ .0114	0.0178	$\bar{0}$ .0021	$\bar{0}$ .0674	$\bar{0}$ .0692	$\bar{0}$ .3075**
X <sub>4</sub>	$\bar{0}$ .0062	$\bar{0}$ .0095	0.0177	<u>0.0995</u>	0.0442	0.0103	0.0103	0.0061	0.0605	0.0298	0.2626**
X <sub>5</sub>	$\bar{0}$ .0639	$\bar{0}$ .0266	0.0980	0.0335	<u>0.1313</u>	0.0098	0.0194	0.0095	0.0887	0.0740	0.3736**
X <sub>6</sub>	$\bar{0}$ .0274	$\bar{0}$ .0036	0.0265	0.0033	0.0104	<u>0.1238</u>	0.0089	0.0023	0.0287	$\bar{0}$ .0014	0.1765
X <sub>7</sub>	$\bar{0}$ .0339	$\bar{0}$ .0137	0.0552	0.0110	0.0273	0.0118	<u>0.0931</u>	$\bar{0}$ .0004	0.0380	0.0330	0.2216*
X <sub>8</sub>	$\bar{0}$ .0251	$\bar{0}$ .0150	0.0294	0.0290	0.0597	0.0138	$\bar{0}$ .0020	<u>0.0208</u>	0.0523	0.0454	0.2083*
X <sub>9</sub>	$\bar{0}$ .0682	$\bar{0}$ .0209	0.1087	0.0336	0.0649	0.0198	0.0198	0.0061	<u>0.1793</u>	0.0729	0.4159**
X <sub>10</sub>	$\bar{0}$ .0905	$\bar{0}$ .0391	0.1426	0.0212	0.0693	$\bar{0}$ .0013	0.0219	0.0067	0.0932	<u>0.1402</u>	0.3643**

Residue = 0.8537

(Underlined figures are the direct effects)

\* : Significant at 5% level of probability

\*\* : Significant at 1% level of probability

The direct effect of  $X_1$  on  $Y_3$  was positive. The correlation of  $X_1$  on  $Y_3$  was also highly significant (-0.2729). This correlation was mainly due to the indirect effect of  $X_1$  via  $X_3$  (-0.2639). The direct effect of  $X_2$  was negative and small, whereas its correlation with  $Y$  was positive. This negative correlation was mainly attributed to its negative indirect effect via  $X_3$  (0.1724). The maximum direct effect was contributed by  $X_3$  (-0.2891), which contributed to 94 per cent of its correlation with  $Y_3$ . The indirect effects contributed to the remaining six per cent of the correlation only. The correlation of  $X_4$  with  $Y_3$  was positive and significant (0.2626). The direct effect of  $X_4$  was about 38 per cent of it. The remaining fraction of the correlation may be attributed to the indirect effect of  $X_4$ . Thirty five per cent of the correlation of  $X_5$  with  $Y_3$  (0.3736) may be attributed to  $X_5$  directly (0.1313) and among the indirect effects,  $X_3$  contributed about 26.24 per cent. The direct effect of  $X_6$  on  $Y_3$  was positive and its correlation with  $Y$  was not significant. Forty two per cent of correlation of  $X_7$  with  $Y_3$  was due to its direct effect (0.0931). The major indirect contributor of this correlation was  $X_3$  (0.0552). The correlation of  $X_8$  with  $Y_3$  was 0.2083 and  $X_8$  contributed about ten per cent of this correlation directly. The major factor contributed maximum

Table 18 Results of Path Analysis

Substantial effects of independent variables on the adoption of the respondents

(n = 100)

Variable No.	Name of the variable	Total correlation	Direct effect	Total indirect effect	Substantial indirect effects through the crucial variables according to rank		
					First	Second	Third
X <sub>1</sub>	Age	0.2729**	0.1814	0.4543	0.2638 (X <sub>3</sub> )	0.0699(X <sub>10</sub> )	0.0678 (X <sub>9</sub> )
X <sub>2</sub>	Education	0.2745**	0.0578	0.3323	0.1724(X <sub>3</sub> )	0.1116 (X <sub>1</sub> )	0.0949(X <sub>10</sub> )
X <sub>3</sub>	Farming experience	0.3075**	0.2891	0.0184	0.1656 (X <sub>1</sub> )	0.0692(X <sub>10</sub> )	-0.0674 (X <sub>9</sub> )
X <sub>4</sub>	Organisation participation	0.2626**	0.0995	0.1631	0.0605 (X <sub>9</sub> )	0.0442 (X <sub>5</sub> )	0.0298(X <sub>10</sub> )
X <sub>5</sub>	Risk orientation	0.3736**	0.1313	0.2423	0.098 (X <sub>3</sub> )	0.0887(X <sub>9</sub> )	0.074 (X <sub>10</sub> )
X <sub>6</sub>	Credit orientation	0.1765	0.1238	0.0527	0.0287 (X <sub>9</sub> )	0.0274 (X <sub>1</sub> )	0.0265 (X <sub>3</sub> )
X <sub>7</sub>	Cosmopolitaness	0.2216*	0.0931	0.1285	0.0552 (X <sub>3</sub> )	0.038(X <sub>9</sub> )	0.0339(X <sub>1</sub> )
X <sub>8</sub>	Extension participation	0.2083*	0.0208	0.1875	0.0598 (X <sub>5</sub> )	0.0523(X <sub>9</sub> )	0.0454(X <sub>10</sub> )
X <sub>9</sub>	Extension contact	0.4159**	0.1793	0.2366	0.1087 (X <sub>3</sub> )	0.0729(X <sub>10</sub> )	0.0682 (X <sub>1</sub> )
X <sub>10</sub>	Mass media participation	0.3643**	0.1402	0.2241	0.1426 (X <sub>3</sub> )	0.0932 (X <sub>9</sub> )	0.0905(X <sub>1</sub> )

Residue = 0.8537

\* - Significant at 5% level of probability

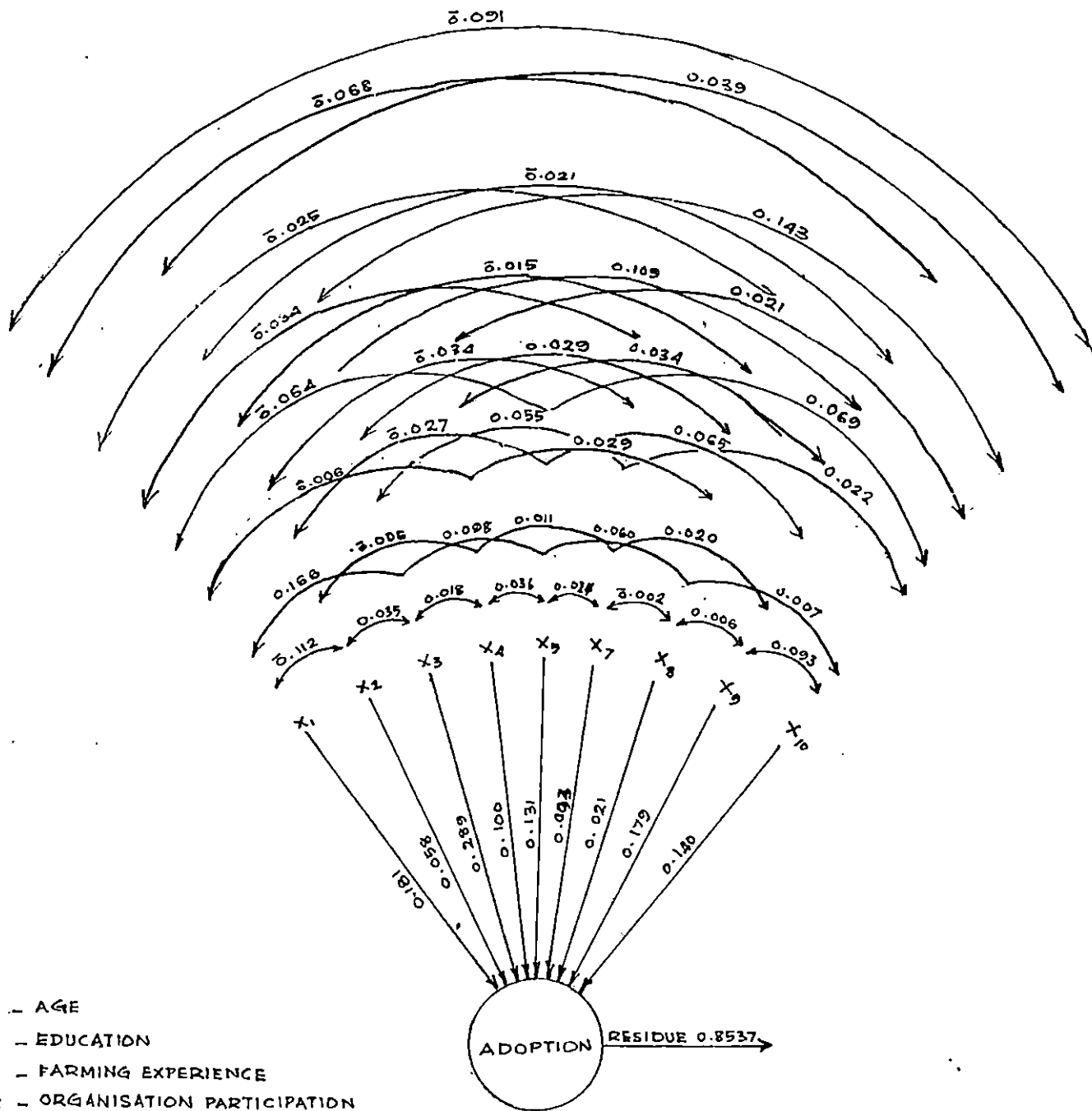
\*\* - Significant at 1% level of probability

indirect effect was  $X_5$  (0.0597). The correlation of  $X_9$  with  $Y_3$  was highly significant (0.4159), but the direct contribution of  $X_9$  was about 43 per cent.  $X_3$  was the major factor which indirectly contributed to this correlation. The highly significant correlation of  $X_{10}$  with  $Y_3$  may mainly be due to the indirect effects of  $X_{10}$  via  $X_3$  (0.1426),  $X_9$  (0.0932) and  $X_1$  (-0.0905), while it directly contributed 38.5 per cent.

Hence it was inferred that age ( $X_1$ ), farming experience ( $X_3$ ) and extension contact ( $X_9$ ) were very crucial and important variables in determining the adoption of modern techniques of cultivation by the tribal farmers. Only 14.63 per cent of the variation in  $Y$  may be attributed to the variables studied.

The results of path analysis is diagrammatically presented in Figure 6.

FIG. PATH DIAGRAM SHOWING THE DIRECT AND INDIRECT EFFECTS OF SELECTED INDEPENDENT VARIABLES ON THE ADOPTION OF MODERN TECHNIQUES OF CULTIVATION BY THE 'KANIKKARS'.



- X<sub>1</sub> - AGE
- X<sub>2</sub> - EDUCATION
- X<sub>3</sub> - FARMING EXPERIENCE
- X<sub>4</sub> - ORGANISATION PARTICIPATION
- X<sub>5</sub> - RISK ORIENTATION
- X<sub>7</sub> - COSMOPOLITENESS
- X<sub>8</sub> - EXTENSION PARTICIPATION
- X<sub>9</sub> - EXTENSION CONTACT
- X<sub>10</sub> - MASS MEDIA PARTICIPATION

6. Factors influencing Agricultural Development

The list of identified factors as perceived by tribal farmers is presented in the following table according to their degree of importance.

Table 19 Factors influencing agricultural development

Sl. No.	Factors according to rank	Score
1.	Availability of irrigation water during summer	494
2.	Availability of marketing facilities	485
3.	Establishing soil conservation project.	468
4.	Establishing agricultural training institute	447
5.	Establishing agricultural extension office.	436
6.	Co-operation of the officers	432
7.	Availability of post-harvest technology	410
8.	Establishing input agencies	409
9.	Co-operation of the people	408
10.	Establishing co-operative society	407
11.	Establishing commercial bank	347
12.	Availability of technology for improving cropping intensity	341

Inferring the results, the factors influencing agricultural development in tribal areas may be summed up as infrastructural development facilities such as availability of irrigation water during summer, marketing facilities and establishing soil conservation project.

Establishment of organisations like agricultural training institute, agricultural extension office, and input agencies was also important. In addition to this, the co-operation of the officers and people was also crucial. The Kanikkars also perceived the establishment of credit institutions like co-operative society and commercial bank as important factors influencing agricultural development.

Availability of post harvest technology and technology for improving cropping intensity were also the factors influencing agricultural development.

#### 7. Constraints affecting agricultural development

Based on the response of the Kani farmers, the following constraints were ranked in the descending order of importance as perceived by them.

The details of ranking of the constraints affecting agricultural development could be obtained from Table 20.

Table 20 Constraints affecting agricultural development

Sl. No.	Constraints according to rank	Score
1.	Crop damage by attack of wild animals	484
2.	Drought during summer	476
3.	Difficulty in availing credit	475
4.	Soil erosion	456
5.	Less co-operation of the officers	443
6.	Difficulty in obtaining various inputs for production	436
7.	Difficulty in getting services	411
8.	Declining soil fertility	397
9.	Attack by pests and diseases	343
10.	Crop damage due to heavy winds	324
11.	Less co-operation of the neighbours	229

Table 20 reveals that crop damage due to attack of wild animals was perceived by the Kanikkars as the most



important constraint affecting agricultural development. The other constraints in the descending order of importance include drought during summer, difficulty in availing credit, soil erosion, less co-operation of the officers, difficulty in obtaining various inputs for production, difficulty in getting services, declining soil fertility, attack by pests and diseases, crop damage due to heavy winds and less co-operation of the neighbours.

**DISCUSSION**

## CHAPTER V

### DISCUSSION

The findings of this study are discussed in this chapter under the following headings.

1. The characteristic profile of the 'Kanikkars'
2. Assessment of extent of agricultural development
3. Relationship between the dependent variables and the selected characteristics of the 'Kanikkars'.
4. Factors influencing agricultural development.
5. Constraints affecting agricultural development.

1. The characteristic profile of the 'Kanikkars'

Of the sampled farmers, about half of the respondents were young and involved in agriculture. This phenomenon is a good indicator of agricultural development in tribal area. This may be due to the reasons that land was available at their disposal and their agriculture was settled in nature. The unemployment problem of the younger generation combined with indispensability of food crops for their livelihood might have influenced them to practice agriculture. This was in accordance with the results obtained by Sushama (1979) and Prakash (1980).

Regarding education, majority of them had high level of education. This may be explained that, the establishment of special adult education centres at tribal areas, government's support and encouragement for enrolling tribal people in the schools and the welfare schemes extended to them might be influencing the tribal farmers to have higher level of education.

It was found that most of the tribal farmers had low farming experience, because of the reasons that younger generation with high educational background had taken agriculture as a profession soon after their general education and the problem of unemployment might have influenced them to start self employment in agriculture. Moreover it is a matter of common sense that lesser the age, the lesser would be the farming experience.

Most of the tribal farmers had low organisation participation because of the reason that majority of them were young and having less farming experience. Hence the necessity for participating in social organisation might not be felt to the maximum extent by the respondents. The lack of opportunities might have also negatively influenced the organisation participation of Kanikkars.

It was interesting to note that equal percentage of farmers had high and low risk orientation due to the reason that the younger generation with high level of education might be more venturesome and prepared to take risk in adopting many innovations as they were starting agriculture as a fresh profession. But at the same time, something prevents them from taking the risk. The traditional tribal culture and the low resource base of the Kanikkars might be the reasons behind this fact.

The tribal farmers had more credit orientation due to the reason that the involvement of younger generation in agriculture, through high level of education and high risk orientation might have prompted them to have more credit orientation for practising innovative practices in agriculture. But the Kanikkars were not at all availing credit from the institutional sources. The complicated procedure to obtain the credit might have led to this.

Viewing the cosmopolitaness of tribal farmers, it was observed that the tribal farmers were more cosmopolite in nature. This might be due to the reason that the farmers with high educational standard coupled with the less experience in farming might have induced their inquisitiveness to learn from the reliable sources and that

might have led them to have more cosmopolitaness. The development of transport and communication facilities might have helped the Kanikkars to go regularly to the nearest towns to meet their personal and domestic needs.

Extension participation of the tribal farmers was very low due to the reason that agricultural meetings, field days and such programmes might not have been arranged at tribal areas for want of infrastructural facilities available for such programmes. This might have resulted in low extension participation.

Extension contact of the tribal farmers was low. This might be due to the reasons that lack of awareness about the availability of facilities such as Krishi Bhavan and the unavailability of Krishi Bhavan in the tribal areas as such, combined with their less experience in farming would have led them to have less extension contact.

The mass media participation of tribal farmers was high, which might be due to the fact that the farmers with high educational standards made them read the newspaper articles and other publications. Exposure to television and radio available in the community centres might have enabled them to secure high level of mass media participation.

It was also found that the land possessed by the tribal farmer respondents was less. Majority of the respondents of this study were small farmers. This might be due to the various restrictions imposed by the forest department to possess the land. The evolution of nuclear families among the Kanikkars might have led to sub-division and fragmentation of holdings and this might be another reason for the low level of land possession.

## 2. Assessment of extent of agricultural development

### 2.0. Identification of agricultural development indicators

Of the list of indicators, only three indicators viz knowledge, attitude and adoption were selected and identified by the experts as far as tribal agricultural development is concerned. This might be due to the fact that, it is natural, any development process, especially in agriculture involves knowledge about technological development, attitude towards such technology and their adoption as chronological/sequential events.

The indicators such as scientific knowledge about agriculture and the latest development in agricultural technologies and innovations, their favourable attitude towards farming based on their experiences and the adoption

of scientific practices of such innovations acquired and experienced were the mental process of any human being. That was why the experts selected these behavioural components such as knowledge, attitude and adoption. These were the three important indicators considered for assessing the tribal agricultural development.

The discussion on the extent of agricultural development among the Kanikkars is done with respect to the three agricultural development indicators selected for the purpose of this study viz. knowledge about improved cultivation practices, attitude towards farming and adoption of modern techniques of cultivation.

#### 2.1. Extent of knowledge about improved cultivation practices

The knowledge level of tribal farmers was high. This might be due to the reason that farmers with high educational status might be exposed more to the mass media especially printed materials, to acquire such knowledge. Their less experience in farming, coupled with more risk orientation and cosmopolitaness might have prompted them to search for innovations and acquire more knowledge on scientific farming. This finding was supported by Viju (1985) in his study on the Kanikkars.



## 2.2. Attitude of tribals towards farming

The attitude of tribal farmers towards farming was more favourable because of the reason that the farmers were well convinced about the new technology through their high educational background, rational thinking and risk-bearing ability coupled with their high level of cosmopolite behaviour. All these factors might have made them to have a more favourable attitude towards farming. Such result was reported earlier by Sushama (1979), Prakash (1980) and Viju (1985).

## 2.3. Extent of adoption of modern techniques of cultivation

The extent of adoption of scientific practices by the tribal farmers was very low. Even the mean score obtained was very low (6.04), compared to the maximum expected score.

This picture gives the results that inspite of having a high level of knowledge and favourable attitude towards farming, their adoption level was very low.

This might be due to the fact that the lack of availability of capital, credit facilities, and the requisite inputs on time, coupled with high cost of inputs might have acted as major constraints in adopting the

practices. This might be the reason for the low level of adoption. This finding was supported by Sushama (1979), Prakash (1980) and Vijju (1985).

### 3. Relationship between the dependent variables and the selected independent variables

The relationship existing between the dependent variables and the independent variables is discussed in this section.

#### 3.1. Relationship between knowledge about the improved cultivation practices and the selected independent variables:

From the Table 7, it was clear that all the independent variables except credit orientation and land possession were significantly correlated with the knowledge level of Kani-farmers at one per cent level of probability. Out of these, the variables viz age and farming experience had negative relationships.

The relationship between age and knowledge was significant at one per cent level of probability. This reveals that younger the age, more would be the knowledge level in crop cultivation. In this study, it is a fact that most of the farmers were young in their age and were prone

to change. They also accepted innovations by acquiring new knowledge about agricultural practices and probably, that would yield such result. This was supported by Bhaskaram and Mahajan (1968), Tripathi (1972), Behara and Sahoo (1975), Menon and Prema (1976), Sadamate (1978) and Siddaramaiah and Rajanna (1984).

Education was found to be having a positive correlation with knowledge, which was significant at one per cent level of probability. It is true that increase in education level of farmers would increase their knowledge level in farming. Since most of the scientific information about agricultural practices are disseminated through mass media including print media, the tribal farmers might have acquired more knowledge about improved farming. Here, the findings from the Table 7 revealed that the education level and mass media contact of tribal farmers were more in this area. This finding was supported by Copp et al (1956), Ramsey et al (1959), Bose (1961), Rogers and Capener (1966), Sharma (1966), Khan (1967) Bhaskaram and Mahajan (1968), Menon (1970), Supe and Salode (1975), Somasundaram (1976), Janakiramraju (1978), Kaleel (1978), Manjunatha (1980), Ahamed (1981), Haraprasad (1982), Balachandran (1983), Viju (1985), Krishnamoorthy (1988) and Intodia (1989).

Farming experience had a significant correlation with knowledge. This indicates that more the farming experience, more would be the knowledge level. But contrary to the fact, the farmers had less experience in farming. This was due to the fact that farmers in the young age might have acquired more knowledge about cultivation practices from information sources and it was an accepted fact that the young farmers as new entrants in agriculture might have sought innovations and ideas, so as to make agriculture a promising and successful enterprise. That was why such a result. This finding was supported by the past studies by Chandrasekaran (1981), Arumugam (1983) and Alexander (1985).

The positive and highly significant relationship between organisation participation and knowledge was also noted previously by Copp et al (1949), Singh and Prasad (1974), Kaleel (1978), Kantharaj (1980), Haraprasad (1982), Viju (1985), Khanal (1986), Subramoniam (1986) and Krishnamoorthy (1988). But the finding was contrary to this. Most of the farmers had low organisation participation. The result may be explained that due to the high educational standard, their perception about the organisation and the utility and usefulness of the

programmes and schemes implemented by the organisation might have been well understood by the tribal farmers. Moreover, as a general rule, people who participate more in organisational activities would be having more knowledge as they have better contacts and good access to sources of knowledge about improved cultivation practices.

Observing the personal characteristics of the farmers, most of the farmers had high risk orientation and their knowledge level was more. It was observed earlier by Viju (1985) among the 'Kanikkar' tribe of Thiruvananthapuram District. It is universal that farmers having more risk orientation behaviour would be more cautious about the pros and cons of different practices and innovations and to bear such risk, they would seek more reliable information about each and every practices and thereby acquire sound knowledge about improved cultivation practices.

Cosmopolitaness and knowledge had positive and significant correlation. People who are frequent visitors to the nearby towns and having better social contacts would be exposed more to the world of knowledge. By analysing the characteristics of farmers, they had more

cosmopolitanism according to the findings of this study. This might be the reason behind the positive correlation between cosmopolitanism and knowledge. It was reported earlier by Knight and Singh (1975), Somasundaram (1976), Kamarudeen (1981) Balachandran (1983), Siddaramaiah and Rajanna (1984), Viju (1985) and Subramoniam (1986).

The results of the present study revealed that extension participation was positively correlated with knowledge at one per cent level of probability. Farmers who are participating more in extension activities like agricultural meetings, field days, farmers' tours, trainings, visit to crop demonstrations and such other extension activities would naturally be a source of knowledge about improved cultivation practices. But contrary to this fact, the study observed that the farmers with low level of extension participation had higher level of knowledge. Thus, they might have acquired knowledge through their mass media contact, by utilising their higher educational standard.

Positive and significant correlation between extension contact and knowledge was observed. It would be explained that the farmers with more extension contact

could acquire more information, technical message and clarification for their doubts and build up their knowledge in sound basis. Whereas, in this study, the extension contact of tribal farmers was low, despite the fact that they had more knowledge. This might be due to their high educational qualification and mass media participation as explained elsewhere. This was supported by Knight and Singh (1975), Kaleel (1978), Sohal and Tyagi (1978), Somasundaram and Singh (1978), Grozovinski (1981), Kamarudeen (1981), Haraprasad (1982) and Sivakumar (1983).

Farmers who are better exposed to the mass media sources like television, radio, farm magazines, leaflets and agricultural columns of newspapers would usually be having a higher level of knowledge on the improved cultivation practices. Such was the case with the farmers of this area, having more mass media participation as per the Table 7. This was supported by Mahapatra (1978), Sohal and Tyagi (1978), Sripal (1978) and Haraprasad (1982).

The variables, credit orientation and land possession were found to be having no significant correlation with knowledge. It is needless to explain that the variables credit orientation and land possession

of farmers would not have exerted any influence for acquiring knowledge in agricultural practices. But the observation in the area revealed that the farmers were not availing any credit due to the reason that they were fresh to this field, and the government was also imposing for land ceiling. Also the government did not issue the title-deed for land cultivated by the Kanikkars. Hence land possession was not acting as a variable, but a constant. The similar findings by Sinha and Parshad (1966), Nanjaiyan (1973), Supe and Salode (1975), Alexander (1985) and Sabapathi (1988) also supported the fact that land possession of farmers had nothing to do with the knowledge level of farmers.

### 3.2. Relationship between attitude of tribal farmers towards farming and the selected independent variables

From the Table 8, it was evident that all the independent variables except land possession had significant relationship with attitude of tribal farmers towards farming.

There was a negative and significant correlation between age and attitude towards farming. This indicates that the young farmers had more favourable attitude towards



farming, than the aged category, as they were tradition bound and conservative in outlook. This study also reveals that most of the farmers were young by their age and had more favourable attitude towards farming. This was supported by Van Den Ban (1957), Rogers and Burdge (1961), Ross (1961), Singh and Singh (1968), Das and Sarkar (1970) and Makkar and Sohal (1974).

Education is normally having an effect on farmers to improve their degree of favourableness towards a particular object. Because of this, the educated farmers might be having a favourable attitude towards farming. This was supported by the finding of this study that most of the farmers were having high education level and more favourable attitude towards farming. The same result was observed previously by Singh and Singh (1968), Das and Sarkar (1970), Sarkar (1970), Makkar and Sohal (1974), Thomaskutty (1975), Kamarudeen (1981), Naik (1981), Surendran (1982), Vijayakumar (1983), Cherian (1984) and Viju (1985).

The results of the present study revealed that farming experience was negatively, but significantly correlated with attitude of tribal farmers towards farming.

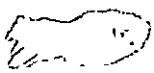
This derives the meaning that lesser the experience in farming, more the favourable attitude towards farming. This might be due to the fact that young farmers in the highly educated category might easily be convinced about innovations/practices than the aged farmers. This view was also supported by the finding that most of the farmers were having less experience in farming and more favourable attitude towards farming.

Positive and significant correlation between organisation participation and attitude was noted. This revealed that more the organisation participation, more would be the attitude towards farming. This might be due to the reason that the farmers would have conceived better opinion and convinced about the farming through the implementation of activities and various developmental programmes in agriculture by the organisations. Eventhough the organisation participation level was low in this study, by virtue of their educational standard, the farmers might have convinced about the development programmes implemented by the organisations and that would have helped them to form favourable attitude towards farming. This finding was supported by Das and Sarkar (1970), Vijayakumar (1983) and Cherian (1984).

Positive and significant correlation between risk orientation and attitude was observed, which means, more the risk orientation behaviour, more the favourable attitude towards farming. It is needless to say that unless people have more favourable attitude, they won't take risk or vice-versa. In the absence of one, the other won't emerge. The present study also revealed the higher risk orientation behaviour of tribal farmers and hence the more favourable attitude towards farming. This finding was supported by Kamarudeen (1981), Naik (1981) and Cherian (1984).

The results of the present study revealed that credit orientation was significantly correlated with attitude. This revealed that higher the credit orientation, more would be the favourable attitude towards farming, which might be due to the fact that credit orientation behaviour of farmers might tend to form favourable attitude towards any practice, because credit facility prompted them towards the successful adoption of practices. That might be the reason for such result. The present study also revealed that the credit orientation of tribal farmers was high and they had more favourable attitude towards farming. That might be the reason for this result.

The present study revealed that cosmopolitanism was positively correlated with attitude. This depicts that farmers who were more cosmopolitan in nature would be having more favourable attitude towards farming. This could better be explained that the farmers by frequent contact, mutual exchange and sharing of views and experiences take place. The clarification of doubts with each other would personally influence and convince them. Such conviction building would naturally lead to form favourable attitude. This was supported by the findings of this study that most of the tribal farmers were more cosmopolitan in nature and had more favourable attitude towards farming.

Extension participation was found to be positively and significantly correlated with attitude of Kanikkars towards farming i.e. more the extension participation, more favourable would be the attitude towards farming. Farmers who were participating regularly in the various extension activities like farm meetings, field days, farmers' tours, trainings etc would usually be having a favourable attitude towards farming. This might  be because of the visualising of the innovations and technologies. Eventhough the finding of this study was showing lesser extension participation by virtue of their general awareness, search behaviour and cosmopolitanism, they might have formed favourable attitude towards farming.

As per the present study, extension contact was positively correlated with attitude, which means, more the extension contact of tribal farmers more would be the farmers' attitude towards farming. This might be due to the reasons that the farmers having more contact with agricultural officers and other extension personnel/agencies would naturally get convinced by way of holding discussions, clarifying genuine doubts and asking remedy for constraints. But here, eventhough the extension contact was less, the farmers might have convinced themselves by observing the activities and services rendered by these extension agencies. That might be the reason for this result. This view was supported by Kamarudeen (1981) and Sivakumar (1983).

A positive and significant correlation between the variables mass media participation and attitude towards farming was noted, which means, more the mass media participation, more favourable would be the attitude towards farming due to the reason, farmers having more exposure to agricultural programmes through radio, television, agricultural magazines and leaflets etc would naturally be having a favourable attitude towards farming, as these mass media sources could persuade them to have favourable opinion about farming. This view was supported

by the finding of this study that most of the farmers had more mass media participation and more favourable attitude towards farming. The same result was noted earlier by researchers like Lerner (1958), Roy et al (1968) Rogers and Svenning (1969) and Murthy (1971).

The results of this study revealed that land possession was not significantly correlated with attitude. Land possession need not determine the attitude of a particular person towards farming and as discussed elsewhere, the land possession did not act as a variable in this study.

### 3.3. Relationship between adoption of modern techniques of cultivation and the selected independent variables

From the Table 9, it was evident that all the independent variables except credit orientation and land possession were significantly correlated with adoption. Among them, cosmopolitaness and extension participation were alone significant at five per cent level of probability. Age and farming experience were found to be having a negative and significant correlation at one per cent level of probability.

The negative and significant correlation between age and adoption means that younger the age, the adoption of improved practices would be more due to the reasons that the young farmers would have taken new venture and more risk in adopting new techniques/innovations. This was supported by the finding of this study that most of the sampled farmers were young by their age. This finding was supported by Svensson (1942), Wilkening (1952), Van Den Ban (1957), Pandit (1964), Rajendra (1968), Tripathi (1972), Anbalagan (1974), Pillai (1978), Rao (1978) Sadamate (1978), Sainath (1982), Batara (1983), Naika (1985) and Khanal (1986).

Education was also positively correlated with adoption of improved practices. This means that, more the education, more would be the adoption of improved practices. Farmers having better knowledge and attitude would also be having a tendency to adopt the scientific practices. Educated farmers have less superstitions, while the less educated farmers are more tradition bound. This might be the reason for the positive correlation between education and adoption. It was supported by many researchers. The recent studies include those by Prakash (1980), Ahamed (1981), Haraprasad (1982), Sainath (1982), Kappattanavar (1983), Naika (1985) and Khanal (1986).

As per the results of this study, the variable viz farming experience was found to be negatively, but significantly correlated with adoption, which means, lesser the farming experience, more would be the adoption of improved practices. This might be due to the fact that the farmers with less experience would like to adopt more by taking risk, so as to have maximum profit, whereas the experienced farmers would think twice or thrice in deliberation stage, which might make them to delay their adoption. This was supported by this study's finding that most of the farmers had less experience and high risk orientation behaviour.

The positive and significant correlation between organisation participation and adoption revealed that more the organisation participation, more would be the adoption behaviour, which might be due to the fact that, by involving more in the organisations and its beneficial activities, people would be influenced to adopt the practices. The financial benefits such as subsidies, credit and free supply of inputs also would have influenced them to adopt the practices. The organisation participation of farmers was less, despite the fact that these organisations might have extended beneficial programmes



such as supply of inputs/subsidies as per the direction of the government. This might have prompted them to adopt the practices. This was in accordance with the results established by many researchers. The studies in the recent past include those done by Mishra and Sinha (1980), Ravichandran (1980), Kamarudeen (1981), Haraprasad (1982), Pillai (1983) and Khanal (1986).


The positive and significant correlation between risk orientation and adoption revealed that higher the risk orientation, more would be the adoption of scientific practices due to the reason that farmers with high risk bearing ability would definitely adopt any practice, since the risk bearing ability and adoption of practices are mutually influencing factors. Hence it is needless to give explanation for this relationship. The present study also revealed that the tribal farmers were having more risk orientation, as per the Table 1. This finding was in accordance with those of Ramachandran (1974), Singh (1975), Tripathy (1977), Rajendran (1978), and Pillai (1983).

Credit orientation was found to be having no significant correlation with adoption, which revealed that credit orientation had no influence on adoption behaviour

due to the fact that credit orientation is a kind of perception about credit facilities. But in reality, they were not availing any credit for adopting the practices and it was very difficult to get credit as it involved too many procedures and cumbersome processes, which might delay the adoption of practices. That might be the reason for this finding and was supported by Nandakumar (1988).

The positive and significant correlation between cosmopolitanism and adoption indicates that more the cosmopolitanism, more would be the adoption of practices, which could be better explained that due to wide contact with farmers, visualisation of development is possible, visit to different fields would motivate them to adopt the practices at an early date. This was supported by the finding that almost all the farmers had more cosmopolite behaviour in this study. This was supported by Tripathi (1972), Troisi (1975), Kittur (1976), Channegowda (1977), Kalamegam and Menon (1977), Ahamed (1981), Kamarudeen (1981) and Ferreira et al (1983).

The positive and significant correlation between extension participation and adoption means, more the extension participation, more would be the adoption of

practices due to the reason that farmers who actively participate in  different extension programmes like farm meetings, field days, study tours, trainings etc have a favourable attitude towards farming and a better knowledge and that would have tempted them to adopt the scientific practices. In spite of low extension participation of farmers in this study, the adoption was high. This might be due to the fact that the farmers might have utilised the information sources given through the mass media. The mass media participation and cosmopolitaness might have tempted them to adopt the practices at an early date. This was supported by Manjunatha (1980), Gavi (1983) and Palvannan (1985).

The significant relationship of extension contact and adoption revealed that the farmers having a higher degree of extension contact normally have a better knowledge and favourable attitude. This might persuade them to adopt the modern techniques of cultivation and in the same corollary under extension participation, this might also be explained. This finding was supported by those of Panneerselvam (1978), Prasad (1978), Subhadra (1979), Osuji (1980), Prakash (1980), Dhanyakumar (1982), Haraprasad (1982), Sainath (1982) and Sivakumar (1983).

The significant positive correlation exhibited by mass-media participation with adoption depicted that more the mass media participation, more would be the adoption behaviour of farmers, which might be due to the reason that exposure to different innovations/success stories/motivational features would have influenced and persuaded the farmers to adopt the practices. In the present study too, the farmers are having more mass media participation and hence the result. This was supported by Manjunatha (1980), Geethakutty (1982), Haraprasad (1982), Sainath (1982) Singh (1983), Raju (1984) and Krishnamoorthy (1988).

Land possession was found to be having no significant correlation with adoption. Land possession need not determine the level of adoption of a particular practice by a farmer and in the same corollary, as in the case of knowledge and attitude, here also it may be explained so. This is in accordance with the findings of Pathak and Dargan (1971), Ramakrishnan (1974), Supe and Salode (1975), Kaleel (1978), Kantharaj (1980), Raju (1984) and Nandakumar (1988).

#### 4. Factors influencing agricultural development

From the Table 19 it was understood that there were twelve factors influencing agricultural development among

the Kanikkars. The availability of irrigation water during summer was perceived by the 'Kanikkars' as the most important factor favouring agricultural development. They might have felt so due to the unavailability of irrigation water, which might hamper their agricultural activities during summer.

The availability of marketing facility might be felt for better ways and means for marketing their produce and to relieve from the exploitation of middlemen. The soil conservation facility was the next important factor because of the reason to preserve the soil fertility and to control the over landsliding and undue damages to their crop.

The 'Kanikkars' are the most disadvantaged group among the farmers of Thiruvananthapuram District. Hence to improve the man-power resources and to improve their resource management efficiency, the tribal farmers felt the establishment of agricultural training institutes as the next important factor for their agricultural development. Establishment of an agricultural development office was the next perceived factor, so as to fulfil their requirements of timely supply and services for their agricultural practices.

Availability of post harvest facility was another factor perceived by the 'Kanikkars' as it might improve their product utilisation and thus obtain better profit through effective marketing followed by establishment of input agencies would benefit the Kanikkars by way of supply of fertilisers, plant protection chemicals etc at low cost at their doorstep. Co-operation of the people, ie the neighbours was ranked by the Kani-respondents as the ninth important factor favouring agricultural development. The establishment of co-operative societies was perceived as another factor influencing agricultural development due to the reason that the co-operative effort of people in group farming, singular attention and attempt to take up uniform cultivation practices so as to effectively utilise their own resources and reduce the cost of cultivation.

Availability of technology for improving cropping intensity was another factor favouring agricultural development. But it was perceived by the tribal respondents as the least important factor. Probably this might be due to the fact that they might look for their need oriented and appropriate technologies, so as to effectively practise the technologies without any dependency.

##### 5. Constraints affecting agricultural development

From Table 20 it could be seen that eleven constraints hampering agricultural development were perceived by the Kanikkars in the descending order of importance. Crop damage by wild animals was a serious problem in tribal areas. The attack on crops by wild animals like wild pigs, elephants and rabbits was a major problem in almost all the tribal hamlets in Thiruvananthapuram District. The elephants mostly damaged the banana crop, while the pigs dug away the tapioca plots. The tribals demand fencing with barbed wire in the forest boundaries. Due to the wild animals' menace, the tribals might have realised this as a major constraint.

Drought during summer was a serious problem faced by the tribals. But if irrigation water was made available during summer, this problem could be solved. Water conservation techniques, which are cost efficient must be popularised. Difficulty in availing credit was mostly due to the complicated procedures. Hence the lending procedure must be simplified so as to solve this problem. Establishment of commercial bank, co-operative society etc, with easy lending procedure would provide solution to this problem. Soil erosion being a serious constraint, the

implementation of various soil conservation measures through the soil conservaiton unit of the state agriculture department might be the solution for this constraint.

Less co-operation of the officers leads to poor agricultueal development as the tribals could not avail goods and services in time. Hence suitable service agencies, inputs agencies, extension agencies system may be made available to the tribal areas. Declining soil fertility could be compensated by adopting soil conservation techniques and utilisation of organic manures and fertilisers based on soil testing and scientific crop rotation recommendations.

Necessary steps must be taken for the supply of plant protection chemicals, so that pest and disease problem could be solved to a greater extent. Crop damage due to heavy winds was a serious problem in hill slopes. 'Shelter belts' and 'wind breaks' might be made to eliminate this problem. Less cooperation of the neighbours was perceived by the Kanikkars as the least important constraint. This could be changed only through a thorough change in the attitude of the tribals, for which a lot of motivational efforts has to be made.



**SUMMARY**

## CHAPTER VI

### SUMMARY

The Kanikkars form the fifth major Scheduled Tribe of the State of Kerala in population. Of the 35 Scheduled Tribes, the largest group in South Kerala is 'Kanikkars'. Of them, 80 per cent are concentrated in Nedumangad Taluk of Thiruvananthapuram District.

Kanikkars are cultivators, who are not progressive in their farming practices. Their agriculture is settled in nature. Coconut, banana, tapioca, pepper and rubber are the important and predominant crops grown by the 'Kanikkars'. Because of their primitive cultivation practices, these crops fetch them only poor returns. Moreover, their resource management efficiency is very poor. Modern technology could be introduced in their cultivation aspects, so that their income from agriculture can be increased. The increased economic returns can lead to improvement in their standard of living. To bridge the gap between the available technology and its adoption by the tribes, it is essential to implement various development schemes, so that the tribes would get convinced about the

scientific agriculture relating to the crops they cultivate. Before implementing or launching any meaningful agricultural development programme, it is necessary to ascertain the present level of agricultural development, using the various agricultural development indicators. Hence a study was undertaken with the following objectives.

1. To study the characteristic profile of the tribal people .
2. To identify the agricultural development indicators in tribal areas.
3. To assess the extent of agricultural development in tribal areas.
4. To findout the association between the agricultural development indicators and the selected socio-economic characteristics of Kanikkars.
5. To identify the factors influencing agricultural development in tribal areas.
6. To identify the constraints affecting agricultural development in tribal areas.

The study was carried out in the Kani-settlements of Nedumangad Taluk of Thiruvananthapuram District of Kerala. A sample of 100 Kani-farmers was selected from five Panchayats of this area using purposive, proportional and random allocation techniques.

A detailed review of literature was done and experts were consulted. Based on this, the dependent variables viz knowledge about improved cultivation practices, attitude towards farming and adoption of modern techniques of cultivation were selected for the study. The independent variables were selected based on review of literature and discussion with experts. Age, education, farming experience, organisation participation, risk orientation, credit orientation cosmopolitaness, extension participation, extension contact, mass media participation and land possession were the independent variables selected for the study.

The extent of agricultural development was assessed using the three agricultural development indicators selected for the purpose of this study, which were the dependent variables.

Knowledge about improved cultivation practices was assessed by a teacher-made test. The improved package of practices of cultivation was considered for construction of questions. For each crop, ten questions were prepared, out of which seven were general questions and three were specific to that particular crop. Thus, altogether, there

were 50 questions for the test. But questions were administered only with respect to the crops grown by the respondent. Scores of one and zero were given to correct and incorrect responses respectively. The total score, thus obtained was divided by the number of questions asked to that particular farmer and then this value was multiplied with 100 to get the knowledge score of the individual Kani-farmer-respondent.

Attitude towards farming was measured using the attitude scale developed by Sadamate (1978) after pretesting it in the area for its validity. The scale consisted of ten statements. Out of these, five statements were indicative of favourable attitude and the remaining five were indicators of unfavourable attitude. A three point continuum was associated with this scale. The three points in the continuum were "Agree", "Undecided" and "Disagree", with respective weights of 3,2, and 1 for favourable attitudes. The scoring procedure was reversed for the negative statements. The final attitude score for each respondent was worked out by adding up the weightage for the ten statements.

Adoption of modern techniques of cultivation was measured using the adoption score worked out by using the formula,

$$\sum_{i=1}^n \frac{e_i/p_i}{n} \times 100$$

where,

$e_i$  - Extent of adoption of selected practices

$P_i$  - Potentiality of adoption of each selected practice

n - number of practices.

After calculating the adoption score of each respondent, based on the number of crops available to him and took the average of these scores by dividing it with the number of crops cultivated.

The independent variable age was measured as the actual age completed in years at the time of interview. Education was measured by using a schedule developed for the purpose and the farming experience of the Kani-farmer was measured in completed years. Organisation participation was measured by the scoring procedure developed by Lokhande (1974). The risk orientation scale

and scoring procedure adopted by Supe (1969) was followed for the present study. For measuring credit orientation, the procedure adopted by Beal and Sibley (1967) was used.

Cosmopolitaness was measured by the scoring procedure developed by Desai (1981). The procedure adopted by Nandakumar (1988) was made use of for assessing the level of extension participation of the Kanikkars. The procedure followed Badrinarayanan (1977) was adopted to measure extension contact. The scoring system of Singh (1972) was followed to measure mass media participation of Kani-farmers. Land possession was measured by the scoring procedure devised for the study.

From the review of literature and based on the pilot study conducted, 12 factors of agricultural development were identified for this study. These 12 factors were ranked after assessing the response of the Kani-farmer respondents in a five point continuum ranging from most important to least important. Based on the review of literature and the pilot study, 11 constraints of agricultural development were identified and were ranked based on the response of the farmers in a five point continuum.

Data were collected with the help of a well structured and pre-tested interview schedule. The data so collected were analysed with the help of statistical techniques viz: percentage analysis, correlation analysis, multiple regression analysis and path analysis to derive the results. The salient findings of the study were as follows.

### Salient Findings

#### The characteristic profile of the Kanikkars

1. Nearly half of the respondents (49%) were young and actively involved in agriculture.
2. Regarding education, majority (56%) were having a high level of education.
3. Majority of the Kani respondents (70%) were having less experience in farming.
4. Majority of the respondents (68%) had low level of organisation participation.
5. The sampled farmers had high level of risk orientation. Equal number of respondents were distributed in the low and high groups (50 per cent in each category).
6. Majority of the respondents (55%) had high level of credit orientation.
7. Majority of the respondents (53%) had high level of cosmopolitaness.



8. Majority of the respondents (73%) had only a low degree of extension participation.
9. Majority of the respondents (51%) had a low level of extension contact.
10. Majority of the Kani-farmer respondents (68%) had a higher degree of mass media participation.
11. Majority of the respondents (67%) had only less land at their disposal.

Assessment of extent of agricultural development

12. The assessment of the extent of agricultural development among the Kanikkars was done utilising the three agricultural development indicators selected for the purpose of this study viz knowledge about improved cultivation practices, attitude of farmers towards farming and adoption of modern techniques of cultivation.
13. Majority of the respondents (52%) had a high level of knowledge on the scientific cultivation practices.
14. Majority of the Kani respondents (60%) had a favourable attitude towards farming.
15. Majority of the respondents (69%) had only a lower level of adoption of modern techniques of cultivation.

Socio-economic characters

16. Of the 11 variables studied, only nine variables viz age, education, farming experience, organisation participation, risk orientation, cosmopolitaness, extension participation, extension contact and mass media participation were found to have significant relationship with knowledge about the improved cultivation practices and adoption of modern techniques of cultivation. Of these variables, age and farming experience were found to have a negative relation, while the rest had positive relationship.
17. Of the 11 variables studied, only 10 variables viz age, education, farming experience, organisation participation, risk orientation, credit orientation, cosmopolitaness, extension participation, extension contact and mass media participation, were found to have significant relationship with the attitude of Kanikkars towards farming. Of these, age and farming experience were found to have negative association, while the rest had positive relation.

Direct and Indirect effects

18. The maximum positive direct effect towards knowledge about improved cultivation practices was due to

education, followed by extension participation and risk orientation. Considering the total indirect effect, the maximum positive indirect effect was due to mass media participation, followed by risk orientation and extension contact. Where as the maximum negative indirect effect was due to farming experience followed by age.

19. The maximum positive direct effect towards attitude towards farming was due to the variable education, followed by cosmopolitaness. Considering the total indirect effect, the maximum positive indirect effect was due to mass media participation, followed by risk orientation and extension contact.
20. The maximum positive direct effect towards adoption of modern techniques of cultivation was due to the variable age, followed by extension contact and mass media participation. Considering the total indirect effect, the maximum positive indirect effect was due to education, followed by risk orientation and extension contact where as the maximum negative indirect effect was due to age, followed by farming experience.

#### Factors influencing agricultural development

21. The various factors influencing the agricultural development in the tribal areas, in the order of

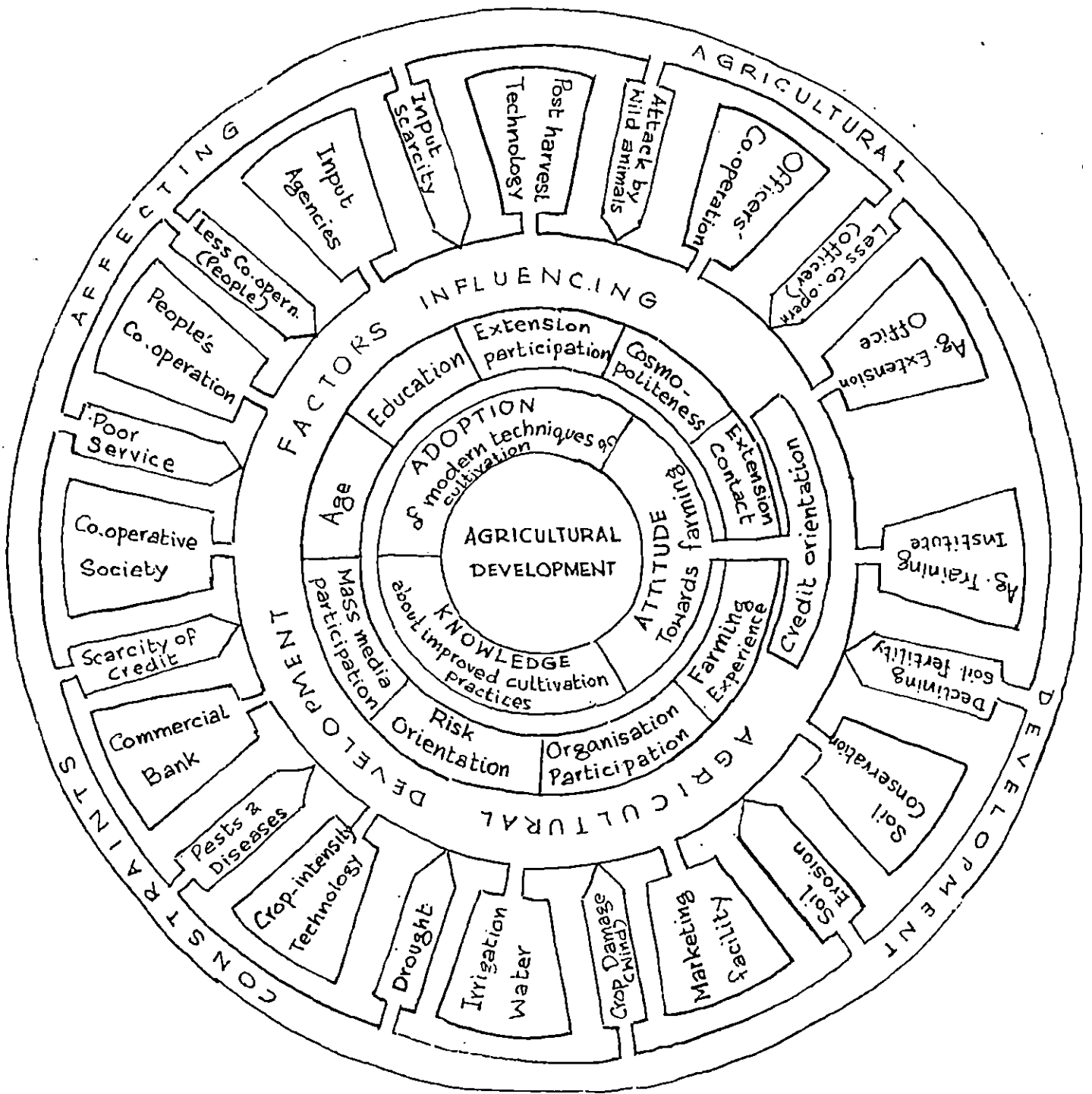


FIG EMPIRICAL MODEL OF THE STUDY

importance were availability of irrigation water during summer, availability of marketing facilities, establishing soil conservation project, establishment of agricultural training institute, establishment of agricultural extension office, co-operation of the officials, availability of post harvest technology, establishing input agencies, co-operation among the people, establishing co-operative society, establishing commercial bank and availability of technology for improving cropping intensity.

#### Constraints affecting agricultural development.

22. The important constraints affecting agricultural development in the tribal areas in the order of importance were crop damage by wild animals, drought during summer, difficulty in availing credit, soil erosion, less cooperation of the officers, difficulty in obtaining various inputs for production, difficulty in getting services, declining soil fertility, attack by pests and diseases, crop damage due to heavy winds and less cooperation the neighbours.

#### Implications

1. While launching any agricultural development programme among the Kanikkars of Kerala, their knowledge about

... and adoption of modern techniques of cultivation must be taken into account as the prime agricultural development indicators.

2. The young educated tribal farmers must be involved and given orientation in agricultural development programme whenever a new development scheme is launched.
3. Organisational facilities in the area must be improved and the participation and involvement of the Kani farmers must be ensured by clearly explaining the need and utility of organisations.
4. The credit facilities available in the area must be more efficient and simplified procedures must be introduced in money lending.
5. More number of extension programmes must be arranged by the concerned extension personnel. Extension meetings and field days must be conducted in the area. The farmers must be taken for educational tours. Crop demonstrations must also be arranged in the area itself. The Kani-farmers must be given practical training on scientific cultivation practices.
6. More awareness must be created among the tribal farmers about the extension agencies.

7. More literature on scientific agriculture in the form of farm journals, booklets, pamphlets etc. must be made available to the educated Kani farmers through local libraries.
8. The rules and regulations of the forest department should be relaxed so as to encourage the tribal farmers to participate in agricultural development.
9. Facilities must be made available in tribal areas to assure the availability of irrigation water during summer or moisture conservation techniques must be introduced in the area.
10. Infrastructural facilities must be arranged in tribal areas for the supply of inputs and credit, processing, marketing, etc.
11. Provisions for conserving soil and water with emphasis on enriching the soil fertility must be made.
12. Agricultural extension offices and training institutes must be established in the tribal areas to provide technical know-how.
13. The tribal people must also be encouraged to start group farming and thereby develop a group cohesiveness.
14. The crop damage by attack of wild animals must be eliminated.

15. An integrated pest and disease management scheme must be launched in each tribal settlement.
16. Windbreak and shelter belt technology must be introduced in tribal areas to avoid crop damage due to heavy winds.

#### Suggestions for future research

1. Studies may be undertaken to identify the common indicators, so as to compare with the farmers in the main stream.
2. Studies on socio-economic indicators which affect the agricultural development of the tribal farmers may also be undertaken.
3. The indicators related to tribal women and their contribution to agricultural development may also be studied.
4. A study relating to training need and their agricultural development indicators and suitable training programme need assessment studies may be undertaken.



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**APPENDICES**

APPENDIX - I

LIST OF SCHEDULED TRIBES OF KERALA

- |                                |                         |
|--------------------------------|-------------------------|
| 1. Adiyar                      | 2. Arandan              |
| 3. Eravallan                   | 4. Hill Pulaya          |
| 5. Irular, Irulan              | 6. Kadar                |
| 7. Kammara                     | 8. Kanikkaran, Kanikkar |
| 9. Kattunaickan                | 10. Kochuvelan          |
| 11. Konda Kapus                | 12. Konda Reddis        |
| 13. Koraga                     | 14. Kota                |
| 15. Kudiya, Melakudi           | 16. Kurichian           |
| 17. Kurumans                   | 18. Kurumbans           |
| 19. Maha Malasar               | 20. Mala Arayan         |
| 21. Malampandaram              | 22. Mala Vedan          |
| 23. Malakkuravan               | 24. Malasar             |
| 25. Malayan                    | 26. Malayarayar         |
| 27. Mannan                     | 28. Marati              |
| 29. Muthuvan, Mudugar, Muduvan | 30. Palleyan            |
| 31. Palliyan                   | 32. Palliyar            |
| 33. Paniyan                    | 34. Ulladan             |
| 35. Uraly                      |                         |
- 

Source : Census of India, 1981, Series - I Part, II B (iii)

APPENDIX II

FACTORS INFLUENCING THE DEVELOPMENT OF AGRICULTURE

AMONG THE 'KANIKKAR' TRIBE OF KERALA

INTERVIEW SCHEDULE

Block : Panchayat :  
Ward : Settlement :  
Respondent No. : Sex :

1. What is your age in completed years ? ..... years.

2. What is your educational status ?

(Illiterate/Read only/Read & Write/Non-formal education)

(Also note the successfully completed formal schooling)

..... Standard

3. How many members are there in your family ?

---

			<u>Supporting farming</u>	
Male	Female	Total	Male	Female

---

---

4. Total number of years in farming:

..... years



8. Risk orientation

(Give your degree of agreement for the following statements from "Strongly Agree" to "Strongly Disagree").

---

Sl. No.	Statements	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
1.	A farmer should grow a large number of crops to avoid greater risks involved in growing one or two crops.					
2.	A farmer should rather take more of chance in making a bit profit, than to be content with a smaller, but less risky profit.					
3.	A farmer, who is willing to take greater risk than the average farmer, usually does it better financially.					
4.	It is good for a farmer to take risks when he knows his chance of success are high.					
5.	It is better for a farmer not to try farming, unless most of other farmers have used it with success.					
6.	Trying an entirely new method for a farmer involves greater risk, but it is worthy.					

---

9. Credit orientation

Give your opinion for the following statements in the given

1. Do you think, a farmer like you should borrow  
more for agricultural purpose ?

Yes/No

2. In your opinion, how difficult is it to secure credit for  
agricultural purpose ?

Very Difficult/Difficult/Easy/Very Easy

3. How a farmer is treated, when he goes to secure credit ?

Very Badly/Badly/Fairly/Very Fairly

4. There is nothing wrong in taking credit from institutional  
sources for increasing farm production.

Strongly Disagree/Disagree/Agree/Strongly Agree

5. Did you use credit in the last two years for crop production ?

Yes/No

10. Cosmopolitaness

- a. How frequently do you go to the nearest town ?

(Specify the periodicity) -----

- b. For what purpose do you go to the town ?

(Specify the purpose) -----

11. Extension participation

Give the periodicity of attending the following extension activities.

---

Sl. No.	Extension activities	Never	Occasionally	Regularly
1.	Agricultural meetings			
2.	Farm fairs			
3.	Visit to agricultural research stations			
4.	Visit to model agricultural farms			
5.	Farmers' training			
6.	Others, if any			

---

12. Extension contact

1. Are you aware of the officers and institutions providing scientific information to the farmers ? Yes/No
2. a. Do you contact the officers of such institutions ? Yes/No  
b. If yes, specify the periodicity. \_\_\_\_\_  
c. For what purpose do you contact the extension agencies ? \_\_\_\_\_

13. Mass media participation (Specify the periodicity)

---

Sl. No.	Particulars	Yes/No	If Yes, periodicity
1.	Do you listen to radio ?		
2.	Do you read newspapers or listen to someone reading a newspaper ?		
3.	Do you read leaflets related to agriculture ?		
4.	Do you read farm magazines ?		
5.	Do you see films related to agriculture ?		
6.	Do you visit agricultural exhibitions ?		
7.	Others, if any.		



14. Knowledge about improved farm practices

Given are the questions to assess the knowledge. Please get the answers for the questions related to the crops grown.

A. General

---

Sl. Questions No.	Tapioca	Banana	Pepper	Rubber	Coconut
1. Name one improved variety (HYV)					
2. What is the dose of organic manure to be applied/plant ?					
3. How much quantity of chemical fertiliser is to be applied/plant					
4. Name two important pests of the crop (with symptoms)					
5. Give the remedial measures (Name of chemical and dose)					
6. Name two important diseases of the crop (with symptoms)					
7. Give the remedial measures (Name of chemical and dose)					

---

B. Specific

a. Tapioca

1. Give the fertiliser application schedule : .....  
(Right/Wrong)
2. In slopy areas tapioca is cultivated across the slope.  
(Yes/No)
3. Name one intercrop in tapioca field : .....  
(Right/Wrong)

b. Coconut

1. Moisture conservation in coconut basin can be done by ..... (Right/Wrong)
2. Two criteria for selecting coconut seedlings  
(Right/Wrong)
3. When 'liming' is done in coconut basins ?  
.....(Right/Wrong)

c. Rubber

1. Tapping is done once in a day. (Yes/No)
2. The best time for tapping is late evening.  
(Yes/No)
3. When does a rubber tree reach the tapping stage?  
..... (Right/Wrong)

d. Banana

1. How banana rhizome weevil is controlled ?  
.. ..... (Right/Wrong)
2. Suckers can be maintained till the emergence of bunches.  
(Yes/No)
3. The pit size for planting banana seedlings is  
..... (Right/Wrong)

e. Pepper

1. Southern slopes of hills are highly suited for pepper cultivation. (Yes/No)
2. Inflorescence formation occurs on all the vines.  
(Yes/No)
3. Pepper berries are ready for harvesting in .... months  
(Right/Wrong)

15. Attitude of "Kanikkars" towards farming

Please give your degree of agreement for the following  
statements from 'Agree' to 'Disagree'

---

Sl. No.	Statements	Agree	Undecided	Disagree
1.	I feel farming is not a promising occupation.			
2.	Farming leads to overall development of one's family.			
3.	Absolute gain in terms of economic returns from farming is very low.			
4.	Farming is a challenge to the tribals and they should accept it.			
5.	Farming is an occupation of rich people.			
6.	Farming is not the solution to remove tribal poverty.			
7.	Farming is a non-profit enterprise and I feel, it is useless to stick to it.			
8.	Food problem of tribals can be solved by taking farming on a wide scale.			
9.	Farming is a profitable occupation.			
10.	Farming provides settled living for tribals.			

---

16. Adoption of improved farm practices.

(Note the response of the farmer as such and compare with the recommendation and workout the 'Adoption Index')

Sl. No.	Particulars	Tapioca	Banana	Pepper	Rubber	Coconut
1.	Extent of area under HYV.					
2.	Quantity of organic manure applied/plant/annum.					
3.	Quantity of chemical fertilisers applied/plant/annum.					
4.	Plant density.					
5.	Intercultural operations done.					
6.	Name of the pests occurred.					
7.	The method adopted to control the aforesaid pest(s).					
8.	Name of the diseases occurred.					
9.	The method adopted to control the afore said disease(s).					

17. Factors influencing agricultural development

The following are the factors which promote the agricultural development in the tribal area. Please give the degree of importance of these factors in promoting agricultural development.

---

Sl. No.	Factors	Most impor tant	More impor tant	Impor tant	Less impor tant	Least impor tant	Type of ser-vice
1.	Establishing agricultural extension office.						
2.	Establishing co-operative society.						
3.	Establishing commercial bank.						
4.	Establishing agricultural training institute.						
5.	Availability of post-harvest technology.						
6.	Availability of irrigation water during summer.						
7.	Establishing soil conservation project.						
8.	Availability of technology for improving cropping intensity.						
9.	Establishing input agencies.						
10.	People's co-operation.						
11.	Co-operation of offices.						
12.	Establishing marketing facility.						
13.	Others, if any.						

---

18. Constraints affecting agricultural development

The following are the constraints affecting agricultural development in the tribal area. Please give the degree of importance of these constraints.

---

Sl. No.	Constraints	Most impor tant	More impor tant	Impor tant	Less impor tant	Least impor tant	Remedy
1.	Difficulty in getting inputs and subsidies.						
2.	Difficulty in getting services.						
3.	Difficulty in availing credit.						
4.	Drought during summer.						
5.	Crop damage due to heavy winds.						
6.	Soil erosion.						
7.	Crop damage due to attack of wild animals.						
8.	Declining soil fertility.						
9.	Attack by pests & diseases.						
10.	Less co-operation of neighbours.						
11.	Less co-operation of officers.						
12.	Others, if any.						

---

APPENDIX III

From

M.M. JALEEL  
M.Sc.(Ag.) Student  
Dept. of Agrl. Extension  
College of Agriculture  
Vellayani - 695 522.

To

Mr./Mrs./Ms.

Sir/Madam,

Enclosed is a list of agricultural development indicators selected for identifying the agricultural development indicators among the Kani Tribal Farmers. Considering your expertise, you are selected as a Judge for selecting the agricultural development indicators with respect to tribals in a five-point continuum. Kindly rate the indicators and return the same at the earliest using the enclosed self-addressed envelope.

Yours faithfully,

Vellayani,

M.M. Jaleel

---

Sl. No.	Agricultural development indicators	Most important	More important	Important	Less important	Least important
1	Response to innovations.					
2	Use of information sources.					
3	Adoption of modern techniques of cultivation.					

---

- 4 Total production  
in farm.
- 5 Conviction about  
the improved  
practices.
- 6 Attitude towards  
farming.
- 7 Leadership  
quality.
- 8 Advancement of  
rural  
institution.
- 9 Knowledge about  
improved  
cultivation  
practices.
- 10 Socio-political  
and economic  
emancipation.



**FACTORS INFLUENCING  
THE DEVELOPMENT OF AGRICULTURE  
AMONG THE 'KANIKKAR' TRIBE OF KERALA**

**BY**

**M. M. JALEEL B.Sc. (Ag)**

**ABSTRACT OF THE THESIS**

Submitted in partial fulfilment of the  
requirement for the degree  
**MASTER OF SCIENCE IN AGRICULTURE  
(AGRICULTURAL EXTENSION)**  
Faculty of Agriculture  
**KERALA AGRICULTURAL UNIVERSITY**

**DEPARTMENT OF AGRICULTURAL EXTENSION  
COLLEGE OF AGRICULTURE  
VELLAYANI  
THIRUVANANTHAPURAM  
1992**

## ABSTRACT

The study on the factors influencing the development of agriculture among the 'Kanikkar' tribe of Kerala was carried out with the following objectives:

1. To study the characteristic profile of the tribal people.
2. To identify the agricultural development indicators in tribal areas.
3. To assess the extent of agricultural development in tribal areas.
4. To find out the association between the agricultural development indicators and the selected socio-economic characteristics of 'Kanikkars'.
5. To identify the factors influencing agricultural development in tribal areas.
6. To identify the constraints affecting agricultural development in tribal areas.

Kanikkars form the dominant tribe of South Kerala. A sample of 100 Kani-farmers was selected from the five Panchayats of Nedumangad Taluk of Thiruvananthapuram District using purposive, proportional and random

allocation techniques. Personal interviews were conducted with the help of a well structured and pre-tested interview schedule. The data so collected were analysed with the help of suitable statistical techniques.

The extent of agricultural development was assessed using the three agricultural development indicators selected for the purpose of the study, which were the dependent variables namely knowledge about improved cultivation practices, attitude towards farming, and adoption of modern techniques of cultivation.

The independent variables selected and utilised for the purpose of the study were age, education, farming experience, organisation participation, risk orientation, credit orientation, cosmopolitanism, extension participation, extension contact, mass media participation and land possession.

The salient findings of the study are as follows:


Nearly half of the respondents (49%) were young. Majority of them had high levels of education, risk orientation, credit orientation, cosmopolitanism and mass media participation, while most of them had low levels of

farming experience, organisation participation, extension participation, extension contact and land possession.

Though majority of the Kanikkars had a better knowledge on the scientific cultivation practices and a favourable attitude towards farming, the adoption level of modern techniques of cultivation was low.

Of the 11 variables studied, land possession was found to have a non-significant correlation with the three dependent variables. Credit orientation was found to have a significant correlation only with attitude. Of the variables which were having a significant correlation with the three dependent variables, age and farming experience were negatively correlated.

The crucial variables through which indirect effects were channelled were: education, risk orientation and extension participation with regard to knowledge about improved cultivation practices, education, cosmopolitaness and mass media participation with respect to attitude towards farming and age, farming experience and extension contact with reference to adoption of modern techniques of cultivation.



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