IMPACT OF DEVELOPMENT PROGRAMMES IN PROMOTING PEPPER PRODUCTION IN KERALA

BY

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I hereby declare that this thesis entitled "IMPACT OF DEVELOPMENT PROGRAMMES IN PROMOTING PEPPER PRODUCTION IN KERALA" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title of any other university or society.
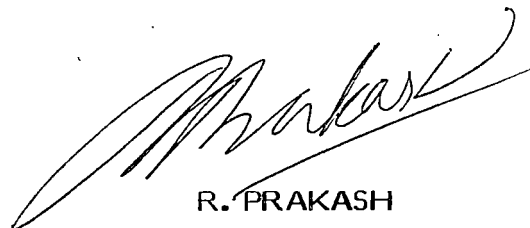
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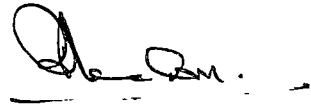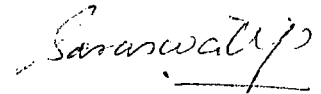CHAIRMAN   :   R. PRAKASH
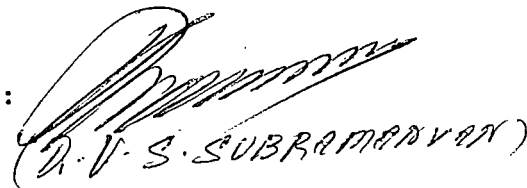
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INTRODUCTION

I. INTRODUCTION

Pepper is the most important export oriented spice crop of India which contributes to about 30 per cent of the total income obtained from the export of spices. Hence, it is needless to say its role in our national economy.

Pepper is cultivated in about 2.5 lakh hectares in the world and the production is about 1.5 lakh tonnes. India held the monopoly of pepper production till the beginning of 19th century but now the country is second to Indonesia. Total area under pepper in India is 1,36,000 ha and production is 40,000 tonnes, whereas in Indonesia, pepper is cultivated in only 80,000 ha but production is 41,000 tonnes.

In India, Kerala ranks first in area and production of pepper and is in a fast pace of development. More than 95 per cent of the production of pepper is contributed by Kerala. The total area under pepper is 1,20,000 ha and the production is around 30,000 tonnes in Kerala. However, it is paradoxical to note that the average yield of the crop in the state is only 240 kg/ha as against 2925 kg / ha, in Malaysia, a country which started pepper cultivation only two centuries ago.

The reason for sharp decline in yield of pepper in recent years include tendency of farmers to stick on to the age old cultivation practices, cultivation of traditional varieties, slackness in replanting old and senile vines, pest and disease attack etc. To overcome these constraints and to boost up the production of pepper in Kerala, 1989 is being celebrated as "pepper year" jointly by the Department of Agriculture and Kerala Agricultural University.

As a prelude to this, various development programmes have been chalked out and implemented in the state. Providing high yielding and quality vines, suitable standards, fertilizers, pesticides and other chemicals, credit for large scale planting and technical guidance are the major activities in this direction.

The pepper development programme was first introduced in Kerala in the early 1970's. Pepper package programme of Kerala Agricultural Development Project (KADP) which started in 1977 - 78 was one of such programme which provides farmers a package of improved practices and inputs. Rejuvenation programme meant for replanting old and senile vines was started in 1980 - 81. Integrated programme for development of spices is the latest of these programmes, introduced in 1987 - 88.

Need for the study

Through the development programmes implemented by the Department of Agriculture, crores of rupees, both in cash and kind have flown to the pepper growers already. The officials of the Department of Agriculture are actively involved to ensure that the subsidies and loans are reaching to the right beneficiaries. No systematic study has been made so far, to investigate the impact of the pepper development programmes implemented in the state. Eventhough, stories of success of pepper growers, had surfaced through the media, these stories do not show a clear picture of the overall impact of the pepper development programmes. Hence this study was taken up to assess the impact of the three selected pepper development programmes viz., pepper package programme, rejuvenation programme and integrated programme for development of spices in increasing pepper production in Kerala.

The specific objectives of the study were :

a) To study the awareness and attitude of pepper growers about the development programmes for promoting the pepper production in Kerala.

b) To study the extent of adoption of improved farming practices under the development programmes by the pepper growers of Kerala.

c) To study the relationship between the personal, psychological, socio-economic and communication behaviour characteristics of pepper growers with their awareness, attitude and adoption of improved farming practices.

d) To identify the constraints, if any, in the adoption of development programme as perceived by the pepper growers.

Scope and limitations of study

The adoption of a recommended technology by farmers depends upon whether it is profitable in the production activity, whether the material components if any, of the technology are readily available and the farmers have the means to purchase them and whether the farmers are market oriented for wider adoption. A study of this type will help to know, how far the different pepper development programmes could achieve their avowed objectives and based on this, the planners, administrators and extension workers could suitably modify the programmes for future implementation.

Since pepper growers are distributed over the entire state, the pepper development programmes have been implemented in almost all the districts. Considering the limited time and other resources available

at the disposal of the investigator, it was rather impossible to cover all the districts of Kerala to get an overall picture. So Cannanore district which has the maximum area under pepper cultivation was taken for study purpose. However, since a major pepper growing tract has been covered in the study, it is hoped that the generalisation made in the study would have applicable to other pepper growing districts in Kerala.

THEORETICAL ORIENTATION

CHAPTER II

THEORETICAL ORIENTATION

Any research programme starts with a review of literature. The main idea behind it is to understand where the society, including the researcher stands in understanding the particular research problem. This review of literature, avoids a duplication of work and gives a forward thrust for future research.

This chapter uncover the past works done on the problem selected and a theoretical basis for the investigation.

The chapter is divided into seven parts and presented as follows :

1. Concept of development programmes

2. Concept of pepper development programmes

3. Dependent variables

4. Independent variables and their relationship with dependent variables

5. Constraints involved in the implementation of programmes

6. Theoretical concepts and operational definitions of the selected variables

7. Hypothesis set for the study

1. Concept of development programmes

Development implies gradual and sequential phases of change.

According to Rogers and Shoemaker (1971) development is a type of social change in which new ideas are introduced into a social system in order to produce higher per capita income and levels of living through more modern production methods and improved social organisation.

Development is fundamentally about human beings and they must participate in the decisions that affect them.

Agricultural development programmes are meant to meet the needs of the farmer. Arrangements for the production and supply of improved seeds, particularly of the high yielding varieties (HYV) have been strengthened. Efforts are being done to lessen the gap between the research centre and the field. The supply of inputs and institutional credit for agricultural requirements are being constantly stepped up. Many such programmes also aim at the uplift of the weaker sections, the small and marginal farmers.

So, the pepper development programmes, selected for this study, gives emphasis to meet the needs of the pepper growers. The programme ensures him, increased production through timely supply of inputs such as, high yielding variety vines, fertilizers, plant protection chemicals etc. and credit facilities. Irrespective of the size of his farm, any pepper grower can become a beneficiary of the pepper development programmes.

2. Concept of pepper development programmes

There are many programmes implemented in Kerala, in order to promote cultivation and production of pepper, of which, three development programmes were selected for this study. They are Pepper Package Programme, Rejuvenation Programme and Integrated Programme for the Development of Spices.

Pepper Package Programme of Kerala Agricultural Development Project was commenced in the year of 1977 - 78. Replanting of 50 per cent area with improved variety vines, providing fertilizers, plant protection chemicals and institutional credit were the main objectives of the programme.

Rejuvenation programme aimed at replanting of old and uneconomic vines by superior vines and providing fertilizers and manures, plant protection chemicals, rooted cuttings etc. The programme was implemented during 1980 - 1981.

Integrated programme for the development of spices also implemented by Department of Agriculture during the year 1987 - 88. Production and distribution of rooted vine cuttings, establishing model gardens, providing input kits and rehabilitation of pepper gardens were the main objectives of the programme.

3. Dependent variables

a. Awareness :

Any development programme aimed at the welfare of the people, calls for maximum people's participation. The success of the development programmes, lies in the support given by the masses. So to gain support, the prime step is to make the people aware of the programme, its activities, aims etc. Awareness is the first step towards adoption.

According to the Dictionary of Behavioural Sciences, awareness is being conscious of something, percieving and taking account of some event, occasion, experience or object.

Lionberger (1960) defined awareness as the first knowledge about a new idea, product or practice. At the awareness stage, a person has only general information about it.

b. **Attitude :**

Allport (1935) stated that attitude is a mental and neural state of readiness organised through experience, exerting a directive or dynamic influence upon the individuals 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.

Singh et al., (1966) found that the farmers attitude towards the package programme had positive and significant influence on the level of adoption of package of practices.

Majumdar and Majumdar (1967) concluded that attitude was significantly related with adoption.

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

Prasad (1978) in his study found positive and significant relationship between attitude of farmers towards functional literacy programme related with agriculture and adoption behaviour.

c. Adoption :

Anthropologists like Suttle (1951) and Sharp (1952) attempted to emphasis the social consequences of innovation and their effects on adoption.

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

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

Adoption has been defined by Copp et al. (1958) as an activity of the farmer taking place over a period of time. They viewed adoption of a farm practice as a bundle of related events following through time, not an instantaneous metamorphosis.

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

According to Ramsey et al. (1959) adoption behaviour involves two components, behaviour and cognition. Behavioural adoption involves the actual use of the practice and cognitive adoption includes obtaining knowledge and critical evaluation of the practices in terms of the individual situations.

Sawhney (1961) examined the factors and forces contributing towards the wide differences in adoption and enhancing the process of

acceptance and found that they can be explained better from the social, psychological and economic point of view.

According, to Rogers (1962) adoption process is the mental process through which an individual passes from first hearing of an innovation to its final adoption.

Chattopadhyay (1963) defined adoption as the stage in the adoption process where decision making is complete regarding the use of a practice and action with regard to such a practice commences.

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

According to Rogers and Shoemaker (1971) adoption is the decision to continue full use of an innovation on the best course of action.

4. Independent variables and their relationship with dependent variables

On reviewing the literature, from the results reported by past researchers, 12 independent variables were selected and categorised into four groups viz., personal, socio-economic, psychological and communication behaviour variables. Here, an attempt was made to study their relationship with the selected dependent variables. The independent variables selected were :

1. Age
2. Education
3. Farming experience

4. Farm size

5. Indebtedness

6. Risk orientation

7. Innovativeness

8. Economic motivation

9. Scientific orientation

10. Market orientation

11. Export orientation

12. Information sources used

Studies on the independent variables and their association with each of the dependent variables are reviewed hereunder.

A. Relationship of awareness to the selected independent variables

1. Age : Sabarathnam (1975) found that there was no association between age and awareness about improved agricultural practices.

Somasundaram (1976) reported that age had no significant relationship with the awareness of the farmers about demonstrations.

Viswanathan et al. (1975) revealed that the age had a positive influence on the awareness about the H Y V programme.

Rao and Reddy (1979) reported that awareness of farmers and officials about Training and Visit (T & V) System was not related to their age.

Nandakumar (1980) found a negative but significant relationship between awareness and age of participants and non participants of Drought Prone Area Programme (DPAP).

Sarkar and Reddy (1980) reported that awareness of farmers about T & V system was found to be unrelated to age.

Vijaya (1982) stated that the awareness of the farmers about T & V system was independent of their age.

According to Cherian (1984) there would be a negative and non-significant relationship between age and awareness of contact and other farmers about T & V system.

In the light of above studies, this variable was included in the study to know the influence on awareness of pepper growers.

2. Education :

Rao and Reddy (1979) reported that awareness of farmers and officials about T & V system are fairly related to their education.

Vijayaraghavan (1979) stated that, education of farmers had positive and significant association with awareness, about HYV of paddy.

Balu (1980) stated that there was a positive and significant relationship between awareness about integrated dryland agricultural development programme and education.

Mani (1980) reported that educational status of participants and non-participants showed positive and significant relationship with awareness.

Nandakumar (1980) concluded that education had positive and significant association with awareness of DPAP.

Sarkar and Reddy (1980) stated that awareness of farmers about T & V system was fairly related to education.

Naik (1981) concluded that for both contact and other farmers there exists a positive association of education and awareness of T & V system. But in the case of officials, education has no association with awareness of T & V system.

Haraprasad (1982) revealed that there was positive and significant relationship between education and level of awareness of SFDA activities of farmers.

Vijaya (1982) revealed that there was positive influence of education on awareness of farmers towards T & V system.

According to Cherian (1984) education was found to be positive but non significantly correlated with awareness of contact farmers and positively and significantly correlated in the case of other farmers about T & V system.

Based on the results of above studies this variable was selected, to study the correlation with the awareness of pepper growers.

3. Farming experience

No closely related study to this variable could be reviewed. However, it was decided to include farming experience as one of the variables affecting awareness of pepper growers.

4. Farm size :

Vijayaraghavan (1979) concluded that farm size was positively and significantly associated with awareness of HYV of paddy.

Balu (1980) stated that farm size was positively and significantly associated with awareness about Integrated Dryland Agricultural Development Programme.

Mani (1980) stated that farm size was significantly and positively associated with awareness of participants and non-participants.

Naik (1981) revealed that there was significant association between farm size and awareness of other farmers while for contact farmers there was no association between farm size and awareness about T & V system.

Haraprasad (1982) revealed that the farm size of farmers was positively and significantly related with the level of awareness of activities of Small Farmers' Development Agency (SFDA).

Vijaya (1982) stated that farm size had no influence on the extent of awareness of farmers about T & V system.

Cherian (1984) stated that there was positive and significant relationship between awareness about T & V system and farm size.

The above reviews denote the importance of the variable to be included in determining awareness of pepper growers.

5. Indebtedness

No closely related study to this variable could be reviewed. However, it was decided to include indebtedness as one of the variables affecting awareness of pepper growers.

6. Risk orientation

Nandakumar (1980) found that there was positive and significant relationship between risk orientation and awareness about the activities of DPAP.

Aristotle (1981) reported that risk orientation had a positive and significant association with awareness about the facilities of nationalised banks.

Based on the above studies, the variable, has been selected for the study.

7. Innovativeness

No closely related study were found on review of lieterature. However, it was decided, to include this variable, to determine its influence on the awareness of pepper growers.

8. Economic motivation

Nandakumar (1980) found that there was positive and significant relationship between economic motivation and awareness about the activities of DPAP.

Aristotle (1981) found that economic motivation had a positive and significant association with awareness about the facilities of nationalised banks.

Based on the above studies this variable, has been selected.

9. Scientific orientation

Nandakumar (1980) reported that there was positive and significant relationship between scientific orientation and awareness about the activities of DPAP.

Aristotle (1981) reported that scientific orientation was positively and significantly associated with awareness about the facilities of nationalised banks.

was no association between scientific orientation and awareness of T & V system. In the case of contact farmers there was association of scientific orientation with awareness about T & V system.

Cherian (1984) found that scientific orientation was found to be positively but not significantly related with awareness of contact farmers and other farmers about T & V system.

Based on the above studies it was decided, to include this variable, to determine the relationship of scientific orientation with awareness of pepper growers.

10. Market orientation

No closely related study to market orientation could be reviewed. However, it was decided to include this variable in influencing the awareness of pepper growers.

11. Export orientation

Here also, no closely related study could be reviewed. So, it was decided to include this variable, to define awareness of pepper growers.

12. Information source used

Naik (1981) revealed that mass media exposure had a significant association with awareness about T & V system of both contact and other farmers.

Eventhough limited studies, it was decided to include this variable in order to study its relationship with awareness of pepper growers.

B. Relationship of attitude to the selected independent variables

1. Age : According to Bose (1961), people become better integrated and somewhat more extreme in their attitude as they grow older.

Makkar and Sohal (1974) reported that there was significant relationship between age ad attitude of respondents towards soil testing. They also reported that the respondents who were younger in age had more favourable attitude towards soil testing than those who were elder in age.

Menon and Prema (1976) reported that age had positive influence in creating a favourable attitude towards applied nutrition programme.

Sushama (1979) found that age was not a discriminating factor in changing the attitude of tribes.

Ravichandran (1980) reported that there was a negative and non significant relationship between age and attitude.

Subburaj (1980) identified a non significant association between age and attitude of regular credit users, whereas it exhibited a negative and significant association with attitude of defaulter credit user.

Kamarudeen (1981) stated that there was no positive and significant relationship between age and attitude of farmers.

Vijayakumar (1983) found that age was negatively, but non significantly related to the attitude of beneficiaries and was negatively and significantly related to the attitude of non-beneficiaries.

Cherian (1984) found that age of contact and other farmers was positively but non significantly related to attitude, towards T & V system.

In the light of above studies, it was clear, that this variable was important in studying the attitude of pepper growers.

2. **Education :** Das and Sarkar (1970) reported that education was significantly related with farmers' attitude towards the improved farming practices.

Ravichandran (1980) found a positive and significant relationship between education and attitude of registered sugarcane growers.

Subburaj (1980) found that education was positively and significantly related to the attitude of the regular credit users.

Kamarudeen (1981) stated that level of education and attitude towards the National Demonstration Programme was positively and significantly related in the case of both neighbour and control farmers of demonstration plots.

Vijayakumar (1983) indicated that the education of both beneficiaries and non beneficiaries had a significant relationship with their attitude towards improved practices of coconut cultivation.

In the light of above studies, the importance of this variable was proved, so as to include in this study, to explore attitude of pepper growers.

3. **Farming experience :** Ravichandran (1980) reported a positive

and significant relationship between farming experience and attitude of registered sugarcane growers.

In the light of above study, it was decided to include this variable also, so as to study the attitude level of pepper growers.

4. **Farm size :** Das and Sarkar (1970) . (1971) found that farm size was positively and significantly related to the attitude of farmers towards improved agricultural practices.

Pillai (1978) also reported that size of holding was positively related to farmers attitude towards soil conservation measures.

Rao and Reddy (1979) reported that there was no relationship between farm size and attitude.

Sushama (1979) found farm size have no significant relationship with attitude of tribes towards modern living practices in both more developed and less developed areas.

Prakash (1980) revealed that there was no significant relationship between farm size and attitude of tribes towards settled agriculture.

Ravichandran (1980) found that there was negative and non significant relationship between farm size and attitude of registered sugarcane growers.

Sarkar and Reddy (1980) stated that farm size was fairly related to the attitude.

to the attitude.

Subburaj (1980) identified that holding size was positively and significantly related to the attitude of the regular credit users.

Kamarudeen (1981) found that farm size and attitude towards the demonstrated cultivation practices was found to be not significant in the case of neighbour farmers of demonstration plots where as the relationship was positive and significant in the case of control farmers.

Vijayakumar (1983) found that the farm size of beneficiaries as well as non beneficiaries was positively and significantly related to their attitude.

Based on the studies reviewed, it was decided to include this variable, in order to study the attitude of pepper growers.

5. Indebtedness : Prakash (1980) found that there was no significant relationship between indebtedness and attitude of tribals towards settled agriculture in both the medium and less developed areas.

Viju (1985) found that there was no significant association between indebtedness and attitude of tribals towards improved agricultural practices.

The above studies, denote the importance of this variable to be included, in order to study the relationship between indebtedness and attitude of pepper growers.

6. Risk orientation : According to Kamarudeen (1981), there was significant relationship between risk preference and attitude of neighbour and control farmers towards the demonstrated practices.

Naik (1981) stated that in the case of other farmers, attitude

towards T & V system was independent of risk preference but in the case of contact farmers, it was found to be dependent.

Cherian (1984) found that there was positive and significant relationship between risk preference and attitude of contact and other farmers towards T & V system.

In the light of above studies, it was concluded that the variable has high significance in defining the attitude of pepper growers.

7. Innovativeness : Ravichandran (1980) found negative and non significant relationship between innovativeness and attitude of registered sugarcane growers.

Eventhough, limited studies are available on this variable, it was decided that this variable has considerable influence in determining the attitude of pepper growers.

8. Economic motivation : Das and Sarkar (1970) reported that economic motivation is positively and significantly correlated to the attitude of farmers towards farming practices.

Eventhough, only limited studies are available on this variable, it was decided to include this variable also, so as to study the attitude of pepper growers.

9. Scientific orientation : According to Kamarudeen (1981) it was found that positive and significant relationship between scientific orientation and attitude towards the demonstrated cultivation practices in the case of both neighbour and control farmers.

scientific orientation was found to be independent of their attitude towards T & V.

Cherian (1984) found that there was negative and non significant relationship between the scientific orientation and attitude of contact farmers towards T & V system.

The review of studies revealed that this variable had considerable importance in the development of attitude among pepper growers.

10. Market orientation : No closely related study has come through, during review. Eventhough, this variable was assumed to be of significant importance in defining the attitude of pepper growers. Hence, on the basis of this assumption, this variable was included for this study.

11. Export orientation : No closely related study has come through, during review. Eventhen, this variable was assumed to be of significant importance in defining the attitude of pepper growers. On the basis of this assumption, this variable was included for this study.

12. Information sources used : According to Sharma and Kishore (1970) radio was an effective mass communication medium in bringing about significant changes in the knowledge and attitude of farmers. It was also found that farmers significantly retain the communicated knowledge even after 15 - 30 days of broadcast.

Murthy (1976) reported that mass media contact was significantly correlated with the attitude of women in decision making at the opperational level of farms.

Prakash (1980) found that there was no significant relationship between information source utilisation pattern and attitude of tribes towards settled agriculture.

Kamarudeen (1981) reported that there was positive and significant relationship between information source utilisation and attitude towards the demonstrated practices.

Based on these studies, this variable has been selected to study its influence on attitude of pepper growers.

C. Relationship of adoption to the selected independent variables

1. Age : Wilkening (1952) found a negative relationship between age and adoption behaviour.

Rogers and Burdge (1962) reported that younger age was associated with the innovativeness of farm technique.

Kaleel (1978) found age is not a discriminatory factor in adoption of improved agricultural practices.

Naidu (1978) found negative relationship between age and adoption of improved farm practices.

Pillai (1978) while studying the impact of soil conservation programme found that age was negatively and significantly related with adoption of soil conservation practices.

Sushama (1979) found age was not a discriminating factor for adoption of modern practices.

Annamalai (1980) found that there was no significant relationship between age and adoption behaviour of both farmer demonstrators and nearby farmers.

Balasubramaniam (1980) reported that there was negative but significant association between age and adoption.

Manivannan (1980) reported that age had a negative, non-significant relationship with adoption of sunflower growers.

Prakash (1980) found negative relationship between age and adoption of improved agricultural practices, among tribals.

Ravichandran (1980) found negative relationship between age and adoption of registered sugarcane growers.

Kamarudeen (1981) found that there is a negative relationship between age and adoption of demonstrated practices.

Vijayakumar (1983) found that there is a negative relationship between age and the extent of adoption.

Swaminathan (1986) stated that age did not exhibit any influence in the adoption behaviour of both participants and non participants of pulse minikit demonstration.

Prasannan (1987) found that age was negatively and nonsignificantly correlated to the extent of adoption of T & V messages.

Based on these studies, the variable was found important in determining adoption of improved farm practices for pepper.

2. **Education :** Wilkening (1953), Vanden Ban (1957), Lionberger (1960), Pandit (1964), Rai (1965), Rajendra and others have shown that the educational level of farmers was positively related with their adoption behaviour.

Kaleel (1978) also found a positive influence of education on the adoption of improved agricultural practices.

Pillai (1978) found that there was no significant relationship between education and adoption.

Rajendran (1978) observed a positive and significant relationship between education and general adoption of the selected agricultural practices.

Subhadra (1979) revealed that adoption was not influenced by education.

Balasubramaniam (1980) found a negative but significant association between education and adoption of high yielding rice technology.

Manivannan (1980) found a positive and significant relationship between education and adoption of sunflower growers.

Ravichandran (1980) reported, education has a negative and non significant relationship with the adoption of registered sugarcane growers.

Kamarudeen (1981) found a positive and significant relationship between level of education and extent of adoption.

Haraprasad (1982) found a significant and positive relationship between education and extent of adoption of improved practices of live-stock rearing.

Vijayakumar (1983) found that education had a positive and significant relationship with the extent of adoption of beneficiaries and non-beneficiaries.

Swaminathan (1986) reported that education did not influence adoption behaviour of small and marginal farmers, in pulse minikit demonstration.

In the light of above studies, it was concluded, that this variable had significant importance, in defining the extent of adoption.

3. **Farming experience :** Grewal and Sohal (1971) reported that previous experience of the farmers showed significant relationship with their adoption of improved practices.

Anbalagan (1976) studied the influencing factors on adoption of package of practices for high yielding variety of paddy and found that the experience of farmer was an important variable for adoption. Adopters possess more previous farm experience than non adopters.

Ravichandran (1980) reported that farming experience has a negative and nonsignificant relationship with adoption of registered sugar-cane growers.

In the light of above studies, this variable proved to be significant in determining the extent of adoption of pepper growers.

4. **Farm size :** Marsh and Coleman (1955), Ban (1957), Chand and Gupta (1966) indicated that size of holding has a positive relationship with the adoption of agricultural practices.

Kaleel (1978) found that size of holding had no significant relationship with adoption.

Pillai (1978) found that size of holding was having a positive and significant relationship with adoption of soil conservation measures.

Rajendran (1978) also found a positive and significant relationship between size of holding and adoption of selected agricultural practices by farmers.

Balasubramanian (1980) reported that farm size had a negative and non significant relationship with adoption of high yielding rice technology.

Manivannan (1980) reported a positive and significant relationship between size of holdings and extent of adoption of sunflower growers.

Prakash (1980) found a positive and significant relationship between farm size and adoption of improved agricultural practices in both, more developed and less developed areas of tribal development activities.

Ravichandran (1980) found that farm size was negatively and non significantly related to the adoption of registered sugarcane growers.

Kamarudeen (1981) found that there was no significant relationship between farm size and extent of adoption of the demonstrated cultivation practices.

Vijayakumar (1983) found that farm size was positively and significantly related with the extent of adoption in the case of beneficiaries as well as non beneficiaries.

Prasannan (1987) reported that farm size posses a positive and significant relationship to adoption of T & V messages.

These studies necessitated the selection of farm size as a variable to confirm its influence on the extent of adoption of pepper growers.

5. **Indebtedness :** Salunke and Thorat (1975) reported that indebtedness of small farmers had a significant relationship with adoption behaviour.

Tribal indebtedness, according to Mathur (1975) is both a cause and effect of poverty and is also related to bonded labour and alienation of tribal land.

Sadamate (1978) reported that indebtedness was positively and non significantly related to the technological gap in the tribal farming system.

Prakash (1980) found a positive and significant relationship between indebtedness and adoption of improved agricultural practices in the medium developed tribal areas of wynad while this relationship was not significant in less developed areas.

In the light of these studies, indebtedness, has been included as a variable to determine the extent of adoption of pepper growers.

6. **Risk orientation :** Ramsey et al. (1959), Fliegal (1959), Rogers and Havens (1961) and Bohlen and Beal (1966) found that risk taking capacity positively influenced the adoption behaviour of farmers.

Nair (1969) while conducting a multivariate study on the adoption of high yielding paddy variety by the farmers of Kerala State, reported that risk orientation was an important variable which affected the adoption behaviour.

Singh and Singh (1970) reported that risk orientation contributed significantly to the adoption behaviour of farmers.

Binswanger (1978) also reported that risk orientation was an important variable in the adoption of new technology by the rural households.

Rajendran (1978) found that risk orientation was positively and significantly related with the general adoption behaviour of the respondents on the selected agricultural practices.

Balu (1980) stated that there was negative and non significant relationship between risk orientation and adoption.

Prasannan (1987) found that risk orientation was positive but did not have a significant relationship with the adoption of T & V messages.

For this study, it was assumed that risk orientation would be one of the deciding factors of adoption of pepper growers, and hence it was included for the study.

7. Innovativeness : Ravichandran (1980) reported that innovativeness was negatively and non significantly associated with adoption of registered sugarcane growers.

Eventhough only limited studies are available, this variable was selected to test its influence on adoption of pepper growers.

8. Economic motivation : Hobbs (1964) reported that there was a positive relationship between economic motivation of farmers and their adoption behaviour.

Beal and Sibley (1967) and reported positive relationship between economic motivation and adoption of improved practices.

Das and Sarkar (1970) attempted in their study to ascertain the extent of economic motivation in influencing the adoption of improved agricultural practices and found that, (a) farmers adopted improved practices for economic gains (b) the socio-cultural factors influenced farmers to adopt improved practices only for economic gains (c) higher the economic motivation more favourable the attitude towards adoption of improved farming practices would be.

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

According to Rajendran (1978) there was positive relationship between economic motivation and adoption.

Balu (1980) reported that there was negative and non significant relationship between economic motivation and adoption.

Manivannan (1980) reported that there was negative and non significant relationship between economic motivation and adoption.

Prasannan (1987) reported that there was positive, but not significant relationship between economic motivation and adoption of T & V messages.

The above studies led to the selection of this variable to study its relation to the adoption of pepper growers.

9. Scientific Orientation :

Beal and Sibley (1965) found that the farmers' favourable attitude towards science was positively related with the adoption of farm practices.

Reddy and Kivlin (1968) observed that scientific attitude was not related with the adoption of recommended practices by the farmers.

Supe and Salode (1975) reported that the scientifically oriented farmers had high extent of adoption of the demonstrated cultivation practices of jowar.

Balu (1980) reported that there was negative and non significant relationship between scientific orientation and adoption.

Manivannan (1980) reported that there was negative and non significant relationship between scientific orientation and adoption of sunflower growers.

Kamarudeen (1981) found that there was significant relationship between scientific orientation and extent of adoption of the demonstrated cultivation practices in the case of both neighbour and control farmers of the selected demonstration plots.

Swaminathan (1986) concluded that scientific orientation do not exhibit adoption by small and marginal farmers in pulse minikit demonstration.

Since the above studies repeatedly pointed out the association between these two variables, it would be of special interest, to study their association in this study also.

10. Market orientation : Beal and Sibley (1967) and Nair (1969) revealed that farmers who perceived a good market and price for the produce of the high yielding variety adopted the variety more than the other farmers who had an unfavourable perception. Lack of market and low price for the produce were two main reasons mentioned for non adoption of high yielding varieties of paddy. The farmers perception of the ease of marketing and his confidence in remunerative prices will have a strong influence on adoption. It is expected that if a produce has a good market and can be sold easily with good prices, then the adoption of the innovations resulting in increased production of that particular produce will be high.

Naidu (1978) found that there was significant relationship between market orientation and adoption.

The influence of market orientation over adoption is well established in the above studies, which paved the way for including this variable for this study.

11. Export orientation : No closely related study could be reviewed in this context. However, it was assumed that export orientation of the farmers would influence the adoption of modern practices. Based on this assumption, this variable was included in the study.

12. Information sources used :

Supe (1971) while studying the relationship of the adoption behaviour with the use of information sources showed that the farmers who had used more institutionalised sources of information were higher adopters than the farmers who had used non-institutionalised sources.

Mathur et al. (1975) found that the less literate the farmer the more he used neighbours, friends and relatives as sources of information.

Padheria and Patel (1975) concluded that the majority of the respondents obtained information about improved farm practices for the selected crops from the village level workers and the next important sources of information was neighbours and relatives.

Nanjaiyan et al. (1973) observed that for the selection of variety and season, neighbours and friends were the most utilized sources followed by radio, whereas in the case of the practices of seed rate and spacing, radio ranked first followed by personal experience.

Naidu (1978) found that relationship of information sources used with adoption was not found to be significant.

Prasad (1978) found that there was significant positive relationship between information sources used and adoption behaviour of farmers.

Sushama (1979) found that use of information sources are positively and significantly related to adoption of modern living practices in more developed areas, while non significant relationship was noticed in less developed area.

Prakash (1980) found that use of information sources was positively and significantly related to adoption of improved agricultural practices in more developed areas while non significant relationship was noticed in less developed area.

The above studies furnish enough evidences with respect to the role of information sources used on adoption and so in this study this variable was also included.

5. Constraints involved in the implementation of programmes

Parameswaran (1973) proved that lack of knowledge, poor efficiency, unsuitability of soil and lack of conviction among the farmers were the important reasons for non adoption of package programme of cotton.

Anbalagan (1976) showed lack of knowledge and lack of conviction as the main reasons for non adoption of package of practices for high yielding variety of paddy.

Viswanathan (1975) in his study found high cost of cultivation as the limiting factor in the adoption process.

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

Pillai (1978) found that lack of technical guidance, inadequate financial assistance, lack of knowledge and non availability of material are the main reasons for the non adoption of soil conservation measures by the farmers of Kerala.

Rajendran (1978) identified the high cost involved in the adoption as the most important problem among the small paddy growers of Kerala. Untimely and inadequate supply and services, lack of awareness, lack of adequate skill etc. were also found to be important.

Manivannan (1980) reported that low seed setting, non remunerative prices and damage of seeds by birds were the major problems faced by the sunflower growers. This was followed by lack of credit facilities, lack of pest resistant variety and inadequate transport facilities.

Mani (1980) observed that lack of credit facilities on pledging the produce was the most important problems in the utilisation of the regulated markets.

Waghmare and Pandit (1982) found that lack of knowledge, technical guidance, and inputs, and small size of holdings were the important

6. Theoretical concepts and operational definitions of the selected variables

1. Pepper development programmes :

They are development programmes implemented by the government and intended for, the farmers to be aware, to develop a favourable attitude and finally adopt the improved agricultural practices followed under the programmes to promote pepper cultivation.

The different programmes selected to study are : (1) Pepper Package Programme of SADU, (2) Pepper Rejuvenation Programme by the Department of Agriculture, (3) and the Integrated Programme for Development of Spices by Department of Agriculture.

2. Impact of pepper development programme :

Varying methods had been used by different researchers to study the impact of different programmes.

Samad (1979) studied the impact of package programme by measuring the level of knowledge about the package programme and improved agricultural practices ; farmers' participation in the package programme which has a positive relationship with adoption and attitude of the officials of the programme towards the programme itself.

Kamarudeen (1981) studied the impact of National Demonstration by measuring level of knowledge about the selected demonstrated cultiva-

tion practices of paddy, attitude towards the selected demonstrated cultivation practices of paddy and the extent of adoption of the selected demonstrated cultivation practices of paddy.

In this study, the impact of pepper development programmes was studied by measuring the awareness of the farmers - both beneficiaries and non beneficiaries - about the aims, objectives and activities of the pepper development programme, attitude of the farmers towards the pepper development programme and the extent of adoption of recommended improved agricultural practices under the pepper development programmes.

3. Beneficiaries :

In this study, beneficiaries are pepper cultivators who availed inputs through the concerned programme, as kind or cash or both, intended to raise the pepper production.

4. Non beneficiaries :

In this study, non beneficiaries are also pepper cultivators, but who did not avail inputs through any pepper development programmes, in kind or cash or both.

5. Awareness :

Lionberger (1960) defined awareness as the first knowledge about a new idea, product or practice. At the awareness stage, a person has only general information about it.

In this study, awareness was operationally defined as the general information possessed by a pepper grower with respect to various activities under pepper development programmes.

6. Attitude :

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

In this study, attitude was operationally defined as the degree of positive or negative affect of the farmers towards pepper development programmes.

7. Extent of adoption :

Wilkening (1953) postulated the adoption of an innovation as a process composed of learning, deciding and acting over a period of time.

Adoption behaviour was operationalised as the extent to which the recommended improved farm practices of pepper cultivation are put into practice under the pepper development programmes.

8. Age :

Age was defined for this study, as the number of years the respondent has completed at the time of interview, since his birth.

9. Education :

Education in this study, was identical with the level of literacy and refers to the ability of the respondents to read and write and the extent of schooling.

10. Farming experience :

Farming experience was operationally defined as the number of years, the respondent has completed in the cultivation of pepper crop, at the time of the interview.

Farm size has been operationally defined as the number of acres of land cultivated and owned by the respondent, at the time of the interview.

12. Indebtedness :

Indebtedness is operationally defined as the amount indebted by a farmer to various money lending sources such as money lenders, cooperative societies, merchants, traders etc.

13. Risk orientation :

Risk orientation was operationalised as the degree to which a pepper grower is oriented towards risk and uncertainity in adopting new ideas or practices in pepper growing.

14. Innovativeness :

Innovativeness has been operationally defined as a psychological orientation of an individual to get linked with change adopting new ideas and practices.

15. Economic motivation :

Economic motivation has been operationally defined as the extent to which a farmer is oriented towards achievement of the maximum profit from pepper cultivation.

16. Scientific orientation :

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

17. Market orientation :

Market orientation has been operationally defined as the degree to which a farmer is oriented towards the market in terms of the demand and price of his crop produce.

18. Export orientation : Export orientation was operationally defined as the degree to which a farmer is oriented towards the export and quality

Information sources used was operationally defined as the sources through which information about pepper development programmes is obtained by an individual.

7. Hypotheses set for the study

Based on the extensive theoretical orientation and review of literature, the following null hypotheses were formulated.

1. There will be no significant difference between beneficiaries and non beneficiaries of Pepper Package Programme with respect to their level of awareness.

2. There will be no significant difference between beneficiaries and non beneficiaries of Pepper Package Programme with respect to their attitude.

3. There will be no significant difference between beneficiaries and non beneficiaries of Pepper Package Programme with respect of their extent of adoption.

4. There will be no significant difference between beneficiaries and non beneficaries of Rejuvenation programme with respect to their level of awareness.

5. There will be no significant difference between beneficiaries and non beneficiaries of Rejuvenation programme with respect to their attitude.

6. There will be no significant difference between beneficiaries and non beneficiaries of Rejuvenation programme with respect to their extent of adoption.

7. There will be no significant difference between beneficiaries and non beneficiaries of Integrated programme for development of species with respect to their level of awareness.

8. There will be no significant difference between beneficiaries and non beneficiaries of Integrated progamme for development of spices with respect to their attitude.

9. There will be no significant difference between beneficiaries and non beneficiaries of Integrated programme for development of spices with respect to their extent of adoption.

10. There will be no positive and significant relationship between the awareness of the farmers about different activities of pepper development programmes with respect to the characteristics of farmer viz., age, education, farming experience, farm size, indebtedness, risk orientation, innovativeness, economic motivation, scientific orientation, market orientation, export orientation and information sources used.

11. There will be no positive and significant relationship between attitude of farmers towards pepper development programmes with respect to the characteristics of farmer viz., age, education, farming experience, farm size, indebtedness, risk orientation, innovativeness, economic motivation, scientific orientation, market orientation, export orientation and information sources used.

12. There will be no positive and significant relationship between extent of adoption of improved farm practices under the pepper development programmes with respect to the characteristics of farmer viz., age, education, farming experience, farm size, indebtedness, risk orientation, innovativeness, economic motivation, scientific orientation, market orientation, export orientation and information sources used.

METHODOLOGY

III METHODOLOGY

This chapter deals with the methodology employed in this study, which are presented under the following sub headings :

1.   Selection of location for the study

2.   Selection of sample

3.   Measurement of dependent and independent variables

4.   Identification of problems or constraints

5.   Data collection procedure

6.   Statistical tools used

1.   Selection of location for the study

This study was confined to Cannanore district in Kerala State. This district was purposively selected, as Cannanore, was having the maximum area under pepper cultivation.

Another reason for the selection of Cannanore district was that all the three selected pepper development programme viz., pepper package programme, Rejuvenation programme and Integrated programme for development of spices were implemented here.

The district consists of three agricultural sub-divisions viz., Cannanore, Tellicherry and Payyannore. From each sub division, one Krishi Bhavan was selected. They were Iritty, Kottiyoor and Karthika-puram Krishi Bhavans from the Cannanore, Tellicherry and Payyannor sub divisions respectively, vide Table 1.

FIG.2. DISTRICT MAP OF KERALA
SHOWING THE LOCATION OF
THE STUDY

kasaragod taluk

hosdurg taluk

Payyannur taluk

cannanore taluk

CANNANORE

bellichery taluk

north wynad taluk

badagara taluk

South wynad taluk

quilandy taluk

kozhikode taluk

KOZHIKODE

MAP OF KERALA

CANNANORE DT.

ARABIAN SEA
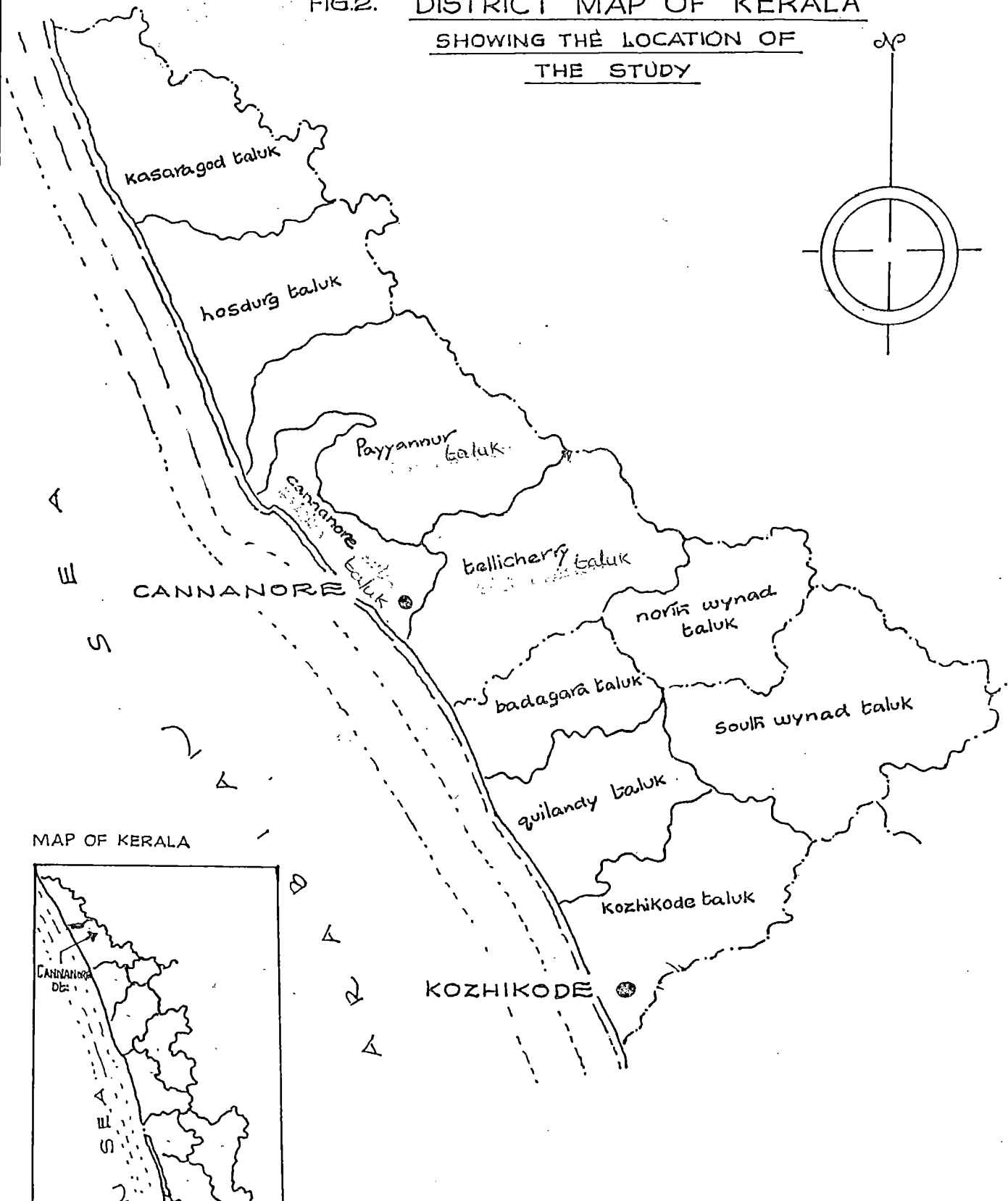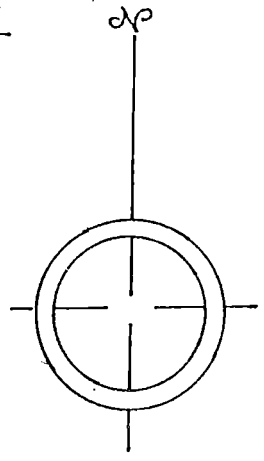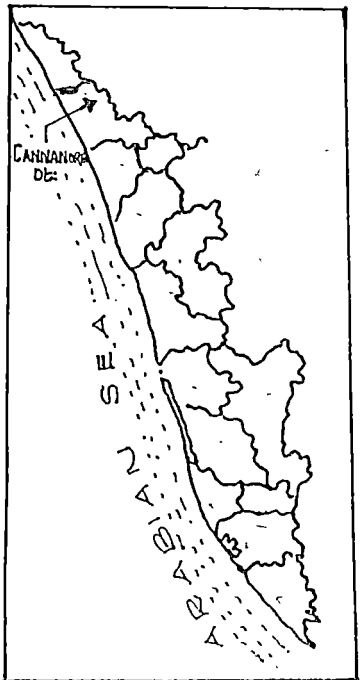
● DISTRICT HQrs.

—··— DISTRICT BOUNDARY

—— TALUK & SUB DIVISION BOUNDARY

STUDY AREA

2. Selection of sample

The sample population comprised 120 pepper cultivators which included both beneficiaries and non-beneficiaries of the pepper development programmes.

From each selected Krishi Bhavan area, 40 farmers were selected at random. Of these, 30 were beneficiaries of pepper development programmes i.e., 10 beneficiaries each of pepper package programme, rejuvenation programme and integrated programme for development of spices respectively.

For comparison, 10 non-beneficiary farmers were also selected from each Krishi Bhavan.

Thus the total sample comprised of 90 beneficiaries and 30 non-beneficiary farmers, making an aggregate of 120 farmers.

The number of farmers selected from each subdivision are presented in the table 1 below.

Table 1. Number of subdivisions and respondents selected for the study

Pepper development programme	Cannanore subdivision Iritty		Payyannore subdivision Karthikapuram		Tellicherry subdivision Kottiyoor	
	Benefi-ciaries	Non-beneficiaries	Benefi-ciaries	Non-beneficiaries	Benefi-ciaries	Non-beneficiaries
Pepper package programme	10		10		10	
Rejuvenation programme	10	10	10	10	10	10
Integrated programme for development of spices	10		10		10	
Total	30	10	30	10	30	10

3. **Measurement of dependent and independent variables**

This part includes a review of methods of measurement of variables already used by different researchers and the empirical measures used in this study.

A. **Measurement of dependent variables**

i. **Awareness :** Various researchers have used different methods to measure variables. Notable among them are given below.

Gaikwad (1971) studied the awareness of participant farmers of integrated area development scheme, by asking a few questions, to find out whether they were aware or not about the scheme and awareness was measured by calculating percentages of farmers aware and unaware of the programme.

Khan (1978) measured awareness by asking the respondents, whether they were aware of certain measures of the government for improving the condition of small farmers.

Salunkhe (1978) measured awareness of farmers by asking questions on the activities of Small Farmers Development Agency (SFDA) viz., publicity about SFDA, method of getting benefits method of granting subsidies, supervision of loan, arranging services, supplies and technical guidance.

For the purpose of this study, the method followed by Salunkhe

(1978) was accepted with slight modification. In consultation with the officials, experts and reviewing the relevant literature a list of questions was prepared. The questions were pretested among 40 farmers in a non-study area in Anad Village, 25 km away from Trivandrum. From the list of questions, 10 questions were selected on the basis of wide variation in response.

These questions were administered to the respondent farmers and a score of one was given for every correct answer and zero for the wrong answers.

Then the awareness index was calculated using the formula =

$$\frac{\text{Actual score obtained}}{\text{Maximum possible score}} \times 100$$

ii. **Attitude :** Attitude was measured by an attitude scale. An attitude scale is one which assess the degree of affect that individuals may associate with some psychological object. In this study, attitude of pepper growers - both beneficiaries and non beneficiaries - towards pepper development programmes was measured using the attitude scale, constructed for the purpose.

Based on review of literature and discussion with experts, 40 statements regarding different aspects of pepper development programmes, were set, so as to make the respondents reflect their attitude through their responses. Then the statements were edited by eliminating those which failed to meet the standards by comparing to the criteria for selection of attitude statements as given by Edwards (1957). Thus 32 statements were finally retained after screening.

The method of Equal Appearing Intervals as described by Thurstone and Chave (1929) was used to determine the scale values of the attitude statements. For this, the 32 statements were sent to a group of judges, comprising of experts of various departments of Agricultural College, Vellayani. They were asked to respond in terms of their own agreement or disagreement to the statements that whether it will reflect attitude rather than in terms of their judged degree of favourableness or unfavourableness. Thus the response are obtained on a five point continuum ranging from strongly agree, agree, undecided, disagree and strongly disagree with scores 5, 4, 3, 2 and 1 respectively for positive statements and the scoring pattern was reversed in the case of negative statements. The scores secured on each statement was added and cumulated proportions were computed.

Taking the median of the distribution of judgements for each statements as the scale value, the scale value was computed using the formula :

$$S = 1 + \frac{(0.50 - \Sigma P_b)}{P_w} i$$

Where   S   the median or scale value of the statement

 l   =   the lower limit of the interval in which the median falls

ΣP_b the sum of the proportions below the interval in which the median falls

P_w =   the proportion within the interval in which the median falls

 i   =   the width of the interval and is assumed to be equal to 1.0

Interquartile range or Q value was also then worked out by finding

the 25th and 75th centiles. On the basis of S and Q values attitude statements were selected, since low Q value indicated a good agreement among the subjects in judging the degree of favourableness or unfavourableness of a statement. Thus 15 statements were finally selected to measure the attitude of pepper growers towards pepper development programmes. The selected 15 statements had almost equal distribution of favourableness and unfavourableness.

Reliability of the scale

A scale is said to be reliable when it produces results with high degree of consistency when administered to the same respondents.

In this study, the reliability of the scale was determined by split-half method. The scale was administered to 30 non-sample pepper growers of the study area. The scale administered to the 30 respondents was divided into two halves, based on odd-even numbers of statements. Two sets of scores were derived from the same respondents and these were correlated. The coefficient of correlation (r) between the two scores was found to be (0.836) highly significant. Hence it was concluded that the scale was reliable.

Validity of the scale

The validity of a scale means the fidelity with which it measures what it is supposed to measure. The developed scale was tested for the following two types of validity.

a. **Content validity :**

The main criterion for content validity is how well the contents of the scale represents the subject matter under study. Since the items

items covered all aspects of the pepper development programmes.

b. Construct validity :

The construct validity was tested by calculating the correlation coefficient between education and attitude score. The attitude and education scores of 30 respondents were calculated and correlation coefficient was found out, by comparing. The r value, 0.853 which was significant. So it was proved, that scale has construct validity also.

The attitude scale thus developed was incorporated in the interview schedule and administered to 120 respondents of the study area and their responses were collected on a five point continuum, ranging from strongly agree to strongly disagree. Scores were given as 5, 4, 3, 2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree statements respectively. The scoring pattern was reversed for the negative statements. The favourable and unfavourable attitude statements were set at a random order and respondents were asked to respond according to their degree of agreement and disagreement to each statement.

Attitude score of each respondent was added together. Attitude scores above the median values were considered as favourable attitude and those below the median value as unfavourable attitude.

3. Extent of adoption

Extent of adoption of improved agricultural practices under the pepper development programmes.

Various researchers have used various methods.

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

Duncan and Kreet low (1954) used a 25 item index of farm practices adoption which was a modification of the index developed by Wilkening.

Marsh and Coleman (1955) used "Practice Adoption Scores" computed as the percentage of applicable practices adopted.

Fliegal (1956) constructed an "Index of Adoption" of farm practices using the correlation of several adoption variables. He used factor analysis of each of the 11 factors selected. A score of one was given for adoption and zero for non adoption.

Beal and Rogers (1960), studied in detail the adoption of two farm practices. A simple adoption scale was computed which credited individual with one point for adoption and zero point for non adoption of a practice.

Supe (1971) developed a scale viz., cotton practice adoption scale. He selected ten cultivation practices of cotton and for each practice, the total score for complete adoption was six. The practices divisible were assigned partial scores for partial adoption.

Singh and Singh (1970) used an "Adoption Quotient" which was a modification of the one developed by Chattopadhyay (1963).

was calculated using the formula :

$$\text{Adoption Quotient} = \frac{\Sigma \, E/P}{N} \times 100$$

Where Σ the summation

  E.   =   extent of adoption of each practice

  P   =   potentiality of adoption of each practice

  N   =   total number of practices selected

In this study, to measure the extent of adoption of improved agricultural practices under the pepper development programme, the method developed by Supe (1969) was followed.

To study the extent of adoption, six improved agricultural practices for pepper, followed under the pepper development programme were selected. The selection of practices was done by review of literature and consultation with the experts of both the department of Agriculture and Agricultural University.

The practices selected were :

1.   Use of high yielding variety like Panniyoor - 1 for cultivation

2.   Use of prescribed chemical fertilizers for cultivation

3.   Adopting the recommended spacing

4.   Need based use of plant protection chemicals

5.   Replanting old and unproductive vines, on time

6.   Use of other organic manures, in correct quantity

Scores were given as one and zero for adoption and non adoption of these practices respectively. The divisible practices were given partial score for partial adoption.

Using the formula suggested by Supe (1969), total score was calculated for each respondent farmer and it was his adoption score. From the adoption score median was calculated. The score above the median, represents high level of adoption and below the median, a low level of adoption.

B.   Measurement of Independent variables

1. Age :

Age was measured as the number of years, the respondent has completed at the time of interview, since his date of birth.

2. Education :

In this study, to measure educational level of the respondent, the scoring system followed by Trivedi (1963), with suitable modifications was adopted. The scoring system used was as follows :

Illiterate	-	0
Can read only	-	1
Can read and write	-	2
Primary level	-	3
Middle school level	-	4
High school level	-	5
College and above	-	6

3. Farming experience :

Farming experience was measured as the number of years, the respondent has completed in the cultivation of pepper, at the time of the interview.

4. Farm size :

In this study, farm size of the respondent was measured as the number of acres of land cultivated and also owned by him.

5. Indebtedness :

The indebtedness was measured in rupees. Amount of money indebted by the respondent to various money lending agencies such as money lenders, cooperative societies, merchants, traders, etc.

6. Risk orientation :

In this study, risk orientation was measured by the risk preference scale developed by Supe (1969). This scale consists of six statements of which two were negative. The responses were collected on a five point continuum viz., strongly agree, agree, undecided, disagree and strongly disagree with scores 7, 5, 4, 3 and 1 respectively for positive items. The scoring pattern was reversed for negative items.

The total score obtained by a respondent was considered as his score for risk orientation.

7. Innovativeness :

In this study, innovativeness was measured by using the scale developed and with the modification as done by Prasad (1983). This scale consisted of eight statements, of which 1st four statements were positive and rest were negative items. The responses were collected on a three point continuum and the scores were given as yes-2, undecided-1 and No-0, for positive items and scoring pattern reversed for negative items.

The total score for the eight statements was taken as the score for innovativeness of that respondent.

8. Economic motivation :

In this study, economic motivation was measured using the scale developed by Supe (1969). This scale consisted of six statements of which five were positive and one negative. Responses were collected on a five point continuum with scores as follows : Strongly agree-7, Agree-5, Undecided-4, Disagree-3 and strongly disagree-1, for positive items and scoring pattern was reversed for negative items.

Then the total score was calculated and mean of the scores were taken. Scores of the respondents obtained above the mean, considered as high economic motivation and if below the mean as low economic motivation.

9. Scientific orientation :

In this study, scientific orientation was measured by using the scale developed by Supe (1969). His scale consisted of six statements of which one was negative. Responses were collected on a five point continuum with scores as follows : Strongly agree-7, Agree-5, Undecided-4, Disagree-3 and Strongly disagree-1 for positive items and scoring pattern was reversed for negative items.

The total score obtained by each respondent was considered as the score of his scientific orientation.

10. Market orientation :

In this study market orientation was measured by using the scale developed for the purpose. The scale consisted of six statements of

which four statements were positive and two negative. Responses were collected on a five point continuum and scores were given as follows Strongly agree-5, Agree-4, Undecided-3, Disagree-2 and Strongly disagree-1 for positive items and scoring pattern was reversed for negative items.

The total score secured by each respondent was considered as his score of market orientation.

11. Export orientation :

In this study, export orientation was measured by using the scale developed for the purpose. The scale consisted of six statements of which three were positive and three were negative. Responses were collected on a five point continuum with scores as follows : Strongly agree-5, Agree-4, Undecided-3, Disagree-2, and Strongly disagree-1 for positive items and scoring pattern was reversed for negative items.

Total score secured by a respondent was considered as his score for export orientation.

12. Information sources used :

In this study, information sources used was measured by using the scale developed for the purpose. The scale consisted of 24 sources of information, which were classified under impersonal sources, formal personal source, informal personal source, commercial source and other channels of communication.

Each respondent was asked, to indicate how often he got information on agricultural technology from each of the listed sources. Responses

were collected and scores were given as 2, 1 and zero for regularly, sometimes and never respectively.

Response scores were summed across each items to form the index of use of information sources. Total scores of three grouping were added together, and median of the scores was calculated. Above median represents high use of information source and below median shows low use of information source.

4. Identification of Constraints

One of the objectives of the study was to identify the constraints with regard to the adoption of recommended agricultural practices under the pepper development programme.

To identify the constraints, the respondents were asked to speak out the constraints in the cultivation of pepper as perceived by them on a priority basis. These constraints were recorded by the researchers. Based on the frequencies of the pooled constraints, they are numerically ranked from one to ten.

5. Procedure adopted for data collection

A pilot study was conducted among the pepper growers of the Anad area, in Nedumangad Taluk, about 25 km from Trivandrum. The interview schedule prepared, was pre-tested among these pepper growers, in order to refine it, so that the schedule gives a good coverage in studying the impact of the pepper development programme. The interview schedule, which is prepared in Malayalam, was finally refined, with the help of experts both of department and university.

Since the objectives of the three development programmes are

almost similar, a single type interview schedule was used to study the impact of three pepper development programme.

Data collection was carried out during February, 1989. Each of the respondent was individually contacted either in the house or farm, with the assistance of staff of respective Krishi Bhavans.

6. Statistical tools used

The data collected were put to the following statistical tests.

1. Simple correlation :

Simple correlation coefficient were worked out to find the relationship of each of the independent variables with dependent variables. Correlation analysis was also used to find out the interrelationship between the dependent variables as well as the interrelationship between independent variables. The significance of correlation was tested at 1, 5 and 10 per cent levels.

The formula used to compute simple correlation was :

$$r_{xy} = \frac{P_{xy}}{xy}$$

Where r_{xy} = Correlation between x and y.

P_x = Product moment of x and y.

x = Standard deviation of the distribution of x.

y = Standard deviation of the distribution of y.

2. Kruskel-wallis Test

This test is equivalent to analysis of variance in parametric case. Kruskel wallis test was employed for comparison among dependent variables between beneficiaries and nonbeneficiaries of the three pepper

development programmes. Here all the observations are pooled together and then ranks are assigned to this course.

The formula used to compute the test was

$$X^2_{k-1} = \frac{12}{n(n+1)} \sum_{j=1}^{k} \frac{C^2_j}{n_j} - 3(n+1)$$

Where C_j = Total of ranks in jth sample

n = Total number of observations

k = Number of independent samples

RESULTS

IV RESULTS

In this chapter, the results of the study are presented under the following sub-heads.

1.   Distribution of beneficiary and non-beneficiary farmers of the three selected pepper development programmes according to their level of awareness, attitude and adoption of improved cultivation practices.

2.   Correlation between the independent and the selected dependent variables

3.   Intercorrelation of dependent variables

4.   Intercorrelation of independent variables

5.   Results of kruskel-wallis Test

6.   Contraints as perceived by farmers

1.   **Distribution of beneficiary and non-beneficiary farmers of the three selected pepper development programmes according to their level of awareness, attitude and adoption of improved cultivation practices**

   A.   Distribution of beneficiary farmers. of Pepper Package Programme

   a)   Level of awareness :

The distribution of beneficiary farmers according to their level of awareness about the Pepper Package Programme is given in Table-2.

Table 2. Distribution of beneficiary farmers according to their level of awareness about Pepper Package Programme

Level of awareness about Pepper Package Programme	Beneficiary farmers	
	Frequency	Percentage
Low (< 89.68)	-	-
Medium (89.68 - 99.66)	16	53.33
High (> 99.66)	14	46.67
Total	30	100.00

From table 2, it could be seen that the farmers having medium level of awareness were slightly more than those having a high level of awareness, towards this programme. Out of the total 30 farmers, 16 of them, (53.33%) were having medium level of awareness and 14 (46.67%) were having high level of awareness. It was also to be noted that none of the farmers come under the low level of awareness.

b. Level of attitude :

The farmers were found distributed according to their level of attitude, as shown in the Table 3.

Table 3. Distribution of beneficiary farmers, according to their level of attitude towards Pepper Package Programme

Level of attitude towards Pepper Package Programme	Beneficiary farmers	
	Frequency	Percentage
Low (< 53.94)	6	20.00
Medium (53.94 - 62.06)	22	73.33
High (> 62.06)	2	6.67
Total	30	100.00

The data presented in the table 3 reveal that majority (73.33%) of farmers were having medium level of attitude, towards the pepper package programme. Of the 30 farmers, 22 farmers (73.33%) possessed medium level awareness, whereas farmers with low level of attitude were six (20%). Farmers with high level of attitude, was only two (6.67%).

c.   Extent of adoption :

The beneficiary farmers were categorised into three groups low, medium and high, according to their extent of adoption.

Table 4. Distribution of beneficiary farmers, according to their extent of adoption under the pepper package programme

Extent of adoption under the pepper package programme	Beneficiary farmers	
	Frequency	Percentage
Low (< 58.53)	3	10.00
Medium (58.53 - 72.48)	22	73.33
High (> 72.48)	5	16.67
Total	30	100.00

The data in table 4 reveal that about three fourth of the total beneficiaries (73.33%), belong to the medium level in extent of adoption of improved agricultural practices. Eventhough the number of farmers in the other two categories are less in number, those in the high level of extent of adoption category (16.67%) was slightly greater than those in the low level extent of adoption (10%).

B. Distribution of beneficiary farmers of Rejuvenation programme

a. Level of awareness :

Beneficiary farmers were distributed into three level viz., low, medium and high level of awareness.

Table 5. Distribution of beneficiary farmers according to their level of awareness about the Rejuvenation Programme

Level of awareness about Rejuvenation Programme	Beneficiary farmers	
	Frequency	Percentage
Low (< 88.85)	-	-
Medium (88.85 to 98.49)	19	63.33
High (> 98.49)	11	36.67
Total	30	100.00

It could be seen from table 5 that the number of beneficiary farmers belonging to the category of medium level of awareness about Rejuvenation Programme was more, (19 farmers out of 30, i.e., 63.33 per cent) whereas the rest of the population wholly belonged to the category of high level of awareness (11 farmers i.e., 36.67%). It was also to be noted that none of the farmers were under low level of awareness category.

b. Level of attitude :

The beneficiary farmers selected for the study were categorised as low, medium and high based on their attitude towards pepper rejuvenation programme.

Table 6. Distribution of beneficiary farmers according to their level of attitude towards the rejuvenation programme

Level of attitude towards pepper rejuvenation programme	Beneficiary farmers	
	Frequency	Percentage
Low (< 51.60)	4	13.33
Medium (51.60 - 62.13)	23	76.67
High (> 62.13)	3	10.00
	30	100.00

The data in the table 6 reveals that, majority (76.67%) of the beneficiary farmers belonged to medium level category in their attitude towards the programme. The number of farmers belonging to the other two categories was more or less the same i.e., 4 (13.33%) and 3 (10%) for the low and high group respectively.

c.   Extent of adoption :

Beneficiary farmers were distributed into three categories viz., low, medium and high extent of adoption.

Table 7. Distribution of beneficiary farmers according to their extent

of adoption under the rejuvenation programme

Extent of adoption under the pepper rejuvenation programme	beneficiary farmers	
	Frequency	Percentage
Low (< 59.47)	6	20
Medium (59.47 - 68.18)	20	66.67
High (> 68.18)	4	13.33
Total	30	100.00

A cursory view of the table 7 shows that, more than half (66.67%) of the selected beneficiaries had medium level of adoption. The number of farmers belonging to other two categories were less, i.e., 6 farmers were of low level category (20.00%) and 4 were of high level category (13.33 per cent).

B.   Distribution of beneficiary farmers of Integrated Programme for development of spices

a.   Level of awareness :

Beneficiary farmers were categorised into three levels of awareness viz., low, medium and high level of awareness.

Level of awareness about integrated programme for development of spices	Beneficiary farmers	
	Frequency	Percentage
Low (< 83.64)	1	3.33
Medium (83.64 - 102.36)	16	53.33
High (> 102.36)	13	43.34
Total	30	100.00

The data presented in table 8 reveals that majority of farmers (53.33%) were having medium level of awareness, about the programme, followed by 43.34 per cent under high level of awareness. There was only one farmer with low level of awareness about the programme.

b. Level of attitude :

Here, beneficiary farmers were distributed into three categories viz., low, medium and high level of attitude.

Table 9. Distribution of beneficiary farmers according to their level of attitude towards integrated programme for development of spices

Level of attitude towards integrated programme for development spices	Beneficiary farmers	
	Frequency	Percentage
Low (< 50.38)	1	3.33
Medium (50.38 - 62.89)	28	93.34
High (> 62.89)	1	3.33
Total	30	100.00

The data in table 9 revealed that a good majority of farmers belonged to the medium level category in attitude. 28 farmers of the 30, i.e., 93.33 per cent belonged to the medium level. The low and high level categories were found to be very less, only one farmer each representing these two categories.

c.   Extent of adoption :

The beneficiary farmers were distributed into three categories viz., low, medium and high level in extent of adoption.

Table 10. Distribution of beneficiary farmers according to their extent of adoption under the integrated programme for development of spices

Extent of adoption under the integrated programme for development of spices	Beneficiary farmers	
	Frequency	Percentage
Low (< 57.07)	3	10.00
Medium (57.07 - 72.44)	24	80.00
High (> 72.44)	3	10.00
Total	30	100.00

From table 10 it could be seen that more than three fourth of the respondents were having a medium level of adoption i.e., 24 farmers out of 30, (80%) and only three farmers each represented the other two classes, i.e., low and high level of adoption.

D. Distribution of non-beneficiaries farmers of pepper development programme

a. Level of awareness :

The non-beneficiary farmers selected for the study, were classified under three groups viz., low, medium and high, based on level of awareness about the programme.

Table 11. Distribution of non-beneficiary farmers, according to their level of awareness

Level of awareness about pepper development programmes	Non- Beneficiary farmers	
	Frequency	Percentage
Low (< 36.60)	3	10.00
Medium (36.60 - 50.73)	26	86.67
High (> 50.73)	1	3.33
Total	30	100.00

The data in table 11 reveals that a good majority (86.67%) of non-beneficiary farmers had medium level of awareness about the pepper development programme. Under the low level group, there were only 3 farmers (10.00 %) whereas the high level group had only one farmer (3.33%).

b. Level of attitude :

Non-beneficiary farmers, based on the level of attitude towards pepper development programme were categorised into three levels low, medium and high level of attitude.

Table 12. Distribution of non-beneficiary farmers, according to their level of attitude towards pepper development programme

Level of attitude towards pepper development programmes	Non-Beneficiary farmers	
	Frequency	Percentage
Low (< 28.34)	5	16.67
Medium (28.34 - 38.93)	20	66.66
High (> 38.93)	5	16.67
Total	30	100.00

According to table 12 it could be seen that majority (66.66%) of non beneficiary farmers had medium level of attitude towards pepper development programme. Five farmers each (16.67%) belonged to the other two groups viz., low and high attitude group.

c. Extent of adoption :

Non-beneficiary farmers were categorised into three viz., low, medium and high level based on the extent of adoption.

Table 13. Distribution of non-beneficiary farmers, according to their extent of adoption

Extent of adoption of improved practices	Non-Beneficiary farmers	
	Frequency	Percentage
Low (< 21.82)	4	13.33
Medium (21.82 - 29.07)	19	63.34
High (> 29.07)	7	23.33
Total	30	100.00

It could be seen from Table 13, that majority (63.34%) of non-beneficiary farmers belonged to medium level in extent of adoption. This was followed by the high level group (23.33%) and the low level group (13.33%).

Comparison between the beneficiary and non-beneficiary farmers in their level of awareness, attitude and adoption

Pepper package programme

Comparing beneficiaries of the programme with that of the non-beneficiaries it was found that more number of beneficiaries (46.67%) were having high level of awareness whereas it was more number of non-beneficiary farmers who were having higher level of attitude and adoption. But the scores obtained in the case of beneficiaries regarding attitude and adoption were very high when compared to that of non beneficiaries.

Rejuvenation programme

More number of beneficiaries of the rejuvenation programme were having high level of awareness (36.67%) than non-beneficiaries. In the case of attitude and adoption, more number of beneficiaries were in the medium level than non-beneficiaries. It was also noted that there was wide difference between beneficiaries and non-beneficiaries in the scores obtained in the case of attitude and adoption.

Integrated programme for development of spices

Beneficiaries of this programme were found to have awareness higher than that of non-beneficiaries. In the case of attitude and adoption, it was found that more number of beneficiaries were at

the medium – level than that of non-beneficiaries. Also there was a wide difference in the scores obtained between the beneficiaries and non-beneficiaries in the case of both attitude and adoption.

2. **Correlation between the independent and the selected dependent variables**

A. **Correlation between the independent and dependent variables** (Pepper Package Programme)

The relationship of the twelve independent variables with the dependent variables of pepper package programme were analysed, by computing the coefficient of correlations and the results were presented in table 14.

a. **Level of awareness :**

The coefficient of correlation (r) as shown in the table 14, revealed that level of awareness of beneficiary farmers of pepper package programme was positively and significantly correlated with education, farming experience, indebtedness, risk orientation, economic motivation, scientific orientation, market orientation and information source used. Farm size, innovativeness and export orientation were found to be negatively correlated and age was found to be non-significantly correlated with the level of awareness.

In the case, of non-beneficiaries, farming experience, risk orientation, economic motivation, scientific orientation, market orientation and information sources used, were positively and significantly correlated with awareness. But all other variables were non-significantly correlated with the level of awareness. It could also be seen that farm size and

Table 14. Correlation between the independent and the selected dependent variables of pepper package programme

Sl. No.	Independent variables	Dependent variables					
		Awareness		Attitude		Adoption	
		Benefi-ciaries	Non-bene-ficiaries	Benefi-ciaries	Non-bene-ficiaries	Benefi-ciaries	Non-bene-ficiaries
1.	Age	0.0931	0.0304	-0.1484	-0.6509	-0.0107	-0.0369
2.	Education	0.3578*	0.0231	0.3097*	0.3254*	0.4488**	0.3431*
3.	Farming experience	0.3142*	0.3388*	0.4126**	0.3120*	0.3200*	0.2661
4.	Farm size	-0.0928	-0.1606	0.2436	0.1707	0.2539	0.2857
5.	Indebtedness	0.3120*	-0.1219	0.3200*	0.1081	0.4127**	0.2677
6.	Risk orientation	0.3401*	0.3534*	0.3329*	0.3494*	0.4034**	0.3039
7.	Innovativeness	-0.0766	0.0301	0.1110	0.2939	0.1803	0.0382
8.	Economic motivation	0.3552*	0.3318*	0.4311**	0.3871**	0.4345**	0.3874**
9.	Scientific orientation	0.4585**	0.3217*	0.3467*	0.3883**	0.3774**	0.3839**
10.	Market orientation	0.3523*	0.3082*	0.6247***	0.4227**	0.3288*	0.2967
11.	Export orientation	-0.0544	0.0885	0.3251*	0.1670	0.2904	0.2691
12.	Information sources used	0.4769***	0.3401*	0.4195***	0.3726**	0.5006***	0.4937***

* : significant 0.1 level ;   ** : Significant 0.5 level ;   *** : Significant 0.01 level

indebtedness were negatively correlated with awareness.

A critical observation of the table will also reveal that information sources used, had the highest coefficient of correlation with awareness followed by scientific orientation in the case of beneficiaries and in the case of non-beneficiaries, risk orientation bears the highest coefficient of correlation, followed by the information source used.

b. Level of attitude :

The data presented in table 14 shows that, all the characteristics of beneficiary farmers, had positive and significant relationship with the attitude towards pepper package programme except age, farm size and innovativeness. In the case of age, it wsa negatively correlated.

In the case of non-beneficiaries, it was found that, age, farm size, indebtedness, innovativeness and export orientation were non-significantly related to the level of attitude and age was negatively related. All the other characteristics were positively and significantly related.

It was further noticed that in the case of beneficiaries market orientation had the highest correlation coefficient followed by economic motivation, and in the case of non beneficiaries, it was market orientation, followed by scientific orientation.

c. Extent of adoption :

According to the data presented in table 14, it was also found that all the characteristics of beneficiary farmers of pepper package programme except age, farm size, innovativeness and export orientation,

had positive and significant relationship with the extent of adoption. Age had a negative relationship with extent of adoption.

In the case of non-beneficiaries except education, economic motivation, scientific orientation and information source used, all other characteristics were non-significantly related. Age was negatively and non-significantly related to the extent of adoption.

A critical observation of the table also showed that information sources used, bears the highest correlation coefficient followed by education in the case of beneficiaries and in the case of non-beneficiaries, information sources used had the highest correlation coefficient followed by economic motivation.

B. **Correlation between independent and dependent variables** (Pepper Rejuvenation Programme)

a. **Level of awareness :**

The coefficient of correlation (r) as shown in table 15, indicate that except age, farming experience, farm size, innovativeness and export orientation, all other characteristics were positively and significantly correlated with the level of awareness in the case of beneficiary farmers. Farm size and export orientation were negatively and non-significantly correlated.

In the case of non-beneficiaries, except age, education, farm size, indebtedness, innovativeness and export orientation, all other variables were positively and significantly related with the level of awareness.

A critical observation of the data, showed that information

Table 15. Correlation between the independent and the dependent variables of rejuvenation programme

Sl. No.	Independent variables	Dependent variables					
		Awareness		Attitude		Adoption	
		Benefi- ciaries	Non-benefi- ciaries	Benefi- ciaries	Non-benefi- ciaries	Benefi- ciaries	Non-benefi- ciaries
1.	Age	0.2897	0.0304	-0.1911	-0.0809	-0.1577	-0.0369
2.	Education	0.3525*	0.0231	0.3318*	0.3289*	0.3293*	0.3461*
3.	Farming experience	0.0791	0.3388*	0.3002	0.3120*	0.2245	0.2601
4.	Farm size	-0.0418	-0.1606	0.3001	0.1707	0.2478	0.2851
5.	Indebtedness	0.3586*	-0.1219	0.3341*	0.1081	0.3142*	0.2677
6.	Risk orientation	0.3862**	0.3534*	0.3609*	0.3494*	0.4218**	0.3039
7.	Innovativeness	0.2353	0.0301	0.2575	0.2939	0.4577**	0.0352
8.	Economic motivation	0.3144*	0.3318*	0.3657**	0.3871**	0.4574**	0.3874**
9.	Scientific orientation	0.3660**	0.3217*	0.3826**	0.3883**	0.4040**	0.3839**
10.	Market orientation	0.3630**	0.3082*	0.3286*	0.4227**	0.4385**	0.2967
11.	Export orientation	-0.0568	0.0885	0.2287	0.1670	0.2637	0.2691
12.	Information sources used	0.4754***	0.3401*	0.3299*	0.3726**	0.4169**	0.4937***

* : Significant at 0.1 level ; ** : Significant at 0.05 level ; *** : Significant at 0.01 level

sources used had the highest coefficient of correlation, followed by risk orientation in the case of beneficiaries. But in the case of non-beneficiaries the result was just reverse.

b. Level of attitude :

From the data in table 15, it could be seen that in the case of beneficiaries, except age, farming experience, farm size, innovativeness and export orientation, all other variables had positive and significant relationship with the level of attitude. Age was found to be negatively related with the level of attitude.

In the case of non-beneficiaries, age, farm size, indebtedness, innovativeness, and export orientation were non-significantly related to the level of attitude and age was negatively related. All the other variables were positively and significantly related with the attitude towards pepper rejuvenation programme.

It was further observed that scientific orientation was found to have the highest coefficient of correlation, followed by economic motivation in the case of beneficiaries and in the case of non-beneficiaries, market orientation had the highest correlation followed by scientific orientation.

c. Extent of adoption. :

The computed r value as per the table 15, revealed that, except age, farming experience, farm size, and export orientation all the other variables showed positive and significant relationship with the extent of adoption of beneficairies. Here, age was found to be negatively correlated with the extent of adoption.

Table 16. Correlation between the independent variables and the dependent variables (Integrated programme for development spices)

Sl. No.	Independent variables	Awareness		Dependent variables Attitude		Adoption	
		Benefi-ciaries	Non-benefi-ciaries	Benefi-ciaries	Non-benefi-ciaries	Benefi-ciaries	Non-bene-ciaries
1.	Age	0.2741	-0.0304	-0.1081	-0.0809	-0.0672	-0.0369
2.	Education	0.3373*	0.0231	0.3735**	0.3259*	0.3561*	0.3461*
3.	Farming experience	0.2094	0.3388*	0.3856**	0.3120*	0.2070	0.2661
4.	Farm size	-0.0320	0.1606	0.2671	0.1707	0.3284*	0.2851
5.	Indebtedness	-0.0011	-0.1219	0.2458	0.1081	0.2569	0.2677
6.	Risk orientation	0.3883**	0.3534*	0.3738**	0.3494*	0.3355*	0.3039
7.	Innovativeness	-0.1709	0.0301	0.1332	0.2939	0.1070	0.0352
8.	Economic motivation	0.3843**	0.3318*	0.3811**	0.3871**	0.3150*	0.3874**
9.	Scientific orientation	0.3499*	0.3217*	0.3667**	0.3883**	0.4025**	0.3839**
10.	Market orientation	0.3108*	0.3082*	0.3890**	0.4227**	0.3657**	0.2967
11.	Export orientation	-0.0863	0.0885	0.2608	0.1670	0.1630	0.2691
12.	Information sources used	0.4518**	0.3401*	0.3522*	0.3726**	0.3103*	0.4939***

* : Significant at 0.1 level ;   ** : Significant at 0.05 level ; *** : Significant 0.01 level

In the case of non-beneficiaries, except education, economic motivation, scientific orientation and information sources used all other variables were non-significantly related and age was negatively and non significantly related with the extent of adoption.

The table, also shows that, innovativeness, had the highest co-efficient of correlation followed by economic motivation in the case of beneficiaries. In the case of non beneficiaries, information sources used had the highest r value followed by economic motivation.

C. **Correlation between the independent and dependent variables**
(Integrated Programme for Development of Spices)
a. **Level of awareness :**

The computed 'r' value as per table 16, indicated that except age, farming experience, farm size, indebtedness, innovativeness and export orientation all other variables of beneficiary farmers were positively and significantly related. On the other hand, farm size, indebtedness, innovativeness and export orientation were negatively and non significantly correlated.

In the case of non beneficiaries, except age, education, farm size, indebtedness, innovativeness and export orientation all other variables were positively and significantly related to the level of awareness.

It was further observed that information sources used had the highest correlation coefficient followed by risk orientation, in the case of beneficiaries, whereas in the case of non-beneficiaries, the result was just reversed.

b. **Level of attitude :**

According to the data presented in table 16, all the independent

variables showed a positive and significant correlation with attitude except age, farm size, indebtedness, innovativeness and export orientation. Age was found to be negatively and non significantly related to the level of attitude.

In the case of non-beneficiaries, it was found that age, farm size, indebtedness, innovativeness and export orientation were non significantly related to the level of attitude and age was negatively related. All the other variables were positively and significantly related.

A critical observation, revealed that market orientation had the highest correlation coefficient followed by farming experience, in the case of beneficiaries and in the case of non-beneficiaries, market orientation had the highest correlation with attitude followed by scientific orientation.

c.   Extent of adoption :

The data presented in table 16, reveals that farming experience, indebtedness, innovativeness and export orientation were non-significantly related. Age was negatively related and all the other characteristics of beneficiary farmers were positively and significantly related to the extent of adoption.

In the case of non beneficiaries, except education, economic motivation, scientific orientation and information sources used, all other variables were non significantly related and age was negatively and non significantly related to the extent of adoption.

The table also shows that in the case of beneficiaries scientific orientation had the highest coefficient of correlation, followed by market orientation. But in the case of non beneficiaries, it was information sources used which secured the highest correlation coefficient followed by economic motivation.

3. Inter correlation of dependent variables

The inter relationship of the three dependent variables are studied. The results of the study are presented in the tables.

The tables 17, 18, 19 & 20 shows the inter relationship between awareness, attitude and extent of adoption of the beneficiary farmers of pepper package programme, rejuvenation programme, integrated programme for development of spices and the case of non beneficiaries of pepper development programme, respectively.

In all the cases, it was found the relationships of the three dependent variables viz., awareness, attitude and adoption are positively and significantly correlated to each other.

Table 17. Intercorrelation of dependent variables (pepper package programme)

	Awareness	Attitude	Adoption
Awareness	-	0.4024**	0.3927**
Attitude	-	-	0.3322*
Adoption	-	-	-

Table 18. Intercorrelation of dependent variables (pepper rejuvenation programme)

	Awareness	Attitude	Adoption
Awareness	-	0.3667**	0.3602**
Attitude	-	-	0.3111*
Adoption	-	-	-

Table 19. Intercorrelation of dependent variables (integrated programme for development of spices)

	Awareness	Attitude	Adoption
Awareness	-	0.3598*	0.4563**
Attitude	-	-	0.4114**
Adoption	-	-	-

Table 20. Intercorrelation of dependent variables of non beneficiaries,

	Awareness	Attitude	Adoption
Awareness	-	0.4203**	0.3308*
Attitude	-	-	0.3836**
Adoption	-	-	-

*   Significant at 0.1 level

**   Significant at 0.05 level

4.   Intercorrelation of independent variables

The intercorrelation among independent variables were calculated and the results obtained are presented in tables 21, 22, 23 & 24.

i. **Intercorrelations of independent variables** (pepper package programme)

Table 21 shows the inter relationships of independent variables selected to study the impact of pepper package programme.

The table shows that age was positively and significantly correlated to education and farming experience. Education was positively correlated of risk orientation, economic motivation, scientific orientation, market orientation and information source used.

Risk orientation was significantly correlated to economic motivation and scientific orientation.

Scientific orientation was positively and significantly correlated to market orientation and export orientation. Innovativeness was found to be negatively related to age, farming experience, farm size, indebtedness and risk orientation.

ii. **Intercorrelation of independent variables** (rejuvenation programme)

Table 22 shows the interrelationships of independent variables selected to study the impact of rejuvenation programme.

The table shows that age was positively correlated with farming experience, risk orientation, economic motivation and information sources used.

But education was negatively and non significantly correlated with farming experience, farm size, indebtedness, economic motivation and export orientation.

Farm size was positively and significantly correlated with indebtedness and positively correlated to economic motivation, scientific orientation,

Table 21. Intercorrelation of independent variables (Pepper package programme)

Characteristics of pepper growers	Age	Educa-tion	Farming experience	Farm size	Indebted-ness	Risk orineta-tion	Innova-tiveness	Economic moti-vation	Scientific orien-tation	Market orien-tation	Export orien-tation	Information sources used
Age	–	0.5954***	0.6704***	-0.1076	-0.2475	0.1905	-0.2877	0.1897	0.1669	-0.1329	-0.0112	0.1523
Education		–	-0.4974	-0.2683	-0.0907	0.3245*	0.2903	0.3298*	0.4051**	0.3510*	-0.1937	0.4067**
Farming experience			–	0.0587	-0.0714	0.1042	-0.2635	0.3615*	0.0757	-0.1023	0.0759	0.1071
Farm size				–	0.2502	0.0738	-0.2217	-0.1566	0.0021	0.1385	0.0027	-0.1810
Indebtedness					–	0.0556	-0.1558	-0.2811	0.1265	0.2094	0.3802**	-0.1787
Risk orientation						–	-0.0312	0.3556*	0.3410*	0.2997	0.1966	0.3956**
Innovativeness							–	-0.0780	0.1521	0.1121	0.2500	0.0565
Economic motivation								–	0.3078*	0.3158*	0.1537	0.3561*
Scientific orientation									–	0.3118*	0.3503*	0.3009
Market orientation										–	0.1954	0.1343
Export orientation											–	-0.1959
Information sources used												–

* : Significant at 0.1 level ;   ** : Significant at 0.05 level ;   *** : Significant at 0.01 level

Table 22. Intercorrelation of independent variables (Rejuvenation programme)

Characteristics of pepper growers	Age	Educa-tion	Farming experience	Farm size	Indebted-ness	Risk orien-tation	Innova-tiveness	Economic moti-vation	Scientific orien-tation	Market orien-tation	Export orien-tation	Information sources used
Age	–	-0.1088	0.3982**	-0.1197	-0.1360	0.3797**	-0.1423	0.3218*	-0.1481	-0.036	-0.1862	0.3983**
Education		–	-0.2007	-0.1287	-0.1607	0.1845	0.0445	-0.1667	0.2992	0.1054	-0.0531	0.1803
Farming experience			–	-0.2097	-0.0701	0.1948	-0.0237	0.1699	0.2467	0.1674	-0.1099	0.2344
Farm size				–	0.4251***	-0.1923	-0.0874	0.1494	0.1344	0.0496	-0.0398	0.2722
Indebtedness					–	-0.0518	-0.0277	-0.1471	-0.0868	-0.1572	0.0525	-0.1742
Risk orientation						–	0.3594*	0.3923**	0.0936	0.1205	0.2422	0.3793**
Innovativeness							–	0.2126	0.3284*	0.1589	0.1039	0.3392*
Economic motivation								–	0.1091	0.6153***	0.3585*	0.1862
Scientific orientation									–	0.2263	0.0199	0.2052
Market orientation										–	0.1868	0.3931**
Export orientation											–	0.0457
Information sources used												–

* : Significant at 0.1 level ; ** : Significant at 0.05 level ; *** : Significant at 0.01 level

found to be positively and significantly correlated to innovativeness, economic motivation and information sources used. Innovativeness was positively and significantly correlated to scientific orientation and information sources used.

Economic motivation was found to be positively and significantly correlated to market orientation and export orientation. Innovativeness and export orientation were negatively correlated to age farming experience and farm size.

iii. **Intercorrelations of independent variables** (integrated programme for development of spices)

According to the data presented in table 23 age was found to be positively and significantly correlated to farming experience and risk orientation and positively correlated to export orientation.

Education was found to be negatively correlated to farm size and indebtedness.

Farming experience was found to be positively and significantly correlated to economic motivation.

Risk orientation was found to be positively and significantly correlated to economic motivation and positively correlated to innovativeness, scientific orientation, market orientation, export orientation and information sources used.

Scientific orientation was positively correlated to market orientation, export orientation and information sources used.

Table 23.   Intercorrelation of independent variables (Integrated programme for development of spices)

Characteristics of pepper growers	Age	Education	Farming experience	Farm size	Indebtedness	Risk orientation	Innovativeness	Economic motivation	Scientific orientation	Market orientation	Export orientation	Information sources used
Age	–	-0.2051	0.5979***	-0.0857	-0.0567	0.3253*	-0.1671	-0.0248	-0.1723	-0.0358	0.1709	-0.0760
Education		–	0.0026	-0.2375	-0.1517	0.1463	0.1165	0.1055	0.3181*	0.3158*	0.0111	0.2095
Farming experience			–	-0.1514	-0.1522	0.2054	-0.0945	0.3834**	0.1272	0.2188	-0.0636	0.3094
Farm size				–	0.3209*	0.1088	-0.1561	-0.0961	-0.2761	0.2457	0.0248	0.1508
Indebtedness					–	-0.0618	-0.1748	0.2901	0.0229	0.1904	0.2590	-0.2018
Risk orientation						–	0.0767	0.3288*	0.2182	0.0646	0.2541	0.2245
Innovativeness							–	0.0071	0.1450	0.1434	-0.0401	0.2330
Economic motivation								–	0.0957	0.1160	0.0050	0.2096
Scientific orientation									–	0.3300*	0.3451*	0.3328*
Market orientation										–	-0.2312	0.1713
Export orientation											–	-0.2622
Information sources used												–

* : Significant at 0.1 level ;   ** : Significant at 0.05 level ;   *** : Significant at 0.01 level

Table 24. Intercorrelation of independent variables of non beneficiaries of pepper development programmes

Characteristics of pepper growers	Age	Education	Farming experience	Farm size	Indebtedness	Risk orientation	Innovativeness	Economic motivation	Scientific orientation	Market orientation	Export orientation	Information sources used
Age	-	-0.3860	0.3093*	-0.0696	-0.0596	0.0484	0.1925	0.0711	0.0487	-0.1110	0.0485	0.0927
Education		-	-0.2140	-0.2162	-0.1635	-0.0313	-0.0520	0.1201	0.0400	0.0103	-0.0971	0.1118
Farming experience			-	-0.1704	0.0859	-0.1746	-0.0274	0.0146	0.1194	0.4583***	0.1634	0.1685
Farm size				-	0.3411	-0.1728	-0.3146	0.0092	-0.1247	-0.0950	0.1084	-0.1618
Indebtedness					-	0.0529	-0.2732	0.3123*	-0.1150	0.1070	0.4627***	0.1960
Risk orientation						-	0.3286*	0.1051	0.0676	0.0208	0.1436	0.1299
Innovativeness							-	-0.1861	0.2381	0.0347	-0.0910	0.0497
Economic motivation								-	0.2195	0.0301	0.1510	0.1526
Scientific orientation									-	-0.146	-0.3518	0.0074
Market orientation										-	-0.0757	0.1608
Export orientation											-	0.0289
Information sources used												-

* : Significant at 0.1 level ; ** : Significant at 0.05 level ; *** : Significant at 0.01 level

Innovativeness was found to be negatively correlated to age, farming experience, farm size and indebtedness.

iv. **Intercorrelations of independent variables of non-beneficiaries of pepper development programme**

Table 24, shows the interrelationship of independent variables selected for the study, of the non beneficiaries of pepper development programme.

The table shows tht age was positively and significantly correlated to farming experience, but negatively correlated to education, farm size, indebtedness and market orientation.

Education was positively correlated to economic motivation, scientific orientation, market orientation and information sources used.

Farming experience was positively and significantly related to market orientation, but negatively correlated to farm size, risk orientation, and innovativeness.

Risk orientation was positively and significantly correlated to innovativeness and positively correlated to economic motivation, scientific orientation, market orientation, export orientation and information sources used.

Innovativeness was found to be negatively correlated to education, farming experience, farm size and indebtedness.

5. **Results of Kruskal - wallis Test**

Kruskal - wallis Test was employed in order to test the differences

between the samples. Thirty observations of four groups of farmers were taken here, to test the significance.

Table 25. Rank values of the beneficiaries and non beneficiaries of the three pepper development programmes.

Dependent variables	Rank values of beneficiaries			Non-benefi-ciaries	Value χ
	Pepper package programme	Rejuvenation programme	Integrated programme for development of spices		
Awareness	77.27	72.82	73.2	15.48	55.27*
Attitude	78.22	73.78	73.05.	16.33	62.58*
Adoption	79.62	68.13	77.68	16.2	65.38*

* Significant at 5 per cent level of probability

Table 25, shows the results of the test employed among the beneficiaries and nonbeneficiaries of the three selected pepper development programmes. Comparison was also made based on the awareness, attitude and adoption characteristics of the farmers.

Level of awareness :

According to table 25 it was found that, χ^2 value for awareness was 55.27, for all the programme beneficiaries and non beneficiaries.

When the rank value of the non beneficiaries was 15.48, rank values of the beneficiaries of pepper package programme, rejuvenation programme and integrated programme for development of spices, were 77.27, 72.82, 73.2 respectively. These data indicate that the rank value of the three pepper programme beneficiaries were around five times higher than that of the non-beneficiaries in the case of awareness.

Attitude :

Table 25, shows that χ^2 value of attitude as 62.58 which was for all the programme beneficiaries and non-beneficiaries. When the rank value of the non-beneficiaries was 16.33, rank values of the beneficiaries of pepper package programme, rejuvenation programme and integrated programme for development of spices, were 78.22, 73.78 and 73.05 respectively. These data indicate that the rank values of the three pepper programme beneficiaries were around five times higher than that of non beneficiaries in the case of attitude.

Extent of adoption :

Table 25 also shows the χ^2 value of extent of adoption as 65.38 which was for all the programme beneficiaries and non beneficiaries. For the extent of adoption when rank value of the non beneficiaries was 16.2, rank values of the beneficiaries of pepper package programme, rejuvenation programme and integrated programme for development of spices, were 79.62, 68.13 and 77.68 respectively. These data indicate that, the rank values of the three pepper development programme beneficiaries were around five times higher than that of non-beneficiaries. in case of extent of adoption.

6.   Constraints as perceived by farmers

The constraints in the implementation of the three pepper development programmes as perceived by the beneficiaries were listed and ranked based on the weightage. The results are presented in table 26.

Table 26. Constraints perceived by pepper growers

S.No.	Constraints	Frequency	Ranks
1.	Inadequate and untimely supply of inputs	70	I
2.	Incidence of quick and slow wilt diseases	65	II
3.	High cost of P. P. equipment	50	III
4.	High labour consumption	47	IV
5.	Lack of communication facilities	43	V
6.	Lack of proper supervision and guidance from the officers concerned	40	VI
7.	Non-availability of good hybrid varieties of vines	36	VII
8.	High cost of recommended fertilizers	30	VIII
9.	Lack of adequate financial assistance	29	IX
10.	Lack of good irrigation facilities	28	X

DISCUSSION

In this Chapter, a detailed discussion of the results obtained are presented under the following sub-heads.

1. Distribution of beneficiary and non-beneficiary farmers of the three selected pepper development programmes according to their level of awareness, attitude and adoption of improved cultivation practices.

2. Correlation between the independent and the selected dependent variables.

3. Inter-correlation of dependent variables.

4. Inter-correlation of independent variables

5. Kruskal-Wallis Test

6. Constraints as percieved by farmers.

1. Distribution of beneficiary and non-beneficiary farmers of the three selected pepper development programmes according to their level of awareness, attitude and adoption of improved cultivation practices.

A. **Distribution of beneficiary farmers** (Pepper Package Programme)

a. Level of awareness

Data in table 2 indicates that, all the beneficiaries were almost evenly distributed in the medium and high level of awareness about Pepper Package Programme. The high scores obtained to these categories, indicated that the beneficiary farmers had fairly good awareness about the Pepper Package Programme. This could be attributed to the prevalance

of good information sources through mass media and interpersonal communication in the area.

b. Level of attitude

A perusal of table 3 shows that majority (73.33%) of the beneficiaries were having medium level of attitude towards the Pepper Package Programme. The results indicated that eventhough there was fairly good awareness about the Pepper Package Programme, the beneficiaries yet to develop an equally better attitude towards the programme. This may be due to certain constraints being experienced like inadequate and untimely supply of inputs, hazard experience like high incidence of ,iick wilt diseases etc, strengthening the input supplies and plant protection services may help to develop a better attitude towards this programme.

c. Extent of adoption

From the data presented in table 4 it could be seen that, majority (73.33%) of the beneficiaries came under medium level of adoption of improved agricultural practices under the Pepper Package Programme. Attitude towards any development programme and its adoption usually go hand in hand. Hence, it could reasonably be concluded that the amelurative measures suggested under level of attitude, hold good for motivating the beneficiaries for high adoption of the package programme, also.

B. Distribution of beneficiary farmers - (Rejuvenation programme)

a. Level of awareness

The data presented in table 5 indicates that, all the selected beneficiaries had either medium or high level of awareness about the rejuvenation programme of pepper. The high scores obtained to these categories,

shows the fairly good level of awareness attained by the beneficiaries. As in the case of Pepper Package Programme, interpersonal and mass media information sources might be playing their roles here also and hence the result.

b. Level of attitude

A perusal of the table 6 reveals that, majority (76.67%) of the beneficiaries were having medium level of attitude towards the rejuvenation programme. The results indicate that the level of attitude towards the rejuvenation programme was disproportionate to the extent of awareness about the programme. Efforts need to be made to develop a better attitude towards the programme through interpersonal communication.

c. Extent of adoption

A perusal of table 7 indicate that, majority (66.67%) of the beneficiaries were having medium level of adoption of recommended practices under rejuvenation programme. The data also indicate that the high level of awareness has not resulted in developing a favourable attitude which will result in better adoption of recommended practices.

C. Distribution of beneficiary farmers (Integrated programme for development of spices)

a. Level of awareness

Data in table 8 showed that majority (53.33%) of the beneficiaries of the Integrated programme for development of spices were having medium level of awareness followed by high level of awareness (43.34%). The high scores obtained to these categories indicate fairly satisfactory level of awareness about the integrated programme for development

of spices among the beneficiaries. This may be due to the well developed and organised extension work in the area.

b. Level of attitude

A perusal of table 9 reveals that a good majority (93.34%) of the beneficiaries had medium level of attitude towards the Integrated programme for development of spices and the remaining beneficiaries were equally distributed between low and high level of attitude categories. Inspite of the incentives given in cash or kind, farmers had only medium level of attitude towards the programme.

c. Extent of adoption

A look at the table 10 will indicate that, majority (80.0%) of the beneficiaries of Integrated programme for development of spices, come under medium level of extent of adoption. The remaining 20 per cent beneficiaries were equally distributed between low and high level of adoption. It could be seen that inspite of the fact that the beneficiaries has satisfactory level of awareness about the programme, their attitude and extent of adoption under the programme was at the medium level. This may be due to low benefit-cost ratio of the spices crop in general which hold back the cultivators from full adoption of the recommended practices and consequently medium level of attitude towards the programme.

D. Distribution of non-beneficiaries (Pepper Development Programmes)

a. Level of awareness

The data presented in table 11 indicate that majority (86.67%) of the non-beneficiaries were in the medium level of awareness about the pepper development programmes. But comparing the scores obtained to this category, with that of beneficiaries, indicate that the scores

of non-beneficiares were very less. This may be due to poor mass media exposure and interpersonal communication among non-beneficiaries.

b. Level of attitude

An examination of table 12 show that, majority (66.66%) of the non-beneficiaries had medium level of attitude towards pepper development programmes. Since the level of awareness was very low, the scores obtained to the level of attitude was also very low. This may be due to the traditional method of cultivation of pepper followed by the non-beneficiaries.

c. Extent of adoption

The data presented in table 13, indicate that, majority (63.34%) of the non-beneficiaries, belong to the medium level in extent of adoption of improved agricultural practices under pepper development programmes. The poor level of awareness and attitude towards the programme, led to poor extent of adoption, which was indicated from the very low scores obtained to the medium level category.

2. Correlation between the independent and the selected dependent variables.

A. **Correlation between the independent and dependent variables** (Pepper Package Programme)

a. Level of awareness

From the data presented in table 14, it could be seen that all the independent variables were positively and significantly correlated with the level of awareness except age, farm size, innovativeness and export orientation. But in the case of non-beneficiaries, it was found

that only farming experience, risk orientation, economic motivation, scientific orientation, market orientation and information sources used were positively and significantly correlated.

As educational level of an individual increases, awareness also should increase. This was true in the case of beneficiary farmers and this result is in conformity with the findings of Haraprasad (1982) and Vijaya (1982).

But in the case of non-beneficiaries awareness was found to be increasing with the increase in farming experience. This may be due to the poor educational level of non beneficiaries. But they had their experience as a vital asset, which contributes much to awareness, eventhough it is a time consuming process.

It was found that as the indebtedness increases, awareness of beneficiaries also increases, but not in the case of non-beneficiaries. This may be due to the fact that beneficiaries eventhough indebted, due to their high educational level and personal interest, try to get information about the new programmes, may be to avail financial aid if any. But in the case of non beneficiaries once indebted, they will not be interested in any development programme for the fear that it may increase their liabilities.

Information sources used were found to be positively and significantly correlated in the case of both beneficiaries and non-beneficiaries. This clearly shows the fact that both beneficiaries and non beneficiaries use radio printed information materials, personal contacts etc. effectively to increase their awareness. Though significant, coefficient

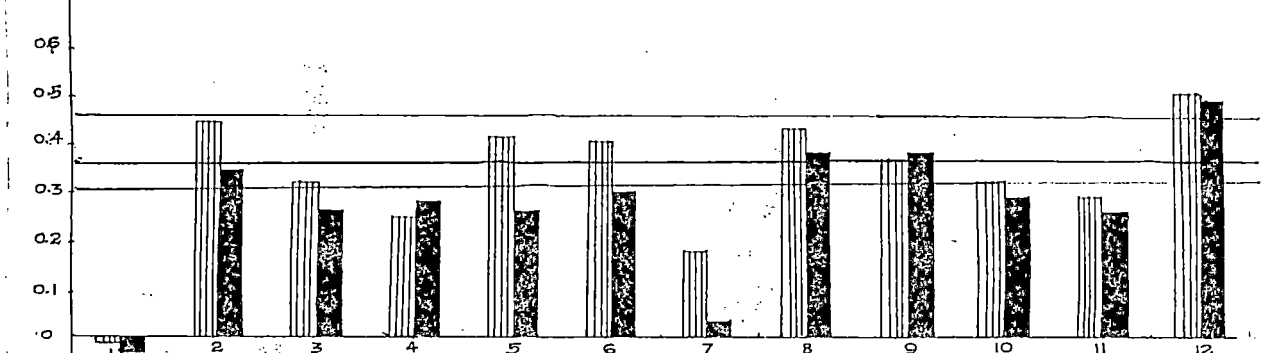FIG.2. CORRELATION BETWEEN THE INDEPENDENT VARIABLES AND THE DEPENDENT VARIABLES OF PEPPER PACKAGE PROGRAMME

a. AWARENESS VS INDEPENDENT VARIABLES
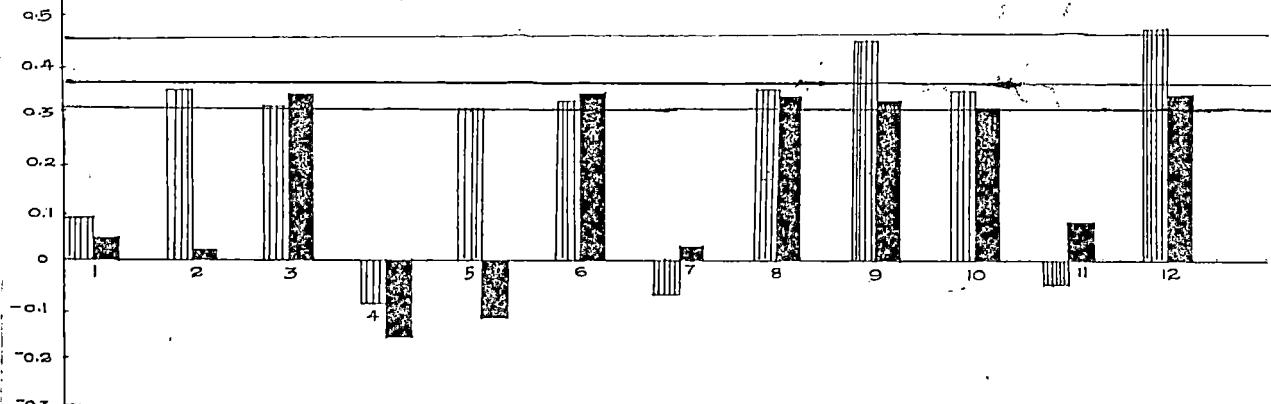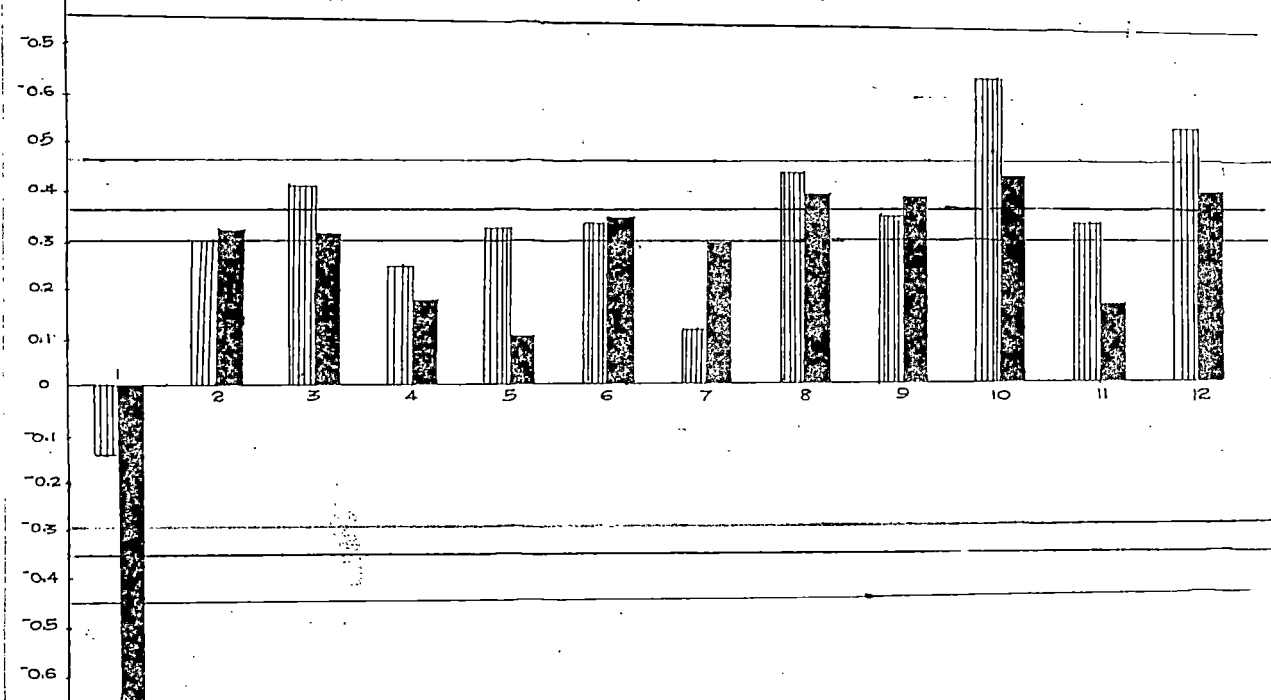
b. ATTITUDE VS INDEPENDENT VARIABLES

C. ADOPTION VS INDEPENDENT VARIABLES

[Legend:]
[crosshatch] - BENEFICIARIES.
[solid] - NON-BENEFICIARIES.

1. AGE.
2. EDUCATION.
3. FARMING EXPERIENCE.
4. FARM SIZE.
5. INDEBTEDNESS.
6. RISK ORIENTATION.
7. INNOVATIVENESS.
8. ECONOMIC MOTIVATION.
9. SCIENTIFIC ORIENTATION.
10. MARKET ORIENTATION.
11. EXPORT ORIENTATION.
12. INFORMATION SOURCE USED.

——— 0.3069   SIGNIFICANT LEVEL [10%]
——— 0.3620   "   "   [5%]
——— 0.4640   "   "   [1%]

of correlation obtained was less in the case of non beneficiaries. This may be due to their inability to use printed information materials because of illiteracy. The finding of this study is in conformity with the results reported by Naik (1981).

Since both beneficiaries and non-beneficiaries were exposed to the information sources, they were aware of the modern scientific cultivation practices and also the market trend of their crop produce. This may be the reason for the positive and significant correlation of the awareness of beneficaries and non-beneficiaries with scientific orientation and market orientation. The positive and significant relationship between awareness and scientific orientation has been reported in a closely related study by Aristotle (1981).

In the light of the above findings, the hypothesis set for the study that there will be no significant relationship between independent variables and awareness, was rejected in the case of farming experience, risk orientation, economic motivation, scientific orientation, market orientation and information sources used and accepted in the case of age, farm size, indebtedness, innovativeness and export orientation both for the beneficiaries and non-beneficiaries. Regarding education and indebtedness, the hypothesis was rejected in the case of beneficiaries but accepted in the case of non beneficiaries.

b. Level of attitude

A glance of table 14 shows that, except age, farm size and innovativeness, all other variables were having positive and significant relationship with the level of attitude. In the case of non-beneficiaries,

except age, farm size, indebtedness, innovativeness and export orientation, all other variables were positively and significantly related to attitude.

Eventhough there was high awareness, the small and marginal farmers, failed to develop a favourable attitude towards the programme. This may be due to the neglect of improved cultivation practices by the farmers because of small size and hence the result. This finding is in conformity with the results reported by Prakash (1980).

Beneficiary farmers, eventhough indebted, are interested on innovations, new agricultural practices and thus show a favourable attitude, towards the programme. But the non-beneficiaries irrespective of their extent of indebtedness found to have less favourable attitude towards the programme. The result obtained in the case of non-beneficiaries, is found identical to those reported by Prakash (1980) and Viju (1985).

The beneficiary farmers of the programme were more conscious of the demand of pepper in foreign market. Their higher educational background and their frequent contact with mass media, may be the reason for their increased knowledge about the export possibilities of the crop produce. But non-beneficiaries are unaware of the export possibilities and this may be the reason for the positive and significant correlation of export orientation with attitude in the case of beneficiaries and non significant relationship in the case of non beneficiaries.

So, the hypothesis, set for the study that there will be no significant relationship between independent variables and attitude was

rejected in the case of education, farming experience, risk orientation, economic motivation, scientific orientation, market orientation and information sources used and accepted in the case of age, farm size, and innovativeness for both beneficiaries and non-beneficiaries. Regarding indebtedness and export orientation the hypothesis was rejected in the case of beneficiaries, but accepted in the case of non-beneficiaries.

c. Extent of adoption

A perusal of table 14 shows that, except age, farm size and innovativeness, all other variables were positively and significantly related. In the case of non-beneficiaries, except education, economic motivation, scientific orientation and information sources used, all other variables were having non-significant relationship with the extent of adoption.

It was found that, both education and farming experience lead the beneficiary farmer to the adoption of a new practice. Education and farming experience helps a beneficiary farmer to evaluate a new practice in terms of it's utility. This may be the reason for the positive and significant relationship of education and farming experience with the extent of adoption in the case of beneficiaries. This result in regard to farming experience agree with the findings reported by Anbalagan (1974).

It was found, only education that leads to adoption in the case of non beneficiaries. Eventhough farming experience helps to gain awareness and develop favourable attitude it does not lead to adoption, so only educated non-beneficiaries are found to adopt new practices.

Thus education was found positively and significantly related with extent of adoption and farming experience found non significantly related to adoption in the case of non beneficiaries.

An indebted beneficiary farmer tries to overcome the problem, by adopting a new practice. i.e., he shows courage to take risks. A fairly high educational and scientific background, of beneficiary farmers also act as catalysts in adopting a new practice. This may be the reason for the positive and significant relationship of indebtedness and risk orientation in the case of beneficiaries and non significant relationship in the case of non beneficiaries. The results obtained in the case of beneficiaries was in conformity with the findings by Prakash (1980) and Rajendran (1978).

The beneficiary farmers market their produce, by getting all information about market position, and even sells the produce in a distant market, to get a reasonably good price. Whereas a non beneficiary farmer does not give importance to the market position of his produce. The results obtained in the case of beneficiaries are in conformity with the results reported by Naidu (1978).

In view of the above discussions, the hypothesis set that there will be no significant relationship between independent variables and extent of adoption, was rejected in the case of education, economic motivation, scientific orientation and information sources used and accepted in the case of age, farm size, innovativeness and export orientation in the case of both beneficiaries and non-beneficiaries. Regarding farming experience, indebtedness, risk orientation and market orientation the hypothesis was rejected in the case of beneficiaries and accepted in the case of non-beneficiaries.

B. Correlation between the independent variables and dependent variables (Pepper Rejuvenation Programme)

a. Level of awareness

The results in Table 15 point out that except age, farming experience, farm size, innovativeness and export orientation, all other variables were positively and significantly related with awareness in the case of beneficiaries. In the case of non-beneficiaries except age, education, farm size, indebtedness, innovativeness and export orientation, all other variables were positively and significantly related to awareness.

Here also, as the educational background of beneficiary farmers increases, awareness about the facilities available to rejuvenate old and senile pepper vines also found to increase. But this was not seen in case of non-beneficiaries, due to low educational background. The awareness of non-beneficiaries was found to increase by seeing demonstration or by sharing the experience of neighbouring farmers. Thus a positive and significant relationship of education with awareness was seen in the case of beneficiaries and non significant relationship in the case of non-beneficiaries. As the farming experience increase, the desire to improve the existing cultivation practices also increases. This may be the reason for the positive and significant relationship of farming experience with the level of awareness in the case of non-beneficiaries.

Rejuvenation of a crop, is done, when the crop is economically not viable. It can be due to disease, drought or senility and the farmer, becomes more and more indebted. In such a situation the beneficiaries

the facilities available under the programme and try to overcome the problem. But in the case of non-beneficiaries, they do not show any interest in the new programme due to their indebtedness. This may be the reason for the positive and significant relationship of indebtedness to the awareness in the case of beneficiaries and the non significant relationship in the case of non-beneficiaries.

Contact with different information sources, helps farmers to be aware of the latest market position of the crop produce, and this induces them to invest money in improved practices. This may be the reason for the positive and significant relationship of information sources used, market orientation, scientific orientation and economic motivation with awareness in the case of both beneficiaries and non-beneficiaries. The findings of this study are in agreement with the results reported by Naik (1981) and Nandakumar (1980).

In the light of these explanations the hypothesis set for the study, that there will be no significant relationship between independent variables, and awareness in the case of risk orientation, economic motivation, scientific orientation, market orientation and information sources used was rejected and accepted in the case of age, farm size, innovativeness and export orientation in the case of both beneficiaries and non-beneficiaries. Regarding education and indebtedness the hypothesis was rejected in the case of beneficiaries but accepted in the case of non-beneficiaries.
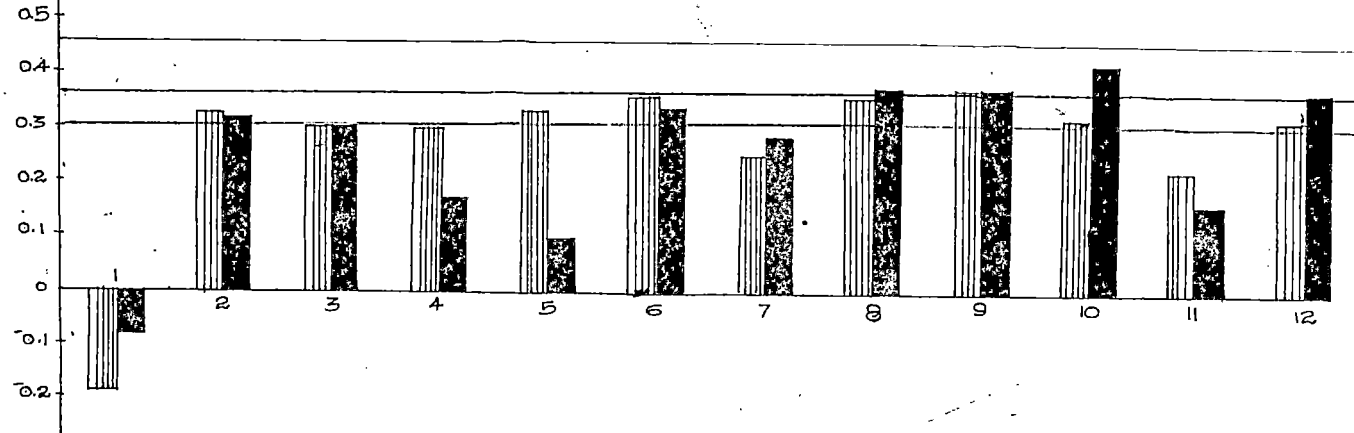
FIG. 3. CORRELATION BETWEEN THE INDEPENDENT VARIABLES AND THE DEPENDENT VARIABLES OF PEPPER REJUVENATION PROGRAMME

a. AWARENESS VS INDEPENDENT VARIABLES
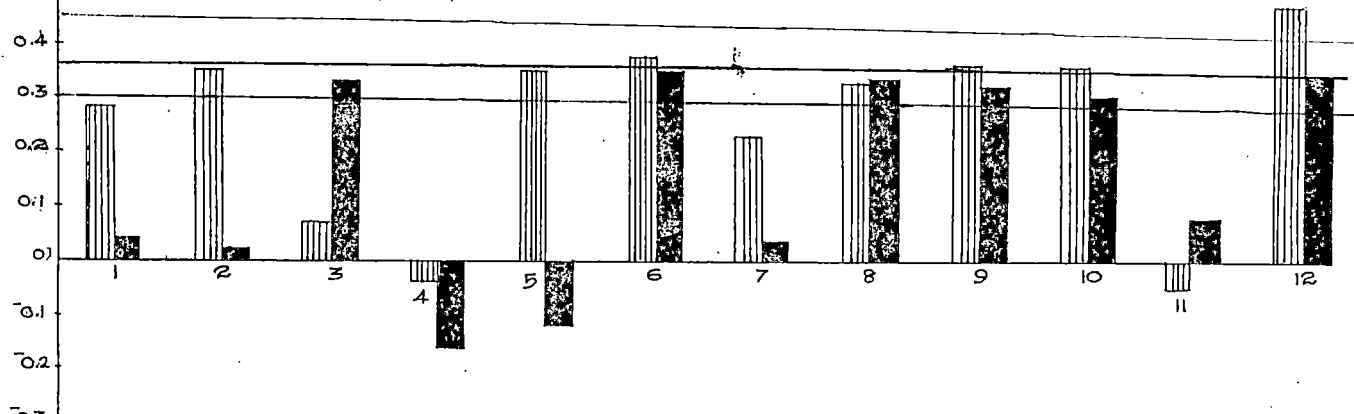
b. ATTITUDE VS INDEPENDENT VARIABLES

C. ADOPTION VS INDEPENDENT VARIABLES
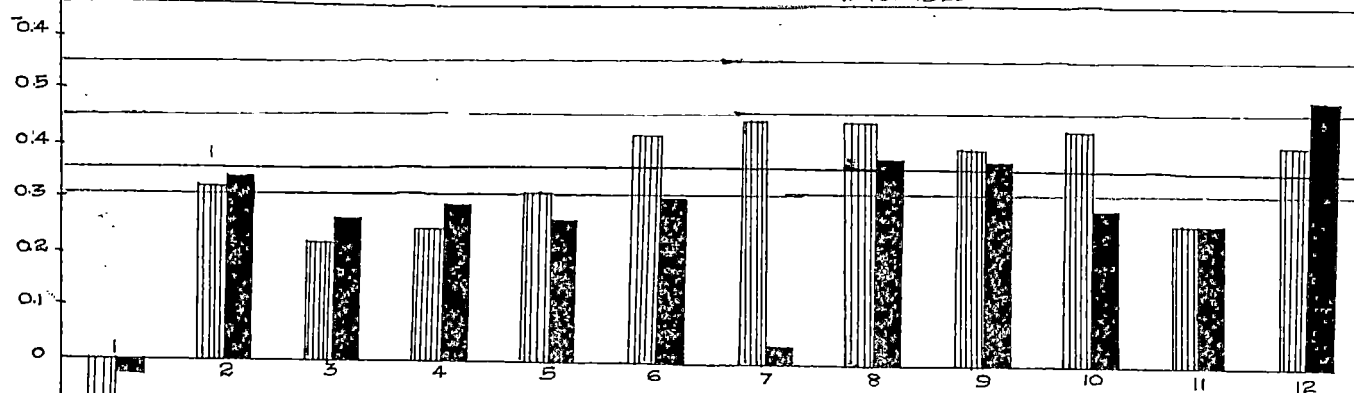
IIII - BENEFICIARIES.
■ - NON-BENEFICIARIES.
1. AGE.
2. EDUCATION.
3. FARMING EXPERIENCE.
4. FARM SIZE.
5. INDEBTEDNESS.

6. RISK ORIENTATION.
7. INNOVATIVENESS.
8. ECONOMIC MOTIVATION.
9. SCIENTIFIC ORIENTATION.
10. MARKET ORIENTATION.
11. EXPORT ORIENTATION.
12. INFORMATION SOURCE USED.

———— 0.3069   SIGNIFICANT LEVEL [10%]
———— 0.3620   "   "   [5%]
———— 0.4640   "   "   [1%]

A critical observation of the data furnished in table 15 revealed that except age, farming experience, farm size, innovativeness and export orientation, all other variables, were positively and significantly related to attitude in the case of beneficiaries. In the case of non-beneficiaries, except age, farm size, indebtedness, innovativeness and export orientation, all other variables were positively and significantly related to the level of attitude.

The beneficiary farmer's favourable attitude towards the programme is due to their higher educational background. But a non-beneficiary farmer was found to develop a favourable attitude, only if he was educated and having longer farming experience. This could be attributed for the positive and significant relationship of education with attitude in the case of both beneficiaries and non-beneficiaries. This also explains the non significant relationship of farming experience with attitude in the case of beneficiary and significant relationship in the case of non-beneficiary. The result obtained in the case of education with attitude supports the findings reported by Vijayakumar (1983).

An indebted farmer, develops a favourable attitude, only if he is a beneficiary. A non-beneficiary takes no interest to know about the development programmes and thus fails to develop a favourable attitude. The results obtained in the case of beneficiary farmers was in conformity with the findings of Prakash (1980) and Viju (1985).

A favourable attitude towards pepper development programmes is a pre-requisite for the risk taking behaviour of farmers. These farmers will be ready to invest any amount of money on the new ventures. This may be the reason for the positive and significant relationship of risk orientation and economic motivation to the level of attitude, in the case of both beneficiaries and non-beneficiaries. The above results are in tune with the findings reported by Cherian (1984) and Das and Sarkar (1970).

Scientific know-how on the rejuvenation programme and the rejuvenation technique, lead to a favourable attitude towards the programme. This can be effected through the efficient use of different information sources. This may be reason for the positive and significant relationship of scientific orientation and information source used with attitude in the case of both beneficiaries and non-beneficiaries. This finding is in confirmity with the results reported by Kamarudeen (1981).

In the light of the above discussions, the hypothesis set for the study that there will be no significant relationship between the independent variables and level of attitude, in the case of education, risk orientation, economic motivation, scientific orientation, market orientation and information source used was rejected and accepted in the case of age, farm size, innovativeness and export orientation in the case of both beneficiaries and non-beneficiaries. Regarding farming experience, the null hypothesis was accepted in the case of beneficiaries, but rejected in the case of non-beneficiaries.

C. Extent of adoption

A scrutiny of the data furnished in table 15, reveals that except age, farming experience, farm size and export orientation, all other variables were positively and significantly related to the extent of adoption, in the case of beneficiaries whereas with regard to the non-beneficiaries, except education, economic motivation, scientific orientation and information sources used, all other variables were non significantly related to the extent of adoption.

It was found that exposing the farmers to the new practices will lead to adoption and not mere farming experience, in the case of both beneficiaries and non beneficiaries. In the case of beneficiaries and non-beneficiaries, it was found that through education, awareness is created, develop a favourable attitude and finally adopt a new practice. This may be the reason for the positive and significant relationship of education to the extent of adoption in the case of both beneficiaries and non-beneficiaries. The above findings are in agreement with the findings reported by Vijayakumar (1983).

It is also to be noted that farming experience by itself do not contribute to the adoption behaviour of the farmer. This may be the reason for the non significant relationship of farming experience to the extent of adoption in the case of both beneficiaries and non-beneficiaries.

The educated farmer, having an access to information sources, acquires scientific information in the pepper cultivation. This may be the reason for the positive and significant relationship of information

sources used and scientific orientation with the adoption in case of both beneficiaries and non-beneficiaries.

These findings are in conformity of the study reported by Prakash (1980) and Kamarudeen (1981).

It was also found that, only beneficiaries were having the risk taking ability and are willing to innovate improved practices. Thus a positive and significant relationship of risk orientation and innovativeness with the extent of adoption in the case of beneficiaries and non significant relationship in the case of non-beneficiaries.

Hence the hypothesis set for the study that there will be no significant relationship between independent variables and extent of adoption in the case of education, economic motivation, scientific orientation and information source used was rejected and accepted in the case of age, farming experience, farm size and export orientation, in respect to both beneficiaries and non-beneficiaries. Regarding indebtedness, risk orientation, innovativeness and market orientation, the null hypothesis was rejected in the case of beneficiaries and accepted in the case of non-beneficiaries.

C. **Correlation between the independent and dependent variables.**
    (Integrated Programme for development of spices)

   a.   **Level of awareness**

A cursory view of the data presented in table 16, reveals that education, risk orientation, economic motivation, scientific orientation, market orientation and information sources used were positively and significantly related to the level of awareness in the case of

beneficiaries. In the case of non-beneficiaries, except age, education, farm size, indebtedness, innovativeness and export orientation, all the other variables were positively and significantly correlated, with level of awareness.

The educational level of the beneficiaries, decides their level of awareness. More the education, higher will be the awareness about the programme. But in the case of non-beneficiaries, it was not a vital factor. This may be the plausible reason for the positive and significant relationship of education to awareness in the case of beneficiaries and non significant relationship in the case of non-beneficiaries. The results obtained in the case of beneficiaries was in tune with the findings reported by Haraprasad (1982) and the results obtained in the case of non-beneficiaries, in tune with the findings of Cherian (1984).

But it is to be noted that farming experience contributed to the awareness of the programme in case of non-beneficiaries rather than beneficiaries. Due to their low educational level, they depend more on their own experience, to know about the programme and the improved cultivation techniques. Hence a positive and signi-ficant relationship of farming experience with awareness in the case of non-beneficiaries and a non significant relationship in the case of beneficiaries.

The modern information sources play a vital role in influencing the farmer's awareness about various development programmes. Radio, T.V.,, Newspaper, frequent extension contacts etc are very helpful

in creating awareness. This makes transfer of scientific information easy and farmers get educated about various improved practices. They also gain the latest information in the market trend of the produce. This may be the reason for the positive and significant relationship of information source used and scientific orientation to the level of awareness in the case of both beneficiaries and non-beneficiaries. This findings are in conformity with the results reported by Aristotle (1981) and Naik (1981).

A good number of farmers are not aware of the export facilities of the crop. Only the large farmers can adjust the crop according to foreign market trend. This may be the reason for the non significant relationship of export orientation and awareness in the case of both beneficiaries and non-beneficiaries.

In the light of the above discussion, the hypothesis set for the study that there will be no significant relationship between the independent variables and the level of awareness was rejected in the case of risk orientation, economic motivation, scientific orientation, market orientation and information sources used and accepted in the case of age, farm size, indebtedness, innovativeness and export orientation for both beneficiaries and non-beneficiaries. Regarding education, the hypothesis was rejected in the case of beneficiaries but accepted in the case of non-beneficiaries.

b. Level of attitude

A perusal of table 16 shows that except age, farm size, indebtedness, innovativeness and export orientation, all other variables

FIG. 4. CORRELATION BETWEEN THE INDEPENDENT VARIABLES AND THE DEPENDENT VARIABLES INTEGRATED PROGRAMME FOR DEVELOPMENT OF SPICES.

a. AWARENESS Vs INDEPENDENT VARIABLES
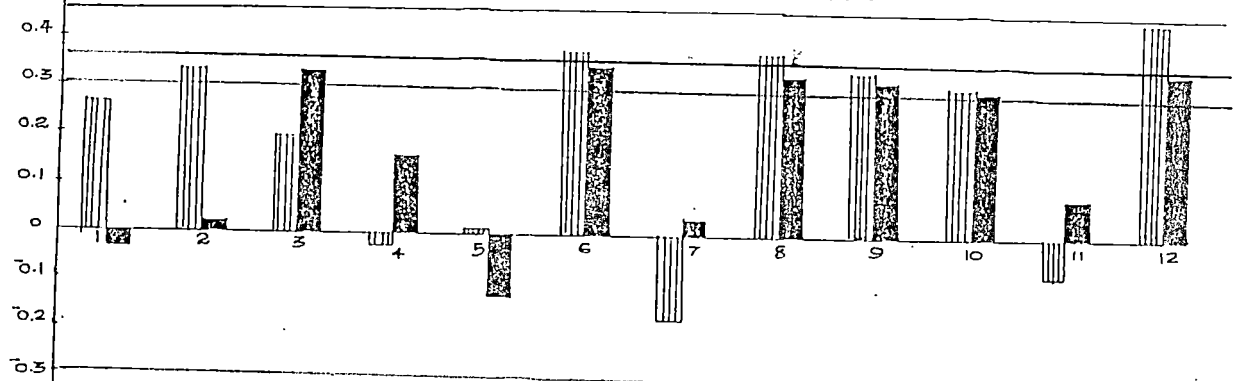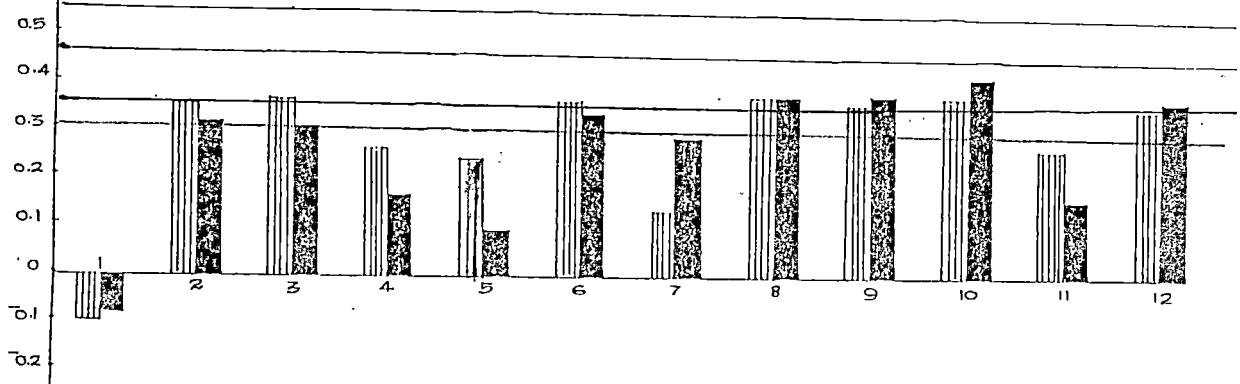
b. ATTITUDE Vs INDEPENDENT VARIABLES

c. ADOPTION Vs INDEPENDENT VARIABLES
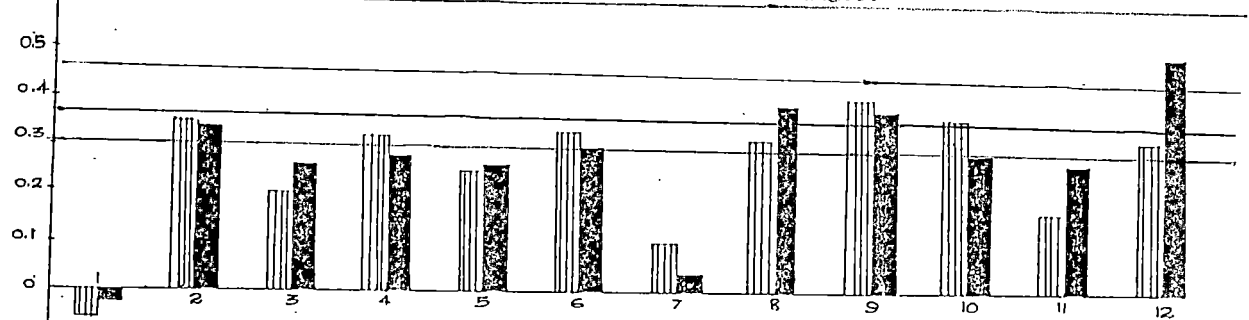
IIII - BENEFICIARIES.
■ - NON-BENEFICIARIES.
1. AGE.
2. EDUCATION.
3. FARM EXPERIENCE.
4. FARM SIZE.
5. INDEBTEDNESS.

6. RISK ORIENTATION.
7. INNOVATIVENESS.
8. ECONOMIC MOTIVATION.
9. SCIENTIFIC ORIENTATION.
10. MARKET ORIENTATION.
11. EXPORT ORIENTATION.
12. INFORMATION SOURCES USED.

	0.3069	SIGNIFICANT	LEVEL	[10%]
	0.3620	"	"	[5%]
	0.4640	"	"	[1%]

were positively and significantly related to the level of attitude in the case of both beneficiaries and non-beneficiaries.

It could be observed from the table that education and farming experience were vital factors which contributed to the development of a favourable attitude towards the programme and this in turn may be the reason of the positive and significant relationship of them with the level of attitude, in both the case of beneficiaries and non-beneficiaries. The findings reported by Ravichandran (1980) generally agree with the above findings.

The modern communication techniques available, help the farmers to know more about the programme. Once the scientific information are obtained they are able to evaluate the new practices under the programme, critically in the light of their knowledge and experience. On the strength of this evaluation, they develop a favourable attitude towards the new programme. Once evaluated a new practice and found valuable, they take risk and invest any amount of money on it. This could be the reason for the positive and significant relationship of information source used, scientific orientation, risk orientation and economic motivation with the level of attitude in the case of both beneficiaries and non-beneficiaries. The above results are in tune with the findings reported by Kamarudeen (1981) and Das and Sarkar (1970).

Inspite of the fact that modern communication facilities are available, it was found that farmers are not export oriented. This was reflected in the non significant relationship of export orienta-

tion with the level of attitude in the case of both beneficiaries and non-beneficiaries.

On the basis of above explanation, the hypothesis set for the study, that there will be no significant relationship between independent variables and the level of attitude was rejected in the case of education, farming experience, risk orientation, economic motivation, scientific orientation, market orientation and information sources used, but accepted in the case of age, farm size, indebtedness, innovativeness and export orientation in respect to both beneficiaries and non-beneficiaries.

c. Extent of adoption

The data provided in table 16 revealed that, except age, farming experience, indebtedness, innovativeness and export orientation, all other variables were positively and significantly related to the extent of adoption, in the case of beneficiaries. But in the case of non-beneficiaries, except education, economic motivation, scientific orientation and information sources used, all other variables were non significantly related to the extent of adoption.

Education is the vital contributor, to the adoption of a new practice, than farming experience. Higher educational level of farmers help them to develop a positive attitude and finally lead to adoption. Thus a positive and significant relationship of education with extent of adoption was seen in the case of both beneficiaries and non-beneficiaries. Farming experience was found to be non significantly related to adoption in both the cases. The above results had been reported in a closely related study by Vijayakumar (1983) and Ravichandran (1980).

In the case of large farmers, they take considerable interest in adopting a new practice and thus try to make the cultivation scientifically sound and more remunerative. But a small farmer is usually reluctant to adopt a new practice. This may be the reason for the positive and significant relationship of the farm size with adoption in the case of beneficiaries and non significant relationship in case of non-beneficiaries. The results obtained in the case of beneficiaries confirms the findings reported by Prakash (1980) and the results obtained in the case of non-beneficiaries, confirms the findings reported by Kaleel (1978).

Educated farmers due to their progressive outlook take risks at any cost. But non-beneficiaries, are reluctant in taking risks. This may be due to their past experience or lack of education. This could be the reason for the positive and significant relationship of risk orientation with the extent of adoption in the case of beneficiaries and non-significant relationship in the case of non-beneficiaries.

Beneficiaries are found to be conscious of the market demand of the crop produce. This may be due to the fact that beneficiaries keep their produce till they get a reasonably good price, or transport to a distant place where a better market is available. But non-beneficiaries sell the produce in the field itself without any consideration of market demand for want of money. This was reflected in the positive and significant relationship of market orientation with the extent of adoption in the case of beneficiaries and non significant relationship in the case of non-beneficiaries.

In view of the above discussion, the hypothesis, set for the study, that there will be no significant relationship between independent variables and extent of adoption was rejected in the case of education, economic motivation, scientific orientation and information sources used but accepted in the case of age, farming experience, indebtedness, innovativeness and export orientation in respect of both beneficiaries and non-beneficiaries. Regarding farm size, risk orientation and market orientation, the hypothesis was rejected in the case of beneficiaries and accepted in the case of non-beneficiaries.

3. Intercorrelation of dependent variables :

A perusal of the data provided in tables 17, 18, 19 & 20 shows that, all the three dependent variables viz., awareness, attitude and adoption were positively and significantly correlated to each other, for both beneficiaries and non-beneficiaries in regard to all the three pepper development programmes.

Awareness is acquiring information about any programme or new practices. It is considered as a prerequisite for development of a favourable attitude. It is created with the help of mass media, and extension contacts. So awareness about the programme, helps to know its objectives, benefits, new practices followed etc. By critically evaluating the programme based on their educational level and experience, they develops a favourable attitude towards programmes. So if a sound awareness is created among farmers, their attitude will also change. This was indicated by the positive and significant correlation between awareness and attitude in all the three pepper development programmes.

Formation of a favourable attitude is a prerequisite for adoption of any new practice. Even with a favourable attitude, many constraints such as financial and infrastructural can come on the way of adoption. The data presented in table 17, 18, 19 & 20 shows that there was a positive and significant relationship between attitude and adoption for both beneficiaries and non-beneficiaries in all the three pepper development programmes.

This is indicative of overcoming the constraints which stand on the way of adoption.

It was also found that, awareness, can lead to adoption. This can happen in the case of educated younger generation, who due to their personal enthusiasm take risk, and adopt the recommended practices under the programme. This could be the reason for the positive and significant relationship of awareness with the adoption for both beneficiaries and non-beneficiaries in all the three pepper development programmes.

4.   Intercorrelation of independent variables :

   a.   **Intercorrelation of independent variables** (Pepper Package Programme)

The data presented in table 21, shows the positive and significant relationship of education with the information sources used, scientific orientation and market orientation.

As age, increases, a farmer's practical knowledge on the work also increases. So, age was found positively and significantly

correlated with farming experience. Education, helps in the development of an individual. An educated individual, is more accessible to the information sources, through which he gets latest scientific information. He also gets the latest market trend of his crop produce, so that, the farmer can select the time and market to dispose his produce.

Similarly, there was a positive and significant relationship of education with risk orientation, innovativeness and economic motivation. A farmer will take risk, if he is convinced thoroughly about the superiority of the new practice. So a scientific background of the farmer, helps him to understand the importance of the new practice and thereby invests the resources on the new venture based on his innovativeness.

A farmer who is scientifically oriented will evaluate critically, not only production and management aspects of the crop, but also marketing possibilities. He will be in touch with the market demand of his crop produce and sell it, when prices are more remunerative. Since pepper is an exporting item, the demand of pepper in foreign markets is also to be taken into consideration. In view of the demand in internal and foregin markets, he can sell the produce at a higher price. This may be the reason for the positive and significant relationship of scientific orientation with market and export orientation.

Innovativeness is the stage of mind, in which a farmer gets interested in new ventures. Irrespective of age and experience, both young and old can turn positively to a new practice, if it is

trying. So innovativeness was negatively correlated with age and farming experience.

   b. Intercorrelation of independent variables (Rejuvenation Programme)

The data desented in table 22 shows the interrelationship of independent variables under pepper Rejuvenation Programme.

Among both small and large farmers there are educative farmers too. The younger generation having less experience, gets high education and subsequently education, was negatively and non significantly correlated with farm size and farming experience.

With the increase in farm size, the farmer will be in need of more inputs both in kind and cash. So for investment in a larger area, more money, is required for which he approaches some financial institutions. This naturally increases indebtedness. With the increase in farm size, and consequent increased investment of resources effective utilization of the resources is expected.

Additional information from different sources are sought to manage his crop effectively. With this scientific orientation, the farmer will also become aware of the market trend for the produce. This may be the reason for the positive and significant relationship of farm size with indebtedness, information sources used, scientific orientation and market orientation.

Though motivated to invest money particularly in a new

venture, it is done, only after appraising the market trend of his crop produce in internal as well as external market. He will go for a new venture, only if it provides economical gain to him. So economic motivation was found to be positively and significantly correlated to market orientation and export orientation.

c. **Intercorrelation of independent variables** (Integrated Programme for Development of Spices)

The data presented in table 23 shows the interrelationship of independent variables of integrated programme for development of spices.

Education helps a farmer to become aware of various development programmes which will be of helpful to him. He also seek incentives like subsidies from the Government and adopts the scientific cultivation methods. This will reduce the cost of cultivation, and thereby, his indebtedness decreases. This must be the reason that education had a negative correlation to indebtedness.

The experienced farmers, go in for investing more money, in risky ventures. Their experience, helps to decide whether the new practice is worthy or not. This could be attributed for the positive and significant relationship of experience with economic motivation.

Effective utilization of the advanced communication devices such as T.V., Radio, Newspapers, bring farmers close to the research systems. As a result scientific orientation is developed in the farmer and thereby he gains the market information of his crop produce.

This may be the reason for the positive correlation of scientific orientation with market orientation, export orientation and information sources used.

d. Intercorrelation of independent variables of non beneficiaries

The data presented in table 24, shows the interrelationship of independent variables selected for the study of the non-beneficiary farmers.

Due to the fast developing communication facilities, the farmer becomes aware of the market trend, irrespective of the age groups. So it was found that age was negatively correlated, with education and market orientation.

Market orientation was also found positively correlated to farming experience. Experience also enables a farmer, to know about the market demand of his crop produce and to decide the price and location to dispose if off.

5. Kruskal Wallis Test :

The data presented in table 25 shows the comparison between the beneficiaries and non-beneficiaries of the three pepper development programmes in respect of their awareness, attitude and adoption.

a. Level of awareness

The χ^2 value (55.27) of table 25 clearly shows that there was significant difference between beneficiaries and non-beneficiaries of pepper package programme, rejuvenation programme, integrated

FIG.6. RANK VALUES OF THREE PEPPER DEVELOPMENT PROGRAMMES BENEFICIARIES AND NON-BENEFICIARIES
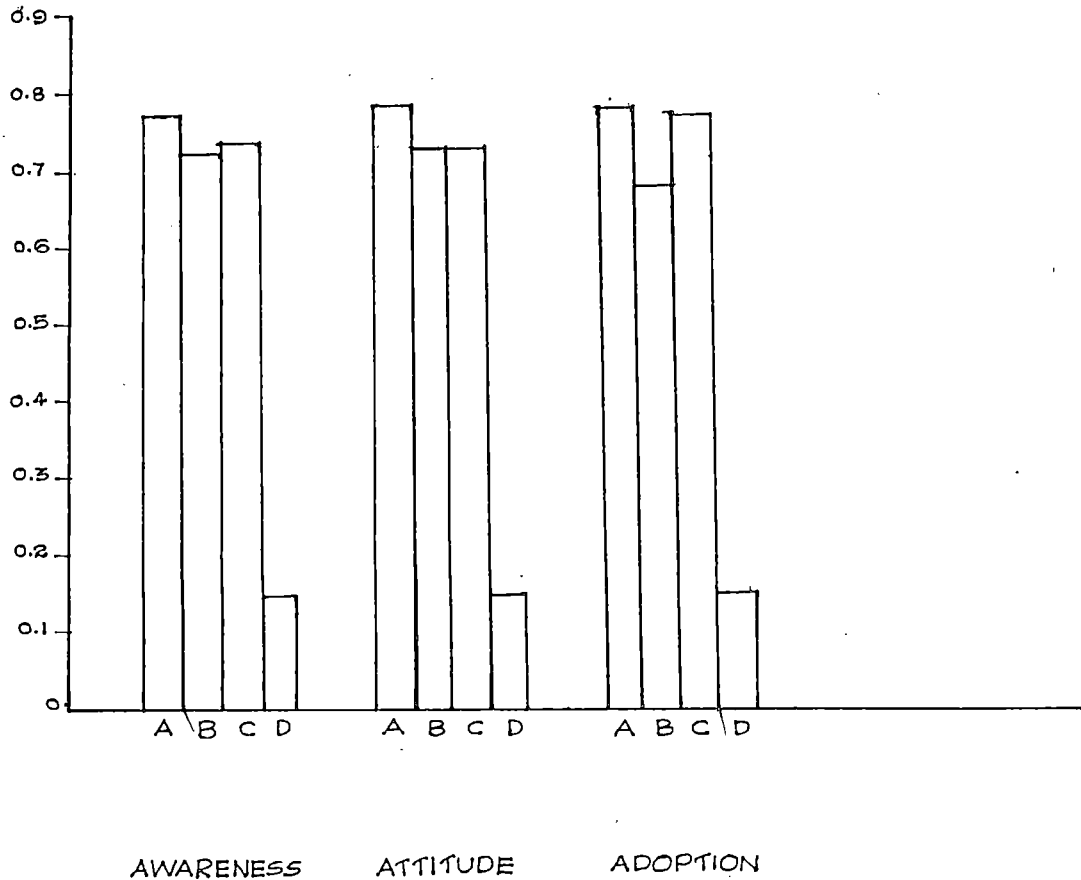
A. BENEFICIARIES OF PEPPER PACKAGE PROGRAMME.

B. BENEFICIARIES OF PEPPER REJUVENATION PROGRAMME.

C. BENEFICIARIES OF INTEGRATED PROGRAMME FOR DEVELOPMENT OF SPICES.

D. NON-BENEFICIARIES.

programme for development of spices with respect of awareness.

The rank values obtained for all the three group of beneficiaries, were found five times higher than that of non-beneficiaries. This clearly indicate, that the beneficiaries were having a high level of awareness about the programme. This may be due to the higher educational level and scientific orientation of the beneficiary farmers. Lack of effective utilisation of information sources, poor innovativeness, may be the reason for the low level of awareness among non-beneficiaries.

A critical observation also shows that among the programmes, farmers had maximum awareness about pepper package programme, (77.27). It was quite natural that this programme creats much interest among beneficiaries, as it was the first programme implemented all over Kerala, offering incentives and inputs.

In the light of above discussion the hypothesis set for the study that there will be no significant difference between beneficiaries and non-beneficiaries of pepper package programme, Rejuvenation programme and integrated programme for development of spices with respect to their level of awareness was rejected.

b.   Level of attitude

The χ^2 value (62.58) presented in table 25, reveals that there was significant difference between beneficiaries and non-beneficiaries of pepper package programme, Rejuvenation Programme and Integrated Programme for Development of Spices, in respect of attitude.

The rank values obtained for all the three group of beneficiaries, were found to be five times higher than that of non-beneficiaries. This clearly shows that the beneficiaries were having a more favourable attitude towards the programmes. The higher educational level, scientific orientation and economic motivation of beneficiaries must have helped them to evaluate each and every new practice and assess its advantages and disadvantages and develop a favourable attitude towards the programme. But in the case of non beneficiaries, limited exposure to mass media, past experience, skeptical nature to new ventures must be the reason for less favourable attitude towards the programme.

A critical observation, shows that among the programmes, people had more favourable attitude towards Pepper Package Programme (78.22). Since it was the first package programme implemented, it created a good influence on the minds of the beneficiaries.

In the basis of above explanation, the hypothesis set for the study that there will be no significant difference in the level of attitude between the beneficiaries and non-beneficiaries of Pepper Package Programme Rejuvenation Programme and integrated programme for development of spices was rejected.

c. Extent of adoption

The x^2 value (65.38) presented in the table 25, clearly shows that there was significant difference between beneficiaries and non-beneficiaries of Pepper Package Programme, Rejuvenation Programme and Integrated Programme for development of spices in the case of extent of adoption.

The rank values obtained for all the three group of beneficiaries, were found to be five times higher than that of non-beneficiaries. This clearly shows that the beneficiaries were having a high extent of adoption of improved farm practices under the programme. This may be due to the influence of demonstrations, provision of inputs and other incentives through the programme and technical guidance given by the officials of the department. Lack of scientific orientation and lack of innovativeness to new improved practices may be main causes of the low level of adoption among non beneficiaries.

A critical observation shows that among the three programmes, highest adoption was in the case of Pepper Package Programme (79.62).

On the light of above discussion, the hypothesis set for the study that there will be no significant difference between beneficiaries and non-beneficiaries of Pepper Package Programme, Rejuvenation Programme and Integrated Programme for development of spices was rejected with respect to their extent of adoption.

So, in general, it was found that Pepper Package Programme ranks first, in the case of awareness, attitude and adoption. Compared to 1950's, pepper cultivation, faced many natural hazards in the early 1970's, such as drought and fungal diseases. The Pepper Package Programme, implemented at this period could solve many of the problems of pepper growers, by providing incentives, subsidies, technical guidance, high yielding and quality vines, and a set of improved farm practices, to give a boost to the pepper cultivation as a whole.

This has shown positive results and this may be the reason of the high awareness, favourable attitude and high rate of adoption among beneficiaries of pepper package programme.

6. Constraints as perceived by farmers : In the adoption of improved farm practices of pepper, farmers are likely to face many constraints. Some of the constraints as perceived by the farmers are ranked and presented in the table 26.

The constraints ranked as first was inadequate and untimely supply of inputs. Eventhough there was a fixed time schedule for different management practices to be carried out under this programme, there was instance of administrative delay in making available subsidies or inputs in time. Such delay will curb the enthusiasm of the farmers and arrest the tempo of the programme. Hence, efforts need to be initiated on the part of the implementing agency to avoid such delay and make available the inputs in time.

Large scale destruction of vines due to quick and slow wilt diseases, is another prominent constraint . Once affected by these deadly disease, an immediate recovery is not possible and there was considerable economic loss for the cultivators. Arrangements need to be done on a warfooting basis to ward off the pepper plantations from these diseases.

Plant protection equipments like sprayers are too costly for an average farmer to own and hence the possibility of making available plant protection equipment on hire at the nearest Krishi Bhavan may be considered.

Cost of labourer in Kerala is raising day by day. For an average farmer this is a major problem and will add to the cost of cultivation. Another constraint is the lack of availability of quality hybrid vines. Locally available vines may be disease affected or of poor quality. But rooted cuttings of hybrid vines like Panniyur-1, was insufficient for large scale supply. The decentralised nurseries started recently, it is hoped, will solve this problem to a large extent.

The high cost of fertilizers was another constraint perceived by farmers. Since the factory price, are not likely to reduce, possibility of making available fertilizers at subsidised rate may be considered.

Many of the farmers had availed loans and are overdue to banks. At times of crop failure, the farmers finds it very difficult to repay the loan. So far rejuvenation of the crop, or to replant the whole area, farmers need fresh loans. But due to non-repayment of previous loans, they are not eligible to get fresh loans, as per the bank policy. This a problem which requires special attention on the part of the implementing agency.

SUMMARY

Pepper, the king of spices, is an important spice crop in Kerala and it is in a fast pace of development, both in area and production. Of the total pepper production in India, 96 per cent is contributed by Kerala, so most of the development programmes aimed at the improvement of pepper cultivation are concentrated in Kerala. The main objective of these pepper development programmes is to give a boost to the pepper cultivation by making available cash and material inputs and providing proper technical guidance to the farming community.

The present study was undertaken to make an evaluation of the selected development programmes for promoting pepper production in the state with the following objectives.

a) To study the awareness and attitude of pepper growers about the development programmes for promoting the pepper production in Kerala

b) To study the extent of adoption of improved farming practices under the development programmes, by the pepper growers of Kerala.

c) To study the relationship between the personal, psychological, socio-economic characteristics and communication behaviour of pepper growers with their awareness, attitude and adoption of improved farming practices

d) To identify the constraints, if any, in the adoption of development programmes as perceived by the pepper growers.

The pepper development programmes selected for this study were (i) Pepper package programme ; (ii) Pepper rejuvenation programme and (iii) Integrated programme for development of spices.

The study was conducted in Cannanore District of Kerala since it has the maximum area under pepper cultivation in the state. One Krishi Bhavan each viz., Kottiyoor, Karthikapuram and Mattannur Krishi Bhavan was selected from the Tellichery, Payyannur and Cannanore subdivisions respectively.

Forty farmers were selected randomly from each of the three Krishi Bhavans in the three subdivisions making an aggregate of 120. Among the 40 farmers, 30 were beneficiary farmers i.e., 10 each from the three pepper development programmes and another 10 non-beneficiary farmers.

The independent variables selected for this study were age, education, farming experience, farm size, indebtedness, risk orientation, innovativeness, economic motivation, scientific orientation, market orientation, export orientation and information sources used, whereas the dependent variables selected were awareness, attitude and adoption.

The data were collected by interviewing the respondents individually with the help of a structured, pre-tested interview schedule prepared for the study. The data were subjected to correlation analysis and Kruskal Walli's test.

The salient findings of the study are summarised and presented below :

and non-beneficiaries in the case of all the three pepper development programmes viz., pepper package programme, rejuvenation programme and integrated programme for development of spices. The beneficiaries were found to be five times higher in their level of awareness, attitude and adoption than that of non beneficiaries for all the three pepper development programmes.

2. Results of the intercorrelation analysis of dependent variables viz., awareness, attitude and extent of adoption revealed that these were positively and significantly related to each other in respect to both beneficiaries and non beneficiaries for all the three pepper development programmes. This relationship proves the fact that a high level of awareness will result in formation of a favourable attitude which in turn leads to adoption of new practices.

3. Results of intercorrelation analysis between independent and dependent variables revealed the following.

i) There was positive and significant relationship between awareness towards pepper package programme and the independent variables such as farming experience, risk orientation, economic motivation, scientific orientation, market orientation and information sources used in the case of both beneficiaries and non beneficiaries. Regarding education and indebtedness, the relationship with awareness was found to be significant in the case of beneficiaries but non significant in the case of non beneficiaries.

A positive and significant relationship was found between attitude towards pepper package programme and the independent variables such as education, farming experience, risk orientation, economic motivation,

scientific orientation, market orientation and information source used in the case of both beneficiaries and non-beneficiaries. Regarding indebtedness and export orientation, the relationship with attitude was found to be significant in the case of beneficiaries and non significant in the case of non beneficiaries.

The study also revealed that there was positive and significant relationship between extent of adoption of the practices under pepper package programme and independent variables such as education, economic motivation, scientific orientation and information sources used in the case of both beneficiaries and non beneficiaries. Regarding farming experience, indebtedness, risk orientation and market orientation, the relationship with adoption was found to be significant in the case of beneficiaries and non significant in the case of non beneficiaries.

ii) There was positive and significant relationship between awareness towards rejuvenation programme and the independent variables such as risk orientation, economic motivation, scientific orientation, market orientation and information source used in the case of both beneficiaries and non beneficiaries. Regarding education and indebtedness, the relationship with awareness was found to be significant in the case of beneficiaries but non significant in the case of non beneficiaries.

A positive and significant relationship was found between attitude towards rejuvenation programme and the independent variables, such as education, risk orientation, economic motivation, scientific orientation, market orientation and information sources used in the case of both beneficiaries and non beneficiaries. Regarding farming experience, the relation-

ship with attitude was found to be non significant in the case of beneficiaries but significant in the case of non beneficiaries.

The study also revealed that there was a positive and significant relationship between extent of adoption of practices under rejuvenation programme and the independent variables such as education, economic motivation, scientific orientation, and information sources used in the case of both beneficiaries and non beneficiaries. Regarding indebtedness, risk orientation, innovativeness and market orientation, the relationship with adoption was found to be significant in the case of beneficiaries but non significant in the case of non beneficiaries.

A positive and significant relationship was seen between awareness towards integrated programme for development of spices and the independent variables such as risk orientation, economic motivation, scientific orientation, market orientation and information sources used in the case of both beneficiaries and non beneficiaries. Regarding education, the relationship with awareness was found to be significant in the case of beneficiaries but non significant in the case of non beneficiaries.

It was also found that a positive and significant relationship existing between attitude towards integrated programme for development of spices and the independent variables such as education, farming experience, risk orientation, economic motivation, scientific orientation, market orientation and information sources used in the case of both beneficiaries and non beneficiaries.

The study also revealed a positive and significant relationship between extent of adoption of practices under integrated programme

for development of spices and the independent variables such as education, economic motivation, scientific orientation and information source used in the case of both beneficiaries and non beneficiaries. (Regarding farm size, risk orientation and market orientation the relationship with adoption was found significant in the case of beneficiaries but non significant in the case of non beneficiaries.

4. Results of the inter correlation analysis of independent variables revealed the following :

i) Intercorrelation analysis of independent variables of pepper package programme showed that education was positively and significantly related to information sources used, scientific orientation, market orientation, risk orientation, innovativeness and economic motivation. It was also found that scientific orientation was positively and significantly related to market and export orientation. But innovativeness was negatively correlated with age and farming experience.

ii) In the case of rejuvenation programme, it was found that education was negatively and non significantly correlated with farm size and farming experience. But farm size was positively and significantly related with indebtedness, information sources used, scientific and market orientation. Economic motivation was found positively and significantly correlated to market orientation and export orientation.

iii) Results of the inter correlation analysis of independent variables of integrated programme for development of spices showed that education was negatively and non significantly correlated with indebtedness. Farming experience was found to be positively and significantly related with economic motivation. Also scientific orientation was positively and significantly

correlated with market orientation, export orientation and information sources used.

iv)   In the case of non beneficiaries, intercorrelation analysis, showed that age was negatively correlated with education and market orientation. Market orientation was positively correlated to farming experience.

5.   The study also revealed that pepper growers faced many constraints, in the adoption of improved farm practices. The major constraints perceived as important by farmers were inadequate and untimely supply of inputs and large scale destruction of vines due to quick and slow wilt diseases, high cost of plant protection equipment, high labour consumption, high cost of fertilizers and lack of adequate financial assistance in the descending order of importance.

The following implications and recommendations emerge out of the findings of the present study.

1.   Among the three programmes studied, only integrated programme for development of spices is in vogue now. It was found that the level of awareness about attitude towards and extent of adoption of improved practices of both beneficiaries and non-beneficiaries, were in the medium level. Hence extension activities may be intensified to achieve the target expected of :

2.   Steps may be taken to ensure timely and adequate supply of inputs, like quality vines, fertilizers, pesticides and financial aid etc. to the pepper growers.

Suggestions for future research

1. In the present study, the investigation was confined to Cannanore district. An extensive study may be taken up including other major pepper growing districts of Kerala, namely, Idukki, Kottayam and Wynad.

2. The present study, investigated the impact of the three selected pepper development programmes. An extensive study is possible by taking each programme separately and indepth study may be conducted.

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APPENDICES

APPENDIX

"IMPACT OF DEVELOPMENT PROGRAMMES IN PROMOTING PEPPER PRODUCTION, IN KERALA

INTERVIEW SCHEDULE

1. Name of the respondent   :

2. Address   :

3. Ward   :

4. Panchayat   :

5. Block   :

6. Age   :

7. Education   :   Illiterate (   )

   can read only (   ) can read and write (   )

   Primary level (   )   middle school level (   )

   High school level (   ) college and above (   )

8. Farming experience   :

        In cultivation   :

   In pepper cultivation   :

9. Total area owned   :

10. Total area cultivated   :

    Further details

         Crops   Area cultivated   yield

    1. Pepper (no. of vines)

    2.

    3.

    4.

11. Whether pepper cultivated as pure crop / multiple crop. If so, what, is
    the standard used - - - - - - - - -

12. Indebtedness

    a.   Do you borrow to meet cultivation expenses ? Yes / No

         Private individuals (   )

         Co-operative society (   )

         Commercial banks (   )

         Private banks (   )

         Traders   (   )

         Others   (   )

    b.   Amount of loan

    c.   Amount paid

         Amount outstanding

13. Risk orientation

    1. A farmer should grow large no. :   SA / A / UD / DA / SDA
       of crops to avoid greater risks
       involved in growing one or two
       crops

    2. A farmer should rather take
       more of a chance in making a
       big profit than to be content
       with a smaller but less risky
       profit.

    3. A farmer who is willing to take
       a greater risks than the
       average farmer usually do
       better financially.

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

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

6. Trying an entirely new method in farming by a farmer involves risk but it is worthy

14. Innovativenss

    1. Do you want to learn new ways of farming ?   Yes / UD / No

    2. If the Ag. Extn. worker gives a talk on improved cultivation aspects, would you attend ?

    3. If the government, would help you to establish a farm elsewhere, would you accept ?

    4. Do you want a change in your way of life ?

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

    6. Do you want your sons to be farmers ?

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

    8. A man's future is in the hands of God.

15. Economic motivation   SA / A / UD / DA / SDA

    1. A farmer should work towards larger yields and economic profits

    2. The most successful farmer is one who makes the most profit

    3. A farmer should try any new farming idea which may earn him more money

    4. A farmer should grow cash crops to increase monetary profits in comparison the cultivation of food crops for home consumption.

    5. It is difficult for the farmer's children to make good start unless he provides them with economic assistance.

    6. A farmer must earn his living but the most important thing in life cannot be defined in economic terms.

16. Scientific orientation

1. New methods of farming give better results to a : SA/A/UD/DA/SDA
   farmer than the old methods

2. The way of farming by our forefathers is still
   the best way to farm today

3. Even a farmer with a lot of farm experience
   should use new methods of farming

4. A good farmer experiments with new ideas of
   farming

5. Though it takes time for a farmer to learn new
   methods in farming, it is worth the efforts

6. Traditional methods of farming have to be
   changed in order to raise the living of a farmer

17. Market orientation : SA/A/UD/DA/SDA

1. One should grow those crops which have
   more market demand

2. Market news is not so useful to a farmer

3. One should sell his produce to the nearest
   market irrespective of price

4. Grading the produce, helps the farmer to
   get a high price

5. Market intermediaries are necessary for
   marketing a product.

6. Produce should be stored until a farmer get
   a high price for it

18. Export orientation : SA/A/UD/DA/SDA

1. One should grow those crops which have more
   export potential

2. Exporting an agrl. produce, brings the farmer, a
   confidence on steady income

3. Market intermediaries are necessary for smooth
   export of the produce

4. Cultivating export potential crops results in
   high income

5. Quality aspect is not so important for exporting
   a produce

6. Cultivating any crop with the aim of exporting
   its product, is merely a waste of land and
   effort

19. Information source used

    1. Impersonal sources   Regularly/sometimes/never

        a. Radio
        b. Newspaper
        c. Farm magazines
        d. T. V.
        e. Farm articles in popular weeklies

    II Formal personal source

        a. v.l.w. / A. D.
        b. Ag. officer
        c. scientist

    III Informal personal source

        a. Family members
        b. Friends / relatives
        c. Neighbours / fellow farmers
        d. Progressive farmers
        e. Local leaders

    IV Commercial sources

        a. Fertilizer dealers
        b. Pesticide dealers
        c. Cooperative officials
        d. Bank personnel

    V Other channels of communication

        a. Demonstration
        b. Exhibition / melas / festivals
        c. Group meeting
        d. Training
        d. Other (specify)

Awareness of farmers towards pepper development programmes

1. Have you heard about the- - - - - - - - - - - - -programme   Yes / No

   If yes,

    a. Which is the nearest unit?
    b. When did it start functioning?
    c. What is the main objective of the particular
       pepper development programme?

2. Do you know that rooted pepper cuttings are
   distributed through the pepper development
   programme ?   Yes / No

3. Do you know that old and uneconomic vines
   should be replanted ?   Yes / No

4. Do you know that plant protection chemicals are
   distributed through this programme ?   Yes / No

5. Do you know that fertilizers are distributed with
subsidy, through this programme ?   Yes / No

6. Are you aware that sprayers for a nominal hire
charge was available as part of programme ?   Yes / No

7. Do you know that financial assistance is available
through this programme ?   . Yes / No

Attitude of farmers towards pepper development programmes

1. Pepper production in our state can be significantly
increased by widely implementing the pepper
development programme   SA/A/UD/DA/SDA

2. Farmers knowledge about Panniyur-1 was enhanced
because of pepper development programme

3. The pepper development programme has failed to
ensure availability of adequate pepper cuttings

4. Pepper development programme was very helpful
in solving many problems of farmers

5. Pepper development programme has failed in
ensuring timely supply of inputs

6. Pepper package programme was a blessing to
pepper growers

7. Large farmers are mainly benefited from pepper
package programmes

8. Regarding scientific pest and disease management
pepper package programme was very useful to
farmers

9. Pepper package programme helped farmers to
adopt the improved cultivation practices of pepper

10. Pepper package programme was merely a waste
of money

11. Farmers are adversely affected, if this pepper
package programme was cancelled

12. Like pepper package programme, new programmes
on pepper should be implemented in future

13. Cultivation of pepper became profitable, with
the implementation of pepper package programme

14. Risk and uncertainity in the cultivation of
pepper, continued even with the implementation
of pepper package programme

15. Pepper package programme had nothing new to offer to the farmers

Extent of adoption of improved farming practices

1. Do you use high yielding varieties for cultivation ?　　　Yes / No

   If so,

Var: Season	Area	Year of adoption	Do you continue to use	If no, when discontinued	Reason for discontinue

2. Do you use chemical fertilizers in your farming ?　　　Yes / No

   If yes,

Fertilizer	Season	Quantity	Since when adopted	Do you continue to use	If no, when discontinued	Reason

3. What is the spacing between vines ?

4. Do you use plant protection chemicals ?　　　Yes / No

   If yes,

Name of chemical	Quantity	since when adopted	Do you continue to use	If no, when discontinued	Reason

5. Do you replant, old and unproductive vines ?　　　Yes / No

   If yes,

Old var used	Replanted after no. of years	New var replanted	Do you continue to replant

6. Do you use other varieties

   What are the constraints faced by the farmer in adopting the new programme ?

   1.
   2.
   3.
   4.

IMPACT OF DEVELOPMENT PROGRAMMES IN PROMOTING PEPPER PRODUCTION IN KERALA

BY

A. SAJEEV CHANDRAN

ABSTRACT OF THE THESIS
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COLLEGE OF AGRICULTURE
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To assess the impact of various development programmes in promoting pepper production, a study was carried out in Cannanore, Payyannore and Tellichery sub-divisions of Cannanore district in Kerala. The impact was studied, by finding out the level of awareness, attitude towards and extent of adoption under the pepper development programmes. The relationship between and among the selected dependent and independent variables was studied. The constraints in the adoption of various recommended practices for increasing pepper production as perceived by the farmers were also identified.

The study revealed that there was significant difference in the level of awareness, attitude and extent of adoption among beneficiaries and non-beneficiaries in the case of all the three selected pepper development programmes viz., pepper package programme, pepper rejuvenation programme and integrated programme for development of spices. It was also found that the beneficiaries had a higher level of awareness, attitude and extent of adoption in the case of pepper package programme when compared with other programmes.

The relationship of the three selected dependent variables viz., awareness, attitude and extent of adoption with the twelve independent variables was also studied in the case of both beneficiaries and non-beneficiaries of pepper package programme, pepper rejuvenation programme and integrated programme for development of spices.

Intercorrelation analysis of dependent variables viz., awareness, attitude and extent of adoption revealed that there was positive and

significant relationship between each other in respect of both beneficiaries and non-beneficiaries for all the three pepper development programmes.

Also, intercorrelation analysis of the selected twelve independent variables viz., age, education, farm size, indebtedness, risk orientation, innovativeness, economic motivation, scientific orientation, market orientation, export orientation and information source used, were also conducted in respect of both beneficiaries and non-beneficiaries for all the three pepper development programmes.

Inadequate and untimely supply of inputs, destruction of vines due to quick and slow wilt diseases, high cost of plant protection equipment and fertilizers were the major constraints as perceived by the respondents in the descending order.