

**ANALYSIS OF FARMERS' PARTICIPATION IN THE
PARTICIPATORY TECHNOLOGY DEVELOPMENT (PTD)
PROCESS VIS-À-VIS PLANT PROTECTION IN VEGETABLES AT
KUNNATHUKAL PANCHAYAT**

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**Thesis submitted in partial fulfillment of the requirement
for the degree of**

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**Department of Agricultural Extension
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DECLARATION

I hereby declare that this thesis entitled “**Analysis of Farmers’ Participation in the Participatory Technology Development (PTD) Process vis-à-vis Plant Protection in Vegetables at Kunnathukal Panchayat**” 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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CERTIFICATE

Certified that this thesis entitled “**Analysis of Farmers’ Participation in the Participatory Technology Development (PTD) Process vis-à-vis Plant Protection in Vegetables at Kunnathukal Panchayat**” is a record of research work done independently by Mr. Suthan, L. (2001-11-48) under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to him.

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MY EVERGREEN

APPA AND AMMA

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Introduction

1. INTRODUCTION

The present approach of technology development is that the scientists develop technologies in research stations with little or no direct contact with the farmers. These technologies are then transferred to the farmers via a process of trial / demonstration and education. This type of conventional research is mostly scientist oriented with very limited involvement of local people who are treated as objects. Researchers often see themselves as scientists, not technology developers. They see their work as purely a scientific activity which does not require much exposure to farmers' practices. No opportunity is given for the poor to theoritise, to think more systematically, critically and intelligently about the farming practices, since conventional research is more prescriptive in nature.

At present what is observed is the passive approach by the research system in technology development. They develop technologies according to their own priorities, needs and interests without taking into account the views and critical needs of either the farmer (user) system or extension system. The lack of involvement and co-operation of the three systems has led to the present desperate state of infidelity in the three systems, (research, extension and client systems) with each system blaming the other for the lapses or deficiencies in the evolved technologies.

To overcome the lapses in the conventional research system as well as the deficiencies in the present mode of technology development, steps should be taken to make switch over attempt from conventional mode to the Participatory Technology Development (PTD) mode.

PTD is the practical process of bringing together the knowledge and research capacities of the local farming communities with that of the commercial and scientific institutions in an interactive way. It involves

activities where local producers and traders work together with external actors in the identification, generation, testing and application of new technologies and practices.

The objective of PTD is to ensure that small scale farmers genuinely participate in establishing their technological requirements and develop their capacity to carry out experiments in the field. This method of participation enables peasant families to achieve a more sustainable rural development.

1.1 Need of the study

PTD is based on the simple assumption that farmers are and remain the main actors in the process of technology development and that outsiders can at best play only a supportive role. This role can be translated into different functions, but in the main should aim at strengthening the experimental capacity of farmers (Haverkort and Zeeuw, 1991).

Since the present approach of technology development is having lot of defects and is purely a scientist and scientific-centred, one is forced to accept a farmer friendly approach, that is otherwise known as Participatory Technology Development (PTD) approach.

In PTD, farmers are encouraged to generate and evaluate indigenous technologies and to choose, test and adapt external technologies on the basis of their own knowledge and value systems (Reijntjes *et al.*, 1992). Hence PTD builds on indigenous knowledge, combining it with external knowledge and inputs only when farmers themselves perceive the need to do so. It aims at site specific, culturally adapted and ecologically sound innovations, selected and defined by the farmer (Haverkort, 1992). Besides developing technologies, the PTD process aims to strengthen the farmers' analytic capacity, awareness and self-confidence. Throughout the process, someone from outside the

farming community, for example extensionist, researcher (or) field worker, supports a group of farmers, acting as a catalyst to those of the farmers. This outsider serves as a researcher (or) facilitator of the research process and is based in the rural community.

Vegetables are rich and comparatively cheaper source of vitamins and minerals. Their consumption in sufficient quantities provides taste, palatability and increases appetite and provides fair amount of fibres. These are currently reckoned as important adjunct for maintenance of good health and beneficial in protecting against some degenerative diseases. They also play key role in neutralizing the acids produced during digestion of proteinous and fatty foods and also provide valuable roughage which promotes digestion and helps in preventing constipation and the meagre intake of vegetables has been largely responsible for malnutrition and under nutrition in large segments of our population.

If the vegetable crops are affected by any pest and disease attack, the total quality, taste, nutritional value and its production and productivity gets diminished and also the commercial value of the vegetables gets reduced. So there is an urgent need to protect the vegetables from the pest and disease attack. For that, researchers' duty is to suggest some valuable and affordable measures to carry out this venture in an effective manner.

In Kunnathukal panchayat, situated in Thiruvananthapuram district of Kerala, the PTD concept was familiarized by the Vegetable and Fruit Promotion Council of Kerala (VFPCCK) officials among the farmers and VFPCCK offers so many programs that are exclusively meant for the vegetable farmers there. Some valuable vegetable plant protection measures suggested by VFPCCK officials by means of PTD concept gained much importance among the farmers.

So the need of the study is to analyse the farmers' participation in the PTD process, which is related to plant protection aspects of vegetables.

The overriding objective is to analyse the vegetable farmers' participation in the PTD process. Thus the present study was taken up with the following specific objectives

- a. To find out the role of vegetable farmers in the PTD process.
- b. To assess the socio-economic and technical aspects of vegetable farmers and their relationship with the participation dynamics attributes
- c. To analyse the factors which motivate the vegetable farmers to voluntarily participate in the PTD process.
- d. To delineate the PTD process and to suggest suitable strategies for the process.

1.2 Scope of the study

In the PTD process, farmers are the experimenters who are guided and supported by the scientists and closely supervised by the extension personnel. Thus there is a true partnership between the research, extension and client systems and each system earns the confidence, support and approval of the other systems. PTD aims at developing locally relevant technology through the joint efforts of farmers and technocrats. The indigenous wisdom of local community combined with the experimental knowledge of institutions really make the technology development efforts more appropriate and fruitful. The role of the farmer also shifts from that of an unquestioning acceptor of technology to that of real partner in technology generation process.

PTD in agriculture is not a substitute for station based research or scientists managed on-farm trials. It is a complementary process which involves linking the power and capacities of agricultural science to the priorities and capacities of farming communities in order to develop productive and sustainable farming systems.

In PTD “Participation” implies an acceptance that people modify their own solutions to their needs. It means that researchers and development workers support farmers to increase their capacity to manage changes in their farming systems.

PTD can make services more responsive to local conditions, more accountable, more effective and more sustainable. The goal of this approach is to achieve equitable and sustainable development through the negotiation of interest among groups and by providing space for the poor and marginalized in collective decision making.

Hence the present study was undertaken to study role perception of farmers about PTD and the role performance in PTD.

1.3 Limitations of the study

As the study forms only a part of the requirement for the PG program, it has been conducted only in the Kunnathukal panchayat of Thiruvananthapuram district. It was not possible to cover the entire state due to limitations of time and other resources available at the disposal of the student investigator. However, these limitations were taken into consideration in deciding the variables, selecting respondents and fixing sample size. In spite of these limitations, much care has been taken to make the study as objective as possible. Moreover, since the study was based on the expressed opinion of the respondents it may or may not be free from their individual biases and prejudices.

Presentation of the report

The remaining chapters of this report are presented as follows

In Chapter II, theoretical orientation and defining the concepts are furnished.

Chapter III covers the methodology followed for the study.

The results, interpretation and discussion are given in Chapter IV.

Chapter V gives the summary of the entire study emphasizing salient findings.

The references, appendices and the abstract of the thesis are given at the end.

Theoretical orientation

2. THEORETICAL ORIENTATION

This chapter deals with review of the pertinent research studies, which enabled a researcher to develop a better understanding of the problem under research. The literature related to the study are presented under the following sub heads

2.1 Concept of role of farmers

2.2 Concepts regarding role perception and role performance

2.3 Concept of extent of participation

2.4 Socio-economic characteristics of farmers

2.5 Factors associated with the participation dynamics attributes

2.6 Delineation of PTD stages

2.7 Constraints faced by the farmers of Harithasangams

2.8 Conceptual model of the study

As no research has been conducted in this field till now, there was a serious paucity of directly related research studies. However, earnest attempt is made to include related studies.

2.1 CONCEPT OF ROLE OF FARMERS

Role has been defined by many authors differently.

Ogburn and Nimkoff (1964) defined role as a set of socially expected and approved behaviour patterns consisting of both duties and privileges associated with a particular position in a group. They further explained it as the obligation which an individual has towards his group.

Hodge and Johnson (1970) constructed role as a unique combination of talent and attitude adopted to discharge a specific assignment.

Luthans (1983) defined role as a position that has expectations evolving from established norms.

Seema (1986) in her study about the role of farm women in the decision making process of a farming community, operationally defined role as a set of behavioral pattern consisting of duties and privileges associated with the position of women as house wives in making decision related to their socio-economic life.

Ashaletha (1993) while studying the role of agricultural assistant in agriculture development, operationalised role as the associated with a position in the field of agricultural development.

Alex (1994) defined role as a set of behaviour pattern consisting of duties and privileges associated with the agricultural labourer employed by the farmer in making decision with them in paddy production process.

2.2 CONCEPTS REGARDING ROLE PERCEPTION AND ROLE PERFORMANCE

2.2.1 Concept of Role Perception

Mathew (1980) stated role perception as a person's indication of what he feels important to do with reference to any idea or statement presented to him.

Ashaletha (1993) operationalised role perception as the perceived degree of importance attached to the role or items to be performed by the respondent.

Alex (1994) defined role perception as the thinking and feeling junction of agricultural labourer towards decision making regarding paddy production with the farmers.

2.2.2 Concept of Role Performance

Davis (1949) defined role performance as how an individual actually performs a task in a given situation as distinct from how he is supposed to perform.

Sobhana (1982) stated role performance as the role being actually performed by virtue of occupying a particular role perception.

According to Warris *et al.* (1990) role performance means the manner in which an employer carries out or actually performs his or her role.

2.3 CONCEPT OF EXTENT OF PARTICIPATION

Extent of participation means the extent of actual involvement of farmers both physical and mental in different stages of a programme.

Gubbels (1992) reported that the tendency to adopt traditional structure of decision making was one of the reasons for failure of farmers organization.

Jeya (1999) found that 73.6 per cent of the respondents had medium level of participation in implementing farm activities where as only 16.8 per cent and 9.6 per cent had high and low level of participation respectively.

Bebbington *et al.* (1994) reported that members of the grassroots level farmer group are involved in planning, monitoring and evaluation of development programs and farmers, extension agents and researchers meet regularly and review results and decide upon the priority constraints to address and solutions to test.

2.4 SOCIO-ECONOMIC CHARACTERISTICS OF FARMERS

2.4.1 Age

Prasad (1995) found that any new skill development is possible only among the younger age group as their physical strength and their psychomotor skills are at the peak.

Sherin (1997) reported a positive and significant correlation between age and need satisfaction of women in her study of the analysis of group characteristics of women's group and their role in rural development.

Jayapalan (1999) reported that there is a non-significant relationship between age and extent of adoption of recommended practices by the farmers in bitter gourd cultivation.

2.4.2 Annual Income

Badagaonkar (1989) reported a positive and significant relationship between annual income and management orientation of the farmers.

NABARD (1995) identified that majority of the farmers of self help groups were possessing low level of annual income.

Padmaiah and Sundraswamy (1998) reported a positive and significant relationship between annual income and extent of adoption of recommended practices in groundnut cultivation.

2.4.3 Farm Size

Sharma and Singh (1970) found that the size of holding significantly affected the extent of adoption.

Manju (1996) reported a negative and significant relationship between farm size and extent of adoption.

Sherin (1997) reported a non-significant relationship between farm size and group leadership of women.

2.4.4 Experience in Vegetable Cultivation

Padmanabhan (1981) found a negative association of experience with labour efficiency.

Sherin (1997) reported a positive and significant relationship between experience in bittergourd cultivation and extent of adoption of recommended practices.

Jayapalan (1999) found a non-significant relationship between experience in bittergourd cultivation and extent of adoption of recommended practices.

2.4.5 Educational Status

Alex (1994) reported that education was not associated with the role perception / role performance of labourers with regard to their participation in decision making with farmers in paddy production.

Ghosh (1995) found a positive or more or less high relationship between educational status and group cohesiveness.

Sherin (1997) reported a negative and non-significant relationship between educational status of the respondents and the group interaction.

2.4.6 Cosmopolitaness

Ferreira *et al.* (1983) in their study indicated that cosmopolite farmers were more inclined to adopt new technology.

Gangadharan (1993) reported a positive and significant relationship between cosmopolitaness and extent of adoption of improved agricultural practices by pepper growers of Idukki district.

Sherin (1997) found out a negative and significant relationship between cosmopolitaness and group leadership of women.

2.4.7 Credit Orientation

Jaleel (1992) observed a positive and significant relationship between credit orientation and extent of adoption.

Nizamudeen (1996) observed that credit orientation behaviour of Kuttymulla growers had prompted them towards the successful adoption of the cultivation practices.

Sindhu (1997) reported a non-significant relationship between credit orientation and conceptual skill of cut flower growers.

2.4.8 Leadership

Rogers and Omstead (1957) defined leadership as an activity in which effort is made to influence people to co-operate in achieving a goal viewed by the group as desirable.

Shilaja (1981) found that different types of leaders whose characteristics were studied did not differ significantly with their age.

Leadership expresses very clearly that fact of social interaction among members of a group (Bhatia, 1971).

2.4.9 Self Concept

Mc Auley (1976) defined self concept as the conglomerate of perception of one as about oneself it may contain in correct picture and its development is continued.

Robbins and James (1976) explained self concept as those perception of ourselves that we have acquired through our interaction with others and that have been validated by our experiences.

Joseph (1983) found significant and positive relationship between self concept and communication effectiveness of village level agricultural demonstrators.

2.4.10 Risk Bearing Capacity

Jaleel (1992) and Gangadharan (1993) reported positive and significant relationship between risk orientation and adoption.

Rajkumar (1992) found a non-significant relationship between risk orientation and adoption.

Varma (1996) in her study on self employment among farm women reported that majority of the respondents (63 per cent) belong to high group with respect to risk bearing capacity.

2.4.11 Exposure to Information Sources

Review of research studies showing relationship between exposure to information sources and knowledge.

Name of the researcher	Year of study	Relationship
1. Prasad	1978	Positive and significant
2. Sheela	1989	Positive and significant
3. Gangadharan	1993	Positive and significant
4. Manju	1996	Not significant
5. Preetha	1997	Positive and significant

Majority of the above studies show that exposure to information sources is positively and significantly associated with knowledge.

2.4.12 Irrigation Index

There are not much studies showing the relationship regarding irrigation index and other variables. Manju (1996) reported a positive and non-significant association between irrigation index and knowledge.

2.4.13 Area Under Cultivation

The researcher has not come across any study regarding area under cultivation. Hence, the reviews regarding relationship between area under different crops and knowledge has been quoted.

Name of the researcher	Year of study	Relationship
1. Godhandapani	1985	Not significant
2. Manju (crop-vegetables)	1997	Negative and significant
3. Jose (crop-vegetables)	1998	Not significant
4. Manju (crop-coconut)	1996	Not significant

2.5 FACTORS ASSOCIATED WITH THE PARTICIPATION DYNAMICS ATTRIBUTES

2.5.1 Innovativeness

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

Sajeevchandran (1989) observed that there was significant and positive relationship with education and innovativeness.

Menon (1995) observed that innovativeness had contributed to the changing farming conditions and continues to raise the performance level of farmers. Thus a modern farmer who is innovative is willing to change his believes, attitudes and ways of acting in response to new challenges and developments.

2.5.2 Scientific Orientation

Hobbs *et al.* (1964) noticed the positive and significant relationship between the farmers attitude towards sciences and their economic performance.

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

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

2.5.3 Perception About Participatory Technology Development (PTD)

Alex (1994) stated that knowledge was positively and significantly associated with the perception of male and female agricultural labourers.

2.5.4 Self Confidence

Khare (1976) opined that confidence would play an important role in the success of a creation or innovation.

Pandayaraj (1978) found a positive and significant relationship between self confidence and communication behaviour of Junior Agricultural Officers in Kerala.

Joseph (1983), Nizamudeen (1996), Varma (1996) and Sangeetha (1997) reported a good majority of respondents belonged to high group with respect to self confidence.

2.5.5 Extension Orientation

Deepali (1979) concluded that extension orientation is one of the most important variables, which established a relationship with degrees of participation of rural people in agricultural operations.

Shaju (1998) opined that extension orientation has a positive and significant relation with extent of participation of women in watershed development programme.

Santhosh (1999) reported that extension agency contact had a positive and significant relation with extent of participation of farmers in agricultural development programmes implemented through people's plan.

2.5.6 Participation in PTD

Deepali (1979) revealed that there was positive relationship between knowledge of rural women in farm practices and their degree of participation in agricultural operations.

2.5.7 Knowledge in Vegetable Cultivation

Meera (1981) found a significant difference in the level of knowledge about improved agricultural practices between trained and untrained farm women.

Sagar (1989) reported that majority of the respondents had medium knowledge about recommended practices of paddy cultivation.

Hemalatha (1997) reported a positive and significant relationship between level of knowledge and extent of adoption in the case of women in defacto household.

2.5.8 Economic Motivation

Radhakrishnamoorthy (1984) observed that economic motivation had a positive and significant correlation with extent of adoption of paddy growers.

Babu (1984) observed a non-significant association of economic motivation with economic performance of grape growers.

Sivaprasad (1997) found that economic motivation had positive and significant correlation with extent of adoption of trained youth.

2.5.9 Achievement Motivation

Devi and Reddy (1984) reported that achievement motivation has no relation with role perception and role performance of rural women in farm activities.

Seema (1986) in her study opined that achievement motivation had no relation with role perception and role performance and extent of participation in implementing the decisions.

Shilaja (1990) reported that achievement motivation was found to have a positive and significant relationship with mixed farming productivity of farm women in progressive villages.

2.5.10 Social Participation

Govind (1984) reported that social participation of farm women gave significant and negative association with the extent of involvement in farm activities.

Prasanna (1987) reported a significant relationship between social participation and adoption behaviour of farmers.

Gangadharan (1993) found that social participation is positively and significantly related with the adoption of improved practices by pepper growers.

2.5.11 Market Perception

Nair (1969) reported a positive relationship between market perception and extent of adoption, but in contrast Naidu (1978) reported a non significant relationship between market perception and extent of adoption.

Porchezian (1991) reported a non significant relationship between market perception and management orientation.

Nizamudeen (1996) reported a non-significant relationship between market perception and extent of adoption of recommended practices of Kuttymulla growers.

2.5.12 Risk Orientation

Manju (1996) observed a negative and non significant relationship between risk orientation and extent of adoption.

Preetha (1997) observed a positive and significant relationship between risk orientation and extent of adoption.

Sivaprasad (1997) reported that by imparting proper training orientation, the risk bearing ability of the individuals can be increased.

2.5.13 Attitude Towards Scientific Agricultural Practices

In the present context, this has been defined as the positive or negative effect associated with scientific agricultural practices, towards which farmers differ in varying degrees.

Padmanabhan (1981) found positive and significant correlation between the attitude of agricultural labourers towards agriculture and participation in decision making with the farmers.

On the basis of the study cited above, a relationship was assumed to exist between the attitude of farmers towards scientific agricultural practices and their role perception and role performance in the PTD programs.

2.5.14 Exposure to Mass Media

Renukaradhya (1983) found a significant relationship between mass media participation of trained, farmers with their level of economic performance.

Balasubramanian (1985), Godhandapani (1985), Jayapalan (1985), Wilson and Chaturvedi (1985) observed positive and significant relationship between extent of adoption and mass media participation whereas Nanjaiyan (1985) reported non significant association between mass media exposure and extent of adoption by small farmers.

Pradeepkumar (1993) reported that mass media contact is positively and significantly related with the extent of participation of educated unemployed youth in agricultural and allied fields.

2.5.15 Employment Generation

Padmanabhan (1981) found that in Kerala the average period of unemployment in a year for men labourers was 138.87 days.

Mencher (1980) observed that eventhough wage rates were high in Kerala, number of days for which employment available for agricultural labourers were less.

Senthilnathan (1991) opined that seasonal unemployment and underemployment were the biggest problems faced by the agricultural labourers.

2.5.16 Need Satisfaction

According to Maslow's need priority model needs form hierarchy. Lower level needs must at least partly be satisfied before higher level needs emerged. In other words a higher order need cannot become an active motivating force until the preceding lower order need is essentially satisfied (Maslow, 1943).

Shaw (1971) opined that groups that fail to satisfy the needs of individual group members, usually disintegrate.

Sherin (1997) found that due to the increased training the members become more knowledgeable about the ways and means to achieve group goals and hence an increased need satisfaction was seen.

2.6. DELINEATION OF PARTICIPATORY TECHNOLOGY DEVELOPMENT (PTD) STAGES

According to Reijntjes *et al.* (1992) and Veldhuizen *et al.* (1997), there are six stages with respect to PTD, They are as follows:

2.6.1 Getting Started

Building relationships for co-operation, preliminary situation analysis and awareness mobilization.

2.6.2 Looking for Things to Try

Identifying priorities, identifying best-bet opinions from indigenous knowledge, scientific sources and screening options.

2.6.3 Designing Experiments

Reviewing existing experimental practice, planning and designing experiments, designing, monitoring and evaluating protocols.

2.6.4 Trying Things Out

Implementing experiments, monitoring and evaluation.

2.6.5 Sharing the Results

Communicating basic ideas, principles, results and the PTD process, training in skills, proven technologies, use of experimental methods and farmer to farmer extension.

2.6.6 Keeping Up the Process

Creating favourable conditions for continuing experimentation and agricultural development.

This process of technology development is closely linked with social change and encourages local innovation, self confidence, and self respect through self organized planning, implementation and the evaluation of systematic experiments.

2.7 CONSTRAINTS FACED BY THE FARMERS OF HARITHASANGAMS

Seshachar (1980) in his study depicts that lack of knowledge regarding spacing, application of farmyard manure and fertilizers and lack of information on the use of plant protection measures were the constraints in chilly cultivation.

Norman (1982) inferred that the problems in vegetable cultivation were high attack of pests and diseases, high input cost and serious transportation.

Bony (1991) concluded in her study that high cost of plant protection chemicals, inadequate marketing, storage and post harvest facilities were the problems of commercial vegetable cultivation.

2.8 CONCEPTUAL MODEL OF THE STUDY

The conceptual model of the study is illustrated in Fig. 1. It was predicted that there might be a significant relationship between participation dynamics attributes, role performance in PTD, role perception about PTD and extent of participation of farmers in the PTD process.

- Y₁-Innovativeness
- Y₂-Scientific orientation
- Y₃-Knowledge in vegetable cultivation
- Y₄-Perception about PTD
- Y₅-Attitude towards scientific agricultural practices
- Y₆-Self confidence
- Y₇-Extension orientation
- Y₈-Participation in PTD
- Y₉-Economic motivation
- Y₁₀-Achievement motivation
- Y₁₁-Social participation
- Y₁₂-Market perception
- Y₁₃-Risk orientation
- Y₁₄-Exposure to mass media
- Y₁₅-Needs satisfaction
- Y₁₆-Employment generation

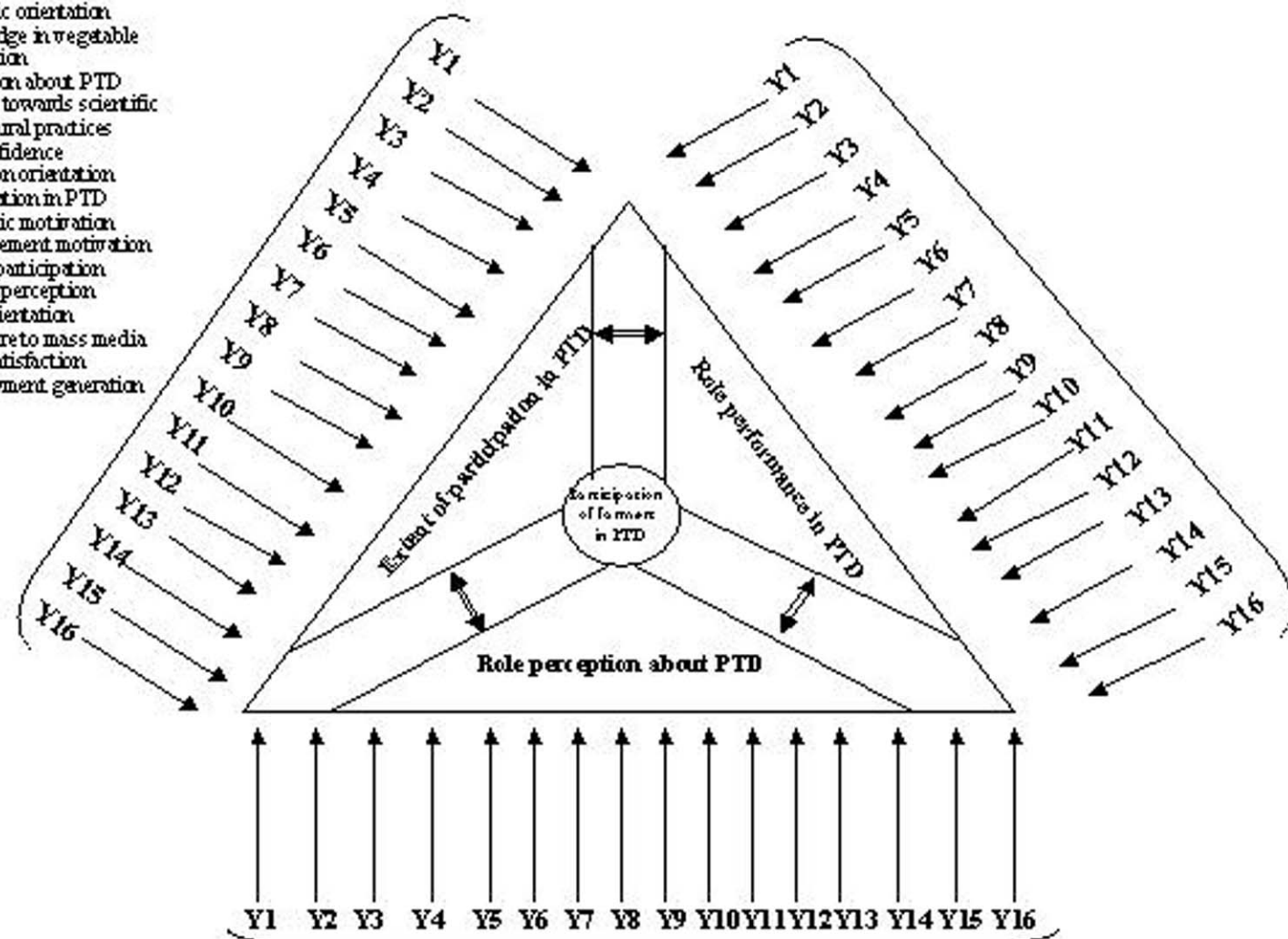


Fig. 1. Conceptual framework of study

Methodology

3. METHODOLOGY

The methodology followed in the study is presented under the following heads.

- 3.1 Locale of the study
- 3.2 Selection of respondents and variables
- 3.3 Concepts regarding role perception, role performance and extent of participation
- 3.4 Operationalisation and measurement of variables in relation to socio-economic characteristics
- 3.5 Operationalisation and measurement of variables with regard to participation dynamics attributes
- 3.6 Constraints faced by the vegetable farmers
- 3.7. Data collection procedure
- 3.8 Statistical tools used in the study

3.1 LOCALE OF THE STUDY

The study was conducted at Kunnathukal Panchayat of Thiruvananthapuram district. The selection was made keeping in view of the following criteria.

- a. This is the only panchayat in Thiruvananthapuram district where this new concept was adopted and put into practice.
- b. No scientific investigation has been so far conducted to study the farmers' participation in the Participatory Technology Development (PTD) process.

3.2 SELECTION OF RESPONDENTS AND VARIABLES

Based on the discussion with the farmers, officials of the Vegetable and Fruit Promotion Council of Kerala (VFPCCK), Krishi Bhavan officials, the experts in PTD concept and the presidents of the harithasangams in the Kunnathukal Panchayat, the farmers who were intensively cultivating

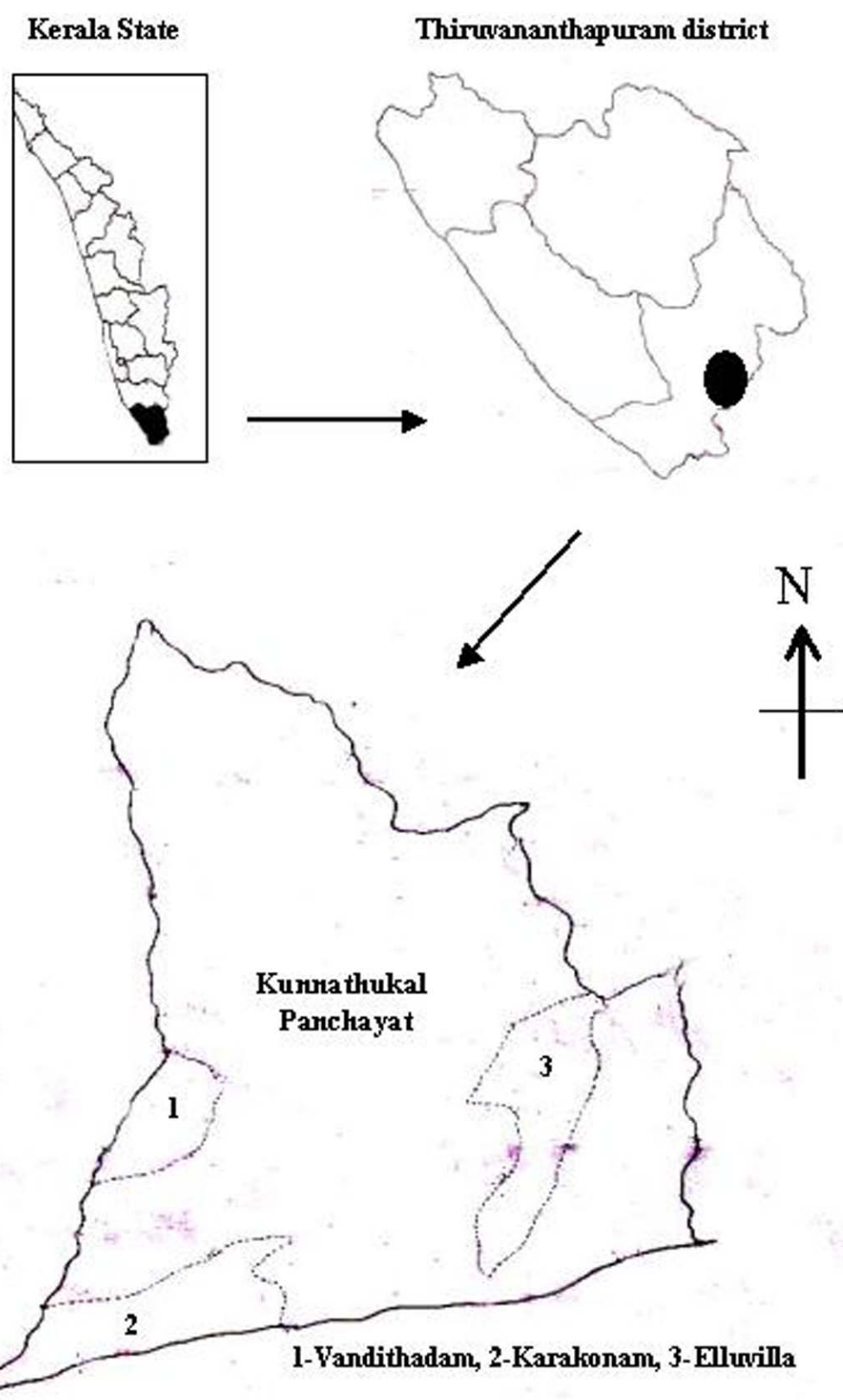


Fig. 2 . Map showing locale of the study

vegetables by means of following farming practices developed through PTD, were selected for the study. There were three Harithasangams in Kunnathukal Panchayat and they were situated in the villages of Vandithadam (one Harithasangam), Elluvilla (one Harithasangam) and Karakonam (one harithasangam). From each harithasangam, 25 farmers were selected.

Thus totally 75 farmers were selected for inclusion in the study.

Detailed review of literature and discussions with experts and scientists in agricultural extension were made use of selecting the variables that could possibly influence the participation dynamics attributes. Above all, judges rating was utilized for the final selection of the variables.

3.3 CONCEPTS REGARDING ROLE PERCEPTION, ROLE PERFORMANCE AND EXTENT OF PARTICIPATION

3.3.1 Role Perception

Role perception is operationally defined as thinking and feeling of farmers about the degree of importance they attach to each role item in the planning and implementation of the technology which is developed through PTD. As item pool of roles which farmers can perform with respect to PTD was prepared by reviewing literature and finally discussing with experienced personnel associated with the PTD programs.

The selected role items were given to the respondents to indicate their responses in a three-point continuum namely very important, important and less important carrying scores of 3, 2 and 1 respectively. Role perception score of an individual respondent is obtained by adding the weightage of her/ his responses over all the items.

In order to know which role is perceived as most important by the respondents, frequency and percentage of the respondents, rating each role/item as most important were worked out and the roles were ranked accordingly. The scale used by Shaju (1998) was used in the present study.

3.3.2 Role Performance

Role performance is operationalised as the degree of regularity with which each role is performed by the farmers as reported by them. The scale used here was adapted from Shaju (1998).

The role items identified were given to the farmers and responses were collected in a three point continuum namely ‘most frequently’, ‘frequently’ and ‘rarely’ with the weightages of 3, 2 and 1 respectively. Role performance score of an individual respondent is obtained by adding the weightage of her/his response over all the items.

In order to know which role is performed most frequently by the respondents, frequency and percentage of the respondents, performing each role / item as most frequently were worked out and the roles were ranked accordingly.

3.3.3 Extent of Participation

It was operationally defined as the extent of actual involvement, expressing their view, and sharing the responsibilities during motivational meetings, planning, implementation, monitoring and evaluation of technologies implemented through PTD.

In this study, extent of participation was measured by using a three point continuum. ‘always’, ‘sometimes’, ‘never’ with the scores of 3, 2 and 1 respectively. The score of an individual respondent is obtained by adding the weightage of his/her response over all the items.

Twelve activities of participation in technology development were selected for inclusion in the study. The maximum possible score is 36.

3.4 OPERATIONALISATION AND MEASUREMENT OF VARIABLES IN RELATION TO SOCIO-ECONOMIC CHARACTERISTICS

The variables considered for this aspect are presented below.

- 3.4.1 Age
- 3.4.2 Annual income
- 3.4.3 Farm size
- 3.4.4 Experience in vegetable cultivation
- 3.4.5 Educational status
- 3.4.6 Area under cultivation
- 3.4.7 Cosmopolitanness
- 3.4.8 Credit orientation
- 3.4.9 Leadership
- 3.4.10 Self concept
- 3.4.11 Risk bearing capacity
- 3.4.12 Exposure to information sources
- 3.4.13 Irrigation index

3.4.1 Age

Refers to the number of calendar years completed by the farmer respondent at the time of interview.

Scoring pattern suggested by Sindhudevi (1994) was adapted in the study as given below.

Category	Score
upto 35 years	1
36-50 years	2
Above 50 years	3

3.4.2 Annual Income

Refers to the total earning of all the members of the family of the respondent for one year.

This was obtained by adding the income earned by all the adult members of the family and income from the land and crops for one year. The variable was measured by directly asking the respondents about the total land possessed by them. The scoring pattern adopted by Sreedaya (2000) was followed in the present study.

Income	Score
upto 2000	1
2001 to 5000	2
5001 to 10000	3
10001 to 20001	4
Above 20001	5

3.4.3 Farm Size

Refers to the extent of area possessed by the respondent. The scoring pattern followed in this study was already used by Sreedaya (2000).

Size of holding	Score
Upto 0.25 acre	1
0.26 to 0.50 acre	2
0.51 to 1.0 acre	3
1.01 to 2.0 acres	4
Above 2 acres	5

3.4.4 Experience in Vegetable Cultivation

Refers to the total number of years the respondents have been engaged in vegetable cultivation.

The method adopted by Ramanathan (1995) was used in this study with slight modification.

Experience	Score
Upto 5 years	1
6 to 10 years	2
11 to 25 years	3
Above 25 years	4

3.4.5 Educational Status

Refers to the extent of formal learning achieved by the respondent.

Educational status was measured by the method suggested by Trivedi (1963) with slight modification.

Items	Score
Illiterate	1
Can read and write	2
Primary school	3
Middle school	4
High school	5
College	6
Professional college	7

3.4.6 Area Under Vegetable Cultivation

It was measured as the area under vegetable cultivation in acres.

3.4.7 Cosmopolitaness

Refers to the tendency of the farmers to be in contact with outside village on the belief that all the needs of an individual cannot be satisfied within his own village.

The scoring pattern suggested by Desai (1981) and adopted by Nelson (1992) with suitable modifications was used to measure cosmopolitaness. The scoring pattern adopted was given below.

A. Frequency of visit of nearest town

Items	Score
Twice or more in a week	5
Once in a week	4
Once in a month	3
Seldom	2
Never	1

B. Purpose of visit

All visits related to his farming	4
Some visits related to his farming	3
Other purposes	2
No purpose	1

C. Membership in organizations outside village

Office bearer	3
Member	2
No membership	1

3.4.8 Credit Orientation

Refers to the orientation to avail credit by the respondent.

It was measured using the scale developed by Beal and Sibley (1967). The scale consisted of five items. The first and last items were measured in Yes or No response with scores two and one respectively. The second item was measured on a four point continuum as very difficult, difficult, easy and very easy with scores of one, two, three and four respectively. The third item was measured on a four point continuum as very badly, badly, fairly and very fairly with scores of one, two, three and four respectively. Fourth item was measured in a four point continuum of strongly agree, agree, disagree and strongly disagree with scores of four, three, two and one respectively. Summation of these scores of all the items was the credit orientation score of the respondent.

3.4.9 Leadership

Leadership is operationally defined as the ability of a person to influence people to co-operate in achieving a goal.

The leadership quality of the farmer was measured by the schedule developed by Jyothis (2000) for this purpose. It was measured using a five point continuum. The scoring procedure adopted was as follows. The total score was obtained by summing up the score on individual items.

Item	Score
Always	5
Often	4
Sometimes	3
Seldom	2
Never	1

3.4.10 Self Concept

Self concept refers to the set of cognition and feelings that a farmer has about him as a farmer.

In the present study, self concept was measured by using the scale developed by Joseph (1983) with slight modification. The scale consisted of eight statements. The statements were rated on a five point continuum. The scoring pattern adopted was as follows.

For negative statements, scoring pattern was reversed. The total score for each of the respondents was worked out by summing up the score on all the items.

Item	Score
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

3.4.11 Risk Bearing Capacity

Risk bearing capacity is operationalised as the degree to which a farmer is oriented towards encountering risk and uncertainty and has courage to face problems in agriculture.

The scale developed by Supe (1969) was adopted for the study and the scoring procedure adopted was as follows.

Item	Score
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

3.4.12 Exposure to Information Sources / Frequency of Exposure

This refers to an individual's contact with various sources of information (ie), his / her mere exposure to various sources. Scale used in this study was already used by Majjusha (2000).

Scores of 0, 1 and 2 were given for responses never, occasionally and regularly respectively for each information source.

3.4.13 Irrigation Index

Irrigation index is the extent to which vegetable crops are being irrigated.

For quantifying this variable, the procedure developed by Geethakutty (1993) was used. Two dimensions viz., availability of irrigation water and area covered under irrigation are considered for this purpose. The scores for these two dimensions are as follows.

1. Availability of irrigation water	Score
Throughout the year	2
Partial availability	1
Never	0
2. Area irrigated (%)	
75 and above	4
Between 74.99 and 50	3
Between 49.99 and 25	2
Below 25 per cent	1

The scores obtained by a farmer for the availability of irrigation water and area under irrigation are multiplied to get irrigation index.

3.5 OPERATIONALISATION AND MEASUREMENT OF VARIABLES WITH REGARD TO PARTICIPATION DYNAMICS ATTRIBUTES

The forces which stimulate farmers while making changes in the PTD process, are referred as participation dynamics.

The variables related with participation dynamics attributes are quoted here.

3.5.1 Innovativeness

3.5.2 Scientific orientation

3.5.3 Knowledge in vegetable cultivation

3.5.4 Perception about Participatory Technology Development (PTD) process

3.5.5 Attitude towards scientific agricultural practices

3.5.6 Self confidence

3.5.7 Extension orientation

3.5.8 Participation in Participatory Technology Development (PTD) process

3.5.9 Economic motivation

3.5.10 Achievement motivation

3.5.11 Social participation

3.5.12 Market perception

3.5.13 Risk orientation

3.5.14 Exposure to mass media

3.5.15 Need satisfaction

3.5.16 Employment generation

These variables were ranked based upon the scores obtained by judges rating of the exhaustive list of variables with respect to participation dynamics attributes. From the 31 variables, 16 were identified for this study.

3.5.1 Innovativeness

Refers to the degree to which the respondent was relatively earlier in adopting new ideas.

The procedure followed by Singh and Choudhary (1977) and adopted by Selvanayagam (1986) was used to measure innovativeness with slight modification. In this procedure a question was asked as to when the farmer would like to adopt an improved practice in farming. The response was scored as follows:

Response	Score
1. As soon as it is brought to my knowledge	4
2. After I had seen other farmers tried successfully in the farm	3
3. I prefer to wait and take my own time	2
4. I am not interested in adopting improved practices	1

3.5.2 Scientific Orientation

Scientific orientation is operationally defined as the degree to which a farmer is relatively ready to adopt scientific ideas.

In this study, scientific orientation was measured by using the scale developed by Supe (1969). This scale consisted of six statements of which one was negative. Responses were collected on a five point continuum with the scoring pattern of

Item	Score
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

3.5.3 Knowledge in Vegetable Cultivation

The knowledge of farmers was tested using a simple teacher made test developed by Sreedaya (2000) for this purpose. Based on review of literature and discussion with the experts, a list of 30 questions related to vegetable cultivation were selected. These questions were further edited to avoid ambiguity and finally a list of six questions were selected, to which the respondent had to answer. A score of three was given to the correct answer, two for partially correct answer and one for wrong answer. The sum of the scores obtained for all the items indicated the knowledge score of the respondent.

3.5.4 Perception About PTD

Perception was operationally defined as a dynamic phenomenon which involves not only perceiving stimuli but also interpreting and describing these stimuli in terms of what are meaningful to the individual. This was measured by a scale developed by Manoj (2000) for his study. The scale consisted of six statements of which one was positive, rest were negative. A score of one was assigned for the agree response and zero score for disagree response in case of positive statement. The scoring

pattern was reversed in the case of negative statements. The scores obtained on each statement were cumulated to obtain the total score of the respondent on this variable.

3.5.5 Attitude Towards Scientific Agricultural Practices

This is operationalised as the degree of positive (or) negative disposition of farmers towards scientific agricultural practices. The scale used in this study was adopted from Alex (1994). The responses were collected on the five point continuum namely ‘strongly agree’, ‘agree’, ‘undecided’, ‘disagree’ and ‘strongly disagree’.

The score given for the responses were 5, 4, 3, 2 and 1 for positive statements and it was reversed for negative statements.

Item	Score
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

3.5.6 Self Confidence

It is operationally defined as the extent of feeling about one’s own powers, abilities and resourcefulness to perform any activity which the farmer desires to undertake.

The variable was measured using the scale developed by Pandyaraj (1978). The scale consists of eight items. The respondents were asked to state their response in a five point continuum from strongly agree to strongly disagree. The scoring method was as follows for positive statements. The scoring pattern was reversed in the case of negative statements. Total score was obtained by summing of all the scores for each item.

Item	Score
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

3.5.7 Extension Orientation

Extension orientation refers to the extent of contact of farmer had with different extension agencies and also his participation in union activities or programs like meetings, seminars etc organized by these agencies and personnel. The scale applied here was adopted from Manoj (2000).

Here the response for contact of a farmer with different extension personnel were measured as following

Response	Score
Regular	2
Occasional	1
Never	0

The total score was obtained by adding up all the scores for different extension activities.

The extension participation was measured by summing up the scores obtained by a farmer for his participation in various extension activities. The scores were assigned to the respondents as follows.

Response	Score
Whenever conducted	2
Sometimes	1
Never	0

The total score was obtained by adding up the scores for all extension activities. The scores for extension orientation for a respondent was arrived at by adding up the scores for extension contact and extension participation.

3.5.8 Participation in PTD

This was operationalised as the involvement of the farmers in the developmental activities carried out through the various package programs. As little study on this aspect has been carried out so far, there was no criteria for measuring the participation in PTD. So it was necessary to develop a standard scale for that purpose, any have for the study a scale was adopted from Manoj (2000). The scale consisted of three programs of PTD on vegetable cultivation in that area. A score of 'one' was assigned to response 'yes' and 'zero' to the response 'no'. The scores obtained on each statement was cumulated to get the score of an individual. The maximum score could obtain was three and minimum was 'zero'.

3.5.9 Economic Motivation

It was operationalised as the drive of the respondent for occupational sources in terms of profit making and the relative value placed on economic ends.

This was measured using Supe's scale (1969) with modification in the scoring procedure. Instead of a five point continuum or response as developed by Supe, a dichotomy of 'Yes' or 'No' response pattern was used as done by Prasad (1983). The scale consisted of six statements of which five statements were positive, while the last one was negative. A score of 'one' was assigned to agree response and 'zero' score for disagree response in the case of positive statements. The scoring pattern was reversed for negative statements. The score obtained on each statement

were added to get the total score of a respondent on this variable. The maximum score that could be obtained by a respondent is six and minimum was zero.

3.5.10 Achievement Motivation

Refers to the striving of farmers to do good work and attain a sense of a accomplishment.

It was measured by applying the achievement motivation scale of Desai (1981). The scale consisted of five incomplete sentences to choose answers felt appropriate. One of the choices indicated high achievement motivation. Farmers who responded with proper choice for each of the five sentences were given a score of ‘two’ and for other choices ‘one’ each. Summing up the scores obtained for all the five sentences, the respondent’s achievement motivation score was obtained.

3.5.11 Social Participation

Social participation refers to the degree of involvement of respondents in formal and informal social organizations either as a member or as an office bearer, which also includes the extent of participation in organizational activities. The procedure developed by Thamban (1990) was used with slight modification for this purpose of measurement of social participation.

I. Membership in organization	Score
1. No membership in any organization	0
2. Membership in any organization	1
3. Office bearer in any organization	2
II. Frequency of attending meetings	
1. Never	0
2. Occassional	1
3. Regular	2

The number of organization in which the respondent is a member (or) office bearer was multiplied by the corresponding weightage and added to the score for participation in meetings to get the individual score on social participation.

3.5.12 Market Perception

Refers to the capacity of the respondent to identify the market trend to sell the produce for greater returns.

It was measured by adopting the procedure developed by Nair (1969). The method consisted of scoring the responses obtained to selective questions presented to the respondents to elicit their perception of the market for the produce. The questions and the scoring procedure adopted were as follows.

1. Do you think a farmer will be able to sell the produce if he increases the production by adopting the recommended practices.
 Yes – 1
 No – 0
2. Do you think that produce of the crop cultivated according to the recommended practices will fetch good price compared to those raised under traditional methods.
 Low price – 0
 Same price – 1
 High price – 2

3.5.13 Risk Orientation

Refers to the degree to which the farmer is oriented towards encountering risks and uncertainty in adopting new ideas in farming.

It was measured using the scale developed by Supe (1969). The scale consisted of six statements of which one statement was negative. The scoring was on a five point continuum as strongly agree (5), agree (4),

undecided (3), disagree (2) and strongly disagree (1) for positive statements and was reversed in the case of negative statements. The sum of the scores of each statement is the score of the risk orientation of the respondent.

3.5.14 Exposure to Mass Media

It refers to the degree to which the different mass media viz., Radio, television, newspaper, magazines, bulletins, books and films were utilized by the farmers for getting information, about different PTD related programs. The scale used here was already utilized by Lakshmi (2000). The frequency of exposure to mass media was measured as shown below.

Frequency of exposure

Media Always Regularly Occasionally Rarely Never

Radio

Newspaper

Television

Farm magazines

Research journals

3.5.15 Need Satisfaction

It is operationally defined as achieving individual member's need and requirements by group within a stipulated time. The scale applied here was used by Sreedaya (2000).

Item	Score
Strongly agree	5
Agree	4
Undecided	3
Disagree	2
Strongly disagree	1

3.5.16 Employment Generation

Refers to the extent to which Harithasangam members obtained additional employment opportunities

In this study, employment generation was measured by using the scale developed by Lakshmi (2000). The number of man days of employment generated in the previous year as responded by the individual were taken, and the scoring pattern adapted was given below.

Employment generated in terms of man days in the previous year

Category	Score
Nil	0
Upto 30 days	1
31-60 days	2
61 days and above	3

3.6 CONSTRAINTS FACED BY THE VEGETABLE FARMERS OF HARITHASANGAMS

In the present study, constraint is operationalised as those items of difficulties or problems faced by the members of the Harithasangams which hinder the successful cultivation of vegetables. The scale used here was already utilized by Sreedaya (2000).

Based on the review of literature and discussion with extension personnel, officials of VFPC and IVDP, two separate list of constraints were prepared for VFPC and IVDP Harithasangams. The members of harithasangams were asked to record their agreement or disagreement regarding the relevancy of these constraints as hindering the functioning of Harithasangams. The agreement was given a score of 'one' and 'zero' score for disagreement. The total frequency of agreement for each constraints was found out and the percentage of agreement of each constraint was worked out. Based on the percentage the constraints were ranked.

The group members were also asked to record other constraints which they felt important other than those listed. The constraints with the first rank number was considered as the most serious. One followed by others in the order of increasing rank order.

Open ended questions were included in the schedule for the farmers in order to know the constraints while participating in the PTD process.

3.7 DATA COLLECTION PROCEDURE

Prior to data collection a pilot study was conducted which included discussion with farmers, agricultural labourers, Krishi Bhavan officials and extension professionals.

Based on the above, the interview schedule was prepared and it was pre-tested in a non-sample area and minor modifications were made and finalized. The English version of the interview schedule was translated into Malayalam version and was used for data collection purpose.

Data were collected from the vegetable farmers by personal interview by the researcher.

3.8 STATISTICAL TOOLS USED IN THE STUDY

Correlation analysis was used to work out the relationship between the socio-economic characteristics and participation dynamics attributes. Inter correlation analysis was also done among the variables selected for the study to find out their interrelationships.

The participation dynamics index (PDI) used in the study was developed by using the formula

$$\text{PDI} = \frac{\text{Total score obtained by each respondent for participation dynamics attributes}}{\text{Maximum possible score}}$$

Percentage analysis

Respondents were categorised into low group and high group on the basis of mean.

Low group $<$ mean

High group \geq mean

Besides mean, variance, Chi-square test were used for the analysis of data

Results and Discussion

4. RESULTS AND DISCUSSION

The results of the study are presented and discussed in this chapter under the following subheads.

- 4.1 Role related characteristics of farmers
- 4.2 Relationship of role related characteristics of farmers with the selected participation dynamics attributes
- 4.3 Relationship of role perception about PTD and role performance in PTD with selected participation dynamics attributes
- 4.4 Socio-economic characteristics of the farmers
- 4.5 Relationship of the socio-economic characteristics of the farmers with the participation dynamics attributes
- 4.6 Relationship of the socio-economic characteristics with the participation dynamics index
- 4.7 Villagewise analysis of socio-economic characteristics
- 4.8 Extent of participation in PTD
- 4.9 Relationship of role perception about PTD, role performance in PTD and extent of participation in PTD.
- 4.10 Relationship of extent of participation in PTD with the selected participation dynamics attributes
- 4.11 Participation dynamics attributes of farmers
- 4.12 Villagewise analysis of participation dynamics attributes
- 4.13 Relationship of participation dynamics attributes with the participation dynamics index
- 4.14 Constraints faced by the farmers of VFPCCK and IVDP
- 4.15 Suggestions for improving the farmers' participation in the PTD process
- 4.16 Empirical model of the study

4.1 ROLE RELATED CHARACTERISTICS OF FARMERS

4.1.1 Role Perception About PTD

Table 1. Distribution of respondents with respect to role perception about PTD

Variable	Obtained score range	Category	Score range	Frequency	Percentage
Role perception of PTD	3 – 9	Low	< 5.7	26	34.67
		High	≥ 5.7	49	65.33

The data presented in the Table 1 and Fig. 3 shows that the mean score of farmers' role perception about PTD was 5.7. From the Table it could be observed that majority of the respondents (65.33 %) had high role perception about PTD and the remaining 34.67 per cent had low role perception about PTD.

Since the PTD concept was already familiarised by the local VFPCCK officials, the farmers were having a good opinion about PTD. As farmers had good perception about PTD automatically their role perception about PTD was also found to be high.

4.1.2 Role Performance in PTD

Table 2. Distribution of respondents with respect to role performance in PTD

Variable	Obtained score range	Category	Score range	Frequency	Percentage
Role performance in PTD	3 – 9	Low	< 5.213	26	34.67
		High	≥ 5.213	49	65.33

A perusal of the data in Table 2 and Fig.4 shows that the majority of the farmers (65.33 %) were having high role performance in PTD and rest of the farmers (34.67 %) belonged to the category of low level of role performance in PTD.

As farmers' participation in PTD as well as their role perception about PTD were found to be good, their role performance in PTD was also found to be good.

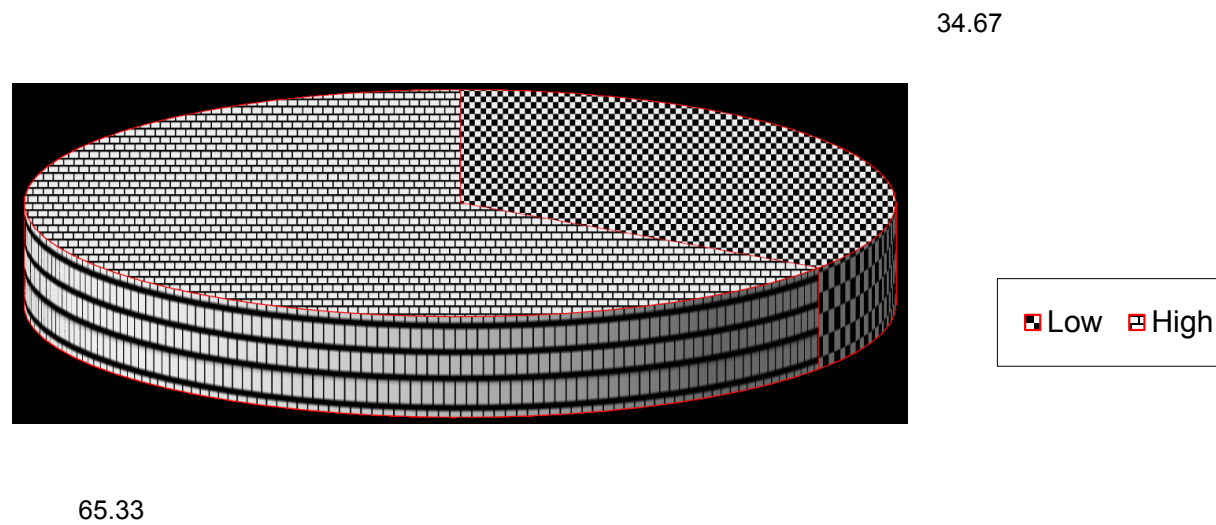
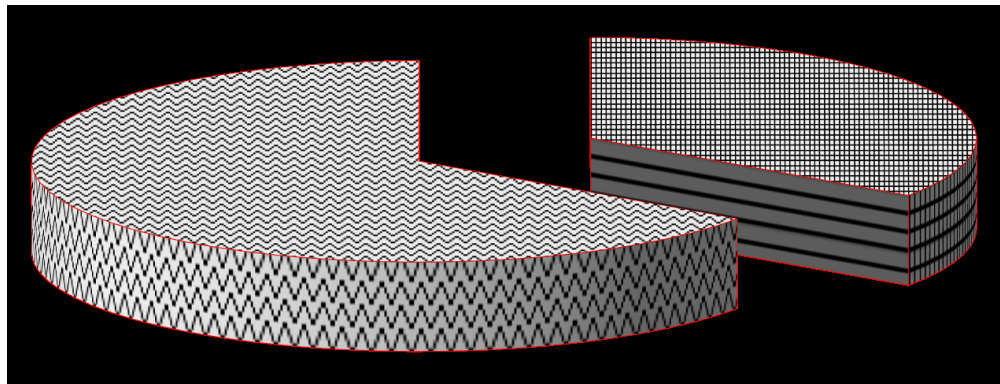


Fig. 3. Pie diagram showing distribution of respondents with respect to role perception about PTD



65.33

34.67

Low High

Fig. 4. Pie diagram showing distribution of respondents with respect to role performance in PTD

4.2 RELATIONSHIP OF ROLE RELATED CHARACTERISTICS WITH THE SELECTED PARTICIPATION DYNAMICS ATTRIBUTES

Farmers' role in PTD was identified by splitting the role characteristics into farmers' role perception about PTD and farmers' role performance in PTD.

Here, the two characteristics like role perception about PTD and role performance in PTD were combined and subjected to chi-square test to find a relationship between role of farmers in PTD with the selected participation dynamics attributes.

Totally there are sixteen participation dynamics attributes included in the study. As the eight participation dynamics attributes got maximum score among them, they were selected and included in the study.

A quick view of the data presented in Table 3, shows the relationship between farmer's role perception about PTD and farmers' role performance in PTD with the selected eight participation dynamics attributes.

Data interpreted in the Table 3, revealed that there was significant relationship between farmers' role perception about PTD and their role performance in PTD with the need satisfaction.

This result clears that the farmers' role perception about PTD and their role performance in PTD were in the perfect pathway, their need satisfaction will be easily achieved.

A close view of the data presented in the Table 3 shows that there was a positive significant relationship among farmers' role perception about PTD and their role performance in PTD with participation in PTD.

Table 3. Role perception about PTD and role performance in PTD with selected participation dynamics attributes – chi-square test

Role related variables	Participation dynamics attributes	χ^2 value
14 and 15	22	NS
	28	NS
	32	S
	21	NS
	23	NS
	25	S
	27	NS
	33	NS

14-Role perception about PTD

15-Role performance in PTD

22-Attitude toward scientific agricultural practices

28-Social participation

32-Need satisfaction

21-Perception about PTD

23-Self confidence

25-Participation in PTD

27-Achivement motivation

33-Employment generation

NS-Non significant S-significance at 5 % level

This eye opener results revealed that farmers' role perception about PTD and their role performance in PTD got improvised by means of their participation in the programs and activities of PTD.

Rest of the variables found no relationship with the role of farmers in PTD process.

4.3 RELATIONSHIP OF ROLE PERCEPTION ABOUT PTD AND ROLE PERFORMANCE IN PTD WITH SELECTED PARTICIPATION DYNAMICS ATTRIBUTES

Table 4. Correlation analysis of role perception about PTD and role performance in PTD with selected participation dynamics attributes

(n=75)

Variables	Selected participation dynamics attributes				
	Participation in PTD	Employment generation	Economic motivation	Social participation	Risk orientation
Role perception about PTD	-0.0362	0.2746*	0.2455*	-0.1724	-0.1046
Role performance in PTD	0.2643*	0.1179	0.0737	-0.0054	-0.0339

*Significant at 5 % level

Since the five participation dynamics attributes were in the maximum score range, they were subjected to correlation analysis with the role perception about PTD and role performance in PTD.

Correlation studies between the role perception about PTD and role performance in PTD with selected participation dynamics attributes showed that role perception about PTD was positively and significantly related with economic motivation and employment generation.

Since the farmers' perception about PTD was high, they intended to practice the PTD farming practices in their field. As the PTD had already shown good results, they got good income from agriculture. This was the reason for the positive significant relationship between role perception about PTD and the economic motivation.

Because of the good role perception about PTD, farmers started practicing the PTD farming practices in their own field. Because of good results of PTD, farmers themselves started extending their cultivation from smaller area to larger area. This may lead to consumption of more number of agricultural labourers. This might be the reason for the positive and significant relation between role perception about PTD and employment generation.

Role performance in PTD was positively and significantly related with the participation in PTD.

As the farmers had good opinion and good attitude towards PTD, their role performance in PTD was found to be good. Since the farmers' role performance in PTD was good, automatically their participation in PTD gets boosted and motivated. This might be the reason behind the positive and significant relationship between role performance in PTD and participation in PTD.

4.4 SOCIO-ECONOMIC CHARACTERISTICS OF THE FARMERS

4.4.1 Age

Table 5. Distribution of the vegetable farmers with respect to age, years

Category	Frequency	Percentage
Upto 35	30	40
36 - 50	38	50.67
Above 50	7	9.33

From the Table 5, it was understood that 40 per cent of the respondents belonged to young aged group, 50.67 per cent of the respondents belonged to the middle aged group and 9.33 per cent of the respondents belonged to old aged group.

Majority of the respondents belonged to middle aged group and young aged group. Young and middle aged people were more likely to adopt any new programs. The elder group usually took more time to adopt the new programs.

This result was in line with the findings of Geetha (2002).

4.4.2 Annual Income

Table 6. Distribution of the respondents with respect to annual income, Rs
(n=75)

Category	Frequency	Percentage
Upto 2000	10.00	13.33
2001-5000	33.00	44.00
5001-10000	30.00	40.00
10001-20000	2.00	2.67
> 20000	0	0

A cursory view of the data presented in Table 6, shows that majority of the respondents were having annual income between Rs. 2001/- to Rs.5000/- and 40 per cent of the respondents were having annual income between Rs. 5001/- to Rs. 10,000/- and the rest were in the range of Rs.10001/- to 20001/- (2.67 %).

This result was in line with the findings of Geetha (2002).

4.4.3 Farm Size

Table 7. Distribution of the respondents in relation to farm size, acres
(n=75)

Category	Frequency	Percentage
Upto 0.25	14.00	18.67
0.26 - 0.50	27.00	36.00
0.51 – 1.00	25.00	33.33
1.01 – 2.00	7.00	9.33
> 2.00	2.00	2.67

From Table 7, it was revealed that majority of the respondents belonged to 0.26 to 0.5 acres (36 %) and 33.33 per cent of the respondents belonged to 0.51 to 1 acres group and 18.67 per cent of the respondents

belonged to less than 0.25 acres group, 9.33 per cent of the respondents belonged to 1.01 to 2 acres group and 2.67 per cent of the respondents belonged to more than 2 acres group.

4.4.4 Experience in Vegetable Cultivation

Table 8. Distribution of the respondents vis-à-vis experience in vegetable cultivation, years

(n=75)

Category	Frequency	Percentage
Upto 5	10	13.33
6 – 10	30	40.00
11 – 25	27	36.00
>25	8	10.67

From Table 8, it was understood that 40 per cent of the respondents were having six to ten years experience, 36 per cent of the respondents experience range was between 11 to 25 years, 13.33 per cent of the respondents belonged to less than five years experience category and the rest were having more than 25 years experience (10.67 %).

4.4.5 Educational Status

Table 9. Distribution of respondents with respect to educational status

(n=75)

Category	Frequency	Percentage
Illiterate	0	0
Literate	32	42.67
Primary level	30	40.00
Middle level	11	14.67
High level	2	2.67

A bird's eye view on the data interpreted in the Table 9, shows that 42.67 per cent of the respondents were literates, 40 per cent of the respondents had primary level education, 14.67 per cent of the respondents were in the middle level school education and 2.67 per cent of the respondents had education up to high school level.

The result was a reflection of the higher literacy rate of Kerala state. There were no illiterates among the respondents. This shows that today's farmers were fully educational forward.

4.4.6 Area Under Vegetable Cultivation

Table 10. Distribution of respondents with respect to area under vegetable cultivation, acres

(n=75)

Category	Frequency	Percentage
Upto 0.25	28	37.33
0.26 - 0.50	25	33.34
0.51 – 1.00	18	24.00
1.00 – 2.00	4	5.33

A cursory view of the data presented in the Table 10, showed that 37.33 of the farmers belong to less than. 0.25 acre category and 33.34 per cent of the respondents belong to 0.26 to 0.5 acre category and 0.51 acre to 1 acre category had 24 per cent of the respondents and the rest belong to 1 acre to 2 acres category (5.33 %).

4.4.7 Cosmopolitaness

Table 11. Distribution of the respondents with respect to cosmopolitaness

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Cosmopolitaness	3-12	Low	< 7.293	36	48
		High	≥ 7.293	39	52

Majority of the farmers (52.00 %) exhibited high level of cosmopolitaness. Only 48 per cent of the respondents had low cosmopolitaness. Since most of the farmers had agriculture as the main occupation, they had to visit the neighbouring towns for agricultural purpose. Moreover, exposure to both print and electronic media, which is a unique feature of the villages of Kerala, keeps them abreast of the changing trends of the time. This might have resulted in a high degree of cosmopolitaness.

This result was in line with the findings of Beena (2002).

4.4.8 Credit Orientation

Table 12. Distribution of the respondents vis-à-vis credit orientation

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Credit orientation	4 – 14	Low	< 8.013	34	45.33
		High	≥ 8.013	41	54.67

High level of credit orientation was expressed by 54.67 per cent of the respondents and 45.33 per cent of the respondents showed low level of credit orientation.

This result was in line with the findings of Sreedaya (2000) and Majjusha (2000).

4.4.9 Leadership

Table 13. Distribution of the respondents in relation to leadership

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Leadership	3-15	Low	< 7.8	33	44
		High	≥ 7.8	42	56

Table 13, reads that 44 per cent of the respondents had low leadership qualities and 56 per cent of the respondents had high leadership qualities. Definitely the farmers who were office bearers and members of the VFPCs had high leadership qualities. It was evident from the personal interview with the farmers. They had shown great leadership qualities in making the voluntary activities successful.

4.4.10 Self Concept

Table 14. Distribution of the respondents with respect to self concept

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Self concept	2 - 10	Low	< 5.53	25	33.33
		High	≥ 5.53	50	66.67

Majority of the farmers (66.67 %) were having high self concept and 33.33 per cent of the farmers were having low level of self concept.

Farmer with good self concept means he was having some good traits like interest in people and things happening around him, active in solving cultivation problems, courteous in dealing with other farmers and eager to learn more on all subjects. And also majority of the farmers feel themselves as capable of solving problems in agriculture. The activities related to PTD programs would have helped the farmers to develop such a status.

4.4.11 Risk Bearing Capacity

Table 15. Distribution of respondents in relation to risk bearing capacity

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Risk bearing capacity	3-15	Low	< 8.123	29	38.67
		High	≥ 8.123	46	61.33

Data represented in the Table 15, shows that 61.33 per cent of the respondents belonged to high group in the case of risk bearing capacity and 38.67 per cent of the respondents belonged to the low group of risk bearing capacity.

Since the farmers were having high self confidence, they were bold enough to face any consequences that came out of their participation in the PTD activities. This showed that they were having a high risk bearing capacity.

4.4.12 Exposure to Information Sources

Table 16. Distribution of respondents in relation to exposure to information sources

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Exposure to information sources	0 - 6	Low	< 3.387	25	33.33
		High	≥ 3.387	50	66.67

Exposure to information sources was found to be high for majority of the respondents (66.67 %). Only 33.33 per cent had low level of exposure to information sources. Since majority of the farmers belonged to low annual income group, they will try to utilize all sorts of information regarding agricultural development programmes from various sources. This might be the reason for the high level of exposure to information sources.

This result was in line with the findings of Majjusha (2000).

4.4.13 Irrigation Index

Table 17. Distribution of respondents with respect to irrigation index

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Irrigation index	0 - 8	Low	< 1.2	65	86.67
		High	≥ 1.2	10	13.33

Availability of water is the main problem in Kunnathukal Panchayat. Most of the farmers may not get an adequate amount of water for irrigation. This is revealed from the data of Table 17, that shows 86.67 per cent of the farmers come under low irrigation index category and only 13.33 per cent of the farmers come under with high irrigation index category, these people get a reasonable amount of canal water, that too only a part of the year.

4.5 RELATIONSHIP OF THE SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENTS WITH THE PARTICIPATION DYNAMICS ATTRIBUTES

A quick review of the data in the Table 18, shows that the relationship between socio-economic characteristics and the participation dynamics attributes.

Annual income was found to be negatively and significantly related with the innovativeness.

Educational status of farmers was found to be positively and significantly related with the need satisfaction.

Need is a peculiar type of motive, the satisfaction of which gives plenty of pleasure to everybody. So it is quite natural that if the educational status of farmers is high, they get easily motivated by thoughts and also it satisfies the farmers through all the necessary means.

Cosmopolitaness was positively and significantly related with the risk orientation and exposure to mass media.

Farmers often made a visit to nearest town regarding their farm activities as well as to fulfil their personal needs, there by they got exposed to many new ventures regarding agriculture. If they implemented that new venture practically they may fall in the risky path. That shows the correlation between cosmopolitaness and risk orientation.

Because of increased rate of frequency of visit to nearest town and be a member in a organization, the farmer got easily exposed to various mass media. This may reveal the relationship between cosmopolitaness and exposure to mass media.

Risk bearing capacity was positively and significantly related with the social participation.

Table 18. Correlation analysis of socio-economic characteristics with participation dynamics attributes

X	Y															
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16
X1	-0.0055	-0.1447	-0.1144	-0.0080	-0.0914	0.0117	-0.0185	-0.0071	0.0733	-0.0236	-0.0755	-0.0276	0.0071	-0.1627	0.1021	-0.0602
X2	-0.2770*	-0.1055	-0.1196	-0.1276	-0.1245	-0.0388	-0.0608	0.0195	0.0878	-0.0350	-0.0325	-0.1277	-0.0675	0.0147	-0.0257	-0.1278
X3	0.0035	0.1396	0.1775	-0.0232	-0.0791	-0.0199	-0.0561	0.0960	-0.0779	0.0806	0.0368	0.0970	0.0402	0.0469	-0.0682	-0.0050
X4	0.2271	0.1501	0.0411	0.0619	-0.1311	0.0227	-0.0184	0.0798	-0.1374	0.0492	-0.1073	0.0413	-0.0881	-0.0360	0.2529*	0.0604
X5	0.1201	0.0415	-0.0417	0.0781	0.0959	-0.1293	-0.0405	-0.0023	-0.1564	0.1837	0.0934	-0.0576	0.2472*	0.2691*	-0.0633	0.0595
X6	0.0725	0.0563	-0.0020	0.0102	-0.1621	0.1074	0.1039	-0.0390	-0.0330	-0.0716	0.0260	-0.0215	-0.1000	0.0941	0.0026	0.1201
X7	0.1152	0.0188	-0.0859	0.2147	0.0304	0.1307	0.0073	0.0073	-0.0928	-0.0576	0.1711	-0.0161	0.0674	0.0948	-0.0770	0.1348
X8	0.1001	-0.0162	0.0724	-0.1330	-0.0976	0.1151	0.0624	-0.0980	-0.0095	-0.0861	-0.2269*	-0.0933	-0.1626	0.0339	0.1267	0.0632
X9	0.1473	0.1821	-0.0604	-0.0514	0.0387	0.0327	-0.0488	0.1598	0.0498	-0.1325	0.2560*	-0.0119	0.1761	-0.0035	-0.1479	0.0713
X10	0.1873	-0.1511	0.0104	0.1796	0.1121	0.0350	0.1096	-0.2096	-0.0378	0.0846	-0.0218	-0.264	-0.743	-0.1717	0.1022	0.0511
X11	0.0542	0.0319	-0.2159	0.1332	-0.1035	-0.2363*	-0.1516	-0.0784	-0.0828	-0.0916	-0.1724	0.0238	-0.2596*	-0.0907	0.0633	-0.0090

Socio-economic characteristics	Participation dynamics attributes
X ₁ -Age	Y ₁ -Innovativeness
X ₂ -Annual income	Y ₂ -Scientific orientation
X ₃ - Experience in vegetable cultivation	Y ₃ -Knowledge in vegetable cultivation
X ₄ - Educational status	Y ₄ -Perception about PTD
X ₅ -Cosmopolitaness	Y ₅ -Attitude towards scientific agricultural practices
X ₆ -Credit orientation	Y ₆ -Self confidence
X ₇ -Leadership	Y ₇ -Extension orientation
X ₈ -Self concept	Y ₈ -Participation in PTD
X ₉ -Risk bearing capacity	Y ₉ -Economic motivation
X ₁₀ -Exposure to information sources	Y ₁₀ -Achievement motivation
X ₁₁ -Irrigation index	Y ₁₁ -Social participation
	Y ₁₂ -Market perception
	Y ₁₃ -Risk orientation
	Y ₁₄ -Exposure to mass media
	Y ₁₅ -Need satisfaction
	Y ₁₆ -Employment generation

Because of high mental as well as physical stamina, the farmer can easily become a member of any social organization and he can easily participate with all the activities of any social organization without considering the risk factor. This highlights the relationship between risk bearing capacity and social participation.

Irrigation index was found to be negatively and significantly related with the self-confidence and it was positively and significantly related with the risk orientation.

If the farmer was a confident risk taker, he can easily access water eventhough rain fails to give water.

All other socio-economic characteristics were having non-significant relationship with the participation dynamics attributes.

4.6 RELATIONSHIP BETWEEN SOCIO-ECONOMIC CHARACTERISTICS AND PARTICIPATION DYNAMICS INDEX

From the Table 19, we found that there was no relationship between socio-economic characteristics and participation dynamics index.

4.7 VILLAGEWISE ANALYSIS OF SOCIO-ECONOMIC CHARACTERISTICS

For the study, the researcher had selected three villages namely, Vandithadam, Karakonam and Elluvilla.

From Table 20, it is understood that exposure to information sources found positive and significant relationship with the farmers of three villages.

From this, it was concluded that since the farmers were literate, they got exposed to various information sources. Exposure to various information sources lead them to adopt many new concepts including PTD.

Table 19. Correlation between socio-economic characteristics and participation dynamics index

Socio-economic characteristics	Participation dynamics index
1. Age	-0.0875
2. Annual income	-0.126
3. Farm size	-0.0126
4. Experience in vegetable cultivation	0.0595
5. Farmer's educational status	0.1008
6. Area under vegetable cultivation	0.0013
7. Cosmopolitaness	0.1585
8. Credit orientation	-0.0185
9. Leadership	0.0990
10. Self concept	-0.0490
11. Risk bearing capacity	0.0938
12. Exposure to information sources	0.0110
13. Irrigation index	0.0662

Irrigation index was also found to be positively and significantly related with the farmers of the three villages.

This shows that the three villagers were facing a severe water shortage problem.

Rest of the variables found no significance among the three villagers.

4.8 EXTENT OF PARTICIPATION IN PTD

Table 21. Distribution of respondents with respect to extent of participation in PTD

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Extent of participation in PTD	0-14	Low	< 8.2	27	36
		High	≥ 8.2	48	64

From the Table 21 and Fig. 5, it was found out that 36 per cent of the farmers had low level of extent of participation in PTD and 64 per cent of the farmers belonged to the high level of participation in PTD.

It showed that farmers' participation in the PTD activities were high and they knew more about the PTD concept and its related aspects.

4.9 RELATIONSHIP BETWEEN ROLE PERFORMANCE IN PTD, ROLE PERCEPTION ABOUT PTD AND EXTENT OF PARTICIPATION IN PTD

Table. 22. Correlation analysis of role performance in PTD, role perception about PTD and extent of participation in PTD

(n=75)

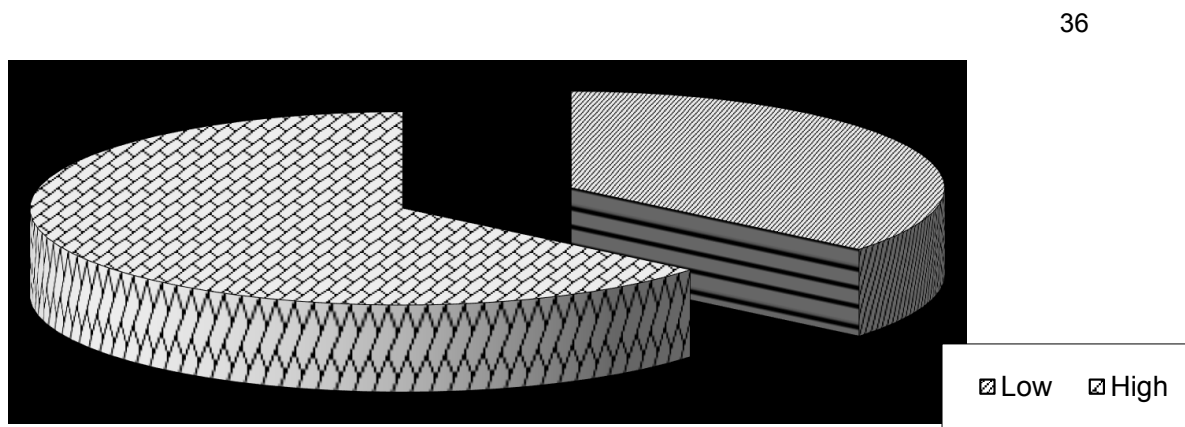
Variables	Role perception about PTD	Role performance in PTD
Role performance in PTD	0.2648*	1.0000
Extent of participation in PTD	-0.1411	-0.0075

*Significant at 5 % level

Table 20. Village wise analysis of socio-economic characteristics

Variables	Vandithadam	Karakonam	Elluvilla	CD
1. Age	1.800	1.720	1.560	NS
2. Annual income	2.400	2.360	2.200	NS
3. Farm size	2.520	2.240	2.480	NS
4. Experience in vegetable cultivation	2.520	2.320	2.920	NS
5. Farmer's educational status	3.000	2.600	2.640	NS
6. Area under vegetable cultivation	1.007	0.543	0.673	NS
7. Cosmopolitaness	7.440	7.400	7.040	NS
8. Credit orientation	7.660	8.56	7.800	NS
9. Leadership	7.520	7.44	8.440	NS
10. Self concept	5.760	5.32	5.520	NS
11. Risk bearing capacity	8.480	8.16	8.000	NS
12. Exposure to information sources	3.040	3.32	3.800	0.605*
13. Irrigation index	1.720	0.64	1.240	0.809*

*Significant at 5 % level



64

Fig. 5. Pie diagram showing distribution of respondent with respect to extent of participation in PTD

Table 22, reads that role performance in PTD was positively and significantly related with the role perception about PTD.

Role perception about PTD and role performance in PTD were complementary to each other. If the farmers were having clear perception about their roles in the PTD process and then they were likely to perform their roles in the PTD process and vice versa. This might have been the possible reason for the observed significant and positive correlation between role perception about PTD and role performance in PTD.

There was no relationship existed either between extent of participation in PTD and role perception about PTD or between extent of participation in PTD and role performance in PTD.

4.10 RELATIONSHIP BETWEEN EXTENT OF PARTICIPATION IN PTD WITH THE SELECTED PARTICIPATION DYNAMICS ATTRIBUTES

Data presented in the Table 23, shows the relationship between extent of participation in PTD with the selected seven participation dynamics attributes. It was employed by using a chi-square test.

A quick review of Table 23, revealed that there was a positive and significant relationship between extent of participation in PTD and social participation.

The reason for positive and significant relationship between social participation and extent of participation in PTD may be that persons by virtue of their participation in different organisations and interaction with other well informed persons and officials gain information about the PTD programs. Consequently their participation in PTD programs were improved.

This result was in line with the findings of Shaju (1998).

Table 23. Extent of participation in PTD with selected participation dynamics attributes

Variable	Participation dynamics attributes	χ^2 value
16	28	S
	32	S
	21	NS
	23	NS
	25	NS
	27	NS
	33	NS

16-Extent of participation in PTD

28-Social participation

32-Need satisfaction

21-Perception about PTD

23-Self confidence

25-Participation in PTD

27-Achivement motivation

33-Employment generation

NS-Non significant S-significance at 5 % level

It tells that the increased level of participation in the PTD directly linked with the farmer's participation in the activities of various social institutions like co-operative society, Panchayat and neighbourhood assembly etc. If the farmers' participation in these social institution was more, then there will be more participation in PTD activities also.

Table 23, also expressed an idea that there was a positive and significant relationship between extent of participation in PTD with the need satisfaction.

If the farmers' extent of participation and their involvement in the PTD activities were more, then their need satisfaction will also be more.

Rest of the variables found non-significant relationship with the extent of participation in PTD.

4.11 PARTICIPATION DYNAMICS ATTRIBUTES OF FARMERS

Percentage distribution of farmers with respect to participation dynamics attributes

4.11.1 Innovativeness

Table 24. Percentage distribution of farmers with respect to innovativeness

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Innovativeness	3-12	Low	< 6.373	30	40
		High	≥ 6.373	45	60

High level of innovativeness was expressed by 60 per cent of the respondents and 40 per cent of the respondents showed low innovativeness. High educational status and familiarity with improved concepts like PTD will create a positive attitude to experiment with the new technology in farming. The low annual income level also might have propelled them to act in this direction. This may be the reason for high innovativeness.

This result was in line with the findings of Geetha (2002).

4.11.2 Scientific Orientation

Table 25. Percentage distribution of farmers with respect to scientific orientation
(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Scientific orientation	3-12	Low	< 7.293	36	48
		High	≥ 7.293	39	52

Data represented in the Table 25, highlights that 57.33 per cent of the farmers had high level of scientific orientation and 42.67 per cent of the farmers had low level of scientific orientation.

This result was in line with the findings of Geetha (2002).

4.11.3 Knowledge in Vegetable Cultivation

Table 26. Percentage distribution of farmers with respect to knowledge in vegetable cultivation
(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Knowledge in vegetable cultivation	1 - 15	Low	< 8.44	28	37.33
		High	≥ 8.44	47	62.77

Majority of the farmers had high level of knowledge in vegetable cultivation (62.77 %) and the rest of the farmers (37.33 %) had low level of knowledge in vegetable cultivation. This shows that the farmers' awareness about the vegetable farming was satisfactory.

This result was in line with the findings of Sreedaya (2000).

4.11.4 Perception About PTD

Table 27. Percentage distribution of farmers with respect to perception about PTD
(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Perception about PTD	0 - 4	Low	< 3.066	25	33.33
		High	≥ 3.066	50	66.67

A bird's eye view of the Table 27 and Fig. 6 clears that about 66.67 per cent of the farmers had good perception about the PTD concept and only 33.33 per cent of farmers had low level of perception about PTD concept.

Since the farmers were literate and innovative, they got sufficient exposure to the new farming practices including PTD. Since, they were convinced about the results of PTD in their own field, they had a good perception about PTD.

This result was in line with the findings of Majjusha (2000).

4.11.5 Attitude Towards Scientific Agricultural Practices

Table 28. Percentage distribution of farmers with respect to attitude towards scientific agricultural practices

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Attitude towards scientific agricultural practices	3-15	Low	< 7.533	45	60
		High	≥ 7.533	30	40

A cursory view of the Table 28, shows that 60 per cent of the farmers had low attitude towards scientific agricultural practices and 40 per cent of the farmers had high level of attitude towards scientific agricultural practices.

Technology evolved through PTD is scientific based, though farmers' participation in PTD is good, they could not have realized this phenomena involved scientific basis also. This might be the reason behind the farmers' low attitude towards scientific agricultural practices.

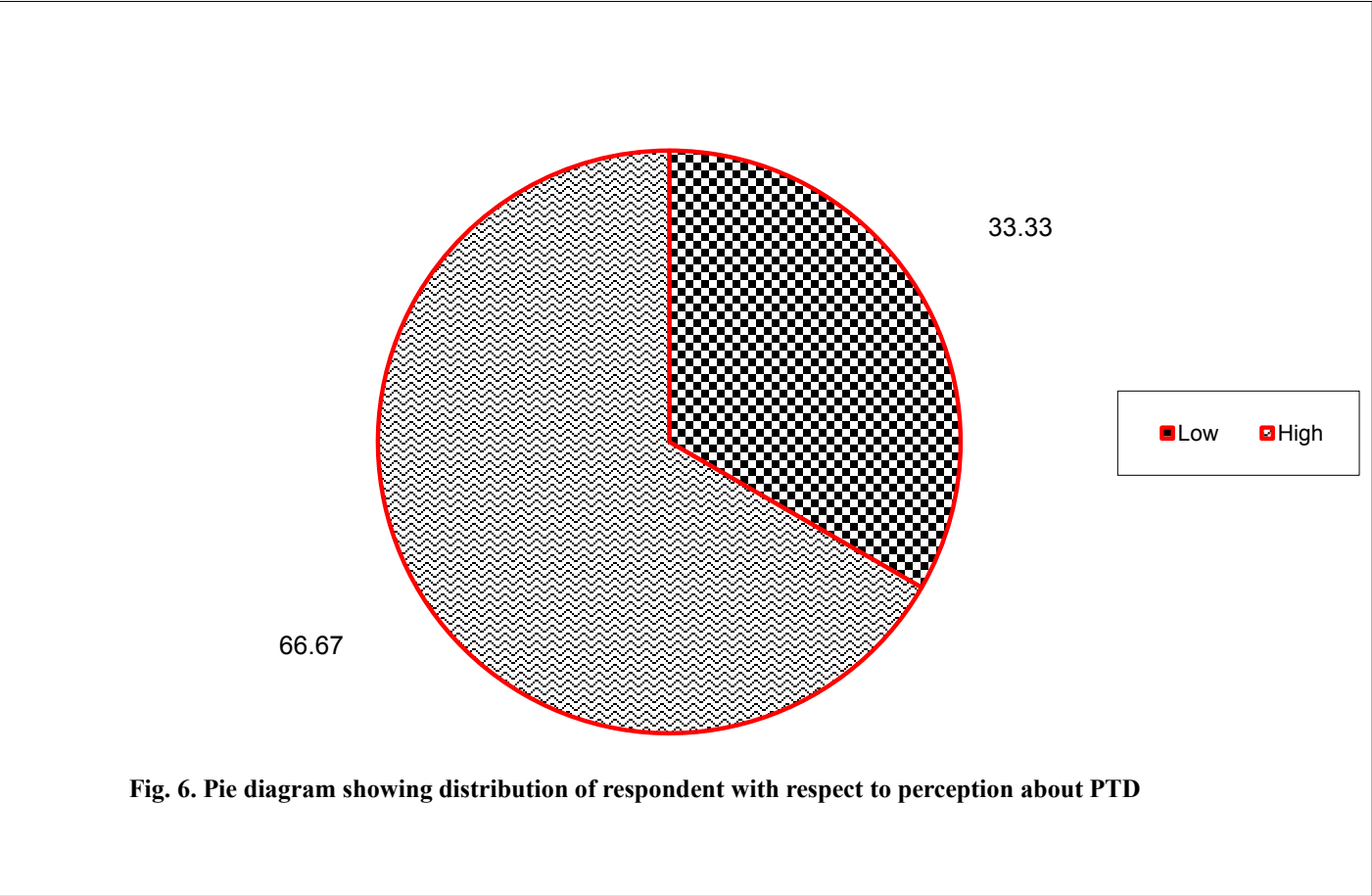


Fig. 6. Pie diagram showing distribution of respondent with respect to perception about PTSD

Since the farmers had high cosmopolitanism and high self concept, they were very interested to know about the new happenings and their good level of exposure to various information sources spearheaded them to know more about the scientific agricultural practices. This leads to high attitude towards scientific agricultural practices.

4.11.6 Self Confidence

Table 29. Percentage distribution of farmers with respect to self confidence

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Self confidence	2 - 10	Low	< 5.69	20	26.67
		High	≥ 5.69	55	73.33

A clear view of the Table 29, shows that 73.33 per cent of the respondents belonged to the high self confidence category and only 26.67 per cent of the farmers had low level of self confidence.

Higher self confidence might be due to the optimum level of getting the desired results by following the technology developed through PTD. This result was supported by Joseph (1983), Nizamudeen (1996) and Geetha (2002).

4.11.7 Extension Orientation

Table 30. Percentage distribution of farmers with respect to extension orientation

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Extension orientation	0 - 4	Low	< 2.53	30	40
		High	≥ 2.53	45	60

More than half of the farmers (60 %) had high extension orientation and 40 per cent of the farmers showed low participation in extension activities. A high social participation might have attributed to a high level of extension orientation.

High level of extension orientation indicates the high level of involvement of farmers in PTD and allied activities. High social participation results in high extension orientation. The farmers who follow their own practices with scientists supervision may keep them intact with the extension agencies.

This result was in line with the findings of Majjusha (2000) and Allan (2000).

4.11.8 Participation in PTD

Table 31. Percentage distribution of farmers with respect to participation in PTD

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Participation in PTD	0 – 3	Low	< 2.053	15	20
		High	≥ 2.053	60	80

A quick review of the Table 31 and Fig. 7 read that about 80 per cent of the farmers' participation in PTD was high and about 20 per cent of the farmers had low level of participation in PTD.

This result revealed that the farmers had good level of knowledge regarding PTD concept and its related practices.

This result was in line with the findings of Majjusha (2000).

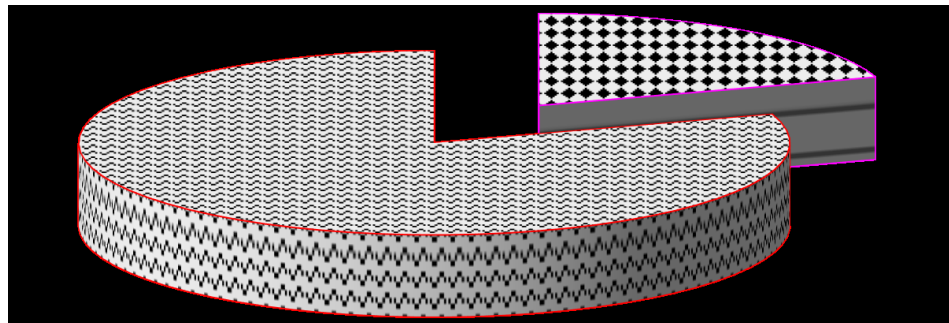
4.11.9 Economic Motivation

Table 32. Percentage distribution of farmers in relation to economic motivation

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Economic motivation	0 - 3	Low	< 2.186	32	42.67
		High	≥ 2.186	43	57.33

20



80

Fig. 7. Pie diagram showing distribution of respondents with respect to participation in PTSD

As far as economic motivation is concerned 57.33 per cent of the farmers exhibited high level of economic motivation and 42.67 per cent of the farmers were in the low group. Most of the farmers were having low annual income. So they will try to utilize all the available opportunities to make the two ends meet. This is the reason for high economic motivation of the farmers.

This result was in line with the findings of Geetha (2002), Sreedaya (2000) and Majjusha (2000).

4.11.10 Achievement Motivation

Table 33. Percentage distribution of farmers vis-à-vis achievement motivation

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Achievement motivation	4 – 8	Low	< 5.693	33	44
		High	≥ 5.693	42	56

Data presented in the Table 33 shows that 56 per cent of respondents had high level of achievement motivation and rest of the farmers (44 %) belonged to low level of achievement motivation category.

People who are economically motivated will naturally have high achievement motivation.

This result was in line with the findings of Geetha (2002) and Sreedaya (2000).

4.11.11 Social Participation

Table 34. Percentage distribution of farmers in relation to social participation

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Social participation	0 – 4	Low	< 2.40	25	33.33
		High	≥ 2.40	50	66.67

Data expressed in the Table 34, depicts that the majority (66.67 %) of the respondents had high level of social participation. Only 33.33 per cent of the respondents belonged to low group of social participation. A moderately high education possessed by the farmers and their high cosmopolitanism might be the reason for the high social participation of the farmers.

This result was in line with the findings of Majjusha (2000).

4.11.12 Market Perception

Table 35. Percentage distribution of farmers vis-à-vis market perception

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Market perception	0 – 3	Low	< 1.78	34	45.33
		High	≥ 1.78	41	54.67

Data interpreted in Table 35, reveals that about 54.67 per cent of the farmers had high level of market perception and about 45.33 per cent of the respondents had low level of market perception.

This result was in line with the findings of Sreedaya (2000).

4.11.13 Risk Orientation

Table 36. Percentage distribution of the farmers with respect to risk orientation

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Risk orientation	3 – 15	Low	< 6.98	31	41.33
		High	≥ 6.98	44	58.67

Table 36, reads out that about 58.67 per cent of the farmers had high level of risk orientation and about 41.33 per cent of the farmers had low level of risk orientation.

Majority of the farmers did not possess their own land for cultivation. They leased in land for one or two years and raise crops which they found to be profitable. If the weather conditions are not favourable they will have to suffer losses. So those farmers who are having risk taking capacity will take up farming.

This result was in line with the findings of Santhosh (1999).

4.11.14 Exposure to Mass Media

Table 37. Percentage distribution of farmers vis-à-vis exposure to mass media

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Exposure to mass media	0 – 12	Low	< 5.72	26	34.67
		High	≥ 5.72	49	65.33

Table 37, depicts that about 65.33 per cent of the respondents belonged to high group and 34.67 per cent of the farmers belonged to low group.

Higher mass media participation was because every family subscribe atleast one newspaper and they may possess radio, TV etc. Possession of all these media might have increased their mass media participation.

4.11.15 Need Satisfaction

Table 38. Percentage distribution of farmers in relation to need satisfaction

(n=75)

Variable	Obtained score range	Category	Score	Frequency	Percentage
Need satisfaction	4 – 20	Low	< 10.05	29	38.67
		High	≥ 10.05	46	61.33

As for as the need satisfaction is concerned, 61.33 per cent of the farmers belonged to high level of need satisfaction and about 38.67 per cent of the farmers had low level of need satisfaction.

Since the farmers followed the farming practices suggested by the PTD programs, they found good output in their farms. They got boosted and their need will be easily satisfied by means of the outcome derived from farming.

4.11.16 Employment Generation

Table 39. Perception distribution of farmers with respect to employment generation

(n=75)		
Employment generation	Frequency	Percentage
Nil	0	0
Upto 35 days	0	0
31 – 60 days	15	20
61 and above	60	80

Table 39, expresses the view that 80 per cent of the respondents perceived that their number of employment days increased to 61 days and 20 per cent of respondents perceived that their employment days were only upto 60 days.

This shows that the farming practices developed through PTD concept, paved way for the farmers to get more number of labour days.

This result was in line with the findings of Geetha (2002).

4.12 VILLAGEWISE ANALYSIS OF PARTICIPATION DYNAMICS ATTRIBUTES

Data represented in the Table 40, shows the villagewise analysis of participation dynamics attributes.

It could be inferred from Table 40, that for the variables like innovativeness, knowledge in vegetable cultivation, attitude towards scientific agricultural practices, social participation, need satisfaction and employment generation, significant difference were observed between the three villages.

Table 40. Village wise analysis of participation dynamics attributes

Variables	Vandithadam	Karakonam	Elluvilla	CD
Innovativeness	6.36	5.76	7.00	0.859*
Scientific orientation	6.48	6.96	6.96	NS
Knowledge in vegetable cultivation	7.72	8.64	8.96	0.7824*
Perception about PTD	2.92	2.96	3.32	NS
Attitude towards scientific agricultural practices	7.56	7.44	7.60	1.162*
Self confidence	5.76	5.56	5.76	NS
Extension orientation	2.40	2.60	2.60	NS
Participation in PTD	2.04	2.28	1.84	NS
Economic motivation	1.84	2.72	2.00	NS
Achievement motivation	5.56	5.88	5.52	NS
Social participation	2.36	2.44	2.40	0.516*
Market perception	1.92	1.76	1.68	NS
Risk orientation	7.24	7.12	6.60	NS
Exposure to mass media	5.24	6.36	5.56	NS
Need satisfaction	10.80	9.20	10.16	1.28*
Employment generation	1.96	1.96	2.04	0.466*

*Significant at 5 % level

As for as innovativeness was concerned among the three villages Elluvilla had high level of innovativeness (7.00) and Karakonam had low level of mean value (5.76).

Regarding knowledge in vegetable cultivation, among the three villages, Elluvilla farmers had highest mean value (8.96) and Vandithadam farmers had lowest mean value (7.72).

Regarding the attitude towards scientific agricultural practices, lowest mean value was obtained for the Karakonam farmers (7.44) and highest mean value was obtained for Elluvilla farmers (7.60).

For the social participation the three villages showed almost the same mean value (2.4).

For need satisfaction, highest mean value was noticed among Vandithadam farmers (10.8) and Karakonam farmers had lowest mean value (9.2).

As for as employment generation was concerned Elluvilla farmers had highest mean value (2.04) and Vandithadam and Karakonam farmers had lowest mean value (1.96).

4.13 RELATIONSHIP BETWEEN PARTICIPATION DYNAMICS ATTRIBUTES AND THE PARTICIPATION DYNAMICS INDEX

Table 41 shows the relationship between participation dynamics attributes and participation dynamics index

It could be inferred from the Table 41, that except six variables namely knowledge in vegetable cultivation, perception about PTD, extension orientation, participation in PTD, social participation and market perception, all other ten variables are found to have positive and significant relationship with the participation dynamics index.

Table 41. Correlation between participation dynamics attributes and participation dynamics index

Variables	Participation dynamics index
Innovativeness	0.315*
Scientific orientation	0.4959*
Knowledge in vegetable cultivation	0.2161
Perception about PTD	0.156
Attitude towards scientific agricultural practices	0.347*
Self confidence	0.241*
Extension orientation	0.060
Participation in PTD	-0.062
Economic motivation	0.251*
Achievement motivation	0.430*
Social participation	0.126
Market perception	0.216
Risk orientation	0.238*
Exposure to mass media	0.401*
Need satisfaction	0.278*
Employment generation	0.246*

*Significant at 5 % level

With this result, it can be concluded that farmers' participation in the PTD process as well as their awareness about the PTD concept and its related aspects were found to be above satisfactory

4.14 CONSTRAINTS FACED BY THE FARMERS OF VFPCCK AND IVDP

4.14.1 Constraints Faced by the Farmers of VFPCCK

Table 42. Constraints faced by the farmers of VFPCCK

Sl. No.	Constraints	Frequency	Percentage	Rank
1.	The time delay in giving back the price of sold produce to the farmers	60	80.00	1
2.	The rules and regulation for availing credit are becoming more complex	55	73.33	2
3.	Lack of attendance of all farmers in the meetings	48	64.00	3
4.	Perishable nature of vegetable and lack of storage facilities at the field centre	45	60.00	4
5.	Lack of dedicated and efficient leadership	40	53.33	5
6.	Improper repayment of loan	36	48.00	6
7.	Lack of working capital at the field centre	35	46.67	7
8.	Lack of vehicle facility at the centre	33	44.00	8
9.	Lack of insurance in the case of high crop damage	28	37.33	9
10.	Lack of incentives from the part of the program for 100 per cent repayment	25	33.33	10

Constraints faced by the vegetable farmers while following the practices developed through PTD were listed here.

From the Table 42, it is understood that the major constraint felt by the farmers was the time delay in giving back the price of sold produce to the farmers and that was followed by the rules and regulation for availing credit and the next constraint felt by farmer was lack of attendance of all farmers in the meeting and the perishable nature of vegetable and lack of storage facilities was the next major constraint felt by the farmer and the next constraint realized by the farmers were lack of dedicated and efficient leadership.

Improper repayment of loan and lack of working capital at the field centre and lack of vehicle facility were expressed as the next major constraints felt by the farmers and lack of insurance in case of high crop damage and lack of incentives from the part of the program were notified as the remaining constraints felt by the farmers of VFPCCK.

4.14.2 Constraints Faced by the Farmers of IVDP

Constraints felt by the vegetable farmers while implementing the practices suggested by PTD were listed here.

Data interpreted in the Table 43, reveals that lack of storage and processing facilities was the major constraint faced by the farmers and the political interference was the next constraint felt by the farmers and it was followed by lack of follow up activities from the officials, predominance of part time members, lack of credit facilities and small and scattered farm holdings.

Lack of direct contact between officials and farmers was the next constraint felt by the farmer and it was followed by lack of co-ordination among farmers and lack of supervision and final constraint felt by the farmers was the lack of proper information source to deliver the latest market time.

Table 43. Constraints faced by IVDP farmers

(n=75)

Sl. No.	Constraints	Frequency	Percentage	Rank
1.	Lack of storage and processing facilities	67	89.33	1
2.	Political interference	60	80.00	2
3.	Lack of follow up activities from the officials	53	70.67	3
4.	Predominance of part time members	49	65.33	4
5.	Lack of credit facilities for the farmers	46	61.33	5
6.	Small and scattered farm holdings	40	53.33	6
7.	Lack of direct contact between officials and farmers	37	49.33	7
8.	Lack of co-ordination among members	32	42.67	8
9.	Lack of supervision	29	38.67	9
10.	Lack of proper information source to deliver the latest market price	27	36.00	10

4.15 SUGGESTIONS FOR IMPROVING THE FARMERS' PARTICIPATION IN THE PTD PROCESS

The suggestions were purely meant for the farmers and officials of VFPCCK and IVDP.

1. There should be proper storage, processing, marketing facilities like own vehicle in the field centre for proper handling of the produce. Then only, farmers can market their produce very easily.
2. The field centre should avoid the time delay in giving back the money for farmers' produce. Then only, the farmers can resume the cultivation practices without much delay.
3. Farmers should be given proper incentive in the case of high crop damage.
4. The PTD programs should give more incentive to those Harithasangams having cent per cent repayment of the credit.
5. The PTD programs should constitute awards at state level for the best Harithasangams.
6. The PTD programs should give more emphasis on organic cultivation and also fix better price for organic products.
7. Facilitate easy release of funds to the Harithasangams through financing institutions.
8. Capacity building of Harithasangam members by giving proper training on upto date technology and provided with latest inputs.
9. The PTD program organisers should make arrangement for group marketing facilitates which help the farmers to acquire the bargaining power and avoid the middlemen.

10. The PTD programmes should provide opportunities for the farmers to participate in the group discussions and group meetings. These opportunities persuade the farmers to take up innovative ideas.
11. The PTD experts should make sure that there is no political interference and no corruption in the distribution of allocated fund to the vegetable farmers.
12. The PTD program should lay emphasis on vegetable cultivation according to market demand.

4.16 EMPIRICAL MODEL OF THE STUDY

The relationship of various dimensions like participation dynamics attributes, extent of participation in PTD, role perception about PTD and role performance in PTD with respect to participation of farmers in PTD was shown in the Fig 8. Their relationships were obviously revealed with the help of arrows.

- Y₁-Innovativeness
- Y₂-Scientific orientation
- Y₃-Knowledge in vegetable cultivation
- Y₄- Perception about PTD
- Y₅- Attitude towards scientific agricultural practices
- Y₆-Self confidence
- Y₇- Extension orientation
- Y₈- Participation in PTD
- Y₉-Economic motivation
- Y₁₀- Achievement motivation
- Y₁₁-Social participation
- Y₁₂-Market perception
- Y₁₃-Risk orientation
- Y₁₄-Exposure to mass media
- Y₁₅-Need satisfaction
- Y₁₆-Employment generation

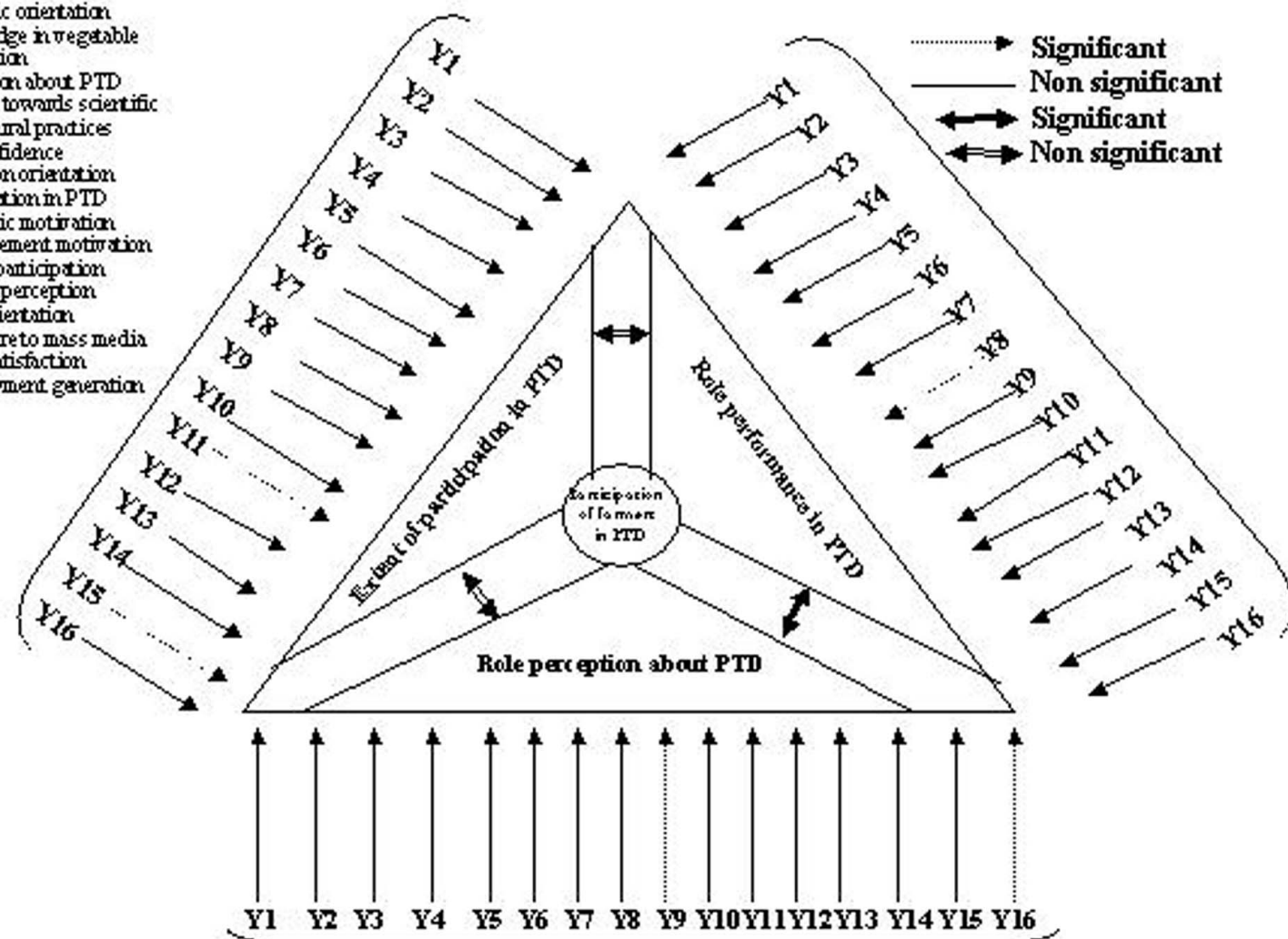


Fig. 8. Empirical model of the study

Summary

5. SUMMARY

Agriculture has been considered as the mainstay of income for more than 60 per cent of the population living in India. Since then, because of changing tradition due to the globalisation of Indian Agricultural sector, farmers are facing lot of problems because of the prevailing competition in the agricultural production and marketing sectors. To overcome this, farmers should be equipped to compete with the world market.

Alieners implant their foot in our soil with new tactics blended with improvised agricultural technologies, consumers get charmed towards their technologies and activities.

So there is an urgent need to make the farmers to stand before them with the developed technologies that could give a befitting reply to them. It is important to combine the traditional technology to that of modern for better performance. PTD is one way to fulfil the requirement. It is essential to make aware the farming community about the PTD process.

In Kerala, farmers are very eager to accept and adopt new technologies. The high literacy status prevailing in the state has helped them to aware of new things. With that intension, Kunnathukal panchayat of Thiruvananthapuram district was selected for the study. The study aims to find out the farmers' involvement in the PTD process, in relation to plant protection aspects in vegetable cultivation.

The study was undertaken with the following objectives

To find out the vegetable farmers and their role in the PTD process.

To assess the socio-economic and technical aspects of vegetable farmers and to find out their relationship with the participation dynamics attributes.

To analyse the factors which motivate the vegetable farmers to voluntarily participate in the PTD process.

To delineate the PTD process and to suggest the suitable strategies for the PTD process.

The Kunnathukal panchayat has three 'Harithasangams' located at Vandithadam, Karakkonam and Elluvilla villages. From each 'Harithasangam' twenty five farmers strictly following PTD concepts were selected for the study.

Age, annual income, farm size, experience in vegetable cultivation, educational status, area under vegetable cultivation, cosmopolitaness, credit orientation, leadership, self concept, risk bearing capacity, exposure to information sources and irrigation index were selected as the socio-economic characteristics. Participation dynamics attributes included in the study were innovativeness, scientific orientation, knowledge in vegetable cultivation, perception about PTD, attitude towards scientific agricultural practices, self confidence, extension orientation, participation in PTD, economic motivation, achievement motivation, social participation, market perception, risk orientation, exposure to mass media, need satisfaction and employment generation. To find out role of farmers in PTD, role perception about PTD, role performance in PTD and extent of participation in PTD were also included for the study.

A well structured and pre-tested interview schedule was used for data collection. The data collected were statistically analysed using percentage analysis, chi-square test and simple correlation.

The salient findings of the study were summarized below

1. The frequency distribution of role related characteristics of farmers revealed that 65.33 per cent of the farmers had high role perception about PTD and their participation in PTD is (65.33 %).

2. Correlation analysis of role related characteristics with the selected participation dynamics attributes showed that role perception about PTD and role performance in PTD had positive and significant relationship with the need satisfaction and participation in PTD.
3. The frequency distribution of socio-economic characteristics of the farmers expressed the truth that 50.67 per cent of the farmers belonged to the middle aged group. Forty four per cent of the farmers were having annual income in the range of Rs.2001 to 5000, 36 per cent of the farmers were having the farm size in the range of 0.26 to 0.5 acre, 40 per cent of the farmers had six to ten years experience in vegetable cultivation, 42.67 per cent of the farmers were literates, 37.33 per cent of the farmers' area under vegetable cultivation was upto 0.25 acres, 52 per cent of the farmers had high level of cosmopolitaness, 54.67 per cent of the farmers had high level of credit orientation, 56 per cent of the farmers' leadership qualities were high, 66.67 per cent of the farmers had high self concept, 61.33 per cent of the farmers had high level of risk bearing capacity, 66.67 per cent of the farmers had high level of exposure to information sources and 86.67 per cent of the farmers had low level of irrigation index.
4. Correlation analysis of the socio-economic characteristics and the participation dynamics attributes showed that annual income was negatively and significantly related with the innovativeness.
5. Educational status of farmers was found to be positively and significantly related with the need satisfaction.
6. Cosmopolitaness was positively and significantly related with the risk orientation and exposure to mass media.
7. Risk bearing capacity was positively and significantly related with the self confidence and it was positively and significantly related with the risk orientation.

8. Irrigation index was found to be negatively and significantly related with the self confidence and it was positively and significantly related with the risk orientation.
9. Correlation analysis of socio-economic characteristics and participation dynamics index showed that there was no significant relationship existed among them.
10. Villagewise correlation analysis of socio-economic characteristics revealed that exposure to information sources was found to be positively and significantly related with the farmers of Vandithadam, Karakkonam and Elluvilla villages.
11. Irrigation index was also found to be positively and significantly related with the farmers of Vandithadam, Karakkonam and Elluvilla villages.
12. Sixty four per cent of the farmers, had high level of extent of participation in PTD.
13. Correlation analysis showed that extent of participation in PTD was positively and significantly related with the social participation and need satisfaction.
14. The frequency distribution of farmers' participation dynamics attributes showed that 60 per cent of the farmers had high innovativeness, 57.33 per cent of the farmers had high scientific orientation, 62.77 per cent of farmers had high knowledge in vegetable cultivation, 66.67 per cent of the farmers had high level of perception about PTD, 60 per cent of the farmers had low attitude towards scientific agricultural practices, 73.33 per cent of the farmers had high self confidence, 60 per cent of the farmers had high level of extension orientation, 80 per cent of the farmers had high level of participation in

- PTD, 57.33 per cent of the farmers had high economic motivation, 56 per cent of the farmers had high level of achievement motivation, 66.67 per cent of the farmers had high level of social participation, 54.67 per cent of the farmers had high market perception, 58.67 per cent of the farmers had high risk orientation, 65.33 per cent of the farmers had high level of exposure to mass media, 61.33 per cent of the farmers had high level of need satisfaction, and 80 per cent of the farmers had perceived more than 61 labour days in a year.
15. Among the three villages selected for the study, farmers from Elluvilla had high level of innovativeness, knowledge in vegetable cultivation, attitude towards scientific agricultural practices and employment generation. But the farmers of Vandithadam village had high level of need satisfaction.
 16. Correlation analysis revealed that variables like innovativeness, scientific orientation, attitude towards scientific agricultural practices, self confidence, economic motivation, achievement motivation, risk orientation, exposure to mass media, need satisfaction, and employment generation were found to be positively and significantly related with the participation dynamics index.
 17. The constraints encountered by the farmers of VFPCCK were the time delay in giving back the price of sold produce to the farmers was ranked first. The other constraints were complex rules and regulation for availing credit, lack of attendance in the farmers' meeting, perishable nature of vegetables, lack of dedicated leadership, improper repayment of loan, lack of working capital and vehicle facility at the field centre, lack of crop insurance and lack of incentives from the part of the program for 100 per cent repayment.

18. The constraints felt by the farmers of IVDP were lack of storage and processing facilities, that was ranked first. The other constraints realised were political interference, lack of follow up activities, predominance of part time members, lack of credit facilities, small and scattered farm holdings, lack of direct contact between officials and farmers, lack of coordination and supervision among members and lack of proper information of source to deliver the latest market price.

Implications of study

By observing the results of the study it can be said that farmers' role perception about PTD and their role performance in PTD were satisfactorily good. It may help the future researchers to go deep into the study. Regarding the extent of participation in PTD it was revealed that farmers' involvement in PTD was very good. It may give an idea to the future investigators to do more research in this area. Many participation dynamics attributes sufficiently contributed towards the better participation of farmers in the PTD practices. This may give a clear picture about the farmers' attitude towards PTD. It may boost the extensionists who wish to undertake a study on PTD. The constraints realised by the farmers while participating in the PTD activities should be given due consideration and the sufficient remedial measures should be suggested to overcome them.

Suggestion for future research

The present study had been conducted only among the selected farmers of Harithasangams those were involved in vegetable cultivation at Kunnathukal Panchayat. In future, researchers can take up action research in a particular panchayath / block where the PTD farming practices were intensively followed. Moreover, similar studies can be taken up in other parts of the state and also for other crops where PTD practices are followed.

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Appendices

APPENDIX I



KERALA AGRICULTURAL UNIVERSITY
College of Agriculture, Vellayani

Dr. N. Kishore Kumar
 Assistant Professor (SS)

Department of Agricultural Extension
 Dated.....

Sir / Madam,

Sri. Suthan. L, one of the M.Sc.(Ag.) students of the Department is undertaking a research study titled “**Analysis of farmers’ participation in the Participatory Technology Development (PTD) process vis-à-vis plant protection in vegetables at Kunnathukal Panchayat of Thiruvananthapuram district of Kerala**” as a part of his research work under my guidance.

The participation dynamics attributes related to the study have been identified based on review of literature and discussion with experts. These are listed in the annexure along with their operational definitions.

In view of your professional experience and expertise you have been identified as a judge for identifying the participation dynamics attributes. Your degree of response (strongly agree, agree, disagree) to the attributes has to be indicated using a tick (mark).

I request you to kindly spare some of your valuable time for the purpose and return the list duly filled at the earliest.

Hoping your kind co-operation.

Yours sincerely,

(Dr. N. Kishore Kumar)

The following are the participation dynamics attributes. Please make your response in the continuum.

Participation dynamics attributes	Strongly agree	Agree	Disagree
1. Economic motivation -It was operationalised as the drive of the respondent for occupational sources in terms of profit making and the relative value placed on economic ends			
2. Innovativeness -Refers to the degree to which the respondent was relatively earlier in adopting new ideas			
3. Scientific orientation -It is operationally defined as the degree to which a farmer is relatively ready to adopt scientific ideas			
4. Achievement motivation -Refers to the striving of farmers to do good work and attain a sense of a accomplishment			
5. Need satisfaction - It is operationally defined as achieving individual members need and requirements by group which in a stipulated time			
6. Risk orientation - Refers to the degree to which the farmer is oriented towards encountering risks and uncertainty in adopting new ideas in farming			
7. Experience in vegetable cultivation - Refers to the total number of years the respondent has been engaged in vegetable cultivation			
8. Cosmopolitaness - Refers to the total number of years the respondent has been engaged in vegetable cultivation			
9. Social participation -It refers to the degree of involvement of respondents in formal and informal social organisations either as a member or as an office bearer, which also includes the extent of participation in organisational activities			
10. Knowledge in vegetable cultivation - Refers to the quantum of scientific information possessed by the farmer on vegetable cultivation			

11. Market perception- Refers to the capacity of the respondent to identify the market trend to all the produce for greater returns			
12. Credit orientation- Refers to the orientation to avail credit by the respondent			
13. Participation in PTD- This was operationalised as the involvement of the farmers in the developmental activities carried out through the various package programs			
14. Perception about PTD- It was operationally defined as a dynamic phenomenon which involves not only perceiving stimuli but also interpreting and describing these stimuli in terms of what are meaningful to the individual			
15. Self confidence- It is operationally defined as the extent of feeling about one's own powers, abilities and resourcefulness to perform any activity which the farmer desires to undertake			
16. Exposure to mass media- It refers to the degree to which the different mass media viz., radio, television, newspaper, magazines, bulletins, books and films were utilized by the farmers for getting information about different PTD related programs			
17. Political orientation- Refers to affiliation of the farmer with politics			
18. Employment generation- Refers to the extent to which harithasangam members obtained additional employment opportunities			
19. Income generation- Refers to capacity of any new venture or technology to reproduce maximum amount of output by intaking less amount of input			
20. Relative advantage- Refers to degree to which a practice is perceived as being better than the idea supersedes			
21. Compatibility- Degree to which a practice is perceived as being consistent with the existing values, past experiences and needs of potential adopters.			

<p>22. Extension orientation- Refers to the extent of contact a farmer had with different extension agencies and also his participation in union activities (or) programs like meetings, seminars etc. organised by these agencies and personnel.</p>			
<p>23. Relevancy- Refers to what extent a particular practice is as much closer to another one with respect to all of its modes</p>			
<p>24. Extent of participation in technology evaluation- Refers to the degree to which a particular practice is evaluated with respect to someone's participation in that practice</p>			
<p>25. Contact with extension agency- Refers the degree of which the respondent contacts the extension agency to get information on agricultural and non-agricultural aspects</p>			
<p>26. Attitude towards scientific agricultural practices- This is operationlised as the degree or positive (or) negative disposition of agricultural labourers towards scientific agricultural practices</p>			
<p>27. Self reliance- Refers to the extent to which a person relies on self for his future</p>			
<p>28. Decision making behaviour- Defined as the frequency with which group members were involved in generation of ideas, evaluation of opinions and making a choice from among options.</p>			
<p>29. Technology evaluation experience- Refers to number of technical potential years one had with respect to technology evaluation</p>			
<p>30. Eco-friendliness as perceived by the farmers- It was the degree to which a practice was perceived as profitable, conserve natural resource base and provide healthy and safe environment in the long run.</p>			

APPENDIX-II

INTERVIEW SCHEDULE

1. Name of the respondent :

2. Address :

3. Age in completed years :

4. Annual income

(i). On farm (Rs.)

(ii). Off farm (Rs.)

5. Farm size (ha)

A. Wet land area (ha)

a. Rice

b. Others

B. Garden land area (ha)

a. Coconut

b. Vegetables

c. Others

6. Experience in vegetable cultivation (years)

7. Family education status

Category	Respondent
Illiterate	
Can read and write	
Primary school level	
Middle school level	
High school	
College	
Professional college	

8. Area under cultivation (cents)

Category	Vegetable	Others
Area owned		
Leased in		
Leased out		

Socio-economic characteristics**9. Cosmopolitanness**

- a. Frequency of visit to nearest town
 - i. Twice or more in a week
 - ii. Once in a week
 - iii. Once in a month
 - iv. Seldom
 - v. Never
- b. Purpose of visit
 - i. All visits related to his farming
 - ii. Some visits related to his farming
 - iii. Other purposes
 - iv. No purpose
- c. Membership in organisation outside the village
 - i. Officer bearer
 - ii. Member
 - iii. No membership

10. Credit orientation

- i. Do you think farmers like you should borrow loan from banks for agricultural purpose

Yes	No

- ii. In your opinion how difficult it is to secure credit for agricultural purpose

VD	D	E	VE

iii. How a farmer is treated when he goes to secure credit from banks / co-operative societies

VB	B	F	VF

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

SA	A	DA	SDA

v. Have you taken credit in the last two years of crop production

Yes	No

11. Leadership

Statements	Always	Often	Some times	Seldom	Never
i. Listens patiently to what they say					
ii. Encourages others to raise questions					
iii. Initiates discussion					
iv. Summarises points made					
v. Analyses and evaluates the problem					

12. Self concept

Statements	SA	D	UD	DA	SDA
1. I am interested in the people and things happening around me					
2. I am active in solving the cultivation problem					
3. I am determined to achieve my goal					

4. I am not courteous in my dealings with other farmers					
5. I am eager to learn more on all subjects					

13. Risk bearing capacity

Statements	SA	D	UD	DA	SDA
1. A farmer should grow a large number of crops to avoid greater risks involved in growing one or two crops					
2. A farmer who is willing to take greater risk than the average usually does it better financially					
3. It is good for a farmer to take risks he knows his chance of success are high					
4. It is better for a farmer not to try farming, unless most other farmers have used it with success					
6. Trying an entirely new method for a farmer involves greater risks, but it worths					

14. Exposure to information sources / frequency of exposure

Source	Never	Occassionally	Regularly
Agricultural officer			
Agricultural assistant			
Progressive farmer			
Scientists			
Family members and neighbours			

15. Irrigation index

Source of irrigation	Period of water availability			Area irrigated
	Throughout the year	Partial availability	Never	
i. Tank				
ii. Well				
iii. Canal				
iv. River				
v. Others				

16. Role perception and performance in PTD process

Statements	Role perception about PTD			Role performance in PTD		
	Very important	Important	Less important	Most frequently	Frequently	Rarely
i. Selecting the crop						
ii. Deciding the varieties to be grown						
iii. Deciding the cropping pattern to be adopted						
iv. Collecting seed materials						
v. Transplanting the seedlings						
vi. Preparation of land for planting the seedlings						
vii. Taking pits						
viii. Planting the seedlings						
ix. Manuring						

x. Watering						
xi. Thinning and gap filling						
xii. Plant protection						
xiii. Supervision of the hired labour in the field						
xiv. Harvesting						
xv. Processing						
xvi. Storage						
xvii. Marketing						

17. Extent of participation in PTD

Please indicate your participation in the following areas

Areas	A	ST	N
1. Cowpea seed treatment using <i>Trichoderma viridi</i>			
2. Usage of light trap and poison baits in controlling the fruit flies of cucurbits			
3. Protecting cowpea seeds by smearing groundnut (or) coconut oil at 1% against storage pests			
4. Following crop rotation for the control of cucumber mosaic virus			
5. Covering cucurbits fruits with polythene bags to control fruitfly			
6. Usage of Kannara local variety to avoid yield loss during flowering			
7. Uprooting amaranthus plant one month after sowing to control leaf blight			

8. Practicing furrow irrigation to avoid the fall of fungal spores on amaranthus leaves			
9. Spraying neem oil for the control of cucurbits serpentine leaf miner			
10. Usage of 4 % neem leaf extract for the control of aphids and leaf webber in cucurbits and amaranthus			

(Whether have you been using the same technology- Yes/No)

If no, how you reinvent the technology

Factors associated with participation dynamics attributes

18. Innovativeness

When would you like to adopt an improved practice in farming?

- i. As soon as it is brought to my knowledge
- ii. After I had seen other farmers tried successfully in the farm
- iii. I prefer to wait and take my own time
- iv. I am not interested in adopting improved practices

19. Scientific orientation

Statements	SA	A	UD	DA	SDA
i. New methods of farming give better results than the old methods					
ii. The way or farming by own forefathers is the best way of farming today					
iii. Even a farmer with a lot of farming experience should use new methods of farming					
iv. A good farming experiments with new ideas of farming					
v. Though it takes for a farmer to learn new methods in farming it is worth the efforts					

20. Knowledge in vegetable cultivation

What are the major vegetables you are cultivating?

- i. Name one high yielding variety of each of them
- ii. The best season for planting them
- iii. Seed rate of these vegetables
- iv. The NPK fertilizers to be used
- v. Name one pest / disease affecting them

21. Perception about PTD (Vegetable projects and programmes)

Statements	Agree	Disagree
i. PTD is a sure way of solving agricultural problems		
ii. PTD is a wasteful exercise		
iii. PTD helps only in increasing rivalry among farmers		
iv. PTD makes the farmer dependent on researcher all the time		
v. It is a waste of time to participate in PTD trials		

22. Attitude towards scientific agricultural practices

Statements	SA	A	UD	DA	SDA
i. HYV deteriorate the quality of soil					
ii. Continuous use of chemical fertilizers spoil the soil					
iii. Spacing is sheer waste of land					
iv. Use of pesticide is not a profitable practice					
v. Plant protection by means of chemical compounds causes environmental pollution					

23. Self confidence

Statements	Always	Most often	Often	Regular	Never
i. I feel no obstacle can stop me from achieving my final goals					
ii. I am generally confident in whatever I do					
iii. I get encouraged easily					
iv. Life is a stranger for me most of the time					

24. Extension orientation

Category	Regular	Occasionally
a. Extension contact		
Category of personnel		
i. ADA		
ii. AO		
iii. AA		
iv. Others		

b. Extension participation

Activities	Regularity in attending		
	Attend whenever conducted	Occasional	Never
i. Study tours			
ii. Seminars			
iii. Farm fair			
iv. Group farming meetings			
v. Demonstrations			
vi. Others			

25. Participation in PTD

PTD experiments	Yes	No
i. Hormone application		
ii. Bio-farming		
iii. Control of fungal diseases		
iv. Integrated pest and disease management		
v. Nemasol application		

26. Economic motivation

Statements	Agree	Disagree
i. The farmer should work towards larger yields economic returns		
ii. The most successful farmer is one who makes the most profit		
iii. A farmer should try new farming areas which may give more money		
iv. A farmer should grow each crop to increase a monetary profit in comparison to growing of food crops		
v. A farmer must earn his living but the most important thing in life cannot be defined in economic farms		

27. Achievement motivation

Please respond to the following sentences by choosing the appropriate answers

- a. In whatever work I undertake on my farm
 - i. I like to make advance plan
 - ii. I like to do my best
 - iii. I don't assume full responsibility for it

- b. I am always been
- i. To maintain social status
 - ii. To remove social evils
 - iii. To develop my qualification

28. Social participation

Institution	Membership			Participation		
	No members	Member	Office bearer	Always	Some times	Never
i. Panchayat						
ii. Co-operative society						
iii. Youth club						
iv. Farmers club						
v. Neighbourhood assembly						
Others						

29. Market perception

Please record your response based on your perception with regard to marketing your produce.

- a. Do you think a farmer will be able to sell his produce if he increases the production by adopting the recommended practices ? Yes / No.
- b. Do you think that produce of the crop cultivated according to the recommended practices will fetch good price compared to those raised under traditional methods (Low / Some / High).

30. Risk Orientation

Statements	SA	A	UD	DA	SDA
i. A farmer should grow large number of crops to avoid greater risks involved in growing one or two crops					
ii. A farmer should take more of a chance in making a big profit than to be content with smaller but less risky profit					
iii. A farmer who is willing to take greater risk than the average farmer usually does better financially					
iv. It is good for a farmer to take risk when he knows his chance of success is fairly high					
v. Trying entirely a new method in farming by a farmer involves risk but it is worth					

31. Exposure to mass media

Mass media	Frequency of exposure			
	Always	Regularly	Occasionally	Never
i. Radio				
ii. Newspaper				
iii. Television				
iv. Farm magazine				
v. Research journals				

32. Need satisfaction

Statements	SA	A	UD	DA	SDA
i. The membership in the harithasangams is a means of livelihood form					
2. I feel some degree of acceptance by others as a member of this group					
iii. I feel satisfaction in working in this group					
iv. I am satisfied in working in this group					
v. I wish to change the membership from this group as my needs aren't at all satisfied					

33. Employment generation

Employment generated in terms of member of man days / year

- i. Nil
- ii. 30 days
- iii. 30-60 days
- iv. More than 60 days

34. Constraints faced by the vegetable farmers while participating the programmes of vegetable Fruit Promotion Council of Keralam (VFPCCK) and Intensive vegetable development programme (IVDP)

Statements	Agree	Disagree
i. Lack of working capital at the field centre		
ii. Perishable nature of vegetables and lack of storage facilities at the field centre		
iii. The time delay in giving back the price sold produce to the farmers		
iv. lack of vehicle at the centre		

v. Lack of incentives from the part of the program for 100 per cent repayment		
vi. The rules and regulations for availing credit are becoming more complex		
vii. Improper repayment in the case of high crop damage		
viii. Lack of insurance in the case of high crop damage		
ix. Lack of attendance of all farmers in the meeting		
x. Lack of dedicated and efficient leadership		
xi. Others		

b. IVDP

Statements	Agree	Disagree
i. Lack of credit facilities for the farmers		
ii. Predominance of part time members		
iii. Lack of co-ordination among members		
iv. Small scattered farmholdings		
v. Lack of direct contact between official and farmers		
vi. Lack of storage and processing facilities		
vii. Political interferences		
viii. Lack of supervision		
ix. Lack of proper information source to deliver the latest market price		
x. Lack of follow up activities from the officials		
xi. Others		

**ANALYSIS OF FARMERS' PARTICIPATION IN THE
PARTICIPATORY TECHNOLOGY DEVELOPMENT (PTD)
PROCESS VIS-À-VIS PLANT PROTECTION IN VEGETABLES AT
KUNNATHUKAL PANCHAYAT**

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ABSTRACT

The study entitled “Analysis of farmers’ participation in the participatory technology development (PTD) process vis-à-vis plant protection in vegetables at Kunnathukal Panchayat” was undertaken to find out the role played by the vegetable farmers in the PTD process. It was also aimed to study the farmers’ socio-economic characteristics and their relationship with the participation dynamics attributes. Its aim also included to analyse the factors which motivate the vegetable farmers to voluntarily participate in the PTD process and the final aim is to delineate the PTD process and to suggest suitable strategies for the PTD process.

The study was conducted in Kunnathukal panchayat of Thiruvananthapuram district. A sample of 75 farmers who were intensively cultivating vegetables by means of following farming practices developed through PTD were selected for the study. It was assured after having discussion with the agricultural officers and the presidents of the Harithasangams. Well structured and pretested interview schedule was used for data collection.

The study revealed that in Kunnathukal panchayat, farmers’ role perception about PTD and their role performance in the PTD activities were found to be extremely high. Most of the farmers were willing to undertake PTD technologies and showed preference to adopt PTD concepts. This shows their high level of participation in PTD.

Most of the farmers in the Kunnathukal panchayat were literates and they had high level of cosmopolitaness, self concept, risk bearing capacity, credit orientation and exposure to information sources and their leadership qualities were also found to be good.

Regarding the participation dynamics attributes of farmers, they had high level of innovativeness, scientific orientation, knowledge in vegetable cultivation, self-confidence, extension orientation, exposure to mass media, market perception, social participation, economic and achievement motivation. They had also perceived more than 61 labour days in a year.

Source of irrigation was the main problem in Kunnathukal Panchayat. Farmers have been facing lot of problems in their cultivation, because of the water shortage.

Regarding the overall view of three villages selected for the study, Vandithadam farmers had quite more knowledge regarding PTD, followed by Karakkonam and Elluvilla farmers and their participation in PTD activities also complied with the above mentioned results.

Among the constraints listed out, the time delay in giving back the price of sold produce to farmers was the major one felt by VFPCK farmers and lack of storage and processing facilities was considered to be a major constraint felt by the IVDP farmers.