

- 172708 -

**SOCIO-TECHNICAL SYSTEM ANALYSIS OF
TRIBAL AND SETTLER FARMERS IN THE WESTERN GHAT REGIONS
OF WAYANAD DISTRICT IN KERALA**

GEETHA G. NATH

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

Doctor of Philosophy in Agriculture

**Faculty of Agriculture
Kerala Agricultural University, Thrissur**



2007

**Department of Agricultural Extension
COLLEGE OF AGRICULTURE
VELLAYANI, THIRUVANANTHAPURAM-695 522**

Dedicated To My

Most Beloved.....

Achan, Amma

&

late Mamman

DECLARATION

I hereby declare that this thesis entitled "**Socio-Technical System Analysis of Tribal and Settler Farmers in the Western Ghat Regions of Wayanad District in Kerala**" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar title, of any other university or society.

Vellayani,
12-02-2007

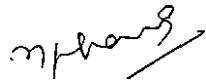


GEETHA G. NATH
(2003-21-10)

CERTIFICATE

Certified that this thesis entitled “**Socio-Technical System Analysis of Tribal and Settler Farmers in the Western Ghat Regions of Wayanad District in Kerala**” is a record of research work done independently by Ms. Geetha G. Nath, (2003-21-10) 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.

Vellayani,
12-02-2007


Dr. N. P. KUMARI SUSHAMA
(Chairperson, Advisory Committee)
Associate Professor,
Department of Agricultural Extension,
College of Agriculture, Vellayani,
Thiruvananthapuram

Approved by

Chairperson:

Dr. N. P. KUMARI SUSHAMA

Associate Professor,
Department of Agricultural Extension,
College of Agriculture, Vellayani,
Thiruvananthapuram-695522

N. P. Kumari Sushama
19/5/07

Members:

Dr. C. BHASKARAN

Associate Professor and Head,
Department of Agricultural Extension,
College of Agriculture, Vellayani,
Thiruvananthapuram-695522

C. Bhaskaran
19/5/07

Dr. G. SOBHANA

Associate Professor (Agrl. Extension)
SC - RARS (NR),
Manjeswar, Vorkady,
Kasargode - 671 323.

G. Sobhana
19/5/07

Dr. B. SEEMA

Assistant Professor (SS),
Department of Agricultural Extension,
College of Agriculture, Vellayani,
Thiruvananthapuram-695 522

B. Seema
19/5/07

Dr. VIJAYARAGHAVAKUMAR

Associate Professor,
Department of Agrl. Statistics,
College of Agriculture, Vellayani,
Thiruvananthapuram - 695 522

V. Jayaraghavakumar
19/05/07

External Examiner:

Dr. Santha Govind
Professor (Agrl. Extension)
Annamalai University

Santha Govind
19/5/07

Acknowledgment

The satisfaction and euphoria that accompanies the successful completion of any task would be incomplete without mentioning the people who made it possible because success is the epitome of not only hard work and perseverance, but most of all "Encouraging guidance".

First and foremost, I bow my head before God Almighty for all the bountiful blessings he has showered upon me at each and every moment, without which, this study would not have ever seen light.

My advisor and mentor, Sushama madam comes next, for her unfailing patience, guidance and intimate cooperation throughout my study period. Words are scarce to express my appreciation for her support and affection provided, at each and every stage. I thank her wholeheartedly for everything she has done for me, precisely in helping me fulfill my dream of getting a doctorate.

Dr. C Bhaskaran, is remembered with much gratitude for all his guidance and help. I consider myself very fortunate in having the privilege of being able to complete this PG programme during his tenure as our Head of the Department. Always looking for perfection, he corrected me several times. He is the one person who reinforces my belief that teaching is the noblest of all professions and knowledge always means teacher! I learnt many things from him.

Members of the advisory committee Dr. G. Sobhana, Associate Professor, SC-RARS (NR) and Dr. B. Seema, Assistant Professor (SS), Dept. of Agrl. Extension for their constructive criticisms and wholehearted help, during the course of investigation and preparation of thesis.

Dr. Vijayaraghavakumar, Associate Professor of Statistics, for his patience in helping me with the statistical analysis, interpretation, valuable suggestions and thorough scrutiny of the manuscript.

All the teaching and non-teaching staff of my department, with special mention of Mr. Radhakrishnan for being a good company always.

Sri. C. E. Ajithkumar, Programmer, for the analysis part of the data.

The financial assistance of Planning and Economic Affairs Department is remembered very gratefully. I thank wholeheartedly Dr. P. N. Premachandran, for his help in getting the fellowship converted for the study.

I am indeed very lucky to get Ms. Priya R. Devi as my classmate, for her support was always there in everything I do, be it studies, library work, thesis work or any other.

I recount with pleasure the company of Nisha M. S., Soumya, Prasadha, Reshma and Honey who always made my days happier at the hostel and department. Thanks are also due to Mercy, Johny, Majjusha chechi, Jagath, Mathew, Nazreen and everyone in my department for their support and affection given to me at one time or the other. A special thanks to Binu and George for all the laughter we had.

CONTENTS

	Page No.
1. INTRODUCTION	1 - 5
2. THEORETICAL ORIENTATION	6 - 38
3. METHODOLOGY	39 - 62
4. RESULTS AND DISCUSSION	63 - 106
5. SUMMARY AND CONCLUSION	107 - 116
6. REFERENCES	117 - 142
APPENDIX	
ABSTRACT	

I also wish to place on record my heartfelt obligation to Saji, John, Gireesh and Shijila of Wayanad who helped me with the data collection and tabulation works. The respondents of the study and all our friends of Wayanad are remembered very gratefully for their co-operation.

There will always be a dearth of words to express the appreciation to our most loved ones. I am deeply indebted to my dearest Renu and Geegi for all their love and support at each and every stage of my life here at Vellayani. Without them I would have never made it. With deepest gratitude I also recall the encouragement and support of Shy throughout the period. Without any sign of exasperation, he was always there to help me, be it anything. I thank them wholeheartedly for their love and abundant supply of fresh hope which kept me in good spirits always and also for making my stay here, a beautiful memory.

Rahul deserves special mention for all his love, encouragement and selfless help.

I would also like to remember my dearest friends of Nagpur, my beloved Liya and Push, Jake, Shirley, Prasu, Laxmi, Hima and all my other friends for their love.

Last but not least my Jayanchettan, Chotu, Suni, Kunjan, Ajichettan, Sreejamma, little Kunjoos, Anitha, Mahesh, Chitappan, Kunjamma, Mami and all for their love and enduring support.

Finally, I would like to dedicate this doctorate degree to my beloved Achan, Amma and late Maman (who would have been much happy, had he been there). It was their prayers and hopes that led me to this achievement against all odds.

CONTENTS

	Page No.
1. INTRODUCTION	1 - 5
2. THEORETICAL ORIENTATION	6 - 38
3. METHODOLOGY	39 - 62
4. RESULTS AND DISCUSSION	63 - 106
5. SUMMARY AND CONCLUSION	107 - 116
6. REFERENCES	117 - 142
APPENDIX	
ABSTRACT	

LIST OF TABLES

Table No.	Title	Page No.
1	Distribution of respondents with respect of age	64
2	Distribution of respondents with respect to education	64
3	Distribution of respondents with respect to family education status	65
4	Distribution of respondents with respect to type of family	66
5	Distribution of respondents with respect to family size	67
6	Distribution of respondents with respect to dependency	67
7	Distribution of respondents with respect to farming experience	68
8	Distribution of respondents with respect to annual income	69
9	Distribution of respondents with respect to exposure to mass media	70
10	Distribution of respondents with respect to extension participation	70
11	Distribution of respondents with respect to economic motivation	71
12	Distribution of respondents with respect to risk preference	71
13	Distribution of respondents with respect to achievement motivation	72
14	Distribution of respondents with respect to credit orientation	73
15	Distribution of respondents with respect to self confidence	73
16	Distribution of respondents with respect to value orientation	74

Table No.	Title	Page No.
17	Distribution of respondents with respect of rational orientation	75
18	Distribution of respondents with respect to information source utilization	75
19	Distribution of respondents with respect to progressiveness	76
20	Distribution of respondents with respect to fatalism	77
21	Distribution of respondents with respect to cosmopolitaness	77
22	Distribution of respondents with respect to indebtedness	78
23	Distribution of respondents with respect to migration	79
24	Distribution of respondents with respect to attitude towards development	80
25	Cropping patterns in Wayanad district in general	80
26	Cropping patterns in Kalpetta block	82
27	Cropping patterns in Mananthavady block	83
28	Cropping patterns in Sulthan Bathery Block	83
29	Comparison of average score of personal, psychological, socio-cultural and economic variables among tribal and settler farmers in the selected three blocks	86-87
30	Correlation between the selected personal, socio-cultural variables among tribal and settler farmers	89
31	Differential diffusion of innovations among tribal and settler farmers in Wayanad district	93
32	Differential diffusion of innovations among tribal and settler farmers in Kalpetta block	94

33	Differential diffusion of innovations among tribal and settler farmers in Mananthavady block	97
34	Differential diffusion of innovations among tribal and settler farmers in Sulthan Bathery block	99
35	Evaluation of agricultural innovations among tribal and settler farmers using the socio-technical feasibility index	101
36	Constraints faced by the tribal farmers	103
37	Constraints faced by the settler farmers	105

LIST OF FIGURES

Sl. No.	Title	Between pages
1	Map showing the locale of the study	39 & 40
2	Cultivation of major crops among tribal and settler farmers in Wayanad district	81 & 82
3	Differential diffusion of innovations among tribal and settler farmers in Wayanad district	94 & 95
4	Differential diffusion of innovations among tribal and settler farmers in Kalpetta block	95 & 96
5	Differential diffusion of innovations among tribal and settler farmers in Mananthavady block	98 & 99
6	Differential diffusion of innovations among tribal and settler farmers in Sulthan Bathery block	100 & 101

LIST OF PLATES

Plate No.	Title	Between pages
1	Tribals of Wayanad	10 & 11
2	Settlers of Wayanad	12 & 13
3	Major crops of Wayanad	12 & 13
4	Other crops of Wayanad	12 & 13

LIST OF APPENDIX

Sl. No.	Title	Appendix page no.
1	Relevancy rating letter	
2.	Interview schedule	

Introduction

1. INTRODUCTION

If it's green, it's biology, if it stinks, it's chemistry,
if it has numbers it's math, if it doesn't work, it's technology

- Unknown

Agricultural technology and its diffusion are important factors in developing India's quest for food security and better economy. Food security in general parlance is thought to be merely sufficient food production. But actually it is a multidimensional concept covering the aspects of availability, access, nutritional absorption and environmental sustainability. Till date, agricultural technology has bypassed the needs of small and marginal farmers and concentrated primarily on better-endured regions, commodity intensive production systems and commercial crops. Most small-scale farmers operate in relatively small but complex farming systems in each agro-ecological zone and they need access to a wide variety of locally validated technologies if they are to increase their productivity.

The agricultural scenario comprising the farmers and the farming systems in the High Ranges of Kerala State should be no exception to this. But such farming systems are so complex that scientific and systematic research investigations are warranted to explore the socio-technical interfaces in the agro-ecosystems of these ecologically sensitive areas.

Studies using the socio-technical system approach help in suggesting new or alternative technology to be used for the betterment of farming. It would also point out to the modification or improvement to be done in the technology so that it fits well in the social system.

Western Ghat is a long narrow range of hills, stretching along the penninsular India parallel to and close to the west coast through the States of Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala. The Western Ghats comprise the mountain range that runs along the western coast of India, from the Vindhya-Satpura ranges in the north to the southern tip. There is a great variety of vegetation all along the Ghats:

scrub jungles, grassland along the lower altitudes, dry and moist deciduous forests, and semi-evergreen and evergreen forests. Topography, suitable climate, long history of uninterrupted biological evolution, biogeographical linkage have all contributed to its exceptional diversity of plants, animals, ecosystems and human culture. (Nair, 2002).

Among the districts covered by the Western Ghat regions in Kerala, the 'ecological degradation' is much pronounced and 'economic deprivation' of the tribals is most serious in the Wayanad district. Tribals constitute 35.82 per cent of the population of this backward district (Census of India, 2001).

Wayanad lies along the crust of Western Ghats and is a biodiversity hotspot. The district (2136 sq. km in size) lies at an altitude of 750 m above sea level and contributes significantly to the foreign exchange earnings of the state of Kerala through its cash crops like pepper, cardamom, coffee, tea and other condiments like ginger and turmeric. The name Wayanad is said to be derived from '*Vayal nadu*' meaning land (*nadu*) of paddy fields (*vayal*). The biological diversity of this place is very diverse at all levels-habitat, species and genetic and with an impressive rate.

According to the 2001 census, out of the total population of 3,18,41,374 in Kerala 3,64,189 (1.14%) belong to the Scheduled Tribes. Wayanad is the district having highest tribal population (35.82 per cent). Moreover, the district also experienced a new move of immigration of the settlers in the sixties and seventies and now the district has one of the largest populations of settlers in the state. (Mohandas, 1992).

1.1 Need for the study

Wayanad has a good agro-ecological diversity, if not approached with utmost care, the exhaustion of this agroecological niche is not far away. The farmers over the years have adopted their own way of cultivation taking into consideration the technologies introduced by the scientists and researchers. Every farming community lives in a unique physical, socio-economic and cultural environment. In the case of

tribals, their physical, socio-economic and cultural environment is isolated from general population. The tribals do not accept every innovation that is introduced into their system. For the technology to be adopted, it should fit their environment and social and cultural system.

Indebtedness is again, a very serious problem concerning the tribals and settlers in Wayanad district. Due to this, the once prosperous district is in the spate of suicides by farmers. According to media and the peasant organisations, 130 farmers and agricultural workers had committed suicide in the year 2004 in this small district with a population of about eight lakhs (2001 Census). This is mainly due to the crop failures, which have created havoc in the lives of the farmers.

From social point of view, agriculture cannot be sustainable unless it is integrated into the existing social systems. Furthermore, it must enhance social justice. Social integration means that the farmers must accept the technology. Optimum adoption of agricultural production innovations is achieved only when a farmer is persuaded to accept a technical innovation, which for him is technically sound, economically feasible, physically possible and politically and socially compatible. Research studies exploring the socio-technical system aspects of agricultural technology generation and diffusion among the diverse tribal and settler farmers in ecologically sensitive locations like Wayanad district will help in envisioning sustainable developmental interventions. It is in this background, the present investigation has been designed with the following objectives:

1. To analyse and compare the socio-technical system determinants.
2. To study the cropping pattern and farming systems on the tribal and settler areas.
3. To study the differential diffusion of agricultural innovations among the tribal and settler farmers in the Western Ghat regions.
4. To construct a Socio-technical feasibility index to evaluate the agricultural innovations among tribal and settler farmers.

1.2 Scope of the study

A set of certain social and technical determinants influences any technology, which is introduced into a social system. These social and technical determinants are different in case of tribal and settler farmers. Studies using the socio-technical system approach help in suggesting new or alternative technology to be used for the betterment of farming. It would also point out to the modification or improvement to be done in the technology so that it fits well in the social system.

In Kerala, Wayanad district which has the highest tribal congregation coupled with preponderance of settlers is an ideal location for such a study. The socio-technical system constraints in farming experienced by the tribal and settler farmers need to be brought to light to tailor technology modifications to suit the area.

The present investigation is a pioneering attempt aimed at a comprehensive analysis of tribal and settler agriculture in Wayanad district. The methods to be developed for operationalising the socio-technical system interfaces and the development of a socio-technical feasibility index would be useful contributions to the body of social research. Moreover, it is hoped that the results of the study would serve as useful guidelines for planned interventions in technology generation and its transfer at the field level.

1.3 Limitations of the study

As the study forms a part of the requirement for the PhD program, it was not possible to take all the respondents 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 is based on the expressed opinion of the respondents, it may or may not be free from their individual biases and prejudices.

1.4 Organisation of the study

The thesis is presented in five chapters. The first chapter of 'introduction' highlights the problems, objectives, scope and limitations of the study. The second chapter '*theoretical orientation*' deals with the definitions, concepts and related findings of the study. The third chapter 'methodology' encompasses the details on selection of study area, sampling procedures for data collection, methods used in the construction of the socio-technical feasibility index, statistical tools used etc. In the fourth chapter, the results of the study in relation to the objectives with interpretation *of findings and their discussion* are presented. The fifth chapter summarises the study highlighting the salient findings and the implications of the study.

Theoretical Orientation

2. THEORETICAL ORIENTATION

The main objective of this chapter is to portray in broad outlines the conceptual frame of references that has been used for the study. A review of the existing literature helps the researcher to develop the theoretical framework for the study and to assess the nature and quantum of research studies already undertaken in the area of selected research topic. This will provide a theoretical basis for the empirical investigation. It will also assist in evaluating one's own research efforts by comparing it with the related efforts of others. Research studies directly relating to the settlers in Wayanad could not be located, however, the available studies related directly or indirectly to the topic has been reviewed.

The review has been presented under the following heads:

- 2.1 Concept, definition and importance of Western Ghats.
- 2.2 Scenario of Wayanad district.
- 2.3 Tribals and settlers of Wayanad.
- 2.4 Agriculture in Wayanad.
- 2.5 Profile characteristics of the tribals and settlers.
- 2.6 Cropping patterns and farming systems in the tribal and settler areas.
- 2.7 Concept of differential diffusion of agricultural innovations among the tribal and settler farmers.
- 2.8 Concept of socio-technical determinants in the diffusion of agricultural innovations among the tribal and settler farmers.
- 2.9 Constraints experienced by tribal and settler farmers in their farming.

2.1 Concept, definition and importance of Western Ghats

Western Ghats is the most important watershed in Peninsular India. All major rivers, south of Narmada originate from it. Its influence in modulating the weather and climate of Peninsular India, particularly regulating precipitation from the south

west as well as the retreat monsoons, is part of the common people's comprehension. The forests of the Western Ghats and their catchment protection role is a boon enjoyed by all peninsular civilizations and people over millennia, till 'Planned Development' and policy changes converted forests to unviable revenue sources for industrialization and the rapidly expanding population benefit of cultural restraints took them over for unsustainable cultivation.

The more equatorial southern stretch, with two monsoons curtailing the dry season, supported exceptionally rich forest cover in the southern Karnataka, Kerala and Tamil Nadu parts of the Ghats. These more rugged, loftier reaches are even now relatively less devastated. The Ghats are at times very narrow with only a single precipitous steep of 1500 meter high ridge between the eastern and western drainage basins. Hence the forest influences transcend State boundaries even where forest boundaries and State boundaries follow the watershed line.

Kerala Western Ghats essentially has two major segments, a southern section of the Palakkad Gap and a northern section beyond the Gap extending up to the Kodagu boundary. Terrain and climatic conditions, particularly inaccessibility helped to retain these riches till very recently.

2.2 Scenario of Wayanad District

Nestled among the mountains of the Western Ghats, lies Wayanad, one of the loveliest hill stations of Kerala. This green paradise is located at a distance of about 76 kms. from the seashores of Kozhikode, on the north eastern part of the state. The present district of Wayanad was carved out, from parts of Kozhikode and Kannur districts and came into being on 1st November 1980 as the 12th district of Kerala. This backward district is, perhaps one of the biggest foreign exchange earners of the state, thanks to its cash crops of pepper, cardamom, coffee, tea, spices and other condiments.

Most of the reserve forests in the state are in this district. The loamy soil generally shows wide variation in depth and texture with a very high content of

organic matter. Wayanad has a long history of agriculture. The agro-ecological conditions of the area, vastly different from the plains and the virtual isolation of the area from plains due to lack of proper communication and other factors restraining early migration from the plains, the agro biodiversity conserved and used by the native tribes evolved several unique adaptive properties. Later, which is more recent in historical time, huge migration from the plains and domination of these migrants in influencing the cropping pattern in the uplands led to the total decline of millets and rise of plantation crops. However, the land use pattern in lowlands changed very little, thus helping the retention of many of the unique indigenous landraces of rice. Between the two early cultivator tribes, Kurumas lost out to the migrants and became landless with the historical continuum, atleast in the case of rice. These indigenous people and their penchant for conservation and innovative agriculture that landraces, have sustained a place in the midst of improved varieties. Wayanad has a rich repository of rice genetic variability, not only suited to hill agriculture, but also distinct in many other ways.

Spice crops such as pepper, cardamom, ginger and vanilla provide livelihood and employment opportunities to most of the dwellers. A group of farmers near Pulpally formed an association called HICOS (Highland Organic Farmers' Co-operative Society) and are practicing organic farming since 1997. A number of traditional and innovative technologies are blended to maximise the crop production with minimal / without external input. A number of bio growth promoters and bio pesticides are produced in the village. Preparations such as Notchi leaf extract, garlic – tobacco decoction, Panchagavya and neem based products are worth mentioning. Cows form the backbone of the village by not only providing milk but also valuable dung and urine that are essential inorganic products. All the farmers work in union to improve their environment and their life. Their village is being organically certified. After certification it would be one of the world's largest organic village producing pepper, coffee, ginger, cardamom and coconut and a variety of vegetables.

The literacy rate in the district was the second lowest in the state with only 58.3 per cent corresponding to the state average of 70.4 per cent. The literacy rate in respect of SC and ST, males and females are all lower than the corresponding state averages. While the literacy rate for SC and ST are 48.1 per cent and 20.7 per cent in the district, the respective figures for the state were 56.0 per cent and 31.8 per cent. The male and female literacy for the ST population in the district were 27.3 per cent and 14.2 per cent respectively.

2.3 Tribals and Settlers of Wayanad:

A large percentage of the population in this district are tribals. The native tribals mainly consist of various sects like Paniyan, Kuruman, Adiyar, Kurichian, Kattunaikkan, etc. Wayanad district also has the maximum number of settlers.

2.3.1 Concept of Tribe

The term tribes commonly signifies a group of people speaking a common language, observing uniform rules of social organisation and working together for common purpose. Broadly, tribe is an aggregated group of people sharing social values, common dialect, territory and culture. But in a restricted sense, a tribe means a group of people usually under a chief and maintaining distinct cultural traits (Dubey, 1977).

Tribe may be defined as “a group of people speaking a common language, observing uniform rules of social organisation and working together for common purpose such as trade, agriculture or welfare. Other typical characteristics include a common name of contiguous territory, a relatively uniform culture or way of life and a tradition of common descent. (Verma, 1996).

2.3.1.1 General profile of the tribals of Wayanad

Population (2001 Census)	*136062
District tribal population (Percentage)	*37.36
Number of household	**23287
Average household size	**4.93
Literacy (effective rate)	**50.3
Number of BPL families	**14063
Poverty rate	**60.38%
Most backward tribe	**Paniyan
Primitive tribe	**Kattunaikan
Farming community	**Kurichian, Kuruman
Agricultural Labourers	**Paniyan, Adiyar, Kattunaikan
Total number of tribal colonies	**1938

* (2001 Census)

** (Rural Information Bureau, Rural Development Department, October, 1992)

A brief description of the major tribes of Wayanad according to Encyclopaedia of Dravidian Tribes (1996) is given below:

2.3.1.2 The Paniyan

A vast majority of tribes in Kerala state hail from the Paniyan tribal sect. Although Paniyan inhabit in the regions of Wayanad and the neighbouring parts of Kannur and Malappuram, about 71.95 per cent of the Paniyan tribal population is found in Wayanad alone.

As bond labourers, the landlords once sold the Paniyan along with plantations. The name 'Paniyan' means 'worker' as they were supposed to have been the workers of non-tribes.

Plate 1. Tribes of Wayanad



Kurichiya leader



Adiya man



Paniya woman



Kuruman at work



Kattunaikkan woman



Paniya family

2.3.1.3 *Adiyan*

The Adiyan are known as '*Ravulayar*' traditionally. The Adiyan, like the Paniyan is one of the slave tribal sects in Kerala. The Adiyan tribal community is divided into 20 classes called '*Mandu*'. The Head of the '*Mandu*' is called '*Chommikkaran*' or '*Peruman*'.

2.3.1.4 *The Kattunaikan*

The Kattunaikan community is found in Wayanad, Kozhikode and Malappuram districts. As their name denotes they were kings of the jungle regions engaged in the collection and gathering of forest produces.

2.3.1.5 *The Kurichian*

The Kurichian are also agricultural tribal community. They have clean food habits and they keep their houses, premises and dress always clean. Formerly the Kurichian were shifting cultivators. Presently they engaged in wet and dry cultivation.

2.3.1.6 *The Kuruman*

The term Kuruman means one who tends sheep. *Gounder* is an honorific title, which they have adopted, in recent years. Thurstone (1946) states that the principal occupation of the Kuruman is wood cutting and the collection of forest produce. He is of the opinion that the term Kuruman is merely another form of Kurumban. Traditionally, the Kuruman reared goat and sheep, but now they have switched over to an agricultural economy. There has been a rise in agricultural labourers recently. The Kuruman in Kerala have been studied under two groups – Mullu Kuruman and Urali Kuruman.

2.3.2 Settlers of Wayanad

In Wayanad during the 19th century, the British authorities opened up the land for cultivation of tea, coffee and cardamom and put up many large estates. Thousands of workers were brought to Wayanad from other parts of Kerala and other neighbouring states to work in the estate. Large –scale deforestation took place during this period. In the first three decades of twentieth century, the growth of population here was less than ten per cent. This shows that there was an influx of settlers to Wayanad after the Second World War. The economic slump and sufferings due to war compelled people from all parts of Kerala and other South Indian states seek shelter on the virgin soil of Wayanad. Large-scale migration and settlement had commenced in Wayanad district with the launching of the Wayanad colonisation scheme in 1948. During 1941 – 51 alone, 62930 families migrated to Wayanad. The low land price was another factor, which attracted settlers to the district. In the early years of settlement, thousand succumbed to malaria and attacks by wild animals. But those who survived these adverse cold conditions cleared the forests and transformed Wayanad into a paradise of prosperity. Till the year 1931, *Adivasis* (aboriginals – tribal) constituted the majority of the population in the district. In 1941, *non-adivasis* became equal to *Adivasis* and subsequently exceeded the *Adivasi* population. As per 2001 census *Adivasis* constitute only 17.36 per cent of the district population. (George and Krishnaprasad, 2006).

2.4 Agriculture in Wayanad

Wayanad has a long history of agriculture. Two tribes, who are among the inhabitants of this region from early times, and associated with earliest cultivation of rice in valley wetlands and rainfed millets in uplands, largely by shifting cultivation, are the ‘Kurichian’ and ‘Kuruman’.

Wayanad also occupies primary position in terms of area and production of coffee in Kerala. More than 80 % of the total coffee produced in Wayanad is exported to various countries. ‘Wayanadan Robusta’ coffee growers are small holders who

Plate 2. Settlers of Wayanad



Plate 3. Major crops of Wayanad district



Paddy



Coffee



Ginger



Banana



Pepper



Arecanut

Plate 4. Other crops of Wayanad



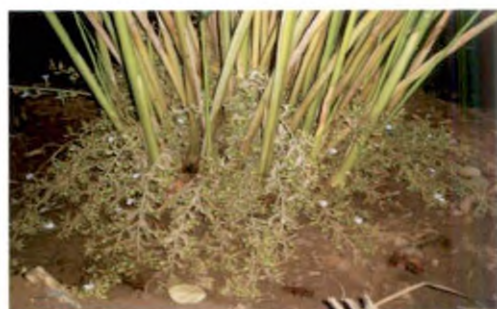
Vanilla



Rubber



Tea



Cardamom

depend chiefly on coffee cultivation for their livelihood. Organic cultivation, value addition and proper marketing strategies are the major steps to increase the export potential of coffee from Wayanad. Quality assurance through standard drying yards, pulping units, storage facilities and quality control labs are immediate measures to attract foreign orders. Branding of Wayanadan coffee is also a positive step in this venture. The Coffee Board has accorded an exclusive brand "*Tiger*" for Wayanadan Robusta coffee, which will boost the export potential of premium Wayanadan Robusta. Special emphasis needs to be given in maintaining quality system in the area of production, processing including post harvest technology and post harvest handling.

The migration into Wayanad district was initially induced by the establishment of commercial plantations by the Britishers during the twenties and thirties. The extensive tea and coffee estates in Wayanad faced the problem of shortage of labour, as tribals were the only source of labour at that time. Migrants could find ready employment and had easy access to un-occupied virgin land. This encouraged not only in bringing vast areas of fallow land under cultivation, but also in encroachment and occupation of forestlands and tribal lands. One significant development, which stemmed from large-scale migration and settlement, was establishment of numerous commercial plantations in the district apart from conversion of extensive areas of forests for raising commercial crops.

2.5. Profile characteristics of tribals and settlers

Number of studies were conducted on the nature of relationship existing among the personal, socio-psychological and economic variables of farmers, tribals, extension personnel, scientists etc. These studies revealed different kinds of relationship. The present study aims to look into the personal, socio-psychological and economic variables of the tribals and settlers of Wayanad district and to find out if any variable has any influence on the social and technical determinants in the diffusion of agricultural innovations.

2.5.1 Age

Age played a significant role in the ordinary tribal life according to Sachidananda (1968), Sahay (1977) and Dubey (1977).

The relationship between the age of the tribal respondent and his technological gap was reported by Tripathi (1972) and Sadamate (1978).

Perumal (1994) found that majority of the participants (70.85 per cent) belonged to young category followed by middle aged category (29.15 per cent).

Kareem and Jayaramaiah (1998) found no significant relationship between age and participation while Sumana and Reddy (1998) and Thomas (1998) reported significant relationship between age and participation in development programmes.

Jeya (1999) found that almost an equal percentage of participation belonged to young (49.6 per cent) and middle aged (50.40 per cent) categories among women farmers.

2.5.2 Education

Sahu (1970) and Srivastava and Singh (1970) reported illiteracy as a major problem in tribal areas.

Sundaraswamy (1971) reported that education has shown a significant relationship with the use of information sources.

Kripal (1978) observed that inspite of many facilities being reserved for the Scheduled Castes and Tribes in the education system, they remain a backward sector of the community.

Sadamate (1978) reported low levels of education (84.39 per cent illiterates) of tribal respondents.

Jayakrishnan (1984) reported positive and significant relationship between education and adoption of low cost technology among paddy growers.

Rathinasabapathi (1987) reported education had positive and non-significant association between education and adoption of improved paddy cultivation practices.

Sanjeev (1987) reported that there was no significant relationship between education and adoption of improved paddy cultivation practices.

Agarwal and Arora (1989) opined that the educational level was significantly associated with adoption of biogas plants.

Quazi and Iqbal (1991) reported that education was an important determinant of innovation adoption.

According to Sinha (2006) the illiteracy rate of the tribals was 23.63 per cent (1991). This is lower than that of the general population (52.21 per cent) and is even lower than that of Scheduled Caste population (30.6 per cent). The literacy rate of tribal female is 12.74 per cent, which is the lowest of all the social groups.

2.5.3. Family educational status

Many researchers have established positive and significant relationship of educational status with adoption (Perumal, 1970, Chandrakandan, 1973, Ramamoorthy, 1973).

Mathew (1986) observed no significant association between education and attitude towards scientific agriculture, among the rural youth club members.

Prakash (1980) in his study among the tribals of Wayanad district had also brought out the positive relationship between educational status and extent of adoption of improved agricultural practices.

Viju (1985) stated that educational level of farmers was seen influencing their knowledge level and their attitude towards farming which in turn influenced their adoption level.

2.5.4 Type of family

McClelland (1961) for instance found a relationship between personality traits and family structural variable. (Family structure may be defined in terms of nuclear and joint families and latter by definition is large in size than the farmers).

Shilaja (1981) operationalised family type as family composition in which families were classified into nuclear and joint families depending upon the composition of the family. A nuclear family consists of husband, wife and their unmarried children if any. Two or more nuclear family living in same household and sharing the same kitchen constituted a joint family.

Shilaja (1981) found out in her study that being a member of a big family, they have a support of a very large lineages and it contributes to their social prestige.

2.5.5 Family size

The relationship of family size with adoption of improved agricultural practices is summarised below.

Review of studies	Nature of relationship
Jain, 1980	Positively significant
Tyagi and Sohal, 1984	Non-significant
Agarwal and Arora, 1989	Non-significant
Haque, 1989	Positively significant
Sagar, 1989	Positively significant
Reddy, 1991	Non-significant

2.5.6 Dependency

Refers to the number of members of either sex living in a household / family dependent on the head of the family. Studies directly related to dependency of the respondents with any other variable could not be located.

2.5.7 Farming experience

The review of studies on adoption in relation to experience in farming is summarised below:

Review of studies	Nature of relationship
Ravichandran, 1980	Non-significant
Ramaswamy, 1983	Non-significant
Krishnamoorthy, 1988	Positively significant
Moorthy, 1984	Positively significant
Godhanapani, 1985	Non-significant
Nanjaiyan, 1985	Negatively significant
Palani, 1987	Non-significant
Ramaswamy, 1987	Positively significant
Krishnamoorthy, 1988	Negatively Significant

2.5.8 Annual income

Vehra (1971) reported that those who had greater economic resources participated more and higher levels of income were conducive for higher participation.

Sushama (1979) reported that there was significant relationship between income of tribes and the attitude towards modern living practices in more developed areas.

Kailasam (1980) found that income had positive and significant association with extent of participation.

Mercoiret *et al* (1990) reported that farmers' organisations were more likely to sustain when they have no impact on family income.

Riddell and Robinson (1995) based on their Indian experience, reported that majority of the groups lacked community participation but all were successful in raising incomes.

Sumana and Reddy (1998) reported that annual income was negatively correlated to participation in watershed development programmes, while Thomas (1998) reported positive and significant relationship between income and participation of farmers in watershed development programmes.

2.5.9 Exposure to mass media

Exposure to mass media was reported to be positively related to innovativeness according to research workers such as Lerner (1958), Roy *et al.* (1968) and Rogers and Svenning (1969).

Rajapandi (1983) reported that mass media was reported to be positively and significantly related to the extent of adoption by both wetland and dryland farmers.

Savithri (1992) concluded that most (62.27 per cent) of the farm women were found to have high level of exposure to mass media followed by medium and low levels with 24.00 per cent and 13.73 per cent respectively.

Chandran (1993) stated that 42.00 per cent of sunflower cultivating dryland farmers had low level of exposure to mass media. Medium and high level of mass media exposure was seen among 34.50 per cent and 23.50 per cent respectively.

2.5.10 Extension participation

The review of studies on adoption in relation to extension participation is given below:

Review of studies	Nature of relationship
Avanti, 1981	Non- significant
Manjunath, 1986	Positively significant
Shivasankara, 1986	Positively significant
Mahadevaiah, 1987	Positively significant
Reddy, 1987	Positively significant
Remeshbabu, 1987	Positively significant
Nandakumar, 1988	Non-significant
Aswathanarayana, 1989	Positively significant
Gopala, 1991	Non-significant
Reddy, 1991	Positively significant

2.5. 11 Economic motivation

Sadamate (1978) reported a positively significant relationship with economic motivation and attitude of tribals towards development.

Sabapathi (1988) observed that those who are economically motivated would try to improve their farming practices by acquiring knowledge from localite sources or cosmopoliteness sources.

Chandran (1989) found positive and significant relationship between economic development and attitude of pepper growers in pepper development programme.

Krishnaiah and Maraty (1989) reported that economic motivation was significantly related to extent of participation.

Anantharaman (1991) reported that economic motivation significantly contributed in efficient management of farms.

Meera (1995) reported that a positively significant relationship exists between economic motivation and adoption behaviour of farmers.

2.5.12 Risk preference

Many researchers have established positive and significant association between risk orientation and adoption behaviour of the farmers. (Jaiswal, 1965, Tripathy, 1977, Rajendran, 1978, Pillai, 1983).

Kamarudeen (1981) observed significant relationship between risk preference and attitude of farmers towards demonstrated cultivation practices.

Naik (1981) and Cheriyan (1984) also reported significant association between risk preference and attitude of farmers.

2.5.13 Achievement motivation

Lowell (1952) observed that high need achievers should perform better than those with low scores.

McClelland (1961) stated that achievement motivation is the desire to do well, not so much for the sake of social recognition or prestige, but to attain an inner feeling of personal accomplishment.

Anantharaman (1991) reported that achievement motivation significantly contributed to efficient farming of cassava.

2.5.14 Credit orientation

Ponnappan (1982) found that credit orientation had significant association with extent of participation of fish farmers of Tamil Nadu.

Wadhwa (1994) based on NABARD experiences reported that self-help groups have been found as an effective and economic means ensuring access of credit to the poor and vulnerable sections of society.

Peterson (1997) reported that access to credit was one of the ways to improve farmers access to new production technology and increased productivity.

Kareem and Jayaramaiah (1998) observed significant relationship between loan amount received and extent of participation in integrated rural development programmes by beneficiaries.

Oostrum (1998) reported that the participatory approach followed by the small holders' associations helped farmers to become credit worthy.

FAO (1999) reported that in Nepal, farmers' associations were provided with credit. But experiences indicate that giving credit alone was not always the best approach. Since it too often induced harmful dependencies, undermining self-reliance. Local resource mobilisation and savings supplemented by matching credit were more effective and sustainable.

2.5.15 Value orientation

Parsons and Shills (1965) defined value orientation as those aspects of the actor's orientation which commits him to the observance of certain norms, standards,

criteria for selection whenever he is in a contingent situation which allow him to make a choice.

Very broadly, value orientation may be explained as a generalised and ordered principle concerning basic human problems, which directly or indirectly influences human behaviour.

Barakataky and Gohain (1970) reported that due to the presence of certain institutional behaviour like religious belief, customs and practices, the pace of expected development was not up to the mark among the tribals.

Dar (1970) reported positive and significant relationship of value orientation with shifting cultivation of tribals.

Goswami and Saika (1970) reported that value orientation of tribals is having a positive significant relationship with modern development.

Sahu (1970) reported that due to the prevalence of rigid, traditional, social and cultural outlook, tribal agriculture could right be classified as subsistence sector of the tribal economy.

Prakash (1980) also reported positively significant relationship of value orientation with agricultural development of tribals.

Kokate *et al.*, (1988) found that traditional believes held by tribals were the bottleneck in the adoption of improved practices in agriculture and animal husbandry.

Chackrabarty *et al.*, (1989) stated that the absence of attitudinal change, attachment of tribals towards traditional heritage, culture and scenic environment in which they live were important aspects of social life that failed to influence the tribal farmer in generating increased level of employment.

2.5.16 Self confidence

Srivastava (1970) observed that *harijans* identify themselves with a closed group of their own, have a hierarchy of further decisiveness among themselves and it is this process that offers resistance to the removal of untouchability.

Hassan (1977) reported that the members of the Scheduled Castes and Scheduled Tribes have *more negative self-image, higher degree of anxiety, authoritativeness and dependence proneness and lower need for achievement* than those of higher and lower caste people.

Review of studies	Nature of relationship
Prasad, 1983	Positively significant
Reddy, 1983	--do--
Shivakumarappa, 1987	--do--
Sumathi, 1987	--do--

2.5.17 Rational orientation

This was operationalised as the extent of rationality and scientific belief of a tribal or settler farmer in relation to different scientific recommendations applicable.

Mannheim (1960) suggested that acts of thought might be classified as substantially rational if they *reveal intelligent insight into the inter-relation of events* in a given situation.

Hobbs (1964) measured rationality on the basis of economic productivity of the entrepreneurs. In this notion of rationality, an individual was considered rational to the extent he earned more profit.

Supe and Singh (1969) inferred that the act of an individual is considered rational to the extent to which he justifies his selection of most efficient means, from among the available alternatives, on the basis of scientific criteria for achieving maximum economic ends.

Rajendran (1992) reported that there was positive and significant relation between rational orientations of Scheduled Caste farming families to the extent of adoption.

2.5.18 Information source utilization

Utilization of personal cosmopolite sources and personal localite sources on factors influencing adoption were studied by many researchers.

Menon (1970) found that neighbours and relatives, radio, exhibition and film shows served as excellent media for the adoption of improved practices by small farmers.

Perumal (1970) reported that mass media played a significant role in influencing farmers to adopt the practices of hybrid maize.

Chandrakandan (1973) concluded that higher the media participation better was the adoption of IR-8 paddy.

Tripathy (1977) observed negative and significant relationship between farmers' use of mass media source of information and technological gap in new rice technology.

Manivannan (1980) found that mass media exposure was positively and significantly associated with the extent of adoption of the selected practices by sunflower growers.

Sohi and Kherde (1980) found that higher exposure to mass media was significantly correlated with the level of adoption of Dairy innovations by the respondents.

Jayakrishnan (1984) reported that mass media participation was positively and significantly associated with extent of adoption of low cost technology among paddy growers.

2.6 Cropping patterns and farming systems in the tribal and settler areas

The method of utilising the land resources by cropping pattern is said to be method of cropping. Farming practice includes specialised farming, diversified or mixed farming and integrated farming.

Wayanad district has a predominantly agrarian economy, which shares 15.9 per cent of the plantation crops of tea, coffee, rubber and cocoa. The most important

crop in the district is coffee (53.425 ha), which contributes 85.7 per cent of the area under this crop in the State. The corresponding percentage for tea is 15.4 per cent with a cropped area of 5389 ha. Another cash crop, which occupies an important position in the district, is lemon grass with an area of 1901 ha which comes to 26 per cent of the area under the crop in the State. Similarly 14.9 per cent of the total area of ginger and 7.9 per cent of cardamom also belongs to the district.

The district is noted for the predominance of the plantation crops and commercial crops. About 2/3rd of the cropped area in the district is covered by them. They also cover the cropped area in the district. The plantation crops of tea, coffee, rubber and cocoa alone covered 46 per cent of the cropped area of the district, corresponding to 13.5 per cent in the State as a whole. However, the prosperity of the district depends mainly on coffee, which occupies about 40 per cent of the total cropped area, against only 2.3 per cent at the State level.

There has been a change in the cropping pattern of significantly larger proportion of households. Besides 37.72 per cent reported increase in area under coffee and 17.98 per cent rise in area under banana. The percentage of households reporting rise in area under paddy, ginger and other crops were 7.46, 5.26 and 4.82, respectively. (Mohandas, 1986).

2.6.1 Cropping patterns

Cropping system is the crop production activity where the meaningful utilisation of the cropping patterns takes place on a farm through their interaction with farm resources and available technology which determine its make up and that contribute to the homegarden requirement in terms of economy (Desai, 1961).

Das (1988) reported that in the case of multi-storeyed cropping under irrigation in coconut garden, the Benefit: Cost ratio was 1.76 and the Internal Rate of Return higher than 20 per cent and the Net Present worth Rs. 32,700/-. He also opined that different varieties of cereals, pulses, oil seeds, tubers and rhizomatous

crops are relatively more compatible and remunerative intercrops than the other annuals in coconut gardens in Kerala.

Gerson (1989) reported that women could increase their income through cultivation of indigenous vegetables like *Solanum nigrum* and *Brassica carinata*.

KAU (1989a) reported that rice based farming system is predominant in low lands and coconut based farming system in uplands. The practice of mixing first and second crop paddy seeds and raising *kootumundakan* mixed crop is followed under the situation in certain areas of Palakkad district.

The nature and type of crops in the homesteads depend mainly on requirement of the farmer and ranges from purely seasonal to perennial crops. One principal feature is that coconut constitutes the base crop in almost every homestead and it is intermixed with other seasonal, annual and perennial crops (KAU, 1989 b).

Storck *et al.* (1991) reported that intercropping of more than two crops is a common practice in Hararghe high land, while crop rotation is practiced less widely. The cropping pattern mainly focused on the provision of food requirement of the family. The land area plays a major role in shaping the household farming system as well as its performance.

Anilkumar (1993) reported that the predominant cropping system of Kerala is coconut based and several farmers are practising sericulture profitably, raising mulberry as an intercrop. Diverse soil and ecological conditions prevailing in Kerala lead to high degree of variability in cropping patterns. Polyculture is the rule in most of the areas. The crop combinations and the crop sequences in the high land, midland and low land are characteristic features of the state.

Gill and Verma (1993) reported that intercropping and mixed cropping of cereals and leguminous forage crops is an advantageous proposition both in terms of yield and quality. Under intercropping yield increased by 44.50 per cent and 26.00 per cent during 1982-83 as compared to sole cropping yield of 72.30 q/ha and 74.00 q/ha respectively.



2.6.2 Farming systems

In a study on economics of mixed farming, Shastry (1959) found that the percentage of income and yield per acre was high on mixed farming units.

Rajagopalan (1960) in a case study on mixed farming units around Coimbatore, concluded that mixed farming led to increasing employment opportunities for family and others and there is a phenomenal development of mixed farming in suburban villages.

Talib and Singh (1960) indicated that yield and income per acre were high in mixed farming as compared to monocrop farming. It was significantly high in the case of small farmers.

Desai (1961) reported that mixed farming with two enterprises on the same farm was to their mutual advantage. He found that crop production aided livestock production by supplying the fodder requirement for livestock and rearing livestock resulted in a better utilisation of resources.

Dhondyal (1971) stated that a farm is termed as a mixed farm where at least 20 per cent of their gross receipts are from milch cattle.

Singh (1971) opined that mixed farming is a system of farming under which crop growing is combined with keeping of livestock production.

Sundaresan (1975) defined mixed farming as rearing of livestock as a subsidiary enterprise along with crop farming.

Puttaswamy (1979) stated that small farmers could maintain two or three milch cows and 15-24 sheep if sufficient operating capital and good marketing facilities were available.

Farming system is the production activity of the farm or holding. The farming systems of homegardens thus encompass the sum total of all activities of the farm related to crop production and overall prosperity of farm household. It comprises all cropping systems in the farm or holding and their interaction with farm resources, other household enterprises and physical, biological, technological, environmental, socio-economic and cultural factors (Swaminathan, 1979).

Mehta *et al.* (1980) inferred that inclusion of dairy activity considerably improved the efficiency of small farmers in Punjab.

Farming system is a resource management strategy to achieve economic and sustained agricultural production to meet diverse requirement of farm and household while preserving the resource base and maintaining a higher environmental quality which could be crop based / bee based and / or animal based (Fernandes and Nair, 1986).

Salam and Sreekumar (1990) opined that mixed farming is a harmonious assembly of crop husbandry and animal husbandry. Mixed farming acts like an ayurvedic treatment to soil ensuring prolonged soil health and consequently the productivity remains sustained.

Singh (1990) opined that mixed farming systems involving proper sequencing of crops, inclusion of livestock/poultry/fish and recycling crop residues and animal/fish wastes can maintain high level of production on a sustainable basis with only moderate use of external inputs without affecting the quality of environment. Optimum harvesting and stocking practices can similarly, restore/maintain forestry and fishery resources in a sustainable system.

Babu and Sreekumar (1991) observed that a vast majority of Indian farmers are practising mixed farming in one farm or other. It offers a vast opportunity and challenge.

Farming system, according to Babu (1995), is the crop production activity of the farm or holding. It comprises all cropping patterns adopted on the farm or holding and their interaction with farm resources, other household enterprises and physical, biological, technological, socio-economic and environmental factors.

The above studies highlight, the relevance of cropping pattern and farming systems in a particular area which is predominantly agrarian. This will also help in suggesting profitable combinations aimed at sustainable agriculture development in a state like Kerala with high cropping intensity and high pressure on land.

2.7 Concept of differential diffusion of agricultural innovations among the tribal and settler farmers.

2.7.1 Delineation of dimensions of technology

To have locally validated technologies, it is essential that the dimensions of technology for systems be identified.

Rajendran (1992) identified 15 dimensions that were related with technology and its feasibility using the mean relevancy score. They were initial cost, income generation, potential, regularity of returns, availability of raw materials, availability of supplies and services, time utilization pattern, rapidity of returns, physical compatibility, efficiency, profitability, availability, simplicity, viability, suitability and social acceptability.

Muthuraman (1995) in his article on sustainable agriculture has quoted some dimensions of sustainable agriculture covering the social, economical, technological, political and environmental facets of sustainability as technological appropriability, economic feasibility, economic viability, environmental soundness, temporal stability, resource use efficiency, local adaptability, social acceptability, social sustainability, political tacitness, administrative manageability, cultural desirability, renewability, equity and productivity.

KAU (2002) identified five dimensions for technology assessment as productivity, adaptability, identity, continuity and security.

2.7.2 Adoption of innovations

The word 'adopt' has the meaning to take up and practice as one's own to accept formally and put into effect. Adoption of a particular message or production recommendation by a farmer implies the voluntary acceptance of the message and its practice.

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

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

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

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

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

Gotsch (1972), Goss (1976), Fliegler and Vaan (1983) had proved 'that consequences' of diffusion of innovations affect adopters and non-adopters of a social system.

Mann (1978) reported that farmers have adopted selectively from technological packages, and that this selectively can be associated with the suitability of a technology to soil and rainfall conditions.

Problems of limited diffusion of new rice technology in South Asia were 'fundamentally related to insufficiently resolved difficulties in adopting the new technology to certain important local and seasonal environments' (Farmer, 1979).

The importance of location specific constraints to technology transfer points to the need for greater attention in diffusion research to what Perez (1979) has termed 'agricultural ecology'. This term referred to a long tradition in cultural or human ecology, which emphasizes the interdependence between social and physical environment. In an ecological framework, a technology or method of farming encapsulates and structures a set of relationships between farmers' social and physical environment resources (Geertz, 1969).

The 'intrinsic characteristics' of the technology and its 'distributional characteristics' define 'the condition for access' to the innovation of potential adopter (Diaz, 1976, Pearse, 1980, Brown, 1981 and Ahamed, 1993).

Ashby (1982), opined that researches done in the lines of the classical diffusion model have been notably deficient in attention to the diverse physiological and social requirements of agricultural technologies and to variations in farming environments as factors influencing farmers' adoption behaviour. The suitability of the agricultural technologies to different farming environments is addressed in the diffusion literature in terms of the availability of socio-economic resources, which facilitate or inhibit farmers' innovation, while the physical and natural parameters of agriculture are largely ignored.

Audirae and Beaulieu (1986) had listed five groups of factors related to the technology affecting its diffusion / adoption. Research and development of the technology

- a) Diffusion infrastructure and diffusion agencies strategies.
- b) Characteristics of the technology
- c) Access conditions for adoption and
- d) Consequences of adoption

According to Webster's Dictionary, the term to adopt means to take up and practice. Ban and Hawkins (1990) defined adoption of innovations as the decision to apply an innovation and to continue to use it.

The 'individual blame' hypothesis, which refers to the socio-psychological factors related to the individual, has for a long time, been thought to be the principle factor affecting the adoption decision. More recently many researchers have focussed attention on the 'system blame' hypotheses which states that characteristics of the technology and the access conditions of the farmers affect the adoption decision (Hooks *et al.* 1983, Audirae and Beaulieu, 1986, Ban and Hawkins, 1988 and Ahamed, 1993).

According to Ashby (1982) adoption of innovations is a decision to substitute or adopt a technique or practice presently being used for a newer one. This decision is possible when there is a match between the conditions for access to the innovation, the potential users' ecological location, natural resource endowment and structural characteristics farm size, capital, hired labour, level of management.

2.7.3 Extent of adoption

Gondi and Gowder (1983) indicated that recommendation involving high cost such as use of fertilizers and plant protection chemicals have been only partially adopted by majority of farmers.

Karwara *et al.* (1991), in their study on comparative adoption of improved technology by female and male-headed Scheduled Caste families, observed that 76 per cent of the female and 70 per cent of the male respondents accepted the improved technology of rice cultivation. It is also evident from the data that 60 per cent of the families headed by women and 48 per cent of the families headed by men adopted the improved package of practices for rice cultivation.

The views of the above authors gave an idea about the dimensions/determinants of technology and their importance in adoption of a particular innovation. It can be concluded from the above studies that the diffusion and adoption of a particular innovation surely depends on the determinants of the innovation. Without taking into consideration the determinants of the innovation, any effort taken to diffuse an innovation will not achieve the desired goal.

2.8 Concept of socio-technical determinants in the diffusion of agricultural innovations among the tribals and settlers farmers

2.8.1 Socio-technical systems

Studies directly related to the socio-technical determinants in the diffusion of agricultural innovations could not be located. Hence studies similar to the concept were reviewed for the purpose of this study.

The notion of socio-technical systems arose from research conducted by Trist and Bamforth in the early 1950s. But here they mentioned about the socio-technical systems in relation to an organisation. A socio-technical systems approach takes the organization as an open system accommodating the technical (task) sub-system and the social subsystem. The technical subsystem receives the inputs and transforms them into outputs. An extension of the open system perspective is the concept of socio-technical systems. Any complex system consists of many subsystems, which, like the overall system, have elements.

The social sub-system embraces interpersonal relationships within the organisation and consists of personal preferences, mutual trust and insight into other peoples' behaviour, antagonisms and so on. The task of management is to create socio-technical systems in which the two sub-systems reach optimum levels together, and are mutually supportive.

Socio-technical systems, here is defined as the social and technical determinants which affects any innovation which is introduced into a system. Any social system is unique in its properties and culture. The social and technical determinants particular to a certain social set up is different from another. Any innovation introduced into a system is influenced by these determinants. For the innovation to fit appropriately into a system, these social and determinants should be taken into consideration. A perfect harmony of the innovation with the social and technical determinants of the system will give the desired results always.

The notable contribution of the socio-technical approach is the emphasis on jointly harnessing the technical and social sub-systems with due regard to the relevant environment.

2.8.1.1 Progressiveness

Rogers (1962) opined that the criterion for adopters categorisation is innovativeness which is the degree to which an individual is relatively earlier to adopt new ideas than other members of the social system.

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

Singh *et al.*, (1971) reported that the large proportion of less progressive farmers borrowed money for the purchase of bullocks followed by fertilizers whereas in the case of their progressive counterpart, the majority obtained credit for investment in developing owned irrigation equipment.

Jaiswal and Dave (1972) referred that the 'Progressive farmers', 'Innovators', 'Agricultural leader', 'Good adopter' etc., have been used as synonymous. Again he conceptualised that a 'A progressive farmer' is one who in comparison with his fellow farmer possess better knowledge and a more positive conviction about improved agricultural practices and who is an early adopter of a greater number of agricultural innovations and where total production and net-profit per unit area better than the norm of his farming community.

2.8.1.2 Fatalism

Vyas and Mann (1960) stated that the tribal society continued to be superstition ridden. The predominance of superstition had not been shaken even under the changing conditions in certain other fields.

Burman and Sharma (1970) found that the question of values was found to affect the adoption of settled agriculture where lands were available with the tribals or made available by the Government.

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

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

Sahu (1970) reported that due to the prevalence of rigid, traditional social and cultural outlook, tribal agriculture could be rightly classified as subsistence sector of the tribal economy.

Srivastava and Singh (1970) found that the tribals have continued to remain conservative and tradition bound.

Yadav (1970) observed that the tribal leaders gave more emphasis on sticking to the traditional way of life.

Dass (1978) reported about the highly superstitious nature of Bond tribes of Orissa and Vedas of Ceylon.

Racine (1978) reported that 'Malaiyali' tribes of Kalrayan mountains in Tamil Nadu are maintaining traditional social structures.

2.8.1.3 Cosmopoliteness

Tripathi (1972) found that new values were replacing old because the tribals had continuous contact with outsiders.

Murthy and Singh (1974) also reported positive and significant correlation between cosmopoliteness and information input and output indices of farmers.

Siddaramaiah and Rajanna (1984) found that farmers with high cosmopoliteness had significantly higher gain in knowledge about agricultural aspects.

Sherief (1985) reported positive and significant correlation between cosmopoliteness and communication behaviour of non-contact farmers.

2.8.1.4 Indebtedness

The study by Mathur (1975) also revealed that the most important cause of indebtedness among the tribes of Kerala are their primitive agricultural technology, illiteracy, low wages, absence of marketing infrastructure and their social and religious problems. The study revealed that the agricultural loans were mostly used for consumption of by majority of tribes. He has also reported that these tribes who

have adopted improved seeds and modern techniques of cultivation are heavily indebted than those who have not responded to improved techniques.

According to Ganguli and Gupta (1976) indebtedness includes hereditary debt and long term loans borrowed by the family for various purposes like socio-cultural activities, improvement of land, purchase of land and livestock, construction of houses, purchase of other movable or immovable assets, crops loans of consumption expenditure.

Indebtedness is a very serious problem faced by the tribes of Kerala. Tribal indebtedness is both a cause and effect of poverty and is also related to bonded labour and alteration of tribal land. (Mathur, 1977)

Puri (1978) found positive significant relationship of indebtedness of tribals with development.

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

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

The nature of relationship of indebtedness with adoption behaviour as reported by researchers in summarised below.

Prakash, 1980	Positively significant
Viju, 1985	Positively significant
Bonny, 1991	Non-significant

According to George and Krishnaprasad (2006) there were three major interrelated factors seem to be responsible for the severe agrarian crisis in the present day Wayanad. The first one is the crash of the price of agricultural produce, the second is indebtedness and the third, drought, diseases and depletion of water sources.

2.8.1.5 Migration

The large scale influx of migrant settlers in the Wayanad district resulted in progressive depletion of common property resources including forests.

According to Mohandas (1992), the principal motive of the settlers was to pursue cultivation in the rich soils of the highlands in the Wayanad district. Nevertheless, the nature of acquiring land ranges from direct cash purchases to illegal encroachment.

2.8.1.6 Attitude towards development

The concept of attitude is the most indispensable concept in behavioural science. The influence of attitude upon psychological processes such as learning, remembering, perception, reasoning, decision making, adoption etc., has been studied by many social scientists.

Allport (1975) stated that attitude is a mental and neutral state of readiness organised through experience exerting a direct dynamic influence upon the individuals response to all objects and situations with which it is related.

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

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

Rai (1965) revealed that adopters of new ideas had favourable attitude towards government programmes

Majumdar and Majumdar (1967), in their study, concluded that attitude was significantly related with adoption behaviour of farmers.

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

Sureshkumar (1989) defined attitude as a summary statement or label for the individual's entire learning history with respect to attitudinal object.

Prakash (1980) operationally defined attitude as the degree of positive or negative affect of the tribals associated with the development programmes for the tribes.

Fathimabi (1993) in her study concluded that most of the agricultural labourers had favourable attitude towards the welfare schemes for agricultural labourers implemented by Government of Kerala. Gangadharan (1993) in another study on pepper growers of Kerala found that majority (89 per cent) of the pepper growers had favourable attitude towards improved agricultural practices.

Hemalatha (1997) revealed that more than 55 per cent of the paddy farmers in Thiruvananthapuram district had favourable attitude towards rice based farming system. In a study among Scheduled caste farm families of Kerala, Rajendralal (1997) opined that for any development programme to achieve maximum people's participation, the beneficiaries must have a positive attitude towards the developmental programme.

The views of the above authors revealed that the attitude of human beings towards an object, programme etc. varied with situation. It can be concluded from the above studies that favourable attitude towards a development programme, technology or innovation is a prime requirement for its increases participation and success.

2.9 Constraints experienced by tribal and settler farmers in their farming

Norman (1982) identified the problem in vegetable cultivation as the high attack of pests and diseases and high input cost farmers also stated that they experienced serious transportation problems in marketing their produce.

Prasad *et al.* (1987) classified those factors influencing the development of agricultural sector in India to common basic constraints, technological constraints, organisational and administration constraints, extension constraints and social constraints.

Pandya and Trivedi (1988) defined constraints as those items of difficulties or problems faced by individual in adoption of a technology. According to Zinyama (1988) a constraint is any problem or limitation.

Menon and Bhaskaran (1988) found that lack of sufficient land and fragmented land holdings were the major constraints to agricultural technology transfer in Kerala.

Rajendran (1992), while analysing the feasibility and utilisation of selected agricultural enterprises among Scheduled Caste farmers observed that lack of technical knowledge, lack of necessary supporting services and unavailability of raw materials as the major constraints in the utilisation of agricultural technologies in general.

Bhaskaran and Sushama (1994) cited lack of infrastructural facilities, absence of technology evaluations and upgradation efforts, inadequate training for farmers, extension personnels and researchers, lack of functional linkages among the research, extension, input and farmer sub-systems as some constraints in technology transfer in Kerala agriculture.

Methodology

3. METHODOLOGY

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

3.1 Locale of the study

3.2 Selection of the sample

3.3 Measurement of variables

3.3.1 Profile characteristics of the tribal and settler farmers including the personal, psychological, socio-cultural and economic variables

3.3.2 Cropping pattern and farming systems in the tribal and settler areas.

3.3.3 Differential diffusion of agricultural innovations in tribal and settler areas

3.3.4 Construction of Socio-technical feasibility index

3.4 Statistical tools used

3.5 Conceptual model of the study

3.1 LOCALE OF THE STUDY

The study was confined to Wayanad District of Kerala, that is chosen on well-founded grounds. First it is the homeland of the most primitive and smallest of the tribal communities on the Indian mainland (Singh, 1977). Secondly, Wayanad has the highest tribal concentration in the State. Wayanad also has the largest population of settlers compared to the other districts. Thus, Wayanad district, which has the highest tribal congregation, coupled with preponderance of settlers, is an ideal location for such a study (Fig. 1).

3.2 Selection of the sample

Kalpetta, Mananthavady and Sulthan Bathery are the three blocks of Wayanad district. There are 24 panchayats with a Krishi Bhavan in each panchayat. From each block, two panchayats having the maximum number of tribal population has been



Fig. 1 Map showing the locale of the study

selected. Thus, the study was conducted drawing samples from these six panchayats of the district. The six panchayats selected for the study are Kaniyampetta and Muttil from Kalpetta block, Noolpuzha and Poothady from Sulthan Bathery block and Thirunelli and Panamaram from Mananthavady block.

Initially from each of the selected panchayats, the lists of tribal and settler farmers were prepared.

From each selected panchayat, 30 tribal and 30 settler farmers were selected using simple random sampling procedure. Thus, there were a total of 360 respondents comprising 180 tribal and 180 settler farmers for the study.

3.3 MEASUREMENT OF VARIABLES

3.3.1 Profile characteristics of the tribal and settler farmers including the personal, psychological, socio-cultural and economic variables

3.3.1.1 Age

Age was operationalised as the number of years completed by the respondents at the time of interview. It was measured by directly asking them the years one had completed at the time of enquiry.

Depending upon the age of individual, they were categorised into three groups taking the frequency and percentage.

3.3.1.2 Education

Education refers to the extent of literacy obtained by the respondent at the time of study. The level of education was measured with the help of scale developed by Trivedi (1963) with slight modifications. Scoring procedure is as follows:

Sl. No.	Level of education	Score
1.	Illiterate	1
2.	Primary level	2
3.	Secondary level	3
4.	Collegiate	4

Accordingly they were classified into their respective groups taking the frequency and percentage.

3.3.1.3 Family educational status

The family education status was measured by the measurement procedure adopted by Ray (1967) where the total educational status was averaged with effective family size. The effective family size was the number of members above the age of five. The respondents were classified in the same way as educational status.

3.3.1.4 Type of family

The respondent was asked about the type of family he belonged to, whether unmarried, nuclear or joint family. The respondents were classified taking the frequency and percentage into the three respective categories.

3.3.1.5 Size of the family

The specific numbers of members of the family of the respondent were noted to know the size of the family. They were asked directly how many members were there in their family and classified into three groups.

3.3.1.6 Dependency

The number of members above fourteen who were dependent on the respondent for their livelihood was considered as the dependent members. The respondents were classified into three groups taking the frequency and percentage.

3.3.1.7 Farming experience

The experience of the respondent in farming was found out directly, by asking the respondent, the number of years of experience he had in farming and further classified into four groups taking the frequency and percentage.

3.3.1.8 Annual income

Annual income was reckoned as the total income obtained from agricultural and other subsidiary occupation for a period of one year. This is measured by directly asking the respondents to indicate their total income both from main and subsidiary occupation for the last one year. Accordingly, the respondents were classified into five various income groups.

Category (In Rupees)

Upto 2000/-

2001 to 5000/-

5001 to 10,000/-

10,001 to 20,000/-

20,001 and above

3.3.1.9 Exposure to mass media

Refers to the degree to which a tribal or a settler farmer had exposure to various mass media available.

The procedure used by Pradeepkumar (1993) was used with slight modification.

Sl. No.	Medium	Daily	Twice / more in a week	Once in a week	Fortnightly	Once in a month	Never
		6	5	4	3	2	1

1.	Newspapers						
2.	Television						
3.	Radio						
4.	Farm magazines						
5.	Other magazines related to agriculture						

The respondents were classified into high, medium and low groups on the basis of the mean and standard deviation. The scores ranged from five to thirty.

3.3.1.10 Extension participation

This refers to the extent of participation of tribal/settler farmer in different extension activities conducted during the past one year.

Category of response	Score
Attended regularly	3
Attended occasionally	2
Never attended	1

The total score was arrived at by summing the scores obtained by the respondent. The respondents were further classified into high and low groups taking the mean and percentage. The scores ranged from nine to twenty -seven.

3.3.1.11 Economic motivation

Economic motivation refers to the extent to which a tribe/settler is oriented towards profit maximization and relative value he places on monetary gains.

This variable was measured using the scale developed by Supe (1969). The scale consists of six statements. The responses were collected on a two point continuum, agree and disagree with assigned scores of two and one respectively for

positive statements. The scoring was reversed in the case of negative statements and classified into high and low groups. The scores ranged from six to twelve.

3.3.1.12 Risk preference

Risk preference was operationalised as the degree to which a tribal/settler farmer is oriented towards risk and uncertainty and portrayed the courage to face the problems occurring.

To measure this variable, risk preference scale developed by Supe (1969) was adopted in this study. This scale consisted of six statements of which two were negative and the rest positive. The responses were collected on a five-point continuum as strongly disagree, disagree, undecided, agree, strongly agree with scores of five, four, three, two and one respectively. For negative statements the scoring pattern was reversed. The total score obtained by summing the score for each statement yielded risk preference score of the respondent. The respondents were classified into high, medium and low groups on the basis of the mean and standard deviation. The scores ranged from six to thirty.

3.3.1.13 Achievement motivation

Achievement motivation refers to the striving of the tribal/settler farmer to do good work and attain a sense of accomplishment. The scale used by Manohari (1970) was used with slight modification. There were five statements which were rated on a two point continuum of Yes (2) / No (1). The respondents were classified into high, medium and low groups taking the mean and standard deviation. The scores ranged from five to ten.

3.3.1.14 Credit orientation

Refers to the orientation to avail credit by the respondent.

It was measured using the scale developed by Bael and Sibley (1967). The scale consisted of five statements. The first and last items were measured with Yes or

No response with scores two and one respectively. The second statement 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 statement was measured on a four- point continuum as very bad, bad, fair, very fair with scores of one, two, three and four, respectively. The fourth item was measured on a five point continuum of strongly agree, agree, undecided, disagree and strongly disagree with scores of five, four, three, two and one respectively. Summation of these scores of all the statements was the credit orientation score of the respondent. The scores ranged from five to eighteen. The classification is the same as the above procedure.

3.3.1.15 Self confidence

This refers to the belief of a respondent in his own abilities, initiative and zeal to achieve his goal or aim. This variable was measured by the scale used by Seema (1997). The scale consisted of seven statements. The scores were given as five, four, three, two and one for always, very often, often, sometimes, and never respectively and classified using the mean and standard deviation. The scores ranged from seven to thirty-five.

3.3.1.16 Value orientation

It is defined as the belief held by the tribal/settler that human situations and acts are pre-determined by some supernatural power and their positive attitude towards traditional institutions and practices.

Value orientation of the tribes and settlers were measured using the scale used by Rajendralal (2005) with slight modification. The scale consists of six statements with response categories ranging from strongly agree to strongly disagree with scores of five, four, three, two and one respectively. Summation of these scores gave the value orientation of each respondent and classification was done on the basis of mean and standard deviation. The scores ranged from six to thirty.

3.3.1.17 Rational orientation

This was operationalised as the extent of rationality and scientific belief of a tribal/settler farmer in relation to the different scientific recommendations of an enterprise. The procedure developed by Jetley (1977) and adopted by Selvanayagam (1986) was used for measuring rational orientation of a farmer.

The question 'what do you feel about the increased improvement in your life?' was posed to the respondent which was rated based on the response as follows:

Response	Score
1. Belief in stars and not in scientific recommendations.	1
2. Belief in stars and scientific recommendation	2
3. Belief only in scientific recommendations	3

The score obtained by the respondent was taken as the rational orientation score of the respondent.

3.3.1.18 Information source utilisation

Information source utilisation was operationally defined in terms of the frequency of obtaining information from different sources. The different sources for obtaining information about agricultural technology were listed and were grouped into three categories viz., mass media, personal cosmopolite sources and personal localite sources.

The procedure followed by Sureshkumar (1994) was adopted in the present study. Each respondent was asked to indicate as to how often he got information regarding agricultural practices from each of the listed sources. The scoring pattern was as follows:

Whenever needed	3
At times needed	2
Never	1

The scores were summed up across each item to form the information source utilisation score of the respondent. The scores ranged from 17 to 51. Mean and standard deviation was used to classify the respondents into high, medium and low groups.

3.3.2 Cropping pattern and farming systems in the tribal and settler farmer areas

The cropping pattern and farming systems were taken into account by asking the respondent about the crops the tribal/settler farmers cultivated and the area of land he owned. The various combinations were taken into account and then for each block the cropping pattern and farming systems were recorded.

3.3.3 Differential diffusion of agricultural innovations in tribal and settler areas

After review of literature and discussion with experts, a schedule was prepared to study the differential diffusion of agricultural innovation. Five crops were listed out, which were the major crops of Wayanad.

The five important crops of the district namely banana, coffee, pepper, ginger and paddy were taken to study the diffusion of agricultural innovations. Based on the Package of practices of Kerala Agricultural University (2003) and discussions with experts, a set of cultivation practices for each crop were identified. Those practices which are considered vital, potential and viable were listed out and rated as important unanimously by all experts were finally selected and were considered as innovations for the respective crops. For each practice adoption was measured using the scale developed for the study.

Practices selected for each crop

3.3.3.1 Banana

- a) Removing affected plant parts along with the rhizomes completely and practising field sanitation help to control pseudostem weevil and rhizome weevil.
- b) Removing side suckers produced till the emergence of bunch.
- c) Applying 30 g furadan at planting and 15 g furadan 2-3 months after planting controls bunchy top disease in banana.
- d) Greater yam and elephant foot yam can be profitably intercropped with *nendran*.

3.3.3.2 Coffee

- a) *Cauvery* is a good variety in coffee.
- b) Mature plants may require medium to severe pruning once in four years.
- c) Ripe and fallen fruits must be immediately removed from the site for the control of coffee borer.
- d) For higher yield shade control should be practiced
- e) Falling of flowers due to dry spells can be avoided by providing irrigation.

3.3.3.3 Pepper

- a) The shoots having 2-3 nodes in each are planted in pits of 50 cm³ on the northern side of standards, 15 cm away from it.
- b) For the control of pollu caused by the flea, spray insecticide dimethoate or monocrotophos 0.05 % concentration.
- c) For the control of phytophthora foot rot a foliar spray with 1% Bordeaux mixture is to be given twice a year.
- d) For control of rotting disease of seedlings in nursery *Trichoderma* can be applied in the potting mixture.
- e) During rainy season mulching the crops helps in reducing mealy bugs.

3.3.3.4 Paddy

- a) Applying 5 tonnes of FYM as basal dose before planting.
- b) Maintaining water level at about 1.5 cm during transplanting. Thereafter increase it gradually to about 5 cm until maximum tillering stage.
- c) Applying recommended fertilizers in split doses to increase the yield.
- d) Applying 2 ½ kg lime in transplanted fields in alternate years.
- e) Applying weedicides like Propanin or 2,4-D helps to reduce the cost of cultivation and increase profit.
- f) Cultivating tolerant varieties.
- g) Adopting timely control measures against insect pests and diseases based on surveillance.
- h) Draining water two weeks before harvest.

3.3.3.5 Ginger

- a) *Rio-De-Janeiro* is a good variety in ginger.
- b) For dry ginger *Maran* variety is good.
- c) Soaking the selected rhizomes in a solution of 0.3% mancozeb and 0.1% malathion for 30 minutes and dry the rhizomes in shade and store the treated rhizomes in pits dug under shade.
- d) For controlling rot, use disease free rhizomes and prevent water logging.
- e) For controlling rhizome rot, inoculation with *Trichoderma* is recommended as a bio control measure.
- f) Immediately after planting, mulch the beds thickly with green leaves and repeat it at two months and four months interval.
- g) To control stem borer spraying 0.05 % dimethoate or quinalphos 0.05 %.
- h) When symptoms of rhizome rot is noticed in the field, digging out the affected plants and drenching the beds and surrounding plants with copper oxychloride (2gm / litre).

3.3.3a Adoption of a particular innovation

The schedule and scoring pattern so as to measure adoption of a particular innovation are as follows:

For each innovation the following responses were collected:

- | | | |
|---|-----------|-------------|
| 1. Do you know about this technology? | Yes | 2 |
| | No | 1 |
| 2. Where did you get information regarding this technology? | | |
| 3. Do you practise this technology | Yes | 2 |
| | No | 1 |
| 4. How long have you been practising this technology? | | |
| 5. Partially or fully | (Full: 2, | Partial: 1) |

The adoption for each crop and each practice was recorded by taking the frequency and percentage of the respondents following each practice. Test of significance (z) for difference among the proportion of respondents adopting the various practices were also calculated using the following procedure.

$$z = \frac{P_1 - P_2}{\sqrt{Pq (1/n_1 + 1/n_2)}}$$

P_2 = Proportion of respondents among settlers following each practice

P_1 = Proportion of respondents among tribals following each practice

P = Weighted mean proportion of tribals and settlers

$q = 1 - P$

n = Number of respondents following each practice

The test for difference, if found to be greater than 1.96, then it states that there is significant difference among the tribals and settlers regarding the practice.

3.3.4 Socio-technical feasibility index

3.3.4.1 Concept of feasibility

Websters' Ninth New Collegiate Dictionary (1988) gave meaning to the word 'feasible' as:

- a) capable of being done or carried out
- b) capable of being used or dealt with successfully

Lekshminarayanan(1984) reported that the ultimate adoption of technology depends entirely upon the characteristics of individuals/ groups for whom the technology has been meant for, in addition to their perception about the attributes of the transferred technology.

Singh (1984) opined that the success of transfer of technology depend upon understanding the nature and characteristics of the technology and their specific requirements, the characteristics of the farming community and effective communication strategy.

Planck (1987) observed that each technological innovation in farming meets performed cultural pattern and social structure. Adoption of techniques from a strange culture can super impose, displace or destroy the existing culture.

Mena (1988) opined that a technology which is appropriate for certain levels of development in a particular society may be found inappropriate for other societies at similar levels of development. The development of technology requires an appreciation and consideration of local culture and conditions.

Ensminger (1989) stated that for farmers to move from traditional towards a modernised agriculture, technology must prove to be trustworthy, the availability of credit and inputs must be assumed and markets must be reliable.

Kapur (1989) observed that each level of technology needs its own milieu, its own system of organisation to take roots. The technologies that we innovate must not only be appropriate to our needs, but also to the times and there must also be a new social organisation and environment to sustain them.

Rajendran (1992) found out that simplicity, initial cost, physical compatibility, suitability, availability of raw materials, efficiency and availability of technology as the crucial at determinants of feasibility of agricultural technologies in general.

Jaiswal and Das (1981) reported that several attributes have to be considered carefully while developing a particular technology and transferring the same to the farming community, particularly to the small and marginal farmers. They were as follows:

- 1) Attributes of the adopters (technical, skill, attitude towards change and risk, level of aspiration and level of income)
- 2) Aspects of technology (profitability, diversibility, complexity, communicability and technical soundness of the technology)
- 3) Characteristics of economy (infrastructure demand for products, Govt. policies)
- 4) Features of environment at the farm level (Socio-cultural factors, farm resource constraints)
- 5) Risk and uncertainty

Leagans (1985) observed that the optimum adoption of agricultural production innovation was achieved only when a farmer was persuaded to accept a technological innovation, which, for him is technically sound, economically feasible, physically possible and politically and socially compatible.

Ensminger (1986) expressed the view that if the small farmer is to significantly improve his yields, he must be aided with agricultural technology within his resources and competence.

These observations drive home the point that feasibility of agricultural technologies is an important determinant of its utilization by farmers in general. Feasibility of agricultural technology is of paramount importance so far as

agricultural farmers are considered in view of their general vulnerability and the sophistication of the technology evolved in agricultural sector.

The socio-technical feasibility of agricultural innovations was measured by using the index developed for the purpose and it is composed of the social and technical determinants.

Development of socio-technical feasibility index to evaluate the socio-technical feasibility of agricultural innovations is one of the first and specific objectives of this study. For this, the delineation and prioritization of the social and technical determinants were done by detailed review of literature and discussion with experts and scientists in agricultural extension. Judges rating was relied upon for the final selection of the variables.

After finalization of the variables, the social and technical determinants for the index were measured independently using standard procedures.

3.3.4 Social variables

To find out the socio-technical system determinants of agricultural innovations, first a list of social and technical determinants which affected the diffusion of agricultural innovations into a system were identified.

According to Carr (1985) technology consists of a series of techniques, each technique being associated with a set of characteristics. Any or all of the characteristics may be important in determining whether it is possible and /or desirable to adopt a particular technique in a particular area.

3.3.4.1 Progressiveness

Refers to the degree to which the tribal/settler farmer is progressive in his thoughts.

An arbitrary scale with three statements was used for the study in which the responses were collected on a two-point continuum of agree and disagree with scores of two and one, respectively. The scores of each statement were added up to get

progressiveness of the respondent. The scores ranged from three to six. The classification into high, medium and low groups were done using the mean and standard deviation.

3.3.4.2 *Fatalism*

Fatalism is operationalised as the belief of tribal/settler farmer that human situations and acts are pre-determined by some supernatural powers and can never or little is influenced by individual violation or by act of any one else.

To measure fatalism, the procedure followed by Verma (1996) was used. The scale consists of five items. The first and second items were negative and the rest positive. The scoring was given as five, four, three, two and one for strongly agree, agree, undecided, disagree and strongly disagree, respectively and the same was reversed for negative statements. The scores on statements were summed up to get individual scores. The scores ranged from five to twenty five. Fatalism was classified in the same way as above.

3.3.4.3 *Cosmopolitanness*

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

The scoring pattern adopted by Suthan (2003) was used with slight modification to measure cosmopolitanness. The scoring pattern was:

(A) Twice or more in a week	6
Once in a week	5
Fortnightly	4
Once in a month	3
Seldom	2
Never	1

(B) Purpose of visit	
All visits related to farming	7
Some visits related to his farming	6
Personal or family matters	5
Recreational matters	4
Other purposes	3
Never visits	2
No purpose	1

Mean and standard deviation was used to classify the respondents.

3.3.4.4 *Indebtedness*

Indebtedness is operationally defined as the total debt in terms of money, a tribal/settler farmer owes to various money lending sources at the time of investigation. Indebtedness was measured in rupees itself. The amount of money indebted by a respondent to any of the sources, the amount taken and the amount repaid were taken into account. The respondents were classified into five groups on the basis of the amount in debt.

For the construction of index, a scoring pattern developed for the study was used giving scores for the variable.

Category (In Rupees)	Score
No debt	8
Upto Rs. 2000	7
2001 to 5000	6
5001 to 10,000	5
10,001 to 15,000	4
15,001 to 20,000	3
20,001 to 25,000	2
25,001 and above	1

Accordingly scores were given for each of the respondents.

3.3.4.5 Migration

An arbitrary scale developed for the study, which asks the settler farmer the number of years since he has settled down in Wayanad and the circumstances regarding his settling down at Wayanad. The years were recorded as such and respondents were classified into four groups taking the frequency and percentage.

Here also for the construction of the index, a scoring procedure developed for the study was used. It is as follows:

Category (Years)	Score
≤15 years	1
16 to 30 years	2
31 to 40 years	3
Above 40 years	4

The respondents were classified taking into consideration the above scores.

3.3.4.6 Attitude towards development

Attitude is the degree of positive or negative affect towards a psychological object. In this study, attitude of tribal/settler farmers towards development was studied. The attitude scale developed by Singh and Singh (1972) and used by Prakash (1980) was suitably modified and used for measuring the tribal and settler farmers attitude towards agricultural development programmes.

Out of the 12 items employed for measuring the farmers attitude towards agricultural development programmes, ten items were selected which were slightly modified without altering the meaning to suit the conditions of the tribal and settler farmers in Kerala. The scores ranged from ten to fifty. The respondents were classified into high and low groups taking based on mean value.

3.3.5 Technical determinants of an innovation

The technical determinants affecting an innovation selected for the study were as follows.

1. Social acceptability
2. Physical compatibility
3. Trialability
4. Complexity / Simplicity
5. Relative advantage
6. Availability
7. Sustainability

The scoring pattern developed by Rajendran (1992) was followed here also to study the technical system determinants affecting the diffusion of agricultural innovations.

3.3.5.1 *Social acceptability*

It is the degree to which a technology is considered useful, practical and feasible by majority of the members of a social system. The scoring is as follows:

High	Medium	Low
6	4	2

3.3.5.2 *Physical compatibility*

It refers to the degree to which a technology is perceived as consistent with the infrastructural availability, past experience and needs of the ultimate users. Maximum score was assigned to one who perceived a technology as highly

compatible with his/her past experiences, needs and the infrastructural availability.

The scoring is as follows:

High	Medium	Low
6	4	2

3.3.5.3 Trialability

It reflects the degree to which the technology may be experimented by a respondent on a limited basis. The scoring is as follows:

High	Medium	Low
6	4	2

3.3.5.4 Complexity / Simplicity

It refers to the degree to which a technology is simple to be adopted by the tribal and settler farmers in terms of understanding as well as application. The respondent who perceives a technology as simple as to follow and use was assigned the maximum score. The scoring is as follows:

Simple	Moderately complex	Highly complex
6	4	2

3.3.5.5 Relative advantage

It refers to the degree to which a technology is perceived as being better than the idea it supercedes. The scoring is as follows:

High	Medium	Low
6	4	2

3.3.5.6 Availability

It refers to the degree to which the technology is readily available for use for tribal and settler farmers without any difficulty. The scoring is as follows:

High	Medium	Low
6	4	2

3.3.5.7 Sustainability

The extent to which the technology is perceived to give returns over a period of time was reckoned as sustainability. The scoring is as follows:

High	Medium	Low
6	4	2

3.3.6 Construction of socio-technical feasibility index

In order to measure the feasibility of agricultural innovations among tribals and settlers in the district, an index was constructed taking the socio-technical and adoption aspects measured in the study.

The steps are as follows:

3.3.6.1 The socio-technical determinants and adoption aspects were given for rating and scores were collected for each item on a ten-point continuum. The scores were added up and average was taken to get the weightages for each determinants.

3.3.6.2 The adoption scores for each practice of the selected crops corresponding to each respondent were taken and average rating for each crop was obtained. The adoption score of the respondent was obtained as average adoption score for cropwise practices followed by him.

i) Rating for each crop = $\frac{\text{Scores of adoption of each practice for each crop}}{\text{No. of practices followed}}$

$$\frac{1}{n_i} \sum_j C_{ij}$$

ii) Rating for the respondent = $\frac{\text{Total rating of all the crops cultivated by respondents}}{\text{No. of crops cultivated}}$

$$A = \frac{1}{k} \sum_i \frac{1}{n_i} \left(\sum_j C_{ij} \right)$$

A = Adoption score of the respondent

C_{ij} = Sum of score of adoption obtained for the i^{th} crop, j^{th} practice of respondent

n_i = No. of practices for the i^{th} crop by that respondent

k = No. of crops grown by that respondent

3.3.6.3 In the same way the technical scores for each practice of the selected crops also were added up and average was taken and average rating for each crop was obtained. The technical score of the respondent was worked out as average technical scores for cropwise practices followed by him.

i) Rating for each crop = $\frac{\text{Scores of technical variable for each practice for each crop}}{\text{No. of practices followed}}$

$$\frac{1}{n_i} \sum_j B_{ij}$$

ii) Rating for the respondent = $\frac{\text{Total rating of all the crops cultivated by respondents}}{\text{No. of crops cultivated}}$

$$W = \frac{1}{k} \sum_i \frac{1}{n_i} \left(\sum_j B_{ij} \right)$$

W = Innovation score of each respondent

B_{ij} = Sum of score of innovation obtained for the i^{th} crop, j^{th} practice of respondent

n_j = No. of practices for the i^{th} crop

k = No. of crops grown by the respondent

3.3.6.4 For the index in addition to the adoption scores and the innovation scores, the socio-technical determinants were also taken.

$$F_i = \left(\frac{1}{\sum_j g_j} \right) \left(\sum_j \left(\frac{S_{ij} - M_j}{L_j - M_j} \right) g_j \right)$$

F_i = Index score obtained by i^{th} respondent

S_{ij} = Score obtained to i^{th} respondent for j^{th} variable (Adoption, Innovation and socio – technical variables)

M_j = Minimum score of the j^{th} variable

L_j = Highest attainable score of the j^{th} variable

g_j = Weightage obtained (Judges rating) obtained to the j^{th} variable

Socio-technical feasibility index is developed so that the score of a respondent will come within the range of 0 and 1.

3.4 Statistical tools used

The statistical tools used in analysing the data collected for the study were mean, standard deviation, percentage analysis, correlation analysis, analysis of variance and socio-technical feasibility index developed for the study.

Results and Discussion

4. RESULTS AND DISCUSSION

Keeping the objectives of the study in view, the results are presented under the following headings:

- 4.1 Distribution of respondents with respect to profile characteristics of tribal and settler farmers including personal, psychological, socio-cultural and economic variables.
- 4.2 Cropping pattern and farming systems in the tribal and settler areas.
- 4.3 Comparison of tribals and settlers in the selected three blocks with respect to the selected variables.
- 4.4 Differential diffusion of agricultural innovations in tribal and settler areas
- 4.5 Evaluation of agricultural innovations using the socio-technical feasibility index.
- 4.6 Constraints experienced by the tribal and settler farmers in their farming
- 4.1 Distribution of respondents with respect to profile characteristics of tribal and settler farmers including personal, psychological, socio-cultural and economic variables.

4.1.1 Age

Table 1. Distribution of respondents with respect to age

Age Category	Tribals (n = 180)		Settlers (n = 180)	
	Frequency	Percentage	Frequency	Percentage
Upto 35	17	9.44	16	8.89
36 – 50	82	45.56	77	42.78
Above 50	81	45.00	87	48.33

From the above table, it can be seen that 46 per cent of the tribals belonged to the age group of 36 to 50 and 45 per cent belonged to category above 50. In the case of settlers 43 per cent belonged to the age group of 36 to 50 and 49 per cent belonged to the higher category.

4.1.2 Education

Table 2. Distribution of respondents with respect to education

Education Category	Tribals (n = 180)		Settlers (n = 180)	
	Frequency	Percentage	Frequency	Percentage
Illiterate	53	29.44	8	4.44
Literate	86	47.78	78	43.33
Primary Level	37	20.56	84	46.67
Secondary Level	4	2.22	10	5.56
Collegiate	0	0.00	0	0.00

Table 2. gives us an idea about the education of the tribals and settlers which shows that 29 per cent of the tribals were illiterate and 48 per cent were literate. This is line with Sinha (2006), which states that the literacy rate of the tribals is 23.63 per cent (2001 Census) and it is lower than the general population (52.21 %) and is even lower than that of the Scheduled Caste population (30.6 %).

Settlers were more advanced in which only four per cent were illiterates. Rest of the category i.e., over 43 per cent were literates and about 47 per cent had education upto primary level. With respect to education the tribals are still in their primitive stage with over 29 per cent of the respondents in the illiterate group. Even though literacy was present, majority were in the literate and primary levels only.

However, there were no respondents in both categories at the collegiate level.

4.1.3. Family educational status

Table 3. Distribution of respondents with respect to family educational status

Family educational status Category	Tribals (n = 180)		Settlers (n = 180)	
	Frequency	Percentage	Frequency	Percentage
Illiterate	10	5.56	0	0.00
Literate	86	47.78	35	19.44
Primary Level	74	41.10	120	66.67
Secondary Level	10	5.56	21	11.67
Collegiate	0	0.00	4	2.22

Family educational status, which is considered as the average educational status of the members of the family is given in Table 3. A perusal of the table gives us an idea that among tribals, literate respondents comes to only about 48 per cent followed by respondents having education upto primary level (over 41 per cent).

The settlers' educational status is high, having 66.67 per cent respondents in the primary level category and about 12 per cent respondents in the secondary level category.

This further strengthens the reason that tribals are backward in educational status. They are reluctant to educate their children also. They are mostly engaged in their traditional jobs to meet the day-to-day needs. Female education is also neglected among tribals. They are oriented towards family life at a very young age itself.

4.1.4 Type of family

Table 4. Distribution of respondents with respect to type of family

Type of family Category	Tribals (n = 180)		Settlers (n = 180)	
	Frequency	Percentage	Frequency	Percentage
Unmarried	3	1.67	0	0.00
Nuclear	56	31.11	132	73.33
Joint	121	67.22	48	26.67

Joint family system is prevalent among the tribal communities. Usually more than two families live in a household. The table above shows that about 67 per cent of the tribal respondents belonged to joint family system. The community structure gives prominence to a leader called '*Moopan*' and a number of households under him, which constitute a clan. When the number of members in a family increases, separate sheds are built. But still they remain as a part of the same household.

Among the settlers nuclear family system is prevalent (about 73 per cent).

4.1.5 Family size

Table 5. Distribution of respondents with respect to family size

Family size Category	Tribals (n = 180)		Settlers (n = 180)	
	Frequency	Percentage	Frequency	Percentage
Upto 3 members	47	26.11	39	21.67
4 to 5 members	94	52.22	113	62.78
Above 5 members	39	21.67	28	15.56

Family size will be related to the type of family. As the type of family falls under the joint family category for the tribals, the family size will be naturally four to five members or more than five. Family planning measures are also not followed among the tribals.

4.1.6 Dependency

Table 6. Distribution of respondents with respect to dependency

Dependency Category	Tribals (n = 180)		Settlers (n = 180)	
	Frequency	Percentage	Frequency	Percentage
None	0	0	17	9.44
1 to 3 members	113	62.78	95	52.78
4 to 5 members	58	32.22	61	33.89
Above 5 members	9	5	7	3.89

Large family size in each household and the joint family system enhances the number of dependent members on the earning member. Table 6. shows that among tribals the dependent members is more.

4.1.7 Farming experience

Table 7. Distribution of respondents with respect to farming experience

Farming experience Category	Tribals (n = 180)		Settlers (n = 180)	
	Frequency	Percentage	Frequency	Percentage
≤15 years	41	22.78	16	8.89
16 to 30 years	79	43.89	92	51.11
31 to 40 years	35	19.44	38	21.11
Above 40 years	25	13.89	34	18.89

About 44 per cent of the tribal respondents had farming experience of 16 to 30 years and 19.44 per cent had above 30 years. Among settlers 51.11 per cent had experience of 16 to 30 years and 21.11 per cent had experience above 30 years. Respondents having farming experience above 40 years among tribals and settlers are 13.89 and 18.89 respectively.

Agriculture is the main occupation of the people, for both tribals and settlers in Wayanad. Collection of minor forest produce and hired labour works are some other occupations the tribals go for which limits their farming experience. Moreover, there are many tribal respondents who are landless.

The settlers had migrated to the virgin lands of Wayanad for the sole purpose of cultivating. Excluding some settlers who have started various business ventures, majority of them have farming as the main occupation.

4.1.8 Annual income

Table 8. Distribution of respondents with respect to annual income

Annual income (in Rupees) Category	Tribals (n = 180)		Settlers (n = 180)	
	Frequency	Percentage	Frequency	Percentage
Upto 2000	13	7.22	9	5.00
2001 to 5000	63	35.00	24	13.33
5001 to 10,000	49	27.22	36	20.00
10,001 to 20,000	35	19.44	35	19.44
20,001 and above	20	11.11	76	42.22

Despite the affirmative actions of the planners and policy makers, still the tribals find it very difficult to earn a good living. This statement is proved clear when we look at the data in Table 8. The annual income for 35 per cent of the tribal respondents ranges from Rs. 2001 to Rs. 5000/-. Twenty seven per cent of the respondents had their income ranging from Rs. 500/- to Rs. 10,000/-. Only, 11.11 per cent had income more than Rs. 20,000/-.

Settlers showed a fairer picture in the case of annual income. Twenty per cent had income ranging from Rs. 5001 to Rs. 10,000/-. Over nineteen per cent had income in Rs. 10,001 to Rs. 20,000/- range and 42 per cent had more than Rs. 20,000/-.

Another reason, which can be attributed to the low annual income among tribals, is that the tribals are practising subsistence farming which limits their surplus products for trade whereas the settlers are considered to be innovators. They are proactive in trying out new crops and farming practices and hence their annual income is more than the tribal respondents.

4.1.9 Exposure to mass media

Table 9. Distribution of respondents with respect to exposure to mass media

Exposure to mass media	Tribals (n = 180) Mean 13.56 ± SD			Settlers (n = 180) Mean 16.01 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	26	108	46	39	113	28
Percentage	14.44	60	25.56	21.67	62.78	15.55

Only 14 per cent of the tribal respondents had high level of mass media exposure as per the Table 9. Sixty per cent of the respondents belonged to the medium category and 25 per cent in the low category.

Among settlers, 22 per cent of the respondents were in the high group with high level of mass media exposure and 63 per cent belonged to the medium category.

Settlers being literate and having good annual income have access to the various media like magazines, radio, television etc., when compared to the tribals who are backward in the case of educational status also.

4.1.10 Extension participation

Table 10. Distribution of respondents with respect to extension participation

Extension participation	Tribals (n = 180)			Settlers (n = 180)		
	Mean	High	Low	Mean	High	Low
	9.86	33 (18.33)	147 (81.67)	10.88	50 (27.78)	130 (72.22)

(Figure in parenthesis indicate percentage)

Extension participation is comparatively low among both the tribals and settlers in the district (81.67 per cent and 72.22 per cent respectively). Only a few of the settlers participate in the various programmes such as seminars, exhibitions etc. Those who actively participate act as contact farmers for the extension agents also.

4.1.11 Economic motivation

Table 11. Distribution of respondents with respect to economic motivation

Economic motivation	Tribals (n = 180)			Settlers (n = 180)		
	Mean	High	Low	Mean	High	Low
	11.95	174 (96.67)	6 (3.33)	11.83	158 (87.78)	22 (12.22)

(Figure in parenthesis indicate percentage)

Economic motivation is the inner urge to be self reliant. Usually every individual is economically motivated, be it a tribal respondent or a settler. This may be the reason for high economic motivation among both the category respondents (Table 11.). They wish to utilize the opportunities prevailing to ensure better economic security.

4.1.12 Risk preference

Table 12. Distribution of respondents with respect to risk preference

Risk preference	Tribals (n = 180) Mean 24.69 ± SD			Settlers (n = 180) Mean 24.33 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	42	112	26	72	85	23
Percentage	23.33	62.22	14.45	40.00	47.22	12.78

Majority of the tribal respondents belonged to the medium category in case of risk preference which shows that the tribals are not ready to take any risks in their life. Tribals are more conservative when compared to settlers.

Forty per cent of the settlers were in the high group, ready to take risks, to try out new ideas. The adoption of newly introduced crops like vanilla, cardamom etc., which requires high input and technical support supports the risk preferring nature of the settlers.

4.1.13 Achievement motivation

Table 13. Distribution of respondents with respect to achievement motivation

Achievement motivation	Tribals (n = 180) Mean 9.24 ± SD			Settlers (n = 180) Mean 8.96 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	54	89	37	81	48	51
Percentage	30.00	49.44	20.56	45.00	26.67	28.33

A perusal of the above table shows that in case of achievement motivation, only 30 per cent of the tribal respondents were in the high category whereas among settlers, 45 per cent were in the high group.

Settlers migrate to different places in search of new opportunities to improve their life. They usually exploit the local resources available for their betterment, as they are more motivated to achieve. Hence, the high level of achievement motivation among settlers. On the other hand, tribals are usually less oriented towards modernisation, which requires more achievement motivation.

4.1.14 Credit orientation

Table 14. Distribution of respondents with respect to credit orientation

Credit orientation	Tribals (n = 180) Mean 11.73 ± SD			Settlers (n = 180) Mean 13.15 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	26	122	32	42	121	17
Percentage	14.44	67.78	17.78	23.33	67.22	9.45

Table 14. gives us an idea about the credit orientation of the tribal and settler respondents. About 68 per cent of both categories respondents were in the medium category. Fourteen per cent of the tribal respondents and 23.33 per cent of the settler respondents were in the high category.

Development programmes and welfare activities aimed at the upliftment of the backward communities are implemented in Wayanad also and the respondents are aware of them also. The level of credit orientation according to the above table is a proof for it. But as elsewhere, access to the benefits of these programmes is limited.

4.1.15 Self confidence

Table 15. Distribution of respondents with respect to self confidence

Self confidence	Tribals (n = 180) Mean 24.54 ± SD			Settlers (n = 180) Mean 24.51 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	39	116	25	59	109	12
Percentage	21.67	64.44	13.89	32.78	60.55	6.67

About 21.67 per cent of the tribal respondents were in the high category regarding to self confidence and 64.44 per cent in the medium category. As for the settlers, 32.78 per cent were in the high category and 60.55 per cent in the medium category.

High self confidence may be due to the optimum level of getting the desired results by following the new technologies compared to the traditional ones which are less remunerative. Even though the tribals showed self confidence, they rarely get the opportunity to materialise their confidence.

4.1.16 Value orientation

Table 16. Distribution of respondents with respect to value orientation

Value orientation	Tribals (n = 180) Mean 29.01 ± SD			Settlers (n = 180) Mean 28.13 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	72	86	22	29	116	35
Percentage	40.00	47.78	12.22	16.12	64.44	19.44

A perusal of the above table shows that 40 per cent of the tribal respondents were in the high category regarding value orientation and only 16.12 per cent of the settlers were in the high category.

Tribals are always conventional adhering more to values without any rational thoughts. Their belief in religion is very strong that they believe diseases can also be cured by prayers. They give more importance to the values and norms associated with their culture.

4.1.17 Rational orientation

Table 17. Distribution of respondents with respect to rational orientation

Rational orientation	Tribals (n = 180) Mean 1.84 ± SD			Settlers (n = 180) Mean 2.25 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	11	125	44	59	107	14
Percentage	6.12	69.44	24.44	32.78	59.44	7.78

Rational orientation was medium among the tribal respondents (69.44 per cent) and among settlers, 32.78 per cent of them were in the high category.

Settlers had more exposure to the various media. Compared to the tribes, they are more progressive and have rational thoughts when dealing with life's problems. Good educational status and exposure to the various media also contributed to the high rational orientation.

4.1.18 Information source utilization

Table 18. Distribution of respondents with respect to information source utilization

Information source utilization	Tribals (n = 180) Mean 24.47 ± SD			Settlers (n = 180) Mean 31.82 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	29	96	55	49	111	20
Percentage	16.11	53.33	30.56	27.22	61.67	11.11

Regarding information source utilization, only 16.11 per cent of the tribal respondents belonged to the high group whereas among settlers, it was 27.22 per cent respondents in the high group.

Good educational status and exposure to mass media paves the way for better information source utilization.

4.1.19 Progressiveness

Table 19. Distribution of respondents with respect to progressiveness

Progressiveness	Tribals (n = 180)			Settlers (n = 180)		
	Mean	High	Low	Mean	High	Low
	5.45	89 (49.44)	91 (50.56)	5.57	104 (57.78)	76 (42.22)

(Figure in parenthesis indicate percentage)

Table 19. gives us an idea about the progressiveness among tribals and settlers. Settlers were more progressive than tribals. Education always provides the base to think progressively and to accept the changes in life with a positive attitude. Settlers have a good socio-economic status than the tribals which enable them to seek good opportunities in life. Regarding some questions like children's education, especially female child's education, they responded very positively to it. The tribals strong belief in their religion and high value orientation is a hindrance for progressiveness, but at the present stage, many of these beliefs are in the process of rapid change.

4.1.20 Fatalism

Table 20. Distribution of respondents with respect to fatalism

Fatalism	Tribals (n = 180) Mean 20.8 ± SD			Settlers (n = 180) Mean 19.52 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	56	94	30	21	130	29
Percentage	31.11	52.22	16.67	11.67	72.22	16.11

About 31.11 per cent of the tribal respondents were in the high group with regard to fatalism and 52.22 per cent in the medium category. In the case of settlers, 11.67 per cent were in the high group, followed by 72.22 per cent in the medium group.

Tribals conventional and orthodox nature forces them to think that fate is responsible for all the things that happen in life, whereas settlers' progressiveness attributes the happenings in their life to actions and not to fate.

4.1.21 Cosmopolitaness

Table 21. Distribution of respondents with respect to cosmopolitaness

Cosmopolitaness	Tribals (n = 180) Mean 9.84 ± SD			Settlers (n = 180) Mean 9.9 ± SD		
	High	Medium	Low	High	Medium	Low
Frequency	14	139	27	30	141	9
Percentage	7.78	77.22	15.00	16.67	78.33	5.00

Table 21. shows the cosmopolitaness among the tribals and settlers. About eight per cent of the tribals were in the high group followed by 77.22 per cent having

medium cosmopolitaness. In the case of settlers, 16.67 per cent were in the high group and 78.33 per cent in the medium group.

Due to the settled nature, the settlers have more exposure to the outside world. They visit the nearest towns frequently for various purposes like marketing their produce, to purchase inputs and for their personal needs. This explains the relatively more cosmopolite nature among settlers.

4.1.22 Indebtedness

Table 22. Distribution of respondents with respect to indebtedness

Indebtedness (in Rupees) Category	Tribals (n = 180)		Settlers (n = 180)	
	Frequency	Percentage	Frequency	Percentage
Upto 2000	5	2.78	2	1.11
2001 to 5000	13	7.22	9	5.00
5001 to 10,000	12	6.67	12	6.67
10,001 to 20,000	16	8.89	7	3.89
20,001 and above	14	7.77	75	41.67
Total	120	66.67	105	58.33

Table 22. shows that among the 180 respondents selected for the study in each category, 60 respondents among tribals (33.33 per cent) and 105 respondents among settlers (58.33) had indebtedness. Another heartening state is that about 42 per cent of the settlers had indebtedness of more than Rs. 20,000/-.

Indebtedness is a very serious problem concerning the tribals and settlers in Wayanad district. According to media and the peasant organisations, 130 farmers and agricultural workers had committed suicide in the year 2004 in this small district with a population of about eight lakhs (2001 Census). The reasons according to George and Krishnaprasad (2006) was price crash, drought, depletion of water sources, hike

in cost of production, family obligations and crop diseases respectively. The entry of private lending agencies with higher interest rates and the more social and cultural pressures on the hapless debtors made the crisis even worse.

Most of the respondents had incurred heavy debts, mainly due to investment in their land and newly introduced crops with a hope to harvest better returns. Cost of cultivation had enormously increased as crops need high doses of pesticides and fertilizers. The farmers undergo great deal of financial distress and mental agony due to the uncertainty of yield and violent fluctuations in the prices of agrarian produce.

4.1.23 Migration

Table 23. Distribution of respondents with respect to migration

Migration Category	Settlers (n = 180)	
	Frequency	Percentage
≤15 years	4	2.22
16 to 30 years	26	14.44
31 to 40 years	43	23.89
Above 40 years	107	59.45

Migration is concerned only with settlers. It is interesting to find out that 60 per cent of the respondents had a history of more than 40 years in the district. Twenty four per cent belonged to the range of 31 to 40 years. Above 14 per cent of the respondents belonged to 16 to 30 years range and only two per cent had a history of less than 15 years.

4.1.24 Attitude towards development

Table 24. Distribution of respondents with respect to attitude towards development

Attitude towards development	Tribals (n = 180)			Settlers (n = 180)		
	Mean	High	Low	Mean	High	Low
	32.01	103 (57.22)	77 (42.78)	31.75	90 (50)	90 (50)

(Figure in parenthesis indicate percentage)

Even though the tribals and settlers do have discrepancies in various other personal and socio-economic variables, both the categories do welcome any programmes that will aim for their development and which will provide them a better standard of living. This is evident from Table 24, which shows the tribal and settler respondents in the high group with respect to attitude towards development (57 per cent and 50 per cent respectively).

4.2 Cropping patterns and farming system in the tribal and settler farmer areas

Table 25. Cropping patterns of Wayanad district in general

Combinations	Tribals (n = 180)	Settlers (n = 180)
Paddy	5 (2.78)	4 (2.22)
Coffee	5 (2.78)	--
Pepper	12 (6.67)	5 (2.78)
Coffee, Pepper	8 (4.44)	10 (5.56)
Paddy, Banana	18 (10.00)	12 (6.67)
Banana, Ginger	17 (9.44)	14 (7.78)

Paddy, coffee	--	22 (12.22)
Paddy, Ginger	--	2 (1.11)
Paddy, Coffee, Pepper	5 (2.77)	6 (3.33)
Coffee, Pepper, Banana	27 (15.00)	15 (8.33)
Paddy, Coffee, Pepper, Banana	5 (2.78)	6 (3.33)
Paddy, Coffee, Pepper, Coconut	8 (4.44)	20 (11.11)
Paddy, Coffee, Pepper, Ginger	8 (4.44)	--
Paddy, Banana and other crops	4 (2.22)	22 (12.22)
Vanilla, Cardamom, Tapioca and other crops	6 (3.33)	22 (12.22)
Coconut, Arecanut and other crops	7 (3.89)	26 (14.44)

(Figure in parenthesis indicate percentage)

Table 25 and Figure 2 gives us an idea of the cropping pattern of Wayanad district in general. The most favoured combination among settlers is coconut, arecanut and other crops among settlers (14.44 per cent). The other favoured combinations are paddy-coffee, vanilla-cardamom- tapioca, paddy-banana along with other crops.

In the case of tribals, the most frequent combination was coffee-pepper-banana (15 per cent) followed by paddy-banana and banana-ginger (Ten per cent and 9.44 per cent respectively).

The table proves that settlers are cultivating a variety of crops when compared to the tribals. Moreover, cultivation of vanilla, cardamom, tapioca was seen more among settlers. Among tribals the percentage of respondents cultivating those crops was meagre (3.33 per cent).

The cropping patterns of the selected three blocks are given in detail in the following tables.

Fig. 2. Cultivation of major crops among tribal and settler farmers in Wayanad district

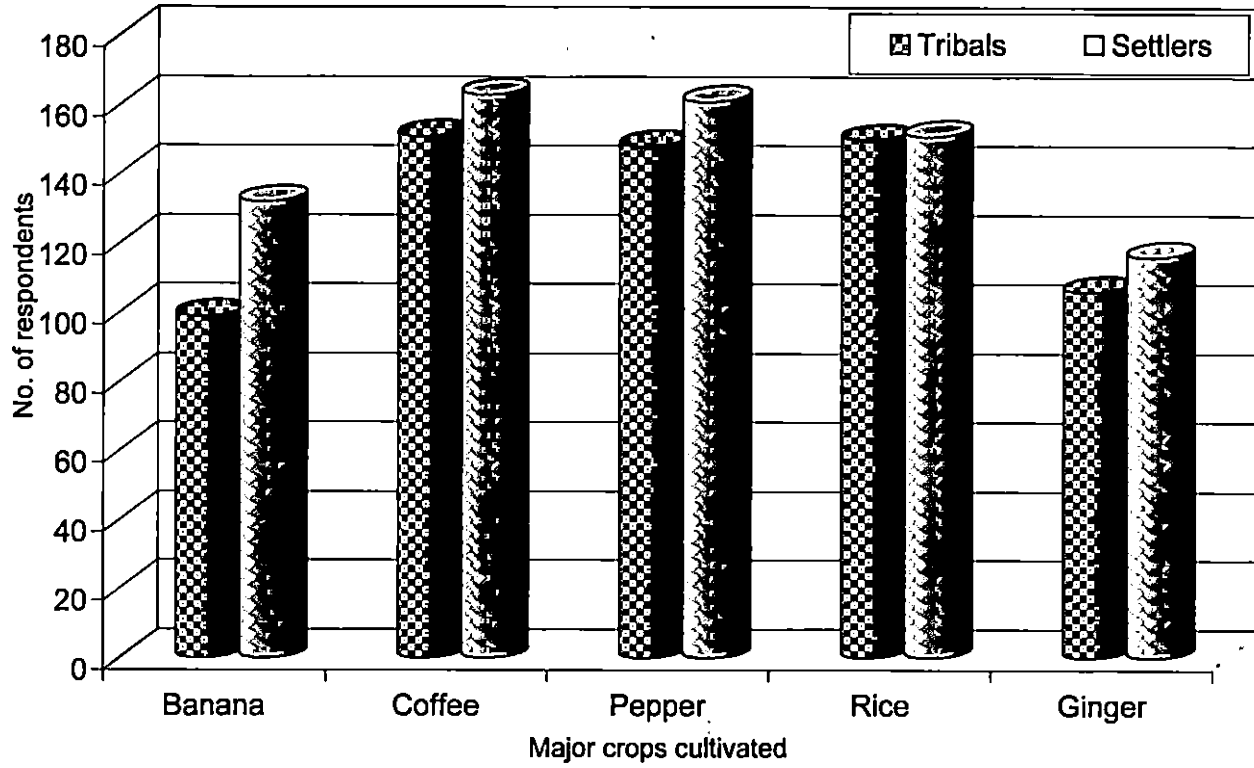


Table 26. Cropping patterns of Kalpetta block

Combinations	Kalpetta block	
	Tribals (n = 60)	Settlers (n = 60)
Paddy	5 (8.34)	4 (6.67)
Coffee	5 (8.34)	---
Coffee, Pepper	8 (13.34)	10 (16.67)
Paddy, Banana	9 (15.00)	2 (3.34)
Banana, Ginger	3 (5.00)	4 (6.67)
Paddy, Coffee, Pepper	5 (8.34)	6 (10.00)
Paddy, Coffee, Pepper, Banana	2 (3.34)	4 (6.67)
Paddy, Banana and other crops	---	12 (20.00)
Vanilla, Cardamom, Tapioca and other crops	2 (3.34)	12 (20.00)
Coconut, Arecanut and other crops	---	6 (10.00)

(Figure in parentheses indicate percentage)

From the above table, it can be seen that among tribals the most frequent combination was paddy-banana (15 per cent) followed by coffee-pepper (13.34 per cent). Monocropping was followed by only a very few respondents. Among the tribals, the cultivation of new crops like vanilla, cardamom etc., was next to nil.

Considering settlers, paddy-banana and other crops (20 per cent) and new crops like vanilla-cardamom, tapioca and other crops (20 per cent) were frequent in Kalpetta block. Combinations like coffee-pepper were also popular (16.67 per cent) followed by paddy-coffee-pepper and coconut-arecanut and other crops (10 per cent).

Table 27. Cropping patterns of Mananthavady block

Combinations	Mananthavady block	
	Tribals (n = 60)	Settlers (n = 60)
Paddy, Banana	9 (15.00)	10 (16.67)
Paddy, Coffee	---	12 (20.00)
Banana, Ginger	12 (20.00)	---
Coffee, Pepper, Banana	15 (25.00)	5 (8.34)
Paddy, Coffee, Pepper, Banana	---	---
Paddy, Coffee, Pepper, Coconut	---	12 (20.00)
Paddy, Banana and other crops	4 (6.67)	10 (16.67)
Coconut, Arecanut and other crops	4 (6.67)	10 (16.67)

(Figure in parentheses indicate percentage)

Among tribals the popular combination was coffee-pepper-banana (25 per cent) followed by banana-ginger (20 per cent) and paddy-banana (15 per cent) respectively. Paddy-banana and other crops and new crops coconut-arecanut with other crops were followed by only few respondents (6.67 per cent)

In the case of settlers, paddy-coffee and paddy-coffee-pepper-coconut were the most favoured combinations (20 per cent). Paddy-banana, paddy-banana along with other crops and coconut-arecanut along with other crops came next (16.67 per cent).

Table 28. Cropping patterns of Sulthan Bathery block

Combinations	Sulthan Bathery block	
	Tribals (n = 60)	Settlers (n = 60)
Pepper	12 (20.00)	5 (8.34)
Paddy, Coffee	---	10 (16.67)

Paddy, Banana	---	---
Paddy, Ginger	---	2 (3.34)
Banana, Ginger	2 (3.34)	10 (16.67)
Coffee, Pepper, Banana	12 (20.00)	10 (16.67)
Paddy, Coffee, Pepper, Coconut	8 (13.34)	8 (13.34)
Paddy, Coffee, Pepper, Ginger	8 (13.34)	---
Vanilla, Cardamom, Tapioca and other crops	4 (6.67)	10 (16.67)
Coconut, Arecanut and other crops	3 (5.00)	10 (16.67)

(Figure in parentheses indicate percentage)

In Sulthan Bathery, 20 per cent of the respondents had pepper as the sole crop and another 20 per cent had coffee-pepper-banana as multiple crops. Paddy-coffee-pepper with coconut and ginger as two combinations were followed by 13.34 respondents each. Here also, the cultivation of new crops were followed by only very few people.

Settlers had paddy-coffee, banana-ginger, new crops like vanilla, cardamom, tapioca and coconut-arecanut along with other crops as popular combinations by 16.67 per cent respondents. Paddy-coffee-pepper-coconut was also followed by 13.34 per cent respondents.

Cropping pattern and farming systems among the tribals and settlers showed notable differences. Majority of tribals in Wayanad district are agricultural labourers having not much cultivable land and no control over land resources. They still preferred the traditional crops to the newly introduced crops like vanilla, cardamom, tapioca etc. The shift in favour of newly introduced crops was not seen among them. So the favoured combinations seen were limited to the predominant five crops of Wayanad.

Settlers had more land compared to the tribals and they favoured the newly introduced crops along with the traditional ones also.

4.3 Comparison of tribal and settler farmers in the selected three blocks with respect to the selected variables.

A perusal of Table 29 gives us an idea about the tribal and settler farmers each with respect to their personal, psychological, socio-cultural and economic variables from the three selected blocks and also between both the categories. The average scores of the two categories of the respondents were compared among and between tribal and settler farmers with respect to the CD values.

Significant difference was observed between tribal farmers from among the three blocks except a few variables like age, economic motivation, progressiveness and indebtedness. Settlers also were significantly different when compared among the three blocks in majority of the variables except age, type of family, family size, farming experience, annual income, achievement motivation, progressiveness, cosmopolitaness, indebtedness and migration.

Regarding tribal and settler farmers, except age, type of family, family size, self-confidence, cosmopolitaness and attitude towards development, all the other variables showed significant difference.

Tribals did not form a uniform pattern of respondents from the selected blocks. Some were very primitive with no cultivation, depending only on wage labour for their livelihood whereas some of them were very progressive in certain aspects, especially in education, socio-economic aspects etc. This may be the reason for the difference observed among tribals.

Settlers were also different among each other but not to that extent of tribals. Some of the families were financially well off, whereas in some cases agriculture was the main source of livelihood. Considering variables like extension participation, information source utilization etc., some respondents were particularly very keen in keeping abreast with the recent happenings in agriculture. They also act as contact farmers and pass on the informations gathered to their fellow folks through informal talks and discussions.

Table 29. Comparison of average score of personal, psychological, socio-cultural and economic variables among tribal and settler farmers in the selected three blocks

	Age	Education	Family education	Type of family	Family size	Dependency	Farming Experience	Annual income	Exposure to mass media	Extension participation	Economic motivation	Risk preference
Tribals												
Kalpetta	51.43	2.12	2.49	2.28	4.73	3.08	33.58	9406.67	15.83	11.57	11.83	25.28
Mananthavady	52.28	1.57	2.02	2.48	5.17	3.6	24.00	15367.5	6.23	9.02	11.98	22.4
SulthanBathery	49.21	2.18	2.67	2.15	3.75	2.83	27.93	8800	18.62	9.00	12	26.38
Mean	50.97	1.95	2.39	2.31	4.55	3.17	28.51	11191.39	13.56	9.86	11.95	24.68
CD	NS	0.26	0.20	0.19	0.55	1.64	4.51	NS	1.60	0.72	NS	1.04
Settlers												
Kalpetta	52.87	2.35	2.74	2.48	4.42	2.25	34.07	18414.17	17.92	13.88	11.63	24.28
Mananthavady	51.47	2.75	2.81	2.38	4.72	3.22	31.7	29941.67	10.2	9.38	11.95	23.07
SulthanBathery	51.92	2.53	2.98	2.12	4.07	3.32	30.07	18733.33	19.9	9.38	11.9	25.65
Mean	52.08	2.53	2.84	2.27	4.4	2.93	31.94	22363.06	16.01	10.88	11.83	24.33
CD	NS	0.24	0.18	NS	NS	0.55	NS	NS	1.71	1.07	0.18	0.9
Tribes Vs Settlers	NS	S	S	NS	NS	S	S	S	S	S	S	S

CD – Critical Difference
 NS – Non-Significant
 S - Significant

Contd.....

	Achievement motivation	Credit orientation	Self confidence	Value orientation	Rational orientation	Information source utilisation	Progressive -ness	Fatalism	Cosmopolite -ness	Indebtedness	Migration	Attitude towards development
Tribals												
Kalpetta	8.83	11.68	25.63	23.30	2.10	32.53	5.30	20.18	10.68	4816.67	---	36.47
Manantha vady	9.70	10.15	22.13	28.07	1.73	13.92	5.50	19.92	9.63	5087.5	---	22.67
SulthanBathery	9.20	13.35	25.87	33.03	1.68	35.95	5.55	22.3	9.20	7191.67	---	36.88
Mean	9.24	11.72	24.54	28.13	1.33	27.46	5.45	20.8	9.83	5698.61	---	32.01
CD	0.30	0.76	1.69	0.89	0.21	1.41	NS	1.05	0.98	NS	---	1.82
Settlers												
Kalpetta	8.67	12.77	27.93	23.58	2.05	36.28	5.00	19.37	10.25	16208.33	46.43	34.28
Manantha vady	9.12	13.85	22.32	30.42	2.67	21.35	5.55	20.73	9.87	18903.51	46.88	22.42
SulthanBathery	9.10	12.83	23.27	33.03	2.03	37.82	5.68	18.46	9.58	46300	40.82	38.55
Mean	8.96	13.15	24.50	29.01	2.25	31.81	5.41	19.52	9.9	27276.84	44.71	31.75
CD	NS	0.73	1.53	1.25	0.18	1.66	NS	1.23	NS	NS	NS	2.51
Tribes Vs Settlers	S	S	NS	S	S	S	S	S	NS	S	---	NS

CD – Critical Difference

NS – Non-Significant

S - Significant

Considering tribals and settlers, it was stated earlier itself, that with respect to almost all variables, there was considerable difference among them. Tribals and settlers form two distinctive ethnic groups of Wayanad, who are very much dissimilar in all respects. The social system in which each group lives, the culture, the norms, customs etc. are unique for each group. Hence, the above result.

4.3.1 Relationship between the selected personal, socio-cultural variables among tribal and settler farmers

A quick glance of the data in Table 30 gives us an idea about the results of the simple correlation among the personal, socio-cultural variables of the tribal and settler respondents selected for the study.

Age was found to be negatively and significantly related to education but was positively significant to farming experience.

Education was found to have positive and significant correlation with exposure to mass media, extension participation, risk preference, information source utilization and attitude towards development programmes. People who are more educated will naturally have more exposure to the various mass media sources and they will be inclined to make use of the various information sources available. Education also makes an individual bold enough to take risks in any new ventures and naturally will have favourable attitude to the various development programmes implemented for the upliftment of weaker sections. This may be the reason for the positive and significant relationship with regard to these variables.

Type of family will have direct effect on the family size and dependency. If the family is joint type, as in the case of tribals with large no. of family members, then correlation will be positive and significant. Dependency also is related to the type of family. If the type of family is large, more no. of dependent members will be present. Hence such a result.

Table 30 . Correlation between the selected personal, socio- cultural variables among tribal and settler farmers

Sl. No.	Tribals Variables	(n=180)	Correlation coefficient	Settlers Variables	(n=180)	Correlation coefficient
1.	Age	Education Farming Experience	- 0.483** 0.625**	Age	Education Dependency Farming Experience Migration	- 0.523** 0.301** 0.697** 0.343**
2.	Education	Farming experience Exposure to mass media Extension participation Risk preference Information source utilization Attitude towards development	- 0.233* 0.508** 0.248* 0.261** 0.333** 0.284**	Education	Farming experience Exposure to mass media Extension participation Risk preference Information source utilization Attitude towards development	- 0.399** 0.508** 0.248* 0.261** 0.333** 0.284**
3.	Type of family	Family size Dependency	0.587** 0.485**	Farming Experience	Economic motivation Migration	0.204* 0.379**
4.	Exposure to mass media	Extension participation Risk preference Credit orientation Information source utilization Attitude towards development	0.216* 0.475** 0.443** 0.758** 0.633**	Exposure to mass media	Extension participation Risk preference Self confidence Information source utilization Attitude towards development	0.377** 0.291** 0.358** 0.707** 0.582**
5.	Risk preference	Credit orientation	0.265**	Information source utilization	Attitude towards development	0.610**
6.	Information source utilization	Attitude towards development	0.694**			

* Significant at 5 %

** Significant at 1%

As mentioned earlier, significant and positive correlation was found between exposure to mass media and extension participation, risk preference, information source utilization and attitude towards development.

Risk preference was found to have positive and significant correlation with credit orientation. Respondents having good orientation will have a tendency to have a favourable mentality towards availing credit and they will be ready to face the risks associated with it also.

Regarding settlers also, age was found to be negatively and significantly correlated with education, but was found to have positive and significant correlation with dependency, farming experience and migration. As age increases, the dependency over the younger members of the family increases. Farming experience is another variable, which is dependent on age. It is the younger generation that is always drifting away from farming. Taking the case of migration, all the settlers who had migrated to Wayanad during the 50s and 60s were senior citizens. This may be the reason for the positive and significant relationship of age with dependency, farming experience and migration.

As in the case of tribals, here also, education was found to have a positive and significant relationship with exposure to mass media, extension participation, risk preference, information source utilization and attitude towards development.

Farming experience was found to have positive and significant relationship with economic motivation and migration. A farmer who is economically motivated is sure to have considerable experience in farming and he considers farming as the best option available for him.

4.4 Differential diffusion of agricultural innovations in tribal and settler areas

The practices are given below for each selected crop:

4.4.1 Banana

- B1- Removing affected plant parts along with the rhizomes completely and practising field sanitation help to control pseudostem weevil and rhizome weevil.
- B2- Removing side suckers produced till the emergence of bunch.
- B3- Applying of 30 g furadan at planting and 15 g furadan 2-3 months after planting controls bunchy top disease in banana.
- B4- Greater yam and elephant foot yam can be profitably intercropped with *nendran*.

4.4.2 Coffee

- C1- *Cauvery* is a good variety in coffee.
- C2- Mature plants may require medium to severe pruning once in four years.
- C3- Ripe and fallen fruits must be immediately removed from the site for the control of coffee borer.
- C4- For higher yield shade control should be practiced.
- C5- Falling of flowers due to dry spells can be avoided by providing irrigation.

4.4.3 Pepper

- P1- The shoots having 2-3 nodes in each are planted in pits of 50 cm³ on the northern side of standards, 15 cm away from it.
- P2- For the control of pollu caused by the flea, spray insecticide dimethoate or monocrotophos 0.05 % concentration.
- P3- For the control of phytophthora foot rot a foliar spray with 1% Bordeaux mixture is to be given twice a year.
- P4- For control of rotting disease of seedlings in nursery *Trichoderma* can be applied in the potting mixture.

P5- During rainy season mulching the crops helps in reducing mealy bugs.

4.4.4 Paddy

- R1- Applying 5 tonnes of FYM as basal dose before planting.
- R2- Maintaining water level at about 1.5 cm during transplanting. Thereafter increase it gradually to about 5 cm until maximum tillering stage.
- R3- Applying recommended fertilizers in split doses to increase the yield.
- R4- Applying 2 ½ kg lime in transplanted fields in alternate years.
- R5- Applying weedicides like Propanin or 2,4-D helps to reduce the cost of cultivation and increase profit.
- R6- Cultivating tolerant varieties.
- R7- Adopting timely control measures against insect pests and diseases based on surveillance.
- R8- Draining water two weeks before harvest.

4.4.5 Ginger

- G1- *Rio-De-Janeiro* is a good variety in ginger.
- G2- For dry ginger *Maran* variety is good.
- G3- Soaking the selected rhizomes in a solution of 0.3% mancozeb and 0.1% malathion for 30 minutes and drying the rhizomes in shade and storing the treated rhizomes in pits dug under shade.
- G4- For controlling rot, use disease free rhizomes and prevent water logging.
- G5- For controlling rhizome rot, inoculation with *Trichoderma* is recommended as a bio control measure.
- G6- Immediately after planting, mulch the beds thickly with green leaves and repeat it at two months and four months interval.
- G7- To control stem borer spraying 0.05 % dimethoate or quinalphos 0.05 %.

G8- When symptoms of rhizome rot is noticed in the field, digging out the affected plants and drenching the beds and surrounding plants with copper oxychloride (2gm / litre).

Table 31. Differential diffusion of innovations among tribal and settler farmers in Wayanad district

Crop	Kalpetta Block		Test for difference in proportions (z)
	Tribals (n = 180)	Settlers (n = 180)	
Banana	99 (42.86)	132 (57.15)	
B1	32 (32.33)	65 (49.25)	2.578*
B2	32 (32.33)	64 (48.49)	2.467*
B3	36 (36.37)	78 (59.09)	3.419*
B4	34 (34.35)	67 (50.76)	2.489*
Coffee	151 (48.09)	163 (51.91)	
C1	86 (56.96)	81 (49.70)	1.288*
C2	94 (62.26)	118 (72.40)	1.917
C3	68 (45.04)	104 (63.81)	3.339*
C4	64 (42.39)	103 (63.19)	3.692*
C5	65 (43.05)	86 (52.76)	1.721
Pepper	148 (47.90)	161 (52.11)	
P1	74 (50.00)	102 (63.36)	2.368*
P2	60 (40.54)	98 (60.87)	3.571*
P3	42 (28.38)	98 (60.87)	5.732*
P4	56 (37.84)	92 (57.15)	3.394*
P5	63 (42.57)	93 (57.77)	2.669*
Rice	150 (49.84)	151 (50.17)	
R1	56 (37.34)	81 (53.65)	2.841*
R2	75 (50.00)	75 (49.67)	0.057
R3	69 (46.00)	74 (49.01)	0.522
R4	64 (42.67)	81 (53.65)	1.905
R5	45 (30.00)	79 (52.32)	3.933*
R6	84 (56.00)	86 (56.96)	0.167
R7	84 (56.00)	89 (58.94)	0.516
R8	88 (58.67)	94 (62.26)	0.636
Ginger	106 (47.75)	116 (52.26)	
G1	32 (30.19)	72 (62.07)	4.755*
G2	36 (33.97)	61 (52.59)	2.794*

G3	24 (22.65)	59 (50.87)	4.340*
G4	38 (35.85)	60 (51.73)	2.379*
G5	28 (26.42)	56 (48.28)	3.355*
G6	34 (32.08)	45 (38.80)	1.044
G7	25 (23.59)	60 (51.73)	4.308*
G8	26 (24.53)	60 (51.73)	4.155*

(Figure in parentheses indicate percentage)

* Significantly different

The above table and Figure 3 shows the differential diffusion among the tribals and settlers in Wayanad district in general among the tribals and settlers. The test of significance showed higher values when the difference among the proportion of tribal and settler respondents is considerably large. Except two practices in coffee regarding pruning and providing irrigation, all the practises showed considerable difference among the proportion of tribal and settler respondents adopting the practices.

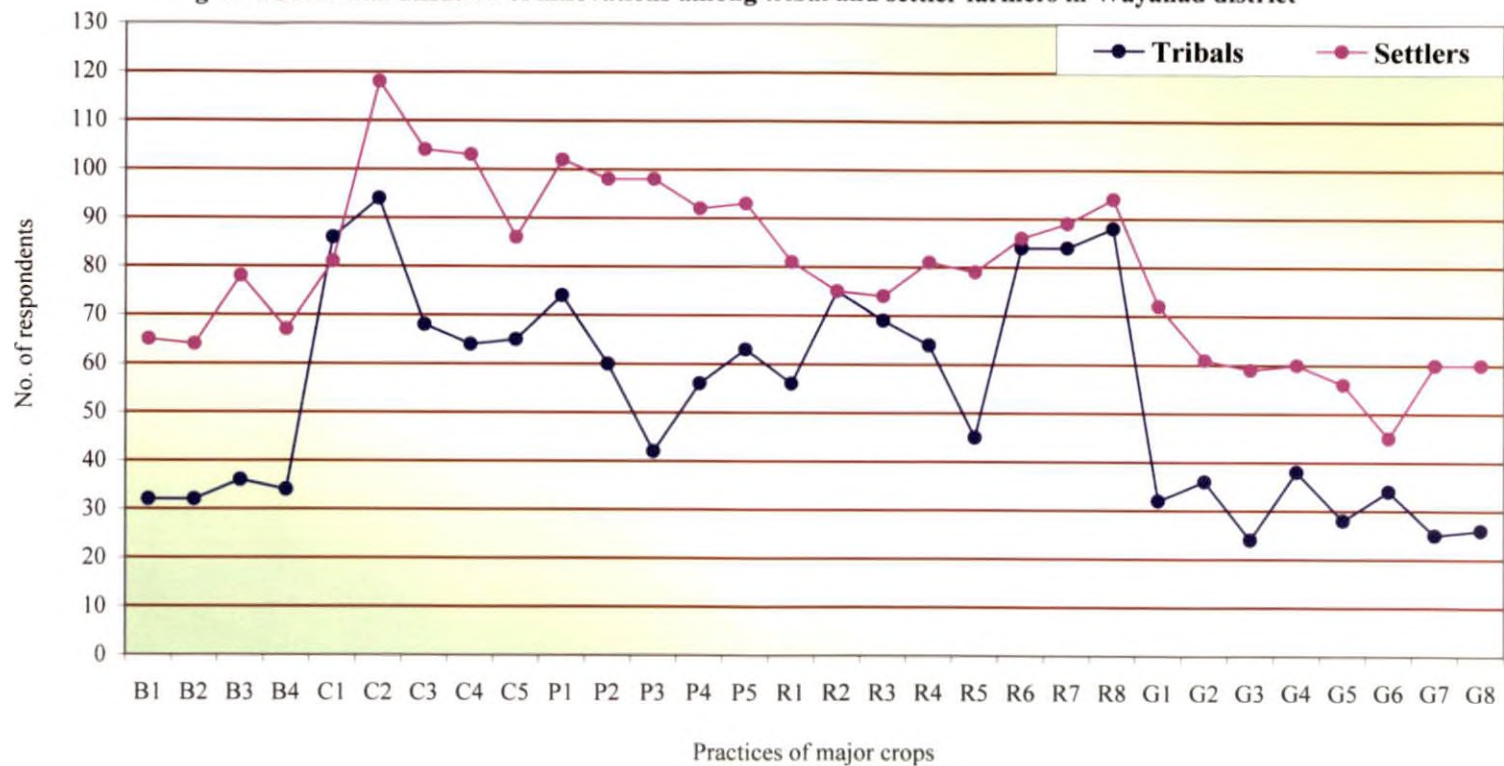
Similarly, in the case of pepper and ginger also, the differences were very high. But in paddy cultivation, comparatively all the practices were known to tribals and settlers except application of FYM and application of weedicides.

The following tables show the differential diffusion between both the categories in the selected blocks.

Table 32. Differential diffusion of innovations among tribal and settler farmers in Kalpetta block

Crop	Kalpetta Block		Test for difference in proportions (z)
	Tribals (n = 60)	Settlers (n = 60)	
Banana	n = 30 (50.00)	N = 35 (58.34)	
B1	22 (73.33)	28 (80.00)	0.636
B2	24 (80.00)	30 (85.71)	0.612
B3	24 (80.00)	32 (91.43)	1.329
B4	20 (66.67)	21 (60.00)	0.555
Coffee	n = 47 (78.33)	N = 52 (86.67)	

Fig. 3. Differential diffusion of innovations among tribal and settler farmers in Wayanad district



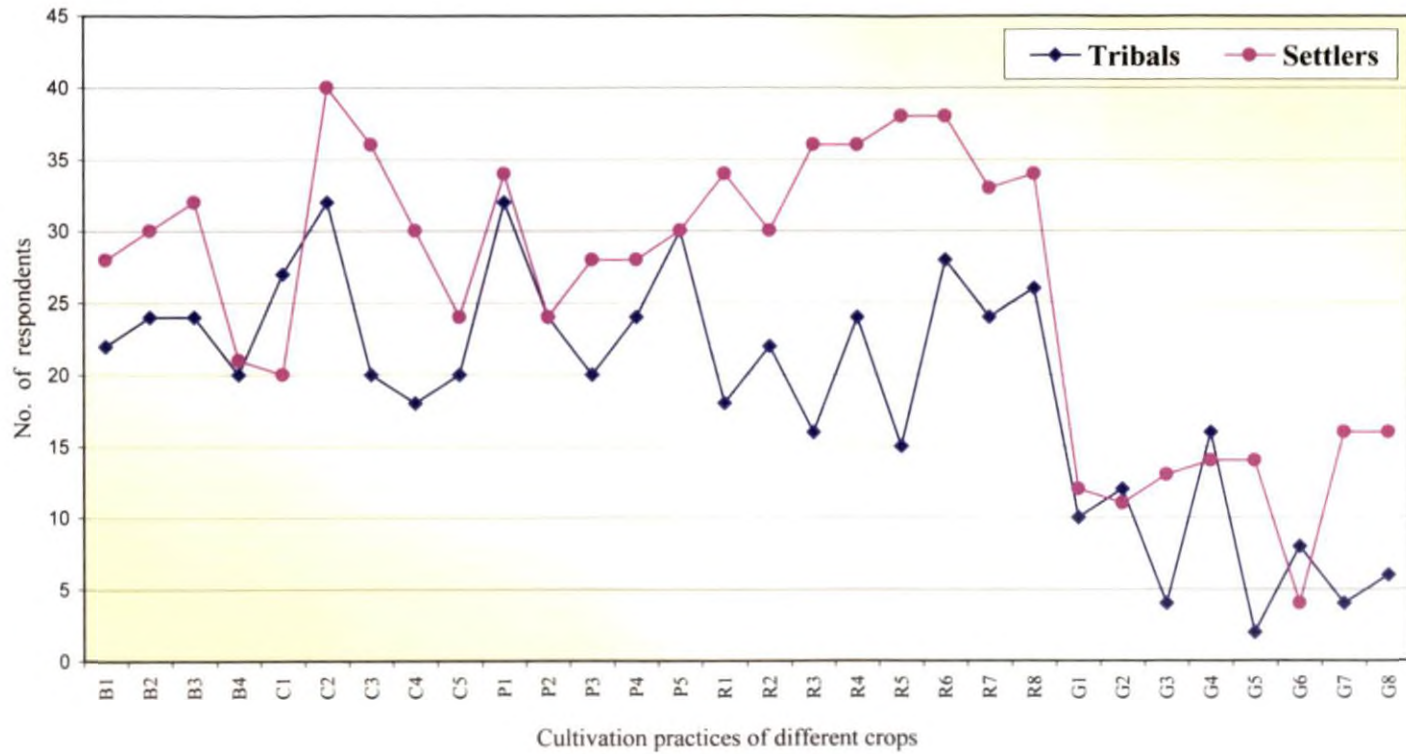
C1	27 (57.45)	20 (38.46)	1.889
C2	32 (68.09)	40 (76.92)	0.986
C3	20 (42.55)	36 (69.23)	2.674*
C4	18 (38.30)	30 (57.69)	1.928
C5	20 (42.55)	24 (46.15)	0.360
Pepper	n = 47 (78.33)	n = 47 (78.33)	
P1	32 (68.09)	34 (72.34)	0.451
P2	24 (51.06)	24 (51.06)	0.00
P3	20 (42.55)	28 (59.57)	1.651
P4	24 (51.06)	28 (59.57)	0.829
P5	30 (63.83)	30 (63.83)	0.00
Rice	n = 34 (56.67)	n = 44 (73.33)	
R1	18 (52.94)	34 (77.28)	2.260*
R2	22 (64.71)	30 (68.19)	0.323
R3	16 (47.06)	36 (81.82)	3.230*
R4	24 (70.59)	36 (81.82)	1.167
R5	15 (44.12)	38 (86.37)	3.965*
R6	28 (82.35)	38 (86.37)	0.487
R7	24 (70.59)	33 (75.00)	0.436
R8	26 (76.47)	34 (77.28)	0.083
Ginger	n = 21 (35.00)	n = 22 (36.67)	
G1	10 (47.62)	12 (54.55)	0.454
G2	12 (57.15)	11 (50.00)	0.469
G3	4 (19.05)	13 (59.09)	2.685*
G4	16 (76.19)	14 (63.64)	0.896
G5	2 (9.53)	14 (63.64)	3.669*
G6	8 (38.10)	4 (18.19)	1.455
G7	4 (19.05)	16 (72.73)	3.528*
G8	6 (28.58)	16 (72.73)	2.895*

(Figure in parentheses indicate percentage)

* Significantly different

Table 28 and Figure 4 shows the pattern of differential diffusion among tribals and settlers in Kalpetta block. Except ginger, all the tribal respondents were cultivating the major crops of Wayanad. The diffusion of innovations was also more than 50 per cent for all those crops except for some practices. In banana the practices related to removal of side suckers and application of furadan at planting to control bunchy top disease is practised by 80 per cent respondents.

Fig. 4. Differential diffusion of innovations among tribal and settler farmers in Kalpetta block



In coffee, more than 50 per cent respondents followed practice regarding the knowledge of variety and pruning, whereas only less than 50 per cent respondents knew the practice of field sanitation, shade control and irrigation.

In the case of paddy cultivation fertilizer application, water management and cultivating tolerant varieties were practices by good number of respondents. The practice of using herbicides is only practiced by about 44 per cent.

Diffusion of innovations are limited in ginger where practices like soaking the rhizomes in mancozeb and control of rhizome by *Trichoderma* were practised by only very few respondents (19 per cent and 9 per cent). Field sanitation measures were only practiced by 38.10 per cent and 28.58 per cent respondents only.

Among settlers also, except ginger, more than 60 per cent of the respondents are practising the cultivation of major crops. Banana is cultivated by only 58 per cent of the settlers and all the practices are followed by a great majority of respondents.

In coffee, practice regarding the variety and irrigation, all the other listed practices are followed by more than 50 per cent of the respondents.

In rice and pepper also, the diffusion of innovation was more than 50 per cent for all the practices. Except for the practice of mulching the beds with green leaves in ginger, all the others were practiced by more than 50 per cent of the respondents.

Further, when the test for difference among the tribals and settlers is considered for practices like control of stem borer in coffee, application of FYM and recommended fertilizers and pesticides in rice, and rhizome treatment, use of *Trichoderma*, and control of stem borer and rhizome rot in ginger, the values were greater than 1.96. This states that there was considerable difference in adoption of practices among tribals and settlers.

Table 33. Differential diffusion of innovations among tribal and settler farmers in Mananthavady block

Crop	Mananthavady Block		Test for difference in proportions (z)
	Tribals (n = 60)	Settlers (n = 60)	
Banana	n = 37 (61.67)	n = 58 (96.67)	
B1	8 (21.63)	16 (27.59)	0.652
B2	6 (16.22)	18 (31.04)	1.621
B3	4 (10.81)	28 (48.28)	3.768*
B4	8 (21.63)	28 (48.28)	2.611*
Coffee	n = 58 (96.67)	n = 60 (100.00)	
C1	33 (56.90)	36 (60.00)	0.342
C2	32 (55.18)	52 (86.67)	3.776*
C3	30 (51.73)	50 (83.34)	3.673*
C4	26 (44.83)	48 (80.00)	3.949*
C5	24 (41.38)	42 (70.00)	3.131*
Pepper	n = 53 (88.33)	n = 60 (100.00)	
P1	24 (45.29)	38 (63.34)	2.388*
P2	20 (37.74)	42 (70.00)	3.863*
P3	18 (33.97)	44 (73.34)	4.600*
P4	16 (30.19)	42 (70.00)	4.607*
P5	18 (33.97)	42 (70.00)	4.233*
Rice	n = 58 (96.67)	n = 51 (85.00)	
R1	20 (34.49)	26 (50.98)	2.717*
R2	25 (43.11)	21 (41.18)	1.314
R3	28 (48.28)	20 (39.22)	2.092*
R4	28 (48.28)	20 (39.22)	2.092*
R5	24 (41.38)	25 (49.02)	0.387
R6	28 (48.28)	28 (54.91)	0.654
R7	30 (51.73)	28 (54.91)	1.055
R8	30 (51.73)	28 (54.91)	1.055
Ginger	n = 47 (78.33)	n = 55 (91.67)	
G1	18 (38.30)	36 (65.46)	2.739*
G2	16 (34.05)	32 (58.19)	2.435*
G3	14 (29.79)	28 (50.91)	2.161*
G4	14 (29.79)	30 (54.55)	2.517*
G5	16 (34.05)	30 (54.55)	2.074*
G6	14 (34.05)	29 (52.73)	2.339*
G7	11 (23.41)	30 (54.55)	3.197*
G8	10 (21.28)	30 (54.55)	3.430*

(Figure in parentheses indicate percentage)

* Significantly different

A perusal of the above table and Figure 5 gives us an idea about the differential diffusion of the tribals and settlers in Mananthavady block. Almost all the respondents among tribals and settlers are cultivating crops like coffee, pepper and rice.

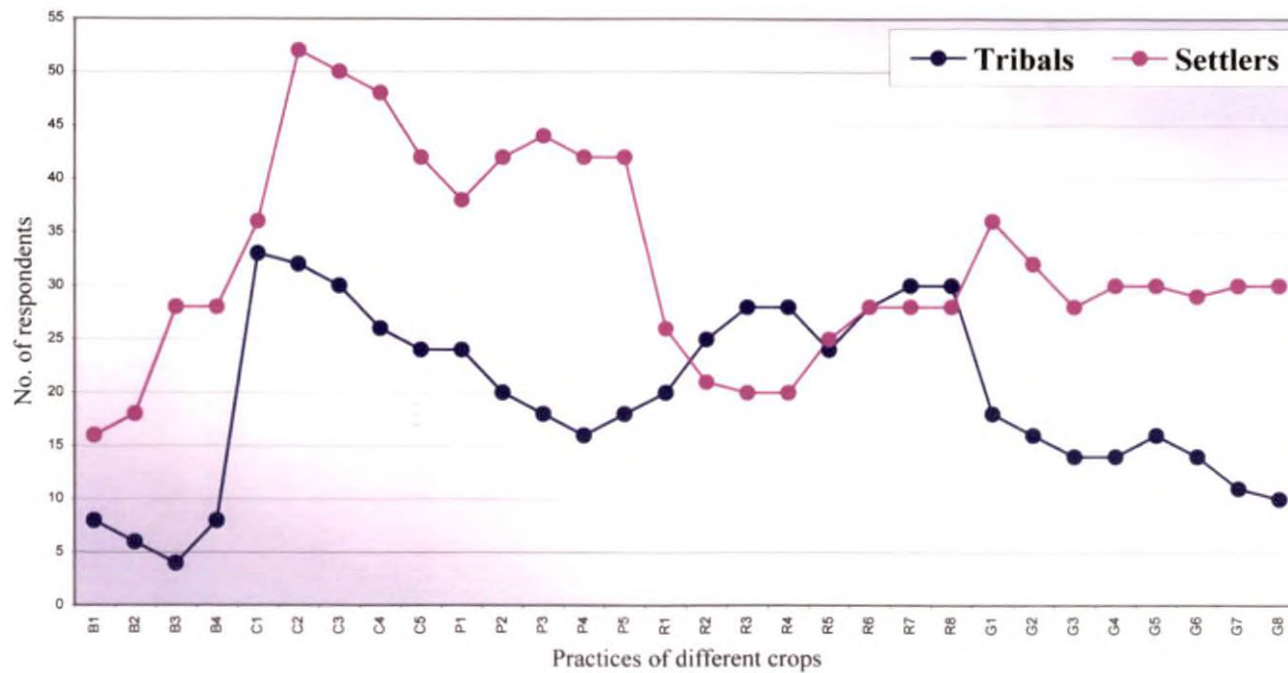
Among tribals, practices in banana like removal of side suckers and application of furadan were followed by only a very small percent of respondents (16 per cent and 10 per cent respectively). Here the difference in proportion of adoption was also greater among the two categories of respondents. Coffee cultivators were abundant in the block but the diffusion of practices of coffee was only nearly 50 per cent in the case of tribals. But for settlers the diffusion was more and practices with regard to pruning, field sanitation and shade control were practised by great majority of the settlers. Further in coffee, other than one practice of knowledge of the variety for cultivation, all the other listed practices showed considerable difference in adoption between tribals and settlers.

Regarding pepper also, among tribals the diffusion was less than 50 per cent in the case of tribals but it was more in the case of settlers. Practices like application of *Trichoderma* and mulching to reduce mealy bugs were followed by 70 per cent of the settler respondents. For all the practices in pepper, the test for difference among the proportion also showed high values indicating considerable difference.

Almost all the respondents among tribals and settlers were cultivating rice, but the diffusion of innovations was comparatively low. More than 50 per cent respondents practised innovations like adopting timely measures against pests and diseases surveillance and water management.

Ginger cultivators were comparatively low among tribals in the block. The diffusion of innovations in ginger was also low among tribals. Drenching the beds with copper oxychloride, spraying with dimethoate to control stem borer and treating the rhizomes with mancozeb were followed by only very few tribals respondents (21 per cent, 23 per cent and 29 per cent respectively). Among settlers, the diffusion is

Fig. 5. Differential diffusion of innovations among tribal and settler farmers in Mananthavady block



more. For practices like using the appropriate varieties for cultivation is followed by 65 per cent. The rest of the practices is also followed by more than 50 per cent respondents. In ginger also there was greater difference among the tribals and settlers regarding the test for difference in proportion.

Table 34. Differential diffusion of innovations among tribal and settler farmers in Sulthan Bathery block

Crop	Sulthan Bathery Block		Test for difference in proportions (z)
	Tribals (n = 60)	Settlers (n = 60)	
Banana	n = 32 (53.33)	n = 39 (65.00)	
B1	2 (6.25)	21 (53.85)	4.264*
B2	4 (12.50)	16 (41.03)	2.659*
B3	8 (25.00)	18 (46.16)	1.841
B4	6 (18.75)	18 (46.16)	2.429*
Coffee	n = 46 (76.67)	n = 51 (85.00)	
C1	26 (56.53)	25 (49.02)	0.739
C2	30 (65.66)	26 (50.98)	1.417
C3	18 (39.13)	18 (35.30)	0.391
C4	20 (43.48)	25 (49.02)	0.546
C5	21 (45.66)	20 (39.22)	0.641
Pepper	n = 48 (80.00)	n = 54 (90.00)	
P1	18 (37.50)	30 (55.56)	1.937
P2	16 (33.34)	32 (59.26)	2.750*
P3	4 (8.34)	26 (48.15)	4.499*
P4	16 (33.34)	22 (40.74)	0.842
P5	15 (31.25)	21 (38.89)	0.872
Rice	n = 58 (96.67)	n = 56 (93.33)	
R1	18 (31.04)	21 (37.50)	0.727
R2	28 (48.28)	24 (42.86)	0.581
R3	25 (43.11)	18 (32.15)	1.207
R4	12 (20.69)	25 (44.65)	2.731*
R5	6 (10.35)	16 (28.58)	2.465*
R6	28 (48.28)	20 (35.72)	1.358
R7	30 (51.73)	28 (50.00)	0.184
R8	32 (55.18)	32 (57.15)	0.212
Ginger	n = 38 (63.33)	n = 39 (65.00)	
G1	4 (10.53)	24 (61.54)	4.652*

G2	8 (21.06)	18 (46.16)	2.329*
G3	6 (15.79)	18 (46.16)	2.876*
G4	8 (21.06)	16 (41.03)	1.892
G5	10 (26.32)	12 (30.77)	0.432
G6	12 (31.58)	12 (30.77)	0.077
G7	10 (26.32)	14 (35.90)	0.908
G8	10 (26.32)	14 (35.90)	0.908

(Figure in parentheses indicate percentage)

* Significantly different

A bird's eye view of the above table and Figure 6 gives us an idea of the differential diffusion among the tribals and settlers in Sulthan Bathery block. There were abundant cultivators in rice, coffee and pepper among tribals. Banana cultivators were only 53 per cent and the diffusion was even low among tribals. Practices like removal of side suckers and application of furadan were only six per cent and 12 per cent respectively.

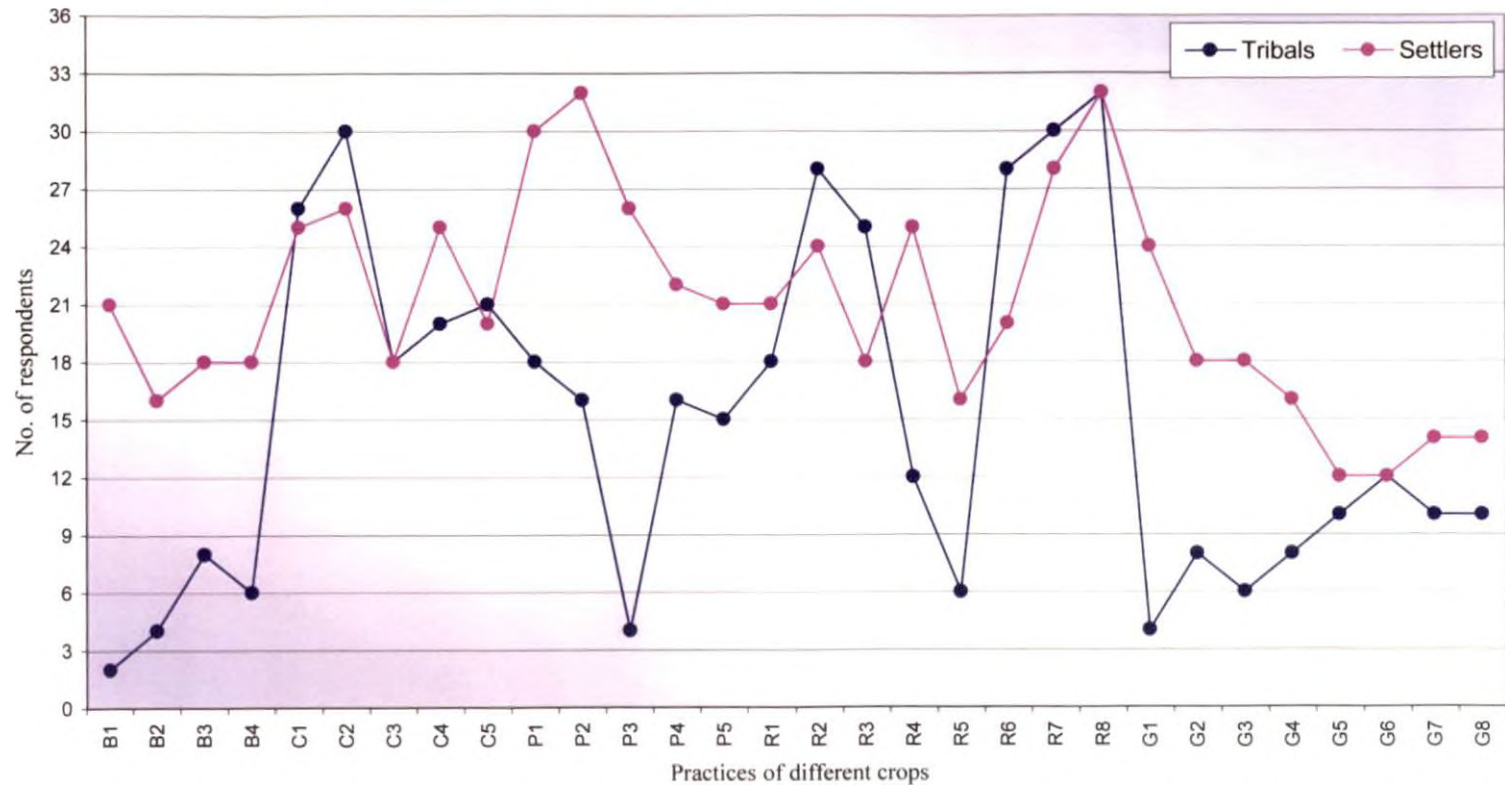
The spread of innovations in coffee were nearly 50 per cent and practice like control of coffee borer was only followed by 39 per cent respondents. In pepper also the diffusion of innovations was very low. Only eight per cent of the respondents followed foliar spray with Bordeaux mixture.

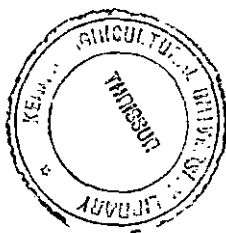
In rice also the diffusion of innovations was only meagre. Application of herbicides were followed by only ten per cent respondents. Compared to the other blocks in Sulthan Bathery, the diffusion of innovations was low.

Taking the case of settlers, there were abundant numbers of growers among the major crops. In banana and pepper, the diffusion of innovations was nearly 50 per cent. The settlers also had good knowledge about some practices listed out in ginger, like knowledge of appropriate variety (61 per cent) and adopting timely control measures against pests and diseases etc (46 per cent).

The results for the difference in proportion among the tribals and settlers in Sulthan Bathery block is comparatively low when compared to the other two blocks. Here, the difference is greater only for a very few practices.

Fig. 6. Differential diffusion of innovations among tribal and settler farmers in SultanBathery block





4.5 Evaluation of agricultural innovations using the socio-technical feasibility index

Table 35. Evaluation of the agricultural innovations among tribal and settler farmers using the socio-technical feasibility index

Category		Mean	CD value
Tribes		0.64113	Significant
Settlers		0.61837	
Tribes of Three blocks	Block 1	0.64394	0.0198
	Block 2	0.62368	
	Block 3	0.65577	
Settlers of Three blocks	Block 1	0.60210	0.0268
	Block 2	0.63063	
	Block 3	0.62238	

The table above gives us an idea about the tribals and settlers on the basis of the socio-technical feasibility index values. Analysis of variance was carried out to compare the tribals and settlers among the three blocks and within the two categories. There was significant difference between the two major categories i.e., tribals and settlers selected for the study.

For the socio-technical feasibility index, the social variables, technical variables and the adoption variables were taken into consideration. In all these variables, the tribals were far behind the settlers. Tribes in Kerala form the very segment of weaker sections of the society with their traditional skills and resources. They are the most vulnerable sections of the population in Kerala. In Kerala, the strategy adopted during Ninth Plan was to earmark and give more than two-third of the Tribal Sub-Plan fund for the purpose of formulating and implementing tribal

development programmes at grassroots level with the active participation of the tribals. But the benefits have not reached them till now, as intended.

The settlers present a better picture than the tribals even though they are also facing serious problems like financial and other constraints in farming. The practices listed out for the selected major crops have reached only a part of the respondents. And care was taken to include respondents who were cultivating most of the listed crops. This shows that the great majority left out still does not have any knowledge about the technologies. There is an urgent need for the research institutions and state departments to address this gap.

Regarding blockwise comparisons of the tribes, it is evident from the above table that there is significant difference among them (CD value: 0.0198). Block 1 (Kalpetta) and Block 2 (Mananthavady) had significant difference with respect to the socio-technical feasibility index values. Similar was the case of Block 2 (Mananthavady) and Block 3 (Sulthan Bathery). But with respect to the CD value, Block 1 and Block 3 were on par. There was no significant difference between those two blocks.

This further shows that from among the selected blocks, tribals of some community, like Paniyan and Adiyar which are concentrated in a particular area are still more primitive compared to others. They are very much underdeveloped and they have no access to the development programmes and schemes implemented so far. This has been further supported by the study of Rajendralal (2005) where he found that the average sustainable index to assess the sustainability of tribal development is very low in Wayanad district when compared to Idukki and Palakkad districts. He recommended initiating concentrated efforts from all the quarters viz., Central, State governments, Local Self Government (LSG) institutions and NGOs to promote sustainability in tribal development in Wayanad district.

Taking the case of settlers, there was not much significant difference among them considering the three blocks (CD value: 0.0268). On the whole, the settlers were similar regarding the adoption of the practices listed out and the social and technical

determinants. Settlers were ahead of the tribals taking into consideration some aspects like education, extension contact, information source utilization etc. They were more progressive and always ahead in trying out cultivation of new crops.

4.6 Constraints experienced by the tribal and settler farmers in their farming

The constraints experienced by the two categories of respondents *ie.*, tribals and settlers are presented in the Table 36 and Table 37.

Table 36. Constraints faced by tribal respondents

Sl. No	Constraints	Tribals (n = 180)	
		Percentage	Rank
1.	Low cost of produce	53	VII
2.	Imbalances in weather	60	IV
3.	Land alienation	77	II
4.	Financial constraint	83	I
5.	Less land	64	III
6.	Lack of knowledge of new varieties	54	VI
7.	Indebtedness	59	V
8.	High cultivation costs	50	VIII
9.	Pests and diseases	48	IX
10.	Attack of wild animals	44	X
11.	Low yield	33	XI
12.	Development programmes not reaching the needed ones	29	XII

Data interpreted in the above table shows that financial constraint was the major constraint faced by the tribal farmers. Eventhough there are various

programmes meant for the upliftment of the backward communities, only a small percent of these programmes benefit reach the people for whom the programmes are really intended. Most of the tribals were complaining of the non-availability of even the pensions which were meant for them.

The next major constraint faced by them was land alienation. The low socio-economic status, educational status and high incidence of external interference due to settlers may be the reason for land alienation in Wayanad. Mohandas (1992) reported that approximately half of the area held by the tribals prior to the in-migration of the settlers had been alienated in different ways. It was striking to note that more than nine tenth of the area of land transferred to the tribals had gone to the settlers alone through cash sales, mortgages and illegal encroachment.

Less land and imbalances in weather were the next major constraints according to the tribals. Tribals did not have enough land for the cultivation purposes. Though majority of the tribes were agriculturists, the alienation of land in most cases reduced them to the state of landless labourers. The problem of land alienation among the tribal people is not only related to the economic system but also to the socio-political and moral systems of the state. Moreover, those who had land were having rainfed agriculture. Imbalances in weather thus formed a serious constraint for the tribals.

Indebtedness was another grave issue among the tribals and settlers both. The conditions of the farmers and the tribal agricultural labourers had greatly deteriorated. Due to the huge debts, the farmers have lost hope and they are resorting to the extreme step of committing suicides.

Lack of knowledge of new varieties, low cost of produce, high cultivation costs, pests and diseases etc., were also perceived as the other constraints by the tribal farmers.

Table 37. Constraints faced by settler respondents

Sl. No	Constraints	Settlers (n = 180)	
		Percentage	Rank
1.	Low cost of produce	86	I
2.	Lack of irrigation facilities	51	IX
3.	Imbalances in weather	60	VII
4.	Financial constraints	70	IV
5.	Less land	55	VIII
6.	Indebtedness	83	II
7.	Lack of profit from improved methods	46	X
8.	Pests and diseases	80	III
9.	Attack of wild animals	67	VI
10.	Low yield	40	XI
11.	Government policies	77	V

Low cost of produce was the major constraint reported from among the settlers. The marketing system prevailing in the district is very weak. The settlers, who have gone for cultivation of newly introduced crops like vanilla, cardamom etc., find it very difficult to sell their produce or get a reasonable price. A quintal of pepper used to fetch Rs. 26,000/- in 2000 but the price is around Rs. 7800/- today. Similarly, the price of coffee beans fell from Rs. 90 – 120/kg in 1996 to Rs. 11-20 now but the price of coffee powder rose from Rs. 450/kg in 1999 to Rs. 900-1200 in 2002. The change in the pattern of the crops has made the farmers rely on the market. The fluctuations in the price of agriculture produce brought havoc in the life of the farmers. Eventually the market grew to be an omnipotent that decides everything in the life of the farmers.

Indebtedness is a very serious problem among settlers also. As mentioned earlier, the shifting pattern in favour of less labour intensive crops like coffee, pepper,

ginger, vanilla etc., made them borrow huge amounts as loan from various sources. Production for sale in market, logically intensified competition to produce more, and to ensure the same, resorted to excess usage of fertilizers and pesticides. Farmers were compelled to purchase everything from the market including food materials. But the returns from the cultivation of these crops were not the expected ones and there were huge losses which the farmers could not bear. The price crash has resulted in a drastic decline in the income of the farmers. Thus eventually farmers were caught in the debt trap.

Pests and diseases were the next major constraint faced by the settlers. The neglect of the land by using large quantities of fertilizers and pesticides led to the considerable drop in the quantity of ground water recharging and the related severity of drought has badly affected agriculture. In the wake of decreasing water content in the soil, there was wide-ranging appearance of various crop diseases. There were pest outbreaks also which were frequent.

Financial constraints, government policies, attack of wild animals, imbalances in weather, less land, lack of irrigation facilities, lack of profit from improved methods and low yields were the other constraints as perceived by the settlers.

Summary and Conclusion

5. SUMMARY AND CONCLUSION

Western Ghats is a long narrow range of hills, stretching along the peninsular India parallel to and close to the west coast through the states of Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala. The Western Ghats comprise the mountain ranges that runs along the western coast of India, from the Vindhya - Satpura ranges in the north to the southern tip. Topography, suitable climate, long history of uninterrupted biological evolution, biogeographical linkage have all contributed to its exceptional diversity of plants, animals, ecosystems and human cultures.

The agricultural scenario comprising the farmers and the farming systems in the High Ranges of Kerala is so complex that scientific and systematic research investigations are warranted to explore the socio-technical interfaces in the agro-ecosystems of these ecologically sensitive areas.

Wayanad lies along the crust of Western Ghats and is a biodiversity hotspot. The district (2136 sq. km in size) lies at an attitude of 750 m above Mean Sea Level and contributes significantly to the foreign exchange earnings of the state of Kerala through its cash crops like pepper, cardamom, coffee, tea and other condiments like ginger and turmeric. The name Wayanad is said to be derived from '*Vayal Nadu*' meaning land of paddy fields. The biological diversity of this place is very diverse at all levels-habitat, species and genetic and with an impressive rate.

Agriculture is always dependent on the technologies generated by the research systems and about 20 to 30 per cent technologies are found to be inappropriate among the farmers. Any technology, before it is introduced into a system should go in harmony with the social and technical aspects of the system. Tribals and settlers are the two major population categories in Wayanad. Both the groups have unique environments. A technology, which fits into the tribal environment, may not necessarily fit into the settler environment. Studies using socio-technical system approach help in suggesting the new or right alternative technology to be used for the

betterment of farming. It would also point out to the modification or improvement to be done in the technology so that it fits well in the social system.

Hence a study of this kind is of immense necessity to further create technologies, which fit into the social and cultural system of any kind.

The present study threw light on the following aspects:

1. Profile characteristics of tribal and settler farmers including personal, psychological, socio-cultural and economic variables
2. Cropping pattern and farming systems in the tribal and settler areas.
3. Differential diffusion of agricultural innovations in tribal and settler areas.
4. Construction of a Socio-technical feasibility index to evaluate the agricultural innovations among tribal and settler farmers.
5. Constraints experienced by the tribal and settler farmers in farming.

Wayanad district has the maximum number of settlers in the state. This district also has the maximum per cent of tribal population in the state. Hence, Wayanad district is selected as the study area. Mananthavady, Sulthan Bathery and Kalpetta are the three blocks in the district. There are twenty four panchayats with a Krishi Bhavan in each panchayat. From each block, two panchayats having the maximum number of tribal population were selected. Thus the study was conducted drawing samples from these six panchayats of the district.

From each selected panchayat, 30 tribal and 30 settler farmers were selected using simple random sampling procedure. Thus, there were a total of 360 respondents comprising 180 tribal and 180 settler farmers for the study.

The data collection was done using a pre-tested interview schedule. An index for measuring the socio-technical feasibility of agricultural innovations was developed for the study taking into consideration the socio- technical determinants and adoption variables. Differential diffusion of agricultural innovations among tribal and settler farmers were also studied and test of significance for difference among the proportion of respondents adopting the various practices were also found out.

5.1 The salient findings of the study are presented below.

1. Regarding the distribution of the tribal and settler farmers, with respect to some variables like education, family education status, annual income, exposure to mass media, risk preference, achievement motivation, self confidence, rational orientation, information source utilization, progressiveness and cosmopolitaness the settlers belonged to the high category, whereas in the case of family size, dependency, value orientation and fatalism the tribals belonged to the high category. Still in the case of some variables like farming experience, economic motivation, credit orientation and attitude towards development programmes, there was not any significant difference between the tribals and settlers.
2. Regarding the variable indebtedness, both the tribals and settlers were highly indebted. About 42 per cent of the settlers had indebtedness of more than Rs. 20,000/- .
3. Regarding cropping pattern and farming systems, the predominant crops in Wayanad are paddy, coffee, banana, ginger, pepper and arecanut. There were also cultivation of newly introduced crops like vanilla, banana, cardamom, coconut etc. present in small numbers. Majority of the tribals in Wayanad are agricultural labourers having no cultivable land and no control over land resources. The crops they cultivated were also the traditional ones. So the favoured combinations seen among the tribals were limited to the traditional crops namely paddy, coffee, pepper and banana. A shift in favour of the newly introduced crops like vanilla, cardamom, arecanut, banana etc. were seen among the settlers. Settlers had more land compared to the tribals and they were also in favour of new crops or cash crops along with the traditional ones.
4. The comparison of the tribals and settlers, in the three blocks with respect to the selected variables showed that significant difference in almost all the

variables except age, type of family, family size, self confidence, cosmopolitaness and attitude towards development.

5. Correlation studies between the personal, socio-cultural variables among the tribals and settlers also showed positive and significant relationship of education with exposure to mass media, extension participation, risk preference, information source utilization and attitude towards development among tribals. Furthermore, type of family and risk preference were also found to have positive and significant relationship with family size, dependency and credit orientation, respectively. Regarding settlers also, education was found to have positive and significant relationship with exposure to mass media, extension participation, risk preference, information source utilization and attitude towards development. Age was also found to have positive and significant relationship with dependency, farming experience and migration.
6. The differential diffusion regarding the listed practices among the tribals and settlers of Wayanad district showed that for banana, coffee, pepper and ginger the diffusion was comparatively greater among the settlers. Regarding paddy cultivation, there was only slight difference between the tribals and settlers. Regarding some practices like application of FYM and water management in paddy, knowledge of variety and pruning in coffee etc. there was no significant difference among the tribals and settlers. For ginger cultivation, the test to find out the difference in proportions among tribals and settlers showed significance between both the categories. A comparative analysis of the three blocks revealed that the differential diffusion was higher in settlers as compared to the tribals of Wayanad. Tribals did not have access to the new technologies and in some cases where there was access, the technology did not suit their existing conditions. The settlers, on the other hand, if they practised new technologies, there were problems with the social and technical determinants, which affected the diffusion.

7. Evaluation of agricultural innovations using the socio-technical feasibility index showed significant difference between the two major categories, i.e., tribals and settlers. Among tribals also, there was significant difference among the three blocks selected for the study. Kalpetta and Mananthavady showed significant difference among the tribals with regard to the index values. Similar was the case of Mananthavady and Sulthan Bathery. But with respect to CD values of Kalpetta and Sulthan Bathery, there was not much difference. Whereas in the case of settlers, there was not much difference among the settlers from among the three blocks of the district. Significant difference was observed between tribals and settlers, in which the tribals were much backward in case of development.
8. Regarding constraints, financial constraint was the major one faced by the tribal farmers, next one being land alienation, followed by less land and imbalances in weather. The problem of land alienation among the tribal people is not only related to the economic system but also to the socio-political and moral systems of the State. Though majority of the tribals were agriculturists, the alienation of land in most cases reduced them to the status of landless labourers. Among settlers, low cost of produce was the major constraint, followed by indebtedness, pests and diseases and financial constraints. Government policies, attack of wild animals, imbalances in weather and less land were the other constraints as perceived by the settlers.

5.2 Practical / Scientific Utility

The present investigation is a pioneering attempt aimed at a comprehensive analysis of tribal and settler agriculture in Wayanad district. The methods developed for operationalising the socio-technical system interfaces, differential diffusion of agricultural innovations and the socio-technical feasibility index will prove to be useful to the body of social research to further evaluate the agricultural innovations.

The socio-technical feasibility index would be much useful to assess the technologies generated, whether it suits a particular environment or not.

5.3 The present crisis of Wayanad

The once prosperous farming villages of Wayanad district in Kerala are facing a spate of suicides by farmers. There are places in Wayanad previously called as 'Kuwait in Kerala' and 'Gulf in Kerala' for the prosperity that came with booming pepper and coffee prices. But now the farmers of those regions are distraught because they lost everything due to the price crash. Incomes have plummeted and farmers are bankrupt because of the fall in prices of farm products. Many pepper and coffee cultivators in this district have also killed themselves after price collapses ruined them.

Wayanad has mainly commercial crop cultivators who have invested a lot in their fields. When pepper and coffee prices touched a high a few years ago, life suddenly became rosy for the farmers. They envisaged good lives before them from the profits they were going to make. Agricultural loans thus became a necessity for every farmer. Many farmers took loans beyond their repayment capability from several sources and that too at high rates of interest.

Till 2000, everything was OK. But the result of the drought and the widespread occurrence of plant diseases, the price of farm commodities began to plummet along with farm production. The real situation behind the still green canopy was not conveyed to the outside world. When it did so, it was far too late and nothing could be done but to witness the heart rending situation.

A number of reasons can be said for this pathetic situation in Wayanad. Continuous drought, crop failure, indebtedness, flawed planning, lack of farmer oriented plans, socio-economic disparities, low procurement price, lack of value addition and import liberalization dampening the price of the produce are some of them.

According to Krishnakumar (2004), of the total bank loans in the district, 76.5 per cent have been disbursed in the priority sector. (The State average is 52.5 per cent). Majority of the loans are given in the farm sector. Banks were liberal in giving these loans because there was a future for cash crops in Wayanad. Wayanad at that time continued to be the lead producer of cash crops and it had a multiple cropping pattern. Because of this multiple cropping pattern, farmers took separate loans for the various crops on the same piece of land. Loans were also taken for the same crop from different banks and private financiers also.

While the average credit-deposit ratio in Kerala is 46 per cent, in Wayanad it is 188 per cent. According to the District Manager of a lead bank, banks were liberal in disbursing loans to the farmers of Wayanad and the farmers too were eager to obtain loans and often borrowed beyond their means. If there were five members in a family, all the five would borrow. Per family borrowings are very high in the district. The credit target for the district was fixed at Rs. 398 crores in 2003. By December Rs. 288 crores had already been disbursed.

Cash crops usually require high investment. For example, the production cost of an acre of pepper is around Rs.50,000/-. But returns from the crop have declined drastically. A quintal of pepper used to fetch Rs. 26,000/- in 2000 but the price is around Rs. 7800/- today. Similarly, the price of coffee beans fell from Rs. 90 – 120/kg in 1996 to Rs. 11-20 now but the price of coffee powder rose from Rs. 450/kg in 1999 to Rs. 900-1200 in 2002. The Government also has not intervened to protect the farmer from these price crashes. Tea and coffee estates have shut down and plantation workers have no other employment. Even the farmers who were prompt in repayment of the loans came to a standstill. The end result was that farmers have been left unprotected to face price collapses in a global market that is skewed against them and controlled by a handful of powerful multinational companies.

According to the banks, a total sum of Rs. 162.42 crores still remains to be unpaid. The banks recovered 88 per cent of the agricultural loans in 2001, 72 per cent

in 2002 and merely 68 per cent in 2003. This recovery according to them meant that outstanding loans were 'closed by converting them into fresh loans'.

Wayanad is still burning with farmers who have an uncertain morrow waiting for them. When the country rejoices in its myriad achievements in other fields, agriculture which is the backbone of our economy also should be looked upon with due importance. Revival of farmers is mandatory for that.

5.4 Suggestions for future research and development

Wayanad is blessed with biodiversity and traditional knowledge; however both men and women could not convert it into livelihood options in a sustainable manner. Changes from agriculture to agribusiness led to the alienation of tribal communities, unsustainable land uses, undoing of land reforms, production insecurity, consumption insecurity etc. It is high time to change the perception of development, and approach should be aimed towards working for the application of technologies for the socio-economic development of tribal people. The tribals and settlers of Wayanad need a space in the development paradigm ie., access to technical education, technology, skill empowerment and economic empowerment. In the light of the findings of the above study the following suggestions are recommended for the development of tribal and settler farmers in Wayanad district:

- Need based financial assistance have to be extended to the tribal and settler farmers.

The programmes planned and implemented by the beaurocrates should be farmer oriented. Rather than packages, farmers require reasonable prices for their produce. Even though waiving off debts brings immediate relief, it is not a permanent solution as they need a boost in the prices and increase in profit. Ban on illegal money lending should be imposed and interest not to exceed the principal amount.

- Extension interventions are to be taken to motivate the tribal and settler farmers. For better living, training programmes on various enterprises etc. and that too, to promote the local knowledges may be taken up. The people should be encouraged to take up self employment units also. The enterprises must be compatible with the socio-cultural conditions of tribals. One of the areas they can concentrate on, is the identification and collection of indigenous medicinal and aromatic plants on a tie-up basis with ayurvedic pharmaceuticals. In order to minimise exploitation of the tribal health, conscientisation programmes may be taken up on human rights, laws and regulations.
- Land problem is a major issue and society should act for materializing the dreams of tribals who were once the owners of the Wayanad. The perpetual problem of land alienation is still continuing among the tribals. To ensure that the tribal lands are not further alienated, tribal development authorities must enable tribal people to manage the agricultural lands on economically sustainable lines through appropriate technological interventions and other support and services. Co-operative and group management efforts are to be fostered to facilitate tribal people to overcome the limitations of economies of scales in their agriculture.
- Changes in the cropping patterns should be brought about. Proactive efforts to diversify cropping patterns should be made. Research studies to study the flaws in the present situations and to suggest profitable combinations should be encouraged.
- Ensure regular payment of pension to all eligible tribal people.

- Research studies for promoting a synergy of the traditional knowledge with the modern technologies also should be commissioned. Promotion of organic farming and value addition to further enhance the incomes should be brought about.
- Research studies taking into consideration the other variables, which have direct effect upon the diffusion of agricultural innovation, should be identified and studied.
- Credit accesses should be increased.
- Legislation of the protection of the rights of knowledge holders like farmers and healers should be initiated.
- Lack of knowledge of pests and diseases can be resolved by adequate extension interventions such as trainings, group discussions and demonstrations.
- Participatory approaches like group farming, GALASA etc. to be started to solve the agrarian distress and to improve yields.
- Farmer counselling centres should be set up by the State Agricultural University to support the farmers and to stop them from further suicides.
- Cooperatives for collective production using improved agricultural technology, identification, value addition and marketing should be formed with the initiative of Governmental and Non- Governmental agencies.

References

REFERENCES

- Agarwal, A. and Arora, D. R. 1989. Factors affecting adoption of gober gas plants in Ludhiana. *Social Change* 19: 69-71
- Ahamed, P. 1993. Adoption of farm implements by the rice farmers of Kerala. Ph.D thesis, Kerala Agricultural University, Thrissur, p 306
- Allport, G. 1975. Attitudes. In Murchison, G. (Ed.). *A Handbook of Social Psychology*, Mass Clark Univ. Press, Worcester, p 798 – 844
- Anantharaman, M. 1991. Managerial Efficiency of Cassava Farmers. Ph.D. thesis, Kerala Agricultural University, Thrissur, p. 217
- Anilkumar, A. S. 1993. Introducing mulberry in coconut based farming systems. *Indian Cocon. J.* 24:2
- Ashby, J. A. 1982. Technology and ecology: Implications for innovation research in peasant agriculture. *Rural Soc.* 47: 234 – 250
- Aswathanarayana, N. 1989. A study of knowledge and adoption of improved silkworm rearing practices and marketing problems of Seri culturists in Kollar Dt. M. Sc (Ag.) thesis, University of Agricultural Sciences, Bangalore. p. 130
- Audirae, I. and Beaulieu, L. J. 1986. Micro computers in agriculture: A proposed model to study their diffusion / adoption. *Rural Soc.* 51: 60-73

- Avanti, D. S. 1981. Adoption behaviour and motivation patterns of dairy farmers of Dharwad and Belgaum Districts of Karnataka State. M. Sc. (Ag.) thesis, University of Agricultural Sciences, Bangalore. p 156
- Babu, M. N. 1995. Evaluative perception of homestead farmers in relation to appropriateness of farming systems and cropping pattern. M. Sc (Ag.) thesis. Kerala Agricultural University, Thrissur. p. 123
- Babu, K. S. and Sreekumar, D. 1991. Biogas deserves attention. *Intensive Agric.* 28: 8-10
- Ban, A. W. V. and Hawkins, H. S. 1990. *Agricultural Extension*. John Wiley and Sons Publications, New York, p 138
- Bael, M. and Sibley, W. 1967. Knowledge of adoption level of farmers and trained in KVK. *Indian J. of Ext. Edu.* 33 : 18 – 21
- Barakatakya, M. and Gohain, D. 1970. Institutional factors as a determinant for economic development in tribal areas. *Indian J. of Agricultural Economics* 25 (3) : 215
- Bhaskaran, C. and Sushama, N. P. 1994. Problems of technology transfer in Kerala agriculture. Abstract of International Congress on Kerala Studies, AKG Centre for Research and Studies. Thiruvananthapuram. pp. 82-83
- Bonny, P. B. 1991. Adoption of improved agricultural practices by commercial vegetable growers of Ollukara block in Thrissur district. M. Sc (Ag.) thesis, Kerala Agricultural University, Thrissur, p. 172

- Brown, L. A. 1981. *Innovation Diffusion: A new perspective*. Methuen Publishers, New York, p 210
- Burman, R. B. K. and Sharma, K. P. 1970. Tribal Agriculture in India. *Indian J. Agric. Econ.* 25(3): 149
- Carr, M. 1985. *The A. T. Reader – Theory and Practice in Appropriate Technology*. Oxford & IBH, New Delhi. p. 56
- Statistics for Planning 2001. Directorate of Economic and Statistics. Thiruvananthapuram, p. 544
- Chakrabarty, M. L., Singh, J. P. and Atibudhi, M.N. 1989. Economic analysis of employment, income and consumption pattern of tribal farmers. *J. Rural Dev.* 18 (1) : 97 - 108
- Chandrakandan, K. 1973. A study on farm practice attributes and socio-personal factors in relation to adoption of agricultural practices in Thanjavur. M.Sc (Ag.) Thesis. Tamil Nadu Agricultural University, Coimbatore, p 112
- Chandran, P. 1993. Spread and acceptance of sunflower among dryland farmers. M.Sc. (Ag.) Thesis, Tamil Nadu Agricultural University, Madurai, p 132
- Chandran, S. A. 1989. Impact of development programme of promoting pepper production in Kerala, M. Sc. (Ag.) Thesis, Kerala Agricultural University, Vellayani, p 141
- Chattopadhyay, S. N. 1963. A study of some psychological correlates of adoption of innovations in farmers. Ph.D. thesis, Indian Agricultural Research Institute, New Delhi, p 243

Cheriyann, K. B. 1984. Awareness and attitude of farmers, agricultural extension workers and officials towards T and V systems. M. Sc (Ag.) thesis, Kerala Agricultural University, Thrissur, p 98

Coleman, A. L. 1955. *How people accept new ideas*. Agricultural Extension Service. IOWA State College, pp 1-10

Dahama, O. P. 1970. *Extension and Rural Welfare*. Ramprasad and Sons. Agra

Dar, V. 1970. Rapporteur's report on development of Agriculture in Tribal areas. *Ind. J. Agric. Econ.* 25 (3): 135

Das, P. K. 1988. Economics of coconut based farming systems. National Symposium on Coconut Breeding and Management, Kerala Agricultural University, Thrissur, pp 42 – 43

Dass, G. N. 1978. *Tribal Welfare*. Khadi Gramodyog. 25 (5): 261

Desai, N. K. 1961. Problems of mixed farming – Study of a character farm. *Indian J. Agric. Econ.* 16: 46 – 50

Dhondyal, S. P. 1971. Economics of mixed farming in different regions. *Indian J. Agric. Econ.* 16: 54 – 56

Diaz, B. J. 1976. Communication of agricultural innovations in Latin America: the need for new models. *Commun. Res.* 3: 135 – 154

- Dubey, S. C. 1977. *Tribal Heritage of India*. Vikas Publishing House. New Delhi. p 322
- Encyclopaedia of Dravidian Tribes 1996. Vol. II. The International School of Dravidian Linguistics. p. 1021
- Ensminger, D. 1986. For a First Step Technology. *Ceres*. 19 (3): 6
- Ensminger, D. 1989. In support of a systems approach to small farm agriculture and rural development. *IASSI Quarterly*. 8 (1): 32 – 44
- FAO. 1999. Proceedings of the FAO E-mail Conference on *Small Farmer Group Associations – Bringing the poor together*. 24 Sep – 11 Nov, 1998. FAO of UN Rural Institutions and Participation Services, Rome
- Farmer, B. H. 1979. The green revolution in South Asian rice fields: environment and production. *J. Development Studi*. 15: 268 – 352
- Fathimabi, P. K. 1993. Welfare Schemes for Agricultural Labourers – A multidimensional analysis. M. Sc. (Ag.) thesis, Kerala Agricultural University, Thrissur. p. 98
- Fernandes, E. C. M. and Nair, P. K. R. 1986. An evaluation of the structure and function of tropical homegardens. *Agroforestry Syst*. 21: 279-310
- Fliegel, F. C. and Vaan, E. S. 1983. Diffusion of adoption process in agriculture: changes in technology and changing paradigms. *Technology and Social Change in Rural Areas*. (ed. Summers, G. F.) West View Press, Boulder, pp 35-49

- Gangadharan, K. K. 1993. Adoption of improved agricultural practices by pepper growers of Idukki District. M. Sc (Ag.) Thesis, Kerala Agricultural University, Thrissur, p 150
- Ganguli, B. N. and Gupta, D. B. 1976. *Levels of living in India: An Interstate Profile*. S. Chand and Company, New Delhi. p 116
- Geertz, C. 1969. Two types of ecosystems. *Environment and Cultural Behaviour*. (ed. Vayda, A. P.). The Natural History Press, New York, pp 103 – 116
- George, J. and Krishnaprasad, P. 2006. Agrarian distress and Farmers' suicide in the Tribal district of Wayanad. *Social Scientist*. 34 (7-8): 70-85
- Gerson, R. T. 1989. Homegardening of indigenous vegetables: the role of women. First International Symposium on horticultural economics in developing countries, Alemaya, Ethiopia
- Gill, A. S. and Verma, B. S. 1993. Intercropping enhances the yield of cereals and leguminous forage crops. *Indian Farming* 42 (12): 25 – 27
- Godhanapani, G. 1985. Knowledge and adoption of nutrient recommendation for irrigated groundnut. M. Sc (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore. p 110
- Gondi, M. G. and Gowder, S. N. 1983. *Monitoring and evaluation of agriculture extension project. Workshop on Management of transfer of farm technology under the T & V system. 2-4 October 1983*. National Institute of Rural Development, Hyderabad, p 45

- Gopala, M. 1991. A study on adoption of recommended mulberry cultivation and silkworm rearing practices in developed and less developed areas of Kolar District. M. Sc. (Ag.) thesis, University of Agricultural Sciences, Bangalore. p. 150
- *Goss, K. F. 1976. Consequences of diffusion of innovations: the case of mechanization in US Agriculture. M. A. Thesis. Michigan State University, Department of Communication, East Lansing, Michigan, p 103
- Goswami, P. C. and Saika, P. D. 1970. Problems of agricultural development in tribal areas. *Ind. J. Agric. Econ.* 25 (3): 140-148
- Gotsch, C. H. 1972. Technical change and distribution of income in rural areas. *Am. J. of Agric. Econ.* 54 (2): 326 – 341
- Haque, M. A. 1989. Adoption of recommended species of fish in composite fish culture. In: Ray, G. L. (Ed.) *Studies in agricultural extension and management*. Mittal Publications, Delhi: 99 – 130
- Hassan, M. K. 1977. Social Deprivation, self image and some personality traits. *Indian J. of Personality and Human Development.* 1 (1): 52
- Hemalatha, S. 1997. Gender analysis of rice farmers in Thiruvananthapuram district. M. Sc (Ag.) thesis, Kerala Agricultural University, Thrissur. p. 180
- Hobbs. 1964. The relation of farm operator values and attributes to their economic performance. *Rural Sociological Report 33*. Iowa State University

- Hooks, G. M., Napier, T. L. and Carter, M. V. 1983. Correlates of adoption behaviour: the case of farm technologies. *Rural Soc.* 48: 308 – 323
- Jain, S. P. 1980. Gobar Gas: A study of the working of the plants in Andhra Pradesh, Haryana and Karnataka. *Rural Development Digest.* 3(4): 231 – 270
- Jaiswal, N. K. 1965. A study of factors associated with low level of adoption of improves agricultural practices. Ph. D thesis, Division of Agricultural Extension, IARI, New Delhi, p. 87-96
- Jaiswal, N. K. and Das, P. K. 1981. Transfer of Technology in rice farming. *Rural Development Digest* 4 (4): 320 – 353
- Jaiswal, N. K. and Dave, A. K. 1972. Measurement of progressiveness in farming. In. Sinha, P. R. R. (Ed.) pp 115 – 127
- Jaleel, M. M. 1992. Factors influencing the development of agriculture among the Kanikkar tribe of Kerala. M. Sc. (Ag.) thesis, Kerala Agricultural University, p 171
- Jaykrishnan, S. 1984. Adoption of low cost technology among paddy growers. M. Sc (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore, p. 185
- Jetley, S. 1977. *Modernizing Indian peasant – A study of six villages in Eastern Uttar Pradesh.* Asian Educational Services, New Delhi: 130 – 157
- Jeya, R. 1999. Impact of TANWA Training on clients. M.Sc (Ag.) Thesis, Tamil Nadu Agricultural University, Killikulam

- Kailasam, S. 1980. The credit seeking, repayment utilization pattern and information need perception of borrowers. M.Sc (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore, p 190
- Kamarudeen, M. 1981. A study on the impact of national demonstration programme on paddy cultivation in Trichur District. M. Sc (Ag.) thesis, Kerala Agricultural University, Thrissur, p. 232
- Kapur, J. C. 1989. Technologies and social organization for eradicating rural poverty. *IASSI Quarterly*. 8 (1): 14 – 20
- Kareem, A. K. and Jayaramaiah, K. M. 1998. Participation of beneficiaries in Integrated Rural Development Programme. *Madras Agricultural J.* 85 (1): 20-23
- Karwara, P. C., Manchand, A., Kishtwana, J. and Kanwar, P. 1991. Comparative adoption of improved technology by female and male headed Scheduled Caste families. *J. Rural Dev.* 10: 343: 351
- KAU. 1989a. *National Agricultural Research Project – Status report of the Southern Zone*. Kerala Agricultural University, Thrissur 1: 3-23
- KAU. 1989 b. *National Agricultural Research Project – Status report of the Southern Zone*. Kerala Agricultural University, Thrissur 1: 323
- KAU. 2002. *Checklist of criteria of Assessing Agricultural Technology Development: a Reader Concept and Methodology*, (ed. Prasad, R. M.), College of Agriculture, Padanakkadu, Kerala Agricultural University, pp 15-17
- KAU. 2003. *Package of Practices Recommendations : Crops* (eds. Jose, A. I., Paulose, S., Prameela, P., Bonny, B. P.). Directorate of Extension, Kerala Agricultural University, Thrissur

- Katz, D. and Scotland, E. 1959. A preliminary statement to a Theory of Attitude Structure and Change. In Koch, S. (Ed.) *Psychology. A study of A Science.* (ed. Koch, S) Mc Grew Hill Book, New York, p. 221-251
- Kripal, V. 1978. Higher education for the Scheduled Castes and Tribes. *Economic and Political Weekly* 13 (425): 12-15
- Kokate, K. D., Tyagi, K. C. and Rao, S. N. V. 1988. Factors influencing feeding gap in local cattle of tribal scenario. *J. Rural Dev.* 7 (6): 709 – 721
- Krishnaiah, G. and Maraty, P. 1989. Impact of primary milk producers co-operative societies on beneficiaries in Nalgonda district of Andhra Pradesh. *Indian Co-operative Review* 26(8): 278 – 282
- Krishnakumar, R. 2004. Driven to Death. 21 (9): 22-24
- Krishnamoorthy, K. S. 1988. Study on knowledge and extent of adoption of seed treatment practices among irrigated cotton and millet growers. M. Sc (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore. pp 164
- Leagens, P. J. 1985. Adoption of technology by Small Farmers – A model of Strategy Builders. *J. Extn. Systems* 1 : 19-24
- Lekshminarayanan, S. R. 1984. Spread and acceptance of wheat technology. M. Sc (Ag.) thesis, Agricultural College of Agriculture and Research Institute, Coimbatore
- Lerner, D. 1958. *The passing of Traditional Society.* Modernizing the Middle East Free press, New York

- Lowell, E. L. 1952. The effect of need for achievement on learning and speed of performance. *J. Psychology*. (33): 31-40
- Mahadevaiah, D. 1987. A study on adoption of sugarcane cultivation practices and the sources of information consulted by the farmers in Mandya dt., Karnataka State. M. Sc (Ag.) thesis, University of Agricultural Sciences, Bangalore. pp 120
- Majumdar, A. K. and Majumdar, P. K. 1967. Adoption and some psychological characteristics of farmers. *Indian J. Ext. Edn.* 3 : 138 – 142
- Manivannan, N. 1980. A study on knowledge and extent of adoption of sunflower growers, M. Sc (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore. p. 69-70
- Manjunath, G. 1986. A study on impact of village adoption programme operated by an input agency in Mandya District of Karnataka State. M. Sc. (Ag.) thesis, University of Agricultural Sciences, Bangalore. p 98
- Mannheim, K. 1960. *Types of rationality and organized insecurity*. Geo-Brazilian Inc. New York. 508 – 528
- Mann, C. K. 1978. *Package of Practices: a step at a time with clusters*. Middle East Technical University, Ankara, p 90
- Manohari, P. L. 1970. Study on the profile of women farm graduate. M. Sc (Ag.) thesis, Tamil Nadu Agricultural University. Coimbatore. p 120

- Mathew, J. 1986. *Idiology, protest and Social mobility – A case study of Mahars and Pulayas*. Inter India Publication, New Delhi. 260 p
- Mathur, P. R. G. 1975. Transfer and Alienation of Tribal land and debtedness in Kerala. *Perspectives on Tribal Development and Administration*. National Institute of Rural Development. Hyderabad. p . 106 –112
- Mathur, P. R. G. 1977. *Tribal Situation in Kerala*. Kerala Historical Society. Thiruvananthapuram, 153 p
- McClelland, D. C. 1961. *The Achieving Society*. Vakils Free Press, New York, p. 196
- Meera, B. 1995. Differential adoption of plant protection technology by farmers of Kerala – A critical analysis. Ph. D. thesis, Kerala Agricultural University, Thrissur. p. 240
- Mehta, P., Sharma, R. K. and Singh, J. N. 1980. Impact of mixed farming on economic efficiency of different farm sizes. *Indian J. Agric. Econ.* 30:166
- Mena, M. M. 1988. *Development of appropriate technology for the rural sector in the developing countries of Asia*. World Scientific Publishing Company, Singapore
- Menon, K. R. 1970. A study on small farmers with regard to their participation in extension methods and utilization of assistance in Sarkarsamakulam block, Coimbatore district. M.Sc (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore, p 102

- Menon, A.G.G. and Bhaskaran, C. 1988. Technology alters traditional attitudes –. *Indian Farming*, 28 (8): 45-47.
- *Mercoiret, M. R., Gondahy, B., Ndiame, F. and Berthome, J. 1990. *The role of farmers' organisation in developing and spreading innovations: The case of CADEF (Senegal)*. CADEF / ISRA / CIEPA / ENEA / DSA – CIRAD
- Mohandas, M. 1986. *Impact of development projects in the Western Ghat region on the forest dependent population – A case study of Wayanad district in Kerala*. Project Report of Ministry of Environment and Forest in collaboration with Kerala Agricultural University, Thrissur, p. 120 - 130
- Mohandas, M. 1992. *Impact of New Settlers in the Western Ghat region on the Socio-economic conditions of the Tribal population – The case of Wayanad District in Kerala*. Project Report of Ministry of Environment and Forest in collaboration with Kerala Agricultural University, Thrissur, pp. 133- 149
- Moorthy, R. S. 1984. Knowledge and use of post harvest technology at farmers' level. M. Sc. (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore. Pp. 120
- Murthy, A. S. and Singh, S. N. 1974. *Communication Behaviour of farmers*. New Heights. New Delhi
- Muthuraman, P. 1995. Towards sustainable agriculture: dimensions and components. *Employment News* 20:13
- Naik, S. N. 1981. A study of factors associated with the knowledge and adoption of selected recommended practices of paddy cultivation in coastal area of Uttara Kannada district of Karnataka. *The Mysore J. Agrl. Sciences*. 32(1) : 248

- Nair, S. S. 2002. *Environmental Protection and Watershed Management*. Watershed based development and management. Western Ghat Cell. Planning and Economic Affairs Dept., Government of Kerala, p. 69-82
- Nandakumar, P. P. 1988. Impact of ITDP on Yerava tribal community in Virajit taluk of Kodagu District, Karnataka. M. Sc (Ag.) thesis, University of Agricultural Sciences, Bangalore. p 112
- Nanjaiyan, K. 1985. Rationality in decision making by small farmers. Ph.D. thesis. Tamil Nadu Agricultural University, Coimbatore. pp. 230
- Norman, S. J. T. 1982. Production and marketing of vegetable in Malappuram district. M.Sc (Ag.) Thesis, Kerala Agricultural University, Thrissur
- Oostrum, J. 1998 Sustainable agriculture needs of sustainable markets. *ILEIA Newsletter* 14 (4): 18-19, Netherlands
- Palani, G. 1987. Extent of adoption of recommended rat control practices by the farmers in Tanjavur District. M. Sc (Ag.) thesis, Tamil Nadu Agricultural University. p 120
- Pandya, R. D. and Trivedi, J. C. 1988. Constraints in the adoption of gober Gas technology. *Rural India* 5 (7): 123 – 124
- *Parson, T. and Shills, E. A. 1965. *Towards a General Theory Action*. Harvard University Press. Massachusetts. 269 p
- *Pearse, A. 1980. *Seeds of plenty, seeds of wart*. Oxford University Pres, London, p 225

- Perez, L. 1979. The human ecology of rural areas: an appraisal of a field study with suggestions for a synthesis. *Rural Soc.* 44: 584 – 601
- Perumal, G. 1970. Study on factors and agencies responsible for the spread of hybrid maize in Coimbatore district. M.Sc (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore
- Perumal, L. 1994. Impact of TANWA training on participants. M.Sc (Ag.) Thesis, Tamil Nadu Agricultural University, Killikulam
- Peterson, W. 1997. The Context of Extension in Agricultural and Rural Development. In Swason *et al* (ed.). *Improving Agricultural Extension – A reference manuel.* FAO, Rome
- Pillai, G. B. 1983. An analytical study of the integrated soil conservation practices in Kerala. Ph.D thesis, Tamil Nadu Agricultural University, Coimbatore
- Planck, U. 1987. Socio-cultural implication of progressive agricultural technology. *Quarterly J of International Agriculture.* 26 (2): 168 – 178
- Ponnappan, C. 1982. Fish Farmers Development Programme. An analysis. M. Sc. (Ag.) thesis. Tamil Nadu Agricultural University, Coimbatore
- Pradeepkumar, R. 1993. Aspiration of educated unemployed youth for self employment in agriculture and allied fields. M. Sc (Ag.) thesis, Kerala Agricultural University, Thrissur. p 112

- Prakash, R. 1980. A study on the impact of Agricultural Development Programme among the Tribals of Kerala. M. Sc. (Ag.) thesis, Kerala Agricultural University. Vellayani, p 114
- Prasad, C., Choudhary, B. N. and Nayar, B. B. 1987. Constraints in Transfer of Technology. In. *First line Transfer of Technology Projects*. Indian Council of Agricultural Research. New Delhi
- Prasad, R. M. 1983. Comparative analysis of achievement motivation of rice growers in three states in India. Ph.D. thesis. University of Agricultural Sciences, Bangalore. p 230
- Puri, V. K. 1978. Planning for tribal development. *Yojana*. 22 : 20-26
- Puttaswamy, T. 1979. Knowledge, adoption and attitudes of small farmers towards mixed farming in Siral and Anekal taluks. M. Sc. (Ag.) thesis, University of Agricultural Sciences. Bangalore, p 131
- Quazi, A. R. and Iqbal, M. 1991. The relationship between personal characteristics and adoption of recommended farm practices. *J. Rural Dev. Admn.* 23: 126-129
- Racine, J. 1978. Traditional Structures and Modern Trends in South India. The studies of rural areas in Tamil Nadu. *Rural Devl. Abstr.* 1(2): 316
- Rai, H. N. 1965. Diffusion of information and farmer's response in relation to an improved farm practices. *Indian J. Ext. Edn.* 1 : 140
- Rajagopalan. 1960. Economics of mixed farming in Coimbatore region. *Indian J. Agrl. Econ.* 16 (1): 145 – 154

- Rajapandi, S. 1983. Water management knowledge and use of different irrigation practices under irrigated condition. M. Sc. (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore
- Rajendralal, T. V. 1997. Multidimensional study on special component plan schemes for the scheduled caste farm families. M.Sc (Ag.) thesis. Kerala Agricultural University, Thrissur, p 113
- Rajendralal, T. V. 2005. Sustainability of tribal development in Kerala- A methodological study. Ph. D. thesis, Kerala Agricultural University. Vellayani p 188
- Rajendran, P. 1978. A study of factors affecting Adoption of selected Agricultural Practices. M. Sc (Ag.) thesis, Kerala Agricultural University, Thrissur, p. 112
- Rajendran, P. 1992. Feasibility and utilization of agricultural technologies among Scheduled Caste farmers. Ph. D. thesis, Kerala Agricultural University, Thrissur, p 239
- Ramamoorthy, H. S 1973. Some factors influencing IR-8 adopter's perception of characteristics of innovations and its relation to adoption. M. Sc (Ag.) thesis, GKVK, Bangalore. p 112
- Ramaswamy, N. K. 1987. Factors responsible for the spread of turmeric in Coimbatore district. M. Sc (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore. p 182

- Ramaswamy, S. 1983. A study on knowledge level and extent of adoption by tenant and owner cultivators. M.Sc (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore. p 182
- Ramsey, C. H., Polson, R. A. and Spencer, G. M. 1959. Values and adoption of practices. *Rural Sociology*. 24
- Rao, S. 1989. IRDP- Well intended programme. *Kurukshetra*. 5 (11): 17-20
- Rathinasabapathi, S. 1987. A study on knowledge and extent of adoption of integrated pest management for cotton. M. Sc. (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore, p 155
- Ravichandran, V. 1980. A study on attitude and extent of adoption and problems encountered by registered sugarcane growers. M.Sc (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore. p 170
- Ray, G. L. 1967. Facilitating people's participation in rural development programmes. *Management of Agricultural Extension in Global Perspectives* (eds. Samantha, R. K. and Arora, S. K.). B. R. Publications, New Delhi, p. 171-187
- Reddy, S. M. V. 1983. Study of self confidence and achievement motivation in relation to academic achievement. *J. of Psychological Research*. 27 (2): 87-91
- Reddy, V. H. C. 1987. Attitude and adoption behaviour of farmers relating to watershed development programme in Bangalore District. M. Sc (Ag.) thesis, University of Agricultural Sciences, Bangalore. p. 113

- Reddy, V. K. G. 1991. A study on knowledge and adoption level of registered cotton seed growers in Chitradurga District of Karnataka. M. Sc. (Ag.) thesis, University of Agricultural Sciences, Bangalore. p 146
- Remeshbabu, R. 1987. A study on adoption behaviour and economic performance of grape growers of Bangalore and Kolar Dts. M. Sc (Ag.) thesis, University of Agricultural Sciences, Bangalore. p 98
- *Riddell, C. and Robinson, M. 1995. *Non-governmental organisations and Rural Poverty Alleviation*. ODI and Clardon Press, Oxford
- Rogers, E. M. 1962. *Diffusion of Innovations*. The Free Press. New York
- Rogers, E. M. and Svenning, L. 1969. Modernization among peasants – The Impact of Communication. Rinehart and Winston Inc. New York
- Roy, H. C. 1965. *Progressiveness of farmers*. M.Sc (Ag.) thesis, Division of Agrl. Extension, Sabour, Bhagalpur, Bihar Agricultural College. pp. 98
- Roy, P., Fliegall, F. C., Kivilin, J. E. and Sen, L. K. 1968. *Agricultural Innovations among Indian Farmers*. N. I. C. D. Hyderabad
- Sabapathi, K. K. 1988. Training needs in Agriculture of Irulas of Attapady. M. Sc. (Ag.) thesis, Kerala Agricultural University, Thrissur
- Sachidananda, 1968. *The Tribal Village in Bihar*. Oriental Publishers. New Delhi
- Sadamate, V. V. 1978. A Study of Tribal Farming System and Technological Gap. Ph. D. thesis. Division of Agricultural Extension. IARI. New Delhi.

- Sagar, R. L. 1989. Determinants of farmers productivity of crops. In. Ray, G. L. (Ed.) *Studies in Agricultural Extension and Management*. Mittal Publication, New Delhi, p 231
- Sahay, B. N. 1977. *Pragmatism in Development*. Book Hive. New Delhi, p 130
- Sahu, B. N. 1970. Guidelines for development of tribal agriculture in India. *Ind. J. Agric. Econ.* 25 (3): 224
- Salam, M. A. and Sreekumar, D. 1990. Coconut based mixed farming system to sustain productivity. *Indian Cocon. J.* 20: 3-5
- Salunke, G. V. and Thorat, S. S. 1975. Adoption behaviour of small farmers in relation to their personal characteristics. *Ind. J. Extn. Edn.* 11 (1 & 2): 67 – 69
- Sanjeev, K. V. 1987. Training programme of KAU Krishi Vigyan Kendras – an analysis. M. Sc. (Ag.) thesis, Kerala Agricultural University, Thrissur, p 155
- Savithri, A. 1992. A study on knowledge, attitude and adoption of dryland technologies of farm women: An ex-post- facto analysis. M. Sc. (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore
- Seema, B. 1997. Interaction of psychological, economic, sociological and technological determinants of the entrepreneurial behaviour of agricultural students. Ph.D thesis. Kerala Agricultural University, Thrissur. p 147
- Selvanayagam, M. 1986. Technocultural profile on dryland farming. M. Sc (Ag.) thesis, Tamil Nadu Agricultural University, Coimbatore.

- Shastri, C. P. 1959. Economics of mixed farming in Bihar. *Indian J. Agric. Econ.* 16 (1): 138 – 144
- Sherief, A. K. 1985. Communication behaviour of Non-contact farmers under Training and Visit System of Agricultural Extension in Kerala. M. Sc. (Ag.) thesis, Kerala Agricultural University, Vellayani, p. 134
- Shilaja, S. 1981. Influence of leaders in the development of rural areas. M. Sc. (Ag.) thesis, Kerala Agricultural University, Thrissur, p. 269
- Shivasankara, K. R. 1986. An analysis of fertilizer use pattern and constraints perceived by the farmers in Chichmangular Dt. M.Sc (Ag.) thesis, University of Agricultural Sciences, Bangalore. p 110
- Shivakumarappa 1987. A comparative analysis of achievement motivation of grape growers in progressive and less progressive villages. M. Sc. (Ag.) thesis, University of Agricultural Sciences, Bangalore. p 130
- Siddaramaiah, B. S. and Rajanna, B. 1984. Relative Effectiveness of combinations of radio, slide show and film show – An experimental evidence. *Ind. J. Extn. Edn.* 20(1 & 2): 7 – 11
- Singh, A. K. 1984. Poverty and Prejudice in India. *UGC National Lecture.* Psychology Dept. Ranchis University, Ranchi
- Singh, B. K. 1971. Economics of mixed farming in Western U. P. and Punjab region. *Indian J. Agric. Econ.* 16: 122-131

- Singh, K. 1977. A study of neo-marginal farmers situations and socio-economic impact of new agricultural technology. Ph. D. thesis. Indian Agricultural Research Institute, New Delhi. p 234
- Singh, L. R., Bhati, J. P. and Jain, S. L. 1971. The supply utilization and economic rationale of credit use on progressive and less-progressive farms. *Indian J. Agricultural Economics*. 26 (4): 474 – 479
- Singh, K. M. P. and Singh, R. P. 1972. Impact of national demonstration in the adoption of HYV of wheat. *Indian J. Extn. Edn.* 10 (1 & 2) : 65 – 67
- Singh, M. 1990. Education for sustainable agriculture. *Indian Agron.* 35 (1 & 2): 1 – 22
- Sinha, A. 2006. Economic empowerment and amelioration of tribals in India. *Kurukshetra* 54 (9): 3-11
- Sohi, J. S. and Kherde, R. H. 1980. A study of dairy adoption behaviour of small and marginal farmers in Punjab. *Indian J. Extn. Edn.* 16 (1 & 2): 84 – 86
- Srivastava, J. C. 1970. Technology for rural development. *I. Khadi Gramadyog.* 27 (1): 25 – 41
- Srivastava, P. N. and Singh, C. B. 1970. Agricultural Development and Tribal Population in India. *Ind. J. Agrl. Econ.* 25 (3): 161 – 167
- Storck, H., Eman, B., Andrew, B., Borowiecki, A. and Hawariat, S. W. 1991. Farming systems and farm management practices of small holders in the

Hararghi high land – a base line survey. Farming system and resources economics in tropics. 11 : 195 p

Sumana, A. and Reddy, V. M. 1998. Participation of farm women in Watershed Development Project in Prakasam district of Andhra Pradesh. *The Andhra Agriculture Journal*. 5(3 & 4): 147 – 150

Sumathi, U. B. 1987. A study on achievement motivation and management orientation of small coffee growers in Chickmangalur Dt. , Karnataka. M. Sc. (Ag.) thesis, University of Agricultural Sciences, Bangalore. pp 109

Sundaraswamy, B. 1971. *Extent of Adoption of Recommended practices and Information sources consulted by the farmers in respect of Hybrid Jowar cultivation in the selected Taluka of Mysore District*. M. Sc. (Ag.) thesis. Tamil Nadu Agricultural University. Coimbatore

Sundaresan, D. 1975. Mixed farming. *Indian Fmg.* 25 (5): 12-13

Supe, S. V. and Singh, S. N. 1969. *Dynamics of Rational Behaviour of Indian Farmers*. New Heights, New Delhi

Supe, S. V. 1969. Factors related to different degrees of rationality in decision making among farmers in Buldana district. Ph D thesis, Indian Agricultural Research Institute, New Delhi, p. 176

Sureshkumar. 1989. *Attitude formation and change*. Jaico publishing house. Bombay

- Sureshkumar, R. 1994. Participation of farm family women in marginal homestead farming systems in Thrissur district. M. Sc (Ag.) thesis, Kerala Agricultural University, Thrissur, p 102
- Sushama, N. P. K. 1979. A study on the impact of selected development programmes among the tribals of Kerala. M. Sc. (Ag.) thesis, Kerala Agricultural University, Vellayani, p 174
- Suthan, L. 2003. Analysis of farmers' participation in the participatory technology development (PTD) process vis-à-vis plant protection in vegetables at Kunnathukal panchayat. M. Sc (Ag.) thesis, Kerala Agricultural University, Thrissur, p. 113
- Swaminathan, M. S. 1979. *Improved Agronomic Practices for Dryland Crops in India*. All India Co-ordinated Research Project for Dryland Agriculture, Hyderabad, p 175
- Talib, B. D. and Singh, N. 1960. Patterns of mixed farming in Punjab. *Indian J. Agric. Econ.* 16 (1): 155 – 162
- Thomas, S. 1998. Role of farm women in Planning and Management of Watershed. M. Sc. (Ag.) thesis, Kerala Agricultural University, Thrissur, p 126
- Thurstone, L. L. 1946. Comment. *Amer. J. Sociology.* 52: 39-50
- Tripathi, G. 1972. Tribal Society in aflux. *Social Welfare.* 19(9): 13

- Tripathy, A. 1977. A study of technological gap in adoption of new rice technology in coastal Orissa and the constraints responsible for the same. Ph. D. thesis, Tamil Nadu Agricultural University, Coimbatore, p 215
- Trist, E. L. and Bamforth, K. W. 1951. Some social and psychological consequences of the longwall method of Coal-getting. *Human Relations*. 4 : 3 – 38
- Trivedi, G. 1963. Measurement analysis of socio-economic status of rural families. Ph.D. thesis, HRI, New Delhi. p 230
- Tyagi, K. S. and Sohal, T. S. 1984. Factors associated with adoption of dairy innovation. *Indian J. Extn. Edn.* 20 (3 & 4): 1-8
- Vehra. S. 1971. *Caste, class and politics: A comparative study if India and United States*. Sage Publications. London, pp 25-26
- Verma, M. M. 1996. *Tribal Development in India – Programmes and Perspectives*. Mittal Publications, New Delhi, 524 p
- Verma, P. H. 1996. A multidimensional analysis of self – employment among farm women. M. Sc (Ag.) thesis, Kerala Agricultural University, Thrissur, p 130
- Viju, A. 1985. Adoption behaviour of Tribal farmers towards improved agricultural practices, M. Sc. (Ag.) thesis, Kerala Agricultural University, Thrissur, p 154
- Vyas, W. N. and Mann, R. S. 1960. *Indian Tribes in Transition*. Rawat Publications. New Delhi, p 98

Wadhwa, C. S. 1994. *Self-help groups for reaching the poor*. Asia-Pacific Rural Finance. July – Sept: 20 –28

Webster's Third New International Dictionary of the English Language Unabridged. Vol. VI. 1988. Encyclopedia Britannica, Inc., Chicago, p. 524

Wilkening, E. A. 1953. Acceptance of improved farm practices. *Agric. Exten. Stat. Bul.* 92, North Carolina, USA

Yadav, K. C. 1970. Socio-cultural obstacles to the development of Adivasis. *Yojana* 14 (5): 13

Zinyama, L. M. 1988. Farmers perception of the constraints against increased crop production in the subsistence commercial farming sectors of Zimbabwe. *Agric Admini and Extension*. 20 : 97 - 107

APPENDICES

KERALA AGRICULTURAL UNIVERSITY

Dr. N. P. Kumari Sushama
Associate Professor (Extn)

Department of Agricultural Extension,
College of Agriculture,
Vellayani – 695 522
Dated:

Sir / Madam,

Ms. Geetha G. Nath, PhD Scholar in Agricultural Extension under my guidance, is doing her research work on "Socio-technical system analysis of tribal and settler farmers in the Western Ghat regions of Wayanad District in Kerala".

One of the most important objectives of this study is to develop a Socio-technical feasibility index to evaluate agricultural innovations among tribals and settlers.

Based on review of literature and discussion with experts, she has identified some social and technical determinants and adoption, which influence the diffusion of innovations in a social system. Kindly go through the items and give weightage for each item considering the importance in a ten-point continuum. I would be thankful if you can send the same to the student through the self addressed stamped envelope, at the earliest.

Thanking you

Yours sincerely,

N. P. Kumari Sushama

SOCIAL AND TECHNICAL DETERMINANTS, WHICH INFLUENCE THE DIFFUSION OF INNOVATIONS

Kindly give weightages to the selected social, technical and adoption on a ten point continuum ranging from one to ten.

(Here the score 'one' indicates the least preferred level and the score 'ten' indicates the most preferred)

Sl.NO	Items	Response pattern (Please indicate your score by marking a circle against each item)									
I	Social Determinants										
1.	Progressiveness	1	2	3	4	5	6	7	8	9	10
2.	Fatalism	1	2	3	4	5	6	7	8	9	10
3.	Cosmopolitaness	1	2	3	4	5	6	7	8	9	10
4.	Indebtedness	1	2	3	4	5	6	7	8	9	10
5.	Migration	1	2	3	4	5	6	7	8	9	10
6.	Land Alienation	1	2	3	4	5	6	7	8	9	10
7.	Attitude towards development	1	2	3	4	5	6	7	8	9	10
II	Technical Determinants										
1.	Social Acceptability	1	2	3	4	5	6	7	8	9	10

2.	Physical compatibility	1	2	3	4	5	6	7	8	9	10
3.	Trialability	1	2	3	4	5	6	7	8	9	10
4.	Complexity / Simplicity	1	2	3	4	5	6	7	8	9	10
5.	Relative Advantage	1	2	3	4	5	6	7	8	9	10
6.	Availability	1	2	3	4	5	6	7	8	9	10
7.	Sustainability	1	2	3	4	5	6	7	8	9	10
III	Adoption	1	2	3	4	5	6	7	8	9	10

Name:

Designation:

പശ്ചിമഘട്ട വികസന പദ്ധതി
ഗിരിവർഗ്ഗ കൂടിയേറ്റ കർഷകരുടെ സാമൂഹിക സാമ്പത്തിക
വിശകലനത്തിനുള്ള ചോദ്യാവലി

- 1. പേര് :
- 2. അഡ്രസ്സ് :
- 3. മതം :
- 4. ജാതി :
- 5. കോളനിയുടെ പേര് :
- 6. ബ്ലോക്ക് പഞ്ചായത്ത് :
- 7. പഞ്ചായത്ത് വാർഡ് :
- 8. വാർഡ് :

1. വയസ്സ് :

2. വിദ്യാഭ്യാസം : വിദ്യാഭ്യാസമില്ല
പ്രൈമറി
സെക്കന്ററി
കോളേജ് തലം

3. കുടുംബ വിദ്യാഭ്യാസത്തിന്റ നിലവാരം

അംഗങ്ങൾ വിദ്യാഭ്യാസമില്ല പ്രൈമറി സെക്കന്ററി കോളേജ് തലം

4. ഏതു തരം കുടുംബമാണ് : അവിവാഹിതൻ
അണു കുടുംബം
കുട്ടുകുടുംബം

5. കുടുംബത്തിന്റെ വലിപ്പം

6. ആശ്രയം

7. എത്രകാലമായി കൃഷി ചെയ്യുന്നു

8. വാർഷിക വരുമാനം

9. ബഹുജന മാർഗ്ഗമുണ്ടോടുള്ള പരിചയം

ആഴ്ചയിൽ / രണ്ടോ അതിൽ കൂടുതൽ തവണയോ /
ആഴ്ചയിൽ ഒരിക്കൽ / രണ്ടാഴ്ചിൽ ഒരിക്കൽ /
മാസത്തിൽ ഒരിക്കൽ / ഒരിക്കലുമില്ല

പത്രങ്ങൾ
ടിവി
റേഡിയോ
കൃഷി മാസികകൾ
കൃഷി സമ്പന്ധമായ മറ്റ് മാസികകൾ

10. വിജ്ഞാന വ്യാപന പങ്കാളിത്തം

പ്രവർത്തനങ്ങൾ സ്ഥിരമായി പങ്കെടുക്കുന്നു / വല്ലപ്പോഴും / ഒരിക്കലുമില്ല

പഠന യാത്രകൾ
സെമിനാറുകൾ
മേളകൾ
കുട്ടു കൃഷി മീറ്റിംഗുകൾ
പ്രകടനം
പുരോഗമന കർഷകരുടെ പരിശീലന ക്ലാസ്സുകൾ
എക്സിബിഷനുകൾ / പ്രദർശനങ്ങൾ
കാമ്പെയ്നുകൾ
മറ്റുള്ളവ

11. സാമ്പത്തിക പ്രേരണ

പ്രസ്താവന

യോജിക്കുന്നു/ വിയോജിക്കുന്നു

ഒരു കർഷകൻ കൂടുതൽ വിളവിനും
ലാഭത്തിനും വേണ്ടി കൃഷി ചെയ്യണം

ഏറ്റവും വിജയിക്കുന്നത് ഏറ്റവും
കൂടുതൽ ലാഭമുണ്ടാക്കുന്ന കർഷകൻ
ആയിരിക്കും

കൂടുതൽ പണം ലഭിക്കുന്ന ഏതു ന്യൂതന
ആശയവും കർഷകൻ പ്രാവർത്തികമാക്കണം

വീട്ടാവശ്യങ്ങൾക്ക് ഉപയോഗിക്കുന്ന ഭക്ഷ്യവിള-
കളേക്കാളും സാമ്പത്തിക നേട്ടം വർദ്ധിപ്പിക്കുന്നതിന്
ഒരു കർഷകൻ നാണു വിളകൾ കൃഷി ചെയ്യണം

കർഷകരുടെ സാമ്പത്തിക സഹായമില്ലാതെ
അദ്ദേഹത്തിന്റേ മക്കൾക്ക് ഒരു നല്ല തുടക്കം
ബുദ്ധിമുട്ടായിരിക്കും

ഒരു കർഷകന് ജീവിക്കാൻ വേണ്ടി സമ്പാദിക്കണം
പക്ഷേ ജീവിതത്തിലെ പ്രധാന കാര്യങ്ങളെ ഒരിക്കലും
സാമ്പത്തിക രീതിയിൽ നിർവ്വചിക്കരുത്

12. നഷ്ട സംഭവ്യത നിർവ്വഹണം

പ്രസ്താവന

ശക്തമായി യോജിക്കുന്നു/ യോജിക്കുന്നു/ അഭിപ്രായമില്ല
വി യോജിക്കുന്നു/ ശക്തമായി വിയോജിക്കുന്നു

ഒന്നോ രണ്ടോ വിളയിറക്കുന്നതിനുള്ള
നഷ്ട സാധ്യത ഒഴിവാക്കാനായി ഒരു
കർഷകൻ കൂടുതൽ വിളകൾ കൃഷി
ചെയ്യുന്നു

ഒരു കർഷകൻ നഷ്ടസാധ്യതയില്ലാത്തതും
കുറച്ച് ലാഭം തരുന്നതുമായ കൃഷികൾ മാത്രം
ചെയ്യാതെ കൂടുതൽ ലാഭമുണ്ടാക്കുന്നവ ഏറ്റെടുക്കണം

കാർഷിക ആവശ്യങ്ങൾക്കായി ബാങ്കിൽ നിന്നും വായ്പ എടുക്കുന്നത് എത്രത്തോളം ബുദ്ധിമുട്ടാണ്

വളരെ ബുദ്ധിമുട്ടാണ്
ബുദ്ധിമുട്ടാണ്
എളുപ്പമാണ്
വളരെ എളുപ്പമാണ്

ബാങ്കുകളെയോ കോ-ഓപ്പറേറ്റീവ് സൊസൈറ്റികളെ കാർഷിക വായ്പക്കായി സമീപിക്കുമ്പോൾ കർഷകരോടുള്ള സമീപനം എങ്ങനെയാണ്

വളരെ മോശം / മോശം / തരക്കേടില്ല/നല്ലത്

ഉൽപാദന വർദ്ധനവിനുവേണ്ടി പണം സ്ഥാപനങ്ങളിൽ നിന്നും കടം വാങ്ങുന്നതിൽ തെറ്റില്ല

വളരെ യോജിക്കുന്നു/
യോജിക്കുന്നു / അഭിപ്രായമില്ല/
വിയോജിക്കുന്നു/
ശക്തമായി വിയോജിക്കുന്നു

കഴിഞ്ഞ രണ്ട് വർഷമായി കാർഷിക ആവശ്യങ്ങൾക്കായി കടം എടുത്തിട്ടുണ്ടോ

ഉണ്ട് / ഇല്ല

15. മുഖ്യവബോധം

പ്രസ്താവന

ശക്തമായി യോജിക്കുന്നു/ യോജിക്കുന്നു/ തീർച്ചയില്ല
വിയോജിക്കുന്നു/ ശക്തമായി വിയോജിക്കുന്നു

എല്ലാം വിധിച്ചതു പോലെ വരു

നിയമപരമായി ഗർഭഭ്രഷ്ടം ഒരു പാപമല്ല

ശാസ്ത്രീയമായ അറിവ് ഒരിക്കലും വേദങ്ങളോട് ഒപ്പമെത്തില്ല

ഗർഭഭ്രഷ്ടനിരോധനമാർഗ്ഗങ്ങളുടെ സ്വതന്ത്ര ഉപയോഗം ധാർമ്മികമായി അപകടകരമാണ്

ഭാര്യയും ഭർത്താവും തമ്മിലുള്ള സമത്വവാദ പ്രവണത ഒട്ടും അഭിലഷണീയമല്ല

കൂടുതൽ സമാധാനത്തിനും കുറച്ച് പ്രശ്നങ്ങൾക്കും വേണ്ടി ചെറിയ കൂടുംബമാണ് നല്ലത്

16. ആത്മവിശ്വാസം

പ്രസ്താവന

എല്ലായ്പ്പോഴും / എപ്പോഴും / മിക്കപ്പോഴും
പതിവായി / ഒരിക്കലുമില്ല

ഒരു പ്രതിബന്ധങ്ങൾക്കും എന്നെ ലക്ഷ്യത്തിന്റെ
പാതയിൽ നിന്ന് പിന്തിരിപ്പിക്കാനാവില്ല

എന്റെ കഴിവുകളെക്കുറിച്ച് എനിക്ക് നല്ല
വിശ്വാസമുണ്ട്

എനിക്ക് മറ്റുള്ളവരുമായി മത്സരിക്കാൻ പറ്റില്ല
എന്ന ചിന്ത എന്നെ അലട്ടുന്നു

ഞാൻ മുൻകൈയെടുത്ത് ഒരുകാര്യവും
ചെയ്യുന്നതിൽ എനിക്ക് താൽപര്യമില്ല

മറ്റുള്ളവരെ കണ്ട് ചെയ്യുന്നതിനെക്കാൾ
എനിക്ക് സ്വന്തം രീതിയിൽ ചെയ്യാനാണ്

ഞാൻ വേഗം നിരുത്സാഹപ്പെട്ടു പോകാറുണ്ട്

ഞാൻ പലപ്പോഴും എന്തിനെക്കുറിച്ചുകിലും
ആലോചിച്ച് വേവലാതിപ്പെട്ടുകൊണ്ടിരിക്കും

17. യുക്തിപൂർവ്വമായ ക്രമീകരണം

നിങ്ങളുടെ ജീവിതത്തിന്റെ പുരോഗതിക്ക് എന്താണ് കാരണമായി കാണുന്നത്

ശാസ്ത്രീയമായ കൃഷിമുറകൾ അല്ല
ജാതക പ്രകാരം നിങ്ങളുടെ നല്ല സമയം
ആയതു കൊണ്ടാണോ

ജാതകഫലവും ശാസ്ത്രീയമായ അറിവും രണ്ടും
ഇതിനെ സ്വാധീനിക്കാറുണ്ട്

ശാസ്ത്രീയമായ അറിവുകൊണ്ട് മാത്രമാണ്

18. വിവര ഉറവിട വിനിയോഗം

ആവശ്യമുള്ളപ്പോൾ കൈ / വല്ലപ്പോഴും / ഒരിക്കലുമില്ല

ബഹുജനമാധ്യമങ്ങൾ

റേഡിയോ / ടിവി / സിനിമ / പത്രങ്ങൾ / കൃഷി സംബന്ധമായ പ്രസിദ്ധീകരണങ്ങൾ / കൃഷി സംബന്ധമായ പ്രദർശനങ്ങൾ

വ്യക്തിഗത സാർവ്വലൗകിക ഉറവിടങ്ങൾ

ഗവേഷകർ / കൃഷി ഓഫീസർ / കൃഷി അസ്സീസ്സന്റ് / മറ്റുള്ളവർ / എൻജിനീയർ / ബാങ്ക് ജീവനക്കാർ / വളം കീടനാശിനി വിത്ത് എന്നിവ വിൽക്കുന്ന എജൻസികൾ

വ്യക്തിഗത പ്രാദേശിക ഉറവിടങ്ങൾ

അയൽക്കാർ / സുഹൃത്തുക്കൾ / കുടുംബാംഗങ്ങൾ / ബന്ധുക്കൾ

സാമൂഹിക സാങ്കേതിക ഘട്ടകങ്ങൾ

1. പുരോഗമന ചിന്താഗതി

പ്രസ്താവന യോജിക്കുന്നു/ വിയോജിക്കുന്നു.

1. പെൺകുട്ടികൾക്കും വിദ്യാഭ്യാസം നൽകേണ്ടതുണ്ട്.
2. ഇന്നത്തെ ചുറ്റുപാടികൾ ജാതി വ്യവസ്ഥയ്ക്ക് യാതൊരു ഉപയോഗവുമില്ല. ആയതിനാൽ നിയന്ത്രണങ്ങൾ ഏർപ്പെടുത്തേണ്ടതുണ്ട്.
3. ശിശുക്കൾ ദൈവത്തിന്റെ വരദാനമല്ല. അതുകൊണ്ട് ജനന നിയന്ത്രണം മനുഷ്യരുടെ നിയന്ത്രണത്തിലായിരിക്കണം.

2. വിധി വിശ്വാസം

പ്രസ്താവന ശക്തമായി യോജിക്കുന്നു/ യോജിക്കുന്നു
തീർച്ചയില്ല/ വിയോജിക്കുന്നു/
ശക്തമായി വിയോജിക്കുന്നു.

1. പ്രേതത്തിനെ കണ്ടിട്ടുണ്ട് എന്ന് പറയുന്നവർ ഒന്നുകിൽ കള്ളം പറയുന്നു അല്ലെങ്കിൽ സത്യം വളച്ചൊടിക്കുന്നു.
2. തെളിയിക്കപ്പെടാത്ത കാര്യങ്ങൾ അവിശ്വസിക്കുകയാണ് നല്ലത്. പക്ഷെ തെളിയിക്കപ്പെട്ടാൽ അത് വിശ്വസിക്കാം.
3. മനുഷ്യൻ ആഗ്രഹിക്കുന്നു. ദൈവം വിധിക്കുന്നു ഇതാണ് അടിസ്ഥാനപരമായ ദുഃഖ സത്യം
4. മന്ത്രങ്ങൾക്ക് ദുരവ്യാപകമായ ഫലങ്ങൾ ഉണ്ട്. ശരിയായ രീതിയിലുള്ള മന്ത്രോച്ചാരണം വഴി പല അത്യുത ഫലങ്ങളും ഉളവാക്കാം
5. മനുഷ്യജീവിതത്തിലെ ഒരോ നിമിഷവും മുൻകൂട്ടി നിർണ്ണയിക്കപ്പെട്ടതാണ്.

3. സാർവ്വദേശീയം

എ) ഏറ്റവും അടുത്ത പട്ടണം സന്ദർശിക്കുന്നതിന്റെ ആവർത്തി
ആഴ്ചയിൽ രണ്ടോ അതിലധികമോ പ്രാവശ്യം
ആഴ്ചയിൽ ഒരു പ്രാവശ്യം
രണ്ടാഴ്ചയിൽ ഒരിക്കൽ
മാസത്തിലൊരിക്കൽ
വളരെ അപൂർവ്വമായി
ഒരിക്കലുമില്ല.

ബി. സന്ദർശനോദ്ദേശ്യം

എല്ലാ സന്ദർശനവും കൃഷി വൃത്തിയുമായി ബന്ധമുണ്ട്
ചിലത് കൃഷിയുമായി ബന്ധമുണ്ട്
വ്യക്തിപരമായി അല്ലെങ്കിൽ കുടുംബപ്രശ്നങ്ങൾ
വിനോദം
മറ്റുദ്ദേശ്യങ്ങൾ
പോകാറില്ല
പ്രത്യേകിച്ച് ഒരുദ്ദേശവുമില്ല.

4. കടബാധ്യത

കൃഷി സംബന്ധമായ കാര്യങ്ങൾക്ക് വായ്പ എടുക്കാറുണ്ടോ?
ഉണ്ടെങ്കിൽ വായ്പയുടെ ഉറവിടം

ഉണ്ട്/ഇല്ല

1. സ്വകാര്യവ്യക്തികൾ
2. സഹകരണ സ്ഥാപനങ്ങൾ
3. വാണിജ്യ ബാങ്കുകൾ
4. സ്വകാര്യ ബാങ്കുകൾ
5. കട്ടവടക്കാർ
6. മറ്റുള്ളവ (എടുത്ത് പറയുക)

വായ്പാ തുക

1. എടുത്തത്
2. തിരിച്ചടച്ചത്
3. ബാക്കി തുക (അടയ്ക്കാനുള്ളത്)

5. കുടിയേറ്റം

1. നിങ്ങൾ ഇവിടെ കുടിയേറി പാർത്തിട്ട് എത്ര വർഷമായി?
2. ഏത് സാഹചര്യത്തിലാണ് കുടിയേറിത്?

6. വികസനത്തോടുള്ള മനോഭാവം

പ്രസ്താവന ശക്തമായി വിയോജിക്കുന്നു/വിയോജിക്കുന്നു
തീർച്ചയില്ല/ യോജിക്കുന്നു/ശക്തമായി യോജിക്കുന്ന

1. മെച്ചപ്പെട്ട കൃഷി സൗകര്യങ്ങൾ ലഭ്യമായത് കാർഷിക വികസന പരിപാടികൾ മുഖേനയാണ്
2. ചെലവുമായി തട്ടിച്ചുനോക്കുമ്പോൾ പുതിയ കൃഷി രീതികളിൽ നിന്നുള്ള ലാഭം കുറവാണ്.
3. കാർഷിക വികസന പദ്ധതിയുടെ ഫലമായി അടുത്തകാലത്ത് കാർഷികോൽപ്പാദനത്തിൽ ഗണ്യമായ പുരോഗതി ഉണ്ടായിട്ടുണ്ട്.
4. വികസന പദ്ധതിയുടെ പ്രയോജനം വേണ്ട സമയത്ത് ഗിരിജനങ്ങൾക്ക് ലഭ്യമാകാറില്ല.
5. കൃഷിരീതിയിൽ ഗണ്യമായ മാറ്റം വരുത്താൻ വികസന പരിപാടികൾക്ക് സാധിച്ചു.
6. വികസന പദ്ധതികളുടെ ഏതെങ്കിലും സഹായം കിട്ടണമെങ്കിൽ ഗിരിജനങ്ങൾ വളരെയേറെ കഷ്ടപ്പെടേണ്ടിവരുന്നു.
7. കാർഷിക വികസന പദ്ധതികളുടെ പ്രയോജനം തിരഞ്ഞെടുക്കപ്പെട്ട പരിമിതമായ ജനങ്ങൾക്ക് മാത്രമേ കിട്ടാറുള്ളൂ.
8. ഗിരിജനങ്ങൾക്ക് എല്ലാവിധ സഹായങ്ങളും കാർഷിക വികസന പദ്ധതികളിലൂടെ ലഭ്യമാകുന്നു.
9. കാർഷിക വികസന പദ്ധതിയുടെ സഹായങ്ങൾ ലഭിക്കുന്നതിനാൽ ഗിരിജനങ്ങളുടെ കാർഷിക വരുമാനം ഗണ്യമായി കുടിയിട്ടുണ്ട്.
10. വികസന പദ്ധതികൾ നിർത്തലാക്കുന്നതുവഴി ഗിരിജനങ്ങൾക്ക് ഏറെയൊന്നും നഷ്ടപ്പെടാനില്ല.

വിള : കാപ്പി

സംരക്ഷണകവിദ്യ	ഇതേപ്പറ്റി നിങ്ങൾക്ക് അറിയാമോ ?	എവിടെ നിന്നാണ് വിവരം കിട്ടിയത്	നിങ്ങൾ ഇത് ചെയ്യുന്നുണ്ടോ	ഉണ്ടെങ്കിൽ എത്രകാലമായി ചെയ്തു വരുന്നു	എത്രമാത്രം	എന്തുകൊണ്ട് ?	ഇല്ലെങ്കിൽ എന്തുകൊണ്ട് ?
കാമ്പോള - കാപ്പിയുടെ നല്ലൊന്നരമാണ്.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരണമായി		1) സാമ്പത്തികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
പ്രാഥമികപരിരക്ഷയായ പെടികൾ സാല് കെട്ടിയിടലുകളിൽ മിതമായോ കഠിനമായോ കമ്പോളം ചെയ്യണം.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരണമായി		1) സാമ്പത്തികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
കരയ്ക്ക് തൃപ്തപ്പെടുന്ന നിയന്ത്രിക്കുന്നതിന് പഴുത്ത കെട്ടിയിടുന്ന കായ്കൾ യഥാസമയം തൊട്ടത്തിൽ നിന്ന് മാറ്റേണ്ടതാണ്.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരണമായി		1) സാമ്പത്തികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
മികച്ച ഉൽപാദനത്തിന് തണുത്ത പ്രകാശം ആവശ്യമാണ്.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരണമായി		1) സാമ്പത്തികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
ഏപ്രിൽ അവസാനവരെയോ മറ്റു കിട്ടിയെടുക്കൽ പൂർവ്വം കെട്ടിയിടുന്നത് തടയാനായി ഇലാസോലം നൽകണം.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരണമായി		1) സാമ്പത്തികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്

വിള : കാപ്പി

സംരക്ഷകവിദ്യ	സംരക്ഷാ സീകര്യത ഈ സംരക്ഷകവിദ്യ നിങ്ങളുടെയിടയിൽ എത്രമുദ്രം പ്രായം ഇ- നപ്രപ്രപ്രായം തരം ആണെന്നാണ് തരം കരുതുന്നത് ?	ഔതികരായ യോഗ്യർ തരം ആവശ്യങ്ങൾക്കും ചുറ്റുപാടുകൾക്കും ഇതേയത്രമുദ്രം യോഗ്യർ ആണോ ?	പരിക്ഷണത്തിൽ പരിക്ഷണത്തിൽ സമരത്തിൽ കുറഞ്ഞതരത്തിൽ പ്രായം തരം വരുത്തുവാനുള്ള സംരക്ഷാ ഇതിനുണ്ടോ ?	സങ്കീർണ്ണത ഇത് മനസ്സിലാക്കുവാനും പ്രായം തരം വരുത്തുവാനും എളുപ്പമുണ്ടോ ?	തരം തരം നേട്ടം ഇത് പ്രായം തരം വരുത്തുവാനും തരം തരം നേട്ടം	ലഭ്യത ഈ സംരക്ഷക- വിദ്യ പ്രായം തരം വരുത്തുവാനും എളുപ്പമുണ്ടോ ?	സ്വസ്ഥത ഇതിന്റെ പ്രായം തരം വരുത്തുവാനും നേടാൻ കഴിയുമെന്ന് തരം കരുതുന്നുണ്ടോ ?
കാട് - കൂട്ടിയുടെ നല്ലതരം	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്കുക	എ) തീർച്ചയായും ബി) കുറച്ചുതരം സി) തിരഞ്ഞെടുക്കുക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുതരം കഴിയും സി) കഴിയില്ല
പ്രായപൂർത്തിയായ ചെടികൾ നല്ല കെട്ടിയിടലിൽ മിതമായ കെട്ടിയിടലിൽ കെട്ടിയിടലിൽ	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്കുക	എ) തീർച്ചയായും ബി) കുറച്ചുതരം സി) തിരഞ്ഞെടുക്കുക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുതരം കഴിയും സി) കഴിയില്ല
കായ് തുറന്നു നീക്കിയിട്ടുള്ളതിന് പഴുത്ത് കെട്ടിയുണ്ടാകാൻ തടയാൻ മിതമായ കെട്ടിയിടലിൽ നന്നായി മിതമായ കെട്ടിയിടലിൽ	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്കുക	എ) തീർച്ചയായും ബി) കുറച്ചുതരം സി) തിരഞ്ഞെടുക്കുക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുതരം കഴിയും സി) കഴിയില്ല
മികച്ച ഉത്പാദനത്തിന് തണുത്ത കെട്ടിയിടലിൽ ആവശ്യമാണ്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്കുക	എ) തീർച്ചയായും ബി) കുറച്ചുതരം സി) തിരഞ്ഞെടുക്കുക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുതരം കഴിയും സി) കഴിയില്ല
ഏപ്രിൽ അവസാനത്തിൽ മഴ കിട്ടിയിട്ടില്ലാതെ പൂവ് കെട്ടിയുണ്ടാകാൻ തടയാൻ മിതമായ കെട്ടിയിടലിൽ നന്നായി മിതമായ കെട്ടിയിടലിൽ	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്കുക	എ) തീർച്ചയായും ബി) കുറച്ചുതരം സി) തിരഞ്ഞെടുക്കുക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുതരം കഴിയും സി) കഴിയില്ല

വിള : കുരുമുളക്

സംരക്ഷണവിധി	ഇതേപ്പറ്റി നിങ്ങൾക്ക് അറിയാമോ ?	എവിടെ നിന്നാണ് വിവരം കിട്ടിയത്	നിങ്ങൾ ഇത് ചെയ്യുന്നുണ്ടോ	ഉണ്ടെങ്കിൽ എത്രകാലമായി ചെയ്തു വരുന്നു	ഏതരംഗം.	എന്തുകൊണ്ട് ?	ഇല്ലെങ്കിൽ എന്തുകൊണ്ട് ?
2-3 മുട്ടുള്ള വെരുപിടിച്ച പെന്തലകൾ താങ്ങുമാരത്തിന് വടക്കുവശത്തായി 50 സെ. മീ കൃഷിയടുത്ത് മാതയിൽ നിന്നും ½ അടി അകലത്തിൽ കംപവർഷനം ചെയ്ത് നടണം.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരായി		1) സംസ്ഥാനം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ധ്യം കുറവ്
പൊള്ളുവണ്ടിന്റെ ആക്രമണം നിമന്തിക്കുവാൻ രാസകീടനാശിനിയായ സൈനാമൈഥൈൽ അക്രമകീടനാശിനിയുടെ മെറ്റോക്സാക്രോട്ടോഫോസ് 0.05 % വിര്യത്തിൽ ഉപയോഗിക്കണം.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരായി		1) സംസ്ഥാനം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ധ്യം കുറവ്
ശ്രുതവാദത്തിനനുസരിച്ച് 1% വിര്യമുള്ള ബോർഡോമിസ്രിതം തളിക്കണം.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരായി		1) സംസ്ഥാനം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ധ്യം കുറവ്
കുരുമുളക് തൈകളെ നശിപ്പിക്കുന്ന അഴുകൽ അംഗം നിമന്തിക്കുന്നതിന് തൈക്കോശ്യാർമ പോട്ടീംഗ് മിശ്രിതത്തിൽ ചേർക്കണം.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരായി		1) സംസ്ഥാനം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ധ്യം കുറവ്
വർഷകാലത്ത് കുരുമുളക് വള്ളിക്ക് ചുറ്റുമുള്ള പുതനീക്കിടക്കം ചെയ്യുന്നതിന് മുമ്പ് മുട്ടകളുടെ ആക്രമണം കുറയ്ക്കണം.	അറിയാം/ അറിയില്ല		ഉണ്ട് ഇല്ല		മുഴുവനായി/ അംഗീകരായി		1) സംസ്ഥാനം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ധ്യം കുറവ്

വിള : കുരുമുളക്

സംരക്ഷകവിദ്യ	സംരക്ഷ സാങ്കേതിക വിദ്യ ഈ സംരക്ഷകവിദ്യ നിങ്ങളുടെയിടയിൽ എത്രമുതലായ പ്രയോജനപ്രദമാണെന്നു കരുതുന്നു?	ഔതികമായ യോഗ്യതയുള്ളവരുടെയും ഇതരശ്രമകരുടെയും യോഗ്യതയുണ്ടോ?	പരിഷ്കരണങ്ങൾ - സ്ഥാനത്തിൽ കുറഞ്ഞതോതിൽ പ്രയോഗിക്കുവാനുള്ള സാധ്യത ഇതിനുണ്ടോ?	ഇത് മനസ്സിലാക്കുവാനും പ്രയോഗത്തിൽ വരുത്തുവാനും എളുപ്പമുണ്ടോ?	ഇത് പ്രയോഗിക്കുന്നതു വഴി ഉണ്ടാകുന്ന തരന്തമ്യനേട്ട	ഈ സംരക്ഷകവിദ്യ പ്രയോഗത്തിൽ എളുപ്പത്തിൽ ലഭ്യമുണ്ടോ?	ഇതിന്റെ പ്രയോഗത്തിലൂടെ വരുമെന്നു കരുതുന്നതുമായ നേട്ടങ്ങൾ കരുതുന്നുണ്ടോ?
2-3 മുട്ടുള്ള വെറുപിടിച്ച പെന്താക്ലോറോബെൻസൈൻ വടക്കുവശത്തായി 50 സെ. മീ. കൂഴിയെടുത്ത് മരത്തിൽ നിന്നും 1/2 അടി അകലത്തിൽ കറുപ്പുവെള്ളത്തിൽ നടണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്ക	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തിരഞ്ഞെടുക്ക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമുണ്ട് ബി) ചിലപ്പോൾ ലഭ്യമുണ്ട് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
പെന്താക്ലോറോബെൻസൈൻ നിയന്ത്രിക്കാൻ രാസകർമ്മശീതയായ ടൈലോമൈറ്റിന്റെ 0.05 % വിദ്യയെടുക്കണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്ക	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തിരഞ്ഞെടുക്ക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമുണ്ട് ബി) ചിലപ്പോൾ ലഭ്യമുണ്ട് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
[[ശുദ്ധവെള്ളത്തിനകത്ത് 1% വിദ്യയുള്ള ബോർഡെൽസൈൻ തളിക്കണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്ക	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തിരഞ്ഞെടുക്ക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമുണ്ട് ബി) ചിലപ്പോൾ ലഭ്യമുണ്ട് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
കുരുമുളക് നൈകളെ ബാധിക്കുന്ന അലൂമിനം അമ്ലം നിയന്ത്രിക്കുന്നതിന് ടൈലോമൈറ്റിന്റെ 0.05% വിദ്യയെടുക്കണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്ക	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തിരഞ്ഞെടുക്ക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമുണ്ട് ബി) ചിലപ്പോൾ ലഭ്യമുണ്ട് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
വർഷക്കാലത്ത് കുരുമുളക് വളർത്തി ചുറ്റുമുളക് പൂർണ്ണമായിട്ടുണ്ടാകുന്നതുവഴി മിളി മുട്ടകളുടെ ആക്രമണം കുറയ്ക്കണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തിരഞ്ഞെടുക്ക	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തിരഞ്ഞെടുക്ക	എ) വളരെ എളുപ്പം ബി) എളുപ്പമുണ്ട് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമുണ്ട് ബി) ചിലപ്പോൾ ലഭ്യമുണ്ട് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല

വിള : വാഴ

സംരക്ഷകവിദ്യ	ഇതേപ്പറ്റി നിങ്ങൾക്ക് അറിയാമോ ?	എവിടെ നിന്നാണ് വിവരം കിട്ടിയത്	നിങ്ങൾ ഇത് ചെയ്യുന്നുണ്ടോ	ഉണ്ടെങ്കിൽ എത്രകാലമായി ചെയ്തു വരുന്നു	എത്രമാത്രം.	എന്തുകൊണ്ട് ?	ഇല്ലെങ്കിൽ എന്തുകൊണ്ട് ?
തടപ്പിച്ചു, മണപ്പിച്ചു മുതലായവ നിയന്ത്രിക്കാൻ വിളയുടെ അവശിഷ്ടങ്ങൾ തോട്ടത്തിൽ നിന്നും നീക്കം ചെയ്യുകയും ആക്രമണം രൂക്ഷമാണെങ്കിൽ വാഴ മുടങ്ങി നീക്കം ചെയ്യുകയും വേണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ദേശികമായി		1) സംവത്സികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
കുല വന്നതിനുശേഷം രണ്ട് കന്ന് മാത്രം നിർത്തി ബാക്കിയുള്ളവ നശിപ്പിക്കുക.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ദേശികമായി		1) സംവത്സികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
നടുവന്ന സമയത്ത് 30 ഗ്രാം ഫ്യൂറഡാനും, നട്ട് രണ്ട് മുതൽ മൂന്നു മാസങ്ങൾക്കകം വാഴയൊന്നിന് 15 ഗ്രാം ഫ്യൂറഡാനും ഇടുമ്പോൾ വഴി കുറുപ്പാൻ രോഗം നിയന്ത്രിക്കാൻ കഴിയും.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ദേശികമായി		1) സംവത്സികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
തടപ്പിച്ചു, മണപ്പിച്ചു മുതലായവ നിയന്ത്രിക്കാൻ വിളയുടെ അവശിഷ്ടങ്ങൾ തോട്ടത്തിൽ നിന്നും നീക്കം ചെയ്യുകയും ആക്രമണം രൂക്ഷമാണെങ്കിൽ വാഴ മുടങ്ങി നീക്കം ചെയ്യുകയും വേണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ദേശികമായി		1) സംവത്സികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
പേന, കറുപ്പിൻ, പച്ചക്കറികൾ ഇവ ഇടവിളയായി കൃഷി ചെയ്ത് ആദായം വർദ്ധിപ്പിക്കാം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ദേശികമായി		1) സംവത്സികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്

വിള : വാഴ

സംരക്ഷകവിദ്യ	സാമൂഹ്യ സിങ്കര്യത ഈ സംരക്ഷകവിദ്യ നിങ്ങളുടെയിടയിൽ എത്രമെത്രം പ്രയോജനപ്രദം/പ്രായോഗികം ആണെന്നാണ് താങ്കൾ കരുതുന്നത് ?	ഔതികമായ യോജിപ്പ് താങ്കളുടെ ആവശ്യങ്ങൾക്കും ചുറ്റുപാടുകൾക്കും ഇടതരമെത്രം യോജിക്കുന്നുണ്ട് ?	പരിക്ഷണരക്ത പരിക്ഷണരക്തം - സാധനത്തിൽ കുറഞ്ഞതരത്തിൽ പ്രായോഗിക്കുവാനുള്ള സാധ്യത ഇതിനുണ്ടോ ?	സങ്കീർണ്ണത ഇത് മനസ്സിലാക്കുവാനും പ്രായോഗത്തിൽ വരുത്തുവാനും എളുപ്പമാണോ ?	തരതമ്യ നേട്ടം ഇത് പ്രായോഗിക്കുന്നതു വഴി ഉണ്ടാകുന്ന തരതമ്യനേട്ടം	ലഭ്യത ഈ സംരക്ഷകവിദ്യ പ്രായോഗത്തിൽ വരുത്താൻ എളുപ്പത്തിൽ ലഭ്യമാണോ ?	സുസ്ഥിരത ഇതിന്റെ പ്രായോഗത്തിലൂടെ സ്ഥിരമായ വരുമാനം നേടാൻ കഴിയുമെന്ന് താങ്കൾ കരുതുന്നുണ്ടോ?
തപ്പേഴ്വു, മണപ്പേഴ്വു മുതലായവ നിയന്ത്രിക്കാൻ വിളയുടെ അവശിഷ്ടങ്ങൾ നേട്ടത്തിൽ നിന്നും നീക്കം ചെയ്യുകയും ആക്രമണം രൂക്ഷമാണെങ്കിൽ വാഴ മുടേടടെ നീക്കം ചെയ്യുകയും വേണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
കുല വന്നതിനുശേഷം രണ്ട് കന്ന് മെത്രം നിർമ്മിതി ബാക്കിയുള്ളവ നശിപ്പിക്കുക.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
നടുവ: സമയത്ത് 30 ഗ്രാം ഫ്യൂറഡാനും, നട്ട് രണ്ട് മുതൽ മുറുന്ന് മരുന്നുകൾക്കകം വാഴയൊന്നിന് 15 ഗ്രാം ഫ്യൂറഡാനും ഇല്ലെന്ന് വഴി കുറുനമ്പ് രേരം നിയന്ത്രിക്കാൻ കഴിയും.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
തപ്പേഴ്വു, മണപ്പേഴ്വു മുതലായവ നിയന്ത്രിക്കാൻ വിളയുടെ അവശിഷ്ടങ്ങൾ നേട്ടത്തിൽ നിന്നും നീക്കം ചെയ്യുകയും ആക്രമണം രൂക്ഷമാണെങ്കിൽ വാഴ മുടേടടെ നീക്കം ചെയ്യുകയും വേണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
മേന, കുമ്പിൻ, പച്ചക്കറികൾ ഇവ ഇടവിളയായി കൃഷി ചെയ്ത് ആദരം വർദ്ധിപ്പിക്കാം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കൂടുതൽ സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല

വിള : നെല്ല്

സംരക്ഷണവിധി	ഇതേപ്പറ്റി നിങ്ങൾക്ക് അറിയാമോ ?	എവിടെ നിന്നാണ് വിവരം കിട്ടിയത്	നിങ്ങൾ ഇത് ചെയ്യുന്നുണ്ടോ	ഉണ്ടെങ്കിൽ എന്തുകൊണ്ട് ചെയ്തു വരുന്നു	എത്രമാത്രം.	എന്തുകൊണ്ട് ?	ഇല്ലെങ്കിൽ എന്തുകൊണ്ട് ?
നെല്കുറെന്നിന് 5 ടൺ കുമ്പിളം അടിവളമായി നൽകുന്നു.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ഭാഗികമായി		1) സംസ്വത്രികം. 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
നല്ലനസരയത്ത് 1/2 " ഉം ക്രമരണ കൂട്ടി കണ പൊട്ടുന്ന സമയത്ത് 2 " ഉം വെള്ളം നിലനിർത്തണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ഭാഗികമായി		1) സംസ്വത്രികം. 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
നിർദ്ദിഷ്ട അളവിൽ രാസവളം ഗുഡ്കളായി നൽകുന്നത് വിളവ് വർദ്ധിപ്പിക്കും.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ഭാഗികമായി		1) സംസ്വത്രികം. 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
പരിപൂർണ്ണ വിളവ് കൃഷിയും സെന്റിന് 2 1/2 കിടലാഗ്രം തോതിൽ ഒന്നിടവിട്ട വർഷങ്ങളിൽ നൽകണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ഭാഗികമായി		1) സംസ്വത്രികം. 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
2, 4- ന്, പ്രൊപാഗന്റ് തുടങ്ങിയ കളനശിനികൾ പ്രയോഗിച്ചാൽ ഉല്പാദനമുയർന്ന് കുറച്ച് അറ്റാദായം കൂടും.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ഭാഗികമായി		1) സംസ്വത്രികം. 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
അഗതികളായവർക്കുതന്നെ പ്രതിരോധശേഷിയുള്ള നെല്കൃഷി നൽകി പൊതു.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ഭാഗികമായി		1) സംസ്വത്രികം. 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
പ്രകൃതിയിലുള്ള കീടങ്ങളുടെയും മിതകീടങ്ങളുടെയും തോത് നിർമ്മിച്ച ശേഷം ആവശ്യമെങ്കിൽ മാത്രം രാസകീടമരുന്നുകൾ അവലംബിക്കുക.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ഭാഗികമായി		1) സംസ്വത്രികം. 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്
വിളവെടുക്കുന്നതിന് രണ്ടാഴ്ച മുൻപ് വെള്ളം മുഴുവൻ വാർത്തുകഴയണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായി/ ഭാഗികമായി		1) സംസ്വത്രികം. 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിവില്ലായ്മ 6) വൈദഗ്ദ്ധ്യം കുറവ്

വിള : നെല്ല്

സംരക്ഷകവിദ്യ	സംരഹിത സ്വീകാര്യത ഈ സംരക്ഷകവിദ്യ നിങ്ങളുടെയിടയിൽ എത്രമാത്രം പ്രയോജനപ്രദമാണെന്ന് അറിയാൻ താല്പര്യപ്പെടുന്നു ?	ഭാരതീയരായ യോജിപ്പ് തരുന്നതും ആവശ്യപ്പെടുന്നതും ഇതേത്രമാത്രം യോജിപ്പിക്കുന്നുണ്ട് ?	പരിഷ്കരണങ്ങൾ പരിഷ്കരണങ്ങൾ - സാധനത്തിൽ കുറഞ്ഞതോതിൽ പ്രയോഗിക്കാവുന്നതും ഇതിനുവേണ്ടി ?	സങ്കല്പനം ഇത് മനസ്സിലാക്കുവാനും പ്രയോഗത്തിൽ വരുത്തുവാനും എളുപ്പമാണോ ?	തരതമ്യ മേന്മ ഇത് പ്രയോഗിക്കുന്നതു വഴി ഉണ്ടാകുന്ന തരതമ്യമേന്മ	ലഭ്യത ഈ സംരക്ഷകവിദ്യ പ്രയോഗത്തിൽ വരുത്താൻ എളുപ്പത്തിൽ ലഭ്യമാണോ ?	സുസ്ഥിരത ഇതിന്റെ പ്രയോഗത്തിലൂടെ സ്ഥിരമായ വരുമാനം നേടാൻ കഴിയുമെന്ന് താല്പര്യപ്പെടുന്നുണ്ടോ ?
ഹെക്ടറിനായി 5 ടൺ കമ്പോളം അടിച്ചെടുക്കുക.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീർത്തുപോയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചുമാത്രം സി) തീർത്തുപോയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചുമാത്രം സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുമാത്രം കഴിയും സി) കഴിയില്ല
നല്ലനസമയത്ത് 1/2 " ഉം ക്രമമായി കട്ടി കണ പൊട്ടുന്ന സമയത്ത് 2 " ഉം വെള്ളം നിലനിർത്തണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീർത്തുപോയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചുമാത്രം സി) തീർത്തുപോയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചുമാത്രം സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുമാത്രം കഴിയും സി) കഴിയില്ല
നിർദ്ദിഷ്ട അളവിൽ രസവളം ഗവേഷകരുടെ നൽകുന്നതു വിളവ് വർദ്ധിപ്പിക്കും.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീർത്തുപോയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചുമാത്രം സി) തീർത്തുപോയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചുമാത്രം സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുമാത്രം കഴിയും സി) കഴിയില്ല
പരിശോധന വിളവ് കൂടാതെ സസേന 2 1/2 കിലോഗ്രാം തോതിൽ മണിട്രിട്ട് വർഷങ്ങളിൽ നൽകണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീർത്തുപോയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചുമാത്രം സി) തീർത്തുപോയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചുമാത്രം സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുമാത്രം കഴിയും സി) കഴിയില്ല
2, 4- ന്റെ ഗുണപ്രദതയെ തുടങ്ങിയ കളനശിനികൾ പ്രയോഗിച്ചാൽ ഉപയോഗിച്ചാൽ കുറച്ച് അറ്റാക്കം കൂടും.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീർത്തുപോയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചുമാത്രം സി) തീർത്തുപോയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചുമാത്രം സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുമാത്രം കഴിയും സി) കഴിയില്ല
വേഗത്തിൽ വരുന്നതും പ്രതിരോധശേഷിയുള്ള നെല്ലിനങ്ങൾ കൃഷി ചെയ്യുക.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീർത്തുപോയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചുമാത്രം സി) തീർത്തുപോയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചുമാത്രം സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുമാത്രം കഴിയും സി) കഴിയില്ല
പ്രകൃതിയിലുള്ള കീടങ്ങളുടെയും മിതപ്പെടുത്തലുടെയും മേൽ നിർമ്മിച്ച വേഗം ആവശ്യപ്പെടാൻ മറ്റും രസകീടനശിനികൾ അപരംബിപ്പുക.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീർത്തുപോയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചുമാത്രം സി) തീർത്തുപോയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചുമാത്രം സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുമാത്രം കഴിയും സി) കഴിയില്ല
വിളവെടുക്കുന്നതിന് രണ്ടാഴ്ച മുൻപ് വെള്ളം മുഴുവൻ വാർത്തുകൊടുക്കണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീർത്തുപോയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചുമാത്രം സി) തീർത്തുപോയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമേറേ സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചുമാത്രം സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചുമാത്രം കഴിയും സി) കഴിയില്ല

വിള : ഇഞ്ചി

സംരക്ഷകവിദ്യ	ഇതേപ്പറ്റി നിങ്ങൾക്ക് അറിയാമോ ?	എവിടെ നിന്നാണ് വിവരം കിട്ടിയത്	നിങ്ങൾ ഇത് ചെയ്യുന്നുണ്ടോ	ഉണ്ടെങ്കിൽ എത്രകാലമായി ചെയ്യുന്നു വരുന്നു	ഏത്രമത്രം.	എന്തുകൊണ്ട് ?	ഇല്ലെങ്കിൽ എന്തുകൊണ്ട് ?
നായം-ഡി-ഇനേററം ഇഞ്ചികൃഷിക്ക് ഉത്തമമായ ഒരു ഇനമാണ്	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായ്/ ഭാഗികമായി		1) സംസ്വത്രികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിയില്ലായ്മ 6) വൈദഗ്ദ്ധ്യംകുറവ്
പുക്കിന് മുരൾ ഇനമാണ് അനുയോജ്യം	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായ്/ ഭാഗികമായി		1) സംസ്വത്രികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിയില്ലായ്മ 6) വൈദഗ്ദ്ധ്യംകുറവ്
മുപ്പേഴ്ത്തിയ വിത്തഞ്ചി 30 മിനുട്ട് 0.3% മരങ്കോസെബും, 0.1% മലഞ്ചിത്താണും കലർത്തിയ ലായനിയിൽ മുക്കിവെച്ചശേഷം തണുത്തശേഷം സൂക്ഷിക്കുകയും നൂണുനൂണിന് മുമ്പ് ആവർത്തിക്കുകയും വേണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായ്/ ഭാഗികമായി		1) സംസ്വത്രികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിയില്ലായ്മ 6) വൈദഗ്ദ്ധ്യംകുറവ്
അഴുകൽ രോഗം തടയാൻ നിർവ്വഹിച്ച അറപ്പട്ടുത്തുകയും, അറഗവിത്തുക മേഖലയിൽ നിന്നും വിത്തു ശേഖരിക്കുകയും ചെയ്യണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായ്/ ഭാഗികമായി		1) സംസ്വത്രികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിയില്ലായ്മ 6) വൈദഗ്ദ്ധ്യംകുറവ്
നൂണു സമയത്ത് തെളിപ്പിക്കാൻ തടയാം, പ്രായോഗികമായി അഴുകൽ തടയാം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായ്/ ഭാഗികമായി		1) സംസ്വത്രികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിയില്ലായ്മ 6) വൈദഗ്ദ്ധ്യംകുറവ്
നട്ട ഉടനെയും രണ്ടുമാസത്തിലും നാലുമാസത്തിനുമുമ്പും കളിയിടശേഷം പച്ചിലകൾ കൊണ്ട് പുതയ്ക്കണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായ്/ ഭാഗികമായി		1) സംസ്വത്രികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിയില്ലായ്മ 6) വൈദഗ്ദ്ധ്യംകുറവ്
തണുത്തുപുറത്തുനിന്നു വെള്ളമെത്താതെ ത്വരമേറിയ ക്ലീനിംഗ് 0.05% തളിക്കണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായ്/ ഭാഗികമായി		1) സംസ്വത്രികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിയില്ലായ്മ 6) വൈദഗ്ദ്ധ്യംകുറവ്
രോഗലക്ഷണം കണ്ടാൽ ചെടി പിഴുതുമാറ്റി തടം കോപ്പർ ഓക്സൈഡ് ക്ലോറൈഡ് (സെഫോലോൻ) 2 ഗ്രാം/ചിറ്റർ എന്ന തോതിൽ കലരി തടം കൃത്യമായി പൂറ്റുമുള്ള ചെടികളിൽ തളിക്കുകയും ചെയ്യണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായ്/ ഭാഗികമായി		1) സംസ്വത്രികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി 4) താല്പര്യമില്ല 5) അറിയില്ലായ്മ 6) വൈദഗ്ദ്ധ്യംകുറവ്
രോഗലക്ഷണം കണ്ടാൽ ചെടി പിഴുതുമാറ്റി തടം കോപ്പർ ഓക്സൈഡ് ക്ലോറൈഡ് (സെഫോലോൻ) 2 ഗ്രാം/ചിറ്റർ എന്ന തോതിൽ കലരി തടം കൃത്യമായി പൂറ്റുമുള്ള ചെടികളിൽ തളിക്കുകയും ചെയ്യണം.	അറിയാം/ അറിയില്ല		ഉണ്ട്/ ഇല്ല		മുഴുവനായ്/ ഭാഗികമായി		1) സംസ്വത്രികം 2) ലഭ്യതക്കുറവ് 3) സ്ഥലപരിമിതി

വിള : ഇബ്ബി

സംരക്ഷകവിദ്യ	സംരക്ഷ സീകാര്യത ഈ സംരക്ഷകവിദ്യ നിങ്ങളുടെയടയിൽ എത്രമാത്രം പ്രയോജനപ്രദമായതാണെന്ന് താങ്കൾ കരുതുന്നു?	ഔദ്യോഗികമായ യോജിപ്പ് താങ്കളുടെ ആവശ്യങ്ങൾക്കും പുറംപുറംകൾക്കും ഇത്രയേറെയോ യോജിപ്പു കൂടുതലാണ്?	പരിക്ഷണാർത്ഥം പരിക്ഷണാർത്ഥം കുറഞ്ഞതോതിൽ പ്രയോഗിക്കുവാൻ ഇതിനുള്ള സാധ്യത ഇതിനുള്ളതാണോ?	സങ്കീർണ്ണത ഇത് മനസ്സിലാക്കുവാൻ പ്രയോഗത്തിൽ വരുത്തുവാൻ എളുപ്പമാണോ?	തരണമുദ്രണം ഇത് പ്രയോഗിക്കുന്നതു വഴി ഉണ്ടാകുന്ന തരണമുദ്രണം	ലഭ്യത ഇത് സംരക്ഷക-വിദ്യ പ്രയോഗത്തിൽ വരുത്താൻ എളുപ്പത്തിൽ ലഭ്യമാണോ?	സുസ്ഥിരത ഇതിന്റെ പ്രയോഗത്തിലൂടെ സ്ഥിരമായ വരുമാനം നേടാൻ കഴിയുമെന്ന് താങ്കൾ കരുതുന്നുണ്ടോ?
റയോ-ഡി-ഇനറററ ഇബ്ബിക്യൂഷിയ്ക്ക് ഉത്തമമായ ഒരു ഇനമാണ്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമാണ് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
പുഷിന് മരൻ ഇനമാണ് അനുയോജ്യം	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമാണ് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
മുപ്പത്തൊമ്പതാം വർഷത്തിൽ 30 മിനുട്ട് 0.3% മരണശേഷി, 0.1% മരണശേഷിയോടൊപ്പം കലർത്തിയ ലായനിയ്ക്ക് മുക്കിനെയുപയോഗം തണുത്തുനേക്കി സൂക്ഷിക്കുകയും നല്ലനതിന് മുമ്പ് ആവർത്തിക്കുകയും വേണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമാണ് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
അഴുകൽ രോഗം തടയാൻ നീർവാർച്ച തരപ്പെടുത്തുകയും, രോഗവിമുക്ത മേഖലയിൽ നിന്നും വിത്തു ശേഖരിക്കുകയും ചെയ്യണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമാണ് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
നല്ല സമയത്ത് ടൈംറൈസിംഗ്, പ്രയോഗിച്ചാൽ അഴുകൽ തടയാം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമാണ് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
നട്ട ഉടനെയും രണ്ടുമാസത്തിലും, നാലുമാസത്തിനുമുമ്പും കളനീക്കിയശേഷം പച്ചിലകൾ കൊണ്ട് പുരയിടണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമാണ് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
തണുത്തുറപ്പിക്കൽ രോഗമരണമുദ്ര ഓരോ 0.05% തളിക്കണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമാണ് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
രോഗലക്ഷണം കണ്ടാൽ പെടി പിഴുതുമാറ്റി തടം കോപ്പർ ഓക്സൈഡ് (തെഫോലോൻ) 2 ഗ്രാം/ലിറ്റർ എന്ന തോതിൽ കലക്കി തടം കൃത്യമാക്കുകയും പുറ്റുമുള്ള പെടികളിൽ തളിക്കുകയും ചെയ്യണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമാണ് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല
രോഗലക്ഷണം കണ്ടാൽ പെടി പിഴുതുമാറ്റി തടം കോപ്പർ ഓക്സൈഡ് (തെഫോലോൻ) 2 ഗ്രാം/ലിറ്റർ എന്ന തോതിൽ കലക്കി തടം കൃത്യമാക്കുകയും പുറ്റുമുള്ള പെടികളിൽ തളിക്കുകയും ചെയ്യണം.	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) കുറച്ച്	എ) വളരെ കൂടുതൽ ബി) മിതമായി സി) തീരെയില്ല	എ) തീർച്ചയായും ബി) കുറച്ചൊക്കെ സി) തീരെയില്ല	എ) വളരെ എളുപ്പം ബി) എളുപ്പമാണ് സി) എളുപ്പമല്ല	എ) വളരെ കൂടുതൽ ബി) കുറച്ചതല്ല സി) കുറവ്	എ) തീർച്ചയായും ലഭ്യമാണ് ബി) ചിലപ്പോൾ ലഭ്യമാണ് സി) ലഭ്യമല്ല	എ) തീർച്ചയായും കഴിയും ബി) കുറച്ചൊക്കെ കഴിയും സി) കഴിയില്ല

**SOCIO-TECHNICAL SYSTEM ANALYSIS OF
TRIBAL AND SETTLER FARMERS IN THE WESTERN GHAT REGIONS
OF WAYANAD DISTRICT IN KERALA**

GEETHA G. NATH

**Abstract of the
thesis submitted in partial fulfilment of the requirement
for the degree of**

Doctor of Philosophy in Agriculture

**Faculty of Agriculture
Kerala Agricultural University, Thrissur**

2007

**Department of Agricultural Extension
COLLEGE OF AGRICULTURE
VELLAYANI, THIRUVANANTHAPURAM-695 522**

ABSTRACT

Agriculture cannot be sustainable unless it is integrated into the existing social systems. Furthermore, it must enhance social justice. Social integration means that the farmers must accept the technology. Optimum adoption of agricultural production innovations is achieved only when a farmer is persuaded to accept a technical innovation, which for him is technically sound, economically feasible, physically possible and politically and socially compatible.

Research studies exploring the socio-technical system aspects of agricultural technology generation and diffusion among the diverse tribal and settler farmers in ecologically sensitive locations like Wayanad district will help in envisioning sustainable developmental interventions. It is in this background, the present investigation has been designed to analyse and compare the socio-technical system determinants, to study the cropping pattern and farming systems of the tribal and settler areas, to study the differential diffusion of agricultural innovations among the tribal and settler farmers and to construct a socio-technical feasibility index to evaluate the agricultural innovations among tribal and settler farmers.

The study was carried out in Wayanad district, as this district has the maximum population of tribals and settlers. Six panchayats having the maximum tribal populations from the three blocks of Wayanad were taken. From each panchayat, 30 tribal and 30 settler farmers were selected randomly, making the total sample size of 360 respondents. An index for measuring the socio-technical feasibility of agricultural innovations was developed for the study taking into consideration the socio-technical determinants and adoption variables. In addition to the index, the differential diffusion of agricultural innovations among tribal and settler farmers, the personal, socio-psychological, economic variables and constraints experienced by the tribal and settlers farmers were also studied.

Regarding the distribution of the tribal and settler farmers, with respect to some variables like education, family education status, annual income, exposure to mass media, risk preference, achievement motivation, self confidence, rational orientation, information source utilization, progressiveness and cosmopolitaness the settlers belonged to the high category, whereas in the case of family size, dependency, value orientation and fatalism the tribals belonged to the high category. Still in the case of some variables like farming experience, economic motivation, credit orientation and attitude towards development programmes, there was not any significant difference between the tribals and settlers.

The predominant crops in Wayanad are paddy, coffee, banana, ginger, pepper and arecanut. There was also cultivation of newly introduced crops like vanilla, banana, cardamom, coconut etc. present in small numbers. Majority of the tribals in Wayanad are agricultural labourers having no cultivable land and no control over land resources. The crops they cultivated were also the traditional ones. So the favoured combinations seen among the tribals were limited to the traditional crops namely paddy, coffee, pepper and banana. A shift in favour of the newly introduced crops like vanilla, cardamom, arecanut, banana etc. were seen among the settlers. Settlers had more land compared to the tribals and they were also in favour of new crops or cash crops along with the traditional ones.

The comparison of the tribals and settlers, in the three blocks with respect to the selected variables showed that significant difference in almost all the variables except age, type of family, family size, self confidence, cosmopolitaness and attitude towards development.

A comparative analysis of the three blocks revealed that the differential diffusion was higher in settlers as compared to the tribals of Wayanad. Tribals did not

have access to the new technologies and in some cases where there was access, the technology did not suit their existing conditions. The settlers, on the other hand, if they practised new technologies, there were problems with the social and technical determinants, which affected the diffusion.

Evaluation of agricultural innovations using the socio-technical feasibility index showed significant difference between the two major categories, i.e, tribals and settlers. Among tribals also, there was significant difference among the three blocks selected for the study. Kalpetta and Mananthavady showed significant difference among the tribals with regard to the index values. Similar was the case of Mananthavady and Sulthan Bathery. But with respect to CD values of Kalpetta and Sulthan Bathery, there was not much difference. Whereas in the case of settlers, there was not much difference among the settlers from among the three blocks of the district. Significant difference was observed between tribal and settler farmers, in which the tribals were much backward in the case of development.

The study indicated the need for evolving a new strategy for solving the problems in technology generation and its transfer at the field level. Only 30 per cent of the technology generated can be used by the farmers. This shows the non-feasibility of the technologies with respect to the social and technical determinants such as profitability, acceptability, complexity, sustainability etc. These social and technical factors, which are particular for each system, should be taken into consideration while generating and transferring technologies further.

-172708-

