EVALUATIVE PERCEPTION OF HOMESTEAD FARMERS IN RELATION TO APPROPRIATENESS OF FARMING SYSTEMS AND CROPPING PATTERNS

By

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THESIS

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DECLARATION

I hereby declare that the thesis entitled ***EVALUATIVE PERCEPTION OF HOMESTEAD FARMERS IN RELATION TO APPROPRIATENESS OF FARMING SYSTEMS AND CROPPING PATTERNS*** *is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title of any other University or Society.*

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CERTIFICATE

Certified that the thesis entitled ***EVALUATIVE PERCEPTION OF HOMESTEAD FARMERS IN RELATION TO APPROPRIATENESS OF FARMING SYSTEMS AND CROPPING PATTERNS*** *is a recoord of research work done independently by Sri. Babu, M. N. under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to him.*

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CHAPTER I

INTRODUCTION

Many of the developing countries worldover, including India, are engaged in fine tuning their agricultural sector with a view to achieve self sufficiency in food production and to enter the global market. Agrarian structure dynamics is determined by a number of factors like the distribution of the land property, land market, system of inneritance of landed property, availability of irrigation facilities, technological advancements, population growth, availability of non-farm employment and land reforms aimed at restructuring property relations.

Farming systems evolve as a result of informal experimentation by farmers over a long period, assessing variations, selecting preferred options and rejecting the inferior. Selected options generally optimise resource utilization rather than maximise production.

Being a densely populated state the pressure of population in Kerala is reflected in the agricultural activities and dynamics of homesteads. Agricultural and other land use strategies aim at increasing the productivity of area under cultivation through exploitation of the available resources (Nair and Sreedharan, 1986).

The scenario of agriculture in Kerala is unique with the predominance of the homestead system of cultivation. A typical homestead consists of a dwelling house with a small garden in front and

a variety of annual and perennial crops grown in mixture in a small piece of land, with/without livestock, poultry and/or fish for meeting the fundamental requirements of family and also to generate additional income by the sale of surplus for the purchase of items non-produceable in the homestead.

The total number of operational holdings in Kerala as per 1976-77 Agricultural Census was 3501100. According to 1980-81 Census, the total number of operational holdings was 4180900 which increased to 5362322 in 1990-91. Between these two periods the number of operational holdings have increased by 679800 nos. (19.42 %) and 1181422 nos. (22.03 %) in 1980-81 and 1991-92 respectively. It is a notable feature that 89 per cent of the holding in Kerala were marginal (i.e. < 1 ha) in the year 1980- 81 which increased to 92.56 per cent during 1990-91. The large holdings (i.e. > 10 Hectare) occupy only 0.05 per cent. The average size of holding was 0.43 ha in 1980-81 which came down to 0.34 ha in 1990-91.

The central zone of Kerala comprised of Palakkad, Thrissur and Eranakulam districts. The geographical area of the zone is 973689 ha. The total population of the zone is 79.36 lakhs. The number of farm families is about 15.24 lakhs. The literacy rate of the zone is 88.97 per cent (Annexure Ia and Ib). The zone is characterised by a comparatively heavy rain fall during south-west monsoon and less rain fall during north-east monsoon. The mean maximum and minimum temperature of the zone are 31.4°C and 21.1°C respectively. The soil type is mainly laterite.

Scope and importance of the study

Nair and Sreedharan (1986) opined that in spite of the importance of homestead systems in the economy of the state and its people, practically no research has been undertaken to improve the productivity of homesteads.

Tejwani (1987) reported that the major constraint of the homegarden system is that it is the least understood one scientifically. The improvement of the system is very challenging and potentially very promising.

Davidson (1990) reported that the home gardening is rarely considered when formulating agricultural projects.

Very little information is available on the internal dynamics of homesteads. A holistic approach taking the individual enterprises into consideration is the need of the day. More over these farming systems are seldom considered during formulation of developmental programmes.No concrete programme is now available for the comprehensive development of homesteads.The vast scope for improving production potential and employment generation capacity are not being properly exploited.

Research studies on the nature and complexities of homestead farming system, it is presumed, would help in formulating strategy to ensure effective and meaningful programmes for the holistic development of homesteads on a sustainable basis. Hence the present study was designed with the following specific objectives.

Objectives of the study

The study was designed with the following specific objectives:-

1. To identify the nature and type of farming systems and cropping patterns followed by the homestead farmers of the central zone of Kerala.

2. To study the evaluative perception of homestead farmers in relation to appropriateness of farming systems and cropping patterns.

3. To assess the level of knowledge of homestead farmers on scientific practices.

4. To study the extent of adoption of scientific practices by the homestead farmers.

5. To identify the relationship between evaluative perception, level of knowledge and extent of adoption of homestead farmers and their personal, socio-cultural and techno-economic factors.

6. To assess the extent of adoption of the indigenous practices by the homestead farmers.

7. To identify the constraints experienced by the homestead farmers.

Limitations of the study

The study was conducted as a part of postgraduate research work and hence it had the inherent limitations of time and other resources.

The study was restricted to 18 panchayats of central zone comprising of Palakkad, Thrissur and Ernakulam Districts and as such it may not be possible to generalise the findings of the study for the entire state. However, all efforts have been made to conduct the study as objective and systematic as possible.

Presentation of the thesis

The thesis is presented in five chapters. The first Chapter, as already seen, deals with introduction highlighting the need, scope and importance, objectives and limitations of the study. The second Chapter presents the theoretical orientation covering the review of literature pertaining to this study, while the third Chapter comprises of the methodology dealing with the study area, selection of respondents, empirical measurement of selected variables, tools for data collection and statistical techniques used. The fourth Chapter deals with the results of the study and also discussion on the results. The final Chapter gives the summary and conclusion of the study. The references and appendices are given at the end.

Theoretical Orientation

CHAPTER II

THEORETICAL ORIENTATION

A review of research works conducted in the area of the study helps the researcher to get an insight into the various empirical procedures adopted in the previous studies and also the findings obtained by these studies. Not much studies were available regarding the evaluative perception of homestead farmers in relation to the appropriateness of farming systems and cropping patterns. But a review of the related works would help to identify the variables that are relevant to the area of the present research and to presume probable relationship among them. Hence, the available studies related directly or indirectly to the topic are reviewed and presented in this Chapter on the following lines.

2.1 Concept of farming systems and cropping patterns

2.2 Nature and type of farming systems and cropping patterns

2.3 Concept and importance of homestead farming

2.4 Evaluative perception and the factors therein

2.5 Level of knowledge of homestead farmers with respect to the scientific practices and factors therein

2.6 Extent of adoption of scientific practices by the homestead farmers and the factors therein

2.7 Extent of adoption of indigenous practices by homestead farmers

2.8 Constraints experienced by homestead farmers

2.9 Conceptual framework for the study

2.1 Concept of farming systems and cropping patterns

Farming systems, rather than individual crops, is much more a relevant concept in the study of homesteads. The farming systems encompass the totality of activities of the farm related to crop production, processing, disposal and overall prosperity of farm-household. For comprehensive economic development of rural sector it is essential to understand the composite nature of farming systems and cropping patterns adopted in the homesteads.

Farming system 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.

There is no unanimity of opinion among cropping systems researchers on the terminology and as a consequence there is some confusion about what the several terms used in the literature actually mean. Some efforts have been made to arrive at a consensus and the terms and definitions suggested by Palaniappan (1985) are given below.

2.1.1 Farming system

Entire complex of development, management and allocation of resources as well as decisions and activities which, within an operational farm unit or combination of units, results in agricultural production, processing and marketing of the products.

2.1.2 Cropping system

The cropping patterns used on a farm and their interaction with farm resources, other farm enterprises, and available technology which determine their make up.

2.1.3 Cropping pattern

Cropping pattern is the yearly sequence and spatial arrangement of crops on a given land area.

2.1.4 Sole cropping

One crop variety grown alone in pure stands at normal density. Synonymous with solid planting, opposite of intercropping.

2.1.5 Monoculture

The repetitive growing of the same crop on the land.

2.1.6 Rotation

The repetitive cultivation of an ordered succession of crops (or crops and fallow) on the same land. One cycle may take one or more years to complete.

2.1.7 Multiple cropping

The intensification of cropping in time and space dimensions. Growing two or more crops on the same field in a year.

2.1.8 Inter cropping

Growing two or more crops simultaneously on the same field. Crop intensification is in both time and space dimemsions. There is intercrop competition during all or part of crop growth.

The method of utilising the land resource by cropping pattern is said to be method of cropping. Farming practices include specialised farming, diversified or mixed farming and integrated farming.

2.2 Nature and type of farming systems and cropping patterns

2.2.1 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 round about Coimbatore, concluded that mixed farming led to increasing employment opportunities or 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 atleast 20 per cent of its 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 to 24 sheeps if sufficient operating capital and good marketing facilities were available.

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

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) opined that since a vast majority of Indian farmers are practising mixed farming in one form or other. It offers a vast opportunity and challenge.

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.

2.2.2 Cropping patterns

Diverse soil and ecological conditions prevailing in Kerala state 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, mid land and low land are characteristic.

Das (1988) reported that in the case of multistoried 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. 32700. 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 can increase their income through cultivation of indigenous vegetables like *Solanum nigrum* and *Brassica carinata.*

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).

KAU (1989 a) 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 districts.

Storck *et al.* (1991) reported that intercropping of more than two crops is a common practices in Hararghe high lands, 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.

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.

2.3 Concept and importance of Homestead farming

Homestead farming system is a unique production system practiced throughout the state, accross religions, castes, ethnic groups and matriarchal and patriarchal settings. It has been referred to in many terms such as homestead, homegarden, house gardens, compound farm, household farm, homestead farming, mixed garden horticulture, forest garden, mixed garden, house compound land etc.

Homestead farming system falls under the broad classification of agroforestry.

Lundergren and Raintree (1983) described agroforestry as a collective term for a land use system and technologies in which woody perennials, trees (including fruit trees), shrubs, bamboo etc. are deliberately combined on the same land-management unit, with herbaceous crops and animals either in some form of spatial arrangement or temporal sequence. In agroforestry systems, there are both ecological and economic interactions among different components.

According to Narayana (1986) agroforestry is a socially, culturally and ecologically acceptable integrated form of land use involving trees that improve or do not degrade the soil and permit increased and sustained production of plant and animal produce including wood.

Nair and Sreedharan (1986) evaluated stability, productivity and sustainability of agroforestry homegardens in Kerala, which combines cultivation of tree crops, plantation crops, seasonal and biennials in intimate mixture on the same piece of land. Farm animals, poultry and sometimes fisheries are also components of the system. The system is characterized by optimum utilisation of available resources of land, solar energy and technological inputs and efficient recycling of farm wastes.

Jose (1992) reported that homegardens with mixed crop and livestock components recorded the highest productivity followed by those with mixed crops alone.

Salam *et al.* (1992 a) opined that the homestead farming system of Kerala is essentially an agroforestry system involving multi-species or annuals and perennials (trees, shrubs, palms, bamboos etc.) which can meet demands of the home.

2.3.1 Definitions

Ninez (1984) defined homestead as a sub system which aims at the production of household consumption items either not obtainable, not readily available or not affordable through field agriculture.

Hanman (1986) referred homesteads to the home and its adjoining land owned and occupied by the dwelling unit of he household including the immediate area surrounding the dweller's unit and space used for cultivation of trees and vegetables.

Nair and Sreedharan (1986) defined homestead as an operational farm unit in which a number of crops (including tree crops) are grown with livestock, poultry and/or fish production mainly for the purpose of satisfying the farmer's basic needs.

A typical Kerala homestead consists of a dwelling house with small garden in front and a variety of annuals and perennial crops grown in mixture in a small piece of land (KAU, 1989 a).

Salam *et al.* (1992 c) defined homestead farming as a special type of agricultural production system practiced around the home with a multi-species of annuals and perennial crops along with/ without poultry and or fish for the purpose of meeting the fundamental requirements of the home viz., food, fodder, fuel, timber and organic mulch, and also to generate additional income through the sale of surplus to purchase the non-produceable items of the homesteads.

Jose (1992) defined tropical homegarden as an age-old production system which has sustained life through centuries.

From the foregoing reviews, it may be seen that the intricacies and dynamics of homesteads of Kerala are complex and unique which should be considered holistically while probing into the characteristics of homesteads.

Jose (1991) opined that wet lands adjoining to the homestead could be considered as a part of homesteads. The term extended garden was employed to refer to such additional crop land operated by the homestead farmer.

The extended garden, either wet land or crop land, influences the activities of the homestead farmer in terms of planning, resources allocation, implementation strategy etc. Extended gardens act as satellite units to the main homestead which play an important role on the performance of the homestead farming, even if the extended garden is at a far away place.

It was an interesting feature to note that the extended garden acts as a satellite unit of the homestead. The interaction and interrelation of homestead and the extended garden is found to be in such a high degree that these two units could be viewed as a single unit. On a wider angle, it may be clear that , as for as homesteads of Kerala state are concerned, the whole farming system can be brought under the broad classification of homesteads with extended gardens. More than 97 per cent of the holdings are of the size below 2 hactares and these holdings are operated by 15.23 million households.

The percentage distribution of number of holdings and area among major holding classes are given in Annexure Ia and Ib.

The percentage distribution of land holdings of size <1ha increased from 81.8 per cent during 1970-71 to 92.56 per cent in 1990-91 and the trend is on the increasing rate.

Encompassing all the above factors, homestead may be operationalised as a special type of agricultural production system practiced around the home with or without extended garden, where a multi-species of annual and perennial crops along with/without poultry and or fish for the purpose of meeting the fundamental requirements of home and also to generate additional income through the sale of surplus to purchase non-produceable items of the household, in addition to the medicare and aesthetic needs of the homestead farmer.

2.4 Evaluative perception and the factors therein

2.4.1. Perception

According to Blalock (1963) perception has the following charactersitics

1. It is an individual matter. Thus there may be as many perception as there are individuals.

2. It must be dealt with in terms of what an individual actually experiences.

3. It involves not only perceiving the stimuli but also interpreting and describing these stimuli in terms that are meaningful to the individual.

4. Various internal and external factors may influence both the interpretations of the stimulus and response it is likely to evoke.

5. It is a dynamic phenomenon that may be continioully changing within the individual.

Theodorson and Theordorson (1970) defined perception as the selection, organization and interpretation by an individual of specific stimuli in a situation according to prior learning, activities, interest, experiences etc.

According the Bhatia (1978) the simplest definition for perception is the sensation plus meaning, sensation signifying quality and perception on object suggest by that quality.

Anderson (1979) observed that ignorence of the way in which risk perception changed in response to new information for either on farm experience or sources beyond the farm was profound.

Ryan (1979) stated that social structure and farm family play an important role in the process of formation of attitudes and perceptions and their effects on the adoption of new technology.

Brady (1981) reported significant influences of social benefit on perception, in a study on developing and transfering technology to small scale farmers.

Harwood (1981) in a study on agronomic and economic consideration of technolgy acceptance in transfering for small scale farming revealed that low requirement of resources is significant in perception.

Byrnes (1982) reported positive and significance influence of observability, compatibility, profitability, reliability and trialability of scientific practices.

Rajagopalan (1986) reported observibility to be a reason for adoption of di-ammonium phosphate in paddy nursery.

Ramegowda and Sidharamaiah (1987) observed that profitability and combitabilty were positively and significantly related with innovativeness of farmers.

Sulaiman (1989) observed that the practice of growing leguminous crop was perceived as high in terms of observability and profitability.

Hans *et al.* (1991) opined that the three most important risks perceived by farmers were rainfall, livestock and production prices and economic and political situations.

Rajendran (1992) found that simplicity, initial cost, physical compatibility efficiency and availability of technology as crucial determinants of feasibility of technologies.

2.4.2 Evaluative perception of appropriateness of farming systems and cropping patterns adopted in homesteads

Specific studies of evaluative perception of homestead farmers in relation to the appropriateness of farming systems and cropping patterns were are not available. Hence, studies conducted in other areas which were directly and indirectly connected with present study were summarised under the following heads.

2.4.2.1 Sustainability

2.4.2.2 Influence of homestead farming on quality of life

2.4.2.3 Utilization of resoruces in homesteads

2.4.2.4 Economic aspects

2.4.2.1 Sustainability

Sustainable agriculture has emerged in U.S.A as the most agreed upon term to synthesise a variety of concepts and perspectives, associated with agricultural practices.

USAID defined sustainable agriculture as a management system for renewable resources including soil, wild life, forests, crops, fish, livestock, plant genetic resources, and ecosystems to provide food income and livelihood for current and future generations and that maintains or improves the economic productivity and ecosystem services of these resources (Singh 1990).

Jambulingam and Fernandez (1986) reported that farmers in Tamil Nadu state integrated neumerous species of multi-purpose trees and shrubs(MPTS) in close association with agricultural crops. These woody perennials are better able to cope with poor growing conditions and there by increasing integration on farm lands which represented a strategy to minimise the risk of crop failure. They also observed that the productivity of these traditionally managed systems can be considerably improved by scientific interventions.

Soemarwoto (1987) opined that while it is relatively easy to increase yield and income, there are difficult problems in achieving

long term sustainability of the home gardens. These difficulties are both in the bio-physical and in the socio-economic realm. It is recommended that these problems should be looked into and research to seek appropriate solutions should be stimulated.

Perumal and Chandramouleeswaran (1988) reported that out of eleven combinations in technology diversification, six per cent had grown only crops and majority had gone for dairying with crops . The reasons expressed for the continued adoption of indigenous farm technologies were 'cost and maintenance were cheap' 'operation' were simple and 'handling was easy'.

Odvol and Aluma (1990), in his study on traditional homegarden systems in Southern Uganda,opined that the system which is operated on a sustained yield basis, retaining, managing animals and crops, various trees and shrubs and crops in order to minimise production of a variety of products.

Rathinam (1991) opined that inter, mixed or multi-species cropping must be followed in coconut garden to sustain income and generate employment.

Salam *et al.* (1991 b) conducted a study to develop a homestead model suitable for a 0.20 hectare holding in the coastal uplands of South Kerala under rainfed conditions and found that the crop-livestock components selected in the model interacts synergistically to increase the productivity and to generate more returns. The model developed is capable to maintain soil health and to ensure environment safety.

Sharma *et al.* (1991) revealed that crop cultivation, animal husbandry and forestery constitute the main closely integrated components of the farming systems in the hills of Himachal Pradesh.

Butler (1992) opined that sustainable agriculture requires the balancing of a variety of goals. This means that often no single side can be maximised, since optimisation might totally produce the achievements of one of the goals of sustainability. In sustainable agriculture farmer shifts from being user of technology to a producer of technology and maker of its impacts.

Neher (1992) defined sustainable agriculture as a system which contains three equally important components namely, environmental quality, ecological soundness, plant and animal productivity and socio-economic viability.

2.4.2.2 Influence of homestead farming on quality of life

Homestead farming has a high significance from the point of view of household food security and family health status. Homestead farmers place high value on the social, aesthetic and habitat functions of homegarden.

Farmers have their own perception about the components of their homesteads. Homestead farmers value the components of their homesteads not only as a source of income and subsistence, but also for their role in improving habitat quality and conservation of soil and water resources and aesthetic value.

Davidson (1990) reported that benefits of household gardens include low input requirements environmental protection, accessible nutrient supply and food provision during the time of agricultural disruption.

Ganesan *et al.* (1991) on a study on duck-cum-fish culture in rice farming system, found that an additional 114 man days of employment were generated by introducing mixed farming system.

Babu *et al.* (1992) reported that inclusion of plants with some medicinal value will also help the immediate medicare needs of the family.

Employment generation out of the coconut based farming system was 400 man days per acre against monocrop of coconut in which there was only 15 man days. In addition to farm income, familiy members could be engaged throughout the year and the employment opportunity generated (Shanmugasundaram and Subramanian, 1993).

2.4.2.3 Utilization of resources

Homesteads of Kerala are predominantly coconut based where mixed cropping is the common practice. The farming systems and cropping pattern adopted in homesteads help the farmer to exploit the available resources to the maximum level possible, where recycling of resources is the thumb rule.

Nair and Sreedharan (1986) opined that close association of agricultural crops, tree crops and animals in homegarden of Kerala, is

characterised by optimum utilisation of available resources of land, solar energy, technical inputs and efficient recycling of farm wastes.

Homestead farms with a multitude of crops presenting a multi-tier canopy configuration ensures a high level of exploitation of environmental resources. Top-most canopy is occupied by coconuts, the second layer by arecanut, pepper, jack, tamarind and mango, the third layer is occupied by banana, tapioca and fruit plants and the lowermost layer of canopy consists of tubercrops, vegetables and guinea grass. The boundaries are live-fenced with gliricidia (Salam and Sreekumar, 1990).

Anilkumar *et al.* (1990) opined that multiple cropping system helps to augment income from cocunut holding. Agronomic research on different forms of multiple cropping system on coconut based cropping of Kerala revealed the scope for taking up multiple cropping in coconut garden with compatible crops.

Bavappa (1991) reported that annuals or seasonal crops or intercrops and perennials, mixed crops in coconut palm, form a multi-storied cropping system which utilises 75 per cent of land and solar energy and top 30 cm of soil surface not utilised by the coconut palm. He also reported that the air space utilisation was 31 per cent and biomass production was also sustained.

Roy (1991) reported that multipurpose trees and shrubs provide food, fuel wood, timber, foliage fodder, green manure and fertilizer.

Homestead agroforestry (multiple combination of various agroforestry components) has a very high potential for increasing production.

Babu *et al.* (1992) opined that diversity in homestead farming is a well planned strategy in terms of pest and disease management, risk aversion and efficient use of natural resources such as light, water, soil and nutrients. Save and Sanghavi (1993) reported that the products from the natural farming have longer shelf life high digestability and palatability.

2.4.2.4 Economic aspects of homestead farming

The main expectation from an intercropping system in a perennial plantation crop system is that the overall return from a unit piece of land is increased without adversely affecting either the current or the long-term productivity of the main crop. At the same time, the returns from the additional crop should justify the adoption of intercropping practice and should contribute to the long-term productivity of the system (Liyanage *et al.* 1984).

Balasubramanian *et al.* (1988) after analysing the existing enterprise combinations of 50 selected garden land farmers of Coimbatore taluk suggested an improved enterprise combination taking intc account the requirements of food, fodder and technical, financial and management constraints. The analysis revealed that it is possible to increase the profit realised to an extent of 25 per cent by proper farming systems management.

The results of a study by Janakiram *et al.* (1988) indicated a shift in the cropping pattern towards black gram, green gram and varagu with livestock enterprises which are less risky. The results indicated the need for suggesting location specific farming systems, which will minimise the variability of farm income and reduce the risk of dry land farmers.

Kandasamy and Chinnaswamy (1988) found that among different mixed farming practices, dairy- based system was more profitable than others. The mean annual net income was Rs 6090/- with the per day income of Rs.16.68. The next best system was dairy-cum-poultry based farming system, having a mean annual net income of Rs 5899/- with per day income of Rs16.16. Poultry based mixed farming gave only a marginal mean annual net income of Rs 2287/- with a per day income of Rs 6.27.

Pasha (1991) described animal husbandary as an important source of income for small and marginal farmers, who have adopted their farming technique in order to maximise production and returns to resource utilisation. Unfortunately, different classes have varied degrees of access to common resources giving the richer farmer a better opportunity on diversification.

Rathinam (1991) opined that through mixed farming in coconut year round income is assured.

Singh (1991) opined that the conservation and utilisation of natural resources on watershed basis has elicited widespread interest and is now increasingly viewed as the most appropriate approach for the

development of eroded lands. The scientific integrated management of soil, water, plant, animal and man power is important for increasing production on a sustained basis for an overall development of the area and for conserving the environment.

Babu *et al.* (1992) reported that diversified homestead farming is a deliberate strategy aimed at producing harvests through out the year so that there is always some product of economic value available for household use or cash sale.

Job *et al.* (1993) revealed that by identifying the optimum mix of crops scientifically, the income from coconut based cropping system can be increased substantially.

2.4.3. Relationship of evaluative perception of homestead farmers and their personal, socio-cultural and techno-economic factors

Age

Nandakumar (1980) reported non-significant relationship between age and their utility perception of mobile farm advisory service.

Sudha (1987) observed that age had no relationship with perception of participants about lab-to-land programme.

Damodaran (1994) reported negative and significant correlation between age and perception of risk in banana cultivation.

Education

Muthukrishnan (1982) found positive and significant correlation between education and perception about attributes of biogas plants.

Sundaram (1986) found positive relationship between perception of effectiveness of soil conservation practices and education.

Balan (1987) observed positive relationship between education and perception of effectiveness of soil test recommendation .

Latha (1990) established a positive and significant relationship between education and perception of user of biogas technology.

Damodaran (1994) reported non-significant negative relationship between education and perception of risk management among banana cultivators.

Occupation

No study could be located relating to this variable. However, with logical reasoning it was assumed that there would be relationship between occupation and evaluative perception.

Farm size

Muthukrishnan (1982) reported that farmers with larger size of holding had more number of cattle and also perceived the gas plants to be profitable compared to others.

Balan (1987) reported positive relationship between size of holding and perception about soil test recommendations.

Latha (1990) observed negative relationship between farm size and perception about efficiency of biogas plant technology.

Irrigation index

Balan (1987) observed that irrigation potential had no significant relationship with perception of farmers about utility of soil test recommendations.

Latha (1990) reported that extent of availability of perennial source of water was positively and significantly related with perception of biogas technology.

Damodaran (1994) reported positive and significant relationship between irrigation potential and risk perception in banana.

Annual income

Muthukrishnan (1982) reported that income and perception of attributes of biogas plants were positively related.

Balan (1987) obtained positive relationship between annual income and perception about effectiveness of soil test recommendations.

Credit utilization

Latha (1990) reported significant and negative relationship and indebtedness on the perception of biogas technology.

Labour utilization

Patil *et al.* (1978) indicated that family labour income contributed to about 70 per cent of the total farm business income.

Indiradevi (1983).opined that more than two-fifth of the man-days utilised was family labour.

Extension participation

Sivakumar (1983) reported positive and significant association between degree of contact of farmers with research station and research workers and their perception about research station.

Balan (1987) observed positive and significant relationship between extension orientation and perception about soil testing.

Sudha (1987) revealed that there was positive and significant relationship between extension orientation and perception about lab-to-land programme of both tribal and non-tribal participants.

Information sources used

Balan (1987) reported that utilisation of information source was positively and significantly associated with the perception of farmers about utility of soil test recommendations.

Latha (1990) reported that the utilization of the interpersonal sources of information had positive and significant relationship with perception of users about efficiency of biogas plant.

Economic motivation

Sundaram (1986) reported positive and significant relationship between economic motivation and perception of soil conservation practices.

Risk preference

Sundaram (1986) found that risk orientation had positive and significant relationship with perception.

Scientific orientation

Sudha (1987) reported that there was no significant relationship between scientific orientation and perception.

Personal guidance for better farming

Geethakutty (1982) reported that personal guidance had positive and significant relationship with understanding of principles behind the recommended practices and also with the knowledge of procedure of recommended practices.

Value orientation

Krishnankutty (1988) reported that value orientation acted as an important variable in explaining the awareness about Integrated Rural Development Programme (IRDP).

2.5 Level of konwledge of homestead farmers with respect to scientific practices and the factors therein

2.5.1 Level of knowledge of homestead farmers with respect to scientific practices

The evaluative perception and extent of adoption of scientific practices are determined by the level of knowledge of homestead farmers. With this view studies on knowledge level of the homestead farmers were reviewed.

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

Uma (1980) found that knowledge level of trained mahila mandal members was significantly high as a result of trining with respect to nutrition and homegardening in Darwad district.

Govind (1984) found that the knowledge of farm women was high with respect to livestock related activities.

Jayakrishnan (1984) also reported that paddy growers had medium level of knowledge on low cost technology.

Krishnamoorthy (1984) reported that the farmers had medium level of knowledge on dry land technology.

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

2.5.1. Relationship between level of knowledge of scientific practices of homestead farmers and their personal, socio-cultural and techno- economic factors.

2.5.2. Factors influencing level of knowledge

Age

Manivannan (1980) found negative and significant relationship between age and knowledge level of sunflower growers.

Ahamed (1981) reported that there was non-significant relationship between age and knowledge.

Sushama *et al.* (1981) reported non-significant relationship between age and knowledge.

Vijaykumar (1983), from his study on the impact of Special Agricultural Development Unit (SADU) reported that the age of the non-beneficiaries had negative and significant relationship with their level of knowledge.

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

Krishnamoorthy (1984) reported positive relationship between age and knowledge of dry land technology.

Godhandapani (1985) revealed negative and significant relationship between age and knowledge of nutrient recommendation for irrigated ground nut. Similar result was reported by Chenniappan (1987) also.

Rathinasabapathi (1987) reported non-significant relationship between age and knowledge of integrated pest management for irrigated cotton.

Krishnamoorthy (1988) reported significant relationship between age and knowledge of seed treatment of irrigated cotton.

Education

Krishnamoorthy (1984) reported positive non-significant relationship between education and knowledge.

Jayakrishnan (1984) reported positive and significant relationship of education with knowledge.

Chenniappan (1987) reported non-significant relationship of education with knowledge. Similar result was reported by Rathinasabapathi (1987) also.

Krishnamoorthy (1988) reported that there was positive and significant relationship between education and knowledge.

Aswathanarayana (1989) reported a positive and significant relationship between education and knowledge. Similar results was reported by Satheesh (1990) also.

Geethakutty (1993) reported that education had positive and significant relationship with knowledge.

Occupation

Jayakrishnan (1984) reported positive significant relationship of occupation with knowledge.

Rathinasabapathi (1987) reported non-significant relationship between occupation and level of knowledge.

Krishnamoorthy (1988) also reported non-significant relatioship between occupation and level of kowledge..

Geethakutty (1993) observed positive and significant relationship between these two variables.

Farm size

Chenniappan (1987) reported positive and significant relationship between farm size and level of knowledge, on improved practices in irrigated cotton.

Rathinasabapathi (1987) reported non-significant relationship between farm size and knowledge on integrated pest management of cotton.

Krishnamoorthy (1988) reported positive and significant relationship between farm size and knowledge on seed treatment practice in cotton.

Aswathanarayana (1989) reported non-significant relationship between farm size and level of knowledge.

Positive and significant relationship between farm size and knowledge was reported by Satheesh (1990).

Geethakutty (1993) found that there was non-significant relationship between farm size and knowledge.

Many researchers had expressed different opinions regarding the relationship of farm size with knowledge. However, this variable was decided to be included in the present study.

Irrigation index

Chenniappan (1987) reported that irrigation potentiality had positive significant relationship with knowledge on improved practices of irrigated cotton.

Geethakutty (1993) reported that non-significant relationship between irrigation index and knowledge.

Annual income

Chenniappan (1987) reported positive and significant relationship between annual income and knowledge.

Credit utilization

There was no related studies on the relationship between credit utilization and knowledge level of homestead farmers. However, on logical reasoning this variable was decided to be included in the final study.

Labour utilization

Aiyaswamy *et al.* (1975) opined that in small farms the general characterstics was that the employment of family labour was high compared to large farms.

Tshibaka, (1992) revealed that the allocation of labour time presents different seasonal patterns for men and women, although no house hold member spent more than 50 per cent of the available time of income generating activities.

Extension participation

Manivannan (1980) reported non-significant relationship of extension participation with knowledge.

Sushama *et al.* (1981) also reported that there was non-significant relationship between extension participation and knowledge.

Krishnamoorthy (1984) reported positive influence of extension participation on knowledge.

Information sources used

Jayaraman (1988) reported mass media participation and social participation had positive significant relationship with knowledge. Similar result had been reported by Satheesh (1990).

Economic motivation

Positive and significant relationship between economic motivation and level of knowledge was reported by Jayakrishnan (1984).

Rathinasabapathi (1987) reported that there was positive and significant relationship between economic motivation and level of knowledge.

Jayaraman (1988) reported positive and significant relationship between economic motivation and level of knowledge.

Krishnamoorthy (1988) revealed that there was positive and significant relationship between econimic motivation and level of knowledge.

Aswathanarayana (1989) opined that there was positive and significant relationship between economic motivation and level of knowledge.

Juliana *et al.* (1991) also reported that there was positive and significant relationship between economic motivation and level of knowledge.

Scientific orientation

Manivannan (1980) reported that knowledge and sunflower growers possess positive and significant correlation with their scientific orientation.

Senthil (1983) reported that there was positive and significant relationship between scientific orientation and level of knowledge.

Krishnamoorthy (1984) revealed that there was positive and significant relationship between scientific orientation and level of knowledge.

Chenniappan (1987) opined that there was positive and significant relationship between scientific orientation and level of knowledge.

Rathinasabapathi (1987) observed that there was positive and significant relationship between scientific orientation and level of knowledge.

Jayaraman (1988) reported that there was positive and significant relationship between scientific orientation and level of knowledge.

Krishnamoorthy (1988) also reported that there was positive and significant relationship between scientific orientation and level of knowledge.

Personal guidance for better farming

Geethakutty (1982) reported that personal guidance for better farming had positive and significant relationship with the knowledge of the procedure of recommended practice of fertilizer use behaviour.

Risk preference

Positive and significant relationship of risk preference with knowledge was reported by Krishnamoorthy (1984).

Jayakrishnan (1984) reported that there was positive and significant relationship between risk preference and level of knowledge.

Rathinasabapathi (1987) opined that there was positive and significant relationship between risk preference and level of knowledge.

Krishnamoorthy (1988) observed that there was positive and significant relationship between risk preference and level of knowledge.

Juliana *et al.* (1991) also reported that there was positive and significant relationship between risk preference and level of knowledge.

Value Orientation

Padmanabhan (1981) reported positive and significant relationship between value orientation and level of knowledge of men and women labourers.

2.6. Extent of adoption of scientific practices by the homestead farmers and the factors therein

2.6.1 Extent of adoption of scientific practices by homestead farmers

Rogers (1962) defined adoption process as the mental process an individual passes from first hearing about an innovation to its final adoption.

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

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

The adoption at individual farm level is defined as the degree of a new technology in long run equilibrium when the farmer has full informations about the new technology and its potential (Feder *et al.* 1982).

Jayakrishnan (1984) reported that paddy growers had medium level of adoption of low cost technology.

Krishnamoorthy (1984) reported similar findings in a study on transfer of technology of dry land technology.

Chaudhari and Makode (1992) reported that majority of their respondents belonged to medium category in the case of level of adoption of high yielding varieties in rainfed chillies and jowar.

2.6.2. Relationship of extent of adoption of scientific practices by the homestead farmers and their personal, socio-cultural and techno-economic factors

Age

Jayakrishnan (1984) in a study on adoption of low cost technology among paddy growers, found that age had positive and significant relationship with adoption.

Krishnamoorthy (1984) reported positive and significant influence of age on transfer of dry land technology.

Chenniappan (1987) reported positive and significant relationship of age with adoption of improved practices for irrigated cotton.

Rathinasabapathi (1987) reported that there was no significant association of age with adoption of integrated pest management practices for cotton.

Krishnamoorthy (1988) found that age had no significant relationship with adoption of seed treatment practices among ragi cultivaters.

A study conducted in a village in Faizalabad district, Pakisthan, indicated that age was inversely related as a determinant of innovation adoption (Quazi and Iqbal,1991).

Education

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

Krishnamoorthy (1984) found that education had positive and non-significant relationship with adoption of dry land technology.

Chenniappan (1987) reported education had positive and significant association between extent of adoption of improved practices of irrigated cotton and education.

Rathinasabapathi (1987) reported education had positive and non-significant association between adoption and education.

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.

Occupation

Jayakrishnan (1984) found that occupation had positive and significant relationship with adoption and low cost technology in paddy cultivation.

Rathinasabapathi (1987) reported non-significant relationship of occupation with extent of adoption of integrated pest management practices in cotton.

Krishnamoorthy (1988) reported that there was no significant relationship between occupation and extent of adoption of scientific practices in irrigated cotton and millets.

Farm size

Chenniappan (1987) reported that farm size had positive and significant relationship with adoption.

Rathinasabapathi (1987) reported non-significant relationship between farm size and extent of adoption.

However, the relationship between farm size and extent of adoption was found non-significant by Aswathanarayana (1989) in the case of adoption of silk worm rearing practices.

Satheesh (1990) and Gopala (1991) reported positive and significant relationship between farm size and extent of adoption.

Chandra and Singh (1992) reported that the level of adoption was positively associated with size of farm.

Irrigation index

Perumal and Mariyappan (1982), Shivaraja (1986) and Chenniappan (1987) reported positive relationship between irrigation index and extent of adoption.

Credit utilization

Chenniappan (1987) established positive and significant relationship of credit utilization with adoption of improved practices in cotton.

Sulaiman (1989) reported positive and significant relationship of credit utilization with extent of adoption of scientific practices of fertilizers in paddy.

Chandra and Singh (1992) observed positive and significant relationship of credit utilization with extent of adoption.

Labour utilization

Bhatia and Singh (1991) established negative and significant relationship between family labour participation and adoption.

Sharma (1987) in a study on adoption of composite fish culture reported positive relationship between labour perception and adoption.

Extension participation

Mahadevaswami (1978) inferred that adoption behaviour of small, marginal and big farmers was associated with extension participation.

Information sources used

Krishnamoorthy (1984) reported that social participation and extension agency contact had non-significant relationship with extent of adoption.

Godhandapani (1985) reported positive and significant relationship between information sources used and the extent of adoption.

Theodore (1988) opined that there was no significant relationship between information source used and adoption.

Sulaiman (1989), Athimuthu (1990) and Geethakutty (1993) reported positive and significant relationship between information sources used and extent of adoption.

Economic motivation

Jayakrishnan (1984) reported non-significant influence of economic motivation and adoption.

Krishnamoorthy (1984) also reported that there non-significant relationship between economic motivation and adoption.

Rathinasabapathi (1987) reported high positive and significant relationship of economic motivation with adoption.

Anilkumar (1988) found that economic motivation was the most important motive influencing farmers in the participation in agroforestry programmes.

Jayaraman (1988) reported economic motivation as an important determinant of adoption. Krishnamoorthy (1988) also supported this finding.

Positive and significant relationship between economic motivation and extent of adoption was reported by Aswathanarayana (1989).

The relationship between economic motivation and extent of adoption was non-significant in the studies conducted by Satheesh (1990) and Gopala (1991).

Chaudhari and Makode (1992) reported that there was positive relationship between economic motivation and extent of adoption of high yielding varieties of chilly and jowar.

Scientific orientation

Jayakrishnan (1984) reported positive and significant relationship of scientific orientation with adoption.

Krishnamoorthy (1984) reported non-significant relationship between scientific orientation and adoption.

Positive and significant relationship of scientific orientation with extent of adoption was reported by Chenniappan (1987). Rathinasabapathi (1987) Jayaraman (1988), Krishnamoorthy (1988) and Chaudhari and Makode (1992).

Personal guidance for better farming

Shivasankara (1986) reported that there was significant and positive relationship between personal guidance for better farming and extent of adoption.

Suresh (1987) opined that there existed non-significant relationship of personal guidance for better farming with adoption of technology.

Sulaiman (1989) also reported that there was non-significant relationship between personal guidance for better farming and extent of adoption.

Geethakutty (1993) observed positive and non-significant relationship between personal guidance for better farming and extent of adoption.

Risk preference

Jayakrishnan (1984) reported positive and significant relationship of risk preference with extent of adoption.

Krishnamoorthy (1984) also reported positive and significant relationship between risk preference and extent of adoption.

Rathinasabapathi (1987) reported positive and significant relationship of risk preference with adoption.

Krishnamoorthy (1988) found that risk preference had positive and significant relationship with adoption. Similar results were observed by Ajayakumar (1989) and Juliana *et al.* (1991).

Value orientation

Parsons and Shills (1965) defined value orientation as those aspects of the actors orientation which commits him to the observance of certain norms, standards, criteria for selection whenever he is in a contingent situation which allows him to make a choice.

Padmanabhan (1981) reported that there was significant positive relationship between value orientation and efficiency of agricultural labour. Similar result was reported by Viju (1985) also.

Jayaraman (1988) reported positive and significant relationship between value orientation and extent of adoption.

2.7 Extent of adoption of indigenous practices by homestead farmers

Wang (1988) defined indigenous knowledge as a sum total of knowledge and practices which are based on people's accumulated experiences in dealing with situations and problems in various aspects of life and such knowledge and practices are special to a particular culture.

Indigenous practices are developed by the farmers through concerted efforts in their farms by trial and error, a process of informal research.

Indigenous knowledge is highly localized and restricted and is passed on by word of mouth from generation to generation.

Michon *et al.* (1983) stated that fish pond-mud, and green manure were commonly used in crop lands. Villagers regulate or modify the functioning and dynamics of each plant and animal with in the system.

Altieri (1987) reported that predative nature of ducks, fishes, frogs and snakes were traditionally employed to control insects in paddy cultivation.

Perumal and Chandramouleeswaran (1988) reported that the reason expressed for continued adoption of indigenous practices were, "cost and maintenance cheap", "operation simple" and "handling was easy".

Sprinkling of diluted cowdung slurry to hasten germination of paddy seed, soaking sprouted seeds in cowdung to dispense with or minimise

farm yard manure application and using of cloth-bit torches at the earhead emergence stage to serve as light trap were extensively practised in specific locations (KAU, 1989 b).

Cashman (1989) emphasised the values and practicability of incorporating indigenous knowledge components in agricultural research to augument sustainable development that benefits all the rural people equally.

Kanakasabhapathi (1991) reported the scientific rationale of using neem cake dissolved in cow's urine and using tobaco leaf extract for controlling cotton boll worms among the farmers practising dry land agriculture.

Groenfeldt (1991) reported that traditional knowledge of Asian agriculture, reflected technical knowledge of sustainability and found that modern agricultural development efforts often ignored the indigenous/traditional knowledge. He also suggested that indigenous systems should be intelligently assisted rather than replaced.

Waters (1991) described the cultivation and livestock management practices of small cultivators using indigenous knowledge, in order to understand the complexity of mixed farming system. He observed that the agricultural knowledge of the cultivators was sufficient to support sustainable agriculture and urged the private/voluntary organisations as well as Government to their policies that way.

Balakrishnan (1992) enumerated a number of indigenous practices on dry land agriculture and opined that many of the indigenous practices were low cost, easy to practice and environmental friendly. He also reported that the indigenous practices were labour saving and some of them improved quality and shelf life of the produce.

Butler (1992) opined that in sustainable agriculture farmer shifts from being user of technology to a producer of technology and maker of its impacts.

Gupta and Patel (1992a) and Gupta and Patel (1992b) reported that indigenous practices were cost effective and easy to practice.

Joseph *et al.* (1993) reported that the practice of applying common salt to coconut is based on the grower's belief that it reduces barren nuts. It was also observed that in rocky laterite soils addition of common salt to pits before planting coconut seedlings soften the laterite bed and help easy penetration of tender roots. They also reported that common salt made the trees more tolerant to leaf blight disease.

Based on the above reviews, indigenous practice is operationalised as the knowledge/practice which is based on people's accumulated experience in dealing with situations and problems in various aspects of life or a modern technology imported and adopted to suit indigenous conditions.

2.8 Constraints experienced by homestead farmers

Tripathi *et al.* (1982) reported non availability of credit and adverse effect of fertiliser on soil and incidence of diseases and pests as constraints in adoption.

Waghmare and Pandit (1982) identified lack of knowledge lack of technical guidance, lack of money, high cost of inputs and non availability of credit as major constraints.

Reddy (1985) reported lack of marketing facility and high cost of transportation as constraints.

Kalita and Phukan (1986) identified lack of infra-structural development, inadequate distributional arrangements, poor purchasing capacity of farmers and inadequate knowledge of farmers as major constraints.

Ramesh (1986) reported financial difficulty and high cost of fertilisers as major constraints. Rajagopalan (1986) reported lack of knowledge on improved practices as a constraint.

Aswathanarayana (1989) identified lack of capital and non availability of irrigation facility as major constraints.

KAU, (1989 b) identified lack of knowledge of technical aspects and economical aspects of balanced use of fertilisers among farmers and lack of optimum fertilisers schedules for different regions, non availability of manure, high cost of organic manure, farmers not convinced of the benefit of liming and high cost of fertilisers.

Sulaiman (1989) identified high cost of fertilisers, high rate interest of crop loan and uncertainty of irrigation water as major contraints.

Gopala and Krishna (1993) reported lack of knowledge, lack of irrigation facility, lack of capital and lack of land as constraints.

2.9 Conceptual frame work for the study

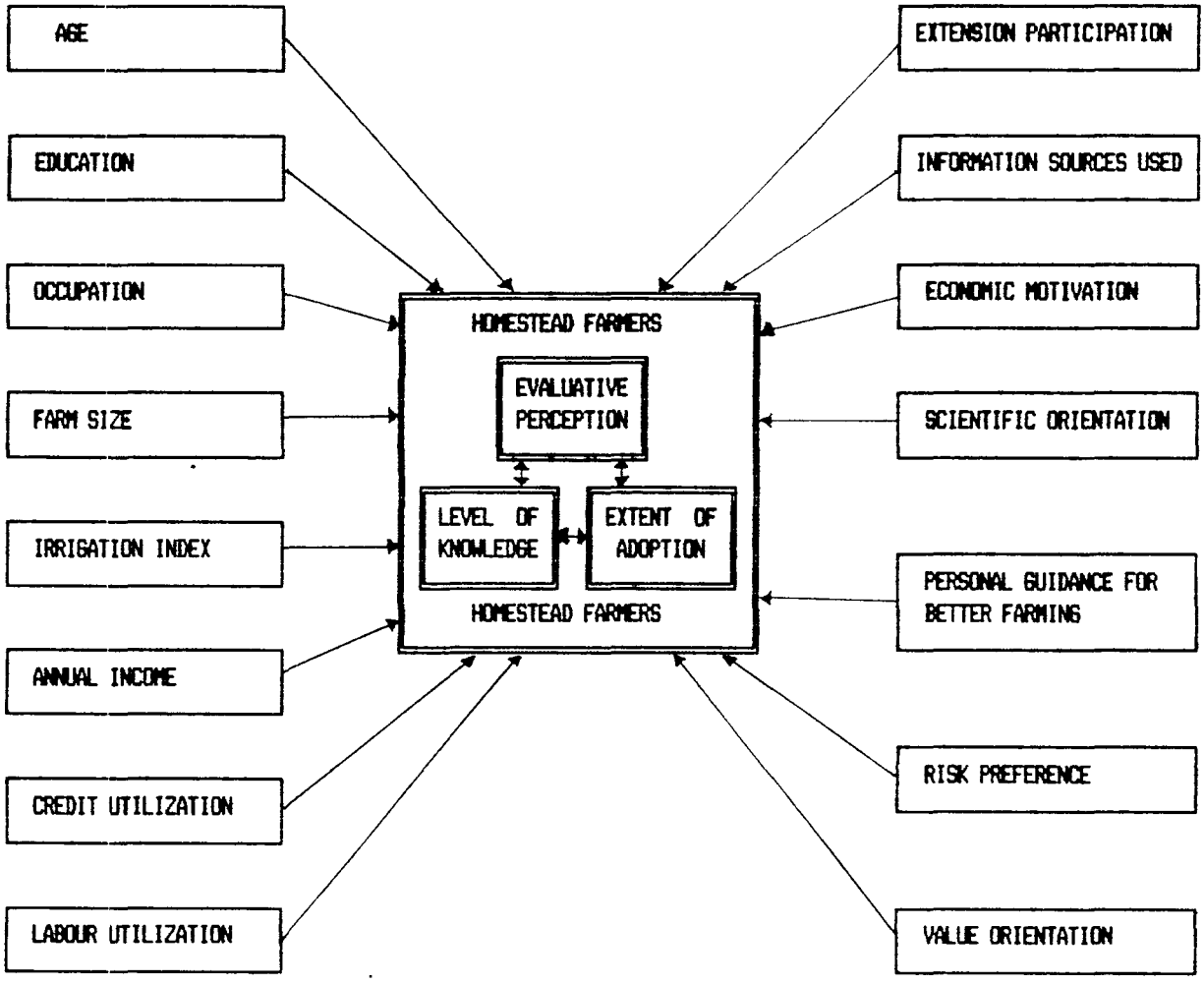
Based on the review presented, a conceptual model was developed for the study which is presented as Fig. 1.

The main objective of the conceptual frame work here is to provide an abstract view of evaluative preception of homestead farmers on appropriateness of farming systems and cropping patterns, their level of knowledge on scientific practices and extent of adoption of scientific practices in homestead farming situation, and their interaction with external and personal factors.

According to Segall *et al.* (1966), perception is subject to many of the same influences that shape other aspects of behaviours. In particular, each individual's experiences combine in a complex fashion to determine his interaction to a given situation. Based on this reason, evaluative perception was taken as a dependent variable for the present study.

The level of knowledge and the adoption of recommended practices are the other two important dependent variables in this context. It is

Fig. 1. CONCEPTUAL FRAME WORK FOR THE STUDY



an accepted fact that evaluative perception, knowledge and adoption are influenced by personal, socio-cultural and techno-economic factors of the homestead farmers.

The external stimuli such as the constraints and indigenous practices assumed to have profound influence on the evaluative perception, knowledge and adoption of homestead farmers. These factors are so intricately associated with each other that they could not be viewed as separate entities for the study. Hence, a holistic study, taking all these factors into consideration would throw sufficient light on the evaluative perception of homestead farmers.

Methodology

CHAPTER III

METHODOLOGY

The methodology followed in this study is presented under the following main headings.

3.1 Locale of the study

3.2 Selection of sample

3.3 Operationalisation and measurement of variables

3.4 Constraints experienced by homestead farmers

3.5 Methods used for data collection

3.6 Statistical tools used for the study

3.1 Locale of the study

The study was conducted in the central zone of Kerala comprising of Palakkad, Thrissur and Ernakulam Districts excluding the high ranges, costal saline tracts and other isolated areas like kole lands with special soil and physiographic conditions. The zone comprises of 17 taluks, 44 development blocks and 274 panchayats. The geographical area of the zone is 973689 hectares. The total population of the zone is 79.36 lakhs (1990- 91). The number of farming families is about 15.23 lakhs.

The zone is charecterised by a comparatively heavy rain fall during South-West monsoon and less rainfall during the North-East monsoon period leaving in between a dry spell of six months from December to May. The mean maximum and minimum temperature of the zone are 31.4°C

and 21.1°C, respectively. The soil type is mainly laterite. The crops raised are mainly rainfed. The zone is the major rice growing tract and it accounts for about 50 per cent of the production of rice. Coconut, arecanut, sesamum, pulses, banana and pineapple are the other important crops of the zone (KAU 1989a)

About 80 per cent of the population of the zone is directly dependent on agricultural sector. The land reforms and other land legislative measures initiated in Kerala are reflected in the fragmentation of the agricultural holdings in the central zone also. More than 92 per cent of the holdings have area less than one hectare. Holding size more than four hecatres accounts for only 0.46 per cent. (Annexure Ia and Ib)

3.2 Selection of sample

Three blocks each from the central zone representing the low land, mid land and high land were selected at random. Thus Thrithala, Coyalmannam and Nenmara blocks from Palakkad district, Mala, Chowannur and Pazhayannur in Thrissur district and Alangad, Angamali and Kothamangalam in Ernakulam District were selected. Out of these blocks, Thrithala, Mala and Alangad constituted low land, Coyalmannam, Chawannur and Angamaly represented mid land and Nenmara, Pazhayannur and Kothamangalam represnted high land. From the selected blocks two panchayats each were selected at random. Thus 18 panchayats namely Thrithala and Pattithara (Thrithala block) Kuthannur and Coyalmannam (Coyalmannam block) Mala and Annamanada (Mala block) Arthat and Chundal

(Chowannur block) Chelakkara and Pazhayannur (Pazhayannur block) Karumalur and Kadungallur (Alangad block) Karukutty and Kalady (Angamali block) Kavalangad and Nellikuzhy (Kothamangalam block) were selected, at random.

From each panchayat thus selected, one ward each was selected at random. Thus there were 18 wards selected for the study.

From each selected ward, 10 farmers were selected at random. Thus there were 20 farmers selected from each block. Accordingly, there were 180 (9 x 20) farmers selected for the study. The maps showing the location of the study are given as Fig. 2. and Fig. 3.

3.3 Operationalisation and measurement of variables

3.3.1 Operationalisation of dependent variables

The dependent variables for the study were evaluative perception of homestead farmers in relation to appropriateness of farming systems and cropping patterns, level of knowledge of homestead farmers on scientific practices and extent of adoption of scientific practices by the homestead farmers.

3.3.1.1 Evaluative perception of homestead farmers in relation to appropriateness of farming systems and cropping patterns

The evaluative perception of homestead farmers in relation to appropriateness of farming systems and cropping patterns, varies from individual to individual.

FIG. 2 . LOCATION OF CENTRAL ZONE

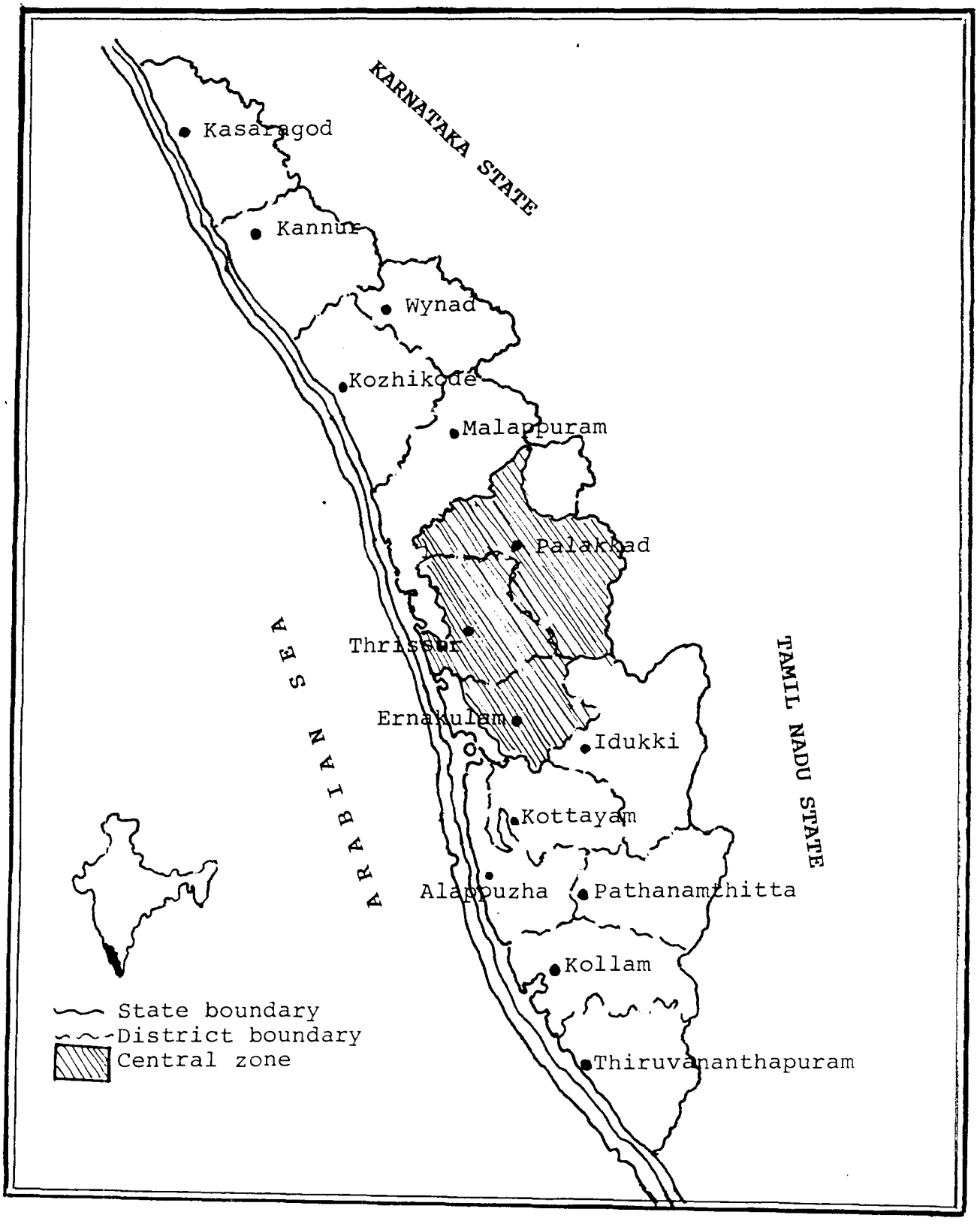
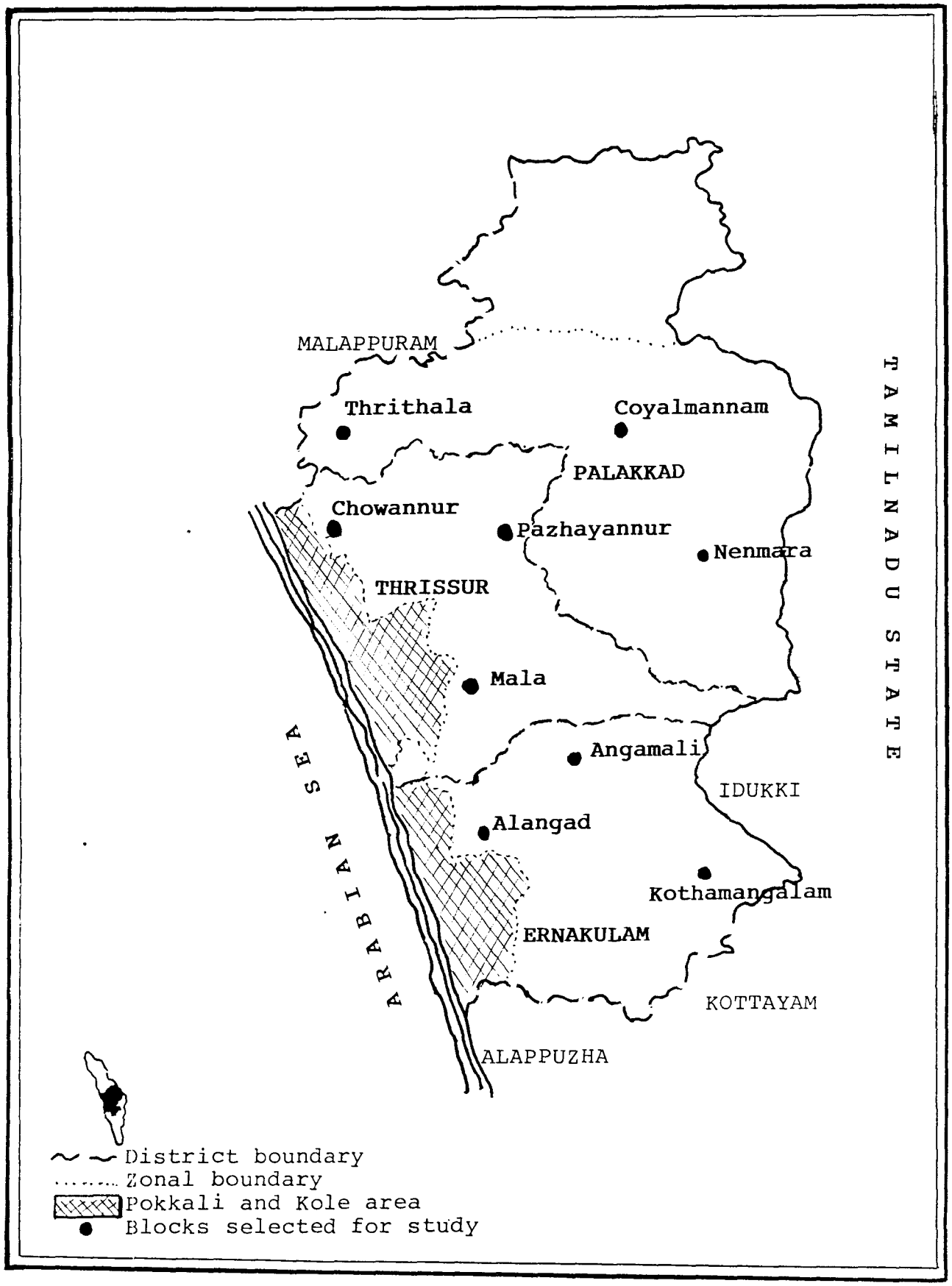


FIG. 3. MAP SHOWING THE LOCALE OF THE STUDY



The purpose of perception is to help individual to cope with the world by assigning meaning to it, which can stand the test of subsequent experiences (Toch and Maclean, 1970)

Evaluative perception of homestead farmers was measured using an arbitrary scale developed for the purpose. The scale was considered as an arbitrary one since the various procedures of standardisation by estimating reliability and validity of the scale were not attempted in the present study.

Based on the relevant review of literature and discussion with experts of Department of Agriculture, and Kerala Agricultural University, items related to farming systems, and cropping patterns adopted by homestead farmers were identified under four major heads namely sustainability, quality of life, utilization of resources, and economic aspects.

Sustainability refers to a management systems for renewable resources to provide food, income and lively hood for current and future generations and that maintain and improve productivity and ecosystem services of the resources.

Utilization of resources refers to the effective resource use management through which maximum utility of inputs is attained.

Economic aspects refer to the degree to which the overall economic improvement of the homestead as a result of adoption of farming systems and cropping patterns.

Quality of life refers to the degree to which the standard of living, nutritional and aesthetic aspects of the household would be influenced by the adoption of farming systems and cropping patterns.

Evaluative perception of homestead farmers about appropriateness of farming systems and cropping patterns is operationally defined as the respondent's meaningful sensation about the worth and efficiency of homestead farming systems in terms of sustainability, quality of life, utilization of resources and economic aspects.

The perception of homestead farmers these items were measured on a four point continuum varying from most important to least important.

The scoring pattern was as follows

Most important	4
Important	3
Less important	2
Least important	1

The scores for the evaluative perception of a farmer on each item were summed up to get the overall perception score for an individual respondent.

3.3.1.2 Knowledge of homestead farmers on scientific practices

Cronbach (1949) defined knowledge test as one in which procedure, apparatus and scroring have been fixed so that precisily the same test can be given at different times and places.

In the present study, knowledge is operationally defined as the respondents' awareness and understanding about the different practices in the recommended package of practices. The knowledge level of homestead farmers was measured with an exhaustive knowledge test developed following the procedures adopted by Sadamate (1978), Viju (1985), Sulaiman (1989) and Bonny (1991).

An item pool of the questions was prepared by discussion with subject matter specialists of Kerala Agricultural University and using package of practices recommendation. One hundred and fifteen questions thus selected from all areas including agriculture and animal husbandry were employed to carry out item analysis for developing standard knowledge test.

These questions were administered to 39 non sample respondents in a pilot study prior to the preparation of final interview schedule and their responses were used for item analysis .

Scores of value one and zero were given to the correct and incorrect responses, respectively. Thus there was a probability of the respondents scoring a maximum of 115 points for all the correct answers and zero for all wrong answers.

The scores obtained by the 39 non-sample respondents were arranged in the descending order of the total scores obtained by them. The three groups were G_1, G_2 and G_3 with 13 respondents in each group. For item analysis, the middle group (G_2) was eliminated retaining only the

terminal ones with high and low scores (G_1 and G_3). The data pertaining to correct responses for all the items of the two groups (G_1 and G_3) were tabulated and the difficulty and discrimination indices were calculated for the above categories.

Calculation of item difficulty index

The index of item difficulty worked out in this study referred to the percentage of the respondents answering an item correctly. As Coombs (1950) pointed out, the difficulty of an item varied for different individuals. In the present study, the items with P value ranging from 30 to 60 were considered for final selection for knowledge test.

Calculation of discrimination index

The second criterion for item selection was the discrimination index indicated by $E^{1/3}$. Mehta (1958) used $E^{1/3}$ method to find out item discrimination values and emphasised that this method was some what analogous to, and therefore, convenient substitute for the phicoefficient as formulated by Perry and Michael (1951). In their studies, Lokhande (1973), Sadamate (1978) and Pillai (1983) had put there units as 0.35 to 0.55, 0.12 to 0.87 and 0.35 to 0.50, respectively. The selected 35 items for final study of knowledge test are given in Appendix II. In the present study, the items where $E^{1/3}$ value above 0.30 were considered for the final selection.

Reliabilty

The split half method was used to test the reliability of the test. All the 35 items of the knowledge test were divided into two halves each having 18 odd numbers and 17 even numbers and administered to 39 non-sample respondents. The coefficient of correlation between the two sets of scores was 0.81 which was highly significant. This indicated that the reliability of the test was high.

Content validity

Content validity is a kind of validity by assumption as described by Guilford (1971). Care was taken to include items covering the entire universe of relevant aspects of knowledge of farm family in homestead farming system. Items were collected through various sources such as specialists in agronomy and agricultural extension of Kerala Agricultural University and Department of Agriculture, so that it was assumed that the test could measure the knowledge level of the homestead farmers.

Method of scoring

Thirty five items were included in the knowledge test. Each respondent was given one score for correct answer and zero for incorrect answer. The total knowledge score for each respondent was calculated by summing up the scores given for each item. Thus the maximum knowledge score that could be obtained by a respondent was 35 and the minimum zero.

3.3.2 Extent of adoption of selected scientific practices by homestead farmers

Many research workers have developed various methods to measure the adoption behaviour.

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

Duncan and Kreetlow (1954) modified the index developed by Wilkening (1952).

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

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

Chattopadhyay (1963) used adoption quotient for measuring adoption which is a ratio scale that measures a farmers' behaviour on dimensions of applicability, potentiality, extent, time, consistency and differential nature of innovations.

Supe (1969) developed a scale namely cotton practices adoption scale. He selected ten practices of cotton and for each practice, a

score of six was assigned for complete adoption. The practices which were divisible had assigned partial score for partial adoption.

Singh and Singh (1974) also used an 'adoption quotient' which was a modification of the one developed by Chattopadhyay (1963). According to this, the adoption quotient of each respondent was calculated by using the following formula.

$$\text{Adoption quotient} = \frac{\Sigma\, e/p}{N} \times 100$$

Where,

Σ = The summation

e = Extent of adoption of each practice

p = Potentiality of adoption of each practice

N = Total number of practices selected

In the present study, the method developed by Supe (1969) as modified by Syamala (1988) and Sulaiman (1989) was followed for measuring the extent of adoption of scientific practices in homesteads.

According to this method, a score of two was given for full adoption, one for improper or partial adoption and zero for non adoption. The adoption score of a farmer was calculated by summing up the scores obtained for different practices.

3.3.3 Measurement of independent variables

The independent variables selected for the study were, age (X_1), education (X_2), occupation (X_3), farm size (X_4), irrigation index (X_5),

credit utilization (X_6), annual income (X_7), labour utilisation (X_8), extension participation (X_9), information sources used (X_{10}), scientific orientation (X_{11}), economic motivation (X_{12}), personal guidance for better farming (X_{13}), risk preference (X_{14}) and value orientation (X_{15}). The above independent variables were seleced based on the pilot study with 30 variables, in an area outside the sample area. The variables which were significantly related atleast with one dependent variable were selected for the study. The details of pilot study are given in Appendix I.

Age

Age was operationally defined as the number of years completed by the respondent at the time of investigation.

Education

It refers to the extent of information and formal learning received by the homestead farmer. Education was measured by assigning scores for different levels of education on the scoring system followed in the socio-economic status scale of Trivedi (1963). The categorisation of respondents and coresponding score assigned were

Category	Score
Illiterate	0
Can read only	1
Can read and write	2
Primary school	3

Category	Score
Middle school	4
High school	5
Collegiate	6

Occupation

Occupation for this study was operationalised as the main vocation and other vocations that the respondents had at the time of interview.

Category	Score
Agriculture	1
Agriculture + private business	2
Agriculture + Govt. job and private business	3

Farm size

This is operationalised as the total area of land in expressed in terms of standard acres owned by the respondent, which included both wet land and garden land.

Irrigation index

The extent to which the holding was irrigated was measured by this variable. This was quantified by considering two dimensions namely irrigation potential and availability of irrigation facilities and expressed in terms of ratio between them.

Annual income

In this study, annual income has been operationally defined as the total earnings of the respondents and the members of the family in an year from the farm and other sources, expressed in rupees.

Credit utilization

Credit utilization of operationally defined as a measure of the utilization of credit facilities available to a farmer. This variable was measured using a dichotomous response pattern as to whether the farmer had availed any credit or not from any agency. If the farmer had availed credit a score of one was assigned for the same, while a score of zero was assigned if he has not availed any credit (Sulaiman 1989).

Labour utilization

In this study labour utilisation was taken as the total number of human labour days used in the homestead per acre during the reference year. This included both male and female labour.

The responses of the farmers were collected in man days per acre and mean was calculated. The below mean value was taken as low labour input and the above mean value as high labour input.

Extension participation

Extension participation is defined as the extent of participation by a farmer in various extension programme activities conducted .

Participation of the respondents in the above extension activities during the previous year was used to arrive at an extension participation score.

Frequency	Score
Always attending an activity whenever conducted	2
Some times attending an activity whenever conducted	1
Never	0

Information sources used

The information sources used was studied in terms of utilization of both mass media sources and inter-personal sources of communication.

The procedure followed by Nair (1969) is adopted in the present study to develop an index on mass media utilization.

Scoring procedure adopted was as follows

Frequency	Score
Most often	4
Often	3
Sometimes	2
Rarely	1

The scores were summed up across each item to form the index of mass media utilization.

Interpersonal sources utilization is operationally defined as the extent of use of different personal sources by a homestead farmer with a view to obtain information about improved agricultural practices.

The procedure followed by Nair (1969) was adopted in this study to develop an index of interpersonal source utilization.

Each respondent was asked to indicate as to how often he received information regarding improved agricultural practices from each of the personal sources.

The range of responses and scoring pattern was as follows.

Frequency	Scores
Most often	4
Often	3
Sometimes	2
Rarely	1

The scores were summed up accross each item to form the index of interpersonal sources utilization.

The index for information sources used of each respondent was arrived at by summing up the indices of both mass media utilization and interpersonal source utilization.

Economic motivation

Economic motivation referred to the extent to which an individual is oriented towards achievement of the maximum economic ends such as maximisation of the product.

Economic motivation in this study was measured using the scale developed by Moulik (1965). The scale consisted of three sets of statements, each set having three short statements, with weights, 3,2 and 1 indicating different intensities of motivation from high to low. The forced choice method was followed to overcome the familiar problem of personal bias and lack of objectivity in self education. The method forced the respondent to choose from a group of three short sentences describing a particular personality characteristic the one which most accurately described the respondent himself and also the one which least accurately portrayed himself.

After obtaining the most-least choice for each of three sets of statements, the scoring was done by summing up the ratios, of the weights of most-like statements to the weights of least-like statements.

Scientific orientation

Supe (1969) operationalised scientific orientation as the degree to which a farmer is oriented to the use of scientific methods in decision making in farming.

For the measurement of this variable, scale developed by Supe (1969) was followed. The scale consisted of six statements in which five statements were positive and one negative. These statements were suggested to respondents in the following scoring continuum.

Category	Score
Strongly agree	7
Agree	5
Undecided	4
Disagree	3
Strongly disagree	1

In the case of negative statement the scoring system was reversed.

Personal guidance for better farming

Personal guidance for better farming is operationally defined as the advice, help and assistance received by a farmer from different extension personnel for efficient utilization of the resources and solving farming problems.

The scale developed by Singh (1981) and modified by Balan (1987) was used to measure personal guidance for better farming. The scale consisted of 12 statements rated on a five point continuum ranging from very much to very little with scores 4,3,2 and 1. The summation of scores for different statements gave the total score of personal guidance for better farming.

Risk preference

Risk preference is operationally defined as the degree to which a farmer is oriented towards risk and uncertainty and portrayed the courage to face problems in farming.

To measure this variable, scale developed by Supe (1969) was adopted. In this scale six statements of which two were negative. The responses were collected on a five point continuum.

Responses continuum	Scores
Strongly disagree	1
Disagree	3
Undecided	4
Agree	5
Strongly agree	7

For the negative statements the scoring pattern was reversed. The total score obtained by summing up the scores for each statements yielded risk preference score.

Value orientation

This variable was studied using the scale adopted by Bhaskaran (1979) as such. This included progressiveness and venturesomeness. Two statements each were given under the each items to check the appropriateness by the respondents. The scoring procedure adopted was two for positive response and one for negative response.

3.3.4 Indigenous practices adopted by homestead farmers

The homestead farmers had developed a number of indigenous practices by virtue of their rich practical experience in the field of agriculture aquired through generations to generations. The major indigenous practices adopted by the respondents had been enumerated and the same were expressed in terms of percentage.

3.4 Constraints experienced by homestead farmers

Based on discussion with farmers, scientists, experts in agriculture and also through relevant review of literature, some of the constraints faced by homestead farmers were identified. A list containing fifteen such constraints were included in the final interview schedule.

The response to each constraint was obtained on a four point continuum namely, most important, important, less important and least imnportant, with weights 4,3,2 and 1 respectively. Cumulative index for each constraint was worked out and the contraints ranked.

3.5 Methods used for data collection

The data were collected using a well structured interview schedule prepared for the purpose (Appendix II). The draft schedule was prepared which was pre-tested by conducting a pilot study and suitable modifications were made in the interview schedule which was directly administered to the homestead farmers by the investigator and responses recorded at the time of interview.

The data collection was done during April,May and June 1993, by directly interviewing the respondents, by the investigator.

3.6. Statistical tools used in the study

The collected data were scored, tabulated and analysed using suitable statistical methods. The statistical tools used for development of knowledge test have already been described in the procedure of knowledge test. The other statistical tools used are described below.

Mean

The respondents were grouped into categories with reference to the means of the independent variables. After grouping the respondents into two categories and their percentages worked out.

Correlation analysis

Correlation coefficient was worked out to measure the degree of relationship between independent variables and dependent variables.

Multiple linear regression analysis

Multiple linear regression analysis was carried out to find the relative contribution of each of the personal, socio-cultural and techno-economic characteristics on dependent variables.

Step-up regression analysis

Step up regression analysis was carried out to trace the independent variables contributing maximum variablity in the dependent variables.

Results and Discussion

CHAPTER IV

RESULTS AND DISCUSSION

The findings of the present study and discussion of the salient results are presented in this chapter under the following heads.

4.1 Distribution of the respondents based on farming systems and cropping patterns

4.2 Distribution of the respondents based on their personal, socio-cultural and techno-economic factors

4.3 Evaluative perception of the respondents in relation to appropriateness of farming systems and cropping patterns

4.4 Level of Knowledge of the respondents on scientific practices

4.5 Extent of adoption of scientific practices by the respondents

4.6 Relationship between the evaluative perception of the respondents and their personal, socio-cultural and techno-economic factors

4.7 Relationship between the knowledge level of the respondents and their personal, socio-cultural and techno-economic factors

4.8 Relationship between the extent of adoption of scientific practices by the respondents and their personal, socio-cultural and techno-economic factors

4.9 Intercorrelation among the dependent variables

4.10 Extent of adoption of indigenous practices by the respondents

4.11 Constraints experienced by the respondents

4.1. Distribution of the respondents based on farming systems and cropping patterns

4.1.1. Farming systems adopted in homesteads

A perusal of Table 1 and Fig. 4 revealed that the major farming systems identified were: (1) homesteads with crop components alone (12.22 %), (2) homesteads with crop components and extended garden (16.11 %), (3) homesteads with crop components and livestock (13.89 %), (4) homesteads with crop component, livestock and extended garden (47.78 %) and (5) homesteads with crop components, live stock, extended garden and agrobased industries (10.00 %).

Fragmentation of land gave rise to non-viable holdings and also changes in farming systems and cropping patterns. A remarkable change that could be highlighted here is the shift in cropping pattern from food crop to more remunerative crops. This has serious consequences for food security and self reliance at village level. The general tendency of the homesteads was to shift from rice to banana, coconut, cassava and to a mixed garden, or even to rubber in certain localities. These results are in line with the findings reported by Salam *et al.* (1990) Jose (1991) and Jose (1992).

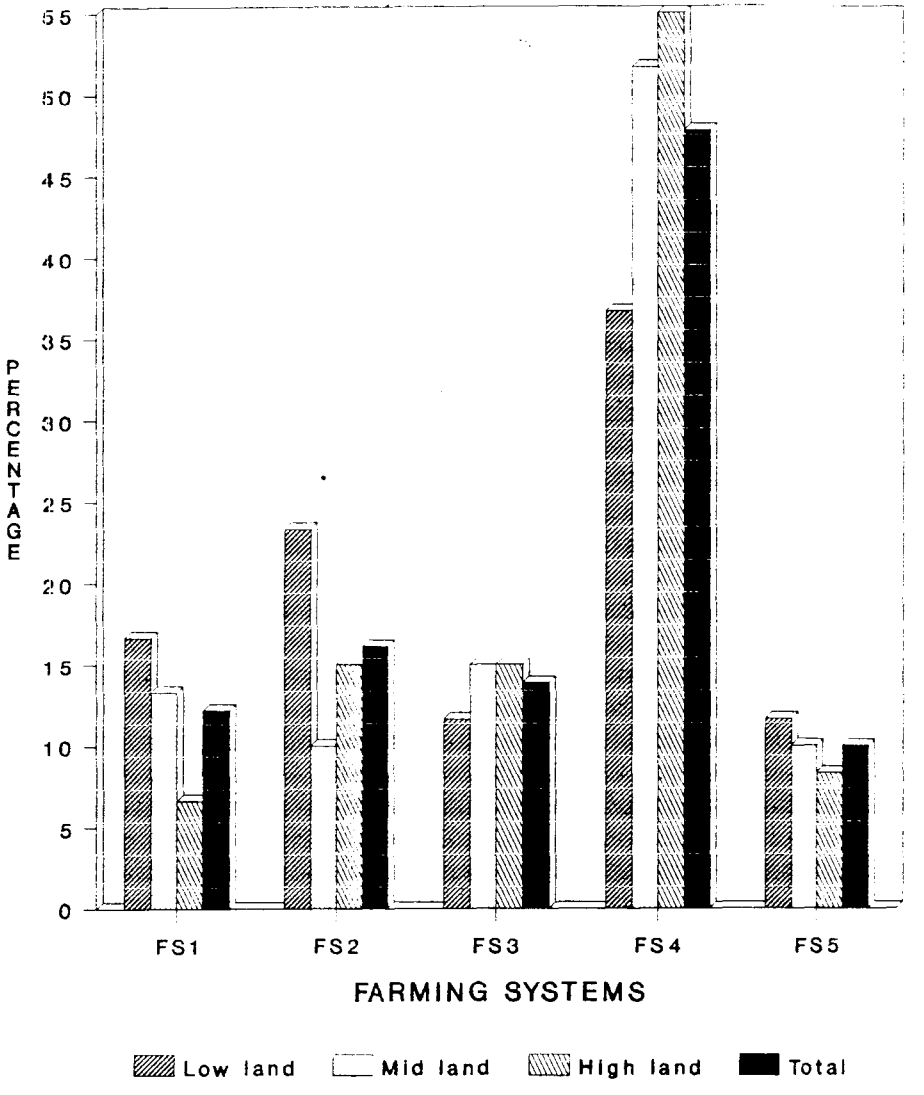
Majority of the homesteads belonged to small and marginal farmers which may be considered as a low to medium input production system. It serves to meet the food and cash needs of the rural households to a great extent. High degree of resource utilization, increased rate of employment generation, better opportunities for choosing enterprises according to the aesthetic sense and need of the farmer and high degree

Table. 1. Distribution of homesteads based on the farming systems adopted

(n = 180)

Sl. No.	Farming systems	Low land (n= 60)		Mid land (n= 60)		High land (n= 60)		Total	
		f	%	f	%	f	%	f	%
1.	Homesteads with crop components alone	10	16.67	8	13.33	4	6.67	22	12.22
2.	Homesteads with crop components and extended garden	14	23.33	6	10.00	9	15.00	29	16.11
3.	Homesteads with crop componenets and live stock	7	11.67	9	15.00	9	15.00	25	13.89
4.	Homesteads with crop components, livestock and extended garden	22	36.66	31	51.67	33	55.00	86	47.78
5.	Homesteads with crop components, livestock, extended garden and Agrobased industries	7	11.67	6	10.00	5	8.33	18	10.00
Total		60	100	60	100	60	100	180	100

Fig. 4. Distribution of homesteads based on the farming systems adopted



FS1. Homesteads with crop components alone
FS2. Homesteads with crop components and extended garden
FS3. Homesteads with crop components and Livestock
FS4. Homesteads with crop components, livestock and extended garden
FS5. Homesteads with crop components, livestock, extended garden and agrobased industries

of sustainability are some of the outstanding characteristics of the farming systems and cropping patterns adopted by the homestead farmers.

Each homestead had its own unique characteristics in terms of enterprise mix, cropping patterns, degree of diversification, production and productivity. Hence a detailed study of each farming system is furnished in the following pages.

4.1.1.1. Homesteads with crop components alone

This type of farming system was found to be common in low lands accounting 16.67 per cent followed by mid land (13.33 %) and high land (6.67 %) respectively, which constituted 12.22 per cent of the total sample. The common cropping patterns followed was coconut, banana and MPTS (45.45%). The characteristic feature of this cropping system was mixed cropping with multitier canopy configuration with coconut as base crop. Table 2 and Fig. 5 revealed that coconut, tapioca and banana were the major crop components of these homesteads (22.73 %). Coconut, banana, arecanut and nutmeg combination (18.18 %) was followed by coconut, banana, vegetable/oilseeds/pulses/fodder combination (13.64 %).

A perusal of Table 2 revealed that homesteads with coconut, banana with MPTS contributed 45.40 per cent , which was distributed over low land (40.00 %),mid land and high land 50.00 per cent each.

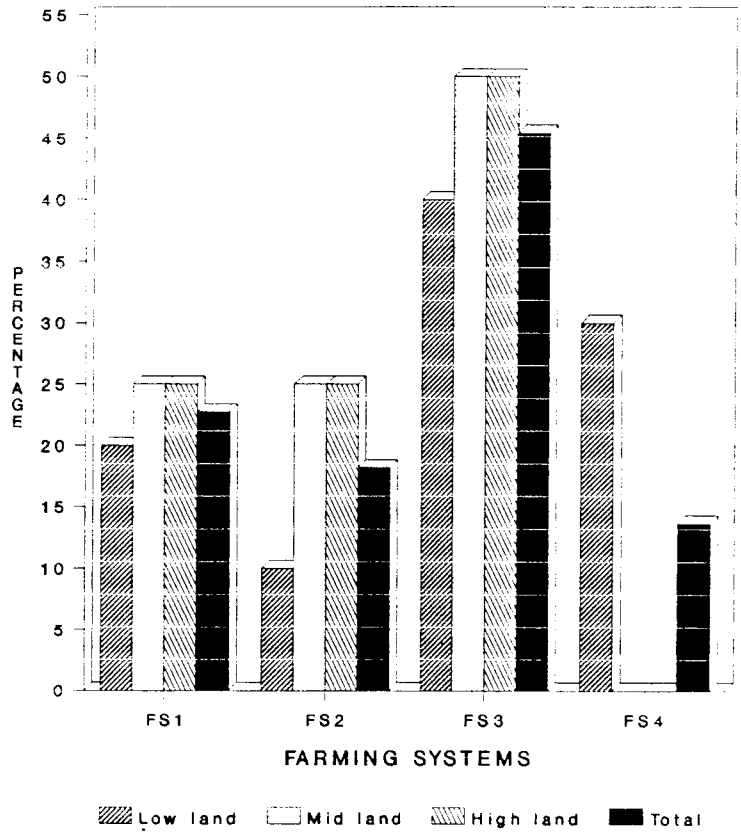
A unique characteristic of Kerala state is that all type of vegetation are retained in the homesteads irrespective of their relative utility. In many cases a well planned strategy in selection and

Table 2. Distribution of farming systems adopted in homesteads with crop components alone.

(n = 22)

Sl. No.	Farming systems	Low land (n = 10)		Mid land (n = 8)		High land (n = 4)		Total	
		f	%	f	%	f	%	f	%
1.	Coconut,vegetable and tapioca	2	20.00	2	25.00	1	25.00	5	22.73
2.	Coconut, banana, nutmeg, arecanut	1	10.00	2	25.00	2	25.00	4	18.18
3.	Coconut, banana, MPTS	4	40.00	4	50.00	2	50.00	10	45.45
4.	Coconut, banana, vegetable/oil seed/pulses /fodder	3	30.00	0	0.00	0	0.00	3	13.64
Total		10	100	8	100	4	100	22	100

Fig. 5. Distribution of farming systems adopted in homesteads with crop components alone.



FS1. Coconut, vegetable and tapioca
FS2. Coconut, banana, nutmeg and arecanut
FS3. Coconut, banana and MPTS
FS4. Coconut, banana, vegetable/oilseed/pulses/fodder

maintenance of crop was not seen systematically followed. Homesteads with coconut, banana, nutmeg and areacanut contributed only 18.18 per cent with region wise distribution, low land (10.00 %), mid land (25.00 %) and high land (25.00 %). Eventhough coconut and banana were the common crop components in homesteads, crops like nutmeg and arecanut were seen mainly confined to certain localities. This was due to the access to market and certain traditional practices. This might be the probable reason for the present finding in this study.

The homesteads with coconut, banana, vegetables/pulses/ oil seed/ fodder were mainly confined to low land (30.00 %) which accounted 13.64 per cent of the total sample. This was due to the inclusion of fodder and pulses crop which was confined to low lands. The availability of natural fodder in high lands and mid land was high because of the high degree of bio-diversity and hence fodder cultivation was not a common practice in high lands. This might be the probable reason for the present finding.

4.1.1.2. Homesteads with crop components and extended garden

Homesteads with wet land rice and rubber mono crop formed this farming system. The major crop components that could be identified under this category were coconut and banana. Rubber mono crop, rice and additional crop land formed the extended garden. MPTS are also seen cultivated through out these homesteads. Table 1 showed that this farming system was more prevalent in low lands (23.30 %) followed by high land (15.00%) and mid land (10.00 %), which constituted 16.11 per cent of the total sample.

Table 3 and Fig. 6 revealed that out of this, coconut, banana, rice in extended garden and MPTS and additional crop land contributed major share (31.03 % each). The other combinations were coconut, banana and rubber in extended garden (17.24 %) and coconut, banana, rubber and rice in extended garden (20.69 %). Jose (1991) reported similar finding.

It was a remarkable feature of Kerala homesteads that MPTS were retained which gave the homesteads an appearance of forestry system. Nelliat and Shambhat (1979) reported similar findings. Kerala farmer had a general tendancy to procure land as an asset which contributed to the extended garden as additional crop land. This may be the reason for ranking the two groups high under this category. This result is also in agreement with the finding reported by Jose (1992) and Jose and Shanmugasundaram (1993).

4.1.1.3. Homesteads with crop components and livestock

Homesteads with crops and live stock components constituted 13.89 per cent of the total homesteads surveyed (Table 1). The distribution of this category of farming system among low land, mid land and high land was almost uniform. This indicated that the incidence of this category was a common practice among homestead farmers throughout the zone. The major combinations are presented in Table 4 and Fig. 7.

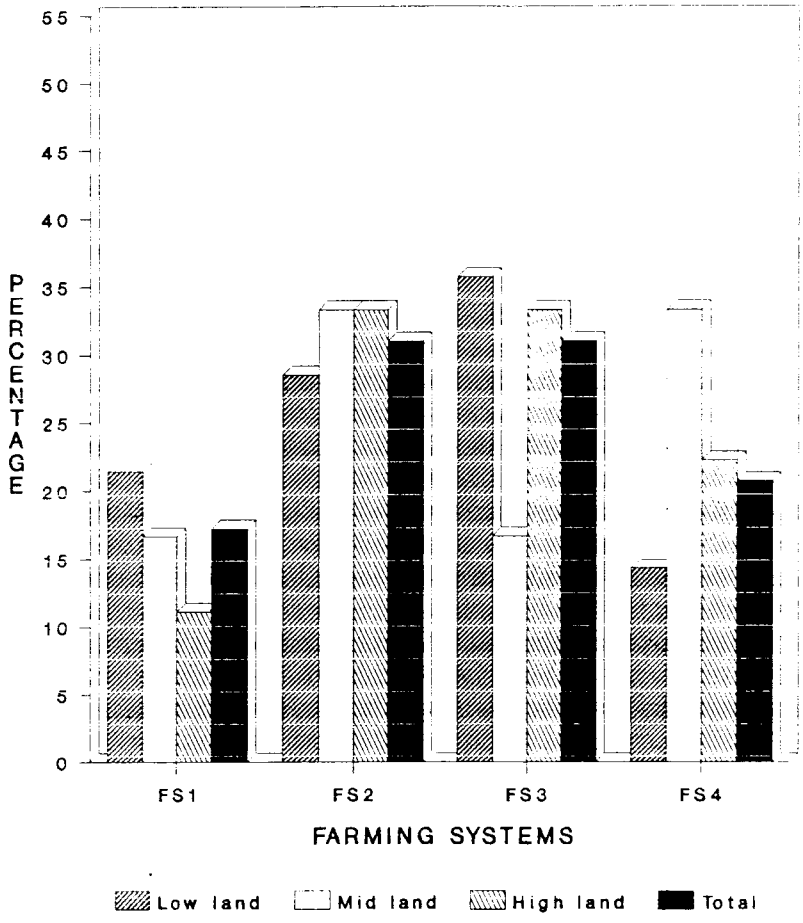
The general tendency of the farmer to rear one or two cows and some birds like poultry, quail and duck in backyard system reflected here also. But fisheries was not seen identified as an income generating

Table 3. Distribution of farming systems adopted in homesteads with crop components and extended garden.

(n=29)

Sl. No.	Farming systems	Low land (n=14)		Mid land (n=6)		High land (n=9)		Total	
		f	%	f	%	f	%	f	%
1.	Coconut, banana and rubber	3	21.43	1	16.67	1	11.11	5	17.24
2.	Coconut, banana and rice	4	28.57	2	33.33	3	33.33	9	31.03
3.	Coconut, banana, MPTS and additional cropland	5	35.71	1	16.67	3	33.33	9	31.03
4.	Coconut, rubber and rice	2	14.29	2	33.33	2	22.23	6	20.69
	Total	14	100	6	100	9	100	29	100

Fig. 6. Distribution of farming systems adopted in homesteads with crop components and extended garden.



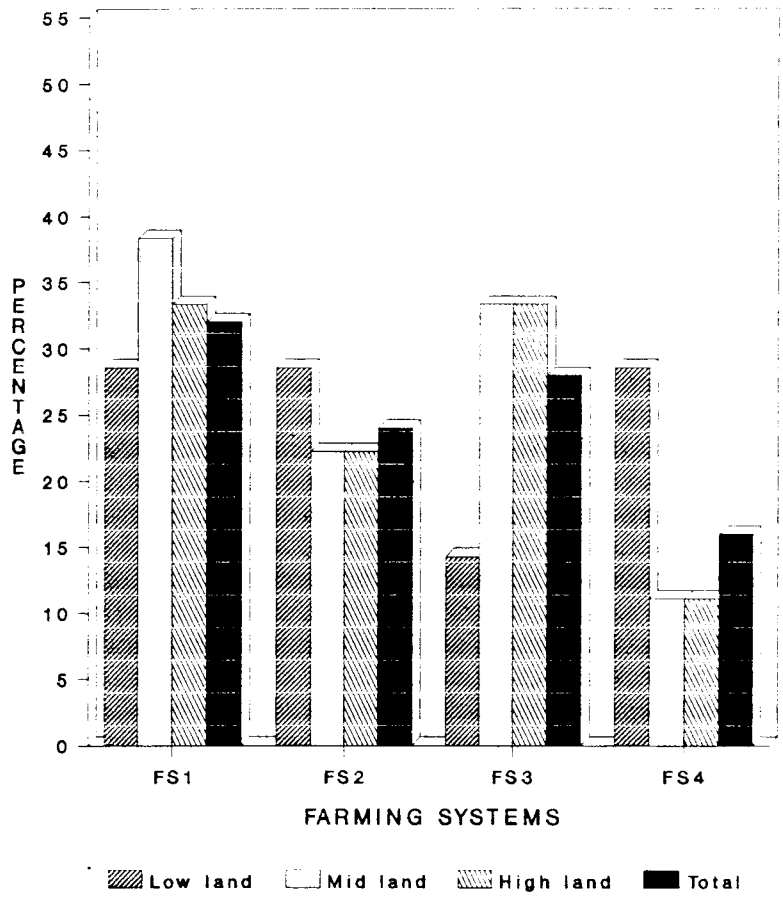
FS1. Coconut, banana and rubber
FS2. Coconut, banana and rice
FS3. Coconut, banana, MPTS and additional crop land
FS4. Coconut, rubber and rice

Table 4. Distribution of farming systems adopted in homesteads with crop components and livestock.

(n = 25)

Sl. No.	Farming systems	Low land (n=7)		Mid land (n=9)		High land (n=9)		Total	
		f	%	f	%	f	%	f	%
1.	Crop components and cattle	2	28.57	3	38.33	3	33.33	8	32.00
2.	Crop components cattle and Goat/ Rabbit	2	28.57	2	22.22	2	22.23	6	24.00
3.	Crop components, Cattle and poultry	1	14.29	3	33.34	3	33.33	7	28.00
4.	Crop components, cattle, fish/ poultry	2	28.57	1	11.11	1	11.11	4	16.00
Total		7	100	9	100	9	100	25	100

Fig. 7. Distribution of farming systems adopted in homesteads with crop components and livestock.



FS1. Crop components and cattle
FS2. Crop components, cattle, goat/rabbit
FS3. Crop components, cattle and poultry
FS4. Crop components, cattle, poultry/fish

vocation which was confined to mainly low lands. Even though a number of ponds and tanks were available, their full potential was not seen exploited.

High degree of organic recycling, improving aesthetic and nutritional aspects of the home and family labour utilization were some of the major advantages of this farming system.

4.1.1.4. Homesteads with crop components, live stock and extended garden

Majority of the homesteads belonged to this category, (47.78 %) out of which 55.00 per cent of the homesteads were in high land, followed by mid land (51.67%). Low land recorded a contribution of only 36.66 per cent (Table 1).

A perusal of Table 5 and Fig. 8 revealed that out of this category 34.88 per cent of the homesteads were adopting the farming system with crop components, livestock, rice and additional crop land, followed by the homesteads with crop components, livestock and rice (30.24%), homesteads with crop components, livestock, rice and rubber (25.58%) and homesteads with crop components, livestock and rubber (9.30 %).

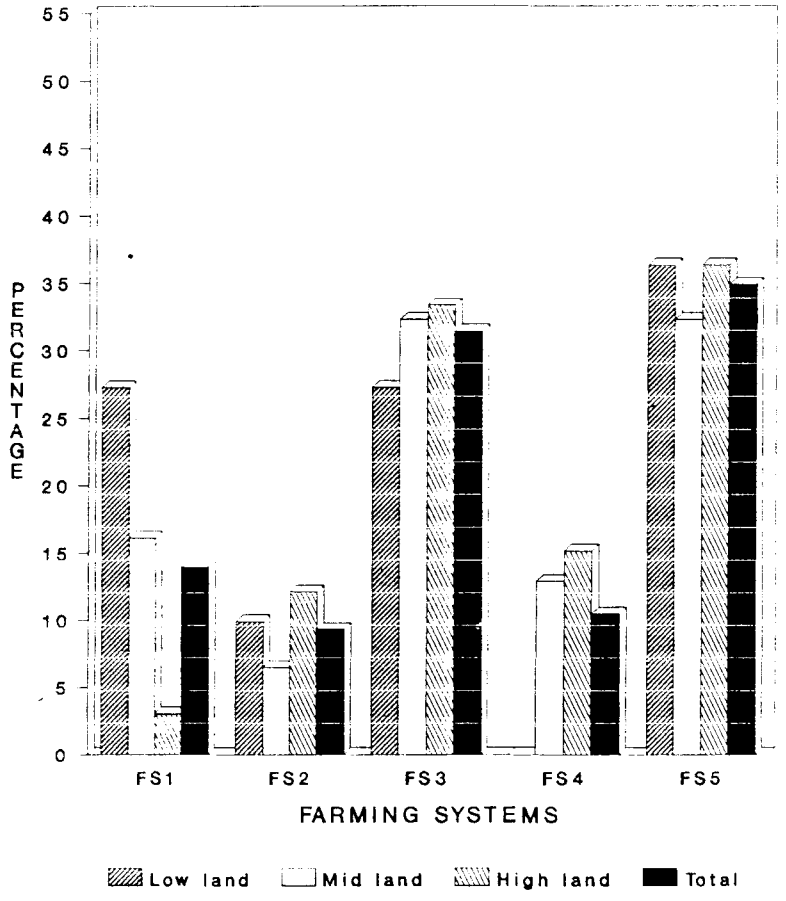
The tendency of farmers to invest money in land as an asset might be the reason for this finding. Moreover Keralites prefer nuclear family system in which single family reside in a house. This character of Kerala people led to fragmentation of holdings at an alarming rate, which is a continuing phenomenon.

Table 5. Distribution of farming systems adopted in homesteads with crop components, livestock and extended garden.

(n = 86)

Sl. No.	Farming systems	Low land (n=22)		Mid land (n= 31)		High land (n =33)		Total	
		f	%	f	%	f	%	f	%
1.	Crop components, livestock and rice	6	27.27	5	16.13	1	3.03	12	13.95
2.	Crop components livestock and rubber	2	9.90	2	6.45	4	12.12	8	9.30
3.	Crop components, poultry and rice	6	27.27	10	32.26	11	33.33	27	31.40
4.	Crop components, livestock, rice and rubber	-	-	4	12.90	5	15.15	9	10.47
5.	Crop components, rice, additional crop land	8	36.36	10	32.26	12	36.37	30	34.88
	Tota	22	100	31	100	33	100	86	100

Fig. 8. Distribution of farming systems adopted in homesteads with crop components, livestock & extended garden



FS1. Crop components, livestock and rice
FS2. Crop components, livestock and rubber
FS3. Crop components, poultry and rice
FS4. Crop components, livestock, rice and rubber
FS5. Crop components, livestock and additional crop land

In low lands the homestead with crop components, livestock and rice and homestead with crop components, livestock, rice and additional land holding occupied major share under this category. However, it is a commendable observation that even in low lands rubber was found to be a major component. In mid land also the same pattern was observed, with a substantial increase in the number of homesteads with crop components, livestock, rice and rubber. Inclusion of rubber in this category might be the reson for this finding. In high land homestead with rice cultivation was decreasing whereas those with rubber showed an increasing trend. Jose (1991) also reported similar findings. This finding indirectly highlighted the alarming rate of conversion of garden land to monocrop rubber which was not a practice .that could be encouraged for it may adversly affect the agro-ecosystem of Kerala State. This results are in agreement with the findings of Jose (1991) and Jose (1992).

4.1.1.5. Homesteads with crop components, livestock, extended garden and agrobased industries

Homesteads with agrobased industries were seen only in 10.00 per cent of the sampled homesteads. The various combinations most prevalent in each region are presented in Table 6 and Fig. 9.

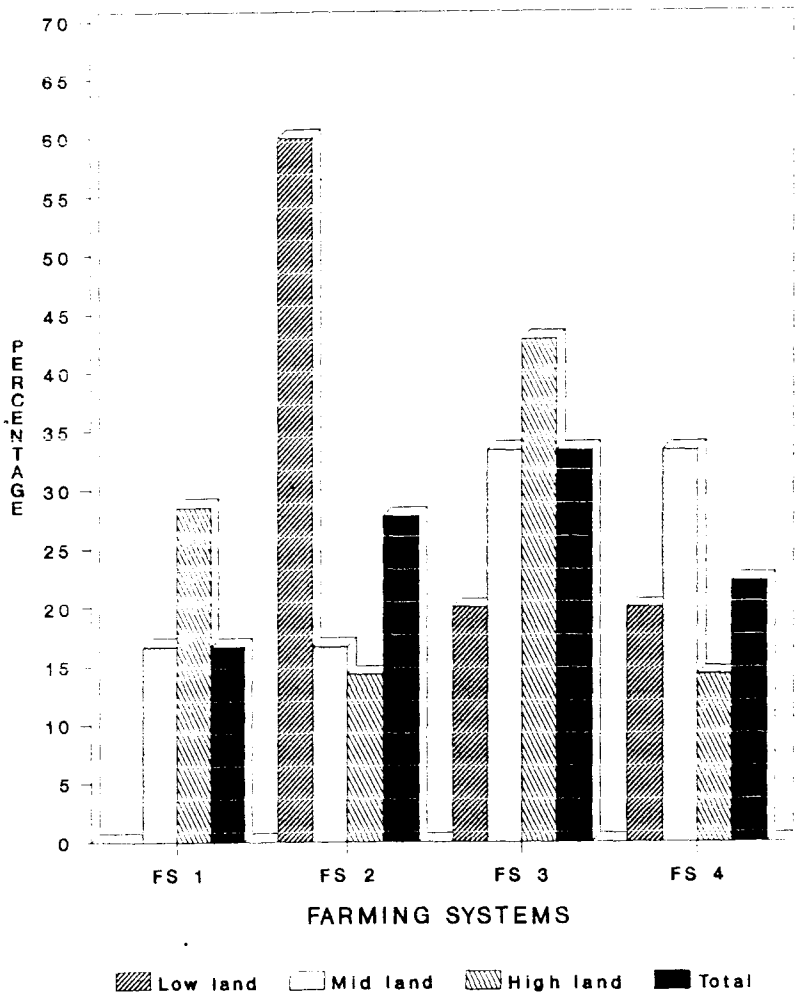
The farming systems adopted were 1) homesteads with crop component and agrobased industries (16.67 %), 2) homesteads with crop components, livestock and agrobased industries (27.78 %), 3) homesteads with crop components, livestock, rubber and agrobased industries (33.33 %) and 4) homesteads with crop components, livestock, rubber, rice and agrobased

Table 6. Distribution of farming systems adopted in homesteads with crop components, extended garden and agrobased industries.

(n = 18)

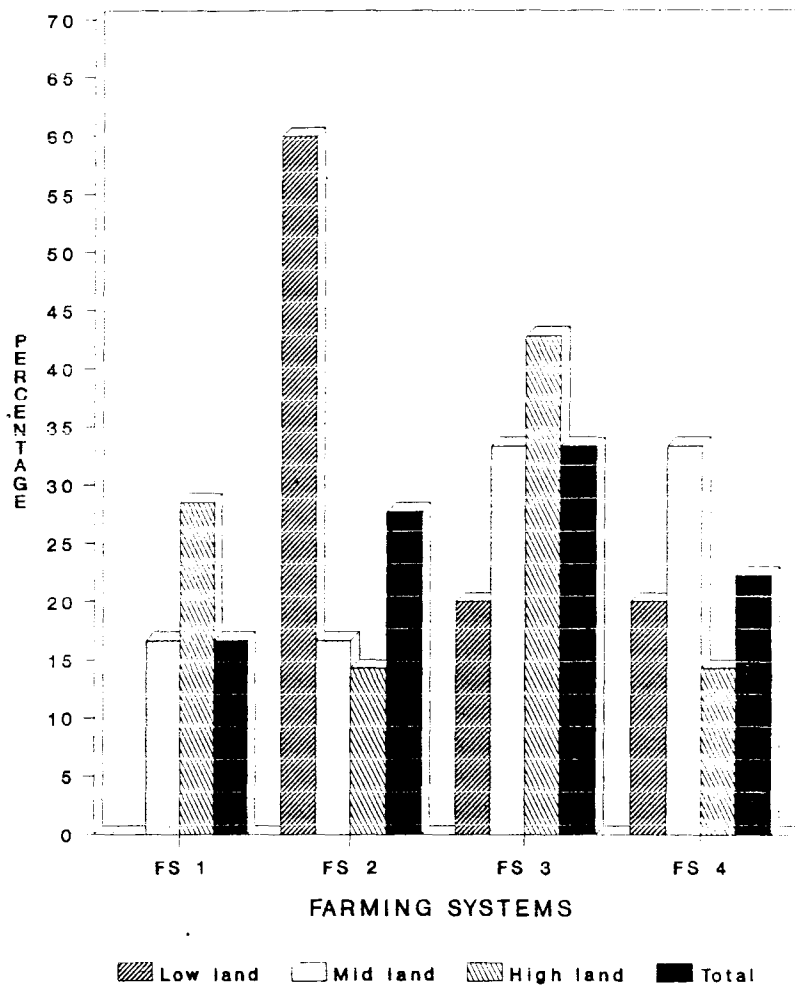
Sl. No.	Farming systems	Low land (n = 5)		Mid land (n = 6)		High land (n = 7)		Total	
		f	%	f	%	f	%	f	%
1.	Homesteads with crop components and agrobased industries	0	0.00	1	16.67	2	28.57	3	16.67
2.	Homesteads with crop components, livestock and agrobased industries.	3	60.00	1	16.67	1	14.29	5	27.78
3.	Homesteads with crop components, livestock, rubber and agrobased industries.	1	20.00	2	33.33	3	42.85	6	33.33
4.	Homesteads with crop components, livestock, rubber, rice and agrobased industries.	1	20.00	2	33.33	1	14.29	4	22.22
	Total	5	100	6	100	7	100	18	100

Fig. 9. Distribution of farming systems adopted in homesteads with crop components, extended garden and agrobased industries



FS 1. Homesteads with crop components & agrobased industries
FS 2. Homesteads with crop components, livestock and agrobased industries
FS 3. Homesteads with crop components, livestock rubber and agrobased industries
FS 4. Homesteads with crop components, livestock rubber, rice and agrobased industries

Fig. 9. Distribution of farming systems adopted in homesteads with crop components, extended garden and agrobased industries



FS 1. Homesteads with crop components & agrobased industries
FS 2. Homesteads with crop components, livestock and agrobased industries
FS 3. Homesteads with crop components, livestock rubber and agrobased industries
FS 4. Homesteads with crop components, livestock rubber, rice and agrobased industries

industries (22.22 %). The Table also revealed that in high lands homesteads with crop components, livestock, rubber and agrobased industries constituted 42.85 per cent but in low lands homesteads with crop components and agrobased industries were lacking. In high lands, the density of population is comparatively low and there by higher holding size, which might be influenced homestead farmers to induct more remunerative vocations and diversify farming activities and hence the observed findings.

It was also a remarkable feature that the distribution of this category was almost uniform over the three regions viz., low land and high land recorded 36.37 per cent where as mid land exhibited 32.26 per cent (Table 6). The next important combination was homesteads with crop components, livestock and rice (30.24%) which was also found distributed among the three regions (high land 21.21% , mid land 32.26% and low land 40.91%). Homesteads with crop components, livestock and rubber combination accounted 9.30 per cent which was found to be a feature of high land (12.12 per cent). This was followed by low land (9.91%) and mid land (6.45 %).

4.1.2.6. Nature and type of cropping systems of Homesteads

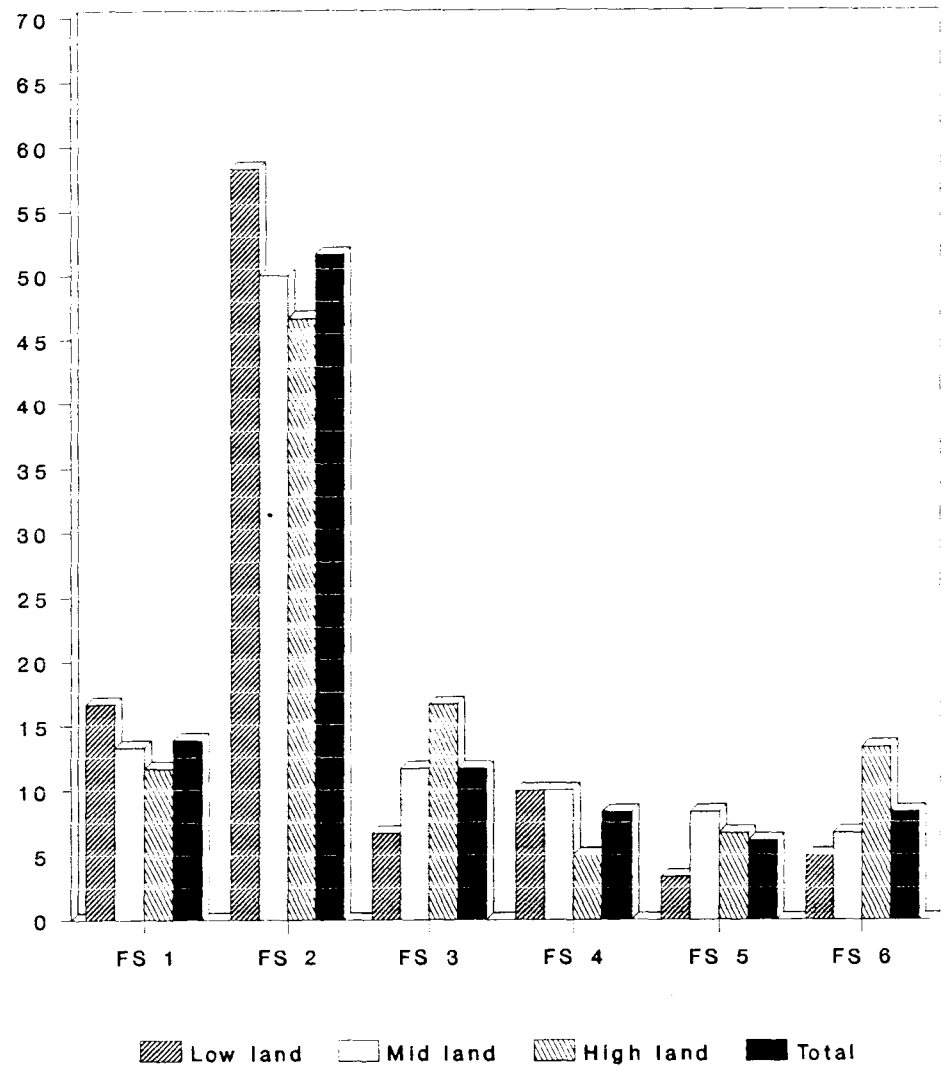
The cropping systems followed by the homestead farmers of central zone were found to be highly diversified with respect to the nature and type of the farming systems, canopy configuration, cropping intensity etc. The major cropping systems that could be identified are presented in Table 7 and Fig. 10.

Table 7. Distribution of the respondents based on the cropping systems adopted in the homesteads.

(n = 180)

Sl. No.	Cropping system	Low land (n=60)		Mid land (n=60)		High land (n=60)		Total	
		f	%	f	%	f	%	f	%
1.	Rice based homesteads	10	16.67	8	13.33	7	11.67	25	13.89
2.	Coconut based homesteads	35	58.33	30	50.00	28	46.67	93	51.67
3.	Pepper based homesteads	4	6.67	7	11.67	10	16.67	21	11.67
4.	Arecanut based homesteads	6	10.00	6	10.00	3	5.00	15	8.33
5.	Cassava based homesteads	2	3.33	5	8.33	4	6.67	11	6.11
6.	Rubber based homesteads	3	5.00	4	6.67	8	13.32	15	8.33
	Total	60	100	60	100	60	100	180	100

Fig. 10. Distribution of the repondents based on the cropping systems adopted in the homesteads.



FS 1. Rice based homesteads
FS 2. Coconut based homesteads
FS 3. Pepper based homesteads
FS 4. Arecanut based homesteads
FS 5. Cassava based homesteads
FS 6. Rubber based homesteads

A perusal of Table 7 and Fig. 10 revealed that majority of the homesteads had coconut based cropping system (51.67 %), which was seen distributed over the zone irrespective of region [low land (58.33%) mid land (50.00%) and high land (46.67%)]. The low intensity of coconut based cropping system in high land may be attributed to the introducion of rubber. The findings of Salam *et al.* (1992a) and Sureshkumar (1994) corroborate this finding.

The next important cropping system that could be identified was rice based cropping system which contributed 13.89 per cent of the homesteads covered under the study. This finding was of utmost importance because the wet land owned by the farmers had a greater level of influence over the activities of the homestead farmer. Rice based cropping system was also a general feature through out the central zone. Rice based cropping system was distributed in low land (16.67 %) and high land (11.67 %). The low coverage of rice based cropping system indicated the increasing trend of conversion of wet land to garden land either for residential purpose or for other more remunerative crops.

It could be derived from Table 7 that about 11.67 per cent of the homestead farmers were adopting pepper based cropping system, which was distributed in the three regions at an ascending order from low to high lands [low land (6.67%) mid land (11.67%) and high land (16.67%)]. In low lands, crop diversity was found to be comparatively lesser than in high lands. In highlands it was observed that all types of MPTS were seen maintained. All types of trees available in the homestead were seen used as standards for training pepper. This

might be the reason for the present finding. This result is in agreement with the finding of Salam *et al.* (1992 b) and Shehana *et al.* (1992).

The next important cropping system was arecanut based cropping system (8.33%). Arecanut based cropping system was distributed in low land and mid land (10.00 % each), where as high land had only 5.00 per cent.

Arecanut cultivation is a common practice of low land and high land because of easy market accessibility. This might be the probable reason for the finding.

Table 7 also revealed that 6.11 per cent of the homesteads were cassava based which was distributed over low land (3.33%), mid land (8.33 %) and high land (6.67 %). This observation indicated that this crop is also giving way to other more remunerative crops like banana, pepper and rubber.

Rubber based homesteads were found to be distributed in low land (5.00%), mid land (6.67%) and high land (13.32%), which accounted to 8.33 per cent of the total sample. This indicated that rubber cultivation also has encroached the small holdings. This observation is in line with the findings of Jose (1992).

4.1.3. Nature and type of cropping patterns adopted in the homesteads

Various cropping patterns followed by the respondents helped them to utilize the available sunshine and backyard of the home for

polycropping with a variety of perennial, annual and seasonal crops of their own choice. Coconut based homesteads, cassava based homesteads and pepper based homesteads were the most popular options. Coconut based farming system dominates in more than 51.00 per cent of the homesteads. Here, coconut was the main crop which was intercropped with perennials including Multi-Purpose Trees and Shrubs (MPTS), annuals and/or seasonals. These created the forest like multistoried canopy structure in many of the homesteads. Jose (1992), Mathew (1993) and Jose and Shanmughasundaram (1993) reported similar findings.

Perennials included coconut which was the main crop. Rubber was also seen cultivated in the backyards of several bigger homesteads in Ernakulam and Palakkad districts. Jose (1991) also reported similar findngs.

Intercrops included perennial crops like mango, jack, guava, tamarind, cocoa, pepper, clove, nutmeg, fodder grass, betelvine and glyricidia on fences. Annuals like tapioca, banana, plantain, yams, other tubers and pineapple were found to be cultivated in dry lands.

Seasonal crops included vegetables, pulses and sweet potato. Crops like papaya,. drumstick, curry leaf, medicinal plants etc. were also seen cultivated in many of the homesteads.

A multi-tier system was in vogue in the zone where crop plus livestock was a general rule. The exact areas covered under each crop in the homesteads were not available. Majority of the homesteads were marginal. Vegetable cultivation was also found to be attempted by them

on the top of re-inforced concrete terraces of buildings, either on loose soil or in pots with good management. In several homesteads goats, birds, rabbits, pigs and fishes were also seen reared successfully. This result was in agreement with the findings reported by KAU (1989 b).

Coconut, banana, pepper, tapioca and vegetables were seen distributed uniformly over the zone. Certain crops were found to be location specific like, nutmeg and betelvine in Angamali and Kaladi blocks, arecanut in Chowannur block, sweet potato in Coyalmannam block, ground nut and sweet potato in Palakkad district and medicinal plants in Pazhayannur,. Angamali and Kothamangalam blocks.

4.1.3.1. Distribution of homesteads based on the cropping patterns adopted in garden land

The distribution of homesteads based on cropping patterns adopted in garden land is presented in Table 8 and Fig. 11. It is evident from the Table that the category of homesteads with coconut, banana, vegetable/yams/ fodder / pulses combination accounted for 28.89 per cent of the total homesteads. This was a general tendancy of Kerala homesteads. 33.33 per cent of the low land constituted of this category. The contribution of the mid land was 28.33 per cent and that of high land was 25.00 per cent.

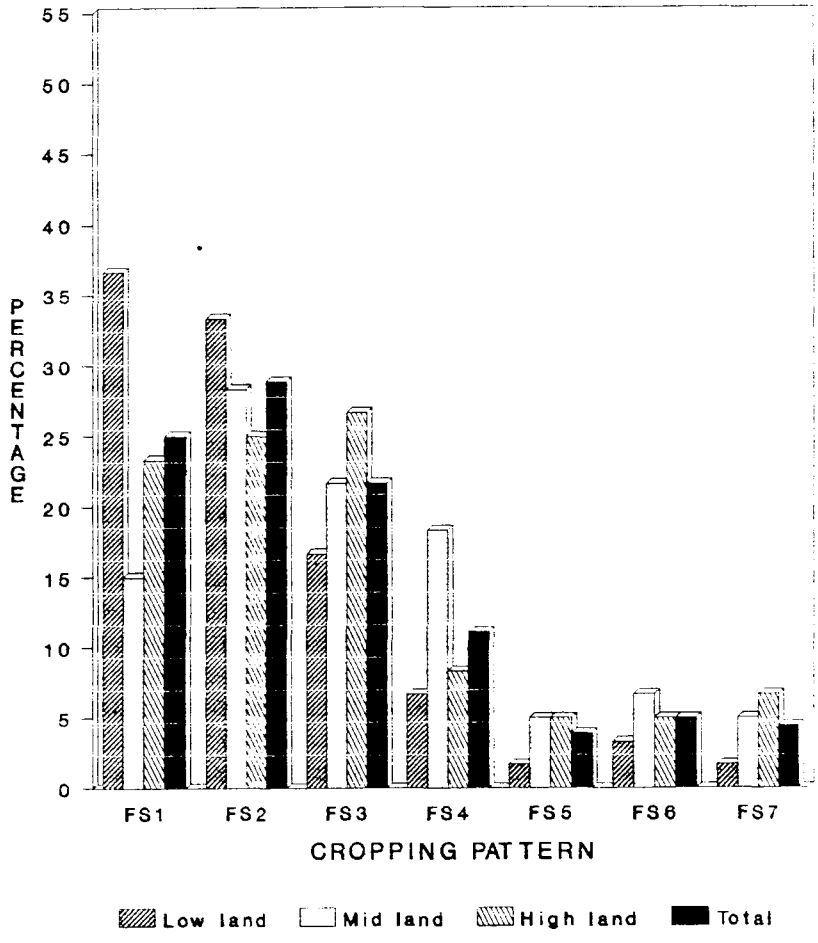
The next important cropping pattern adopted was homesteads with coconut, banana and arecanut (25.00 %). This category was distributed over low land (36.66 %) mid land (15.00%) and high land (23.33 %).

Table 8. Distribution of the homesteads based on the cropping patterns adopted in garden land.

(n = 180)

Sl. No.	Cropping system	Low land (n=60)		Mid land (n=60)		High land (n=60)		Total	
		f	%	f	%	f	%	f	%
1.	Coconut + banana + arecanut	22	36.66	9	15.00	14	23.33	45	25.00
2.	Coconut + banana + vegetable/yams /fodder/pulses	20	33.33	17	28.33	15	25.00	52	28.89
3.	Coconut + pepper + banana	10	16.67	13	21.67	16	26.67	39	21.67
4.	Coconut + banana + tapioca	4	6.67	11	18.33	5	8.33	20	11.11
5.	Coconut + banana + pineapple	1	1.67	3	5.00	3	5.00	7	3.89
6.	Coconut + banana + mulberry	2	3.33	4	6.67	3	5.00	9	5.00
7.	Coconut + banana + rubber	1	1.67	3	5.00	4	6.67	8	4.44
	Total	60	100	60	100	60	100	180	100

Fig. 11. Distribution of the homesteads based on the cropping patterns adopted in garden land.



FS1. Coconut + banana + arecanut
FS2. Coconut + banana + vegetable/yams/fodder/pulses
FS3. Coconut + pepper + banana + tapioca
FS4. Coconut + banana + tapioca
FS5. Coconut + banana + pineapple
FS6. Coconut + banana + mulberry
FS7. Coconut + banana + rubber

The third important category was homesteads with coconut, banana and pepper (21.67 %), which was distributed over low land (16.67 %), mid land (21.67 %) and high land (26.67 %). Under this category, mid land showed a major share. This was due to the inclusion of pepper under this category.

It was a remarkable feature to note that the category with tapioca shared only 11.11 per cent of the total sample. The decline of tapioca which is a major food crop of Kerala State is attributed to the conversion of tapioca to more remunerative crops like coconut, mulberry, pineapple, banana and to certain extent rubber.

In central region, tapioca cultivation was mainly for home consumption. The produce has to be disposed off with in two or three days after harvest. Accessibility to processing centres in central zone was limited. This was the probable reason for this finding.

Mulberry cultivation was also found to emerge as one of the major options in homestead farming system, for its high remunerative nature. This was also in line with the findings reported by Sureshkumar (1994) and Anilkumar (1993).

Inclusion of rubber in homesteads was not found to be a healthy option for the reason that it imposes imbalance of crop diversity which adversly affects the unit level food security and self reliance.

4.1.3.2. Cropping patterns adopted in wet lands

In wet lands, the major cropping patterns adopted were rice-rice-fallow (38.71%), rice-rice-vegetable/pulses/oil seeds (18.55%), rice-rice-rice (14.52%) and rice-fallow-fallow (12.90%). The other major cropping patterns identified are presented in Table 9 and Fig. 12.

The wet land acted as a satellite unit of the homestead in many ways. The presence of livestock component in the homesteads was highly related to the wet land components. The degree of organic recycling was found to be at maximum level in these homesteads. Sureshkumar (1994) was also in the same opinion.

The cropping pattern rice-rice-fallow was more in high land (49.06 %) where the irrigation facilities were inadequate. But in low land this cropping pattern was to the tune of 22.58 per cent. This might be due to the conversion of paddy field to banana, where the contribution of rice-banana (2 year system) was found to be more when compared to the total sample. The cropping pattern of rice-rice-vegetable/ pulses/oil seed was more in low land (9.68 %) as against 18.55 per cent to the total sample. Mid land accounted to 25.00 per cent. The pulses and oil seed cultivation was found to be concentrated in the low land and hence the finding. This result draws agreement with the result reported by KAU (1989 a).

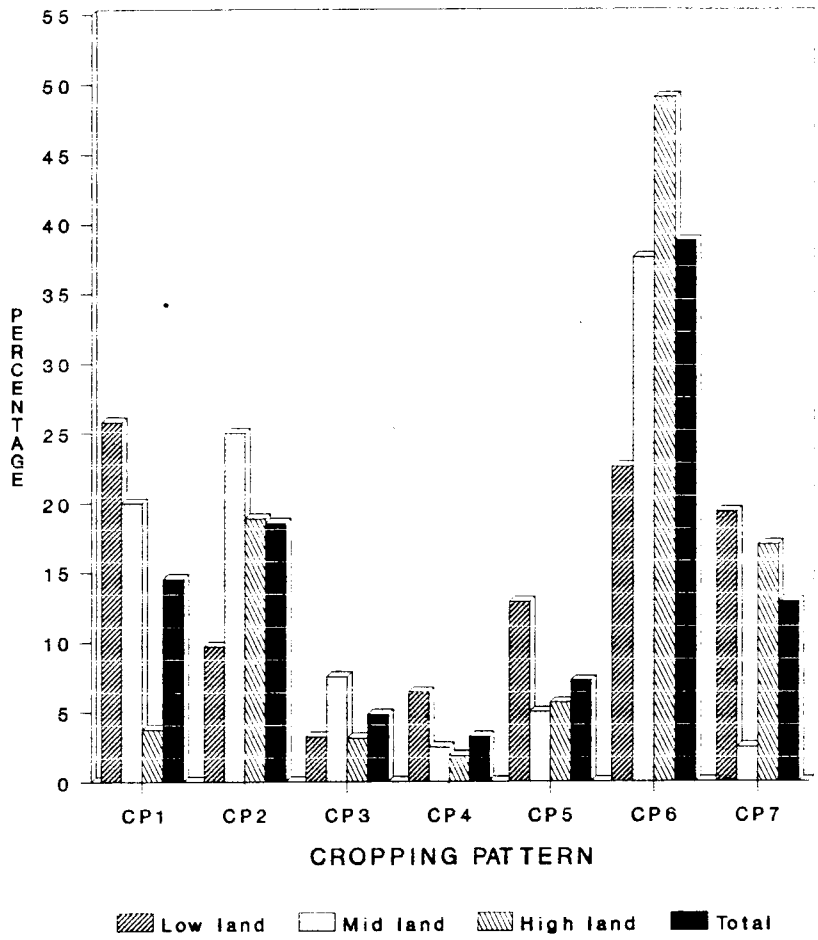
It was an interesting feature to note that rice-rice-green manure pattern was followed in only 4.84 per cent of the homesteads. In low land the distribution was to the tune of 3.23 per cent, mid land

Table 9. Distribution of homesteads based on the cropping patterns adopted in wet lands.

(n = 124)

Sl. No.	Cropping Pattern	Low land (n = 40)		Mid land (n=31)		High land (n=53)		Total	
		f	%	f	%	f	%	f	%
1.	Rice-Rice-Rice	8	25.81	8	20.0	2	3.77	18	14.52
2.	Rice-Rice - Vegetable/Pulses/ Oil seeds	3	9.68	10	25.00	10	18.87	23	18.55
3.	Rice-Rice-Green manure	1	3.23	3	7.50	2	3.77	6	4.84
4.	Rice-Vegetable-Fallow	2	6.45	1	2.50	1	1.89	4	3.23
5.	Rice-Banana (2 years)	4	12.90	2	5.00	3	5.66	9	7.25
6.	Rice-Rice - Fallow	7	22.58	15	37.5	26	49.06	48	38.71
7.	Rice-Fallow-Fallow.	6	19.35	1	2.50	9	16.98	16	12.90
	Total	40	100	31	100	53	100	124	100

Fig. 12. Distribution of the homesteads based on the cropping patterns adopted in wet land.



CP1. Rice-Rice-Rice
CP2. Rice-Rice-Vegetable/Pulses/Oil seeds
CP3. Rice-Rice-Green manure
CP4. Rice-Vegetable-fallow
CP5.Rice-Banana (2 years)
CP6. Rice-Rice-fallow
CP7. Rice-Fallow-Fallow

showed 7.50 per cent and high land 3.77 per cent. In low land the availability of green leaf manure was found to be low whereas in high land it was comparatively high. This might be the probable reason for this finding.

Vegetable cultivation was also found to be meagre in the homesteads. An appropriate strategy to promote vegetable cultivation has to be formulated for homesteads.

Homestead system of cultivation was found to be a major production system of marginal farmers of the central zone.

The concept of homesteads with extended garden concept made the agriculture scenario of Kerala a unique one. Since more than 97 per cent of the operational holdings of the state were of the size below 2 ha, this concept holds good in the case of homestead agriculture of Kerala State.

Coconut was found to be a component in almost all the homesteads in the central zone, which offered ample opportunity for intercropping and other forms of crop combination. A variety of crops were seen managed in the homestead, which gave the homestead a forest like appearance, because of the temporal and spatial arrangement of crops. Nair and Sreedharan (1986) Salam *et al.* (1991 b) Shehana *et al.* (1992) and Sureshkumar (1994) supported this finding.

A multi-storeyed cropping system was in vogue where coconut formed the top layer, arecanut and pepper formed second layer, banana the third layer, vegetable, pulses, pineapple and fodder grass

formed the ground layer. In addition to these, MPTS were also seen maintained in the homesteads. Fernandez *et al.* (1984) and Fernandez and Nair (1986) also reported such homesteads in tropics.

The major coconut varieties cultivated were WCT, D x T and T x D. Banana was also found to be a common intercrop in homesteads which included *Nendran, Poovan and Palayamkodan.* Ccoconut and banana cultivation seemed to be a life style of Kerala farmers, which influenced all the activities including aesthetic, traditional beliefs, customs and norms. This finding was also corroborated the findings of Sureshkumar (1994).

Vegetable cultivation was also found to be popular through out the zone. The major vegetables cultivated were brinjal, bittergourd, cucumbers, amaranthus, chillies, moringa, checurmanis etc. which provided a good source of human nutrition. Sureshkumar (1994) also supported this observation. A variety of tuber crops were also cultivated including amorphophalus, *Dioscorea* species colocasia, lesser yams, cassava etc. In some homesteads ginger turmeric fodder grass and medicinal plants were also seen cultivated which took care of aesthetic, nutritional and health needs of the farm family. Arecanut, pepper and pineapple also contributed a major share in homesteads. MPTS included crops like Jack, mango, breadfruit, mangium, subabool, matti, teak and shrubs like glyricida, acacia and medicinal plants of various uses, which met the multi faceted needs of homestead farmers.

The structural arrangement , canopy configuration and component interaction of homesteads are also similar to other homegardens and this ensured a high degree of resource use efficiency both temporaly and spatially. Salam *et al.*(1991b)also reported similar findings.

Homestead farmers of Ernakulam and southern parts of Thrissur districts, where root(wilt) disease of coconut is prevalent, believed that mixed farming in such gardens enhanced productivity and sustainability. Nelliat and Shambhat (1979) reported similar findings.

Adopting mixed cropping practices in homesteads contributed to the net income to a greater extent. Jose (1992) and Mathew (1993) also reported similar findings.

According to Nelliat and Krishnaji (1976), under rainfed conditions in coconut garden, tuber crops and banana are best suited. Intercropping also reduced the risk of monocropping and increased the total returns. Damodaran (1994) also reported this view.

A good number of homestead farmers were adopting animal husbandry practices. Dairy and poultry were the common practices, where the kitchen waste and crop waste were mainly used as fodder and feed for animals and birds. The farm yard manure and poultry litter were used as manure for crops. In homesteads where irrigation ponds were available fish culture was also practiced, which enhanced the net income and home consumption. The silt deposited in the ponds was also used as a rich manure for crops. Sureshkumar (1994) also reported similar findings.

4.2. Distribution of the respondents based on their socio-cultural and techno-economic factors

A perusal of Table 10 revealed that the majority of the respondents were in the low category with respect to variables namely age, occupation, farm size, irrigation, credit utilization, annual income, scientific orientation, personal guidance for better farming, risk preference and value orientation. Majority of the respondents were in the high category with respect to the variables namely education, labour input, information sources used and economic motivation. In the case of extension participation the respondents were seen distributed uniformly.

A perusal of Table 10 indicated that majority of the respondents were middle aged (72.78 %). This observation could be attributed to the characteristic nuclear family system of Kerala State, which added a number of new households during the last decade. This finding is in agreement with the finding of Shudha (1987), Fonte (1987) and Damodaran (1994).

Similarly, it was observed that 62.22 per cent of the respondents were in the high category with respect to education, which could be attributed to the high literacy rate prevalent in Kerala state.

A close observation of the sample profile presented in Table 10 indicated that the sample was following normal distribution. Further, it could be observed that 63.33 per cent of the respondents were having agriculture as their main occupation. In Kerala, the homestead farming

Table 10. Distribution of the respondents based on their personal, socio-cultural and techno-economic factors.

(n = 180)

Sl.No.	Characteristics	Category	Score	f	%
1.	Age	Young	Below 40 year	27	15.00
		Middle	Between 40-62	131	72.78
		Old	Above 62	22	12.22
2.	Education	Low	Below 3.989	68	37.78
		High	3.989 & above	112	62.22
3.	Occupation	Low	Below 1.594	114	63.33
		High	1.594 & above	66	36.67
4.	Farm size	Low	Below 2.207	112	62.22
		High	2.207 & above	68	37.78
5.	Irrigation index	Low	Below 0.969	97	53.89
		High	Above 0.969	83	46.11
6.	Annual income	Low	Below 0.461	111	61.67
		High	0.461 & above	69	35.33
7.	Credit utilization	Low	Below 19295.16	117	65.00
		High	19295.16 & above	63	35.00
8.	Labour utilization	Low	Below 0.292	87	48.33
		High	0.292 & above	93	51.67
9.	Extension participation	Low	Below 7.617	90	50.00
		High	7.617 & above	90	50.00
10.	Information sources used	Low	Below 17.494	86	47.78
		High	17.494 & above	94	52.22
11.	Economic motivation	Low	Below 4.290	76	42.22
		High	4.290 & above	104	57.78
12.	Scientific orientation	Low	Below 25.684	103	57.22
		High	25.684 & above	77	42.78
13.	Personal guidance for better farming	Low	Below 25.094	106	58.84
		High	25.094 &above	74	41.11
14.	Risk preference	Low	Below 25.928	95	52.78
		High	25.928 & above	85	47.22
15.	Value orientation	Low	Below 3.078	93	51.67
		High	3.078 & above	87	48.33

is generally not considered to be an income generating avenue, rather it is conceived to be a part of human activity of subsistence. More over the higher level of education indirectly influenced the mass to be more enterprising to look for varied challenging vocations. An individual with multiple income generating occupations is assumed to be superior in his entrepreneural behaviour and hence assigned with higher score. This may be the probable reason for the observation of respondents with farming as main occupation in low group. This finding is in conformity with those reported by Jayakrishnan (1984).

It was observed that majority of the respondents were in the low category in the case of farm size (62.22 %), which indicated that the majority of the farms were small ones. This finding confirms to those reported by Nair and Sreedharan (1986), Mathew (1993) and Sureshkumar (1994).

The next important variable which had a majority (57.78%) of the respondents under high category was economic motivation. This showed that homestead farmers had a high degree of willingness to invest their potential resources for adopting scientific practices.

About 52.22 per cent of the respondents were found in the high category in the case of information sources used. Majority of the respondents preferred newspapers, radio broadcasts agricultural seminars and extension personnel to get the relevant information. The listening habit of homestead farmers with regard to radio and television indicated the high degree of information sources used by them.

It could be noted that 51.67 per cent of the respondents were in the high category with respect of labour utilization. This indicated that the farming systems and cropping patterns followed by the homestead farmers were to a extent labour intensive. This observation was in agreement with those reported by Mathew (1993).

However, the respondents were distributed equally in the two categories in the case of extension participation.

It is evident from Table 10 that 53.89 per cent of the farmers belonged to low category with regard to irrigation index. This showed that the majority of the homesteads were not having sufficient irrigation facilities. This observation is in line with the general irrigation status of the state.

It is clear from Table 10 that 50.00 per cent of the respondents were in the low category of credit utilization. This indicated that homestead farmers were not getting adequate financial support for improvement of the activities in the homesteads. In homestead farming situation, the farmers adopt a number of enterprises and a variety of crops in a crop cafeteria pattern, where the individual crops would be at a nominal level. It was not an ideal option to homestead farmers to avail loan for individual crops in such situations.

For the variable annual income most of the homestead farmers (61.67 %) were found in the low category. This may be attributed to the microscopic holdings and the comparatively low returns from the homesteads.

Another important variable, where 57.22 per cent of the respondents were found to be in the low category was scientific orientation. The reason for this situation may be that specific recommendations for homestead farming situation were not available. Similar observation was made by KAU (1989 b). Personal guidance for better farming was another variable, wherein 58.89 per cent of the respondents were found to be in the low category.

The Table 10 also showed that 52.78 per cent of the respondents were in the low category with respect to risk preference. The reason may be that the homestead farmers were less oriented towards risk. Moreover, most of the homesteads were marginal, resulting in subsistence economy. This finding is in agreement with the observation of Binswanger *et al.* (1979) and Damodaran (1994).

Value orientation is another variable where in 51.67 per cent of the respondents fell in the low category. This indicated that majority of the farmers were traditionally oriented.

The findings of the study in general corroborate what has been discussed as the profile of Indian farmers typified by thier subsistence farming. They are also reflective of the representative nature of the homestead farmers in Kerala.

4.3. Evaluative perception of homestead farmers in relation to appropriateness of farming systems and cropping patterns

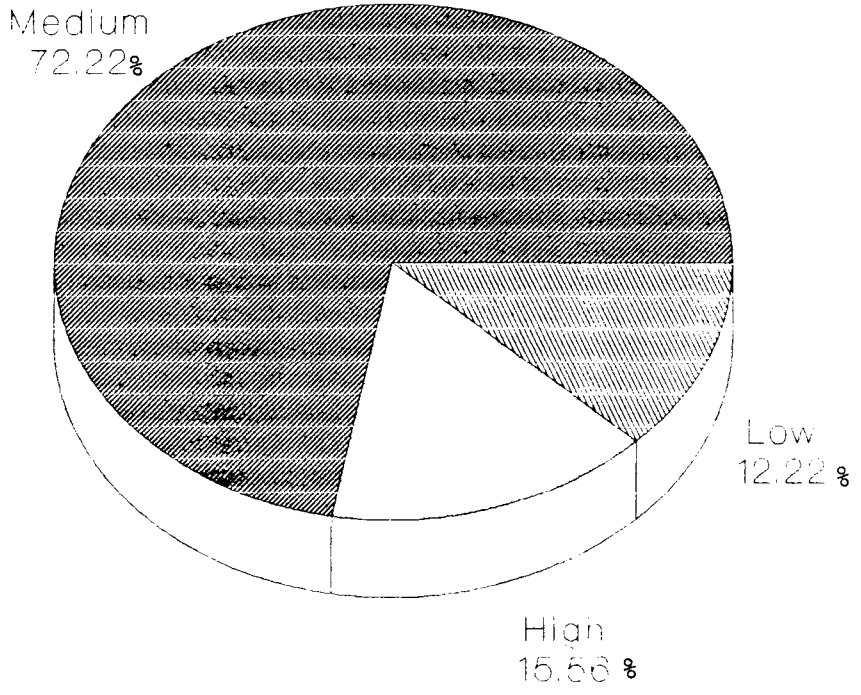
The distribution of the homestead farmers based on their evaluative perception in relation to appropriateness of farming systems and cropping patterns adopted, is furnished in Table 11 and Fig. 13.

Table 11. Distribution of the respondents based on the evaluative perception of appropriateness of farming systems and cropping patterns.

(n = 180)

Sl. No.	Category	Class limits	Frequency	Percentage
1	Low (Below X-1SD	< 65.24	22	12.22
2	Medium (Between X± 1SD	65.24 - 101.32	130	72.22
3	High (Above X - 1SD)	> 101.32	28	15.56

Fig. 13. Distribution of the respondents based on the evaluative perception of appropriateness of farming systems and cropping patterns



A perusal of the Table 11 showed that the majority (72.22 %) of the respondents were in the medium category in terms of evaluative perception. This indicated that the farming systems and cropping patterns followed by them has been perceived effectively in all the dimensions. Majority of the respondents were having high level of education. They were also in high group in the case of information sources used and extension participation. Perception is the organisation of sensory inputs into meaningful experiences. As pointed out by Segall *et al.* (1966) perception is subject to many influences. In particular each individual's experiences combine in a complex fashion to determine his perception about a stimulus object. Hence the rich experience and worldly exposure through extension participation and inherent knowledge derived from generation to generation might be the reason for better level of evaluative perception of the respondent.

It could be seen that only a small percentage (12.22%) of respondents were under the low category. It was interesting to note the about 15.56 per cent of respondents were in the high category. The result in general indicated that only a very small portion of the homestead farmers had poor perception about the appropriateness of farming systems and cropping patterns. A number of reasons could be attributed to the relatively better perception of homestead farmers about the appropriateness of farming systems and cropping patterns. An important on among these reasons could be the sustainability of the homesteads over generations as experienced by the farmers themselves. Besides, the Kerala farmers possessing a relatively higher level of

education and worldly exposure would have had no difficulty in correctly evaluating their farming systems and cropping patterns as better when compared to other mono enterprise/ crop systems prevalent in the other parts of the country.

4.4. Level of knowledge of the respondents based on scientific practices

The distribution of the respondents based on their level of knowledge on scientific practices is presented in Table 12 and Fig. 14.

It is evident from the Table 12 and Fig. 13 that majority of the respondents (61.67 per cent) had medium level of knowledge and 16.66 per cent of the respondents had high level of knowledge. Only 21.67 per cent of the respondents constituted the low category.

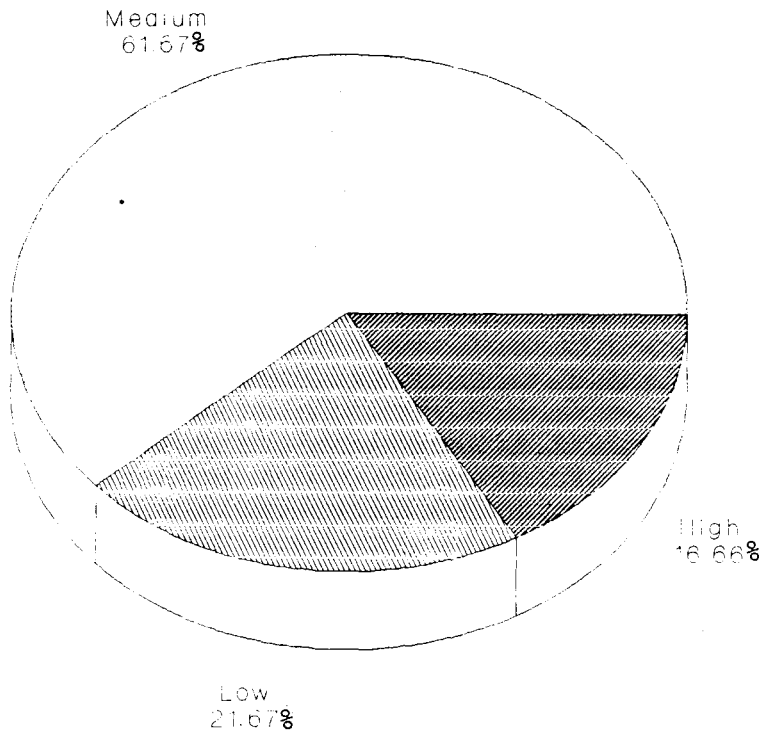
This indicated that the majority of the homestead farmers had internalised the intricacies of scientific management practices. This finding could be attributed to the education status of the respondents. Yet another plausible reason could be that the homesteads being predominated with perennial crops, the farmers took every efforts to acquire scientific information on their cultivation aspects so as to avoid risk. The findings of this study are in line with those reported by Manivannan (1980), Arumugom (1983), Jayakrishnan (1984), Krishnamoorthy (1984), Chenniappan (1987), Bonny (1991) and Damodaran (1994).

Table 12. Distribution of the respondents based on their level of knowledge on scientific practices.

(n = 180)

Sl. No.	Category	Class limits	Frequency	Percentage
1	Low (Below X-1SD	< 19.15	39	21.67
2	Medium (Between X± 1SD	19.15 - 29.60	111	61.67
3	High (Above X - 1SD)	> 29.60	30	16.66

Fig. 14. Distribution of the respondents based on their level of knowledge on scientific practices



4.5. Extent of adoption of scientific practices by the respodents

The Table 13 and Fig. 15 depict the distribution of homestead farmers based on the extent of adoption of selected scientific practices in homesteads.

A perusal of Table 13 showed that a good majority of the homestead farmers fell under medium category (69.44 %) and high category (15.00 %). Only 15.56 per cent of the respondents were seen under the low category. Though the homesteads were not scientifically planned and market oriented, with regard to cultivation of remunertive crops like coconut, banana and rubber, farmers to a good extent, adopted scientiic practices. Homestead farming system is one where organic recycling is the principle, except for more remunerative crops. A well defined cropping pattern was not available . Hence, scientific practices as such was not a relevant option for homestead farmers. Butler (1992) was also in the same opinion.

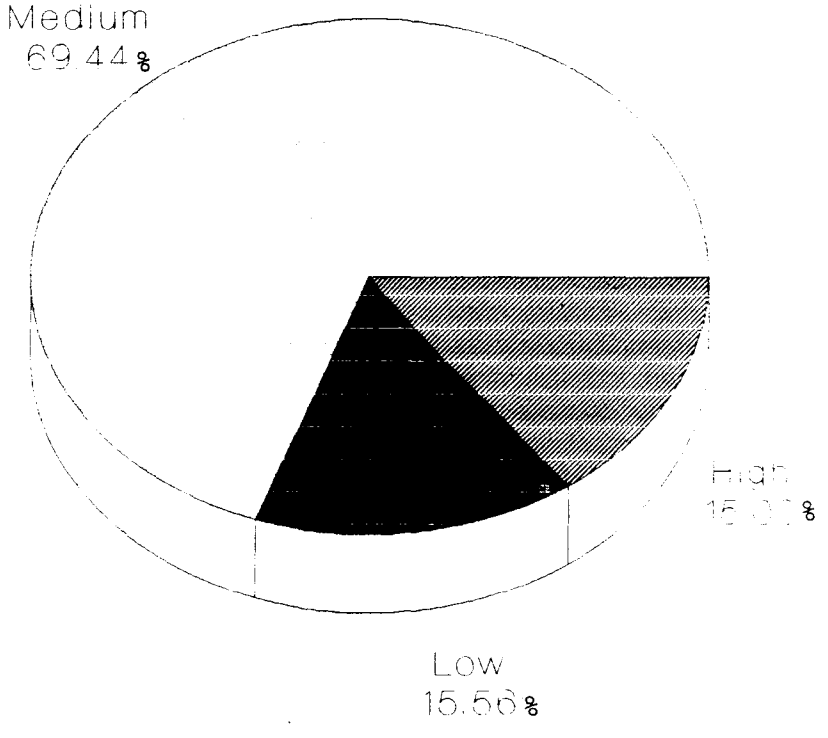
These results are a reiteration of the pattern of distribution observed in the case of knowledge on scientific practices. The reasons cited earlier while discussing the results on level of knowledge could be relevant in this case also. These findings are also in line with those reported by Aziz (1980), Krishnamoorthy (1984), Jayakrishnan (1984), Godhandapani (1985), Chenniappan (1987), Rathinasabapathi (1987) and Bonny (1991).

Table 13. Distribution of the respondents based on the extent of adoption of scientific practices in homesteads.

(n = 180)

Sl. No.	Category	Class limits	Frequency	Percentage
1	Low (Below X-1SD	< 21.56	28	15.56
2	Medium (Between X± 1SD	21.56 to 35.16	125	69.44
3	High (Above X - 1SD)	> 35.16	27	15.00

Fig. 15. Distribution of the respondents based on the extent of adoption of scientific practices in homesteads.



4.6. Relationship between evaluative perception of the respondents and their personal, socio-cultural and techno-economic factors

The results obtained from the simple correlation analysis, multiple regression analysis and step up regression analysis were taken into consideration for analysing the relationship between evaluative perception of the respondents and their personal, socio-cultural and techno-economic factors.

4.6.1. Correlation analysis

The results of correlation analysis in this regard are given in Table 14 and Fig. 16 and 17.

The correlation analysis revealed that out of the 15 independent variables, five variables namely education, extension participation, information sources used, economic motivation and value orientation were positively and significantly related with the dependent variable evaluative perception at 1 per cent level of significance. The rest of the independent variables were not significantly correlated with evaluative perception.

4.6.2 Multiple regression analysis

The results of multiple regression analysis of the evaluative perception of homestead farmers are presented in Table 15.

A high R^2 value of 0.70499 with significant F value (26.12736) indicated that more than 70 per cent of the variation in the evaluative

Table 14. Correlation between the evaluative perception of the respondents and their personal, socio-cultural and techno-economic factors.

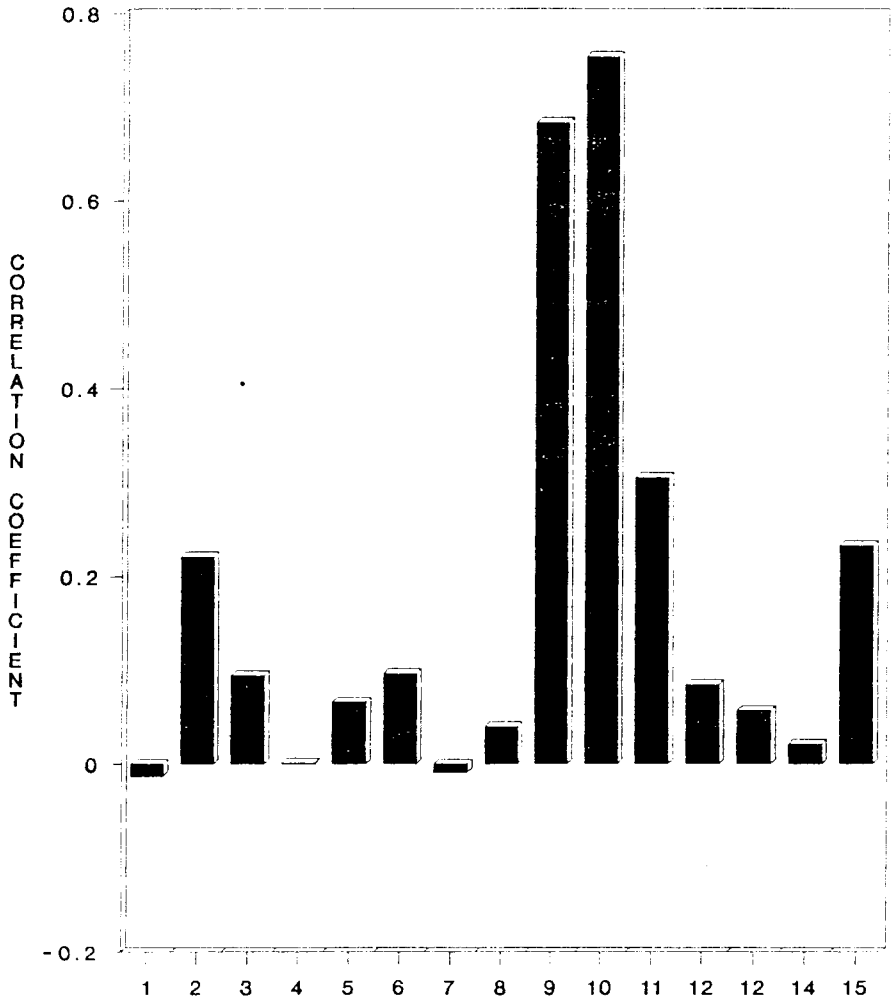
(n =180)

Sl. No.	Personal, socio-cultural and techno-economic factors	Correlation Coefficient (r)
1.	Age	-.013 NS
2.	Education	.221 **
3.	Occupation	.095 NS
4.	Farm size	.001 NS
5.	Irrigation index	.066 NS
6.	Annual income	.097 NS
7.	Credit utilization	-.009 NS
8.	Labour utilization	.040 NS
9.	Extension participation	.683 **
10.	Information sources used	.754 **
11.	Economic motivation	.305 **
12.	Scientific orientation	.085 NS
13.	Personal guidance for better farming	.057 NS
14.	Risk preference	.021 NS
15.	Value orientation	.233 **

** Significant at 1 per cent level

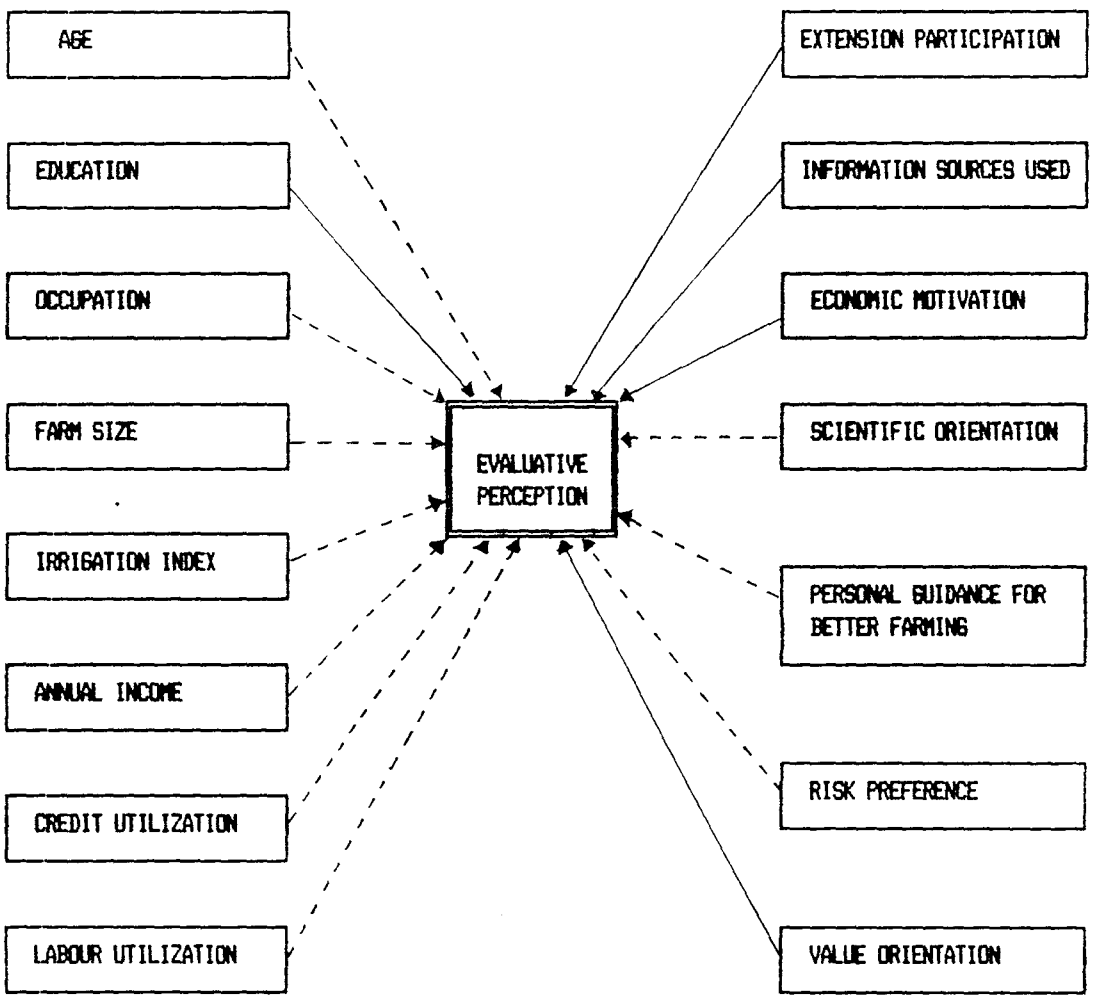
NS Not significant

Fig. 16. Correlation between evaluative perception of the respondents and their personal, socio-cultural and techno-economic factors.



1. Age 2. Education 3. Occupation 4. Farm size 5. Irrigation index 6. Annual income 7. Credit utilization 8. Labour utilization 9. Extension participation 10. Information sources used 11. Economic motivation 12. Scientific orientation 13. Personal guidance for better farming 14. Risk preference 15. Value orientation

Fig. 17. Empirical diagram showing relationship between evaluative perception and independent variables



_____ Significant at 1 per cent level

_ _ _ _ Not significant

perception of homestead farmers could be explained by the selected personal, socio-cultural, and techno-economic factors taken together.

Table 15 revealed that out of the 15 variables selected only three were significantly contributing to the variation of evaluative perception. They were information sources used (0.012045), extension participation (0.021105) and economic motivation (0.019410).

These results indicated that unit increase in information sources used could result in an increase of 0.012045 unit of evaluative perception of homestead farmers, *Ceteris paribus*. Similarly, the results for the other variables viz. extension participation and economic motivation could be be interpreted. However, farm size showed a negative and significant relationship with evaluative perception of homestead farmers.

The estimated regression coefficient for one variable may vary substantially depending on whether the other independent variables were included in the regression equation or not. Hence, step up regression analysis was employed.

4.6.3 Step up regression analysis

Step up regression analysis was employed to select the best regression equation and there by to identify the best set of variables for predicting the dependent variable. The results of step up regression analysis between evaluative perception of homestead farmers and their personal, socio-cultural and techno-economic factors are given in Table 16.

Table 15. Results of multiple linear regression analysis of evaluative perception of the respondents and their personal, socio-cultural and techno-economic factors.

(n = 180)

Sl. No.	Independent Variable	Partial regression Coefficient 'b'	Standard error of 'b'	't' Value	
1.	Age	.000472	.000549	0.859	NS
2.	Education	-.000076	.005057	-.015	NS
3.	Occupation	.002581	.007781	.332	NS
4.	Farm size	.006369	.004468	-.1426	*
5.	Irrigation index	.005882	.006108	.963	NS
6.	Annual income	.000001	.000004	.255	NS
7.	Credit utilization	-.005287	.012602	-.419	NS
8.	Labour utilization	.016470	.028710	.574	NS
9.	Extension participation	.021105	.003055	6.908	**
10.	Information sources used	.012045	.001331	9.052	**
11.	Economic motivation	.019410	.005902	3.289	**
12.	Scientific orientation	.002581	.007781	1.916	NS
13.	Personal guidance for better farming	.000512	.000992	.517	NS
14.	Risk preference	.000086	.000945	-.092	NS
15.	Value orientation	.004282	.006825	.627	NS

R^2 = 0.70499 **
F = 26.12736 **

** Significant at 1 per cent level
* Significant at 5 per cent level
NS Not significant

Table 16. Results of step up regression analysis of evaluative perception of the respondents with their personal, socio-cultural and techno-economic factors.

(n=180)

Variable No.	Independent variable	Partial regression coefficient 'b'	Standard error of 'b'	't' Value
9.	Extension Participation	.021288	.002925	10.267 **
10.	Information sources used	.012274	.001196	7.279 **
11.	Economic motivation	.017694	.005516	3.208 **
12.	Scientific orientation	.002115	.001030	2.053 *

R^2 = 0.69589
F = 100.11007 **

** Significant at 1 % level
* Significant at 5 % level

Step up regression analysis was carried out in four steps. The predictive power increased with the inclusion of each variable in the successive steps, till the percentage variation did not increase significantly. The step IV gave the highest per cent variation in this analysis.

It could be found out that out of the total variation of 70.49 per cent explained by all the 15 variables together, 69.58 per cent of variation could be explained by four variables namely, information sources used, extension participation, economic motivation and scientific orientation. Thus these four variables became important in predicting the evaluative perception of homestead farmers.

The above results showed that these four independent variables were capable of explaining the variation of evaluative perception of homestead farmers.

Education was found to be positively and significantly correlated with evaluative perception of homestead farmers. Perception is a more complex process by which people select, organise and interpret sensory stimulus into meaningful and coherent picture of the world (Berelson and Steiner, 1964). Higher the level of education better would be the degree of evaluative perception.This finding was in conformity with that reported by Muthukrishnan (1982), Sundaram (1986), Balan (1987) and Latha (1990).

But in the multiple linear regression analysis and subsequent step up regression analysis this variable was not found to be an important one.

Extension participation was another variable which was positively and significantly related with evaluative perception. The extension activities conducted by various agencies and the strong extension net work established at *Krishi Bhavans* and *Karshaka samithees* formed by Command Area Development Authority (CADA) must have created a favourable atmosphere for the farmers for a better extension participation. This might be the reason for the present finding. This finding corroborates with that reported by Sivakumar (1983), Balan (1987) and Sudha (1987).

Information sources used was also found to be positively and significantly related with evaluative perception. This finding reinforced the theory of selective perception put forth by Patton and Giffin (1974) according to which " We see what we want to see and hear what we want to hear". Here the individual who gathers more information breaks the barrier of selective perception because of his expanded mental horizon. Hence the finding. This finding is in line with the findings of Balan (1987).

Economic motivation was the next variable which was positively and significantly associated with evaluative perception. Selection of an enterprise in a homestead was generally to maximise profit. This finding draws attention to the theory of need hierarchy put forth by various authors, which emphasised the security need of the individual. In this case, the financial security was the out look of the farmer which leads them to critically evaluate the income generating enterprises and hence the finding.

A close perusal of Table 15 showed that scientific orientation had come up as an important variable in explaining the variation of evaluative perception of homestead farmers. Evaluative perception is a type of critical appraisal and rational thinking. A person with good educational backgrond will have better scientific out look and thereby he will be able to judge scientifically the surroundings. This might be the probable reason for the present finding.

4.7. Relationship between the level of knowledge of the repondents and their personal, socio-cultural and techno-economic factors

The results of simple correlation analysis, multiple regression analysis and step up regression analysis were taken into consideration for analysing the influence of personal, socio-cultural and techno-economic characteristics of the respondents and their factors on level of knowledge on scientific practices.

4.7.1. Correlation analysis

The results of simple correlation analysis are presented in Table 17, Fig. 18 and 19.

Correlation analysis revealed that out of 15 independent variables, only four variables namely education, extension participation, information sources used and value orientation were positively and significantly related with the dependent variable, viz., level of knowledge of homestead farmers. Many of the scientific practices were a non-viable proposition in homestead farming situation, because majority of the farmers were marginal holders.A number of variety of crops

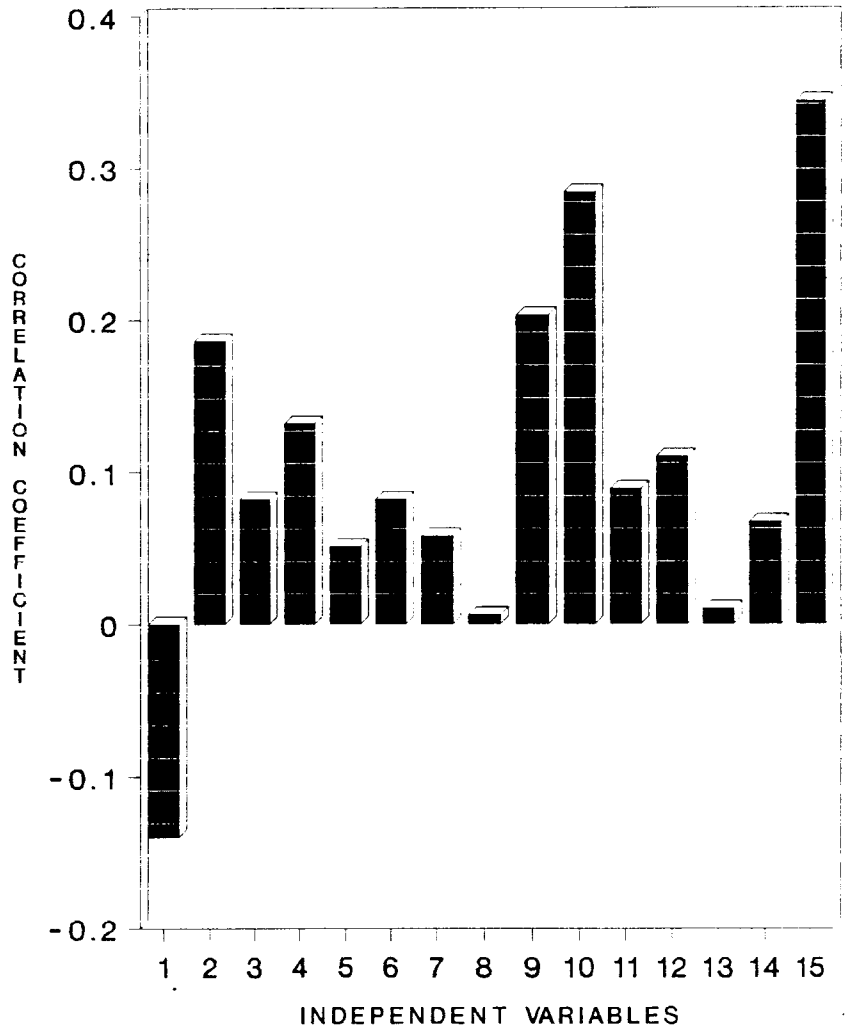
Table 17. Correlation between level of knowledge of scientific practices of the respondents and their personal, socio-cultural & techno-economic factors.

(n = 180)

Sl. No.	Independent variables	Correlation Coefficient 'r'	
1.	Age	-.140	NS
2.	Education	.186	*
3.	Occupation	.082	NS
4.	Farm size	.132	NS
5.	Irrigation index	.051	NS
6.	Annual Income	.082	NS
7.	Credit utilization	.058	NS
8.	Labour utilization	.006	NS
9.	Extension participation	.203	**
10.	Information sources used	.284	**
11.	Economic motivation	.089	NS
12.	Scientific orientation	.110	NS
13.	Personal guidance for better farming	.010	NS
14.	Risk preference	.067	NS
15.	Value orientation	.344	**

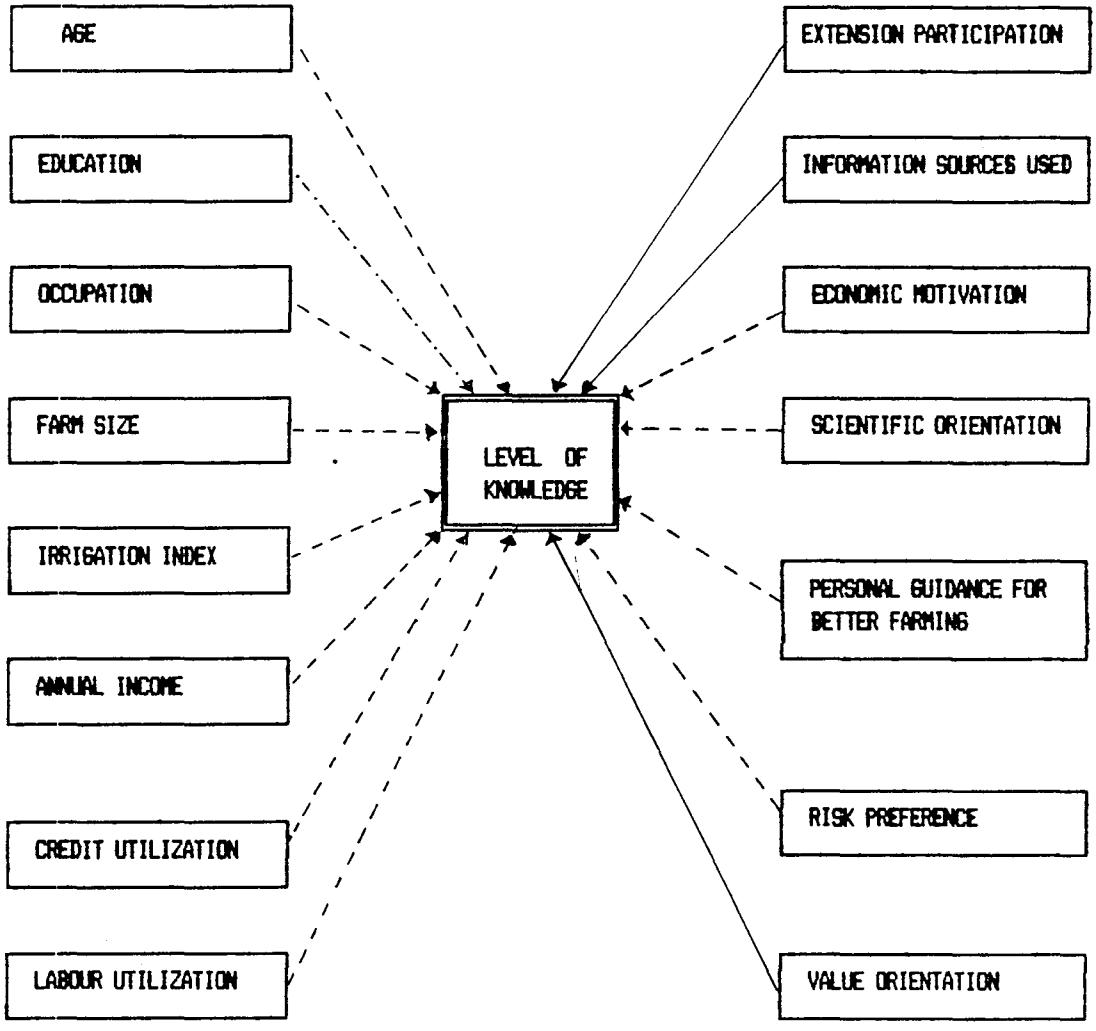
** Significant at 1 per cent level
* Significant at 5 per cent level
NS Not significant

Fig. 18. Correlation between level of knowledge of scientific practices of the respondents and their personal, socio-cultural and techno-economic factors



1. Age 2. Education 3. Occupation 4. Farm size 5. Irrigation index 6. Annual income 7. Credit utilization 8. Labour utilization 9. Extension participation 10. Information sources used 11. Economic motivation 12. Scientific orientation 13. Personal guidance for better farming 14. Risk preference 15. Value orientation

Fig. 19. Empirical diagram showing relationship between level of knowledge and independent variables



_____ Significant at 1 per cent level

_._._._ Significant at 5 per cent level

_ _ _ _ _ Not significant

were cultivated in homesteads and hence a very few number of the very species were growing in a crop cafeteria pattern. In addition to this situation there was no comprehensive recommendation available for homestead situation (KAU, 1989 b). Under this circumstances farmers resorted to certain options which might be cost effective, indigenous, result oriented and easy to do. This may be the probable reason for this finding.

4.7.2. Multiple regression analysis

The results of multiple regression analysis between knowledge of scientific practices of homestead farmers and their personal, socio-cultural and techno-economic factors are presented in Table 18.

The R^2 value of 0.21140 with significant 'F' value (2.93093) indicated that only 21.14 per cent of the variation in the level of knowledge of homestead farmers could be explained by the selected personal, socio-cultural and techno-economic factors taken together.

The Table 18 revealed that out of 15 variables only one variable namely value orientation (0.045105) was found to be positively and significantly related to the level of knowledge of homestead farmers.

Value orientation included progressiveness and venture-someness of which a unit increase could result in an increase of 0.045105 units of knowledge of homestead farmers, *Ceteris paribus*.

Table 18. Results of multiple linear regression analysis of level of knowledge of the respondents and their personal socio-cultural and techno-economic factors

(n = 180)

Variable No.	Independent variable	Partial regression co-efficient 'b'	Standard error of 'b'	't' Value	
1.	Age	-.000956	.001005	-.952	NS
2.	Education	.006065	.009239	.656	NS
3.	Occupation	.024583	.012467	-1.729	NS
4.	Farm size	0.101370	.008161	1.271	NS
5.	Irrigation index	-.010374	.011157	-.930	NS
6.	Annual income	.000000	.000008	-.074	NS
7.	Credit utilization	-.000627	.023025	-.027	NS
8.	Labour utilisation	.015252	0.52447	.291	NS
9.	Extension participation	.005435	.005581	.974	NS
10.	Information sources used	.004608	.002431	1.896	NS
11.	Economic motivation	-.007718	.010782	-.716	NS
12.	Scientific orientation	.003061	.002062	1.484	NS
13.	Personal guidance for better farming	-.001298	.001812	-.716	NS
14.	Risk preference	.000933	.001727	.541	NS
15.	Value orientation	.045105	.012467	3.618	**

R^2 = 0.21140
F = 2.93093 **

** Significant at 1 % level
* Significant at 5 % level

4.7.3. Step up regression analysis

The results of step up regression analysis between knowledge on scientific practices of homestead farmers and their personal, socio-cultural, techno-economic factors are given in Table 19.

In this case, step up regression analysis was carried out in two steps. It could be seen that out of the total variation of 21.14 per cent explained by all the 15 variables together 15.76 per cent variation could be explained by the two variables namely value orientation and information sources used.

The positive and significant association of education with the knowledge level of homestead farmers indicated that farmers with high level of education were in a better position to gather more information about scientific agricultural practices.High level of education helped them to use print media for acquiring more knowledge.This result draws support of finding reported by Jayakrishnan (1984), Krishnamoorthy (1984), Chenniappan (1987) and Krishnamoorthy (1988) .

Extension participation had positive and significant association with the level of knowledge of homestead farmers. Extension participation included seminars, group meeting, demonstrations, campaigns etc.which influenced the knowledge level of homestead farmers. Extension participation helped the respondents to reinforce the knowledge acquired and hence the finding. Senthil (1983), Gothandapani (1985), Jayaraman (1988), Chenniappan (1987) and Syamala (1988) also reported similar results.

Table 19. Results of step up regression analysis of knowledge level of the respondents and their personal, socio-cultural and techno-economic factors.

Variable No.	Independent variable	Partial regression coeffi-cient 'b'	Standard error of 'b'	't' value
10.	Information source used	.005409	.001889	2.864 **
11.	Value orientation	.047494	.011828	4.016 **

R^2 = 0.15766

F = 16.56463 **

** Significant at 1 per cent level

Information sources included mass media like television, radio, print media etc. and interpersonal sources like extension personnel, university, input agencies, neighbours etc. It is quite rational to think that use of these information sources improved knowledge level of homestead farmers.

Value orientation included progressivism and venture-someness. Value orientation was positively and significantly related to the level of knowledge of farmers. Progressive and venturesome farmers always tries to acquire more knowledge of scientific practices. Vijayakumar (1983), Jayaraman (1988) and Krishnankutty (1988) reported similar results.

4.8. Relationship between the extent of adoption of scientific practices by the respondents and their personal, socio-cultural and techno-economic factors

The results of simple correlation analysis, multiple regression analysis and step up regression analysis were taken into consideration for analysing the influence of personal, socio-cultural and techno-economic factors on the extent of adoption of scientific practices by the homestead farmers.

4.8.1 Correlation analysis

The results of correlation analysis are presented in Table 20, Fig. 20 and 21.

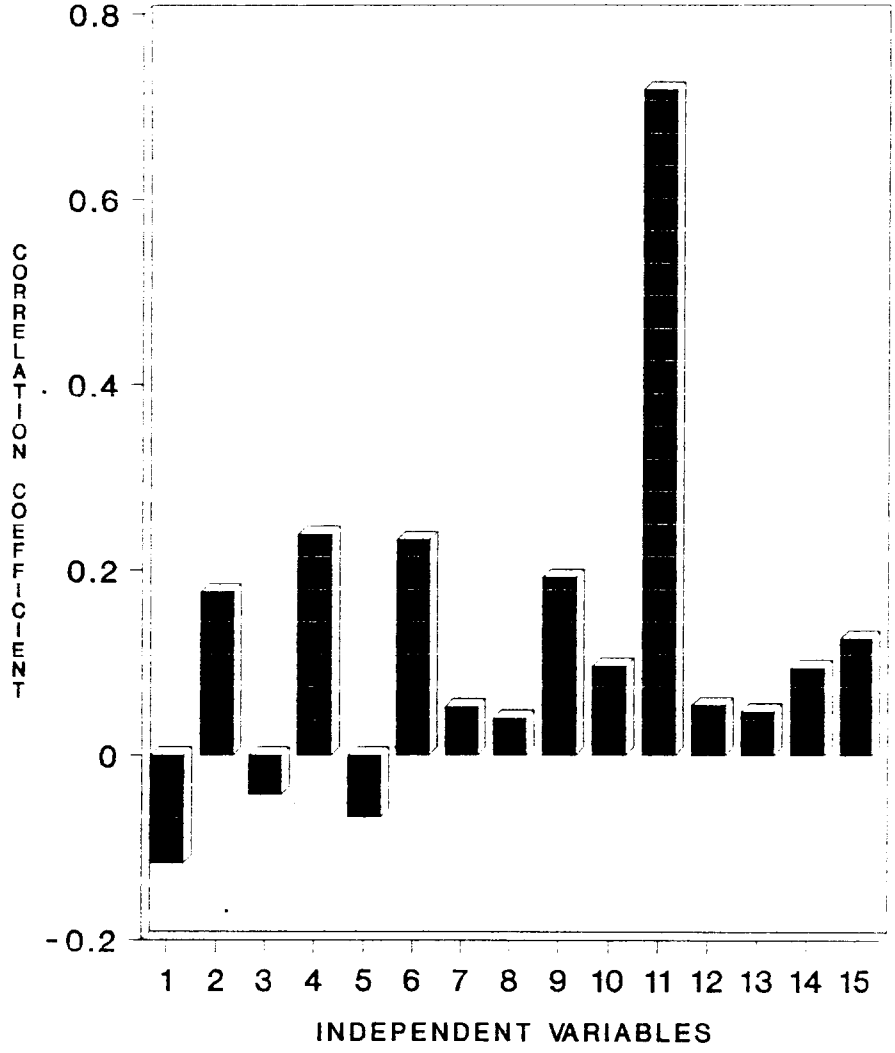
Correlation analysis revealed that out of 15 independent variables, five variables namely education ($r = 0.176$), farm size ($r = 0.238$),

Table 20. Correlation between extent of adoption of scientific practices by the respondents and their personal, socio-cultural and techno-economic factors.

Variable No.	Independent variable	Correlation co-efficient 'r'	
1.	Age	-.117	NS
2.	Education	.176	*
3.	Occupation	-.043	NS
4.	Farm size	.238	**
5.	Irrigation index	-0.067	NS
6.	Annual income	.232	**
7.	Credit utilization	.052	NS
8.	Labour utilization	.040	NS
9.	Extension participation	.192	**
10.	Information sources used	.095	NS
11.	Economic motivation	.718	**
12.	Scientific orientation	.054	NS
13.	Personal guidance for better farming	.047	NS
14.	Risk preference	.093	NS
15.	Value orientation	.125	NS

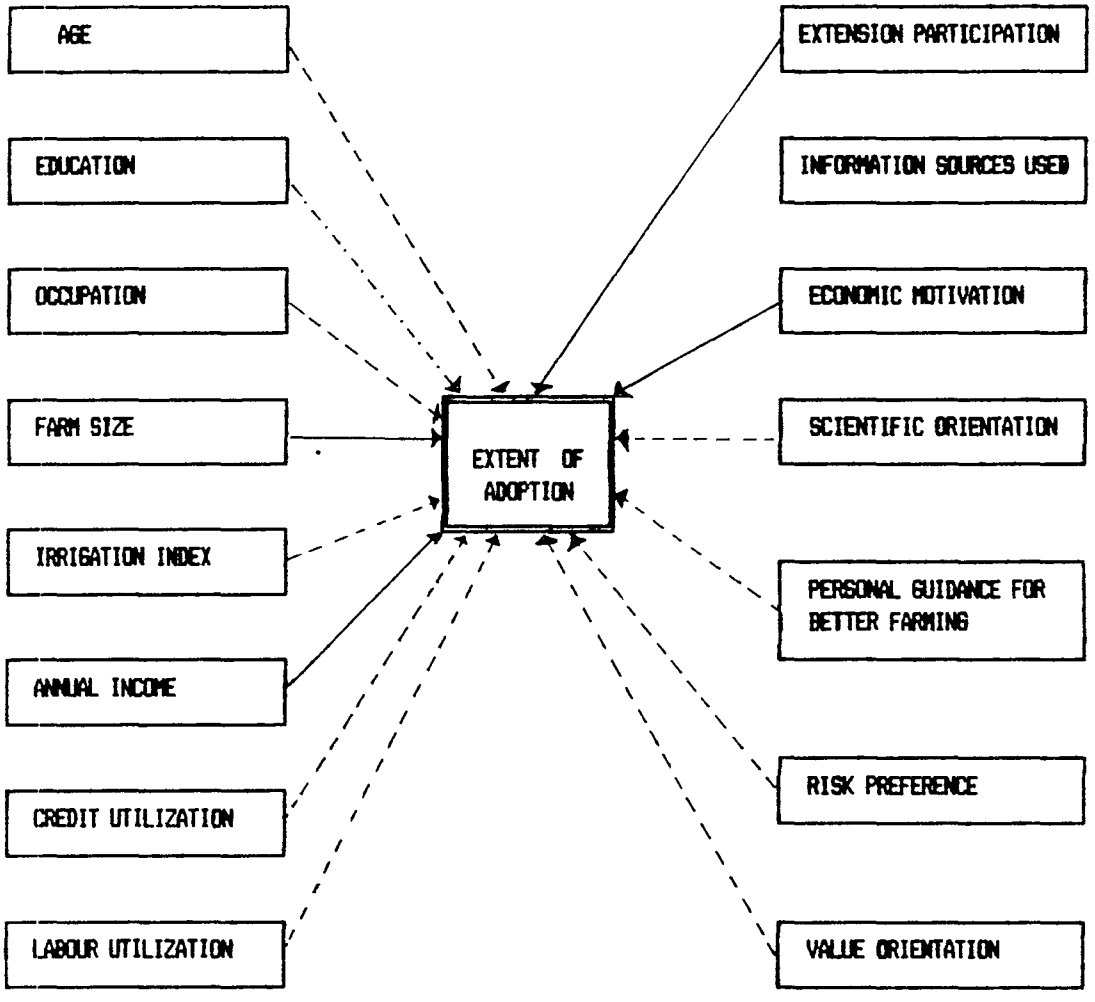
** Significant at 1 % level
* Significant at 5 % level
NS Not significant

Fig. 20. Correlation between extent of adoption of scientific practices by the respondents and their personal, socio-cultural and techno-economic factors



1. Age 2. Education 3. Occupation 4. Farm size
5. Irrigation index 6. Annual income 7. Credit utilization
8. Labour utilization 9. Extension participation
10. Information sources used 11. Economic motivation
12. Scientific orientation 13. Personal guidance for better farming 14. Risk preference 15. Value orientation

Fig. 21. Empirical diagram showing relationship between extent of adoption and independent variables



_____ Significant at 1 per cent level

_._._._ Significant at 5 per cent level

_ _ _ _ Not significant

annual income (r = 0.232), extension participation (r = 0.192) and economic motivation (0.718) were positively and significantly related with the dependent variable, extent of adoption of scientific practices.

4.8.2. Multiple regression analysis

The results of multiple regression analysis between adoption of scientific practices by the respondents and their personal, socio-cultural and techno-economic factors are presented in Table 21.

A high R^2 value of 0.59778 with significant 'F' value (16.24931) indicated that more than 59 per cent of the variation in the adoption of scientific practices of homestead farmers could be explained by the selected personal, socio-cultural and techno-economic factors taken together.

Table 21 revealed that out of 15 variables only three variables were positively and significantly related with extent of adoption of scientific practices. They were economic motivation (0.223697), annual income (0.000006) and farm size (0.032353).

These results indicated that a unit increase in economic motivation could result in an increase of 0.223697 units of extent of adoption of scientific practices by the respondents, *Ceteris paribus*. Similarly, the results for other variables namely annual income and farm size could be interpreted.

Table 21. Results of multiple linear regression analysis extent of adoption of scientific practices by the respondents and their personal, socio-cultural and techno-economic factors.

(n = 180)

Sl. No.	Independent Variable	Partial regression Coefficient 'b'	Standard error of 'b'	't' Value	
1.	Age	-.001119	.001639	-.683	NS
2.	Education	.003386	.015074	.225	NS
3.	Occupation	-.014719	.023192	-.635	NS
4.	Farm size	.032353	.013316	2.430	*
5.	Irrigation index	-.063341	.018204	-3.480	**
6.	Annual income	.000006	.000001	2.009	*
7.	Credit utilization	-.019385	.037567	-.0516	NS
8.	Labour utilization	-.023397	.085572	-.273	NS
9.	Extension participation	.016503	.009105	1.812	NS
10.	Information sources used	-.005368	.003966	-1.353	NS
11.	Economic motivation	.223697	.017591	12.716	**
12.	Scientific orientation	-.002938	.003365	-.873	NS
13.	Personal guidance for better farming	-.008222	.002957	-2.781	**
14.	Risk preference	.001908	.002818	.677	NS
15.	Value orientation	.014155	.020342	.696	NS

R^2 = 0.59778
f = 16.24930 **

** Significant at 1 per cent level
* Significant at 5 per cent level
NS Not significant

Table 21 also revealed that irrigation index and personal guidance for better farming exhibited negative and significant relationship with extent of adoption of scientific practices.

4.8.3. Step up regression analysis

The results of step up regression analysis between extent of adoption of scientific practices by the respondents and their personal, socio-cultural and techno-economic factors are given in Table 22.

Step up regression analysis was carried out in five steps. From the Table 22 it could be seen that step number I with only one variable, namely economic motivation was included. The predictive power increased with inclusion of each variable in the succesive steps, till the percentage variation did not increase significantly. The step number V gave the highest percentage of variation in this analysis.

It could be found that out of the total variation of 59.77 per cent explained by all the 15 variables together, 58.12 per cent of variation could be explained by five variables viz. economic motivation, personal guidance for better farming, annual income, irrigation index and farm size. Thus these five variables become important in predicting the adoption behaviour of homestead farmers. Hence a variable-wise discussion is furnished below.

Education was found to be positively and significantly correlated with extent of adoption of scientific practices (Table 19). It was a

Table 22. Results of step up regression analysis of extent of adoption of scientific practices by the respondents and their personal socio- cultural and techno-economic factors.

(n=180)

Variable No.	Independent variable	Partial regression coefficient 'b'	Standard error of 'b'	't' Value	
4	Farm size	.030361	.012396	2.449	*
5	Irrigation index	-.060005	.017371	-3.454	**
6	Annual Income	.000002	.000001	2.397	*
11	Economic Motivation	.227360	.016779	13.550	**
13	Personal guidance for better farming	-.008420	.002793	-3.015	**

R^2 = 0.58120 ** Signinificant at 1 per cent level

F = 48.29397* * Signinificant at 5 per cent level

general tendency throughout the analysis that the majority of the respondents were educated and education was significantly related with the dependent variables. Educated persons acquire more knowledge through mass media and they were in a better position to internalise the scientific cultivation practices. Dasgupta (1989) reported that education helps the farmer to use print media and often sources of information which are technically accurate.

Education contributes to adoption behaviour of a farmer by expanding the horizon of his awareness which makes him more rational and innovative. This might be the probable reason for this finding. This finding is also in line with that reported by Jayakrishnan (1984), Chenniappan (1987), Agarwal and Arora (1989) and Quazi and Iqbal (1991).

Another variable which showed positive and significant correlation with extent of adoption of scientific practices was extension participation. The greater the degree of participation in extension activities like seminars, group discussions and exhibitions, the greater would be awareness of scientific practices. The farmers who aquire knowledge through mass media reinforced it by attending to extension activities. However, the predictive power of this variable was found to decrease in explaining the variation in the extent of adoption of scientific practices (Table 20 and 21).

Farm size was another variable which exhibited positive and significant relationship with extent of adoption of scientific practices (Table 21 and 22). In homestead farming situations large

farmers were seen engaged throughout in agricultural activities, whereas small farmers, amidst whom subsistence farming was in vogue, go for other income generating occupations. Hence, the large farmers get easy access to adoption of scientific practices. Moreover, large farmers were getting increased income which was seen invested again in the farm for adopting new ideas and practices. This might be the probable reason for this findings. Sathees (1990), Gopala (1991) and Geethakutty (1993) were also in agreement with this finding.

Another variable which established positive and significant relationship with extent of adoption of scientific practices was annual income. A farmer who is financialy sound will be enthusiastic to invest more money on adopting new ideas, than those who are not. Farmers with higher economic status adopt agricultural innovations, which led to increased income. The increased income makes more capital available to them for further investment in new practices (Dasgupta, 1989).High education level and farm size also contributed to annual income of the homestead farmers. This finding was in line with that reported by Anilkumar (1988), Chandra and Singh (1992) and Geethakutty (1993).

Economic motivation was another variable which was positively and significantly related with extent of adoption of scientific practices. Homesteads of Kerala are typical example of subsistance farming and intensive cropping. Farmers believed that inclusion of various enterprises provide economic harvest throughout the year, which enabled them to meet day-to-day economic affairs. Salam *et al.*

(1990) proposed a homestead model for 0.2 ha and reported that the cost: benefit ratio of the homestead model was 1.8. The present finding corrobrates with the findings of Aswathnarayana (1989) and Chaudhari and Makode (1992).

A perusal of Table 21 and 22 revealed that irrigation index was contributing negatively and significantly in explaining the variation in extent of adoption of scientific practices. The homesteads of Kerala are excellent examples of organic recycling and judicious use of resources. Many farmers were seen recycling waste water from home for watering the plants. In this situation farmers were capable adopting scientific practices even if only little irrigation facilities are available . Another reason for this finding was the inclusion of animal husbandry practices in working out the extent of adoption, which required no irrigation.

4.9. Intercorrelation among the dependent variables

A perusal of Table 23 revealed that the dependent variable evaluative perception was positively and significantly correlated with level of knowledge (r = 0.1903). The dependent variable evaluative perception was positively and significantly correlated with extent of adoption (r = 0.2615). However, the dependent variable level of knowledge had only non-significant correlation with the extent of adoption (r = 0.0598). The positive and significant correlation between extent of adoption and evaluative perception showed that a better perceived technology was readily adopted by the respondents. Similarly,

Table 23. Intercorrelation among the dependent variables.

(n = 180)

Sl. No.	Dependent variable	Correlation coefficient 'r'	
1.	Evaluative perception and extent of adoption	0.2615	**
2.	Extent of adoption and level of knowledge	0.0598	NS
3.	Level of knowledge and evaluative perception	0.1903	*

* Significant at 5 per cent level

** Significant at 1 per cent level

NS Not-significant

level of knowledge and evaluative perception showed positive and significant relationship. This indicated that better internalisation of technology leads to better perception and there by adoption.

Perception is a psychological phenomenon which is affected by one's subjective judgements and ones opinions. The positive and significant relationship of evaluative perception with level of knowledge reinforced the above theory. This result is in agreement with the finding of Sundaram (1986).

But, the non-significant relationship between knowledge and adoption indicated that even though the farmers were aware of the technology they need not perceive them as a viable proposition. Farmer is the ultimate integrator of technology components in a farming system. He makes the ultimate decisions to accept those technologies which are consistent with his farming objectives and resources availbale with him at that time.

4.10. Extent of adoption of indigenous practices by the respondents

The homestead farmers of the central zone have evolved certain practices based on their rich practical experiences, for which they have their own justification. Most of these practices have been existing for the past several years, while a few of them were of recent origin. The scientific rational of many of the indigenous practices has to be looked into systematically. A perusal of the Table 24 revealed that a majority of the respondents were found

Table 24. Extent of adoption of indigenous practices by the homestead farmers of central zone

(n = 180)*

Sl. No.	Indigenous practice	Farmers adopting	
		f	%
1	2	3	4
COCONUT			
1.	Fumigation of field against Rhinoceros beetle of coconut	32	17.78
2.	Use of fresh cows' urine against immature nut fall	6	3.33
3.	Use of Cowdung supernatent solution against Bacterial diseases	11	6.11
4.	Use of common salt	19	10.56
5.	application of Cowdung solution of leaves of plants to protect them from animals	15	8.33
6.	Application of sand in leaf axils against rhinoceros beetles	21	11.66
7.	Painting milk of lime on stem against sun scorching	22	12.22
RICE			
1.	Adjusting planting season to exploit the wind against rice bugs in Palakkad	21	11.66
2.	Use of twig of Lantana camara to open the galleries of leaf roller	4	2.22
3.	Application of cow dung solution against Bacterial leaf blight	3	1.67

(contd.....)

Table 24 Contd.....

1	2	3	4
4.	Leaving paddy fields fallow during summer for pest and disease management	5	2.78
5.	Employing ducks immediately after harvest removed insect pest and weed seeds	13	7.22
6.	Planting Cajanus cajan (Red gram) on bunds of paddy fields as wind break	17	9.44
8.	Extract of lemon grass and garlic used against rice bug	5	2.78
BANANA			
1.	Smearing cowdung + ash solution for the banana suckers before sowing/storing	120	66.66
2.	Application of tobaco decoction/ soap solution against bunchy top disease of banana	18	10.00
3.	Planting banana suckers uniformily gives unidirectional bunches	9	5.00
4.	Packing of banana bunches with dry banana leaves gave bunches of better colour and size	35	19.44
VEGETABLE			
1.	Tobaco decoction diluted in vep oil and emulsified in soap water used against many of the pests in vegetable	15	8.33

(contd.....)

Table 24 Contd.....

1	2	3	4
2.	Dried coconut leaves were smeared with jaggery and insecticide used in the vegetable plots as bate to attract insects and control them	6	3.33
3.	Toddy mixed with insecticide used as bate for many insects	3	1.66
4.	Light traps used to attract pests and collected the pests in containers having insecticide within	4	2.22
OTHER CROPS			
1.	Use of Kerosene-Bamboo gum against rats and Birds	1	0.55
2.	Use of Polythene carry bags in paddy fields to scare birds and rats	44	24.22
3.	Use of waste video tapes as a bird scarer in paddy fields	6	3.33

* The total n exceeded 180 because multiple reponses of the repondents were taken into account.

following the indigenous practices namely smearing cowdung-ash paste over the banana suckers before planting (66.66 %). It is believed that many of the diseases and attack of pests are warded off by this practice.

About 24.22 per cent of the respondents were in the habit of using poly bags tied up on poles to ward off birds and rodents. This practice is a variation of the traditional practice of using white cloth (KAU, 1989 b).

Some of the banana growing farmers (19.44 %) believed that packing of banana bunches with dried banana leaves, gave better sized bunches and it was also believed that the colour of bunches remarkably improved.

Fumigation of coconut garden was found to be a common indigenous practice. About 17.78 per cent of respondents were practising this method regularly. This practice is believed to be effective in the case of cashew, vegetable, mango etc.

Painting milk of lime on coconut palms was believed to have protective effect against sunstroke (12.22 %). over 11 per cent of the farmers were in the habit of adjusting the planting season to exploit wind to get rid of rice bugs. It is believed that if flowering season is coincided with the wind season the attack of rice bug was considerably reduced.

Application of sand in the leaf axill to control rhinoceros beetle of coconut was also found to be common practice (11.66 %).

The other important indigenous practices identified are listed in Table 24. Application of common salt in coconut pits, application of cowdung slurry on leaves of coconut seedlings to ward off animals, application of tobacco decoction and soap solution to ward off vectors of bunchy top disease of banana, tobacco decoction diluted in vepoil and emulsified in soap solution to control pests of vegetable etc. were the other major indigenous practices identified.

The indigenous practices commonly adopted by the homestead farmers were found to be highly cost effective and less expensive and easy to practice.

4.11. Constraints experienced by the respondents

An attempt was made to identify the constraints perceived as important by the respondents in adopting farming system and cropping patterns.

The major constraints experienced by the farmers are presented in Table 25. These constraints were ranked based on the importance with which they were felt by farmers as indicated by them.

Prohibitive cost of inputs was ranked by the respondents as the most important constraint. The next important constraint was non-availability of labour followed by high labour cost. Inadequacy of capital, low price of produce and uneconomic holding size were the other constraints in the order of importance, as the score index indicated. The ranks obtained by other constraints are shown in the Table 25.

Table 25. Constraints experienced by respondents.

(n = 180)

Sl. No.	Constraints	Score	Rank
1.	Prohibitive cost of inputs	700	I
2.	Non-availability of labour	684	II
3.	High labour cost	675	III
4.	Inadequacy of capital	625	IV
5.	Low price for produce	601	V
6.	Uneconomic holding	589	VI
7.	Lack of knowledge about technology	572	VII
8.	Scarcity of irrigation water	563	VIII
9.	Non-availability of Credit	545	IX
10.	Poor storage and post harvest facilities	541	X
11.	Non-availability of equipments	532	XI
12.	Poor transportation facilities	528	XII
13.	Inadequate supervision and guidence	515	XIII
14.	Non-availability of supply and services	451	XIV
15.	Poor socio-economic status	420	XV

Mixed farming practice was found to be a common feature of the homesteads identified in the central zone, where a good amount of inputs had to be mobilized for effective management of homesteads. Hence it may not be an astonishing statement that the majority of the farmers perceived prohibitive cost of inputs as the most important constraint. Similar findings were reported by KAU (1989 b) Sulaiman (1989), Geethakutty (1993) and Susamma (1994).

So also in the homesteads where integrated farming system was adopted, it could be seen that the practices were labour intensive. This could have prompted them to perceive the high cost of labour and non-availability of labour as important constraints in the adoption of the farming systems and cropping pattern by homestead farmers.

Inadequacy of capital coupled with low price of produce undermines all the speculations of the homestead farmers. In addition to all the above constraint, uneconomic holding size added to the grievences of the homestead farmers. This result was in accordance with the findings reported by Aswathanarayana (1989).

Summary and Conclusion

CHAPTER V

SUMMARY AND CONCLUSION

Homestead farming is the major agricultural production system of Kerala State. The primary factor that determines the components of homestead is the evaluative nature of the homestead farmer to meet his multifaceted needs. The highly diversified nature of these homesteads may be attributed to the various socio-economic and techno-cultural factors. The income from homestead farming is quite unstable and it varies from individual to individual.

Homestead farming has been evolved by farmers over generations in an attempt to optimise production in the light of their needs and the physical, biological, climatic and socio-economic constraints of the environment in which they live. Very little effort has been made so far to analyse the nature and type of homesteads of Kerala, and their influence and dynamic nature in Kerala's economy.

Against this background, the present study was undertaken with the following specific objectives.

1. To identify the nature and type of farming systems and cropping patterns followed by the homestead farmers of central zone of Kerala.

2. To study the evaluative perception of homestead farmers in relation to appropriateness of farming systems and cropping patterns.

3. To assess the level of knowledge of the homestead farmers on scientific practices.

4. To study the extent of adoption of scientific practices by the homestead farmers.

5. To identify the relationship between evaluative perception, level of knowledge and extent of adoption of homestead farmers and their personal, socio-cultural and techno-economic factors.

6. To identify the relationship of evaluative perception with personal, socio-cultural and techno-economic characteristics of homestead farmers.

7. To assess the extent of adoption of the indigenous practices by the homesteads farmers.

8. To identify the constraints experienced by the homestead farmers.

The study was conducted during 1993 in the central zone of Kerala comprising of Palakkad, Thrissur and Eranakulam districts. Three blocks each from the central zone representing the low land, high land and mid land were selected at random.

Thus, Thrithala, Coyalmannam and Nenmara blocks in Palakkad district, Mala, Chowannur and Pazhayannur blocks in Thrissur district and Alangad, Angamali and Kothamangalam blocks, in Ernakulam district were selected. Out of these blocks Thrithala, Mala and Alangad blocks constituted the low land, Coyalmannam, Chowannur and Angamaly,

represented the mid land and Nenmara, Pazhayannur and Kothamangalam represented the high land. From the selected blocks, two panchayats each were selected at random. Thus 18 panchayats namely Thrithala and Pattithara (Thrithala block) Kuthanur and Coyalmannam (Coyalmannam block), Mala and Annamanada (Mala block), Arthat and Chundal (Chowannur block), Chelakkara and Pazhayannur, (Pazhayannur block), Karumalur and Kadungallur, (Alangad block), Karukutty and Kalady (Angamali block) and Kavalangad and Nellikkuzhi (Kothamangalam block), were selected. Ten farmers each from the above panchyats were selected at random to constitute a sample of 180 homestead farmer-respondents.

The dependent variables in this study were evaluative perception of homestead farmers in relation to appropriateness of farming systems and cropping patterns, level of knowledge of homestead farmers and extent of adoption of selected scientific practices. The personal, socio-cultural and techno-economic factors selected as independent variables were age, education, occupation, farm size, irrigation index, annual income, credit utilization, labour utilization, extension participation, information sources used, economic motivation, scientific orientation, personal guidance for better farming, risk preference and value orientation.

Evaluative perception of homestead farmers was measured using an arbitrary scale developed for the purpose. The level of knowledge of homestead farmers was measured using a knowledge test developed for the study. The extent of adoption of scientific practices was measured by the procedure developed by Supe (1969).

The independent variables were quantified using already existing scales or following established procedures.

The data were collected by conducting personal interviews with the respondents using well structured and pre-tested interview schedule developed for the purpose. Percentage analysis, correlation analysis, multiple regression analysis and step-up regression analysis were employed in the analysis of the data and interpreting the results.

The salient findings of the study are furnished below.

1. Homestead farms of Kerala state are of unique nature in the sense that they comprised of the dwelling unit with/without extended garden of wet land, mono crop rubber/ rice or additional crop land, which acted as a satellite unit of the homestead.

2. Mixed farming system was a common characteristic of the homesteads, wherein various enterprises directly or indirectly related with agriculture were included to make the homestead a sustainable system.

3. Based on the nature and type of homesteads they were classified under the following four heads.

    a. Homesteads with crop components alone (12.22%)
    b. Homesteads with crop components and extended garden (16.11%)
    c. Homesteads with crop components and livestock components (13.89%)

d. Homesteads with crop components, livestock and extended garden (47.78%).

e. Homesteads with crop components livestock, extended garden and agro-based industries (10.00%)

4. The cropping systems adopted in the garden lands were:

Rice based homesteads (13.89%), coconut based homesteads (51.67%), pepper based homesteads (11.67%), arecanut based homesteads (8.33%), cassava based homesteads (6.11%) and rubber based homesteads (8.33%).

5. The major cropping patterns adopted in the wet land were Rice-rice-rice (14.52%), rice-rice-vegetable/oilseed/ pulses (18.55%), Rice-rice-fallow (37.71 per cent) and rice-rice-green manure (4.84%), rice-vegetable-fallow (3.23%), rice-banana (2 years) (7.25%) and rice-fallow-fallow (12.90%)

6. Majority (72.22%) of the homestead farmers had medium level of perception about the appropriateness of farming systems and cropping patterns adopted in the homesteads.

7. About 61.67 per cent of the respondents had medium level of knowledge about scientific practices adopted in homesteads and 16.66 per cent of them had high level of knowledge.

8. A good majority of homestead farmers were under the medium category (69.44%) with respect to the extent of adoption of scientific practices adopted in homesteads.

9. Correlation analysis revealed that out of 15 independent variables, five variables namely education, extension participation, information sources used, economic motivation and value orientation were positively and significantly correlated with the dependent variable evaluative perception.

10. The results of multiple regression analysis indicated that 70.49 per cent of the variation in evaluative perception could be explained by the selected personal, socio-cultural and techno-economic factors taken together.

11. The results of step-up regression analysis revealed that out of the total variation of 70.49 per cent variation explained by all the 15 variables together, 69.55 per cent of the variation could be explained by the four variables namely, information sources used, extension participation, economic motivation and scientific orientation.

12. Only four variables namely education, extension participation, information sources used and value orientation were positively and significantly correlated with the level of knowledge.

13. Multiple regression analysis revealed that out of 15 variables, only value orientation was found to be positively and significantly associated Hwithlevel of knowledge of homestead farmers.

14. The results of step-up regression analysis showed that out of total variation of 21.14 per cent explained by all the 15 variables

together, 15.76 per cent variation could be explained by the two independent variables namely information source used and value orientation.

15. Out of 15 independent variables, five variables namely education, farm size, annual income, extension participation and economic motivation were positively and significantly correlated with the extent of adoption of scientific practices.

16. Multiple regression analysis revealed that out of 15 variables three were significantly related with extent of adoption of scientific practices (59.78 %). They were economic motivation, annual income and farm size. However, irrigation index and personal guidance for better farming recorded negative and significant relationship.

17. The results of step-up regression analysis showed that 58.12 per cent of the total variation could be explained by five variables namely, economic motivation, annual income, irrigation index, farm size and personal guidance for better farming.

18. Evaluative perception of homestead farmers was positively and significantly correlated with level of knowledge and extent of adoption. However, level of knowledge and extent of adoption expressed a non-significant relationship.

19. Nearly half of the homestead farmers (47.77 %) were seen adopting indigenous farm practices in one or other form in their homesteads.

20. Prohibitive cost of inputs was perceived by the homesteads faremrs as the most important constraint, followed by high labour cost, inadequacy of capital, low price of produce and uneconomic holding size.

Implications of the study

It has emerged from the study that a highly diversified farming system is adopted in the homesteads through out the zone. The interaction and interrelation of these highly diversified components had to be effectively perceived by the farmers. It is also evident that there existed immense potential hidden in the homesteads. The inadequate knowledge on scientific practices of agriculture and non-adoption of these practices contributed to the lower productivity of these homesteads. Since homestead farming is identified as a major farming system of Kerala state all efforts should be focused on the development and preservation of these homesteads through which the overall agricultural status of the state can be improved to a greater extent. As suggested by Pretty (1990) the key to sucessfull natural resource management for sustainable agriculture, lies in a partnership between the research scientists, policy makers, regulators, developers and extension workers plus the farmers and rural people themselves.

Each homestead can be considerd as an effective productive unit and plans for development should be focused on the holistic development of the unit rather the individual enterprises. Research programme have to be focused on the following lines.

1. Evolving poly-crop combinations suitable for the homesteads that would lead to maximum utilisation of solar, water and soil resources.

2. Attempts to increases the production and productivity in the homesteads of different sizes and to increase net return per unit area with the ultimate aim of improvement of the standard of living of small and marginal farmers have to be made.

3. Research should be re-oriented to develop appropriate technology for homestead farming system.

4. Evolving farming systems that would ensure maximum utilisation of family labour and for improving employment generation opportunities.

5. Evolving coconut based, cassava based and rice based farming systems suited to the homesteads.

6. Scrutinising general recommendations for the crops and bringing out modifications therein, suitable for homesteads.

7. Efforts should be made for a coordinated approach in which all agencies directly or indirectly involved in the agricultural development activities of homesteads in one stage or other are integrated.

8. Scrutinising indigenous practices adopted in homesteads for their scientific rationale and standardisation and documentation should be given priority.

9. Further fragmentation of the holdings may definitely invite serious consequences for the agricultural sector and hence the Government of Kerala should initiate effective policy measures to check further fragmentation. Action should also be taken to control the conversion of crop lands for purposes other than agriculture.

10. Homesteads of Kerala may be considered as the nodel unit of development of agriculture. Development schemes for homesteads may be formulated on a watershed basis. Every effort should be taken to preserve the characteristic features of these homesteads in order to preserve the agro-eco system of Kerala state.

Suggestions for future research

1. Studies of this type in other parts of the state have to be initiated.

2. Homestead farming, the predominant farming system prevailing throughout Kerala state may be identified as an exclusive system, which may be considered as a pivotal unit, based on which future development, research and extension programmes have to be planned. By this the major agricultural programmes of Kerala state can be brought under the umbrella of homestead farming system and there by planning and implementation of development and other activities become more realistic and meaningful, which when implemented will be a grand success.

3. Research activities may be focused to find out appropriate production technology for homestead farming situation, which would be more valuable to farmers.

4. Action research studies on the sustainable development of homestead farming systems by superimposing watershed development approach have to be designed and implemented.

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Appendices

APPENDIX - I

Results of correlation analysis between dependent variables and independent variables selected for pilot study

(n = 40)

Sl. No	Name of the variable	Evaluative Perception	Level of Knowledge	Extent of Adoption
1	2	3	4	5
#1.	Age	0.3347*	0.1440	-0.2848
#2.	Education	0.4041**	0.4061**	0.2000
#3.	Occupation	0.2991	0.3442*	0.2571
4.	Family size	-0.0641	0.1261	0.2111
#5.	Labour utilizaion	0.2880	0.0751	0.3830*
#6.	Annual Income	0.3680*	0.3030*	0.2940
#7.	Farm size	0.2728	0.2051	0.5599**
8.	Cropping intensity	0.2234	0.0091	0.2248
#9.	Irrigation index	0.3318*	0.2941	0.1400
#10.	Credit utilization	0.5250**	0.2801	0.0934
11.	Leisure time availability	-0.1464	0.1137	-.1464
12.	Social participation	0.1051	0.2332	0.2060
13.	Innovativeness	0.1704	0.2935	0.2661
14.	Mass media exposure	0.0083	0.1201	0.0782
15.	Mass media participation	0.1470	0.1610	0.0750
16.	Self reliance	0.0671	0.2334	0.2821
#17.	Scientific orientation	0.7047**	0.7085**	0.7465**
#18.	Extension participation	0.6865**	0.5059**	0.6625**

1	2	3	4	5
#19.	Economic motivation	0.4917**	0.7938**	0.7286**
20.	Credit orientation	-.1611	0.1466	0.0667
21.	Management orientation	-0.1272	0.2298	0.0354
22.	Achievement motivation	-0.1464	0.1137	-0.2827
#23.	Risk preference	0.3101*	0.4840**	-0.0898
24.	Rationality in decision making	0.1201	0.0083	0.0311
#25.	Personal guidance for better farming	0.5897**	0.5296**	0.3581*
26.	Communication skill	0.1105	0.1994	0.2135
27.	Cosmopoliteness	0.1889	0.1200	0.0261
28.	Economic performance index	0.0612	0.2135	0.0717
#29.	Information sources used	0.4577**	0.5879**	0.1105
#30.	Value orientation	0.3212*	0.4354**	0.2780

* Significant at 5 per cent level

** Significant at 1 per cent level

Variable selected for the study.

APPENDIX - II

EVALUATIVE PERCEPTION OF HOMESTEAD FARMERS IN RELATION TO APPROPRIATENESS OF FARMING SYSTEMS AND CROPPING PATTERNS

INTERVIEW SCHEDULE

Sl. No. Panchayat :

Date Block :

District :

PART - A

1. Name of the farmer :
2. Age :
3. Address :
4. Religion/caste :
5. Education : Illiterate/ can read/ can read and write/Primary school/middle school/high school/college
6. Occupation :
7. Farm size : Area in acres
   a. Wet land
   b. Dry land
   c. Total
8. Cultivated area
   Wet land
   1. Single crop
   2. Double crop
   3. Tripple crop

b. Dry land

1. Single crop

2. More than two crops

9. **Whether irrigated** : Yes/No

If yes, source and area under irrigation :

10. Crops grown	Area	Net returns
Paddy		
Coconut		
Nutmeg		
Arecanut		
Banana		
Cashew		
Vegetable		
Others (specify)		

Trees	No.	Age	Value

11. Other enterprises	No.	Breed	Value	Returns
a. Diarying				
b. Poultry				
c. Goat				
d. Piggery				
e. Rabbitry				
f. Fisheries				
g. Others(specify)				

12. Agrobased industries

Size

Investment

Financial sources

Returns

13. Annual Income

On farm income :

Off farm income :

Total :

14. Credit utilization

i. Have you borrowed to meet cultivation expenses : Yes/No
If yes, give details

a. From private individuals :

b. Co-operative societies :

c. Commercial banks :

d. Private banks :

e. Others specify :

ii. When did you borrow?

iii. Amount of loan taken

iv. Amount repaid

vi. Amount outstanding

vii. Purpose for which the credit was availed

viii. Whether utilized the credit for the purpose

ix. If not utilized for which purpose.

15. Labour utilization

Operation	Family Labour		Hired Labour		Total	
	M	F	M	F	M	F
a. Preparation of land						
b. Sowing/transplanting						
c. Manuring						
d. Weeding and inter-cultural operation						
e. Plant protection measures						
f. Harvesting and processing						
g. Others (specify)						

16. Extension participation

(Please indicate your frequency of participation in the following activities)

Sl. No.	Extension activities	Frequency of participation		
		Whenever	Occasionally	Never
1.	Campaigns			
2.	Film shows			
3.	Seminars			
4.	Group meetings			
5.	Exhibitions			
6.	Demonstrations			
7.	Any other (specify)			

17. Information sources used

(Please indicate from which of the follwoing sources you obtain technical information regarding new practices in farming)

Sources	Frequency			
	Most often	Often	Sometime	Rarely
I. Mass media utilization				
1. Television				
2. Radio				
3. Movies				
4. News paper				
5. Farm magazine				
6. Any other (specify)				
II. Interpersonal source utilization				
1. Agricultural Assistant				
2. Agricultural Officer				
3. University Scientists				
4. Input agencies				
5. Neighbours				
6. Relatives				
7. Any other (specify)				

18. Economic motivation

(Below are given 3 sets of statements from each set. Select two statements "most like" or "least like"

	Items	Most like	Least like
I	a. All I want from my farm is to make just a reasonable living for family		
	b. In addition to making reasonable amount of profit the enjoyment in farming life is also important to me		
	c. I would invest in farming to the maximum to gain large profit		
II	a. I do not hestitate to borrow any amount of money in order to run the farm properly.		
	b. Instead of growing new cash crops, which cost more money, I follow the routine farming practices.		
	c. It is not only monitary profit, but the enjoyment of work done well, which gives me satisfaction for my hardwork on farming		
III	a. I hate to borrow money, on principles, even when it is necessary for running the farm.		
	b. My main aim is maximising profits by growing cash crops in comparison to growing of crops which are simply consumed by my family.		
	c. I avoid excessive borrowing of money for farm investment.		

19. Scientific orientation

(Indicate the degree of your agreement or disagreement or undecideness with each of the following statements).

Statements	SA	A	UD	D	SD
1. New methods of farming gives better results to a farmer than the old methods					
2. The way of farming of our forefathers is still the best way to farm today.					
3. Even a farmer with lot of farm experience should use new methods of farming.					
4. A good farmer experiments with new ideas in farming					
5. Though it takes time for a farmer to learn new methods in farming it is worth the efforts.					
6. Traditional methods of farming have to be changed in order to raise the living of a farmer					

20. Personal guidance on better farming

(Indicate your response to the following statements in the appropriate column)

Item	Very much	Much	Not so much	Very little
1. The extent to which you discussed farming problems with extension personnel in the last two seasons				
2. The extent to which the extension personnel visited your crop in the last two seasons				
3. The assistance you received in testing your farm soil				

Item	Very much	Much	Not so much	Very little
4. The help you received in preparation of your farm plan				
5. The help you received in determining the most suitable cropping pattern of your farm.				
6. The advice you have received for proper use of fertilizer to different crops of your farm				
7. The advice you have received for efficient water use in your farm				
8. The advice you have received in using farm machinery				
9. The assistance you have received in identifying the diseases of your crop plants and prescribing control measures.				
10. The advice you have got about proper storage of your farm produce				
11. The advice you have received in getting the additional returns in the use of new items				

21. Risk preference	SA	A	UD	D	SD
1. A farmer should resort to multiple cropping to avoid greater risk involved in growing a single crop					
2. A farmer should rather take more of a chance in making a big profit than to be constant with a similar but less risky profits.					

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

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

5. It is better for a farmer not to try new farming unless most others have used them successfully.

6. Trying an entirely new practice in farming by a farmer involves risks but it is worth it.

22. Value orientation

Progressivism

1. Change from traditional practices in agriculture to the new practices mean less secure and less orderly.

2. The adoption of new agricultural practices different from traditional practices is a necessity of modern days to satisfy the basic needs.

(Check the appropriateness)

Venturesomeness

1. Change from traditional practices in agriculture to new practices means less secure and less orderly.

2. Practicing modern technology of agriculture definitely leads to better results.

(Check the appropriateness)

PART B

1. Evaluative perception of appropriateness of homestead farmers

	Very much	Much	Less	Very less
	1	2	3	4
Sustainability				
1. In agroforestry home gardens land use system ensures better resource management				
2. Woody perennial crops play an important role in the productivity and sustainability				
3. Integrated pest management (IPM) principles can be effectively utilised in homestead agriculture				
4. Homestead farming reduces soil and atmospheric pollusioin				
5. Homestead agriculture is ecologically compatible				
6. Agricultural practices in a homestead are environmentally safe				
7. In situ input generation is possible in homesteads				
8. Interacting between the crop system and livestock system of a homestead facilitates high degree of organic recycling which maintain soil health and sustainability.				
Influence of homestead farming on quality of life				
9. Homestead farming provides adequate provision for developing aesthetic aspects of the family members				

	Very much	Much	Less	Very less
	1	2	3	4
10. Livestock components in a homestead helps to improve the general health status of the family members				
11. Homestead ensures more family labour input				
12. Homestead farming helps to get the farmer engaged in the farm throughout the year				
14. Home gardens help to meet the immediate medicare needs of the family				
15. Homestead farming ensures reasonable income through sale of surplus so as to pruchase unproduceable articles in the farm.				
16. Homestead farming provides for risk reducing practices				
Utilization of Resourses				
17. Catch cropoing is more beneficial to the residual soil moisture and nutrients after the major crop				
18. Multi-storied cropping helps to exploit resources effectively				
19. In situ green manure production can affectively be build up in homesteads				
20. Solar harvesting principles can be effectively implemented in homesteads				
21. Livestock components in a homestead helps to improve the quality of agricultural produce				
22. Agroforestry components help to meet requirement of food/fuel				

	Very much	Much	Less	Very less
	1	2	3	4

Economic aspects

23. Homestead farming provides for year round income

24. Homestead farming ensures highest returns per unit area

25. Homestead farming ensure to optimising production

26. Livestock components in a home stead helps minimising the manuring cost of the homestead

27. Homestead agriculture helps to reduce cost of cultivation

28. Woody perennials of homestead will dominate the arable crops and will compete for resources

29. Integrated farming practices make homestead an economically viable unit

30. Structural and functional diversity of the comonents in a homestead provides for multiple demands of the familiy

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2. Level of knowledge on scientific practices

1. Name a green manure crop supplying nitrogen

2. Which are the important nutrients present in organic manures

3. Name a potassic fertiliser

4. When lime has to be applied?

5. Name a variety of paddy suitable to your locality

6. Give spacing for short duration variety of paddy cultivation

7. Application of fertilisers based on soil test recommendation is always advisable — Yes/No

8. Apply farm yardmanure/compost @ 5 MT/ha — True/False

9. Name a disease of rice

10. Name an important pest of rice

11. Name any pesticide that can be used to control rice bug

12. Give control measures for the control of sheath blight disease of paddy

13. Name a green manure crop suitable for coconut gardens

14. Basins should be taken at 1.8m radius around the stem and 25 cm depth — True/False

15. Apply lime @ 1 kg/palm — True/false

16. Irrigate the palm during summer at an interval of 5 to 6 days — True/false

17. Name an important pest of coconut

18. Give control mesaures for Rhinocerous beetle

19. Mosaic disease is an important problem in pumpkin cultivation — True/false

20. Give the name of pesticide which is largely used in vegetable cultivation

21. Planting of vegetables in pits during summer season helps in conserving miosture — Yes/No

22. Panniyoor-1 is to be grown in comparatively open areas

23. Name a sutable standard for growing pepper

24. Name an important pest affecting pepper

25. Name an important disease affecting pepper

26. It is better to feed animals individually according to production and requirement — Yes/No

27. Good quality roughages save concentrate — True/False

28. Production ration should be fixed based on milk yield — Yes/No

29. It is important to feed collustrum to infants — Yes/No

30. Udders should be disinfected using light disinfectants after milking — Yes/No

31. Name a variety of broiler chicken

32. RD vaccine should be given at 5 days old — True/False

33. Pigeon pox vaccine is to be given at 3 to 4 weeks — Yes/No

34. Birds should be dusted against ectoparasites — Yes/No

35. Rabbitry is a profitable enterprise in homesteads — Yes/No

3. Extent of adoption of scientific practices in homesteads

(Please indicate whether you are adopting the following management practices for your crops. If so give details)

Sl. No.	Practice	Yes/ No	Crop	Area	Quan- tity	Indigenous practices if any	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Green manure crops						
2.	Organic manures						
3.	Chemical fertilizers						
4.	High Yielding varieties/ improved ovarieties						
5.	Spacing for paddy cultivation						
6.	Control measure for rice bug						

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
7.	Control measure for sheath blight						
8.	Taking basins for coconut						
9.	Apply lime @ 1kg/palm						
10.	Control measure for Rhinocerous beetle						
11.	Spacing for banana						
12.	Split application of fertilizers for banana						
13.	Control measure agaist bunchy top disease of banana						
14.	Control measure against fruit fly of cucurbits						
15.	Control measure for quick wilt disease						
16.	Feeding animals with commercial feeds						
17.	Feeding collestrum						
18.	Clean milking						
19.	Vaccination against conta-geous diseases						
20.	Deworming of calves						

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
21.	Using Irrigation pond for fish culture						
22.	Using silt deposited in the pond as organic manure						
23.	RD vaccine						
24.	Dusting of birds against ecto parasites						
25.	Dipping of birds						

4. Extent of adoption of indigenous practices

a. Give details of indigenous practices adopted in your homestead

b. Give your justification on the indigenous practices

c. Give the advantages of indigenous practices

5. Constraints experienced by homestead farmers

Which among the following would you identify as the most important and least important in adoption of recommended practices.

Sl. No.	Constraints	Most important	Least important
1.	Poor Socio-economic stauts		
2.	Non-availability of supply and services		
3.	Poor transport facilities		
4.	Lack of knowledge about technology		
5.	Inadequacy of capital		

Sl. No.	Constraints	Most important	Least important
6.	Uneconomic holding		
7.	Non-availability of credit		
8.	Non-availability of labour		
9.	Scarcity of irrigation water		
10.	Inadequate supervision and guidance		
11.	Low price for produce		
12.	High labour cost		
13.	Prohibitive cost of inputs		
14.	Poor storage and post harvest facilities		
15.	Non-availability of equipments		

ANNEXURE I a

DISTRICT WISE SOCIO-ECONOMIC AND DEMOGRAPHIC DETAILS OF KERALA (1991-92)

District State	Area (Sq.km.)	Popln. (.000s)	House holds (.000s)	Holdings	Literacy rate (%)
Trivandrum	2192	2947	619	621222	89.22
Kollam	2491	2408	490	479220	90.47
Pathanamthitta	2642	1188	259	247629	94.86
Alappuzha	1414	2001	405	398589	93.87
Kottayam	2203	1828	362	344646	95.72
Idukki	5019	1078	233	242396	86.94
Ernakulam	2407	2817	556	509862	92.35
Thrissur	3032	2737	522	509339	90.18
Palakkad	4480	2382	446	431721	81.27
Malappuram	3550	3096	477	453835	87.94
Kozhikode	2344	2620	457	458302	91.10
Wynad	2131	672	135	129432	82.73
Kannur	2966	2252	371	366476	91.48
Kasargod	1992	1072	182	169653	82.51
State	38863	29099	5513	5362322	89.81

Source: Directorate of Economics and Statistics. Government of Kerala

ANNEXURE I b

Percentage distribution of the number of holdings and area among major holding size classes

Size class *	1970-71		1976-77		1980-81		1986-87		1990-91	
	1	2	1	2	1	2	1	2	1	2
< 1ha	81.8	31.1	87.7	40.0	89.2	41.6	91.5	46.1	92.56	48.83
1-2 ha	10.1	19.6	8.0	23.2	6.9	22.0	5.7	21.5	5.19	21.14
2-4 ha	5.6	21.2	3.2	17.9	2.9	18.4	2.1	15.3	1.80	14.10
4-10 ha	2.1	15.7	1.0	10.9	0.9	10.8	0.5	7.4	0.39	6.22
>10 ha	0.4	12.4	0.1	8.0	0.1	7.2	0.08	9.7	0.05	9.66

Source: Bureau of Economics and Statistics, Government of Kerala

Farm Guide, 1995, Government of Kerala.

1 Number of holdings (%)

2 Area (%)

EVALUATIVE PERCEPTION OF HOMESTEAD FARMERS IN RELATION TO APPROPRIATENESS OF FARMING SYSTEMS AND CROPPING PATTERNS

By

M. N. BABU

ABSTRACT OF A THESIS

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ABSTRACT

The study was undertaken in 18 selected panchayats of central zone comprising of Palakkad, Thrissur and Ernakulam districts, with a view to identify the farming systems and cropping patterns adopted in homesteads. The evaluative perception of the farmers in relation to the appropriateness of farming systems and cropping patterns adopted in homesteads,their level of knowledge on scientific practices and extent of adoption of scientific and indigenous practices were also studied .

The sample consisted of 180 homestead farmers selected at random. Data were collected using a well-structured interview schedule developed for the purpose. Suitable statistical techniques were employed in the analysis of data.

The study revealed that the homesteads of central zone were of unique nature in the sense that they comprised of a dwelling unit, with/without exended garden of wet land rice, monocrop rubber or additional crop land which acted as satellite units of the homestead. The major farming system identified was homesteads with crop components, livestock and extended garden, of which coconut based homesteads were predominant. In many of the homesteads, a multi-storied cropping pattern was in vogue whereas that of wet land was rice-rice-fallow.

A good majority of the farmers were in the medium category with reference to their evaluative perception , level of knowledge and extent of adoption.

Among the independent variables, extension participation, information sources used , economic motivation and annual income were found important in predicting the variations in evaluative perception. Education, extension participation, information sources used and value orientation were significantly correlated with level of knowledge. Education, farm size ,extension participation, annual income and economic motivation were significantly correlated with extent of adoption .Evaluative perception of farmers was positively and significantly correlated with their level of knowledge and extent of adoption. Nearly half of the respondents were found adopting indigenous practices. Prohibitive cost of inputs was perceived as most important constraint followed by high labour cost.

The study pointed out to the urgent need of effective measures to control the escalating rate of conversion of crop land to monocrop rubber and for purposes other than agriculture, and also the important role of these homesteads in conserving the agro-ecosystem and maintaining the environmental equilibrium. It also emphasised the need for an appropriate strategy for development of the homesteads, preferably on watershed area basis, by co-ordinating all the agencies directly or indirectly involved to ensure realistic, meaningful and sustainable agro-ecosystem management.