DYNAMICS OF LAND USE IN RECENTLY SETTLED FOREST AREAS
A CASE STUDY OF ATTAPPADY, KERALA

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CERTIFICATE

This is to certify that the Ph.D thesis entitled **Dynamics of Land use in Recently Settled Forest Areas: A Case Study of Attappady, Kerala** is a bona fide record of the research work done by Mr. Sanathanan Velluva under our supervision and guidance and the work has not formed the basis for the award of any degree, diploma or associateship in any University. The thesis is worth submitting for the degree of Doctor of Philosophy under the Faculty of Social Sciences.

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Table of Contents

List of Tables

List of Figures and Charts

List of Appendices

Chapter I

INTRODUCTION

Changes in land use in the forest cleared areas and their impact on economy and ecology via degradation have formed the subject of debate in several countries of the world since the beginning of this century. Of the gamut of consequences of the denudation of its verdant vegetation through denudation and destruction of forests, the most threatening to the balance of the ecosystem is the ill-effects of degradation of land. Continuous decay of natural resources poses severe threats to the very survival of millions of human beings. The gravity of the problem in the tropical regions of developing countries is more acute than in the rest of the world.

In-migration to forest areas is one of the most important reasons cited for degradation of forest land. When such settlement takes place in an indigenous tribal belt the entire land use scenario undergoes change due to several factors: demographic pressure, competition for resource, structural changes in land holding, land tenure, etc. The link between rural poverty and environmental destruction was clearly articulated by the World Commission on Environment and Development. The poor and the hungry will often destroy their immediate environment for survival and they cut down forests and overuse marginal lands, resulting in is degradation and reduction in land productivity.

1.1 The Problem in Global Context

The problem of growth of settlement is widespread in the world's marginal lands, especially in the mountain slopes. Unplanned settlement is a world wide phenomenon, which results in agricultural expansion at the cost of forest depletion (Hirsch 1988). Deforestation follows settlements on a large scale. Massive deforestation and changes in

the socio-economic situations of the migrant peasant economy have been identified as the cause for such settlement. In some instances peasants are so disillusioned with farming in one location that they seek employment elsewhere in which conditions are more favourable. Owing to settlement, pressure falls increasingly on the indigenous people and destruction of forest areas begins.

In the beginning of this century, one-third of Asia was covered with forests. That proportion has been shrinking fast. Encroachment of forest lands for expansion of cultivation, consequent on population growth accounts for most of the deforestation in the world. From the current trends, it is forecast that half the original 735 million hectares of forests would disappear by the turn of the century. By 1980 the forest area had already dwindled to about 460 million hectares. The extent of forest depletion in India during the decade 1971-80 was at the rate of 2.5% per year. A resource that has been recently "unwisely" exploited, especially by the third world countries, is the forests. Deforestation has been occurring throughout these countries at rapid rates mainly to clear land for agriculture. The immediate causes of deforestation are the clearing of land for farming, demand for firewood and excessive commercial logging. Deforestation is aggravated by pressure of population from thickly populated growing area to untouched virgin forest land. FAO has estimated that 70% of recent disappearance of closed forests in Africa, 50% in tropical Africa and 35% in Latin America can be attributed to its conversion to agricultural uses (FAO 1982).

The process of deforestation has been exacerbated by large spells of land settlement, rapid rate of population growth, unplanned agricultural development, over grazing and poor forest management. Hence, the social and environmental costs of deforestation are considerable and the least that can be said about it is " ..... that degradation of the environment leads to *degradation of people*" (Whitney 1987). The process through which such conversion is made is different in different countries. If cash

crop expansion is directly responsible for such displacement in certain areas, accelerated encroachment on forest land by subsistence farmers is liable in other areas. Moreover, conversion of forests to tree crops has social and ecological implications different from those of conversion to other land uses (Barraclough and Ghimire 1990).

The immediate impact of settlement in a forest area is deforestation through resource acquisition (mainly land) process in a competing spirit and its indiscriminate utilisation. "Those who are poor and hungry will often destroy their immediate environment in order to survive: they will cut down forests; they will overuse marginal lands ...." (World 1987:28). They frequently destroy trees to establish another patch of crop land. Short-term income -- to feed the family today -- is a major goal for these settlers and little heed is given even to the medium term. These non-tribal in-migrants, in their turn to resource acquisition, encroach upon land which belongs to the indigenous people without recognising the latter's legitimate rights. The indigenous people of these forest areas who had developed sustainable resources utilisation systems, are often threatened by the inroaders and are sometimes displaced. Therefore, the original forest dwellers who lost not only their cultivable land but also their accessibility to many livelihood resources.

New settlers to the region, however, have low accessibility to resource, limited security of tenure and less familiar with the climatic changes. Thus, they have developed an extractive, short-term agricultural system, resulting in rapid depletion of soil nutrients and increased erosion. Thus, emphasis on short-term benefit at the expense of diversification and sustainability (Schmink and Wood 1987) had an important role in the dynamics of land use in the region. However, the extent of resource depletion would depend on the in-migrants' access to capital, labour, technology and production skills. Such massive settlement in forest areas for cultivation, may have far reaching environmental consequences too. In their struggle to survive or compete, the settlers

adopt strategies, which are incompatible with sustained, environmentally appropriate land use and lead to deterioration of soil and other natural resources (Collins 1986).

Poverty, insecurity of tenure, public policies and inaccessibility to other resources have frequently cited as the prime factors for the indiscriminate exploitation of the natural resources. Poverty and land degradation are often associated. 'The vicious cycle hypothesis' postulates that poverty drives degradation and degradation drives further poverty (Blaikie and Brookfield 1987). Immediate needs are often given prime importance than long-term sustenance by the new arrivers. The effect is depletion of the natural resource base and further leads to poverty. Indigenous people who were driven out to hill top by the in-migrants were denied customary access to their forests. This alienation sometimes forced the peasant to degrade the surrounding he once lived in symbiosis with (Guha 1985). So the result is an accelerated exploitation of the land and other natural resource by various agents. However, connected with this issue, a slightly different views are held by some other researches. For instance Moench (1990) demonstrates that the patterns of resource use depend upon the resource access: access to land, labour, credit, extra local authority and community support networks rather than wealth alone. The second part of vicious cycle, that degradation drives to poverty, is also refuted. He concludes that initial resource degradation may lay the foundation for later wealth and resource protection.

However, the resource conservation and development is often limited by the type of farming systems and the costs incurred and return received from each practices. The settlers follow, in general, an array of cultivation and crop selection practices different from those of the indigenous population. The skill and technology brought by the in-migrants may be adopted fully or partially by the original inhabitants with or without success. Interaction between settlers and indigenous people on the one hand and settler cultivation practices and traditional cultivation practices on the other result in massive

changes in the land use pattern. Therefore, resource protection phase is determined by the much wider influencing factors like the extent of land transfers, type and magnitude of crop succession, and costs and return of farm practice among the farming groups.

1.1.1 In Local Context

Human intervention in the evergreen forest through encroachment of lands for cultivation and the gradual displacement of original inhabitants from their land were quite common in the high ranges of Kerala since the beginning of this century. The gravity of the problem became exacerbated due to excessive population pressure and low per capita availability of land. The result was the appearance of an array of agricultural crops with such wide heterogeneity at micro level and forest cleared patches in the hill areas, once occupied by evergreen forests. The process is still continuing unabated with all its consequences on ecology and economy. Between 1905 to 1973 the natural vegetation decreased from 44.07% to 17.06% in the southern part of Western Ghats, forming parts of the State of Kerala in India. This region, once famous for its tropical rain forest, is now left with only a few patches of virgin rain forest along with rugged slopes. Economic factors, population pressures, land hunger and Government policy together accounted for the main causes of the unabated deforestation in the area (Chattopadhyay 1985).

In-migration tendency towards forest areas sprung-up in the state mainly with the interest of acquisition of land for cultivation. People from plainlands starts migrate to the highly dense forest areas. By 1981, the forest dwellers accounted for 1.5 lakhs population distributed throughout the reserve forests (GOI 1981). Human intervention in the evergreen forest in search of land and the development of cropping system through forest destruction have its serious effect on the ecological processes and micro climate. High density of population, lack of any source of livelihood other than land which sets

reflected in the 'land hungryness' of the population, the politics of petty gains legitimising such hunger encouraging further land grabs and the further degradation of eco-system (Sivanandan et al 1986).

In-migration had resulted in drastic changes in the socio-economic life of the tribals along with changes in the resource base. The migrants from the low land who were culturally and technologically more advanced than the native tribals overpowered and dispossessed them. As a result many tribal households lost their land in the greedy 'land hunt' strategy of non-tribals. Thus, the alienation of the tribals had been a part of the influx of land hungry people to hill range areas (Kunhaman 1981, Mathur 1975). With loss of lands, tribals began moving further into the forested hills to cultivate small patches in the slopes. Bringing of different style of farming to the area by the in-migrants further destort the low-technology agriculture of indigenous people. A wide variety of farming systems emerged in the place of indigenous cultivation.

Many explanations have been given for the factors at the macro level for the influx of people towards hill ranges. Impact of such settlements on the socio-economic conditions of tribals was examined in local context by some studies. However, land use dynamics at the micro level in recently-settled forest areas have not formed the subject of systematic enquiry. This emphasis the need for conducting a micro level study to understand the process of land use changes and the influencing factors; crop succession and emerging farm activities in the light of cost, return and relative profitability in a post-settled economy with technologically variant farming groups. The present study addresses this question in the context of a tribal area in Kerala.

1.2 Objectives

The main objectives of the study are:

1. to examine the processes of change in settlement, land acquisition, land degradation and land use pattern;

2. to trace the development of farming systems in the forest areas with a view to analysing the factors which influence crop selection decisions of farmers; and

3. to analyse costs, returns and relative profitability of the prominent crops cultivated.

1.3 Layout of the Thesis

The thesis is organised into eight chapters. First chapter is more generic in form comprising the problem, objectives and limitations of the study. Second chapter is devoted exclusively for presenting general methodology, survey techniques, data collection and a detailed description of the study area. The socio-economic setting on which the recently settled economy is built-in in its various dimensions is examined in the third chapter. In chapter four the history of settlement in tribal areas and the resultant land acquisition, land transfers, land alienation and the growing land-related issues are discussed. Fifth chapter is devoted mainly for exploring the genesis of resource degradation; the process of crop succession from the period of massive settlement to the present day; and to examine the emerging cropping pattern and yield difference between settlers and tribals. In chapter six, the factors which influence crop selection among farming groups and the emerging farming systems and crop combinations area examined. Cost, return and relative profitability of prominent crops under cultivation among farming groups are analysed in seventh chapter. This chapter also comprises the major cost concepts and imputation procedure adopted for the estimation of cost of cultivation of major perennial, seasonal and dry crops in the study areas. The summary and conclusions, and policy implications emerging from the study are discussed in chapter eight.

1.4 Limitations

One of the problems which came-up during the present study is the generation of field level data. The data which we have collected through field investigations could also have shortcomings usually observed in survey data. Another point is that since most of the farmers do not keep accounts of expenditures on and returns from cultivation, it is likely that the data supplied by them suffer from memory biases, especially data related to historical information and extent of crop successional trend. The non-availability of time series data for examining the historical course of crop succession and the causative factors has rendered the discussion less affirmative that it could have been. Finally, the measurement errors related to cross section data also might have crept-in in this study.

In fine, this study has examined the process of land alienation and crop succession, as well as the economies of crop cultivation in Attappady. We have examined the economic aspects in terms of costs, returns and profitability of individual crops. More studies are necessary to understand the economics of the different farming systems in practice in this area. Factors and processes other than the purely economic need also to be examined in more detail. Such exercises are however beyond the scope of our present discussion.

Chapter II

STUDY AREA, METHODOLOGY AND DATA COLLECTION

2.1 Introduction

This chapter describes the various steps involved in the collection of data for this study. Both primary and secondary data are used. The various steps included in collecting the primary data are described in more detail below. The chapter starts with a description of the study area followed by general methodology and a discussion of the sample design, including sample selection and allocation. The next section is about the design and administration of the interview schedule. The discussion is summarised in the last section.

2.2 The Study Area

2.2.1 Reasons for Selection

The present study is located in two revenue villages, Agali and Sholayur, of Attappady block of Palakkad district of Kerala State. Attappady area was chosen for various reasons. Firstly, uncontrolled deforestation, over-grazing, inappropriate methods of agricultural practice, etc., have all contributed to the indiscriminate removal of dense forest cover of this area since the second quarter of this century. This has led to large scale erosion and low productivity in the occupied land of this area. Deforestation as a consequence of inappropriate forest management and unhealthy human interactions have produced a semi-desert within a few kilometres of the lush evergreen forests of Muthikulam and silent valley ranges. A recent paper on the area starts with the statement that:

> " Attappady offers a typical example of unplanned human settlement in a forested area which has turned the 'green hell' to a 'red desert' .....A

> variety of agricultural practices - shifting cultivation to modern farming - are in vogue. Deforestation and unsuitable agricultural practices have left scars both on the land and the people. Rains evade the area, rivers run dry most part of the year, the fertility of the soil is lost, and thus, agricultural production, the mainstay of the majority of the population is jeopardised. The region is included in the eco-restoration zone of the Nilgiri Biosphere Reserve and represents a veritable microcosm of forest splendour tampered by anthropic blunder" (Sankar and Muraleedharan 1990:127)

Secondly, most of the population is recent migrants from the adjacent state Tamil Nadu and Malayalis from other parts of Kerala that acted as a pressure on the early inhabitants. Between 1951 and 1981 the population of Attappady has increased annually at the compound rate of 5.71, of which the increase of the tribals and settlers was about 2.36% and 11.8% respectively (GOI 1981). The excessive growth rate of settlers during this period is signalling massive influx of people from outside Attappady. Thirdly, settlers are now occupying the major portion of the total cultivated area and practising a farming system different from traditional tribal cultivation. Fourth, existing agricultural land use scenario in Attappady is unique, especially in areas where the pressure of settlers is high. The area is characterised by wide crop diversity as is evident from the history of crop succession among the settlers and the indigenous people.

2.2.2 General Description

The study cite, Attappady[1], is an extensive mountain valley above the crest of the Ghat ranges, spreading over nearly 731 km^2 is a unique place in the State. It is located in the mid eastern part of Kerala and north eastern part of Palakkad District adjoining Coimbatore and Nilgiri Districts of Tamil Nadu. It forms almost the eastern half of Mannarkad taluk and is separated from the rest of the taluk by a hump like, steep mountain range. The northern and eastern boundary of the area is towards Nilgiri and Coimbatore districts of Tamil Nadu. Whereas, it is bordered by Palakkad taluk in the

[1] The name Attappady ascribed to this part of Mannarkad Taluk is originated from two Malayalam words, viz., *Atta* and *pady*. *Atta* stands for blood sucking leeches and *pady* for settlement. Until recently the area was highly tormented by leeches.

South; and Karimba and Pottessery and Mannarkad revenue villages of Mannarkad taluk and Ernad taluk of Malappuram district in the West (GOK 1976a)

2.2.2.1 Physical Features

The Attappady area is essentially a plateau rising from the undulating midlands beyond the East of Mannarkad Taluk to a height of 750-1000 meters. This area is flanked by mountain ranges, the Nilgiris in the north and extensions of the Western Ghats in south and in the west. The terrain of Attappady area is marked by hills and valleys, particularly high mountains and narrow valley in the western half (Muraleedharan and Sankar 1991). Attappady lies between the two ranges of Western Ghats and the general slope of the area is towards north-east. Once the hump like mountain range from the Mannarkad approach is crossed, the plateau slides gradually towards east and merges with the elevated plains of Tamil Nadu. From the south-west the elevation increases from 90 m to 550 m at Mukkali. From Mukkali to Anakkatty towards east, the elevation is between 500 m and 575 m. The northern boundary of Attappady block lies at an elevation of around 2300 m in the Nilgiris peak. From there it decreases along the south-west and later climbs up to 2000 m at Muthikulam (KSLUB and NRSA 1994). The highest peak Malleeswaram[2] has a height of 1664 meters. This could be seen from most locations in Attappady.

Around 51% of Attappady has an elevation between 600m to 1000m and 71.6% of the area has a slope between 15 to 30 degrees (Ibid. 1991), showing the environmentally sensitive nature of the region

[2] Malleswaram is the highest peak in Attappady. Tribal people considered this as the abode of Siva. Some of them worship the peak itself (GOK 1976b)

2.2.2.2 Rivers

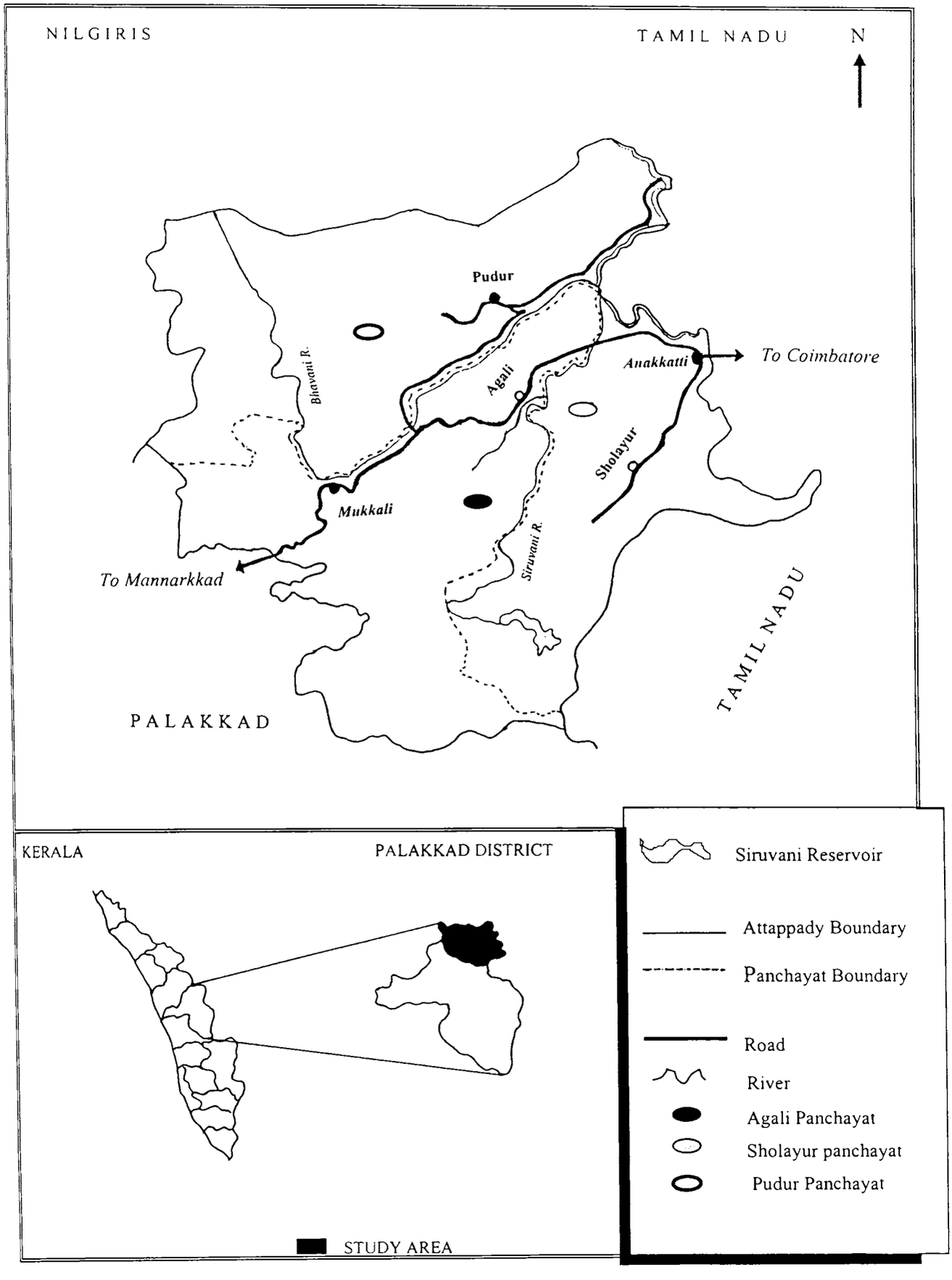
Two major rivers Bhavani, in the northern half, and Siruvani, in the southern half, originate in this area and flow towards east into Tamil Nadu and join to form a tributary of Caveri. The Bhavani river springs from the Kundha mountains near Kudikadubeta in the Nilgiris. Before it enters into Kerala, Bhavani is fed by two streamlets just 9.66 km away from its starting point. These are in Tamil Nadu. About 18.5 km from its entry into Kerala, it takes a right angled turn and flow there after more or less in a north easterly direction draining along its course a few more tributaries until it passes beyond Kerala borders. It takes a circuitous course through the Attappady valley. The numerous streamlets winding in and out of the many hills of Bhavani river drain the whole valley (GOK 1976b). Bhavani river, though a blessing to the southern half of Attappady valley, remains dry during summer seasons making the land and people waiting for another rainy season. The catchment area of the Bhavani river in Kerala comes to 569.8 square kilometre.

The Siruvani River[3] takes its origin from Muthikulam Reserve Forest, then it flows into a deep and legendary lake called Muthikulam, which lies at an elevation of about 1219 metres above seal level. At Muthikulam a diversion work takes off water for the drinking purposes of Coimbatore Municipality about 45.1 km. From Muthikulam the river takes its direction towards north east and join Bhavani river at Koodappatty at the boundary of Coimbatore district in Tamil Nadu (Ibid. 1976b). Like Bhavani, Siruvani also remains dry-up during early summer onwards mainly due to diversion of water to Coimbatore town.

[3] Siruvani river was not considered as and independent river by Innes and Logans in their writing on Malabar as it join Bhavani at Koodappatty. "The Bhavani flows south from the Kundahs ....., till it is join by its tributory the Siruvani on the boundary of the Coimbatore District" (Innes and Ivans 1908: 467).

Figure 2.1

Location Map: Attappady



2.2.2.3 Climate and Rainfall

Being located in the rain shadow Attappady receives much lower monsoon rainfall. The mountain ranges separating the valley from Mannarkad obstruct much of the rain-bearing clouds. Consequently, a rain-shadow area is formed beyond and east of the mountain ranges. The slopes facing the west and the areas immediately lying to the east receive high rainfall. As one moves to the east towards the border of Tamil Nadu, the rainfall declines sharply (GOK 1976a). The average rainfall varies 794.87 mm at Agali to 794.98 mm at Pudur. Much higher rainfall, varying from 1574 mm at Sholayur to 2289.6 mm at Mukkali, is received in the highly elevated region in the western parts near the origin of Siruvani and Bhavani rivers respectively. The spatial variation in rainfall is very high in Attappady region. The monsoon starts during the month of May and continues up to November with a high rainfall period during July and low rainfall period during the month of August.

Yet, high rainfall areas receiving more than 2000 mm dominate the region constituting 45.7% of the total geographical area. These areas are located in the western and southern sectors. Medium rainfall region , ranging from 1000 mm to 2000 mm a year, is found to be 29.95% of the total area. Most of the tribal hamlets are located in this part of Attappady. Areas receiving rainfall below 1000 mm a year, constitute 24.4%. These areas are located in the eastern part of Attappady. This part is occupied mainly by tamil settlers from Tamil Nadu and tribals. The annual rainfall in this part of Attappady is less than 800 mm a year with 6 to 9 months dry seasons (Muraleedharan and Sankar 1991). However, the average of the dry part of Attappady is only around 900 mm per year. Based on Kavundikkal rain gauge station the average annual rain fall for the year 1993 was 952 mm. It was below 900 mm for the year from 1989 to 1991 (KSLUB and NRSA 1994).

2.2.2.4 The People

The population of Attappady consists of tribals and non-tribals. The non-tribal population consists of migrants from Tamil Nadu, mainly in the eastern low-lying portion, and migrants from the rest of Kerala, mainly in the western regions. The anthropologists do not consider the tribal inhabitants of Attappady as aboriginal (Nair 1988). They must all have been in-migrants who sought refuge in the dense forests of the upper reaches to escape persecutions in the plains. The tribals of Attappady belong to three groups, namely, Irulas, Mudugas and Kurumbas (Muraleedharan and Sankar 1991). They reside in small nuclear villages called *Oorus*.

Panchayat-wise population of Attappady as per 1991 census is given in Table 2.1. Accordingly the tribals constitute 39% of the total population. When more than 50% of the population in Pudur Panchayat form tribals, they constitute only less than 30% in Agali. This is an indication of the destination of the migrants in the Attappady region. It can be see that the tribal and non-tribal population is approximately in the ratio 2:3.

Table 2.1

Panchayat-wise Population of Attappady

Name of Panchayat	No. of households	Total population	Tribals	Percentage of tribals
Agali	7082	32738	9507	29.04
Pudur	3018	12354	7130	57.71
Sholayur	4119	16941	7591	44.81
Total	14219	62033	24228	39.06

Source: Census Report, 1991

2.2.2.5 Tribals of the Valley

There are three major tribal communities in the area, namely, Irulas, Mudugas and Kurumbas, all belong to the broad group of Dravidians. Among these tribal groups,

the Kurumbas were less exposed to, and have suffered less from, the incursions of the plains man into Attappady, especially during the initial stages, than the other tribes (Kunhaman 1989). All these tribal communities are listed as Scheduled Tribes. The settlement of the tribals in Attappady is known as *Ooru* (hamlet). Each *Ooru* contains, on an average, 50 houses constructed in rows, close to one another. As per 1981 census there were 20659 tribals in Attappady, spread over 140 hamlets. By 1995 there were 168 oorus constituting 24228 tribals.

Tribal hamlets of Attappady are found in all the three Panchayats, namely, Agali, Pudur and Sholayur. The distribution of these hamlets in these Panchayats is given in Table 2.2.

Table 2.2

Tribe-wise Distribution of Hamlets in the Three Panchayats

Panchayat	Irulas	Mudugas	Kurumbas	Total
Agali	35	15	--	50
Pudur	32	5	16	53
Sholayur	37	--	--	37
Total	104	20	16	140

Source: ITDP Office, Agali

Irula hamlets dominate in all the three Panchayats. The Kurumbas reside only in Pudur and Sholayur is an exclusively Irula Panchayat. The break-up of tribal population of Attappady is given in Table 2.3. Numerically, Irulas form the largest tribal community (82.25%) followed by Mudugas (12.53%) and Kurumbas (5.22%). Annual compound growth rate of Kurumbas during the period 1961 to 1981 was 2.44% as against 1.61% in the case of Mudugas, while Irulas registered an increase of 2.41%.

Table 2.3

Tribe-wise Break-up of Population in Attappady

Name of Tribe	1961	1971	1981
Irulas	10559 (80.30)	12649 (80.06)	16990 (82.25)
Mudugas	1881 (14.40)	2370 (15.00)	2590 (12.53)
Kurumbas	693 (5.30)	790 (5.00)	1079 (5.22)
Total	13133	15800	20659

Source: ITDP Office, Agali

(i) The Irulas

The Irulas (Irulans or Irulars), the numerically dominant tribe of Attappady, derive their name from their complexion as *Irula* (pitch black). Irulas are of Tamil origin and formerly occupants of Coimbatore district. It is probable that the Irulas of Attappady are the descendants of those who migrated from Coimbatore to Attappady forests when there was a great water scarcity in Coimbatore and neighbouring places. The history of their mass migration dates back to the end of 16th century or the beginning of 17th century (Luiz 1962). There are 104 Irula hamlets in Attappady. Irulas are of medium height, long armed and have curly hair, prominent check bones and narrow noses. They speak a mixture of *Malayalam*, *Canerese* and *Tamil.*

Originally they were shifting cultivators. As a consequence of wide encroachment by settlers they have taken to settled-agriculture and plough cultivation. Generally they cultivate millets such as *makka cholam* or maize (*Zea mays*), *ragi* or French millet (*Eleusine coracana*) and *chama* or Little millet (*Panicum miliaceum*), pulses (like *thuvara* or Red gram) and oilseeds (like groundnut and castor seed)(GOK

1976a). As of now, they have added to their cropping pattern almost all the crops cultivated by tamil and malayali settlers.

The traditional Irula houses are made up of bamboo, mud and grass and are built in a row. Recently, a number of tiled and concrete houses were constructed by the Integrated Tribal Development Project (ITDP) in certain Irula hamlets (Muraleedharan and Sankar 1991). Irulas quarrel for these Government-sponsored houses in spite of the fact that sleeping under these asbestos or tile roofed houses is for them like lying below amber bed. As sleeping within the house is intolerable during summer, in many Irula hamlets they are found taking rest at night outside these concrete houses.

(ii) The Mudugas

The Mudugas or Mudugars are the second largest tribal community in Attappady. The name Mudugar is said to have originated from the primitive custom of carrying children on their *Muthukus* (back) which is not the practice with other tribes of the valley. Mudugas live in remote forest settlements of the Attappady tribal area. They always prefer to be as far away as possible from the civilised people of the plain.

Mudugas have no knowledge about their origin and early history, though they are believed to be Tamilians from Coimbatore district, who are attracted by the lure of extensive agricultural activities in the fertile soil of Attappady. They have legends connected with their origin in common with the Kurumbas. There is a belief that they were Kurumbas and subsequently broke away from them to form a separate community. Another belief is that the Muduga established the township at Coimbatore and later moved westward due to persecution and exploitation by more dominant communities (Ibid. 1991).

Mudugas are of medium height, curly hair, thick lips and have most of the external features of primitive tribes. Their complexion varies from light to dark shades of brown. They converse in a dialect of *Tamil* with many *Tulu* words and phrases, and have poor speaking knowledge of *Malayalam*.

Like Irulas, they also practice settled agriculture but with many features of shifting cultivation. The principal agricultural products they produced are *chama*, *ragi*, paddy, red gram, black gram, horse gram, cotton, groundnut, ginger, sweet potato, tapioca, etc. (Rajendran 1979). These tribal groups lost most of their land through encroachment and other improper practices by malayali settlers. The growing contact between Mudugas and Malayali settlers has led to acculturisation of this tribe, which often ends up in inter- marriages with the latter and erosion of tribal culture.

(iii) The Kurumbas

The Kurumbas are one of the most primitive tribal communities in Kerala. They were perhaps the earliest inhabitants of Attappady, strongly believed to have moved down from Nilgiris with the colonisation of the area by Badugas (Muraleedharan and Sankar 1991). Kurumbas also claim that they are the descendant of those who fled from Mysore during a war and hid in the forests.

There are 16 Kurumba hamlets in Attappady, of which nine are in the Reserved Forests and the rest in the vested Forests and are located mostly in valley of river Bhavani and its tributary. The Kurumbas are short, flat nosed people. The language spoken by them is a mixture of *Kannada*, *Tamil* and *Malayalam*. Their houses are built, in general, in rows, made up of grass, bamboo and mud. The Kurumba term for house is *Aalai* or *Salai.*

The Kurumbas are shifting cultivators and food gatherers. In olden days they had freedom to cut and burn as much area as they could manage for shifting cultivation. Now they have to take permission from the officials of the Forest Department who allot a particular patch irrespective of their choice. The Forest Department allots the land (*Kothukadu*) in the name of Ooru Moopan (*Chieftain*), it is he who demarcates plots of each households in the hamlets. He is assisted by a *Bhandari* (Treasurer) and a *Kuruthalai* (Junior Headman) and M*annukkaran* (a soil man or agricultural expert). With the switch over to settled agriculture the role of *Mannukkaran* has dwindled into a ritualistic one (Mathur 1977). It is still possible to identify the *Mannukkaran* in most of the hamlets. The Kurumbas sow all seeds such as *chama*, *thuvara*, jower, black gram, *ragi* and so on.

2.3 Methodology

Both primary and secondary data have been used in the study. The study consists of two stages. In the first stage a macro analysis of the settlement and land use pattern of Attappady is made, while in the second stage, a micro analysis of land use and crop selection by the aboriginal and settlers in the selected area is attempted. In this stage information on farm practices, costs, prices and profitability of cultivation of the various crops is collected through a farm household survey by using a structured interview schedule. Participant observations and interviews are the other major tools used for generating information in this context.

To assess the economics of crop cultivation among various farming systems and among farming groups we have used cost and income concepts used in the Farm Management Surveys of India with suitable modification. To analyse the viability of the crop cultivation practices followed by farming groups we have used Benefit-Cost Ratio.

Apart from descriptive and tabular statistics we have used statistical tools such as ratios, percentages and regression analysis to analyse the questions posed in the study.

2.4 Sample Design

2.4.1 Sample Selection

As mentioned already, the survey was conducted in two villages of Attappady block. For an intensive study a multi-stage sampling design was followed in order to select the study region and the ultimate unit of analysis, namely, the farm households. In the first stage, Attappady is selected on account of various reasons cited in the second section. The area is spread of 731 km^2 comprising six revenue villages, namely, Agali, Kallamala, Kottathara, Sholayur, Pudur and Padavayal. The magnitude of settlement and its impact on land use change in these villages are not uniform. For example, the extent of influence of malayali settlers are high in Kallamala, Agali and Padavayal Villages, whereas, the impact of tamil settlers are high in Sholayur, Kottathara and Pudur Villages. In order to compare and contrast the influence of these two types of settlers we require two areas - one with malayali predominant and the other with tamil dominant. At the same time these two areas may not be occupied exclusively by either of these two settler groups. Keeping these considerations in mind, we selected Agali and Sholayur villages as the second unit of the study. These two villages lie on both sides of Siruvani river and have more or less the same agro-climatic situation. Both these villages consist of tamil farmers, malayali farmers and tribal farmers. Thus Agali and Sholayur are selected to capture the diversity of the land use dynamics in the area.

For selecting the sample households, stratified sampling was employed using settler groups and tribal as strata[4]. This kind of strata is prepared for examining the differences in the land use dynamics as between settlers and tribals on one hand and

[4] A stratified sampling is one obtained by separating the population elements into non-overlapping groups called strata and then selecting a simple random sample from each stratum (Scheaffer et al. 1986)

between malayali dominant and tamil dominant regions on the other. We have three strata representing three farming groups, Malayalis, Tamils and Tribals.

In order to select the sample house list, Voters list available in the Panchayat was used as the sample frame. One defect of this list is that it includes both farm and non-farm households. Once the household is listed from the voters list sequentially, it is checked with the village-wise list of farmers with land holdings. The voters list is used also to divide the total population of each village according to the three strata of farming groups. Information on the number of tribal households in each village is available in the Integrated Tribal Development Project Office, Agali. However, no such information is available to find out separately the number of tamil settlers or malayali settlers in the selected villages. The voters list was made use of to prepare the distribution of settler population on the basis of the names of the members of the households. From the surnames like Gowndan, boyan, chettiyar, etc. tamil settlers were easily marked out in the voters list. In order to maintain accuracy to the maximum extent possible, in the classification of the population into three strata, the help of two experienced old settlers - one each from the malayali and the tamil households - in the study areas, was obtained. Thus, sets of name of the head of the household written sequentially, on the basis of this method, from the voter's list formed the sampling frame.

2.4.2 Sample Size and Allocation

Given the wide crop diversity and the statistical errors connected with cross-sectional analysis of data within and between farming groups, it was essential to take a fairly a large sample size. For various estimations like farming system characteristics, crop combinations, cost of production and the like a minimum sample size of 300-400 families or households is required (Cochran 1977). Hence it was decided to take a reasonably large sample size of 367 farm households. This number corresponds to

approximately six per cent of the total farm households in the two villages. Special care has been taken to avoid estate owners.

To allocate the sample among the strata, proportionate stratification was used. That is, for making the strata sample sizes proportional to the strata population size, a uniform sampling fraction was used. If N_i and n_i are the population size and sample size for the i^{th} stratum, the uniform fraction (f) is given by

$$f = n_i/N_i = n/N \quad .....2.1$$

Where $n = \Sigma_i n_i$ is the whole sample size; and $N = \Sigma_i n_i$ is the total population in all strata. From the above equation the i^{th} stratum sample size (n_i) is given by,

$$n_i = (N_i / N)\, n \quad .....2.2$$

Where n/N is approximately 6% and hence the size of each stratum sample is also approximately 6% of the size of the population in the stratum.

Using the above method, from the population list the sample households for each strata were selected proportionately on a systematic sampling basis with a random start. In other words, in the list of first stratum first household was selected with the help of a random number table, then every fourth households was selected so as to make the sample size of the first stratum proportionate to the total population of that stratum. The same procedure was adopted to obtain 6% sample each from Agali and Sholayur villages (Table 2.4).

Table 2.4

Allocation of Sample Households Among Selected Villages

Farming Groups	Population Size			Sample Size		
	Agali	Sholayur	Total	Agali	Sholayur	Total
Malayali Settlers*	2083	480	2563	125.0	28.8	153.8
Tribals**	1264	677	1941	75.8	40.6	116.5
Tamil Settlers*	874	750	1624	52.4	45.0	97.4
Total	4221	1907	6128	253.3	114.4	367.7

Source: * Prepared from the Voters List
** ITDP, Agali.

The total sample of 367 is approximately 6% of the total population in the study area. At the same time allocated sample size of Agali and Sholayur between three farming groups, viz., Malayalis, Tribals and Tamils are also 6% of the respective categories.

One advantage of proportionate stratification is that it simplifies the formula for estimating the population mean of any variable. To see this, let Y_i denote the sample mean for the simple random sample selected from stratum i, n_i the sample size for stratum i, μ_i the population mean for stratum i. An unbiased estimator of the population mean μ is given by

$$Y_{st} = (1/N) \Sigma_i n_i Y_i \qquad 2.3$$

where Y_i is an unbiased estimator of the population mean for stratum i.

Using equation 2.1, equation 2.3 can be simplified to:

$$Y_{st} = (1/n) \Sigma_i n_i Y_i$$

$$= (1/n) \Sigma_i \Sigma_j Y_{ij} \quad i = 1, ...,m; \; j = 1,....,n_i \qquad 2.4$$

Where,

$$Y_i = (1/n_i) \Sigma_j Y_{ij} \; ; \; i = 1,...,m; \; j = 1,....,n_i \qquad 2.5$$

Equation 2.4 establishes that proportionate stratification reduces the "stratified" estimator of the population mean to the "simple" sample mean. We used these in the estimation of average area cultivated, average yield, etc. by the farming group.

2.5 Interview Schedule Design and Administration

To collect the information required for the study a structured interview schedule was prepared. Before structuring the interview schedule discussions were held with a few residents in the study villages, both settlers and tribals. In the preparation of the interview schedule agricultural survey schedules used earlier, were consulted. Before the final survey, a pilot survey was carried out. Along with the interview schedule an instruction manual was also prepared to assure the accuracy of the data collected.

The interview schedule contained questions on in-migration details, household structure, land holding details, cropping pattern, nature and extent of crop succession, cost of cultivation and return from farm and non-farm activities and forest dependence.

The survey, along with participant observation and interviews with key informants, was carried out during the agricultural year 1st June, 1994 to 31st May, 1995. During the interview, special attention was given to establish good rapport with the farmers by explaining to them why we came here and what for in a simple and polite way. This step was very important to obtain reliable information because some farmers might tend to provide incorrect information if they felt that the interviewers were Government Official. The farmers were assured that the survey was not supported by the Government and that it is part of a Ph.D effort. Farmers were also assured that the information they released would remain strictly confidential. During the time of field survey, rumours were agog in Attappady that the Government is going to take action to evict settlers from Attappady land, as this land had belonged to tribals. As this news spread like fire, many settlers respondents hesitated to give answers to our questions, related to area of land, nature of ownership and name of person whom they got this land. In order to get accurate information, in exceptional cases, we have taken a biased stand, explaining them that this study supports settlers. The same strategy was used in a few tribal households as they expressed reluctance in giving information. The few household which did not respond, had dropped from the sample list and the gap was filled from the buffer of the sample size.

The farmers were interviewed in isolation from their friends and/or relatives during the interview, to make sure that the answers would not be affected by arbitrary responses from people around them. In most cases, the head of the household is interviewed. However, in a few cases, the member of the household who managed the agricultural activities of the household was interviewed. Instead of asking questions

straight way from the interview schedule and to reduce the monotonous nature of formal interviews a kind of highly informal talk was made starting from their family structure to the present land use picture. Instead of collecting the information directly to the structured schedule, a note book and field recorder was used. In order to check the reliability of the information given and to collect information related to the geographical aspect of the farm land, the land was visited personally by the interviewer along with the respondent.

2.6 Summary

In this chapter the details of the study area, methodology and the techniques employed in collecting data for this study was presented. First, it was stated why this study area was chosen. Second, a detailed description of the study area (location, agro-climatic features, other physical characteristics and demographic structure) was given. Third, the chapter detailed the general methodology and the procedures of sample selection and the allocation of the sample among the different strata. Finally, the interview schedule design and its administration was discussed. Having discussed the survey methodology and the design of the interview, we now pass on to an analysis of the socio-economic dimensions of the sample in the next chapter.

Chapter III

SOCIO-ECONOMIC DIMENSIONS OF THE SETTLED ECONOMY

3.1 Introduction

The land use decisions of the households are greatly influenced by their social, demographic, economic and cultural settings. Any examination of the farm economy or land use decision, especially in a recently cleared forest area, would not be complete without examining the socio-economic conditions of the farm households concerned. The inter-relationship and interaction of tribal people, having poor economic situation and unique cultural settings, with land-hunger settlers, in terms of their socio-economic settings are discussed in this chapter.

3.2 Basic Settings of the Settled Economy

In the beginning, we present a comparative profile of the status of settlers and tribals in the two villages, namely, tamil-concentrated Sholayur and the malayali-concentrated Agali, with the help of some selected indicators. In order to get a broad picture of settlers vis-à-vis tribals we have selected the indicators: size of the family, size of land per household, size of land per person, average number of crops grown (crop diversity), per capita farm income and per capita off-farm income (Table 3.1).

The average household size of malayalis (5.01) is 1.3 times higher than that of the tribals and 1.09 times higher than that of tamils in Agali. However, interestingly, the average family size of malayalis (4.07) is lower than that of tribals and tamils in Sholayur. This clearly shows the relative dominance of malayalis in Agali; and dominance of tamils in Sholayur. It is a custom of tribals to live in independent house after marriage. The small family size of tribals can also be attributed to the allotment of

houses through the Government sponsored programmes and the resultant emergence of nuclear family among them. The Government sponsored houses, however, has been a major motive for tribals to acquire independent houses immediately after the marriage.

The differences in land ownership between settlers and tribals are substantial. The average size of land holdings of settlers is 1.6 times higher than that of tribals in Agali. In Sholayur, the average size of holdings of malayalis is lower than that of the tribals and tamil settlers. However, the per capita land availability is advantageous to settlers when compared to tribals in both the areas. In addition to different levels of land ownership among farming groups, the distribution of ownership of wet and garden land differs substantially among them (Figures 3.1 and 3.2). A very high percentage of wet land in Sholayur is occupied by tamil cultivators and the shares of other two farming groups are relatively insignificant. While in Agali, large area of wet land is occupied by malayalis, followed by the tamils. Although variation in wet land ownership is significant among settlers, a larger share of such lands in the study area is owned by tamilians. In both the villages the share of tribals in wet land is relatively low. A similar pattern is observed in the distribution of garden land also. However, the order of dominance is reversed and stands in favour of malayali cultivators.

Another interesting observation is that in terms of the number crops cultivated, there is clearly divergence between the two areas and within the farming communities. On an average, a malayali cultivates ten types of crops in his land in Agali; but only six in Sholayur. Also the number of crops grown is sizeably larger for malayalis in both the areas when compared to tamils and tribals. However, the crop preference -- between perennial and annual or seasonal -- among farming groups shows a different picture. Malayalis in both the villages, on an average, cultivate more perennial crops and; tamilians and tribals on the contrary cultivate more annual or seasonal crops. This is an indication of the preference of settlers from Kerala towards perennial-crop-based cropping system.

Table 3.1

A Comparative Profile of Settlers and Tribals in Two Villages

Indicators	Agali			Sholayur		
	Malayalis	Tribals	Tamils	Malayalis	Tribals	Tamils
Mean household size	5.01	3.96	4.56	4.07	4.17	4.40
Size of land per household (acres)	6.10	3.76	6.17	4.58	4.84	5.32
Size of land per capita (acres)	1.62	1.10	1.66	1.21	1.17	1.32
Number of crops grown (Diversity)	10	8	6	6	4	5
Number of perennial crops	6	3	2	4	1	1
Number of annual or seasonal crops	4	5	4	2	3	4
Per capita farm income (Rs.)	4770	1173	2445	3216	143	4015
Per capita off-farm income (Rs.)	3954	3386	1903	2029	2810	1299

Figure 3.1

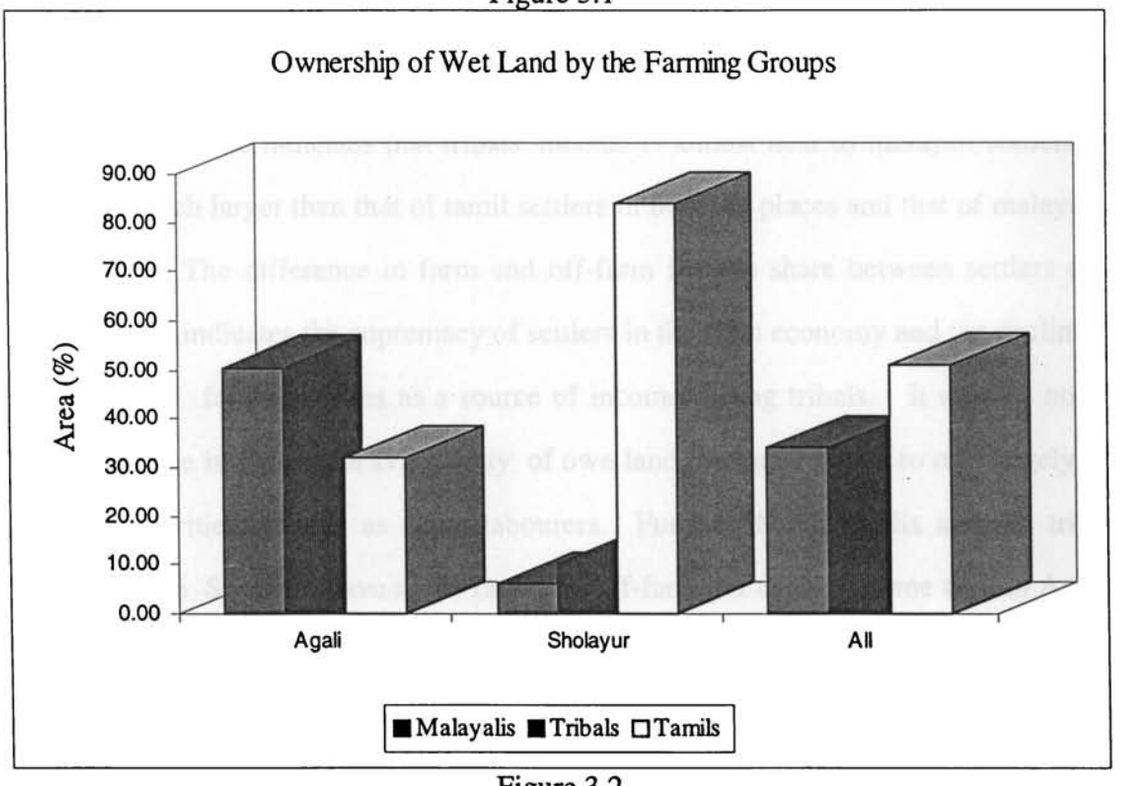
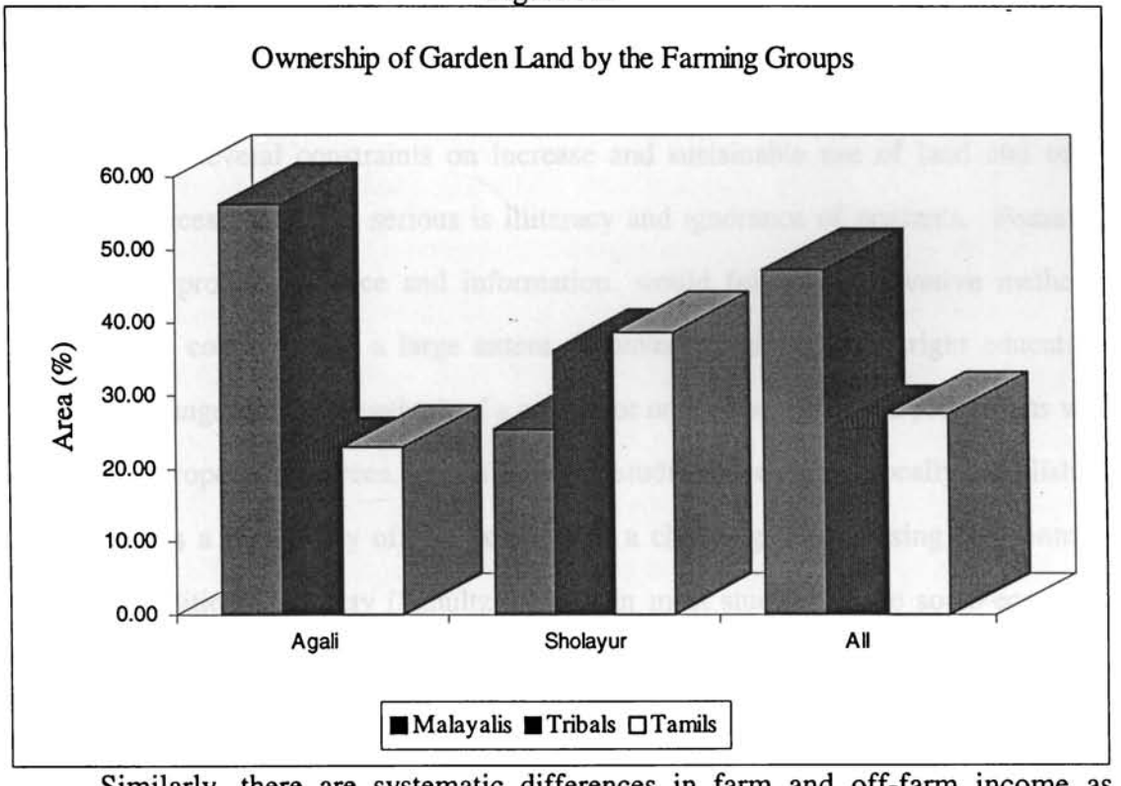


Figure 3.2



Similarly, there are systematic differences in farm and off-farm income as between settlers and tribals. The annual farm income of malayali household in Agali is 2.7 times higher than that of a tribal household and 1.95 times larger than that of a tamil household. While in Sholayur farm income of malayali household is 22.4 times

larger than that of a tribal household. The farm income of the tamil household in Sholayur, however, stands higher than that of a malayali household. However, the data on off-farm income indicates that tribals' income is almost near to malayali settlers in Agali and much larger than that of tamil settlers in both the places and that of malayalis in Sholayur. The difference in farm and off-farm income share between settlers and tribals clearly indicates the supremacy of settlers in the farm economy and the declining importance of farm activities as a source of income among tribals. It may be noted that the decline in per-capita availability of own land has made tribals to rely largely on off-farm activities, mainly as wage labourers. Further, the malayalis and the tribal households in Sholayur have a low farm and off-farm per capita income than in Agali. Having discussed the basic settings with some selected indicators, we now pass on to the detailed examination of the socio-economic profile of the farm households.

3.3 Educational Profile

Of the several constraints on increase and sustainable use of land and other natural resources, the most serious is illiteracy and ignorance of peasants. Peasants, unless given proper guidance and information, would follow conservative methods. This obstacle could be, to a large extent, removed by giving them right education. Education changes the total outlook of a cultivator on the use of private property as well as common property resources, as a number of studies have unequivocally established. Education has a higher pay off for peasants in a changing, modernising environment than in a traditional society (Schultz 1964). In most studies on the socio-economic status of households, education of the head of the household is taken to examine its impact on decisions concerning land use and other farm practices. This method is, in a strict sense, inappropriate in an economy in which the younger generations also actively participate in productive activities. The level of education of the head of the household, though important in farm practice and decision-making, is not a suitable criterion for evaluating the influence of education on cultivation practice of a household. Any

attempt to analyse the influence of education on decision making at the farm level, therefore, should consider the level of education of other members of the family as well, living permanently in the same or nearby household and participating in its cultivation. In our analysis, educational status of all the working members of the family is included. In order to get a true picture of the family education level in a single compact value a household's Family Education Index (FEI)[1] was obtained. The family index of education is obtained by giving rank to different levels of education of the productive members of the household. Summing this value we will get total educational level of each household. Index of each family is then obtained by dividing total level of education by the number of productive family members. Conveniently, the index, thus, obtained is divided into four categories, namely, 0-4, 4-7, 7-10 and greater than 10. This is then converted into 100. Hence the family falling in the category of 75-100% can be treated as a highly educated family.

Taking the total productive members it is seen that in Agali the proportion of illiterate people is 3.4% among malayalis, 43.3% among tribals and 35.8% among tamils; in Sholayur the corresponding percentages are 6.9%, 28.6% and 27.1%. The percentages of people with primary level of education, both in Agali and Sholayur, also show more or less same picture as in the case of illiterate. Tribals and tamilians are found to be the largest percentage of people not having good education. It may be noted that about 63.2% of the malayalis in Agali and 56.4% in Sholayur are educated at high school and above levels. The corresponding percentages for tamils are 18.9% and 26.4%. As for tribals these figures stand at a very low level of 8.9% and 17.9% respectively. This indicates that tamils and tribals having higher levels of education are far below the level of education attained by the malayali settlers.

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[1] Family Education Index (FEI) = Σ EDi / Σi (where, ED = Level of Education, i = 1 to n Productive family memebrs. The rank for education level is given as 1 to 10 for primary level to SSLC, 11 and 12 for intermediate level, 13 to 15 for graduate levels, and so on.

Table 3.2

Distribution of Members of Households According to the Level of Education

(Percent)

Category/ Region	Level of education				
	Illiterate	Primary	Middle	High School	Secondary & above
Malayalis	3.4	12.3	21.1	40.0	23.2
Tribals	43.3	30.8	17.0	8.5	0.4
Tamils	35.8	24.9	20.4	14.9	4.0
Agali	20.3	19.6	19.9	26.8	13.4
Malayalis	6.9	14.9	21.8	29.7	26.7
Tribals	28.6	38.4	15.2	17.0	0.9
Tamils	27.1	23.2	23.2	21.9	4.5
Sholayur	22.0	25.5	20.4	22.6	0.5
Malayalis	4.0	12.7	21.2	38.4	23.8
Tribals	38.7	33.1	16.4	11.1	0 .6
Tamils	32.0	24.2	21.6	18.0	4.2
Total	20.8	21.2	20.0	25.6	12.3

Taking these two areas together it is seen that the percentages of people in the illiterate category are 4%, 38.7% and 32% for malayalis, tribals and tamilians respectively. About 33.1% Tribals and 24.2% of the tamilians are educated at the primary level. While moving to higher levels of education their percentage declines; whereas for malayalis it is on the increase. When 23.8% of malayalis are above SSLC only a mere 0.6% among tribals and 4.2% among tamilians are found to belong to this category. Tamil families, like tribals, do not give much importance to education. Even though they are capable of financially supporting their wards for educating them, most of these families are reluctant to send their children after they obtain primary level of education. Both tribals and tamilians are yet to go a long way in the matter of education to reach levels already attained by malayalis.

Family education index may be considered a compact unit of measuring the educational status of each household. Table 3.3 presents the percentage of settlers and tribals under four groups based on education index. It is found that in Agali a larger percentage of malayalis falls in the third and the fourth categories. Whereas, 88.2% of tribals and 61.5% of tamilians fall under the first category, not even a single tribal household falls in the third and the fourth categories. Thus it is evident that malayalis are, in general, a well-educated farming group. When we examine the position in Sholayur, where tamilians are the majority, malayalis are far ahead in educational attainment. Taking the sample population as a whole we found that 69.5% of the malayali households fall in the upper index category. The deplorable position of the tribals in the matter of educational status has been brought out by several studies carried out in the past few decades.

3.4 Occupational Profile

In a newly-emerged predominantly agrarian society, the occupation of the members of the households would be primarily in agriculture and allied sectors. However, they may also earn income from other sectors, which has considerable influence in their outlook and perception towards various assets creating activities. We examine in the following section the occupational status of the members of the households. We have classified occupational status of the members initially into main and subsidiary; each category is then subdivided into nine categories, namely, (a) agriculture (cultivation) and other allied activities (b) wage labour (Coolie) in agricultural and non agricultural sectors (c) trade/business (d) Government employees (e) artisans (f) students (g) household works and (h) others (Table 3.4). It is observed that cultivators accounted for 38.6% and wage labourers 20.9% of the working population. Persons engaged in occupations other than household activities form only small percentage. While 38.2% of malayalis and 52.1% of tamilians are engaged in

own cultivation, only 26.2% of tribals are engaged so. This fact clearly reflects the dominance of settlers in agricultural activities conducted in own land and the weak position which the tribals have in this respect. The majority of tribal household members (52.4%) earn their livelihood by wage labour on land owned by the settlers (Interview: Settlers and Tribals 1994).

Table 3.3

Family Education Index of Settlers and Tribals

Category/ Region	Education index			
	0-4	4-7	7-10	> 10
Malayalis	4.8	24.8	48.8	21.6
Tribals	88.2	11.8	--	--
Tamils	61.5	30.8	7.7	--
Agali	41.5	22.1	25.7	10.7
Malayalis	3.4	31.0	44.8	20.7
Tribals	79.5	12.8	7.7	--
Tamils	46.7	37.8	11.1	4.4
Sholayur	46.9	27.4	18.6	7.1
Malayalis	4.5	26.0	48.1	21.4
Tribals	85.2	12.2	2.6	--
Tamils	54.6	34.0	9.3	2.1
Total	43.2	23.8	23.5	9.6

Source : Computed from the field data

The distribution of the people in Agali according to occupational status shows that malayalis (41%) and tamils (55.2%) rely on own land as cultivators and a large share of tribals (55.5%) on others' land as wage labour. In Sholayur, 23.8% of malayalis are operating in own land and 29.7% of the household members are engaged in household activities; the tribals mostly depend on others' land (46.5%) for their livelihood as casual wage labourers. Just like in Agali, in Sholayur also the majority of the tamil households are in cultivation of own land for livelihood. Thus we find that the tribals (Irulas) have lost most of their lands. It may be noted that till the second

quarter of the 20th century, Attappady area has remained untouched by settlers, neither tamils nor malayalis (Kunhaman 1989).

Table 3.4

Distribution of Household Members According to Main Occupation

(Percent)

Category/ Region	Main occupation of the people							
	Agri-culture	Wage labour	Trade or Business	Govt. service	Artisans	Students	House-hold	Others
Malayalis	41.0	8.2	7.1	6.1	1.9	11.1	20.9	3.6
Tribals	23.5	55.5	2.0	1.2	3.2	11.7	2.8	25.5
Tamils	55.2	10.9	3.0	1.0	0.5	5.0	20.4	4.0
Agali	39.5	20.8	4.9	3.8	1.1	7.8	18.5	3.5
Malayalis	23.8	7.9	5.9	3.0	5.9	20.8	29.7	3.0
Tribals	31.5	46.5	2.4	3.1	3.1	12.6	0.8	32.9
Tamils	48.1	9.5	6.3	1.3	1.3	3.8	25.9	3.8
Sholayur	36.3	21.2	4.9	2.3	2.1	8.0	22.5	2.6
Malayalis	38.2	8.2	6.9	5.6	2.6	12.7	22.3	3.5
Tribals	26.2	52.4	2.1	1.9	3.2	12.0	2.1	27.6
Tamils	52.1	10.3	4.5	1.1	0.8	4.5	22.8	3.9
Total	38.6	20.9	4.9	3.4	1.4	7.9	19.6	3.2

3.5 Community Profile

In Attappady block the main community division is between tamils and malayalis. The tribals are considered as independent community group with three subdivisions, namely, Kurumbas, Mudugas and Irulas. As our study area comprises only Irula community, separate explanation of their proportion has no relevance. So, community- wise concentration of malayali and tamil settlers are important in this context. Among the malayali settlers, the main community divisions are Roman Catholic Christians, Other Christians, Nairs, Other backward classes and Scheduled Castes. The major tamil communities are Gowndans, Boyan, Chettiyar, Naidu,

Muthaliyar, Konar and Thevar. Area-wise and settler-wise distribution of these communities is presented in Table 3.5.

Table 3.5

Community-wise Distribution of Settlers

(Percent)

Category and Community	Area		
	Agali	Sholayur	Total
Malayalis			
(a) Roman Christians	59.20	48.28	57.14
(b) Other Christians	11.20	6.90	10.39
(c) Nairs	4.80	6.90	5.19
(d) Backward Caste	23.20	37.93	25.97
(e) Scheduled Caste	1.60	0.00	1.30
Tamils			
(a) Gowndans	65.38	60.00	62.89
(b) Boyan	3.85	6.67	5.15
(c) Chettiyar	13.46	6.67	10.31
(d) Naidu	7.69	6.67	7.22
(e) Muthaliar	3.85	6.67	5.15
(f) Konar	5.77	6.67	6.19
(g)Thevar	0.00	6.67	3.09

Among the malayali settlers, the majority are from the Roman Catholic Christians who constitute 59.2% in Agali and 48.28% in Sholayur; the next in the order are Hindus belonging to other backward classes. This category includes Ezhavas and Saliyas. They together account for 23.20% in Agali and 37.93% in Sholayur. The presence of the Nair community is comparatively low in both Agali and Sholayur. This reveals that most of the in-migrants from Kerala constitute Christians.

Both in Agali and Sholayur, the Gowndan community constitutes the majority of tamil settlers. Over three-fifths (62.89%) of the tamil settlers belong to this community.

3.6 Economic Profile

Economic status is measured by way of two indicators: the level of income and the ownership of land. Economically, Agali village is better than the other village. Among farming groups more malayalis is placed in a better income group than the other groups (Table 3.6). In Agali alone more 54.4% of malayalis have income more than 25 thousand per annum; and the corresponding figure for tamils and tribals is 25% and 23.7%. In contrast, in Sholayur village 33.3% of the tamil households lies in the income bracket above 25 thousand, while it is 17 % for malayalis and just 10% for tribals. This clearly indicates that malayalis are better placed in Agali, and tamils in Sholayur. At the same time it is seen that economic position of tribals in Agali is better than that of Sholayur. It is also seen that almost 59% of tribal households belong to the income bracket 10-25 thousand. However, the distribution of households in the low income bracket, that is, below 10 thousand reveals that more tamils (36.6%) in Agali; and more malayalis (27.5%) and tribals (32.5%) in Sholayur lies in this category. The above analysis indicates that inequality is persisting not only between settlers and tribals but within settlers and between malayali-dominated and tamil-dominated villages.

As the economy mainly relies on agriculture as their mainstay, it would be appropriate to examine the share of agricultural income in the total income of the households. We have classified the sample households into five groups (< 20%, 20-40%, 40-60%, 60-80%, > 80%) on the basis of the percentage share of farm income to total income. A similar trend in the distribution of household on the basis of share of agricultural income to total income is observed both in Agali and Sholayur. As for the tribals, a majority of the households' farm income share lies below 20% and only a very small percentage of households depends exclusively on agriculture. They are found to depend excessively on non-agricultural income (Table 3.7). In contrast, more than half of the tamil households and one-third of the malayali households receive income exclusively from agriculture, their agricultural income being in the 80-100% category. If

we assume a norm that if above 80 per cent of the total income emerge out of agriculture, they are considered highly dependent on agriculture, the major portion of the settler households are highly depending upon agriculture. This fact is more visible among tamil households. Tamils households in Attappady, do not seek employment, in general, as casual workers in the land owned of malayali or tribal land holders.

Not only is the dependency of tribals on off-farm activities high their average farm and off-farm income is low too (Table 3.8). Except, in the case of the off-farm average income in Sholayur, in all other cases the average income of the tribals is much lower than those of their counterparts. For example, in Agali the average annual farm income of malayali settlers is 4.51 times larger than that of tribals.

Table 3.6

Percentage Distribution of Households According to Annual Income

Category/ Region	Income group (in thousands)						
	0- 5	5-10	10-25	25-50	50-75	75-100	>100
Malayalis	4.8	14.4	26.4	34.4	12	1.6	6.4
Tribals	7.9	9.2	59.2	23.7	--	--	--
Tamils	23.1	13.5	38.4	21.2	3.8	--	--
Agali	9.5	12.6	38.7	28.5	6.7	0.8	3.2
Malayalis	3.4	24.1	55.4	10.3	3.4	3.4	--
Tribals	10	22.5	57.5	7.5	--	--	2.5
Tamils	11.1	11.1	44.5	24.4	6.7	2.2	--
Sholayur	8.8	18.4	51.7	14.9	3.5	1.8	0.9
Malayalis	4.5	16.2	31.9	29.9	10.4	1.9	5.2
Tribals	8.6	13.8	58.6	18.1	--	--	0.9
Tamils	17.5	12.4	41.2	22.7	5.2	1.0	--
Total	9.3	14.4	42.7	24.3	5.7	1.1	2.5

Table 3.7

Distribution of Households According to the Percentage Share of Farm Income to the Annual Income

Category/ Region	Percentage of farm income				
	0-20	20-40	40-60	60-80	80-100
Malayalis	13.6	21.6	20.0	5.6	39.2
Tribals	51.3	26.4	7.9	3.9	10.5
Tamils	11.5	13.5	13.5	9.6	51.9
Agali	24.5	21.4	15.0	5.9	33.2
Malayalis	20.7	27.6	17.3	3.4	31.0
Tribals	32.5	32.5	7.5	10.0	17.5
Tamils	13.3	13.3	6.7	6.7	60.0
Sholayur	21.9	23.7	9.7	7.0	37.7
Malayalis	14.9	22.7	19.5	5.2	37.7
Tribals	44.8	28.4	7.9	6.0	12.9
Tamils	12.4	13.4	10.3	8.2	55.7
Total	23.7	22.1	13.4	6.3	34.5

Table 3.8

Average Annual Income of the Farm Households

(in Rs.)

Source	Agali			Sholayur		
	Malayalis	Tribals	Tamils	Malayalis	Tribals	Tamils
Farm	19390.42 (53.35)	4300.88 (24.31)	9644.03 (57.85)	11911.45 (60.62)	5021.96 (29.95)	15769.05 (72.66)
Off-farm	16953.60 (46.65)	13387.89 (75.69)	7026.92 (42.15)	7737.93 (39.38)	11743.50 (70.05)	5933.33 (27.34)
Total	36344.02 (100.00)	17688.77 (100.00)	16670.95 (100.00)	19649.38 (100.00)	16765.46 (100.00)	21702.38 (100.00)

Figures in parentheses are percentages

3.7 Asset Profile

Hunger for land was the main reason for the massive influx of people to Attappady. Therefore, the structure of land ownership in the area may be treated as a major determinant of asset status of its population. It is seen that more than 52% of the malayalis in Agali own more than 4 acres of land; while it is around 21% in Sholayur. Interestingly 67.3% of the tamilians in the former and 46.6% in the latter village have holdings of more than four acres of land. Whereas, the holdings of tribals above four acres is smaller in both the villages. However, inequality in land ownership is more pronounced in Agali than in Sholayur. Number of large farmers are 225% larger than small farmers in former village; while it is 130% in latter village. As expected, the tribals of the area were thrown out in the category of small land owners (34.5%) or landless labourers in the process of migrant's occupation of land. This is clear from the dominance of settlers in the ownership of larger size of land when compared to tribals.

Table 3.9

Distribution of Households by Size of Land Ownership

(Area in acres)

Category/ Region	Small (< 2)	Medium (2-4)	Large (> 4)	Total
Malayalis	21 (16.8)	38 (30.4)	66 (52.8)	125 (100.0)
Tribals	30 (39.5)	19 (25.0)	27 (35.5)	76 (100.0)
Tamils	6 (11.5)	11 (21.2)	35 (67.3)	52 (100.0)
Agali	57 (22.5)	68 (26.9)	128 (50.6)	253 (100.0)
Malayalis	11 (37.9)	12 (41.4)	6 (20.7)	29 (100.0)
Tribals	10 (25.0)	14 (35.0)	16 (40.0)	40 (100.0)
Tamils	12 (26.7)	12 (26.7)	21 (46.6)	45 (100.0)
Sholayur	33 (29.0)	38 (33.3)	43 (37.7)	114 (100.0)
Malayalis	32 (20.8)	50 (32.4)	72 (46.8)	154 (100.0)
Tribals	40 (34.5)	33 (28.4)	43 (37.1)	116 (100.0)
Tamils	18 (18.6)	23 (23.7)	56 (57.7)	97 (100.0)
Total	90 (24.5)	106 (28.9)	171 (46.6)	367 (100.0)

Figures in parentheses are percentages

3.8 Participation in Agriculture

Agriculture is the main source of livelihood for most of the families in Attappady. Before the entry of settlers, tribals depended on agriculture as their main source of livelihood; agriculture used to be supplemented by collection of forest produce and hunting. However, the share of forest produce and hunting as a source of livelihood started dwindling due to massive destruction of the forest and unsustainable extraction of forest produce. Now, only a very meagre share of their family income comes from forest produce and, that too, only to families living near forest and in remote forest areas. With the settlers occupying more and more land in the area tribals changed from cultivators of own land to landless agricultural labourers. Agriculture became a secondary occupation for the majority of tribals families (see Appendix A: Table A.1). The extent of wage labour among this community sharply shot up. To examine the role of agriculture in settler and tribal families we have classified the households into five categories on the basis of average time devoted to agriculture by the family (Table 3.10).

On an average, tamil families spent most of their time in agriculture and closely related activities. In malayali families a few members, mostly, the oldest male members, spend their working time almost entirely on their land. Women's role in agriculture is low among malayali families in comparison with tamilians and tribals. In contrast, tribals spent most of their working time in casual labour in farm and non-farm activities, devoting only a small proportion to work on own land. In carrying out their farm activities, both men and women participate actively (Sanathanan 1995). Tribal men are also found actively engaged in several types of casual labour generally carried out by females in the rest of Kerala. The participation of women in agricultural work, especially from malayali families is low due possibly to availability of tribal men and women at low wages. Low wages keep the demand for tribal men for work in agricultural and non-agricultural activities high. Pre-occupation with wage labour and alienation of land have

contributed to their loss of involvement and interest in cultivation of own lands. None of the tribal families uses its entire labour time for agriculture in own land (Table 3.10). At the same time 4% malayalis in Agali and 6.7% tamils in Sholayur spend almost their entire labour time exclusively for cultivation. Among settlers the distribution of families by labour time categories shows an inverted 'U' shape relationship. While a major proportion of settler households in the former village fall in 40-60% and 60-80% family labour time, it is lower in the latter village in the category 60-80%. Like the tribals, malayalis in Sholayur do not heavily depend on agriculture, a fact which becomes evident from their low family labour time share in the category 60% and above. In short, most of the settler families spend a major share of their labour time on own land, a practice which is less among tribals.

Table 3.10

Distribution of Households According to the Time Devoted in Agriculture

(Percent)

Category/ Region	Time in percentage				
	Up to 20	20- 40	40-60	60-80	80-100
Malayalis	2.4	13.6	49.6	30.4	4.0
Tribals	7.9	52.6	31.6	7.9	--
Tamils	1.9	11.5	36.5	48.2	1.9
Agali	4.0	24.8	41.5	27.3	2.4
Malayalis	--	41.4	48.3	10.3	--
Tribals	--	47.5	37.5	15.0	--
Tamils	4.4	15.6	46.7	26.6	6.7
Sholayur	1.8	33.3	43.9	18.4	2.6
Malayalis	1.9	18.8	49.4	26.7	3.2
Tribals	5.2	50.9	33.6	10.3	--
Tamils	3.1	13.4	41.2	38.2	4.1
Total	3.3	27.5	42.2	24.5	2.5

3.9 Summary

The socio-economic indicators for settlers and tribals in two villages show that settlers are in a much better position than tribals. We have examined educational, occupational, economic and farm dependency differences between the two villages and between settlers and tribals. It is observed that educationally both tamils and tribals are backward, whereas educational attainment of malayalis is much higher. The occupational structure reveals that agriculture is the primary occupation of the settlers, while it is only a secondary occupation for the tribals. The dominance of agriculture among settlers is clear also from their economic status, which measured in terms income and ownership of land, is much higher among the settler households. Among settlers, the tamils in both the villages and malayalis in Agali, are better-off. The off-farm income (mainly from casual work) of the tribals forms a major part of their income. The dependency on land as a source of livelihood is low and they earn their income mostly from wage labour. The socio-economic status malayalis in tamil-dominated Sholayur is lower than in Agali. However, the tamils both in Agali and Sholayur are equally well-off. The fact remains that even among settlers a dichotomy in terms of their socio-economic development is visible. The outlook of malayalis and tamils towards land use seems however to be different. This question is examined in the ensuing chapters.

Chapter IV

PROCESS OF SETTLEMENT AND LAND ACQUISITION

4.1 Introduction

In this chapter the history of settlement and land acquisition by malayali and tamil settlers in the Attappady valley is examined. The socio-political reasons for migration of malayalis from Travancore to Malabar, including Attappady; and tamilians from Coimbatore and adjacent areas to this hill range are traced. Even though massive influx of people from both sides of Attappady put pressure on tribals, studies on the location specific character of the process are few. This chapter is divided into two sections. In the first section of this chapter, along with a brief history of land settlement, an overview of the magnitude of migration to the valley and the nature of land acquisition in its various dimensions is presented. In the second section land transfers and the consequent land alienation of tribals and the trend in out-migration are discussed.

4.2 Peasant Migration: Land Scarce Travancore to Land Abundant Malabar

The first ever migration from Travancore took place in 1926 in the valleys of Vakkodan, Kalladikodan and Anakkaranam hills of Mannarkad Taluk (Joseph 1991). This place is situated 10 kilometre away from the present Mannarkad Town. The major settlement areas of Mannarkad were Pottessery, Palakkayam, Irumbakachola and Poonchola. During the same year, migration took place in the unoccupied regions of Kuttiadi (Kozhikode District). The first peasant migrant to Malabar was a sacristan of a Church in Palai, an in-migrant from Vaikam taluk. He had gone there with his family of twelve members and bought a few acres of dry land at Rs. 2 per acre. Sixteen more families of peasant farmers migrated to the jungle lands around Kuttiady between 1927

and 1930. They could not withstand the onslaught of malarial fever and attack from wild animals. The first wave of in-migration to Malabar thus came to an abrupt end. In spite of malarial attack and other problems, second wave of migration soon began to Maruthankara, a place near to the first settlement areas, and became successful (Joseph. 1988).

During the year 1926, Karippaparambil Chockachan and Maliyekkal Thomas Joseph from Kanjirappaly leased 3000 acres of land from Moopil Nair for 99 years in the hills of Pottassery for a rent of 50 *paise* for one acre. Being pleased with Chackochan, Moopil Nair freely gave another 300 acres of land to him.. This incidence was the beginning of Malabar migration in the Mannarkad region (Joseph 1991). The benevolence of Moopil Nair in giving such large acres of land reflects the zero opportunity cost of land even outside the Attappady areas. Also the local people near to Mannarkad were reluctant to take land from Moopil Nair or other *Jenmis* for cultivation owing to two reasons. Firstly, most of the native dwellers had own land for cultivation. Secondly, those who did not have land for cultivation were neither ready to toil nor able to pay land rent. In this circumstances, it was natural that the *Jenmis* entertained migrants who were prepared to offer ready cash in exchange for cultivation rights on land.

In 1932, Kuttiparambil Joseph bought 500 acres near Palakkayam area and started rubber cultivation. In 1942, about 500 acres of land was purchased by Maliyekkal Joseph, Pallivathukkal George Thomas and Mangali Ittira jointly from Elaya Nair. In the beginning, they used the land for the cultivation of *Theruva* or lemon grass *(Cymbopogon citratos*). Failing in *Theruva* cultivation, they decided to sell their share to small cultivators and workers who came with them. This was the beginning of the entry of small settlers in Mannarkad. Till the 1950s, lands of different size were purchased from Moopil Nair and Elaya Nair by rich migrants for cultivation, independently and in

groups, in the Mannarkad area. However, Attappady remained untouched by Travancoreans.

Before the coming of migrants from Travancore to Malabar, Mr. Hunt a European, had leased in 3000 acres of land in Mannarkad from Moopil Nair. He surveyed the areas, prepared a plan and named it as "Pulikkal Rubber Estate". Also he constructed roads for horse journey. However, during the Malabar Revolution of 1921, Mr. Hunt was killed by the rioters. After three years of his death, his estate was taken back by the *Jenmi*. It was this land the Moopil Nair later sold to Chackochen and Joseph in 1926. The plan prepared by Mr. Hunt and signed by Moopil Nair in 1926 is still with the Family of Poovathingal Thomas. In 1937, Chackochan and Joseph independently sold their share of land. Joseph sold his share of 1800 acres to Southern Company in Kozhikode and later, in 1949, the company sold this land to Kizhakkakara Thomachan for Rs. 1,40,000 (Ibid. 1991).

The lease of land by Mr. Hunt indicates that land transfer had started in Mannarkad even before the arrival of migrants from Travancore. Till the 1950s, the trend of migration was influenced by ups and down in the price of agricultural commodities. The Great Depression which began in 1929 had its impact on price of agricultural commodities as well as prices of land. It halted the migratory flow at least for a few years (GOK 1932). The period between the end of the First World War and the beginning of the Second world war was characterised by economic depression. Prices of crops such as pepper, ginger, rubber, coconut, etc., plummeted. For 1000 coconuts, the maximum price was as low as Rs. 10 (Joseph 1991). Falling prices had their impact on in-migration to Malabar. However, after the Second World war recovery began, prices soared and the migratory process took a fresh lease of life.

4.3 Migration to Attappady Valley

Till the beginning of the second quarter of the 20th century, Attappady was inhabited by three hill tribes, namely, Irulas, Mudugas and Kurumbas. Of the several factors responsible for non-interventions in this area by outsiders, the most important was the availability of sufficient lands in the midland. Hence the area remained less exploited and the magnitude of degradation was limited to a sustainable level. Almost all the areas in this virgin region were, before the intervention began, under thick forests and inhabited by tribals engaged in slash and burn cultivation. As the area was under thick forest and infested with blood-sucking leeches and wild animals, accessibility to this area became difficult for early settlers (GOI 1961). Those who came in the beginning succumbed to severe malaria infestation and faced attacks from wild animals (Interview: Early Tamil Settlers 1994).

Not having transport and communication facilities, census enumerators could not reach the tribals settlements. Hence, limited accessibility resulted in false census estimates. Until, the early 1950s, the agents of Zamorins of Kozhikode used to be the main source of information. These Chieftains did not have any source of detailed information regarding the size of families of tribals and their other dependants. A monograph from the 1961 census series makes the following observation about the Kurumbas of Attappady "Inhabiting as they do, in the interior dense forest regions accessibility to them is ordinarily difficult" and notes that they had, therefore, been left out from the detailed (ethnographic) study (Kunhaman 1983). Inaccessibility to the forest areas owing to lack of infrastructure and attack of wild animals and availability of lands in the plain areas discouraged in-migrants to settle in Attappady. However, growth of population and rising demand for land for cultivation prompted the succeeding generations of in-migrants to move towards this area. Government policies also were helpful to settlers to make this area their destination.

By the early 18th century, Attappady had became the *jenmom* property of the Zamorin of Kozhikode. The Zamorin entrusted the administration of this area to three Nair Chieftains, Mannarghat Moopil Nair, Palat Krishna Menon and Eralpad Raja (Mathur 1977). Moopil Nair got larger part of this area as he managed to please Zamorin during his visits. Once Zamorin of Kozhikode happened to stay at Moopil Nair's house. Being pleased with Nair's hospitality, along with *Moopil Sthanam*, a vast area of land has been given to him. In this way Moopil Nair got large areas of land in Mannarkad, including forest areas of Attappady. Nair was given an area, a horse can cover (Joseph 1991). However, Moopil Nair and other *Jenmis* were not very much interested in cultivation of the leech infested forest areas of Attappady. Their interest in this area was confined to capturing elephants from the dense forests for using them for temple festivals. Capturing of an elephant from the Attappady was considered a prestige for the family and was in those days a great news (Interview: Kochunny Nair, K.C., Pakkulam, 1994). Also these chieftains were given right to collect land revenue at the rates of Rs. 0.50 to Rs. 1.25 per acre of land and forest produce respectively as land revenue from Irulas, Mudugas and Kurumbas. The tribals were either tenants or lessees of these *Jenmis*. The tribals enjoyed the right to cultivate as much area as each was able to manage at the prescribed rates of land revenue. In practice, however, they were heavily exploited by the *Kariasthans* (Managers) of the *Jenmis* (GOK 1976b). In the mean time the *Jenmis* managed to get *Jenmom* (Free hold property) rights of these lands from the Zamorin. These three Chieftains were the oldest *Jenmis* of the Attappady Valley. As the landlords had enough land in the plain land, Attappady valley remained virtually intact and untouched by outsiders for long time. The tribals cultivated these areas in their conventional ways such as shifting cultivation, hunting and collection of forest produces. (Kunhaman 1981). Jenmom right gave the landlords the inheritable right to collect usufructs and rent. These land lords had also the power to give this land on lease. Moopil Nair alone managed 70% of the Attappady land. In the first half of the

20th century, a few landlords were given lease rights on the western part of Agali; about 6000 acres were given on lease to one Kunhammed Sahib of Mannarkad (Nair 1986).

Till the close of the 19th century, the valley had neither a police station nor a post office. However, a full complement of village officers was appointed, and beat constables periodically enter the valley and get the signature of the *Adhikari* (Village Officer) in their beat books. During the early day of the 20th century timber was the main product in the valley. Of the total area, 21 hills in full and another hill in part belonged to the Government. The rest of the area was under dispute between the three *Jenmis* referred to above. The dispute led to frequent disturbances which culminated in actual bloodshed in 1901. A solution was finally reached around 1908 by the Divisional Officer under Section 145 of the Criminal Procedure Code. Accordingly 44 hills and part of 5 others were awarded to Moopil Nair, 16 hills and parts of six others to the Eralpad Raja, 10 hills to P.K. Menon and two hills to another *Jenmi* (Innes and Evans 1908). Even after this division most of the areas remained undisturbed by outsiders due to easy availability of land in plain lands of Mannarkad and nearby areas (Kunhaman 1981).

4.3.1 Migration and Demographic Variation

During the beginning of the second quarter of the 20th century there was a general trend of massive migration from Travancore to hill areas of Malabar. It is estimated that, in the first half of the decade 1930-40, there was an average weekly inflow of two or three malayali families from Travancore to Malabar. The period 1940-50 was remarkable in the history of in-migration to Malabar. During this period the existing settlement became enlarged and a number of new settlement emerged. Nearly 50 new settlements developed in the region. Between 1950 and 1960, the number of new settlements developed either as an off-shoot of earlier settlements in nearby areas or independently. The rapidly increasing population and the resultant pressure on cultivable

land in Travancore are considered to have been the major reason for the migration of farmers from Travancore to Malabar during 1930-60 period (Tharakan 1976). This process of migration to Malabar also brought migrants in large numbers to Attappady.

Table 4.1

Growth of Population in Malabar and Palakkad

(in thousands)

Year	Malabar	Decadal increase	Palakkad	Decadal increase
1901	2795.1	--	390.1	--
1911	3015.1	7.84	414.0	6.12
1921	3098.9	2.77	427.0	3.14
1931	3533.9	14.03	463.9	8.64
1941	3929.4	11.19	495.6	6.83
1951	4758.3	21.09	585.7	18.17

Source: Census of India, Madras, 1911, 1921, 1931, 1941 and 1951

Population growth in Malabar and Palakkad during the decade 1941-51 was exceptionally high and is a clear indication of the unnatural pressure of population in this area during that period. An important feature of the in-migrants into Malabar was that the majority of them were Christians. The Christian population in Malabar increased from 54000 in 1921 to 1,54,000 in 1951. The decadal percentage increase in Christian population during 1941-51 in Malabar was 97.69%. In the same period, population in Malabar increased only by 21.09%. The total population of Palakkad during 1901 was a mere 3800. Between 1921-31, the Christian population increased by 13.8 %. Between 1931-41 the increase was 4.88% (Census of India, Madras 1901 to 1941). The Board of Revenue, Madras estimated the tribal population of Attappady in 1947 to be around 10,000 and non-tribal population to be just a few hundred (Vijayanand 1996). Hence, the peak period of Malabar migration, that is 1941-51, affected the Attappady valley the least; migrants occupied lands in other pockets of Palakkad to a much lower extent than they did in other areas of Malabar. Travancreans, therefore, reached Attappady after the 1950s when land became scarce in the plain land and other hill tracks of Malabar.

4.3.2 Agents of Demographic Variation in Attappady

4.3.2.1 Tamil Settlers

The area is inhabited mainly by settlers from Tamil Nadu and Kerala. It is not clear from the available literature as to who the earliest intruders into this area were. In the opinion of some old settlers the earliest were the Tamil speaking Gowndans who came to Attappady in the beginning of the 20th century mainly for buying forest produce. However, According to Innes,

> "In Malabar Malayalam is the language of 94 per cent of the people .... Tamil is the language of 4 per cent, made up mostly of East coast Merchants .... and Gowndans and other inhabitants of the Attappady Valley" (Innes and Evans 1908:91)

A Gowndan from Thadakam, Tamil Nadu, who settled in Attappady in 1924 remembers his experience thus: "I came here after several days of journey halting in different places. The eastern part of Attappady, at the time of my arrival, was full of bushes of forest trees. Tall trees were very rare in the locality. However, land were available sufficiently to cultivate. The climate was terribly bad for health" (Interview: Tamil Settler 1994).

The early Gowndan settlers started cultivation in the land, obtained by bribing Kariasthans of *Jenmis*. Gradually, they encroached on more lands in the nearby places. As there were shortage of labour, these settlers brought workers from their native place promising higher wages (Mathur 1975). This was followed by massive flow of population during the 1950s to the eastern side of Attappady, mainly of people from Thadakam and other parts of Coimbatore.

4.3.2.2 Malayali Settlers

The first malayali who settled in Attappady from the plain land is unidentifiable either from the literature or from the key informants. However, before the colonisation trend and the massive move of people from south central regions of Kerala to Malabar and Attappady began, relatives and neighbours of the *Jenmis* used to visit Attappady for various purposes (Interview: Kochunny Nair, Pakkulam 1994). Their intention was collection of valuable forest produces from the tribals. The major objective of the malayalis from the plains to go to this area was, in the beginning, jobs in the plantations started by the Britishers and work in the forest land leased by landlords for timber extraction. However, many of these original settlers could not continue in Attappady because of the difficult terrain; they, therefore, handed over their lands to other groups of migrants and left Attappady. After 1956, malayalis migrated to Attappady for work in timber felling and extraction. The fact remains that the net increase in migrant population continued till 1981.

4.3.3 Demographic Trend

The whole demographic structure of Attappady has changed after the 1950s mainly due to uncontrolled influx of population. As a consequence, demographic structure turned to be unfavourable to tribals. During 1940s, the tribal population of Attappady is estimated to have been around 10,000 and the non-tribal population just a few hundred. But the demographic scenario totally changed after the 1950s. According to the 1951 census, the proportion of non-tribal population to total population was just 9.68%. The proportion rose to 67% in 1981 and 71.91 in 1991. During 1951-61 the population in the area increased by 89.9; even though the natural increase of tribal population was only just 27%. During this period the increase of settler population was at the exorbitant rate of 671%. The next decade (1961-71) also presents a similar picture

with an increase of total population by 88% and tribal population only by 17%. The growth of non-tribal population was by 219%. The sudden increase in population in Attappady reduced the tribals from a majority group in 1951 to a minority group by 1981 and an insignificant group by 1991.

Table 4.2

Demographic Trend in Attappady

Year	Total population	Tribal population	Non-tribal population	% of tribal	% of non-tribal
1951	11300	10200	1100	90.32	9.68
1961	21461	12972	8489	60.45	39.55
1971	39183	16536	22647	42.21	57.79
1981	62246	20659	41587	33.00	67.00
1991	86261	24228	6203	28.08	71.91

Source: Census of India, 1951 to 1991

4.3.4 Native Place of Settlers

All malayali settlers in Attappady are called Travancoreans because most of them came from the southern part of Kerala, which was a part of Travancore before the Kerala State was formed. However, a break-up of these in-migrants according to the places of their origin is rarely found in literature. It is seen from the Table 4.3 that malayali settlers in Agali represent all the districts of the State. Also, it is observed that in-migrants are not exclusively from the Travancore side. Most of the malayali settlers are from Kottayam district representing 32.8% in Agali and 31% in Sholayur. The majority of malayali settlers came from Ernakulam, Idukki, Kottayam, Alappuzha and Thiruvananthapuram districts. A few malayali in-migrants came also from Coimbatore to which place they had migrated earlier in search of jobs before the 1950s. It was from the early tamil settlers and their own neighbours in Coimbatore they came to know of the availability of cultivable land in Attappady.

Settlers from Tamil Nadu are generally called by malayali settlers as *Kounder,* (locally used term) as most of them belonged to the Gowndan community. When malayali settlers in Attappady had their origin in various parts of Kerala, most of the tamil settlers had their origin in Thadakam, Coimbatore district. Interestingly, 86.5% tamil migrants in Agali and 88.9% in Sholayur are from Coimbatore. A few tamil migrants came from Palakkad, who had been in-migrants to Palakkad from Coimbatore.

Table 4.3

Distribution of Settlers According to Place of Migration

(Percent)

Location	Malayalis			Tamils			Total
	Agali	Sholayur	Total	Agali	Sholayur	Total	
Kannur & Kasargod	2.4	--	1.9	--	--	--	1.2
Kozhikode	1.6	--	1.2	1.9	--	1.0	1.2
Malappuram	1.6	3.4	1.9	--	--	--	1.2
Palakkad	4.8	3.4	4.5	7.7	--	4.1	4.4
Thrissur	8.0	3.4	7.1	--	--	--	4.4
Ernakulam	12.8	3.4	11.0	--	--	--	6.8
Idukki	19.2	6.9	16.9	--	--	--	10.3
Kottayam	32.8	31.0	32.5	--	--	--	19.8
Pathanamthitta	1.6	6.9	2.6	--	--	--	1.6
Alappuzha	3.2	6.9	3.9	--	--	--	2.4
Kollam	2.4	3.4	2.6	--	--	--	1.6
Thiruvananthapuram	8.0	27.6	11.7	--	--	--	7.2
Coimbatore	0.8	3.4	1.3	86.5	88.9	87.6	34.7
Salem	--	--	--	3.8	6.7	5.2	2.0
Periyar	0.8	--	0.6	--	4.4	2.1	1.2
Total	100	100	100	100	100	100	100

Travancoreans migrated to Attappady in large numbers only after the 1960s. Those who came before 1960 were mainly rich settlers, whose urge was acquisition of large areas of land. However, these settlers left Attappady and settled in Mannarkad and nearby areas. A few who still hold lands in Attappady valley are absentee landlords. In fact, a majority of the malayali peasant settlers bought land from these rich early

migrants. Tamil settlers occupied the eastern part of Attappady in the late 1940s and the early 1950s when Travancoreans had hardly begun their trek to Malabar in the quest for cultivable land. These early tamil settlers, except a few, are still living in Attappady cultivating their lands.

If the peak period of Malabar migration was 1951-60 (Tharakan 1976 and Joseph 1988), the inflow of people to Attappady reached its pinnacle during 1961-1970. It continued its pace till 1980 and thereafter has sharply declined (Figure 4.1). Tamilians, the pioneers of the in-migrants to Attappady, reached the area mainly during the period 1951-60. The inflow reached its zenith during 1961-70, declined in the next decade and became insignificant after the 1980s. Table 4.4 presents the decadal percentage of inflow of malayali and tamil in-migrants to Agali and Sholayur. By the 1950s, only a few malayalis had come to Agali and no malayalis had come to Sholayur with the specific purpose of acquiring land or starting cultivation. No land was transferred to malayali settlers before the 1950s (Interview: Kochunny Nair, Pakkulam 1994). The period 1951-60 was characterised by the beginning of malayali in-migration. However, the period 1961-80 witnessed a huge influx of malayalis forming 85% of the total malayali in-migrants in the area. Nearly 74% of the tamilians reached Attappady during 1951-70. The decade 1971-80 witnessed a smaller inflow of tamilians to Attappady. About 93% of them came to Attappady mainly with the intention of acquiring land.

Of the total malayali in-migrants in Attappady, 80% were first time migrant settlers in the area; and the rest 20% had initially migrated to other parts of Palakkad district or other district of the State and later arrived at Attappady. They moved to Attappady later, for a variety of reasons such as difficulties in obtaining land, failure of crops, diseases, debt, cheating by fellow in-migrants, etc. More than 95% of the tamil

settlers, on the other hand, settled in Attappady in the first attempt of migration itself. (see Appendix A: Table A.2).

Figure 4.1

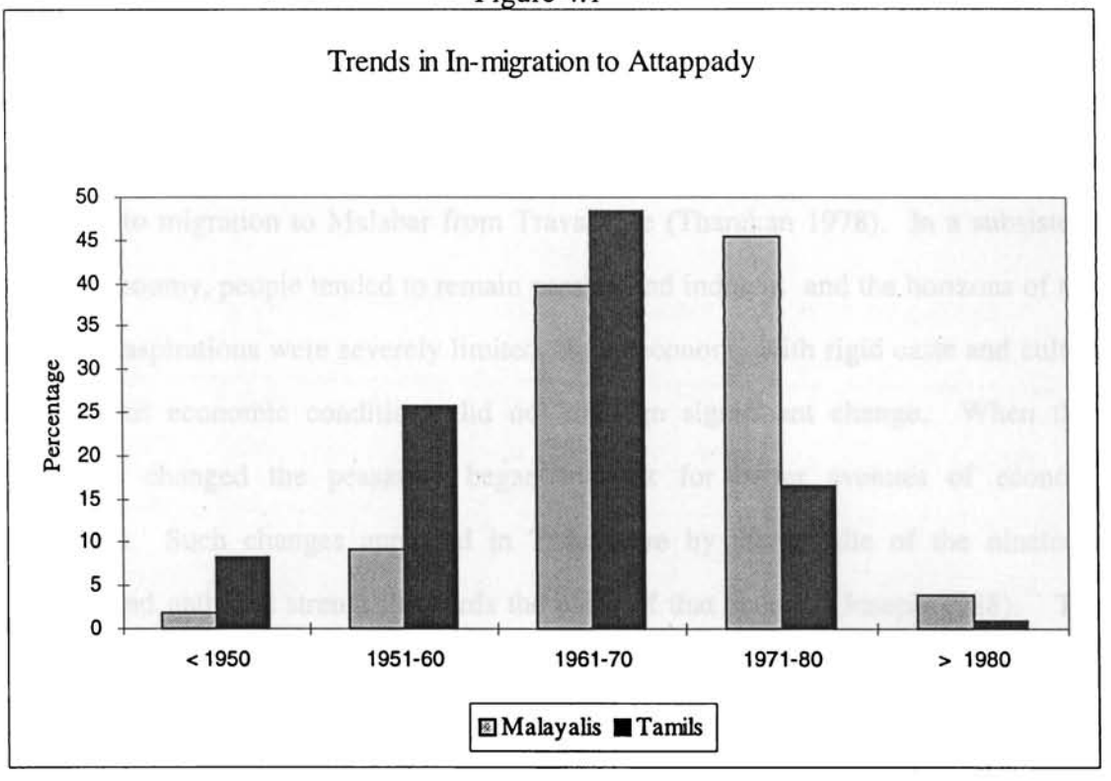

Table 4.4

Percentage Distribution of Households According to Year of Migration

Region/ Category	Before 1950	1951-1960	1961-1970	1971-1980	After 1980
Agali	2.4	9.6	35.2	48.0	4.8
Sholayur	--	6.9	58.6	34.5	--
Malayalis	1.9	9.1	39.6	45.5	3.9
Agali	9.6	25.0	55.8	9.6	--
Sholayur	6.7	26.7	40.0	24.4	2.2
Tamils	8.2	25.8	48.5	16.5	1.0
All	4.4	15.5	43.0	34.3	2.8

It is well known that with opening of Malabar area for in-migrant cultivators an unbelievably large influx of settlers ensued. The reasons underlying the flows are, however, yet to be examined systematically. Various reasons - social, political, economic and demographic are usually attributed to internal (from within Malabar) peasant migration. Scarcity of cultivable land due to increase in population and the emergence of commercialisation of agriculture are two important economic factors attributed to migration to Malabar from Travancore (Tharakan 1978). In a subsistence type of economy, people tended to remain passive and indolent and the horizons of their economic aspirations were severely limited. In an economy with rigid caste and cultural environment economic conditions did not undergo significant change. When these conditions changed the peasantry began to look for better avenues of economic upliftment. Such changes appeared in Travancore by the middle of the nineteenth century and gathered strength towards the close of that century (Joseph 1988). Thus began the flow of an aspiring peasantry to land-abundant areas for cultivation to improve their economic situation. Most settlers of Attappady had insufficient or poor quality land at the places of their origin. Those early settlers came to Attappady merely for acquiring larger tracks of land for starting plantation and cutting down and selling forest trees. Some had no land in their native places and were seasonal workers in agriculture; others had been heavily in debt. They sold of their lands, paid off there debts and purchased larger area of forest land at extremely low prices. Some came as workers in plantations while a few rich for acquiring large track of virgin land. Dense forests of Attappady and in its over all prosperity gave asylum to criminal elements too most of whom became regular in-migrants settlers. Thus, the place witnessed, in fact, an inflow of settlers drown to Attappady by a variety of pressures in areas outside the region such as demographic pressure, social inequalities and political developments.

However, a large proportion of the settlers were driven to Attappady by their extreme hunger for a piece of land. More than 50% of the malayalis arrived at

Attappady with the aim of acquiring land for cultivation. Another 24% were driven out of their native places by sheer poverty. Hardly, 4% of the malayalis happened to come and settled in Attappady as they were in Government Service. Quite surprisingly, 69% of tamil settlers in Agali and 80% in Sholayur migrated with the objective of acquiring cheap and fertile land for cultivation. Only 19% of the tamil settlers reported extreme poverty at home as the reason for migration.

Table 4.5

Distribution of Settlers According to Primary Reason for Migration

Region/ Category	For land	Gover-nment job	Poverty in the native place	Family at Attappady	Search for job	Estate work
Agali	51.2	4.0	28.0	10.4	4.8	1.6
Sholayur	82.8	3.4	3.4	--	6.9	3.4
Malayalis	57.1	3.9	23.4	8.4	5.2	1.9
Agali	69.2	1.9	19.2	3.8	5.8	--
Sholayur	80.0	8.9	6.7	2.2	--	2.2
Tamils	74.2	5.2	13.4	3.1	3.1	1.0
All	63.7	4.4	19.5	6.4	4.4	1.6

4.3.5 Sources of Land Acquisition

In the Attappady region *Jenmis* had entrusted the management of their lands to *Kariasthans.* These *Kariasthans* acted as an intermediary between the *Jenmi* and the tribals. The main duty entrusted with these *Kariasthans* was the collection of rent from the tribals for the land allocated to them for cultivation. The tribals subsisted on shifting cultivation and collecting minor forest produces such as honey, lac, horns and herbs. The beginning of exchange of their produces with traders (mainly Gowndans) from Tamil Nadu marked the beginning of their contact with the outside world. These traders who came to Attappady to buy forest produces which had good market in Coimbatore. In exchange for the forest produce tribals were given plastic items like baskets, rope and dresses. These Gowndans, by their several trips to the boarders of Attappady, became

acquainted, in course of time, with the *Kariasthans* and established rapport with them. This gave them a handle to acquire land for cultivation and for cutting wood.

The entry of small malayali settlers was, in the beginning, neither for cultivation nor for acquisition of land. They came as workers in the land of big settlers[1] to cut trees and to carry on manual work in their lands. The big settlers in Mannarkad were the first who bought land in Attappady from Moopil Nair. They could acquire ownership rights for vast areas of hillside lands at prices as low as Rs. 2 per acre. For *Jenmis* the amount of Rs. 2 or even less per acre was attractive enough considering the zero opportunity cost of land (Kunhaman 1981). These settlers were assisted by the *Kariasthans* who in turn got rewarded in cash and liquor. The main reason for buying such large acres of land was the availability in them of high quality timber of different valuable species (Interview: Nechooly Balan, Social Worker, Mannarkad 1994).

The landlords issued Money Receipts (MR) for the amounts received from the purchasers of land[2]. The receipts became the documentary evidence of ownership. In the money receipts, neither the location nor the size of areas used to be specified. Instead, the settler was told some locally known border points to identify his area. In some cases *Kariasthans* were sent along with these settlers to locate the areas. In most cases of the early transactions it was the agent of the *Jenmi* who was been entrusted to identity and locate the land to the settler. As the areas were not easily accessible even to the *Kariasthans*, lands were allotted arbitrarily. In certain cases, the allotted area was identified on the basis of the standing trees. These trees became the boundary of the land bought. This sort of allotment led to several bickerings and conflicts among the settlers. There were also instances of issue of MR for two or more persons for the same plot of land. Several clashes and even fights taken place in consequences. *Kariasthans* were

[1] Early rich settlers were *Jenmis* for the small settlers and hence gave undue respect and were ready to do any thing for them.

[2] In Attappady area Money Receipts given by the *Jenmi* was known as MR and the term is commonly used by settlers.

entrusted to solve such clashes (Interview: Kumaran Nair, *Kariasthan*, Moopil Sthanam 1994). These clashes were an advantage to *Kariasthans* who subsisted mainly on the income of his *Jenmi*. Being bribed by the settlers, the agents, mostly the *Kariasthan*, closed their eyes while the settlers laid hands on large areas of land in excess of what had been mentioned in the Money Receipt. As a result, when cash receipt for 10 acres was given, 5 to 10 times larger areas were occupied. Neither the *Jenmi* nor the agent was interested to look into the actual area appropriated by the settlers.

The big settlers brought workers with them, mostly poor and economically backward, from the plain lands. These workers were used to cut woods and were given promises of land for cultivation. Often they were given the land after the harvest of timber was over. Agricultural labourers, mainly, Ezhavas and Scheduled Castes, were brought in large numbers by the in-migrant agriculturists who were mostly Christians of the Travancore - Cochin Area (Mathur 1977). There were also Christian migrants who had failed to find land for cultivation in the hill sides of Pottessery and other parts of Mannarkad. These Christian in-migrants also finally occupied in the fertile lands of Attappady. Availability of land at a low rate in Attappady hills spread in the native place of early in-migrants and the result was massive flow of landless people to the area (Interview: Malayali Settlers, Jellippara 1994).

The early settlers, who became big cultivators, had close contacts with *Jenmis* and Agents of *Jenmis*. It is through them that the later in-migrants secured lands. The prices varied between Rs 100 to Rs 1000 per acre. Fixation of price was highly arbitrary. During the period 1950-60 many peasant settlers directly leased in land from Moopil Nair for cultivation at a rate of Rs. 2 acre (Karshakan 1994). While granting permission to cultivate the land they were also permitted to stay in the same plot. The extent of benevolence received by a lessee from the *Jenmi* depended on the status of the person who introduced him to the *Jenmi*. Generally new in-migrants were brought to the *Jenmi's*

place by the *Kariasthans* and close relatives of the *Jenmi*. As the settler's main motto was cultivation, security of ownership did not bother them much. As a result many settlers got land already either occupied or cultivated by tribals. The result was the pushing out of the tribals from the lands they were cultivating and living in. The land hungry settlers were not interested in questions of the natural right of the tribals on land.

As there did not exist postal communication facilities in the area, the settlers exchanged messages with their relatives at him through itinerant traders. In the beginning of the 1960s, many Christian families from Kottayam reached Jellippara, Kurukkankundu, Puliyara and Chittoor areas of the Agali village. Most of these settlers got land from the rich settler family of *Poovathingal*, which had entrenched itself in the area much earlier. Many who occupy this area, besides the land bought, encroached forest areas in a competing spirit (Interview: Malayali and Tamil Settlers 1994)[3]. Settlers as a group are not hesitant to report encroachment, but they do not reveal the magnitude involved.

Up to 1966 the major land transactions were (those that took place) between Settlers and *Jenmis*. After 1966, new types of land transfers emerged among settlers themselves and between settlers and tribals. This was besides the routine purchase of land from Moopil Nair and other big land holders. By 1976 almost the entire area of Sholayur and Agali Panchayat came under the occupation of tamilian and malayali settlers. Since there exists no boundary demarcation between forest land and other lands, the settlers made no distinction between the two; the fittest and the strongest among them encroached all lands that came their way, forest land as well as tribal land.

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[3] During survey many settler households reported ownership of land, which are lesser than the actual area they were cultivating. We made all possible efforts to get details regarding encroachment but met only with limited success.

A lion's share of the land gathered by tamilians was contiguous to water courses. Malayali settlers could not acquire much area near to the river side. Owing to the eastward flow of Siruvani and Bhavani rivers, tamilians had greater accessibility to *fertile* lands near to the two river beds.

Settlers had acquired land, in the beginning, from *Jenmis* and later from tribals through various strategies. Tribals, on the other hand, used the land from *Jenmis* for slash and burn cultivation. However, during the last five decades several rounds of land transfers have taken place and many of the first generation settlers have died away. Property has passed on to their descendants. At the time of our survey, we observed that peasants of Attappady had acquired lands mainly through five sources, viz., (a) inherited from ancestors, (b) purchased from *Jenmis*, early settlers, fellow settlers or/and tribals, (c) leased-in (Kuthakapattom) from *Jenmis*, early settlers, fellow settlers or/and tribals, (d) encroached upon forest land and tribal-occupied areas, and (e) received free from the Government. Encroachment was extensive in Attappady. However, the area reported as encroached was only 9.25 % in Agali and 1.84% in Sholayur. This was, perhaps, due to the fact that 20.64% of lands in Agali and 38.77% in Sholayur were inherited by the present generation and occupants who do not know what was the real source. In the early years of migration, settlers had taken land from *Jenmis* and tribals on lease. Now a reverse operation is in vogue in the hill slopes of the study area. Tribals, owing to lack of land for cultivation, lease-in land from settlers for cultivation on an annual or biennial basis. Settlers are interested in such lease as it would save them of the large amount of labour required for clearing virgin forest lands. The land leased-in for cultivation by tribals in Sholayur is almost nil; in this area, it is the malayali and the tamilian workers who have taken land on lease.

Recently, on the riversides and in other wet areas, settlers have started massive cultivation of plantain attracted by high prices in Mannarkad and Coimbatore markets.

Those who do not have land in riversides obtained it from tribals and other settlers on lease at very low rent. Tribals, interested in cash, gave their wet land on a large scale. Malayali settlers in Agali as well as in Sholayur obtained around 90% of the land through purchase from *Jenmis*, fellow settlers and tribals. Tamil Settlers also obtained large chunks of such areas through purchase: 74% in Agali and 82% in Sholayur. Land purchased by tribals from their own community or settlers were small indicating that selling of tribal land to settlers has far exceeded purchase of land by tribals.

Table 4.6

Distribution of Area According to Nature of Ownership

(Area in acres)

Category/ Region	Inherited	Purchased	Leased	Encroached	Free	Total
Malayalis	71.65 (9.39)	676.54 (88.67)	7.5 (0.98	1.5 (0.2)	5.83 (0.76)	763.02 (100.0)
Tribals	156.0 (54.6)	15.0 (5.25)	3.4 (1.19)	95.7 (33.5)	15.61 (5.46)	285.71 (100.0)
Tamils	55.0 (17.15)	236.21 (73.65)	--	29.5 (9.2)	--	320.71 (100.0)
Agali	282.65 (20.64)	927.75 (67.75)	10.9 (0.8)	126.7 (9.25	21.44 (1.57)	1369.44 (100.0)
Malayalis	6.5 (4.79)	121.32 (89.32)	8.0 (5.89)	--	--	135.82 (100.0)
Tribals	181.78 (93.81)	1.5 (0.77)	--	10.5 (5.42)	--	193.78 (100.0)
Tamils	32.35 (13.51)	196.18 (81.9)	11.0 (4.59)	--	--	239.53 (100.0)
Sholayur	220.63 (38.77)	319.0 (56.05)	19.0 (3.34)	10.5 (1.84)	--	569.13 (100.0)
All	503.28 (25.96)	1246.75 (64.31)	29.9 (1.54)	137.2 (7.08)	21.44 (1.11)	1938.57 (100.0)

Figures in Parentheses are percentages

4.3.6 Purchase of Land by Settlers

It is seen that a major share of the land possessed by the settlers were obtained through purchase. Though the main source of purchase in the 1950s was *Jenmis*, in the

later stages most of the land transactions were among settlers themselves and between settlers and tribals. There were also ethnic and religious considerations behind land transfers. Early tamil settlers were reluctant to sell their land to malayali settlers. They preferred sales to fellow tamil settlers. Similarly in the malayali-occupied areas, community considerations prevailed. In the Ommala area of Agali village, where Muslim density is high, most of the land was sold to Muslims by rich Muslim settlers. This type of community considerations was practically absent when *Jenmis* transferred their lands indiscriminately to tamil and malayali settlers[4]. This is one of the reasons for concentration of tamilians in Eastern part and malayalis in Western part. There exist separate concentration pockets of Muslim and Christian malayali settlers. Inter-settler transactions were widely practised in Attappady. It is seen from the table that in Agali, malayali settlers purchased 52% of their land from malayali settlers and that around 35% of the tamil settlers bought their land from tamil settlers. In Sholayur, both malayali settlers purchased the majority of lands in their possession from Moopil Nair (66.62%). In Agali, when malayalis purchased only 14.4% of their lands from tamilians, only 12.8% of the tamilians bought land from malayalis. In Sholayur, corresponding share is 4.89% and 9.16%.[5]

The settlers had acquired their land at various stages from different sources. The average area bought by settlers from the *Jenmi* is much larger than area transacted within settlers and between settlers and tribals. The mean area is obtained by dividing the reported purchased area in each source by the number of plots. When the mean area purchased by settlers from the *Jenmi* was 6.12 acres it is 3.4 acres from malayalis and 2.9 from tribals. The mean area purchased from malayali is below 4 acres except in Sholayur by tamils (Table 4.8).

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[4] Early rich settlers belongs to Christins and Muslims of Kerala and Gowndans of Tamil Nadu.

[5] It is reported that land is bought by giving a price. However, lands occupied by illegal ways are also included in this.

Table 4.7

Source of Purchase of Land by Settlers

(Area in acres)

Category/ Region	Source of purchase				Total
	Moopil	Adivasi	Malayalis	Tamils	
Malayalis	160.30 (23.12)	76.68 (11.06)	356.46 (51.42)	99.85 (14.40)	693.29 (100.00)
Tamils	60.01 (25.11)	65.65) (27.47)	30.60 (12.81)	82.70 (34.61)	238.96 (100.00)
Agali	220.31 (23.63)	142.33 (15.27)	387.06 (41.52)	182.55 (19.58)	932.25 (100.00)
Malayalis	85.15 (66.62)	16.40 (12.83)	20.02 (15.66)	6.25 (4.89)	127.82 (100.00)
Tamils	80.05 (37.69)	56.10 (26.41)	19.45 (9.16)	56.78 (26.74)	212.38 (100.00)
Sholayur	165.20 (48.56)	72.50 (21.31)	39.47 (11.60)	63.03 (18.53)	340.20 (100.00)
Malayalis	245.45 (29.89)	93.08 (11.34)	376.48 (45.85)	106.10 (12.92)	821.11 (100.00)
Tamils	140.06 (31.03)	121.75 26.98	50.05 (11.09)	139.48 (30.90)	451.34 (100.00)
Total	385.51 (30.30)	214.83 16.88	426.53 (33.52)	245.58 (19.30)	1272.45 (100.00)

Figures in parentheses are percentages

Table 4.8

Mean Area Purchased by Settlers from Various Sources

(Area in acres)

Category/ Region	Moopil	Adivasi	Malayalis	Tamils
Malayalis	6.41	2.56	3.43	5.55
Tamils	5.46	3.28	3.4	5.51
Agali	6.12	2.85	3.43	5.53
Malayalis	6.55	1.82	2.5	3.13
Tamils	5.72	3.74	4.86	4.06
Sholayur	6.12	3.02	3.29	3.94
Malayalis	6.46	2.39	3.36	5.31
Tamils	5.60	3.48	3.85	4.81
Total	6.12	2.9	3.41	5.01

The extent of land now owned by settlers has been acquired by them at different stages. There is no literature available on the exact date of acquisition of land by the settlers. Nevertheless, the extent of land and the date of acquisition is collected from settlers. Many settlers in Attappady were not able to acquire land on a large scale at the time of their arrival due to financial difficulties. However, over the years many settlers could acquire large areas of land. The size of land owned by a settler family depends on several factors: the number of adult members in the household, educational status, accessibility to other resources, date of settlement, etc. Up to 1950 malayali settlers did not occupy any land in Attappady, whereas by that time tamilians had occupied land both in Agali and Sholayur. But interestingly, most of the area now owned by settlers are acquired during the period 1960-80 (Figure 4.2). Malayali Settlers obtained 48% of their land during the period 1971-80 and tamil Settlers obtained 40% during 1961-70. Among settlers more than 70% of the land were transferred during the period 1961-80, which was helped by on the one hand the influx of population and on the other the implementation of Land Reform[6]. The influx of in-migrants to Attappady considerably declined after the 1980s.

As settlers obtained their land in different places and in different periods, we have collected holding-wise details of land owned. The average size of a plot owned by malayali settler is 3.83 acres in Agali and 4.12 acres in Sholayur. The corresponding figures for tamilians are 4.65 acres and 4.20 acres. The mean area (holding-wise) owned by malayali settlers was 9.33 acres in 1951-61 period and it has come down to 2.86 after 1980s. In the case of tamil settlers, the average size of plot owned has declined from 6.78 in 1951-60 to 3.64 after 1980. It is seen that the average plot size of a malayali is smaller than that of tamil settler. Decline in mean area over time has been due to influx of settlers and fragmentation of land among an increasing population.

[6] It is reported from the field that when the wave of Land Reform was spread in the Vally, settlers who have larger areas of land either sold their land to fellow settlers or transferred to in the name of next heirs.

Table 4.9

Distribution of Area Owned by Settlers by Period of Acquisition

(Area in acres)

Year	Malayalis			Tamils		
	Agali	Sholayur	Total	Agali	Sholayur	Total
Up to 1950	0.00	0.00	0.00	13.50	12.00	25.50
	(0.00)	(0.00)	(0.00)	(4.21)	(5.01)	(4.55)
1951-1960	51.00	5.00	56.00	49.41	45.55	94.96
	(6.68)	(3.68)	(6.23)	(15.41)	(19.02)	(16.95)
1961-1970	160.75	89.15	249.90	141.55	83.65	225.20
	(21.07)	(65.64)	(27.80)	(44.14)	(34.92)	(40.20)
1971-1980	405.67	21.40	427.07	77.55	53.33	130.88
	(53.17)	(15.76)	(47.51)	(24.18)	(22.26)	(23.36)
After 1980	145.60	20.27	165.87	38.70	45.00	83.70
	(19.08)	(14.92)	(18.45)	(12.07)	(18.79)	(14.94)
Total	763.02	135.82	898.84	320.71	239.53	560.24
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Figures in parentheses are percentages

Table 4.10

Mean Area Owned by Settlers According to Period of Acquisition

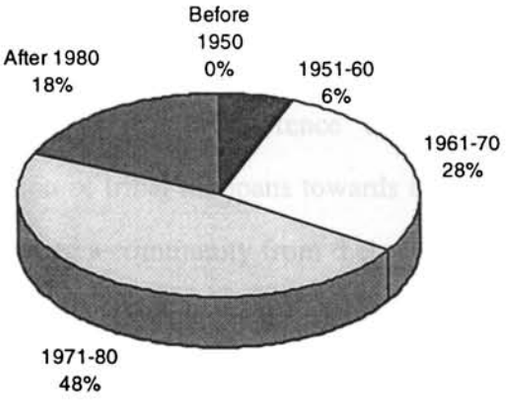
(Area in acres)

Year	Malayalis			Tamils		
	Agali	Sholayur	Total	Agali	Sholayur	Total
Up to 1950	0.00	0.00	0.00	6.75	12.00	8.50
1951-1960	10.20	5.00	9.33	7.06	6.51	6.78
1961-1970	5.36	5.94	5.55	5.66	4.18	5.00
1971-1980	3.59	2.14	3.47	3.23	3.14	3.19
After 1980	2.85	2.90	2.86	3.52	3.75	3.64
Total	3.83	4.12	3.87	4.65	4.20	4.45

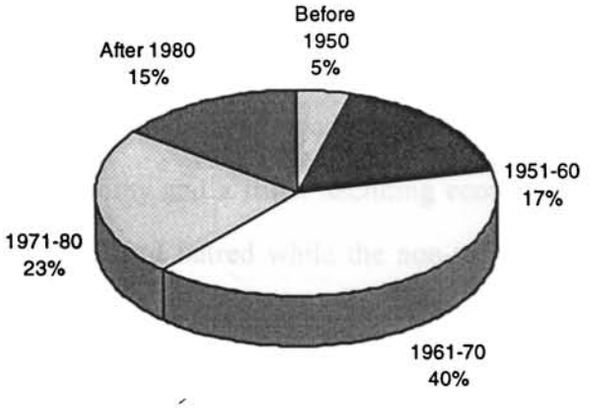
Figure 4.2

Trends in Acquisition of land by settlers

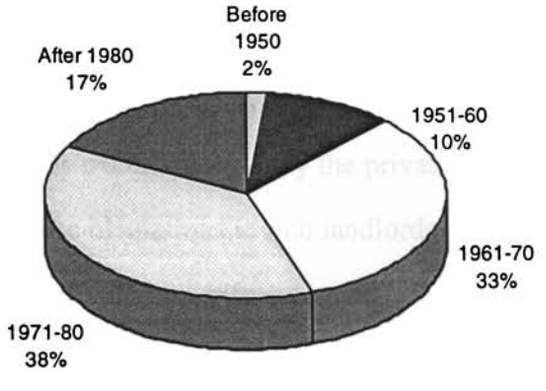
Malayalis



Tamils



All Settlers



4.4 Land Transfers and Land Alienation

There were large scale land transfers from tribals to non-tribals in Kerala and especially in the Attappady region (Mathur 1977, Kunhaman 1981 and 1989, Muraleedharan and Sankar 1991). Emergence of plantations, implementation of Government sponsored programmes, indifference of officials and sometimes the favourable attitude inclination of tribal moopans towards the upper strata - all supported directly or indirectly to alienate a community from their means to live. For example the implementation of Silent Valley Project displaced many Muduga families. Of several factors, the most pertinent for land alienation was the massive influx of people from midland and lowland to highland. The process of land transfer took place in different ways in the different tribal centres. However, the exact cause for land transfers and the ways in which they changed hands from tribals to non-tribals remain to be documented. A dualistic economy has emerged in Attappady through land alienation of the tribals - a non-tribal flourishing economy and a tribal declining economy. The tribals look at the settlers with fear, suspicion and hatred while the non-tribal settlers consider the tribals foolish, lazy and primitive.

4.4.1 Emergence of Plantation and Alienation

Plantations were started in the green hills of Attappady by British entrepreneurs during the end of the 19th century. When Moopil Nair gave land on lease to the British, tribal lands were deliberately excluded and only the private forests were given out. Even after the British sold out these plantations to rich landlords, the exclusion factor remained in the record; as time passed by, infrastructural development and expansion of plantations put pressure on tribals. Many tribal households were ousted from their land by force and in some cases by bribing them with liquor and promises of job security in plantations (Interview: Nechooly Balan, Social Worker, Mannarkad 1994). Hence, the

emergence of plantations marked the beginning of the process of alienation of the tribals from their native habitat, a process which had the tacit support of government officials.

The prominent plantations include Siruvani Group Estate, Parco Group Estate, Maliyekkal Estate and Vrindavan Estate. This groups of estates lie on the Sholayur side of Attappady. Siruvani Estate is the largest in the group covering an area of more than 3000 acres; the land had been the Jenmam property of Mannarkad *Moopil Sthanam* (family). The land was given on *verumpattom* (surplus) lease in the year 1935. In a suit between Moopil Sthanam and the Bhavani Tea and Produce Company Limited, the company got fixity of tenure in this property. As a part of plantation up-gradation and development, roads were constructed; the area occupied by roads is about 10 acres. Clear felling and laying out plantations was started in 1942. By the end of 1969 an area of 2338.70 acres were planted with tea, coffee, cardamom and rubber. The entire area coming under the company is named and known as Siruvani Group of Estates consisting of four divisions namely, Siruvani, Varadyamalai, Elamalai and Hilton. The areas converted into *pucca* (full-fledged) plantation by the company is 2748.7 acres, consisting 490.14 acres of tea, 700 acres of coffee, 798.56 acres of cardamom and 850 acres of rubber. All these estates have been exempted from the purview of vested forest (Interview: Manager, Siruvani Group of Estates 1995).

Emergence and growth of this kind of plantations generated employment opportunity, mostly to settlers in the area and income to the country, but at the cost of dispossessing tribals of their lands and destroying their traditional ways of life and culture. If the plantations reduced the severity of the damage done to the tribals by offering them some employment, the settlers set their eyes only on land, with little promise of any recompense in return.

4.4.2 Land Appropriation - By any Means

During the period of the massive influx of in-migrants tribal lands got expropriated by them through illegal ways. They used various means such as gifts, sale, forcible encroachments and mortgages to get lands from tribals. Little documentary evidence exists for most of the transactions (Muraleedharan and Sankar 1991). There are cases, where land was obtained by settlers by offering narcotics and liquor (Panoor 1990). In other cases, deceptive and aggressive measures such as use of force and threat were the modalities (Kumaran 1993). The various methods adopted by settlers for acquiring tribal lands are (a) lending of money during off-season at exorbitant rates of interest and transfer of actual possession of land without any record, *in lieu* of loan. (b) transfer to non-tribals in the form of *kuthaka* (lease) or *bhogyam* (mortgage) (c) acquisition by encroachment and (d) acquisition by force and threat.

4.4.2.1 Direct Purchase

The tribals in the initial days of settlement approached the settlers with fear and suspicion. Hence, whatever land transaction took place was not in the interactive mode but was done indirectly using the loopholes in the existing local political system. In the mean time the monetisation of the tribals economy increased the cash needs of the tribals. Settlers started buying land directly from the tribals, initially making use of the dominant position of the *ooru* moopans, and later through direct dealing.

In Sholayur, near Vayalur Ooru a tribal, *Kare* sold 3.60 acres of his land to a Christian settler, Yohannan just for Rs. 300 in the year 1982. At the time of registration this Christian settler gave the tribal and additional Rs. 200 and a bottle of arrack. After three years, this settler sold this land for Rs. 20,000 to a settler from Pathanamthitta. This sort of buying and selling was quite common in Attappady after the 1950s. The overt form of exploitation involved in this transaction is the extremely low price paid to

the tribals. In 1962-63, while the non-tribals received Rs. 650 per acre, the tribals received only 182 per acre. In 1975-76 also the price differential was quite substantial, the land of non-tribals fetching Rs. 843 per acre while that of the tribals only Rs. 390 per acre. Abject poverty of the tribals and the tactics of intimidation and blackmail employed by the non-tribals were the main methods employed (Kunhaman 1981). The tribals who did not want to sell their land also had to borrow cash from the settlers on promise of repayment after harvest. Settlers used this opportunity to snatch lands away from the tribals since most of them failed to repay the loans.

4.4.2.2 Money Lending and land Appropriation

Thus, the easiest method followed by the in-migrants, mostly those from Travancore, to acquire tribal land was lending money to the tribals in off seasons at exorbitant rates of interest; dubious methods were employed in their trade transactions with the tribals. The non-tribal money lenders, mostly the rich and greedy malayali and tamil settlers, generally took a written statement while advancing the loans saying that, if the borrower fails to repay the loan within the stipulated time, he has to dispose of his land to the money lender. This type of conditional sale deeds was common in most parts of Attappady during the mid 1960s. As the tribals were greedy of money the repercussions of such borrowing would not emerge at the time of borrowing. Those who could not repay the principal and the cumulative interest at the stipulated time, had to surrender their lands to the lender. In the absence of any agency to serve the interests of the tribals and since the tribals themselves were week and defenceless, the lands passed on to the settlers without any hitch. The extent of land lost by the tribals due to non-repayment of cash loans was the higher in Attappady than other part of tribal centres (Mathruboomi 1983). Land transfer takes place in three ways viz., Vilakkary, Bogyakkary, and Kuthakappattam. In Vilakkary land is sold for money or in exchange for goods. In the two other cases, land is given to a person for cultivation on lease for

one to five years. Instead of relieving this land after the lease period is over, settlers settle down in this land giving the tribal paltry sums of money. Once a dispute arose regarding land transfers, the tribal is isolated by the fellow settler community and demands from his repayment of the borrowed sum with exorbitant amounts of rate of interest at once. The Adivasis, being the worshippers of *Malleeswaran*, never practise falsehood and seldom like to live in debt. Hence, they give their land to the settler and take up wage labour in the settler's land.

Tea shops started by a few settlers were another source of land transaction. During rain and winter seasons tribals had very difficult time. As they were unable to give money immediately they brought items such as tea, beedi, and the like on credit. As tribals were, as a rule, illiterate such accounts were maintained by the tea shop owner. After three or four months the shop owner would approach the tribal to clear off the account. The tribal who could not settle such a huge amount might give his land to the shop owner to cultivate for one or two years. The new occupants continue giving cash to the tribals and gradually throw him out of his land.

In Pudur village an Adivasi, Chottimonnan lost his land to a tamil settler Sivalingam. Sivalingam was running a grocery shop. During difficult days Chottimonnan purchase rice from his shop. The debt on account of this increased to Rs. 50. Unable to clear this account, as a last resort, Chottimonnan sold his 1.50 cents of wet land to Sivalingam. These are a few reported case.

Adivasis borrow not only from settlers but also under various Government Schemes. In 1982, Nanchan moopan of Pudur borrowed Rs. 1200 from Agricultural Development Wing of the State Bank of India, Palakkad. Nanchan had used the borrowed money for cultivation but due to poor monsoon he could not repay the principal and interest. He finally sold his 4 acres of fertile land to Ponna Gowndan.

Many Adivasis lost their land for want of repaying loan taken from Co-operative Societies, Banks and Money lenders.

4.4.2.3 Encroachment of Tribal Occupied Land

In some places tribal land has been encroached by settlers. Loss of land due to encroachment of tribal land was widely prevalent during the early 1960s. In Kalkandiyoor 142.75 acres were alienated to tamil Settlers . Of this 140.75 acres were encroached by M.C. Chettiar, Coimbatore and later transferred to Assan Mohamed Rawther. As the tribals were ignorant about the act of tamil settlers they remained unobjectionable towards such practices. Several complaints were submitted for legal action but were unnoticed or not considered in want of proper records of rights. Instances of encroachment and unfavourable bureaucratic decision on complaint were not rare even in 70s.

> "*Kakki* held 3 acres of *Kottukadu* (forest land for slash-and-burn cultivation) and 3/4 acres *Vayal* under Mannarghat Muppil Nayar. The land has been encroached upon in 1972 by Fr. Varghese's secretary *Kannadi Chettan* (Christian who wears spectacles). The Irular resented the Chettan's action. The Chettan then leased out the land to one Gowdar on an annual rent of Rs. 1500 for three years. While the *Chettan* had gone to the Registrar's office for the execution of the document, Mallan Irulan, a kind of *Kakki* went to the office and submitted that the land belonged to Kakki, but not to the Chettan. But the Registrar told Mallan that he should bring the records in support of his claim. But the Irular could not get the record. On the following day when the Chettan threatened the Irular that he would shoot them with his gun, the former was manhandled by the latter. In this connection 9 irular were arrested and a criminal case charged against them. The case lasted for three months. The accused were fined Rs. 30 each by the court. The Chettan pleaded in the court that he was beaten and had to undergo hospitalisation. The informants confided this author that they actually did beat the Chettan because their land was alienated by an unscrupulous Christian immigrant" (Mathur 1975:205).

4.4.2.4 Force and Threat

In Kallamala Ooru 60 acres of land has been taken forcefully by Kalladi Kunhammed, a Malayali settler. As a result of this, 27 tribal households became landless (GOK 1982). The argument he had at the time of forceful eviction of tribals from their land was that the land belonged to him as he purchased the land from Moopil Nair. The land, thus occupied by him, was later sold to settlers from Kerala. In another incident Pazhani Gowndan forcefully occupied three acres of land from Gumban, S/o Soriyan, Agali Ooru in the year 1967. These are only few reported case during various studies. There are large number of unreported forceful evictions in Attappady.

Instances of atrocities of Muslims on Mudugas for acquiring their land are rightly recorded in literature (Mathur 1975). Burning of their hut and physical harassment were widely used by Muslim settlers to evict Mudugas forcefully from their land. There were instances tribals jointly protest these atrocities.

4.4.3 Instances of Land Alienation

Many studies have pointed out that the most burning problem facing the tribal economy of Kerala is land alienation. Related to this issue some attempts have been made by Governmental agencies to understand the extent of land alienation in its various angle. The first and most comprehensive of this category is the census survey carried out by the Bureau of Economics and Statistics, Government of Kerala in the year 1977 for a decade 1966-1976. During this decade an area of 10,500 acres were acquired by the non-tribals from tribals. Of this an area of 6250 acres were given out on lease to individuals and companies for plantations (GOK 1976-77).

It is seen from table that during the decade 1966-1976 the land alienated from Irula formed 92.34% of the total tribal land alienated and it was the least among Kurumbas which stands just at 0.35%. Thus, during this decade, there had been a sharp decline in land ownership of tribal households and a corresponding increase in that of non-tribal households. Devoid of land, the only resource with which earlier they earned the little income for their sustenance, they became labourers of settlers. The survey also brought to light the reasons which compelled the tribals people to sell their property. It is seen that 90.55% of the area was transferred for default in loan repayment and on sales for meeting costs of medical treatment, 3.85% for other immediate financial requirements; land encroached upon and land taken over by force came to be 4.89%.

Land taken from Kurumba settlement either by force or other dubious means was found virtually nil during the decade. Very weak accessibility and remotest nature of the area may perhaps have discouraged settlers to settle here. The reliability of this estimate is not much questioned as it covers every household in the entire hamlets.

Table 4.11

Distribution of Land Alienation by Reason and Tribe during the Decade 1966-1976

(Area in acres)

Tribes	Debt and medical treatment	Lack of finance	Force and encroachment	Others	Total area alienated
Irulas	3593.22 (91.18)	164.49 (4.17)	153.21 (3.89)	29.38 (0.75)	3940.9 (100.00)
Mudugas	256.38 (82.20)	--	55.5 (17.80)	--	311.88 (100.00)
Kurumbas	(15) 100.00	--	--	--	15 (100.00)
Total	3864.6 (90.55)	164.49 (3.85)	208.71 (4.89)	29.38 (0.69)	4267.78* (100.00)

Source: GOK. 1976-77. Socio-economic Survey on Tribals, Bureau of Economics and Statistics.

* This was in addition to the 6250 acres given out on lease to individuals and companies for plantations.

Land transactions have been more numerous in places in which the interaction between tribals and non tribals was the highest. Also the inaccessibility to tribal land by the non-tribal was one of the prominent limiting factors in the land transactions (GOK 1982). The alienation of land is seen to be high among Mudugas (46.12%) and followed by Irulas (43.72%). The Kurumbas are mainly concentrated in Agali and Sholayur Panchayats. Loss of land is the lowest among the Kurumbas who are less exposed to the outer world and dwell in the remotest forest tracts. The data on percentage of area alienated to total area alienated among these tribals reveals an entirely divergent picture, since the same accounted for 90% in the case of Irulas as against around 10% for Mudugas and very insignificant for Kurumbas. Perhaps, one explanation for massive land transfer for Irula community is that the from 1950 to till recently migrants found their place mainly in these regions. When land availability became scanty in-migrants moved towards other tribal areas. Panchayat-wise examination of the magnitude of land alienation to total alienated land shows that it had been the highest in Agali (45%) and Sholayur (36%) as these areas are the most opened up in Attappady and the least in Pudur (19%) which has the least developed road network and hence less accessible to non-tribals.

Table 4.12

Panchayat-wise and Tribe-wise Distribution of Land Alienation

(Area in acres)

Panchayat/ Tribes	No of families	Cultivated area	Area alienated	% of Area alienated to total area
Agali	1461	5112.37	4487.90	46.75
Pudur	1178	6841.89	1986.63	22.50
Sholayur	1304	4196.88	3631.66	46.39
Total	3943	16151.14	10106.19	38.49
Irulas	3310	11580.89	8996.41	43.72
Mudugas	417	1266.25	1083.78	46.12
Kurumbas	216	3304.00	26.00	00.78
Total	3943	16151.14	10106.19	38.49

Source: Government of Kerala. 1982. Survey Report of Attappady, Trivandrum.

An examination of the type of lands transferred and the various ways in recent years shows that all types of lands have been alienated. The socio-economic survey (Vijayanand 1996) of 150 families from 15 Oorus shows that 38.82% of their land is alienated in one way or other. Of the total land alienated the extent of land sold out (14.88%) and land forcefully occupied by non-tribals remained more than the extent given on lease or mortgage. The extent of land given on lease or mortgage stands 11.89% which is comparatively a low figure when compared to early situation. Land occupied by others by force forms 12.05% of the total alienated land. It is found that, of the total area sold out, 29.11% is irrigated flat land and 12.93% sloping land capable of being irrigated naturally.

4.4.4 Extent of Land Transferred to Settlers

It would be now quite appropriate to examine the extent of land alienated to tribals and accrued to non-tribals. The tribals lost their land mainly to settlers but land transfer between tribals is also quite common. There are two main types of land alienation prevalent in the area. They are permanent removal of the title right through selling and temporary transfer in the form of leasing. An attempt is made in this study to examine the extent of land alienated among the tribals - permanent and temporary - and its direction in two villages. To accomplish this task we have collected data on land alienation from the tribal households included in our field survey. The data collected for this purpose are based on the information gathered from the memories of tribals who had lost their land during the last five to ten years. Since temporary alienation is for periods of one or two years, data for the current year and preceding year have been used. Land alienated to tribals is almost the same in Agali and Sholayur. The extent of permanent loss to tribals in Agali is less than in Sholayur. However, tribals lost more land to malayalis in Agali and to tamilians in Sholayur. Land sales among tribals were not very popular in the past. Of late, such land transfers emerged in certain pockets.

Temporary alienation on lease is quite common in Attappady. For example, in Agali, the land loss to the tribals was to the extent of 25% of the total land they owned. Out of this, 15% is land leased-in by the tamilians. Almost the same percentage of land has been lost to tribals in Sholayur; and here also the major portion is land leased-in by tamilians. The type of land dealt in these temporary transactions are fertile land near to river bed, which is mainly used by tamilians for the cultivation of cash crops like sugar cane, plantain, etc. Land leasing among tribals is rarely found in some part of the area. Now the reverse process of leasing, that is from non-tribal to tribal, is in operation in Attappady. The type of land dealt with in such leasing is always found unattractive to tribals as the main motto of the settlers is to convert bushy uncleared land into cultivable land. Though permanent transfer is on the decline, temporary transfer is widely in practice and has been an opening for future loss of land.

Table 4.13

Alienation of Tribal Land and its Direction

Types of alienation	Agali (Total land = 285.78 acres)				Sholayur (Total land =193.78 acres)			
	Malayalis	Tamils	Tribals	Total	Malayalis	Tamils	Tribals	Total
Sold	38.50 (13.47)	12.40 (4.34)	4.00 (1.40)	54.90 (19.21)	12.50 (6.45)	42.10 (21.73)	0.00 (0.00)	54.60 (28.18)
Leased	23.00 (8.05)	44.00 (15.40)	6.50 (2.27)	73.50 (25.72)	2.00 (1.03)	24.00 (12.39)	13.00 (6.71)	39.00 (20.13)
Total	61.50 (21.52)	56.40 (19.74)	10.50 (3.67)	128.40 (44.93)	14.50 (7.48)	66.10 (34.11)	13.00 (6.71)	93.60 (48.30)

Figures in parentheses are percentages to total land owned by tribals in respective areas

4.4.5 From Fertile River Bed to Rocky Steep Areas

The process of land transfer from tribals not only kicked out tribals from their land but also threw them into the steep slopes of hills and uncultivable parts of

Attappady. Just as with the case of every human civilisation the world over, the tribal people of Kerala too had understood the importance of settling near river beds and shores and such areas of forests where natural water course facilities exist for settled cultivation (Rajeev and Kumaran 1995). The immediate consequence of land transfers from tribal to non-tribal is that the total cultivable area of the tribals declined sharply while that of the non-tribals increased several fold. Even within the cultivable land a major chunk of this remained uncultivated due to several reasons like disputes, lack of finance and unsuitability of the land. During 1962-63, about 41% of the cultivable land of the tribal remained uncultivated. This has increased to 81% by 1975-76. One of the most distressing reasons for the cultivable land left uncultivated is the unsuitability of the land itself. For instance, nearly 28% of the land held by the tribals in 1975-76 had rocky and uncultivable patches. The corresponding percentage of such land was 2% in 1962-63 (GOK 1977).

In order to examine the extent of alienation of tribals from flat areas four slope angle classification is made, namely, flat, moderately flat, steep and very steep. Each plot owned by the settlers and tribals were then divided according to the above slope angle method. By this method, though accurate estimation is not possible, the extent of displacement of tribals towards interior part of the forest and hill slopes can be assessed. Tribals, especially Irulas, of Attappady also were originally settled in the flat river beds of the two east-flowing rivers Bhavani and Siruvani. Now the number of tribal households, which owned land near to the riverside is insignificantly low. Malayalis and tamilians now own almost 85% of the flat area in Agali and 76% in Sholayur. Within Sholayur, 60.63% of the flat areas are under the ownership of tamilians. Tribals are toiling now in very steep areas for their livelihood. It is evident that 51.56% of the very steep areas in Agali and 82.51% in Sholayur are owned or cultivated by the Irula community. At the same time steep area owned by the tamilians is 8% and 11% respectively in Agali and Sholayur. Taking the two centres together, we find that hardly 19% of the flat areas are owned and operated by the tribals, the remaining 81%

being in the hands of the in-migrants. It is clear that the most serious outcome of influx of people to Attappady area is the shifting of the tribals from their original habitations to the interior and uninhabitable parts of the area.

Table 4.14

Percentage Distribution of Area Owned According to Slope Angle

Region/ Category	Flat	Modera-tely flat	Steep	Very steep
Agali				
Malayalis	51.20	54.96	63.33	40.08
Tribals	15.40	18.50	20.74	51.56
Tamils	33.40	26.54	15.94	8.36
Sholayur				
Malayalis	15.66	29.76	25.88	6.36
Tribals	23.70	31.05	47.36	82.51
Tamils	60.63	39.19	26.76	11.13
All				
Malayalis	38.61	46.80	54.61	35.42
Tribals	18.34	22.56	26.93	55.83
Tamils	43.05	30.64	18.46	8.74

4.4.6 Tribal Land Issue and Out-migration

The serious social consequences of in-migration in the hill areas and the dangers posed by the tribes were noticed in 1961 by an Evaluation Committee of the Kerala Legislative Assembly. Expressing its concern over this social malady the committee recommended a special legislation 'with a protective shield and preventive sword' so that it can restore to the tribals the land alienated in the past and prevent deceptive transfer in the future (Rajeev and Kumaran 1995). In 1975 the Government introduced a legislation called Kerala Scheduled Tribes (Restriction on Transfer of Lands and Restoration of

Alienated lands) Act, 1975. The features[7] of the Act are very striking in the sense that it has created much hue and cry in Attappady and other settler-occupied tribal areas. In the pretext of framing rules the Act was kept in cold storage for 11 years. The act was finally upheld by the Supreme Court, but still remains unimplemented. Against the implementation of this law, settlers have organised a forum and held several meetings and discussions on the issue and expressed their strong reaction (Interview: Nechooly Balan, Social worker, Mannarkad 1994).

There are 3943 tribal families in Attappady. Of this 2600 tribals families either possess proof of record of their land ownership right or reported loss of land. At the same time there are 16000 tamil families. Evicting 16000 tamil families, of whom many got their land after several transactions, for giving the lands to 2600 tribals is reported to be a clear injustice (Deepika 1994). During 1992-93, eviction notice was sent to large numbers of settlers, especially tamil settlers, in Attappady. The security of tamil settlers in the lands of Kerala is in question as 95% of the eviction notices were sent to tamil settlers. Settlers strongly reacted to the decision of the Government on various grounds. They cited several example for unplanned decisions by the Government on the land of

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[7] The main fatures of the Act are:

a) The Act provides a comprehensive definition of the term 'trasnfer' for the purpose of invalidating or restricting the different transactions of immovable property convered under the Act;

b) It dichotomises the concept of alienation on the basis of a time criterion to refer to varius transactions of immovable property. hence all transfers made on or after january1, 1960 and before the date of the commencement of theAct have ben invalidated and provision has been made for the restoration of such property to be concerned member of Scheduled Tribe;

c) It creates a new offence in respect of restricted transfers;

d) the Act also protects the applicant against criminal proceedings under Chapter X of theCriminal Procudure Code;

e) the burden of proof in criminal procedings or proceedings related to restoration application is shifted to the non tribal accused/respondent;

f) the Act provides for the payment of certain amount of money to the respondent when the property in invalidated transfers is restored;

g) it prohibits attachment of immovable property of members of Scheduled Tribes in certain cases; and

h) the Act also restricts the appearance of legal practitioners in any proceedings before the authorities constituted for its implementation.

Attappady and has pointed out to the wastage of men, materials and money on this account. The Government acquired 8000 hectares of land for Attappady Farming Society but the programme is remaining as a non-starter. The hasty decision for enhancing irrigation facility in Attappady, the Attappady Valley Irrigation Project (AVIP) was initiated and many settler households were evicted from the Chittoor area. The programme is yet to be initiated and the possibility of its implementation is doubtful (Karshakan 1994).

Fr. Vincent Moyilil, Secretary, Attappady Social Service Organisation, expressed concern over the issue "Security of tenure is a great problem in Attappady. The Act of 1975 is not a real solution to the problems of exploitation of the tribals. This has created a lot of troubles to both tribals and settlers. The real problem in this area is lack effective implementation of the welfare programme intended for tribals and exploitation of tribals by the Government Officials". With the issue hotting up, the tribals and the settlers are becoming increasingly hostile to each other. Tamil settler Nanchappa Muthaliyar says "I bought 3 acres of land from an Adivsai paying Rs. 6000 per acre. In the same year, he bought 10 acres of land with that amount. The same Adivasi now put up a complaint to get this land back". Reactions of tribals and settlers differ. However, it is time to find an amicable solution. Now the area is on the verge of a fight on the land ownership issue. The real winners in this fight would be neither the tribals nor the settler cultivators. There lurks beneath greedy groups which need to be identified and thrown out from the lands of Attappady.

4.5 Summary

In this chapter we examined the process of settlement and the extent of land alienation in the Attappady valley. The easy-going approach of the *jenmis* and the lack of state control were the major reasons which facilitated in-migration in the early stages. The main motivating factor for the inflow of people to the region in the early stages was

acquisition of land for extraction of forest trees; and it was cultivators in the next stage. The process of settlement, later, turned more of exploitative in nature. In their drive to acquire at least a small portion of land, the in-migrants exploited the tribals indiscriminately on both sides of the valley. The total demographic and the land ownership structure changed in favour of the settlers within a short span of time. These developments have created a dualistic economy in the area by the mid 1970s. The dual nature of the economy has further accentuated the process of land transfer from tribals to settlers and many tribals became landless labourers. The few tribal families left with some land were either located in the remotest parts or the least fertile tracts of land. Agricultural practices of the valley have totally changed from the unique tribal mode of production to a system of diverse agricultural practices, which are discussed in the next chapter.

There are numerous tribal families who lost their lands and many settlers who lost immense amounts of money in their struggle for acquiring a piece of land in the valley. The tribal land issue and the fear of eviction have created tension in the area. An amicable settlement is yet to be reached to make the area rid of social tensions and economic exploitation.

Chapter V

LAND DEGRADATION, CROP SUCCESSION AND LAND USE CHANGE

5.1 Introduction

The changes in land use patterns and the consequent problems of resource degradation in Attappady are discussed in this chapter. The factors held responsible for land degradation and the transition from the traditional tribal cultivation practices after the flow of in-migrants to this area are examined in some detail. The interaction between new entrants and the indigenous people have led to the development of different cropping patterns in the valley. The emerging cropping pattern through the process of crop succession and yield variation among farming groups is discussed in the subsequent section.

5.2 Land use and the Environment

Land use is the surface utilisation of all developed and vacant land on a specific part at a given time and space (Mandal 1982). Land use changes to meet the variable demands of land by the society in its new ways and conditions of life. For a variety of reasons a drastic change in land use has taken place in Attappady within a few decades. Most of these changes were unfriendly to the mountain environment system.

Typically, alternative uses for the land resources include, agriculture and forestry. Most of the studies on land use in Attappady throw light to the extent of forest degradation and consequent emergence of waste land. Menon (1990) using aerial photomap estimated that forests occupy 48.1% of the total area of 59406.22 hectares. Of this 22.48% occupy evergreen forest. Agriculture, excluding plantation, covers 25.73% of the area. However, another work conducted in 1991 clearly shows the extent of

forest degradation. The total forest cover of the area is 387 km^2, of which 131 km^2 is dense forest. Although an area of 200 km^2 was under reserve forests in the early 1900, a good portion of the area is degraded at present. Degraded forests cover an area of 210 km^2 and are mostly the earstwhile private forests which were vested with the government in 1971. Plantation crops, mainly rubber, coffee, cardamom and tea cover an area of 78 km^2 forming 10.7% of the total area (Muraleedharan and Sankar 1991).

In the process of various human interaction with the forest ecosystem the extent of forest land dwindled and waste land has increased. As per the latest estimate available, it is seen that waste land/degraded land area forms 21.04%, and agricultural area, including mixed plantation accounts for only 17.49%, of the total area. It is quite disappointing to see that waste land forms more than 50% of the non-forest areas (Table 5.1). The extent of degradation and the speed with which it happened is indicated in Table 5.2. It is seen that the area under good quality agricultural land has sharply declined while barren areas have expanded. Area under dense forests, due to human interaction, has been reduced and become scrubs and grass lands. The economic and environmental effects of this change are very significant.

5.2.1 Land use Change and Resource Degradation

Land use in Attappady has undergone a spectacular change since the first quarter of this century making the area irreversibly unsustainable. The dominant features of the most fragile mountain regions in developing countries are quite visible in Attappady mountain ranges also. There are persistent negative changes taking place relating to crop yields, economic well being of the people, environment and natural resources (Blaikie and Brookfield 1987). For instance, in Attappady in comparison to the situation five decades ago, the extent and severity of landslides is higher; water flow in rivers and streamlets is lower; yields of major crops are lower; forest produce has dwindled as forest area sharply declined; over-grazing converted many parts into deserts; and finally,

he extent of poverty and unemployment and out-migration of those who have little esource left with them has

Table 5.1

Land use in Attappady

Land use/Land cover categories	Area (km^2)	% to total area
A) Forest	444.07	60.00
1. Ever green/Semi-ever green (dense)	146.16	19.62
2. Ever green/Semi-ever green (open)	40.38	5.42
3. Deciduous (dense)	125.15	16.80
4. Deciduous (open)	104.79	14.07
5. Degraded/under utilised	21.55	2.89
6. Scrub	1.08	0.14
7. Blank	1.16	0.16
8. Plantation	3.80	0.51
B) Agricultural lands	130.30	17.49
1. Kharif crop area (single crop)	44.87	6.02
2. Kharif and Rabi area (double crop)	7.15	0.96
3. Fallow	0.63	0.08
4. Agricultural Plantation (mixed)	77.65	10.42
C) Waste lands/Degraded lands	156.64	21.03
1. Land with or without scrub	88.93	11.95
2. Barren rocky/stoney waste	3.10	0.42
3. Permanent fallow	64.61	8.67
D) Water bodies (Major rivers / Reservoirs)	10.72	1.43
E) Road, Streams, etc.	3.27	0.44
Total	745.00	100.00

Source: Kerala State Land use Board and National Remote Sensing Agency 1994.

Table 5.2

Changes in Land use Since 1971

(Area in km^2)

Category	1971	1989
Agriculture	178.10	52.00
Dense forests	406.37	164.00
Scrubs/Grass land	28.30	152.80
Barren/Rocky	--	233.80

Source : CWRDM 1994.

increased. Reduced productivity and reduced resilience of the traditional farming systems have led tribals to increased dependence on the Government for assistance. The vulnerability of Attappady can be attributed to the irreversible damages caused by the overuse of fertile land, vegetative resources, and even the delicate economic life support system of the dependent communities. The dangers, in most cases, are irreversible or reversible only over a long period (Grainger 1982).

The negative changes plainly visible in the area relate to (i) land degradation affecting the resource base (ii) persistent decline in crop yield of both tribals and settlers and hence lower production flow and (iii) increased unfeasibility of specific cropping pattern which made resource management a tedious task.

5.2.2 Genesis of Land Degradation

The resource base of Attappady was always laid open for exploitation; by the *Jenmis*, the British, the Planters, the officials, the settlers, and even the so called aboriginal tribals. The area, in later stages, specifically, in the past two decades, received attention of researchers, freelance writers, social workers and politicians. For some, Attappady has to remain degraded for ever with all kinds of tribal-welfare-oriented programmes so that their income earning activities, like road construction, soil conservation work, etc. will continue. For some others the area has to be remain a contentious based. In the history of Attappady only a few officials worked for the real development of the area and the welfare of its people as most Government officials used to be posted to this hilly area on punishment transfer. They were not interested in its development and remained indifferent spectators to the plundering of the area and its consequent desertification as well as the alienation of its indigenous population. Still for another group the resource and the people are mere instruments for experimentation. Now the area is confronting a new form of degradation other than resource degradation,

that is, debasement of the human relations. In short, during the past one or two decades even though the area witnessed a wide range of activities aimed at its development, Attappady is steadily degrading. A report which appeared in Deepika daily 28th December, 1995 says that the Government had spent, till that data, on an average, Rs. 25 lakh per Adivasi family. If this amount had actually reached the targeted people, Attappady would have turned a paradise. Resources intended for development of Attappady must have leaked away into unintended directions. Of the major factors for resource degradation of Attappady, the most prominent are deforestation, influx of migrants, over-grazing, road construction and changes in tribal behaviour.

5.2.2.1 Deforestation

With the assumption of power by the British in Malabar the north-west part of Attappady was declared reserved forest; the rest of the area remained with the *Jenmis* as private forests. During the early periods, neither the *Jenmis* nor the British exploited the forests. In the reserved areas the tribals continued to enjoy full freedom, the British placing any restrictions on their movement in the forests and the pursuit of their economic activities which were least detrimental to the forests. The forests of Attappady was first disturbed in 1932 through clear felling to make way for plantation in its south eastern portions. Following by this, nearly 300 hectares of forests were clear felled and planted with teak. Later the British felled timber to meet the requirements of railway sleepers and support the plywood industry (ESRG 1989).

However, the process of deforestation in Attappady became extensive with the influx of settlers. The new form of cultivation brought by tamilians and malayalis required forest clearance, and the process of deforestation got accelerated. Cultivation of deep-rooted crops like *ramacham* or vetiver *(Vetiveria zizaniodes)* and *theruva* or lemon grass *(Cymbopogon citratos)*, which are still in practice, led to the erosion of top soil.

For extraction of oil from these crops huge quantities of firewood were required. Firewood was obtained freely by cutting trees from the forest areas. Settlers from Travancore helped the timber trade of the rich early settlers in return for a piece of land to cultivate. During the early 1950s even high quality timber species were used by settlers as firewood (Interview: Malayali Settlers 1994). Lack of security of ownership, low value of timber, poor resource base, etc. were factors which accentuated the process.

Deforestation accelerated during the second half of the Sixties when the feudal landlords became certain that they would lose their land due to impending land reform measures. They stopped looking after their forests and tusked increasingly to creating fictitious tenancies (Vijayanand 1996). Large areas of forested land were given to timber traders at throw away prices. 'Something is better than nothing' was what the *jenmis* had in mind. When the reforms began to be implemented, 10 to 15 truck loads of timber passed through the Mukkali junction each day. The truck number, the type of timber, and the time and date used to be recorded in the register kept by the *Moopil Sthanam* (Interview: Kumaran Nair, *Kariasthan* of *Moopil Sthanam* 1994). *Jenmis* gave lands liberally to relatives for removal of trees. Private forests were vested with the Government in 1971, through the Kerala Forests Vesting and Assignment Act. This was a severe setback to *Jenmis* and all those who were engaged in tree cutting in the leased lands. The High Court of Kerala struck down the order on 21st May 1972. After a long legal battle the Supreme Court of India approved the legislation on 19th August 1973. The interim period of one year and four months was a legal vacuum, during which massive, organised forest plunder was carried out (Nair 1988). The greenest parts of Attappady, except the reserve areas, were totally vanished by the mid 1970s. Forest area which constituted 82% of the total geographical area of Attappady, even as late as 1959, was reduced to a mere 28% in 1971 (Kunhaman 1981). Whatever trees remained in the private land were used up by the settlers in the later stage. Even now newspapers carry tales of plunder of forest trees even from the reserved forest areas.

5.2.2.2 Emerging Cultivation

The types of cultivation brought into Attappady by tamils and malayalis was highly unfriendly to the forest environment. In their struggle to hold on to their land and build up their resource base they put all their energy into their lands indiscriminately and regardless of its environmental consequences. Tamil settlers who cultivated dry crops never allowed even a single tree to remain in their plot. Continuous ploughing and week terracing resulted in top soil erosion on an extensive scale. Malayali settlers, on the other hand, practised *ramacham* and *theruva* cultivation in the early period and tapioca at a later stage. These two crops, which give immediate income, are not suitable to sloppy lands unless protected by strong soil conservation measures. Thus, the new cultivation practices, along with deforestation, intensified the process of deterioration of the fertile lands of Attappady. Of late, at least malayalis, have turned to the homegarden system of cultivation.

5.2.2.3 Tribal Cultivation

Tribals themselves were also partly responsible for the degradation of the resource base of Attappady. Shifting cultivation practices, though technologically suitable for forest eco-system, have intensified in recent years as the per capita land availability has diminished. When Kurumba land was re-surveyed and reallocation made in 1985, there were 847 persons in the community. The land allotted to them for cultivation was as low as 294 hectares. The per capita land availability come down to 0.35 hectares. Along with intensified use of the available land, they cleared interior forests for cultivation unauthorisedly. The formation of *Kinattukara* settlement is an example of this phenomenon (Nair 1991).

The extensive shift of Irulas and Mudugas towards settler type cultivation, mainly for want of money, has created extensive patches of denudation near to their hamlets. With the influx of migrants, many tribals, who lost their land, were pushed to very steep and fragile upper reaches. In these areas tribals began practising cultivation of crops like tapioca and cotton, quite unsuitable to the areas.

For many years the settlers have exploited the ignorance and illiteracy of tribals and plundered their resources. Instead of learning from this bitter experience, they do still seek help in cash and kind from the exploiters, thus aiding and abetting the destructive process even further.

5.2.2.4 Soil Conservation

The most noticeable conservation work undertaken in Attappady valley is based on the Soil Conservation Schemes under the Kundha Project. The major objective of the work was not to save fragile land of Attappady but to prevent erosion of soil towards Kundha Project area. The total area taken up for soil conservation work under this Project in the Attappady area was 5925 hectares. The implementation procedure starts with selecting a specific area (by the soil conservation sub-divisional office) and estimating the extent of land occupied by the individual farmers. The matter is then reported to the respective farmers, namely, that the area has been taken up for soil conservation works. The work is to be carried out directly by the concerned farmer or his nominee with the funds provided to the farmers on loan basis of which 50% forms a subsidy. The remaining 50% has to be repaid in 20 equal instalments within a period of 10 years. If nobody comes forward to undertake the work, tenders will be called and the work will be executed through the contractors. Afterwards the concerned farmer will be informed of the 50% amount to be repaid in instalments. If he fails to repay the amount will be realised from him through revenue recovery. If the work is done in tribal land,

100% subsidy may be given. During the period 1976-1981 an area of 5550 hectares have been covered under the scheme, of which 3000 hectares belong to the tribals (KIRTADS 1982).

In the beginning, settlers responded to this scheme with extreme interest as it carried some subsidy. Some farmers have taken up the work at their on risk but later on, due to inordinate delay in the sanctioning of amount and other formalities, his nominee, that is the contractor, began operating between him and the Soil conservation Department. In consequence, the conservation work got totally out of the control of farmers in the later stage. During our survey period many farmers reported to us that they got information from the Department about the soil work done and the amount to be repaid. However, no such work was actually done in their plots. They say it is an *adjustment* between the Department and the contractors. Many farmers received recovery notice as they refused to repay the balance amount in time. As tribals enjoy 100% subsidy, and as they are less argumentative in nature, contractors were more keen to take up '*soil work*' in tribal land.

Farmers were not really interested in the soil conservation work since they found that the work done in many parts were only further intensifying erosion of soil. Whether agreed upon or not it was the contractor who decide the area to be selected for conservation work. Hence, the contractor selects an area where he can make more profit with less labour and other resources. There were instances of soil conservation work done in same plot several times over through *adjustment.* Once the contractor got the work, mainly by bribing the officials, he reached the concerned area and finished the work with minimum mandays and minimum resources, when the actual mandays and resource required is much larger. To prove that the work has been done they just dig the area and remove the top grass. When boulders are required for terracing they use

locally available poor quality stone and put them one upon another. The first rain itself caries away the entire stones and, thus intensifies erosion.

5.2.2.5 Grazing

Degradation of the slopes of Attappady is further accentuated by indiscriminate grazing. Tribals who alienated their land took up grazing of cattle and goats of tamilian settlers as their main job. Travelling across from Mukkali and Anakkatty one can see on both sides of the mountain slopes, innumerable wandering cattle and goats. Substitution of cattle by goats, mainly in tamil-dominated Sholayur regions, has led to shaving off of the entire surface grass and tiny plants in the area. A goat leaves nothing, not even the roots, thus destroying the regenerative capacity of the soil.

Grazing has been identified as the most important reason for the degradation of Attappady next to deforestation (CWRDM 1994). Livestock development in Attappady took a new turn after the initiation of Integrated Tribal Development Project. The Project envisaged livestock development as a major source of income generation to tribals. The shift of emphasis to livestock rearing, mainly goat and bullock rearing, gave an added impetus to the growth of livestock population in Attappady. The total cattle population in 1972 was 23000 while goat population was 8700. Among the cattle population, 8785 were work bullocks (GOK 1976-77). According to 1987 census, livestock population has increased to 42,596. Although the total bovine population in Attappady has increased in the past fifteen years, it is not really an increase in cattle population, rather it constituted a sudden increase in goat population. Goat population increased to 19,736 - an increase of 127% when compared to the year 1972. Livestock population is more concentrated in Sholayur (43.7%); of the goat population, a major share (77%) is in Sholayur and Pudur. Cattle population is also more in Sholayur (47%) followed by Agali, 34% (KSLUB and NRSA 1994). Although a sharp increase in goat population is

observed in Attappady, facilitated by supportive Government programmes, a concomitant increase is not found in the extent of grazing land; nor have goat management practices become scientific.

In between 1977/78 and 1980/81 an amount of Rs. 2,41,530 has been spent for animal husbandry development in this area. In spite of this fact, due to unscientific development plans and lack of follow-up the programme failed to meet its objectives. Instead, it has accelerated the pace of environmental decay. Involvement of go-betweens, uneven distribution of funds, lack of technological backup and non-availability of adequate grazing lands led to the failure of the programme (KIRTADS 1982).

5.3 Crop Succession

Since different land use patterns have different environmental impacts, it is necessary to identify the factors in the larger social environment which affect these patterns. The resource management strategy in a farm economy is often influenced by both price and non-price factors. The important factors which affect farmers' decisions on crop selection are their own skills, may be acquired from ancestors, climatic suitability of the crops, time preference, farm level price of the crops (in the case of cash crops), subsistence requirements of the family, availability of inputs including labour, cost of production, etc. The influences of these factors undergo changes as the farm economies grow over time. When subsistence comes first in the portfolio of requirements of the farm economy, the influence of price, cost, skill, etc. will not influence the crop selection process in the early stages of its development. When the economy grows more intensive cultivation practices will be followed to meet both the subsistence and also the cash requirements. In the case of recently developed farm economies, the degree of adaptability of farm households to changing requirements and situations is found to be high. Recent works on peasants and small farmers have

underlined this fact and explained the rationality underlying it (Schultze 1964 and Barlett 1980).

Most cultivators prefer to do with time tested agricultural practices; however, they tend to experiment with new practices when confronted with problems and challenges posed by economic as well as environmental factors. Economic compulsions to build up assets for ensuring an assured flow of incomes and environmental challenges posed by erratically changing climatic conditions have compelled farmers in Attappady to experiment with different crop practices.

As population grows farmers adopt more labour-intensive techniques such as terracing, irrigation, and fertilisation to counteract decline in soil fertility (Boserup 1965). There are now ample pieces of evidence to suggest that intensification of land use has historically been accompanied by extension of cultivation to other ecological zones such as the uplands (Fernando 1986). A consequence of extension of farming to inferior lands is impoverishment of land of quality, decrease in average productivity and soil erosion (Blaikie and Brookfield 1987). In the latter circumstances modification of farming systems is likely, in particular, when the volume and value of production obtained does not rise to meet the cost of investment. In such circumstances, farmers in Attappady have been experimenting with methods of crop succession leading to a home garden system. Unless motivated by subsidies or other incentives, farmers are seldom interested in land protection practices such as terracing and erosion control measures. Declining yield of many traditional cropping patterns force them to switch on to a permanent income-yielding perennial-crop-based farming system. All available evidence indicates that in the absence of adequate inputs, yield declines are inevitable under mono-cropping practices.

Arguments are often advanced to show that poor yield is the result of farmers' indolence and irrationality. However, it is proved that farming practices remain rational and that farmers seek to obtain the best yields possible under given very stressful circumstances. A complex set of factors, including labour scarcity, competing economic activities that diminish the value of farming, low soil fertility and heavy pest infestations, have contributed to the shifting of the cropping pattern. Farm decisions on crop selection, depend to a larger extent, in addition to local ecology, on the larger political and economic environment (Conelly 1994).

Settlers enter the region with varying types of skills, experience and capital. The extent of social differentiation which exists in Attappady was almost entirely imported into the area along with the in-migrants. Leaders among the in-migrants - both malayali and tamilian - brought with them large amounts of capital on their arrival, while many those came later possessed only their farm level skills. Thus, eventually, after amassing enough capital through land dealing and timber trade leaders moved to plainland after leaving considerable land behind for future dealing. Hence they remained absentee landlords and, in some exceptional cases, planters. Followers, with what ever land they got, started their struggle to accumulate more. It appears that in many cases small holders engaged in environmentally destructive practices as a last resort to meet obligations and hold on to land. In this struggle, there appears to have taken place a polarised pattern of growth characterised by two social groups, *Adivasi* and *Vandavasi* (in-migrants), confronting each other with uneven and contrasting relationships with regard to productive resources.

5.3.1 Farming Systems in the Traditional Tribal Economy

Traditional tribal cultivation was primitive subsistence agriculture of the slash-and-burn type (shifting cultivation). Along with cultivation of subsistence crops, mainly

coarse cereals, they also collected minor forest produce like honey, lac, incense and medicinal herbs as well as and tubers and fruits. The economy was more or less self sufficient in nature with little damages caused to the environment and its ecology. However, in the course of development, the area under shifting cultivation dwindled considerably due to a variety of reasons like emergence of settlers with a different mode of cultivation, monetisation of the tribal economy and restrictions on extensive cultivation imposed by the government. The most important among them was the entry of men from adjacent areas with a technology different from their own. The result is that tribal economy was opened up to outsiders, commercial crops gained importance and the tribal practices of cultivation paled into insignificance.

Taking the State as a whole we find that only a few tribal workers are engaged in shifting cultivation. By 1975, only 0.2% of all tribal workers were engaged in shifting cultivation in Kerala. In Palakkad, where Attappady tribal belt is located, also this percentage holds (GOK 1976-77). Two types of cultivation, shifting cultivation, based on tribal know-how and technology and settled cultivation, the result of dynamic changes, are now in operation in Attappady among tribals. Now, among the three tribal communities, only Kurumba community follows shifting cultivation.

5.3.1.1 Shifting Cultivation (*Kothukadu*): Disappearing from the Tribal way of life

Kothukadu, a mode of cultivation and a 'way of life', was extensively practised in Attappady till the beginning of this century. Certain restrictions on this practice were imposed by the Government for the first time in 1917. A series of schemes followed as a result of which the main livelihood activities of the tribals in the forest areas got restricted to a limited forest area. As a result of this, two ethnic groups, Irulas and Mudugas, moved away to other forest areas. At present, Kurumba is the only community

-- less exposed as they on to the outer world than other tribals -- which follows shifting cultivation within the limit of restrictions.

Before the intervention of the Government, land was sufficiently made available to tribals by feudal land lords in the plains at a normal rent and hence selection of land for cultivation was more or less by choice. Situation changed and the forest land is allotted to the tribals by the Government on lease in the name of Moopan of the hamlet. Moopan, being the leader of the Ooru, has the right to distribute land among families. Allotted land, not by choice of the actual cultivators, will be used for cultivation by the families of the hamlet as per the allocation of Moopan. Land allotment shifted the emphasis from 'choice to chance' through the imposition of restriction.

As different from settled cultivation, shifting cultivation involves traditionally established conventionality and rituals. The various steps encompass the shifting cultivation of tribals are selection of land, fixation of date of cultivation, preparation of land, sowing of seeds, weeding and harvesting. Selection of an area for cultivation is the first step involved in shifting cultivation. The *mannukkaran* (Soil expert) would select the land for cultivation which would be approved by the Tribal Council presided over by the Moopan. It was the *mannukkaran* who decided the date of cultivation after looking into natural growth and soil condition. Once land and date of cultivation is decided, under the leadership of the Moopan, all the able bodied members of the hamlet participated in clearing the land selected for cultivation. This will commence, in normal case, immediately after the *Sivarathri* festival. Every tree and bush except big trees will be cut down and burned for clearing the land and the ashes served as fertiliser. Sowing of seeds begins in the month of May. Land is not much disturbed by way of 'preparation' for the purpose of sowing seeds; instead, seeds are just dibbled into holes. Women take small pits on the ground for sowing *thuvara* or *thumara* or *thumarai* (*Cajanus indicus*) and *amara* or field beans (*Dolichos lablab*). Afterwards, in May itself,

the seeds of *ragi or kora* (*Elusine coracana*), *chama* (*Panicum miliaceum*), *kaduku* or mustard (*Brassica juncea*) and *cheera* or *Kirai* (*Amaranthus gangeticum*) are mixed together and broadcast. When the plants have grown up to about one feet high, weeding work begins (by June) and continues till August. They do minimum weeding as it magnify soil erosion. The last step in the routine farm operations is harvesting which will take place in the month of September. As the maturity period is different for each crop, harvesting is carried out successively starting with *kaduku* and *cheera* in September; *ragi* in October to November; *chama* in November-December; and *amara* and *thuvara* by January-February.

Production was mainly intended for meeting the family consumption requirements. However, to meet other requirements like, salt, cloth, tobacco dry fish, etc., they market a portion of *thuvara* and *kaduku*. It is estimated that about 80% of the produce constituted *kora* and *chama*, while *thuvara* constituted about 15%. Cultivation of *cheera*, *kaduku* and *amara* was insignificant while compared to *kora* and others (Nair 1991). Hence, production in a tribal economy was mainly aimed to establish a self-sufficient economy with minimum environmental hazards.

One notable feature of shifting cultivation is that once the fertility of the land declined, they abandon it and select another area for clearing and farming. The former area reverted to forests and remained uncultivated for years together. This system of cultivation was eminently suited to the topography of the forest land in Kerala with undulating terrain, steep hills and low lying valleys (Kunhaman 1981).

The area under *kothukadu* is shrinking and settled cultivation of various types is growing. Various studies have pointed out the technological superiority of shifting cultivation of tribals. The evaluation of five system properties, namely, productivity, stability, sustainability, equitability and autonomy of the tribal agro-ecosystem of

Attappady has shown that all these properties are well satisfied in shifting cultivation. Efficiency of shifting cultivation in terms of energy and economy is superior to that of settled agriculture among tribals. In shifting cultivation output is high with an output-input ratio of 19.5:1. In settled agriculture the output is less with an output-input ratio of 16.3:1. In another form of settled agriculture practised by Irulas, which is similar to the one practised by tamilians, the output is the lowest among the three cases with the output-input ratio of 12.9:1(Muraleedharan et al. 1993).

5.3.1.2 Influence of Migration on Cropping Pattern

In the absence of historical records on the nature of crop succession and its interaction with forest, this aspect is examined on the basis of information gathered from old settlers in the study area. The validity of this information is confirmed after interviewing many old settlers and tribal Headmen (Moopan). In the initial days of settlement people engaged themselves in various kinds of activities such as timber extraction and plantation work, along with adoption of traditional tribal cultivation practices. For subsistence, they extensively cultivated crops such as *ragi*, *chama*, *thuvara*, *cheera* and rainfed-rice in the cleared forest lands using family labour. The crops used to be protected from animals by settlers jointly or individually. Crop selection at this stage was affected more by subsistence requirements than by profit consideration. Population expansion, cash requirements and fall in area under pure subsistence crop due to extensive cultivation of cash crops ensured.

Cheap availability of timber and easy accessibility to virgin forest land shifted the attention of settlers from subsistence crops to *ramacham* or vetiver and *theruva* or lemon grass cultivation on an extensive scale. The oil extracted from *ramacham* and *theruva* was in great demand in markets outside. This fetched large incomes to the

cultivators. The oil extraction process required large quantities of firewood and human effort which were available in plenty in the study area. R*amacham* cultivation, though a source of immediate income, became a double-edged weapon. On the one side, it increased soil erosion because its root extraction requires very deep digging. Secondly, for oil extraction large quantities timber were used, as firewood, thus resulting in deforestation. This significantly affected the availability of fuel wood in the study area. As a consequence, tamilians abandoned *ramacham* and *theruva* cultivation and switched on to dry crops like groundnut, grams, cotton and the like.

When more cleared forest areas became available, the malayali settlers started cultivating seasonal crops like, tapioca, tubers, plantain, etc. both for subsistence and for cash. The attack of rodents and the poor climate conditions of the area resulted n crop losses. Malayali farmers were forced to divert their attention to cultivation of a mixture of perennial crops like pepper, coconut, arecanut, coffee, rubber, etc. and seasonal crops like tapioca, plantain, ginger, turmeric, etc. By the middle of the 1970s, prices of perennial crops increased significantly which led to conversion of more areas from seasonal crops to perennial crops.

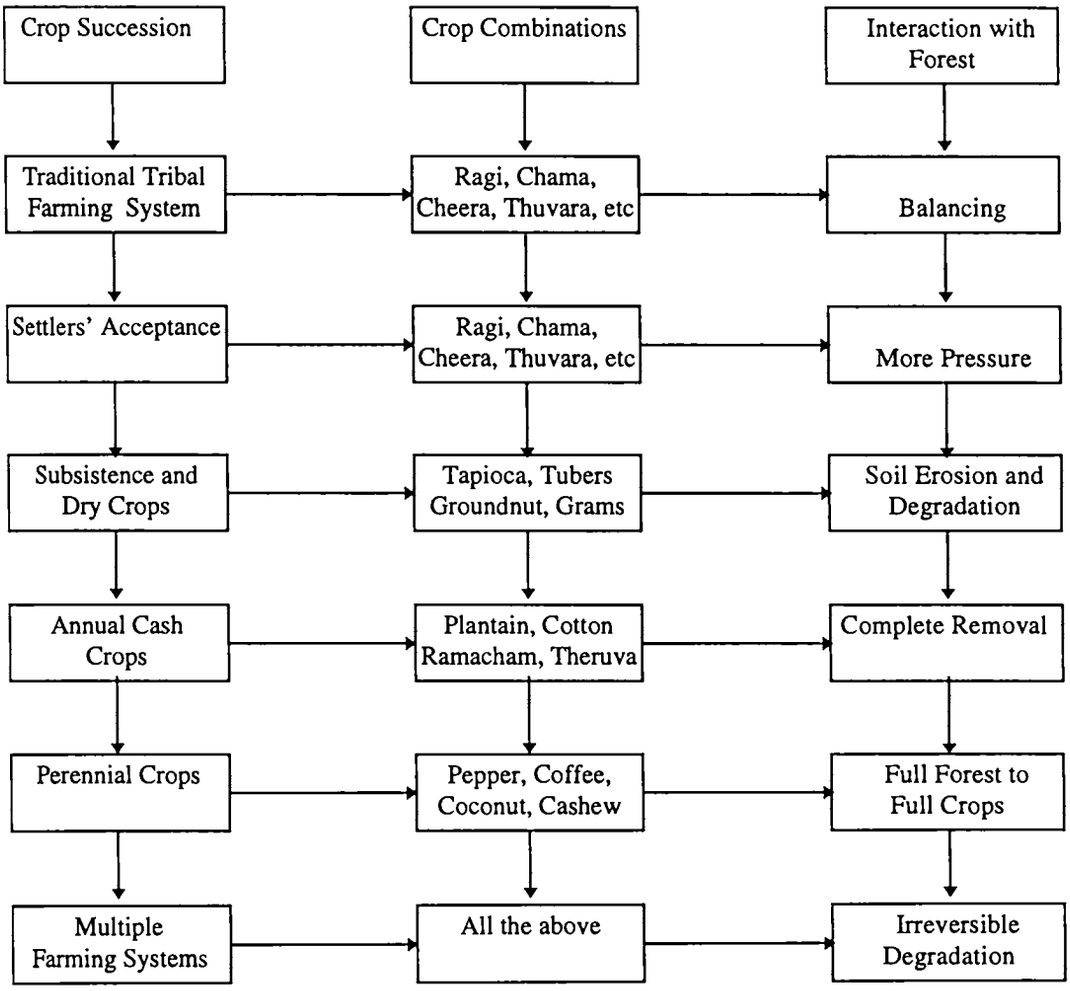
Considering the fluctuations in the prices of perennial crops that have occurred since 1990 most of the malayali settlers now prefer a crop mix of perennial and seasonal crops. A few malayali settlers have also succeeded in developing mono crop systems of perennial crops along with mixed farming systems.

Unlike malayali in-migrants, tamil in-migrants continued cultivation of dry crops like groundnut, *thuvara*, cotton in the hill sides, and field crops like maize, sugar cane, etc. in the downstream wet areas. Tamil farmers look for, in general, immediate returns from investment rather than wait for a stream of income over a long period of time from cultivation.

The cropping patterns discussed in the preceding passages have had their influence on tribal cultivation practices also. Except a few households in the study area, tribals have shifted to perennial crops, cotton and groundnut. This shift has also been accentuated by the tribal development activities of governmental agencies, which consist of supplying to them of seeds and seedlings and fertilisers. Figure 5.1 presents the nature of crop succession and its repercussions on the quality and extent of forest lands.

Figure 5.1

Crop Succession and Resource Degradation



5.3.1.3 Crop Succession Among Tribals.

The exact period during which tribals took to settler cultivation is unknown. Farm level data, however, shows that among Irula communities a major share of their land is now under either home garden or dry annual crops. Basically, three factors must have prompted them to shift from their traditional subsistence crops to settler crops. They are, (1) excessive land occupation by the settlers and the resultant changes in cropping pattern (2) assistance received in the form of seeds and seedlings (like coconut and cashew seedling, pepper vines, cotton seeds, etc.) through governmental agencies as part of tribal development schemes and (3) increasing cash requirements of tribals which in the early days were met through sale of land to settlers.

For a long time Irulas of Agali and Sholayur continued with their own cropping systems. When they were thrown out of their lands through legal and illegal ways, by the settlers, they were left with nothing but their own labour power and infertile hill slopes. For subsistence they had no choice but to apply their traditional skill. When the new arrivers became their neighbours, they got casual work in the fields of the former, and got acquainted with and interested in settler cultivation. As a part of total development and building up the assets of tribals, cash and kind assistance were provided through the office of ITDP, the Panchayat and the Krishi Bhavan. A major portion of the assistance in kind was made in the form of seeds and seedlings of grains and plants not traditionally cultivated by tribals. Whatever seeds and seedlings received, they planted in their plots without receiving sufficient technological backup. As a result, many of these crops remained unproductive or yielded very low levels of output. Cultivation of *ragi*, *chama* and other cereal crops did not fetch them adequate income to meet the cash requirements of most of the tribal households. So they were forced to shift to cash crops like cotton, groundnuts and tapioca which require only short periods of waiting for receipt of return.

Gradually, many tribal households, shifted their emphasis towards an array of annual and perennial crops, in addition to subsistence crops.

5.4 Cropping Pattern : The Current Scenario

As a consequence of this shift an innumerable number of crops - annual, seasonal and perennial - found their place in Attappady. We broadly divide the land used by the cultivators into three categories, namely, under perennial crops, under seasonal or annual crops and under other trees, to examine the importance of each among the farming communities (Table 5.3). In the surveyed area, the majority of the farmers do not follow the standard spacing norms for planting crops. To overcome this difficulty, the area under crops was estimated using the standard area requirement given by the Kerala Agricultural University (KAU 1991) and the Indian Council of Agricultural Research (ICAR 1987). It is seen that, perennial crop is dominant in Agali and annual or seasonal crops cover most part of Sholayur. Out of the area under perennial crops in Agali, a sizeable portion (80%) is cultivated by malayalis, 13% by tribals, and only 7% by tamils. However, the area under seasonal or annual crops is shared almost equally by malayalis and tamils, whereas in Sholayur, tamil farmers dominated in annual crops and had more area under perennial crops. From Table 5.3 the dominance of tamils in annual crops is clear: they occupied about 52% of the total cropped area under annual crops, followed by tribals (35%), malayalis occupied only (13%). Rarely we found tamils allowing trees to grow in their plots. However, it is common among malayalis to maintain trees. These trees - not all of them - served as the standard to grow pepper vines on. Also they give shade to coffee plantations and numerous other benefits. Of the total area under trees, more than 70% in both villages are found in malayali-occupied land. However, the proportion of area under forest trees is 18% in Agali and as low as 6% in Sholayur.

Table 5.3

Relative Share of Crops in Total Cropped Area

(Area in acres)

Category	Agali			Sholayur		
	Perennial	Annual or Seasonal	Other trees	Perennial	Annual or Seasonal	Other trees
Malayalis	880.07 (79.89)	295.97 (39.59)	318.22 (74.17)	111.66 (54.47)	48.91 (13.47)	25.87 (70.09)
Tribals	149.95 (13.61)	174.23 (23.30)	81.78 (19.06)	34.33 (16.75)	127.06 (35.00)	4.21 (11.41)
Tamils	71.64 (6.50)	277.41 (37.11)	29.03 (6.77)	58.99 (28.78)	187.08 (51.53)	6.83 (18.50)
All	1101.66 (59.55)	747.61 (40.45)	429.03 (18.83)	204.98 (36.09)	363.05 (63.91)	36.91 (6.10)

Figures in parentheses are percentages

Note: Area is calculated according to the standard spacing given by Kerala Agricultural University

The proportions of area under the various crops and trees according to ownership by the settlers and tribals in the two villages are significantly different (Figures 5.2 and 5.3). It is seen that in both the villages the area allotted by the malayalis is the highest for perennial crops. Contrary to this, tamils have the largest percentage of their area under annuals. The proportion of area under perennial crops by the tribals in Sholayur is significantly less than that of their allotment in Agali. It is also interesting to note that malayalis maintains more forest trees in their land than other farming groups.

Figure 5.2

Area Allocation between Crops and Trees in Agali

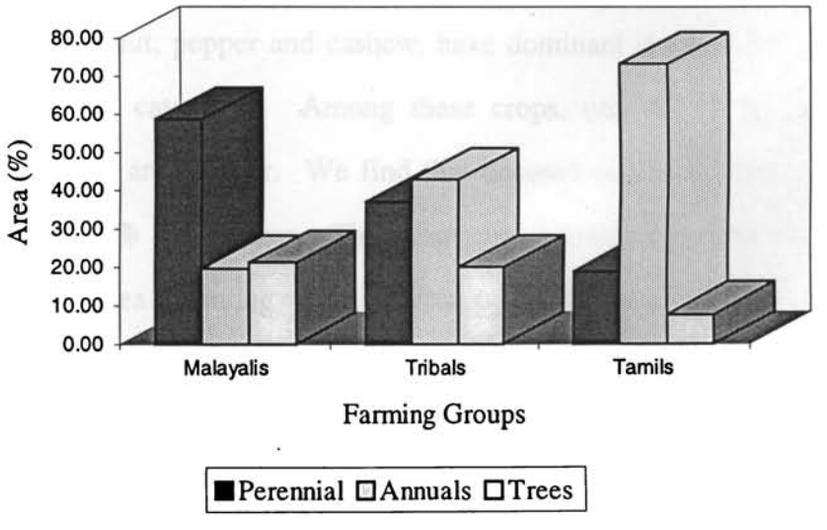
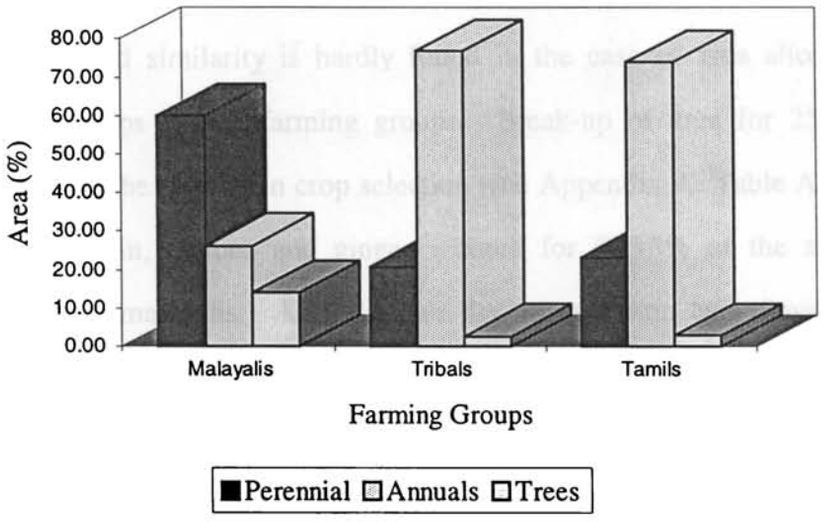


Figure 5.3

Area Allocation between Crops and Trees in Sholayur



5.4.1 Major Crops in the Study Area

As mentioned earlier, the area is characterised by great crop diversity. However, the trees which dominates in the lands cultivated by settlers are different from trees dominating in tribal lands. Also influence of a variety of factors over long periods of time had its impact on crop conversion and crop adoption. The break-up of the area under perennial and seasonal (or annual) crops is given in Appendix A: Table A.3. Since the area is suitable for growing a number of crops, a variety of crops have been tried by farmers. However, an examination of the area under perennial crops reveals that three crops, namely, coconut, pepper and cashew, have dominant share in the aggregate area put under this crop category. Among these crops, coconut is the dominant crop followed by cashew and pepper. We find that coconut occupied about 26%, cashew 21% and pepper 15% of the area. The other nine identified perennial crops together cover 38% of the area. Among farming groups and between Agali and Sholayur the same proportions hold. A difference noted in this is among malayali farmers of Sholayur, where coffee dominates more than pepper in terms of area. Also area under rubber in Agali is almost near to that of pepper. Among settlers, coconut is the most

dominant crop and for tribals it is cashew nut. Though the area under cashew is the highest among tribals, the majority of the trees have not reached the fruit-bearing stage.

The above noted similarity is hardly found in the case of area allocation for annual or seasonal crops among farming groups. Break-up of area for 25 crops is considered to examine the priority in crop selection (see Appendix A: Table A.4). Three crops, namely, plantain, tapioca and ginger account for 67.18% of the area under seasonal crops among malayalis. As for tribals dry crops cotton and *thuvara* covers around 30% of the area. Other crops, which cover more than 10% each of the areas is *ragi* and *chama* together (27.35%) and tapioca 16.48%. These four crops predominate both in Agali and Sholayur among tribals. Tamils, as evident from the Table, lay more importance to dry crops like, cotton, *thuvara* and groundnut. These together account for 55% of their area under seasonal crops. The same pattern is followed by tamils, in area allocation, in Agali and Sholayur and an exception is the allocation of area on sugarcane in Sholayur. In short, in Agali, plantain, tapioca, *thuvara* and cotton dominate; and in Sholayur, tapioca, cotton, sugarcane and groundnut cover more area under cultivation. Subsistence crops of tribal, namely, *ragi* and *chama*, is losing its ground in these areas. One can now say that, among malayalis the crops they brought to this area are still have a potential role in their farm activities. At the same time, seeing the area allocation to other crops, much shift towards dry crops has not taken place among them. Tamils, like malayalis, still adhered to their own traditional cropping pattern. However, tribals made a leap forward towards the adoption of tapioca and cotton.

5.5 Yield of Important Crops

Just like variation in the cropping pattern, there is considerable difference in yield of various crops among the farming groups and between Villages (see Appendix A: Table A.5 and A.6). The flow of in-migrants and the introduction of new cash crops,

which required technology different from the indigenous tribal technology, and the alienation of fertile land has considerably reduced the productivity of traditional tribal crops. To understand the yield variation across farming groups, productivity of prominent crops - perennial and annual or seasonal- are examined. To accomplish this, the yield difference between malayalis and tamils, malayalis and tribals and then tamils and tribals are worked out (Table 5.4). Among settler groups itself there is significant yield difference. The magnitude is much more when it is examined for settlers and tribals. Except for four crops, namely arecanut, cotton, groundnut and *ragi*, the productivity of malayalis is larger than tamils. Of these crops, only for cotton and groundnut the yield of tamils is more pronounced than malayalis. It is noteworthy that for two perennial crops, namely, cashew and coffee and two seasonal crops, namely, ginger and turmeric the yields of malayalis are more than 100% of tamil cultivators. Tamilians are traditionally practising these dry crops and thus the yields of these crops in their lands are higher than that of other cultivators.

As expected, the yield of tribal cultivators is much less than malayalis, and for many crops the yield of malayalis is more than 50% of tribals and for *ragi* yield variation is more than 100%. However, yield of groundnut per acre of malayalis is 18% less than that of tribals. The continuous decline in the productivity of traditional crops is affirmed by studies conducted by voluntary organisations in the area. For example, Participatory Rural Appraisal conducted by Action Aid for 'Nature' and NGO at Mully on 19/9/1991 reveals that the productivity of all tribals crops dwindled considerably. The yield per acre of *ragi* reduced from 12 bags in 1961 to 6 bags in 1991, 50% decline within 30 years. As for *chama* the decline is much faster, that is, from 6 bags to 0.5 bags (that is, 91% decline). A similar trend is seen in the case of other crops like *makka cholam* (*Zea mays*), *cheera*, *thuvara* and *avara*. Forceful adoption of crops, brought by settlers neither improved their position nor they do well in their traditional crops. However, in comparison with tamil settlers, tribals are a step ahead in many crops. Among the

perennial crops, except arecanut and pepper, the productivity of tribals is more than tamils. For two crops, cotton and groundnut, yield of tribals are better than malayalis but lower than tamils. The massive shift in area towards these two crops by tribals, in recent years, may be attributed to the comparative advantage in productivity. The comparison indicates that malayali and tamil cultivators are producing, other things remaining the same, good yield per acre in their traditional crops. However, tribals could neither produce good yield from all the newly introduced crops nor from their traditional crops.

Table 5.4

Yield Difference between Settlers and Tribals

(Yield per acre)

Crops	Yield			Yield difference					
	Mala-yalis	Tribals	Tamils	1 - 3	4 as % of 3	1 - 2	6 as % of 2	3 - 2	8 as % of 2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Perennial									
Coconut	1226	1069	971	255	26.26	157	14.69	-98	-9.17
Arecanut	1659	830	2037	-378	-18.56	829	99.88	1207	145.42
Pepper	321	171	232	89	38.36	150	87.72	61	35.67
Coffee	288	202	137	151	110.22	86	42.57	-65	-32.18
Rubber*	239	0	0	--	--	--	--	--	--
Cashew	123	100	83	117	141.06	23	23.00	-17	-17.00
Annual or Seasonal									
Banana	5166	4995	5035	131	2.60	171	3.42	40	0.80
Rice	1460	1212	1187	273	23.00	248	20.46	-25	-2.06
Tapioca	5551	3070	4455	1096	24.60	2481	80.81	1385	45.11
Ginger	1375	808	643	732	113.84	567	70.17	-165	-20.42
Turmeric	1136	687	520	616	118.46	449	65.36	-167	-24.31
Thuvara	148	131	148	0	0.00	17	12.98	17	12.98
Cotton	441	444	578	-137	-23.70	-3	-0.68	134	30.18
Sugarcane*	0	0	50641	--	0.00	--	--	--	--
Groundnut	300	367	446	-146	-32.74	-67	-18.26	79	21.53
Maize	578	528	431	147	34.11	50	9.47	-97	-18.37
Ragi	351	169	361	-10	-2.77	182	107.69	192	113.61
Chama	214	229	209	5	2.39	-15	-6.55	-20	-8.73

*Rubber is exclusively cultivated by Malayalis

*Sugar cane is exclusively cultivated by Tamilians

5.6 Summary

This chapter examined the process of change in the land use from a fully forested area to a diversified agricultural cropping system. First, we examined the genesis of land degradation in the valley and found that a gamut of factors had their influence in transforming the area to a land with a variety of agricultural practices. Secondly, the crop succession that had taken place, along with the influx of migrants, and its influence on tribals' indigenous cultivation was investigated. The enquiry showed that tribal cultivation is on the ruin due to low productivity on the one hand and the adoption of non-traditional crops on the other. It is also revealed that, a plethora of socio-political factors has had its role in the emergence of a variety of crops and cultivation practices in the area.

Chapter VI

DETERMINANTS OF CROP SELECTION AND THE EMERGENCE OF FARMING SYSTEMS

6.1 Introduction

This chapter identifies the factors which influence crop selection among farming groups and the emergence of different farming systems in the area. The key factors held responsible for crop succession are examined in detail. In the process of crop succession different farming systems have emerged in the area. In order to examine the magnitude of changes, which have taken place, crop selection practices of the different farming groups, cropping intensity, crop combinations and farming systems are examined.

6.2 Factors Influencing Crop Selection

Price and non-price factors are identified as the major determinants of the selection of crops. The major non-price factors emphasised as a cause of crop selection are uncertainty, access to capital and technology, security of ownership, size of land owned, labour endowment and the level of education of the members of the household.

6.2.1 Price

Changes in crop selection in commercial agriculture are often said to relate to variations in price. Farm level prices often act as a guide to production decisions. Farmers are sensitive to economic stimuli and would respond to price incentives (Sangwan 1995). Studies conducted at the village level also appear to show this to be the case. Before settlement started, price has not affected area under tribal crops because production was for the farm economy. Settlement reached at its zenith by the mid 1970s

and the shift from food crops to commercial crops took place during the late 1970s. However, tamil settlers had started cultivation of dry land annual crops even before the cultivation of perennial commercial crops by malayali settlers. In order to examine the influence of price on area change, block level data are necessary. In the absence of such micro-level data, we use district level data related to area and farm price. For dry annual crops data on area response in Coimbatore district and perennial crops area changes in Palakkad district are used. This is because Coimbatore is the major market for dry annual crops like cotton, groundnut, maize, etc. Hence area response in Coimbatore will have its impact on Attappady also. Similarly, the area response of perennial crops, which are mainly cultivated by malayali settlers, are examined by taking time series data on area and farm price available at Palakkad district.

6.2.1.1 Behaviour of Farm Prices and Crop Selection

An attempt is made to analyse the trends in farm prices of major crops cultivated in Attappady using time series data on post-harvest prices in the adjacent market since the 1970s. Crops like, coconut, arecanut, pepper, cashew, tapioca and ginger are marketed through traders from Mannarkad, whereas maize, *ragi*, *chama*, groundnut, *thuvara*, cotton, etc. are marketed through traders from Coimbatore. Therefore, in the later case farm prices in Coimbatore and for former prices in Palakkad, are used. All the estimates are found to be statistically significant from the t-statistic. The growth equations indicate that the farm prices of perennial crops have registered an average annual growth rate of 9% or more while the increase in farm price of annual or seasonal crops was lower. Among perennial crops prices of cashew and arecanut increased at a higher rate than those of pepper and coconut. However, the price of pepper skyrocketed during 1983/84 to 1988/89. Massive conversion of area from other crops to pepper followed. The influence of the increase in price of cashew is well reflected in the up-trend in the area especially after 1975-76. This continued steadily for quite a long

time. However such an up-trend is not reflected in the trends in area of arecanut (Figure 6.1).

Among seasonal or annual crops, tapioca and ginger show an annual growth rate of farm price above 8% while price of dry annual crops, except *thuvara*, registered only insignificant increase in price. In consequence, shift of land to these crops has remained small. In fact, in some areas, there have taken a marginal decline in acreage under these crops. The response of farmers to price change, in the case of certain seasonal crops, are quick. The area under ginger and tapioca, for example, declined sharply during 1974-76 periods and recovered thereafter. To cite an example the price of ginger per quintal in Palakkad district increased from Rs. 691 in 1975/76 to Rs. 1396 in 1976/77. The immediate response to this price change was a sharp increase in area under ginger in the year 1977/78 (area increased from 210 hectares in 1976/77 to 484 hectares in 1977/78). Thereafter the area remained stagnant and marginally declined till 1982/83. From 1983/84 onwards the area has been increasing. Contrary to this observation, for tapioca, even without much variation in price the trend in area shows wide fluctuation from 1974/75 to 1979/80 periods (Figures 6.2 and 6.3).

The slow increase in farm prices of annual crops in comparison to those perennial crops may be considered one of the reasons for conversion of more area into cultivation of perennial crops in the malayali dominated areas. Also the risk of damage of annual/seasonal crops due to poor climate, attack of animals, etc. is high. The tendency found among tamil settlers to convert more of their areas into coconut and cashew has been the low prices of dry crops.

Table 6.1

Estimated Growth of Farm Price of Selected Crops Since 1970

Sl. no.	Crops	Constant	Coeffi-cient (B)	SE of B	R^2	Growth rate (%)	t value*
1	Coconut	3.85	0.090	0.007	0.89	8.96	12.42
2	Arecanut	0.73	0.105	0.007	0.92	10.53	15.09
3	Pepper	6.28	0.098	0.010	0.82	9.75	9.65
4	Cashew	5.10	0.110	0.008	0.91	10.97	14.56
5	Tapioca	2.87	0.082	0.006	0.90	8.17	13.24
6	Ginger	5.88	0.089	0.014	0.66	8.85	6.27
7	Sugarcane	4.32	0.068	0.003	0.96	6.83	21.15
8	Maize	4.39	0.040	0.012	0.44	4.02	3.29
9	Ragi	4.23	0.056	0.013	0.59	5.64	4.48
10	Chama	4.07	0.055	0.012	0.59	5.46	4.52
11	Groundnut	5.11	0.066	0.013	0.64	6.57	5.02
12	Thuvara	4.93	0.073	0.008	0.85	7.33	8.94
13	Cotton	5.35	0.069	0.008	0.85	6.86	9.01

* t statistics shows that all the estimates are significant at 5% probability level.

Note: To estimate the annual growth rate semilog model $\ln Fp = \alpha + \beta t + u_t$ is used

Sources: (1) Season and Crop Reports. Government of Kerala (various issues). 1970/71 to 1990/91 for crops 1 to 7.

(2) Season and Crop Reports. Government of Tamil Nadu (various issues). 1970/71 to 1986/87 for crops to 8 to 13.

Figure 6.1

Trends in Area of Major Perennial Crops in Palakkad

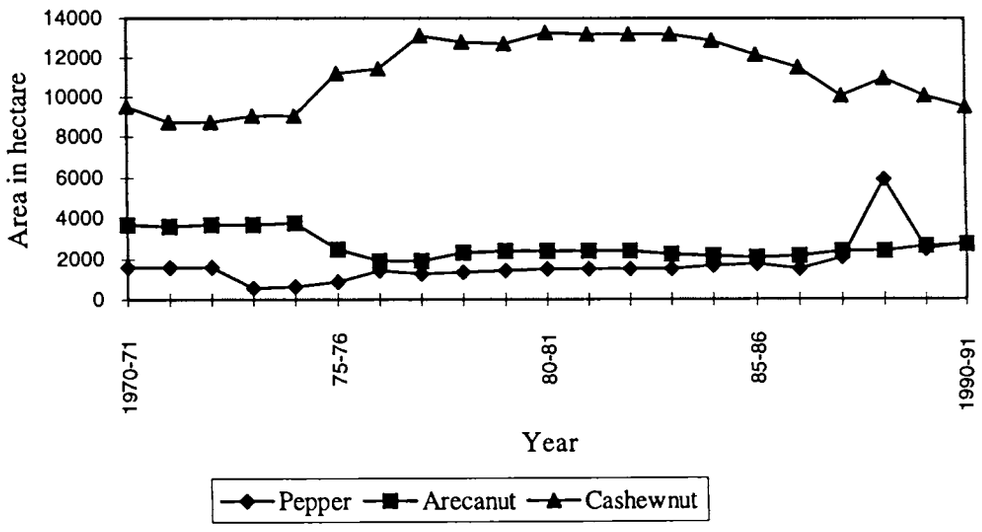


Figure 6.2

Trends in Area of Ginger in Palakkad

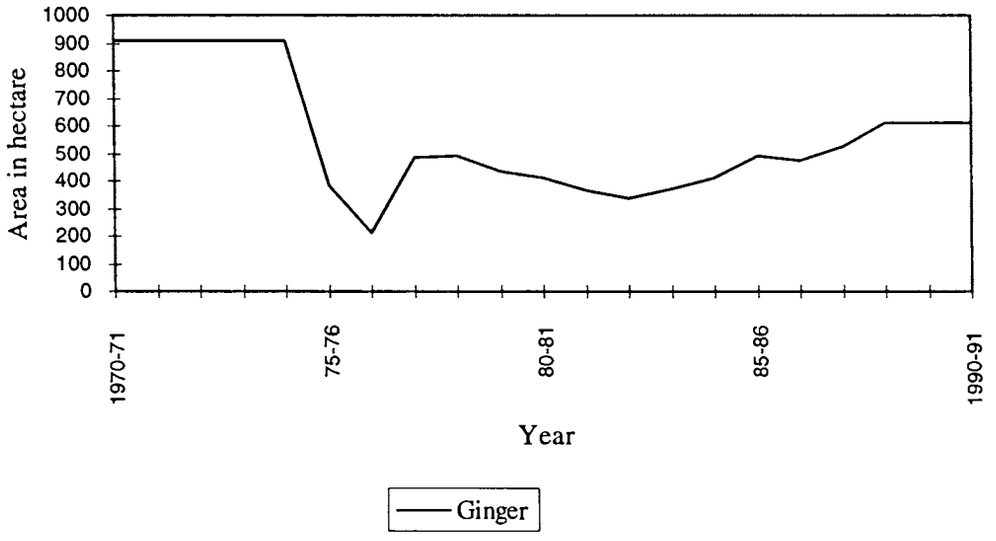
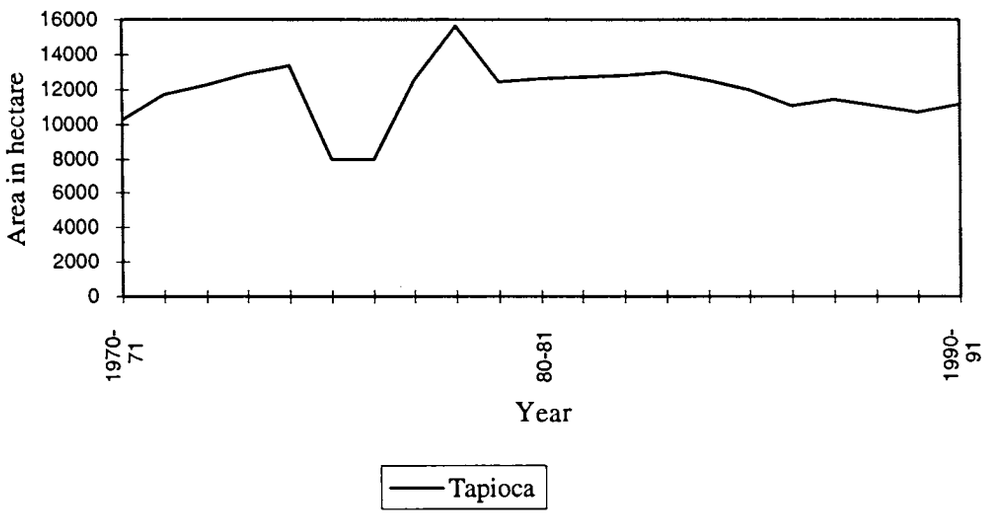


Figure 6.3

Trends in Area of Tapioca in Palakkad



6.2.1.2 Area Response

A relative increase in price of a crop is expected to result, other things remaining equal, in conversion of land to it, from other crops. Numerous studies exist in India on farmers' price response to area. Some such studies found that the elasticity of area response to price is positive. Time series data required to examine area response of farmers in this newly-settled area are not available. Hence, in order to substantiate the primary level information, time series data for the district level are used. The analysis would, it is hoped, give a rough estimation of the short-run elasticity of area response in Attappady. For this purpose, the Nerlovian Adjustment Model expressed in logarithmic form[1] is used (Nerlove 1956).

$$\log A_t = \log a_o + b_o \log P_{t-1} + c_o \log A_{t-1} + \log v_t$$

Where,

$\log a_o = \beta \log a$, $b_o = b\beta$, $c_o = 1-\beta$ and log and $V_t = \beta \log U_t$

A_t = Area cultivated in period t

P_{t-1} = Farm harvest price in period t-1

A_{t-1} = Area cultivated in period t-1

v_t = the error term

The economic interpretation of β, the adjustment coefficient, is that when it is equal to one there are no technological or institutional constraints to prevent the producer

---

[1] The estimating equation in logarithmic form is derived as follows:
The Nerlovian percentage adjustment model with price in the previous period as the determinants is presented as:

$$A_t = a\, p^{b}_{t-1}\, u_t$$

$$At/ A_{t-1} = (A_t^{*}/ A_{t-1})^{\beta}$$

Where, $0 < \beta < 1$

When the above equations are expressed in logarithmic form they become:

$$\log A^{*}_t = \log a + b \log P_{t-1} + \log u_t$$
$$\log A_t - \log A_{t-1} = \beta(\log A^{*}_t - \log A_{t-1})$$

The estimating equation is then given by:

$$\log A_t = \log a_o + b_o \log P_{t-1} + c_o \log A_{t-1} + \log v_t$$

from realising his intended acreage level. The smaller the β the greater is the constraint that technological and institutional factors place on the producers' planned acreage level. As the model is non-linear the short-run elasticity of area is given by b_o.

The estimates are made four perennial crops and seven seasonal crops. The results of the analysis are presented in Table 6.2. The adjustment coefficient β is derived from the relationship $A_{t-1} = 1-\beta$. For example the regression coefficient of A_{t-1}, for coconut is 0.80 so that β works out to be 0.20. The coefficients of determination (R^2) for all the four perennial crops are fairly high except in the case of pepper. In the case of annual/seasonal crops, only four crops, namely, groundnut, cotton, sugarcane and ginger show strong association between the explanatory variables. It is evident from the table that there exists no serial correlation in the case of all the four perennial crops and except one seasonal crop tapioca (tested with Durbin-Watson 'd' statistic table at 0.05 level of significance). The Durbin-Watson statistic is found near to the value of two. F test suggests that the estimated values of all perennial crops are statistically significant and that out of the seven annual crops, estimates of four crops are statistically significant. Hence, most of the estimates are unbiased and statistically consistent. The regression coefficient of P_{t-1}, which is the price elasticity of supply itself, because of the logarithmic function, of all the perennial crops, except cashew, shows a positive sign. The elasticity of pepper is found to be the highest among the perennial crops, a finding which is consistent with the high adjustment coefficient of 0.64.

One interesting observation is that short-run elasticity of all the statistically significant estimates of seasonal crops, except sugarcane, are found negative. The R^2 value of sugar turned out to be very high and the regression coefficient shows that area under sugarcane was positively responsive to price change. One possible explanation for the observed positive area response of perennial crops and negative area response of

seasonal crops to price changes is the widespread commercialisation tendency in the state since the 1970s.

Table 6.2

Acreage Response Function of Selected Crops

Crops	Constant	Regression Coefficients		R^2	F Value	DW d Statistic	β	Elasti-city
		P_{t-1}	A_{t-1}					
Perennial								
Coconut	1.710	0.073 (0.050)	0.800 (0.187)	0.71	19.03*	2.03	0.20	0.073
Arecanut	1.585	0.011 (0.074)	0.793 (0.178)	0.70	18.26*	1.86	0.21	0.011
Pepper	2.093	0.355 (0.134)	0.361 (0.196)	0.54	9.51*	2.08	0.64	0.355
Cashew	1.115	-0.015 (0.035)	0.891 (0.150)	0.76	25.09*	1.94	0.11	-0.015
Seasonal								
Maize	2.558	-0.194 (0.204)	0.324 (0.248)	0.19	1.62	1.74	0.68	-0.19
Ragi	2.159	-0.081 (0.292)	0.338 (0.250)	0.13	0.99	1.72	0.66	-0.08
Groundnut	1.708	-0.123 (0.121)	0.659 (0.190)	0.54	7.98*	1.88	0.34	-0.12
Cotton	2.748	-0.216 (0.084)	0.423 (0.226)	0.60	10.12*	1.70	0.58	-0.22
Sugarcane	0.328	0.183 (0.224)	0.781 (0.202)	0.90	82.50*	1.91	0.22	0.18
Tapioca	3.532	0.019 (0.079)	0.124 (0.191)	0.03	0.19	1.38	0.88	0.02
Ginger	1.628	-0.095 (0.129)	0.499 (0.179)	0.52	9.29*	1.59	0.50	-0.09

The figures in parentheses are standard errors

* Significant at 1% probability level

Note: For perennial crops farm price and area for 20 years from 1970/71 to 1990/91 was used. For seasonal crops, namely, maize, ragi, groundnut and cotton time series data for 17 years from 1970/71 to 1986/87 was used and for other crops data from 1970/71 to 1989/90 was used.

6.2.2 Uncertainty

There are also uncertain variables that are not under the control of decision makers like climate, crop diseases and crop damage due to attack from wild animals.

Farmers in general plan their cropping system in such a way as to minimise uncertainties and maximise yield. One of the uncertain inputs in the area is rainfall. It is more uncertain and low in the eastern part and more certain and higher in the western part. During 1950s the area had received good rainfall but other climatic features were not suitable for many types of perennial crops. Continuous mist (locally called *koda*) and drizzling rain through out day and night created severe problems to early settlers (Interview: Malayali Settlers, Jellippara 1994). This was a major setback for malayali settlers, who had ownership right, for not attempting mixed home garden practice. After the 1970s, many remembered, the extent of *koda* and continuous drizzling diminished. Subsequently, therefore, crop diversification began in a big way. Even rich settlers - among malayalis - were reluctant to cultivate mono-perennial crops owing to the unpredictable climatic change in the form of strong wind and *koda*. Incidence of severe land sliding was very common during the early periods. In Agali village there is place called *Idinjamala,* the name assigned to this place by the inhabitants after a severe land slide in 1964. In the case of tamil settlers, neither variation in climate nor attack of rodent animals, played any impressive role in crop selection. Even in areas suitable for high value perennial and seasonal crops, these farming groups cultivate a package of their traditional crops comprising groundnuts, grams, cotton, maize, sugarcane, and so on.

6.2.2.1 Climate

Eastern part of Attappady is dry and, therefore, the major inhabitants in this part are cultivating dry crops, except on riversides. Other than climatic reasons, traditional knowledge in cultivation has had influence in crop selection under favourable climatic conditions. A typical example of the use of traditional skill and knowledge among tamil settlers in the crop selection observed in Agali village may be referred to here. Yogippara, located near to Chittoor, is now almost completely occupied by malayali settlers. Typical high density home garden practice with forest trees is in vogue in this

area. A malayali from Pathanamthitta bought 16 acres of land from a Gowndan in the year 1974. At the time of purchase the area remained waste after groundnut and cotton cultivation and not even a single tree stood in that barren land. At the time, the Gowndan himself had got this land from the *Jenmi* on lease at a rent of Rs. 2 per acre in 1964, the area was under thick forest. By 1974 many tamil Gowndans left this part of Attappady selling their land to malayali settlers. At the time of purchase of this 16 acres of land in 1974, some Gowndans were still in possession of lands in this area and were cultivating dry crops. As a result of cotton and groundnut cultivation, this area remained dry through out the summer season. These conditions have radically changed since them. At the time of our visit, we found that the 16-acre land has a densely cultivated home garden interspersed with different species of trees. The area, even during hot summer days, does not face water scarcity. High cropping intensity, crop diversity and high productivity of this plot shows that cropping systems can influence land use efficiency to a great extent reckoned both in economic and in ecological terms.

6.2.2.2 Crop Damage due to Wild Animals

Wild animals and rodent animals do extensive damage to crops in Attappady. The damage is most acute in plots under tuber crops. The farmers' response to this risk involved particularly in cultivating one or two crops, was resort to a mixed cropping system. When tamilians diversified their crop mix of annual crops, malayali settlers shifted to a mix of annual, perennial and seasonal crops and attempted to avert loss of income caused cultivation of one crop or two.

6.2.3 Security of Tenure

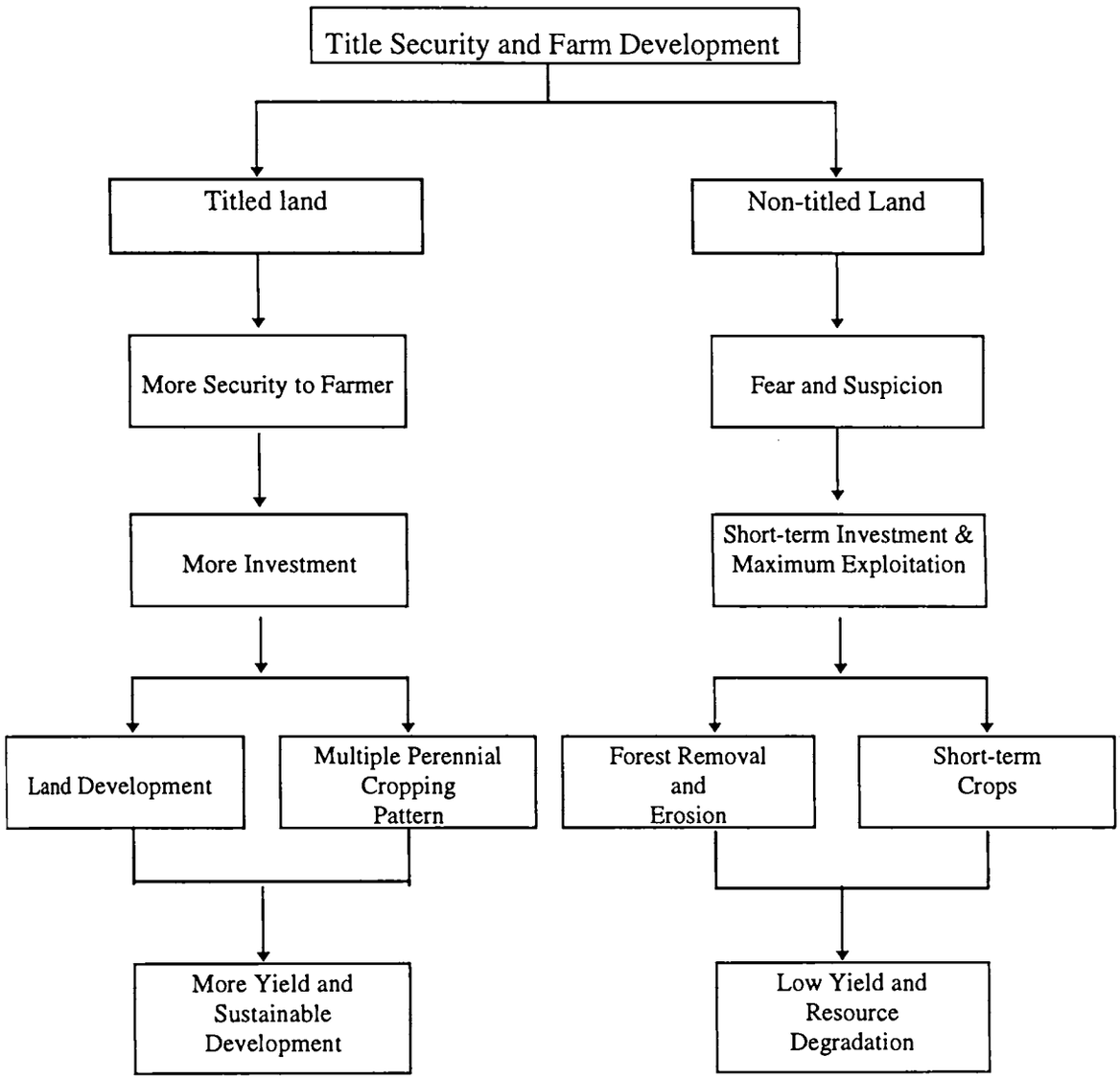
Farmers with security of tenure on their lands evince greater interest than others in cultivation and investment in land. The most obvious effect of lack of secure land

ownership is increased uncertainty by the farmers as to whether he will be able to benefit from the investments that he makes to retain or improve his land (Feder 1987). Lack of secure title to land means inaccessibility to credit facilities and low land price. Though both tamil and malayali settlers were able to acquire large amount of lands from *Jenmis* on lease ownership rights were not guaranteed. Lack of security over land encouraged settlers to cut on-farm trees or encroach upon surrounding forest areas. The result was extensive destruction of forest cover and degradation of land. A similar outcome of lack of legal title is that plantations of slowly maturing crops are less likely to come up.

Security of land tenure is a pre-condition for the poor to take to perennial crop cultivation. Insecurity of tenure would discourage them from investing their labour and meagre capital resources in crops which yield benefits only after several years (Chambers et al. 1989). Considerable amount of deforestation in Attappady is connected with early settlement and insecure land tenure. In the first phase of migration, best lands (meaning lands with rich tree cover) came into the hands of rich tamil and malayali settlers who used the land extensively for supplying timber to the outside world. Marginal and small settler farmers, owing to lack of security of ownership and poor economic conditions, accentuated the process of destruction of natural resources through wood cutting and practising unhealthy cultivation practices. Tamil settlers brought with them a style of farming which is more destructive in nature than that of the aboriginal. Dry crop systems are more destructive than most other types of cropping systems. Tribals who had lost their land naturally moved to interior forest areas which again leads to removal of forest. Deforestation and the resultant degradation of land in Attappady has been connected to, in the first phase from 1950-65, to the heartless destruction of greenery of Attappady valley by a few rich settlers. Goodland (1991) remarked that the greedy rich destroy more than the hungry poor. However, insecurity of resources and extreme destitution became the major factor for further accentuation of the ruin of verdant greenery of Attappady since the mid of 1960s.

In a titled land, due to more security, farmers make more investment in the form of farm development activities and adopt tree crops which begin to yield after some time, but continues it yield period over several years. Increased accessibility to various inputs and possibility of innovative practices increase the output per unit area. On the other hand, in non-titled land, the immediate aim of the owner is to run-down on whatever on-site resource are available. The result is further deterioration of land and poor output per unit area in subsequent periods (Figure 6.4).

Figure 6.4



Title information collected during farm survey, with all its probable bias, has been used to examine whether it had any profound influence on crop choice. Most of the settlers and tribals in the area own *pattayom* (title or legal right) and other kinds of occupancy right for a major part of their land (Table 6.3). Land occupied even without sufficient document is also not rare. According to the information gathered, it is seen that a very high percentage of land owned by settlers and tribals are with sufficient ownership right. Land occupied on the support of Money Receipt is also quite common among them. Cultivation in the encroached land and its occupancy, though quite common, has not been reported much by settlers owing to fear and suspicion. Tribals, however, reported that 15% of the total area they had, has no sufficient title as they got into the area through encroachment by them. Tribals, due to their illiteracy, reported, in several cases, full title to ownership when they had, in fact, only occupancy right or other kinds of possession. Therefore, the reported 83% of full title ownership is an exaggerated figure.

The year of settlement, purchase of land and acquisition of full title to the land happened in different years for many settlers. Hence a knowledge of the period of ownership right is a pre-requisite for examining the influence of title security on crop conversion. Table 6.4 illustrates distribution of title ownership among settlers and tribals by five year periods. The majority of malayali settlers obtained title rights before the 1980s. Tamil settlers also obtained title for more than 50% of their land before the 1980s. Tribals, on the other had, obtained title for major share of their lands mainly after the 1980s. Settlers often used their affiliation with the officials to get titles quickly. Acquisition of title was a pre-requisite for their continuation and further resource acquisition activity. They, therefore, resorted to all means, fair and foul to obtain the full title. However, such a worry never bothered tribals as they felt secure in the thought they were the sons of the soil of Attappady. Of late, tribals have become aware of their vulnerability and realised the need for title to protect their land. After 1980 tribals of

Agali and Sholayur obtained title for 70% of the land they possessed. The title ownership issued to them for land before 1970 constituted only below 10%. The decade 1970-1980 was the peak of conferment of title ownership to malayalis. Hence, it was from this period onwards that conversion of land from quick-yielding annual or subsistence crops to perennial tree crops began on a large scale among malayali farmers. For tamils and the tribals crop conversion was not needed as they were traditionally following a different cropping pattern. However, title security is a pre-condition for them too to adopt a tree-crop-based cropping system if found necessary, at some later stage. It would be appropriate to examine the relationship, if any, between title ownership and the emergence of perennial tree crops.

Table 6.3

Distribution of Land According to Nature of Acquisition

(Area in acres)

Farming Group	Pattayom	Money Receipt	Encroached	Others	Total
Malayalis	786.32	46.52	--	66.00	898.84
	(87.48)	(5.18)	--	(7.34)	(100.00)
Tribals	402.69	4.50	2 .00	70.37	479.56
	(83.97)	(0.94)	(0.42)	(14.67)	(100.00)
Tamils	485.83	12.10	5 .00	57.31	560.24
	(86.72)	(2.16)	(0.89)	(10.23)	(100.00)
Total	1674.84	63.12	7 .00	193.68	1938.64
	(86.39)	(3.26)	(0.36)	(9.99)	(100.00)

Figures in parentheses are percentages

Table 6.4

Trends in Acquisition of Ownership Title

(Percent)

Year	Malayali	Tribals	Tamils
Before 1970	8.62	1.40	13.40
1971-75	12.15	12.50	14.34
1976-80	44.52	17.50	23.00
1981-85	21.31	38.41	25.45
After 1985	13.40	30.19	23.81

Note: Only land with title is considered

6.2.3.1 Trends in Planting of Perennial Crops

Table 6.5 provides a clear picture of the emergence of major perennial crops in the area. In order to investigate the relationship between the planting of perennial crops with title ownership we have classified the planting period into five. Settlers started planting of perennial crops mainly in the early 1970s. Thereafter, it spread rapidly in most of the malayali-dominated areas. Tree crops like mango tree and jack fruit were prevalent among tribals from time immemorial. However, high value perennial crops like pepper, coffee, rubber and cashew reached Attappady through settlers. During the first half of the 1970's malayalis planted mainly mango and jack fruit trees. Planting of these two tree crops does not involve much investment except seedling and labour cost. However, the second half of the 1970s witnessed a remarkable up-trend in the planting of various kinds of tree crops, which involves more investment. More than 25% of coconut trees planted by malayalis were during this period. By the end of this period malayalis could obtain title for a major portion of the land they held. This was followed by a massive shift in area into perennial crops like pepper, coffee, rubber and cashew. It is evident from the Table that around 50% of coconut, pepper, rubber and cashew were planted during the period 1980-85. Another reason, as noted earlier, for the wide popularity of pepper during this period was the sharp rise in price of pepper. Conversion of area towards these crops lessened the importance of mango and jack fruit tree. Planting of almost all these crops continued till after 1985. Most of the coffee was planted during this period since 1981.

Tamil settlers and tribals, however, shifted their interest to perennial crops mainly in the second half of the 1980s. It is noteworthy that tamil farmers never attempted to cultivate rubber. The extent of tree crops planted by tamils up to 1980 was limited to coconut, coffee and cashew. There was a remarkable increase thereafter in all the crops. If the period 1980-85 witnessed conversion of the major part of lands held by malayalis to the tree crops, it was only in the late 1980s that tamils planted most of their perennial

crops. As is evident from the table, 90% of cashew plants, 75% of coffee plants were planted after 1985. Since tamil farmers were less adaptive to cultivation of tree crops they had to learn tree crop cultivation practices and procure seeds and seedlings from malayali settlers. There is considerable difference in the level of skills, knowledge, farming technique and inputs required as between perennial-crop-based cropping system of the malayali settlers and dry-crop-based farming system of the tamil settlers.

Table 6.5

Trends in Planting of Perennial Crops Since 1950

(Percent)

Category/ Year	Perennial Crops									
	Coco-nut	Areca-nut	Pepper	Coffee	Rubber	Cashew	Mango	Jack fruit	Others	Total
Malayalis										
Up to 1970	1.62	0.86	0.00	0.00	0.00	0.00	1.50	2.96	0.26	0.50
1971-75	12.74	18.70	1.28	3.51	0.48	3.31	39.52	25.39	0.24	9.40
1976-80	26.67	16.88	11.81	12.98	14.15	19.33	36.53	51.19	1.87	16.61
1981-85	42.18	27.86	54.02	39.04	52.28	43.50	11.75	14.04	21.58	38.83
After 1985	16.79	35.70	32.89	44.46	33.09	33.87	10.70	6.42	76.06	34.66
Tribals										
Up to 1970	1.07	0.00	0.00	0.00	0.00	0.00	2.00	1.68	0.00	0.24
1971-75	6.10	4.24	0.00	0.00	0.00	0.00	11.98	25.61	7.59	2.65
1976-80	1.95	14.04	0.00	0.00	1.48	1.03	52.69	42.84	15.19	5.77
1981-85	24.32	42.40	5.55	9.73	29.67	65.24	10.98	12.20	17.72	26.75
After 1985	66.55	39.31	94.45	90.27	68.84	33.73	22.36	17.68	59.49	64.60
Tamils										
Up to 1970	0.14	0.00	0.00	0.00	0.00	0.64	3.45	2.87	2.99	0.28
1971-75	6.66	0.00	0.00	0.00	0.00	0.00	11.82	41.95	3.65	3.20
1976-80	9.44	0.00	0.00	14.42	0.00	6.89	52.71	25.29	18.94	7.31
1981-85	22.06	11.27	49.02	9.62	0.00	2.44	17.73	8.33	10.96	25.94
After 1985	61.70	88.73	50.98	75.96	0.00	90.04	14.29	21.55	63.46	63.26
Total										
Up to 1970	1.24	0.79	0.00	0.00	0.00	0.04	1.69	2.74	0.45	0.46
1971-75	10.66	17.43	0.93	2.98	0.47	2.34	33.77	26.88	0.62	8.25
1976-80	20.05	16.32	8.56	12.11	13.90	14.34	39.90	47.55	3.35	14.82
1981-85	35.79	28.29	45.68	34.58	51.84	46.04	12.00	13.24	20.74	36.64
After 1985	32.25	37.17	44.83	50.33	33.80	37.24	12.65	9.60	74.84	39.83

Note: Number of tree crops planted in different years are used for calculating percentage share

Just like tamilians, tribals too had to wait and learn the farming operation from malayalis. As tribals were used as casual labours in the lands of malayalis, they could learn the skill for planting perennial crops. The area put under major tree crops, except mango, jack and arecanut, remained virtually nil among tribals till 1980. Since then, there had been a considerable shift towards such crops, which was mainly motivated by the supply of free seeds and seedling and their frequent interaction with malayalis. The lion's share of tree crops was planted by tribals after 1985.

6.2.4 Other Indicators of Crop Choice

Crop selection by a farm household is influenced by several other factors. They are size of land owned, date of settlement to the area, labour endowment of the family, level of education of the household members and dependence on the farm. The pattern of crop selection is not the same for all farming groups. Hence, the number of crops grown by the household is a good indicator of crop diversity. An attempt is made here to examine the association, if any, between the number of crops grown and the indicators of crop selection among farming groups.

6.2.4.1 Extent of Land

The size of the land holdings has also its influence on crop selection and crop diversity. The very small farmers tend not to plant pepper, coconut, and the like, which begin to yield only after several years. Their time preference is for short-duration crops. Land holding size is a good indicator of the settlers' opportunities and constraints in making crop choices. Large farm households may be able to earn livelihood from their own lands all the year round. For small farmers, it may be necessary to seek wage employment. They may not be therefore able to devote full time to land and the crops

raised on them. Those who prefer to reduce risk may go in for cropping variety rather than mono-cropping.

6.2.4.2 Date of Settlement

Boserup (1970) discusses the evolution of land rights in the course of economic development. She argues that at a very early stage in agricultural development, cultivation rights within a given area are established. These cultivation rights would not be backed by formal ownership title. This observation is found true in the land transactions of Attappady (see Chapter IV). The early settlers and their descendants had better access to land than the recent arrivers had. A negative relationship thus exists between the year of settlement in the area and the number of crops that the settler cultivates. Now we would expect that settlers who came in Attappady in the beginning might have grown more crops. Therefore, we may expect a negative association between date of settlement and number of crops grown.

6.2.4.3 Labour Endowment

The number of crops cultivated also depends on the labour endowment and educational status of the household. Several studies have found positive correlation between level of education and crop innovation. Better educated households may be more oriented towards innovation (Schultz 1964). Better educated and better labour endowed households tend also to have large land holdings. They are also likely to have richer variety in their cropping pattern.

On the basis of the above framework the number of crops cultivated by households has been regressed on the following explanatory variables. The associations are examined for three farming groups separately and is given in Table 6.6.

Variables	Explanation
1. NCRO	Number of Crops Grown
2. SLAND	Size of Land Owned in Acre
3. DOM	Date of Migration to Attappady (applicable to settlers only)
4. NOAD	Number of Adults (between 15-60 ages) in the Household
5. EDIN	Education Index of the Household
6. NOAG	Number of Members of Households Engaged in Agriculture

Table 6.6

Correlation Coefficients with Number of Crops Grown Among Farming Groups

Groups	SLAND	DOM	NOAD	EDIN	NOAG	No of cases
Malayalis	0.287**	-0.104	0.252**	0.202 *	0.424**	154
Tribals	0.117	--	0.295**	0.101	0.039	116
Tamils	0.311**	-0.053	0.179	-0.036	0.197	97
Agali	0.238**	--	0.270**	0.368**	0.202**	253
Sholayur	0.338**	--	0.180	0.411**	0.145	114
Total	0.241**	--	0.282**	0.378**	0.210**	367
One-tailed significance * P < .01 ** P < .001						

The result indicates that the number of crops grown among farming groups is strongly correlated with size of land, the date of migration. The labour endowments of the family expressed in terms of the number of adult members have a significant association with number of crops grown among malayalis and tribals. Level of education is also positively correlated with number of crops for malayalis and tribals but is significant only for the former. Similarly, the number of adult members engaged in agriculture are positively correlated with number of crops, but insignificant for tribals and tamils. For the total sample and for Agali all the indicators are positively associated with number of crops except date of migration. In Sholayur size of land and education are significantly associated and other indicators are insignificant. In all the cases, the date factor is insignificant and hence weak in its association with number of crops.

When regressed the relationship, land area is seen to be a significant variable either alone or with one or other variables except in case of tribal farmers. Date of migration has not turned out to be a significant variable. Taking all samples together, size of land, number of adults and education variables have their influence on the number of crops planted, with significant partial correlation. However, an analysis among farming groups reveals that one or other variable loses significance when regressed together. For example, among settlers land variable is significant, but for tamils, other variables, however, lose significance. As for tribals only number of adults has its influence on crop selection. Educational factors always remained not influencing farmers' crop choice. However, area-wise examination shows that even after the inclusion of educational factor partial correlation remained significant along with land factor (Table 6.7). In all the tests made after avoiding insignificant variable, it is found that the DW statistic is almost near to two.

Table 6.7

Estimates of Association Between Number of Crops and its Determinants

Malayalis

Variables	Coefficient	Standard Error	Partial Correlation	T Value	Sig T
Constant	6.37	0.64		9.979	0.000
SLAND	0.11	0.04	0.20	2.694	0.008
NOAD	0.22	0.15	0.12	1.514	0.132
NOAG	0.90	0.22	0.33	4.189	0.000
Multiple R =	0.48	F =	14.75	Total =	154.00
R^2 =	0.23	Signif F =	0.000	DW =	1.89

Tribals

Variables	Coefficient	Standard Error	Partial Correlation	T Value	Sig T
Constant	4.75	0.67		7.074	0.000
NOAD	0.63	0.19	0.61	3.296	0.001
Multiple R =	0.61	F Value =	10.86	Total =	116.00
R^2 =	0.36	Signif F =	0.001	DW =	1.71

contd.

Tamils

Variables	Coefficient	Standard Error	Partial Correlation	T Value	Sig T
Constant	4.29	0.45		9.459	0.000
SLAND	0.20	0.06	0.31	3.185	0.002
Multiple R =	0.31	F Value =	10.15	Total =	97.00
R^2 =	0.10	Signif F =	0.002	DW =	1.67

Agali

Variables	Coefficient	Standard Error	Partial Correlation	T Value	Sig T
Constant	5.09	0.55		9.295	0.000
SLAND	0.10	0.05	0.13	2.101	0.037
NOAD	0.39	0.12	0.19	3.318	0.001
EDIN	0.28	0.06	0.29	4.752	0.000
Multiple R =	0.43	F Value =	19.30	Total =	253.00
R^2 =	0.19	Signif F =	0.000	DW =	1.98

Sholayur

Variables	Coefficient	Standard Error	Partial Correlation	T Value	Sig T
Constant	3.56	0.31		11.377	0.000
EDIN	0.21	0.05	0.35	4.094	0.000
SLAND	0.10	0.03	0.26	2.990	0.003
Multiple R =	0.48	F Value =	16.64	Total =	114.00
R^2 =	0.23	Signif F =	0.000	DW =	1.63

Total

Variables	Coefficient	Standard Error	Partial Correlation	T Value	Sig T
Constant	3.87	0.45		8.514	0.000
SLAND	0.09	0.04	0.13	2.555	0.011
NOAD	0.44	0.11	0.20	4.143	0.000
EDIN	0.30	0.05	0.30	6.061	0.000
Multiple R =	0.45	F Value =	30.34	DW =	1.87
R^2 =	0.20	Sig F =	0.000	Total =	367.00

6.3 Cropping Intensity

An increase in cropping intensity over time is generally considered as an index of agricultural improvement. It indicates how intensively land is utilised for crop production activities for augmenting the income of farmers. Cropping intensity is the ratio of gross sown area to net sown area expressed in percentage terms (Multiple Cropping Index).

Multiple Cropping Index is estimated as,

$$MCI = \frac{\sum_{i=1}^{n} ai}{A} \times 100$$

Where n = total number of crops, ai = area occupied by i^{th} crop planted and harvested within one year and A = total cultivated land area available. This method, however, captures only one dimension of cropping intensity, namely the additional crops raised from a given piece of land during the reference year. By increasing plant population density per unit of land as in the case of inter-cropping and mixed cropping it is possible to make further intensive use of land. This dimension of intensive use of land is not captured by the traditional MCI. Hence, we used here Total Cropping Intensity (Nair and Krishnankutty 1985), to estimate land use intensity index. Total Cropping Intensity (TCI) is estimated as:

$$TCI = 100/A \left(1/12 \sum_{g=1}^{m} S_g D_g + \sum_{h=1}^{n} O_h/P_h + \sum_{i=1}^{q} \sum_{j=1}^{r} Tij \right)$$

Where,

S_g = Area occupied by the g^{th} seasonal or annual crop
D_g = Duration in months of the g^{th} seasonal or annual crop
O_h = Observed number of trees of the h^{th} perennial crop
P_h = Optimal number of trees of the h^{th} perennial crop per unit area
Tij = Area occupied by the j^{th} tree of the i^{th} species
A = Total area of the land used for agricultural activities of the selected household

Without any statistical exploration, a causal observation of the plots of malayali settlers and tamil settlers give a clear indication of cropping intensity. However, for clarity of analysis, we have estimated the percentage of area in five cropping intensity classes (Table 6.8). It is found that more than 50% of the area owned by malayalis are more intensively cultivated both in Agali and Sholayur. Of this, 33% or above are under the high cropping intensity class. The area which falls under very low or low cropping intensity class is below 18% among malayalis while it remained above 26% for tamils and 38% for tribals. The high percentage of land in the low intensity class observed among tribals is due to their extreme dependence on subsistence crops. However, the land area under high cropping intensity is higher for tribals than for tamils both in Agali and Sholayur. This may be attributed to the maintenance of forest trees and other tree crops by the tribals in recent years. A major portion of the area under tamil settlers comes under medium cropping intensity class. A uniform type of cropping pattern followed by the tamil farmers might have put most of their land in the same class.

High cropping intensity among malayali settlers is presumably due to the shift towards home garden system with multiple crops planted in the same land. A similar feature is observable in tribal land. However, tamil farmers, except in a few cases, follow a pattern of short duration dry crops with minimum number of trees. Hence, high cropping intensity among malayali farmers is an evidence of the emergence of multiple-crop planting among them. A similar characteristic is emerging on lands owned and operated by some tribal families. Cultivation of tall perennial crops permits judicious combination of a number of tree crops and seasonal crops. For example, many farmers in Agali cultivate ginger, turmeric and tubers as a secondary crop in plots with tall tree crops. Also in a multi-tiered cropping system, intensification of cultivation of both forest crops and agricultural crops is possible (Nair and Krishnankutty 1985). It is, therefore, clear that the cropping system followed by malayali settlers and tribals indicates

agricultural development. Also maintenance of forest trees in their plot has its advantage for maintenance of a balanced ecosystem.

Table 6.8

Agricultural Cropping Intensity across Farming Groups

(Percent)

Category/ Region	Cropping Intensity Class				
	0-25 Very Low	26-75 Low	76-125 Medium	125-175 High	>175 Very High
Malayalis	1.9	15.6	22.1	27.3	33.1
Tribals	2.6	38.8	31.0	16.4	11.2
Tamils	--	26.8	50.6	14.4	8.2
Agali	1.6	25.9	32.5	20.4	19.6
Malayalis	2.4	13.6	20.0	29.6	34.4
Tribals	--	38.2	28.9	19.7	13.2
Tamils	--	26.9	53.8	13.5	5.8
Sholayur	1.2	23.7	29.7	23.3	22.1

6.4 Crop Combinations

It would be interesting to examine the crop combinations followed by cultivators in the area. A rational farmer always gives importance to the ancient adage of the unwisdom of putting all eggs in a single basket. As mentioned earlier, frequent variation in price, instability in yields and climatic variation had its influence on crop selection. To compensate such unexpected setback from the farming activities cultivators adopt a mixed crop system to avert the risk associated. However, owing to their adaptability to a particular cropping pattern, each farming groups in Attappady had been following a different form of crop combinations. As the area is characterised by wide crop diversity as much as 60 crop combinations have been prepared from the field data.

The crop combinations in the study area are shown in Table 6.9. Two types of crop combinations are identified: tree crop-based and annual or seasonal-crop-based system. The combination E+8+9 forms a major portion of the area of malayali settlers. This combination includes crops, which are conventional in home garden system. The next prominent combination is E+8+9+10; an addition to the former is dry crops, like *thuvara*, groundnut, maize and other grams. These two combinations together form around 25% of the total area they operate. Among malayalis, plots exclusively with tamilian type crops are almost nil. Even though considerable crop conversion has taken place during the past four to five decades, a major portion of the land owned by malayalis are still based on tree-crop-based perennial crop system. However, they follow almost all types of the observed crop combinations as different from the practice tamils and tribals either in Agali or in Sholayur.

Among the tribals the combination E+8+9 constitutes below 5% of their total operated area and the same is zero for tamils. The combination A+4+8+9+10+11+12 is dominant among tribals. The other two important combinations are serial numbers 48 and 50. These three combinations together form almost 49% of the total area they cultivate. It shows that tribals, now, follow a cropping pattern, besides their subsistence crops, with due importance to dry crops and tree crops.

Interestingly, among the tamils cultivators of Agali, six crop combinations, out of 60 combinations constitute 80.63% of the area and; each of these combinations occupies more than 10% of the total area. Among these combinations, the dominant is 10+11+12, that is, dry crops like thuvara, groundnut, maize and cotton. In all these combinations, dry annual crops have its prominent presence. This shows tamilians' disinclination towards tree crops based cropping pattern.

A similar exercise in Sholayur gives a different result for settlers and tribals. As for malayalis the area exclusively without dry annual crops forms only 17.27% (see combinations 5 and 23). Also the number of combinations found among malayali farmers of Sholayur is over half that of Agali; and only one combination has more than 10% of the area, that is, G+4+5+6+7+8+9. A major portion of the area of tribals and tamils in Sholayur is based on annual crops. As we examine the last 11 combinations, which stress more on dry crops; 88.47% of tribals' land fall in these combinations. Similarly, 77.82% of the area of tamils drop in these groups. Of these, the combination 10+11+12 along constitutes 14.17% of the tribal area and 18.78% of the tamil area. Thus, in Sholayur, a major share of the area is under dry annual crops and subsistence crops cultivated by the tribal and tamil cultivators. Malayali farmers show some liking for these crops but not at the cost of the perennial-crop-based home garden system. Dry climate and instability in rainfall are the critical factors for the dry crop dominance in this part of Attappady. When we examine the total sample farmers the combination E+8+9 still dominates among all the combinations.

Though we identified innumerable number of crop combinations in the study area it is possible to group them into a few farming systems. The combinations are based on the number of crops found in the land owned by each farmer. However, each plot owned by farmers has some unique feature which are highly variant as between settlers and tribals. For example, when some plots are exclusively used for mono-culture crops some other plots are cultivated with a wide mix of perennial and annual or seasonal crops. Some farmers take utmost care of their plot; while some others treat it with less attention. Considering the above crop combinations and their features, the important farming systems are discussed in the next section.

Table 6.9

Percentage Distribution of Area under Major Crop Combinations

Sl. no.	Crop Combinations	Agali			Sholayur			Total
		Malayalis	Tribals	Tamils	Malayalis	Tribals	Tamils	
1	A+4+5+7+8+9	1.34	0.00	0.00	0.00	0.00	0.00	0.65
2	A+4+5+7+8+9+10	1.09	0.00	0.00	0.00	0.00	0.00	0.53
3	A+4+5+7+8+9+10+11+12	0.46	0.00	0.00	0.00	0.00	0.00	0.23
4	A+4+7+8+12	0.00	0.00	0.00	0.00	4.45	0.00	0.59
5	A+4+8+9	1.41	0.00	0.00	9.25	0.00	0.00	1.30
6	A+4+8+9+10+11+12	0.00	16.74	0.00	0.00	0.00	0.00	2.25
7	A+5+7+8+9	0.65	0.00	0.00	0.00	0.00	0.00	0.32
8	A+5+7+8+9+10+12	4.65	0.00	0.00	0.00	0.00	0.00	2.27
9	A+7+8+11+12	0.00	0.00	15.89	0.00	0.00	2.77	2.56
10	B+5+6+7+9+10+12	0.00	0.00	0.00	4.04	0.00	2.65	0.54
11	B+6+7+8+9+10	0.44	0.00	0.00	2.75	0.00	2.65	0.67
12	B+6+8+9	0.52	0.00	0.00	1.36	0.00	4.49	0.80
13	B+7+10	0.33	0.00	0.00	5.69	0.00	0.00	0.53
14	B+7+10+12	0.00	1.46	0.00	4.02	0.00	2.19	0.69
15	C	1.44	0.00	0.00	0.00	0.00	0.00	0.70
16	C+7+8+9+10+12	2.91	0.00	0.00	0.00	0.00	0.00	1.42
17	C+7+9	0.98	0.00	0.00	0.66	0.00	0.00	0.52
18	C+7+10+11+12	0.00	0.00	10.15	0.00	0.00	0.00	1.46
19	C+8+9+10+12	1.36	0.00	0.00	0.00	0.00	0.00	0.66
20	D+8+9+10+12	1.72	5.95	0.00	0.00	0.00	0.00	1.64
21	D+9	1.26	0.00	0.00	0.00	0.00	0.00	0.61
22	D+9+10+11	0.72	0.00	0.00	0.00	0.00	0.00	0.35
23	E+8	0.00	0.00	0.00	8.02	0.00	0.00	0.53
24	E+8+9	16.25	5.44	0.00	0.00	0.00	0.00	8.66
25	E+8+9+10	8.31	0.00	0.00	0.00	0.00	0.00	4.05
26	E+9	2.34	0.00	0.00	5.30	0.00	0.00	1.49
27	E+9+10	5.59	0.00	0.00	4.28	0.00	0.00	3.01
28	E+9+10+12+13	2.32	0.00	0.00	0.00	0.00	0.00	1.13
29	E+12+13	4.21	0.00	0.00	0.00	0.00	0.00	2.06
30	F+5+6	0.95	0.00	0.00	0.00	0.00	0.00	0.46
31	F+6+7+9+10+11	0.97	0.00	0.00	0.00	0.00	0.00	0.48
32	F+6+8+9+13	1.22	0.00	0.00	2.55	0.00	0.00	0.76
33	F+6+9	0.40	0.00	0.00	0.00	4.40	0.00	0.20
34	F+7+9+10	1.22	0.00	0.00	0.00	0.00	0.00	0.60
35	G+4+5+6+7+8+9+10+12+13	7.54	0.00	0.00	0.00	0.00	0.00	3.68
36	G+4+5+6+7+8+9	4.89	0.00	0.00	11.51	0.00	0.00	3.15
37	G+4+5+6+7+9+10+12+13	3.37	0.00	0.00	0.00	0.00	0.00	1.64
38	G+4+5+6+7+9	2.50	0.00	0.00	0.00	0.00	0.00	1.22
39	G+4+6+7+9+12+13	3.64	5.30	0.00	0.00	0.00	0.00	2.49
40	G+4+7	0.85	0.00	0.00	0.00	0.00	0.00	0.41
41	G+4+7+10	1.52	0.00	0.00	0.00	0.00	0.00	0.74
42	G+4+8+10	0.50	0.00	0.00	0.00	0.00	0.00	0.24

Contd.

Sl. No.	Crop Combinations	Agali			Sholayur			Total
		Malayalis	Tribals	Tamils	Malayalis	Tribals	Tamils	
43	G+5+6+7+8+9+10+13	1.17	0.00	0.00	0.00	0.00	0.00	0.57
44	G+7+9+10+12	1.38	3.69	0.00	7.84	0.00	6.48	2.34
45	G+10+11+12	0.00	0.00	4.70	5.29	0.00	0.00	1.02
46	H+7+8+9	0.48	0.00	0.00	0.00	2.68	0.00	0.41
47	H+7+9+10+12	0.00	5.57	0.00	3.69	0.00	0.00	0.99
48	1+2+3+6+7+8+9+10+12	0.48	15.05	0.00	5.30	0.00	0.95	2.71
49	1+6+10+11+12	0.00	0.00	13.84	5.30	4.12	5.09	3.13
50	1+7+8+10+11+12+13	0.56	15.60	0.00	1.49	11.60	6.74	3.93
51	1+7+12+13	0.00	0.00	0.00	4.02	12.20	0.00	1.08
52	1+10+11+13	0.00	0.00	0.00	0.00	9.16	0.00	0.61
53	1+10+12	0.00	0.00	10.80	2.17	6.31	2.01	2.32
54	1+11+12	0.00	0.00	0.00	0.00	5.15	11.50	1.51
55	6+7+10+11	0.00	0.00	1.53	0.00	0.00	7.61	0.99
56	6+10+11+12	0.00	0.00	11.66	0.00	0.00	10.05	2.70
57	7+10+11+12	0.00	0.00	7.27	0.00	7.09	9.27	2.46
58	10+11+12	0.00	0.00	18.29	0.00	14.17	18.78	5.48
59	10+12	0.00	7.46	0.00	0.00	11.07	0.00	1.74
60	Others	6.06	17.74	5.87	5.47	7.60	6.77	7.72
	Total	100	100	100	100	100	100	100

Note: Crop code and its details are given below.

Code	Crop/ Crop combinations
A	Coconut + Cashew
B	Coconut + Cashew + Pepper
C	Coconut + Cashew + Pepper + Arecanut + Coffee
D	Coconut + Cashew + Pepper + Arecanut + Coffee + Other perennials
E	Coconut + Cashew + Pepper + Arecanut + Coffee + Other perennials + Banana & Plantains
F	Coconut + Cashew + Pepper + Coffee
G	Coconut + Pepper
H	Coconut + Arecanut
1	Coconut
2	Cashew
3	Pepper
4	Arecanut
5	Coffee
6	Other Perennials
7	Banana and Plantains
8	Tapioca
9	Ginger + Turmeric + Other tubers
10	Thuvara + Groundnut + Maize + Other Grams
11	Cotton
12	Ragi + Chama + Rice
13	Other Annual or Seasonal

6.5 Emergence of Farming Systems

There are basically three forms of farming systems in Attappady. They are (1) system with perennial crops (2) system with dry annual crops (3) system with tribal crops. These three systems were traditionally followed by malayalis, tamils and tribals respectively. As a result of interaction and internal and external intervention these cropping systems were adopted by the fellow farming households too. In the course of crop succession and cropping system development, malayali settlers diversified their cropping pattern from subsistence crops to mixed home garden and mono-perennials. In order to supplement, along with perennial farming system these settler group partially adopted other farm practices. The following forms of farming system classification can be made from perennial crop based crop practises.

a) One predominant perennial crop supplemented by other perennial crops, inter-cropped with annual crops.

b) Perennial home garden supplemented by annual dry crops mainly practised by tamil settlers.

c) Perennial home garden supplemented by tribal crops like ragi, chama, etc.

The annual-crop-based farming systems of tamils are supplemented by the following crops.

a) Dry annual crops supplemented by perennial field crops like sugar cane, seasonal field crops like rice, vegetables, maize, etc.

b) Dry annual crops mixed with tribal annual crops like ragi, chama and other millets and/or seasonal crops like tapioca, ginger, tubers, turmeric, etc.

c) Dry annual crops supplemented with perennial crops like coconut, arecanut, pepper, cashew, coffee, etc.

Tribals' farming practice has changed considerably during the past four decades. Majority of the land holding tribals belonging to Irula community have shifted to settled type of agriculture. The farming system based on tribal crops takes the following form.

a) Tribal subsistence crops supplemented with perennial and seasonal crops of malayalis. This is widely in practice in malayali dominated Agali village.

b) Tribal subsistence crops supplemented with quick income yielding dry annual and field annual crops of tamil settlers.

On the basis of the above observations, six kinds of farming systems may be identified in general among malayali, tamil and tribal farming groups (Table 6.10). This classification is made on the basis of crop intensity, crop type and vegetative cover. All these six cropping systems are widely in practice among these three groups with varying degrees of importance. However, among these farming groups their traditional crops still dominate except in the case of tribals. Migrants in Attappady brought a different style of farming that was not, in the beginning, acceptable to tribals owing to lack of adoptive skill and knowledge. The aboriginal often sold off land at throw away prices to the newcomers; in several cases tribals are thrown out by newcomers. Later, increasing requirement for cash and the gradual shift from fertile river sides prompted them to follow migrants' crops widely with skills and knowledge acquired from the settlers. In the process of the emergence of various cropping systems, the share of tribals' total cropped area has fallen considerably. Tribals are also hesitant to put more area to cultivate ragi and chama as they are not cash crops.

Table 6.10

Types of Farming Systems

Farming systems	Crop combinations
1. High Density Home Garden (**HDHG**)	⇒ Plot with mix of perennial and seasonal or annual crops and having good vegetative cover.
2. Low Density Home Garden (**LDHG**)	⇒ Plot with mix of perennial and seasonal or annual but practically uncared.
3. Home Garden with Forest Mix (**HGFM**)	⇒ Plot with perennial + seasonal + forest trees but practically uncared.
4. Mono-Perennial (**MP**)	⇒ Plot with high value perennial crops like pepper, rubber, coffee, cardamom, coconut, cashew, etc.
5. Mono Seasonal including crops in wet lands (**MS**)	⇒ Plot exclusively with rice, plantain, tapioca, sugar cane, etc.
6. Dry Annual Crops (**DAC**)	⇒ Plot with cotton, ground nut, *thuvara*, other grams, *ragi*, *chama*, etc.

6.5.1 Area Under Farming Systems

Both in Agali and Sholayur, high density type of home garden is most prevalent among malayali settlers and annual crops dominates the area under tamilians. The cultivation practice of settlers is thus seen to have been influenced also by their traditional ways of cultivation. And further, if some area is devoted to the cropping system which is not very familiar to them, it has been due to their continuous interaction with other communities having different traditions of cultivation. This is evident from the fact that the area under annual crops is very low among malayalis, that is, only less than one percent (Table 6.11). Similarly, area under high density type of home garden is as low as six percent among tamil farmers. This sort of a cultivation among tamil

Table 6.11

Distribution of Land Area According to Farming Systems

(Percent)

Category/ Region	Farming Systems					
	H DHG	L DHG	HGFM	Mono perennial	Dry annuals	Waste land
Malayalis	53.14	29.84	7.54	8.16	0.39	0.93
Tribals	6.95	36.84	3.21	22.21	27.61	3.18
Tamils	4.99	10.46	0.00	17.06	65.59	1.90
Agali	32.22	26.76	4.87	13.17	21.34	1.63
Malayalis	63.59	24.63	0.00	9.57	2.21	0.00
Tribals	20.90	2.06	0.00	6.71	69.30	1.03
Tamils	5.39	2.45	0.00	7.72	78.17	6.26
Sholayur	24.56	7.61	0.00	7.82	57.02	2.99
Malayalis	54.72	29.05	6.40	8.37	0.67	0.79
Tribals	12.59	22.79	1.91	15.94	44.45	2.31
Tamils	5.16	7.04	0.00	13.07	70.97	3.77
Total	29.97	21.14	3.44	11.60	31.82	2.03

Note: Holdings are used in this classification

The classification of farming system is very closely correlated with the distinctions made between farming groups in both the villages (Figure 6.5 and Figure 6.6). As expected the home garden type, including home garden with forest trees, dominates the malayali cultivators. Tamil cultivators, in contrast, dominate in annuals; and in mono-perennials equal to that of the malayalis. Interestingly, the area allocation of tribals has been scattered into all types of farming systems. However, there is trend among tamils farmers to convert wet area, which has been used earlier for seasonal crops, to mono-perennial, mainly, coconut. The patterns in Figure 6.5 and 6.6 indicate that the shift towards mono-perennials is significant among tamils.

Figure 6.5

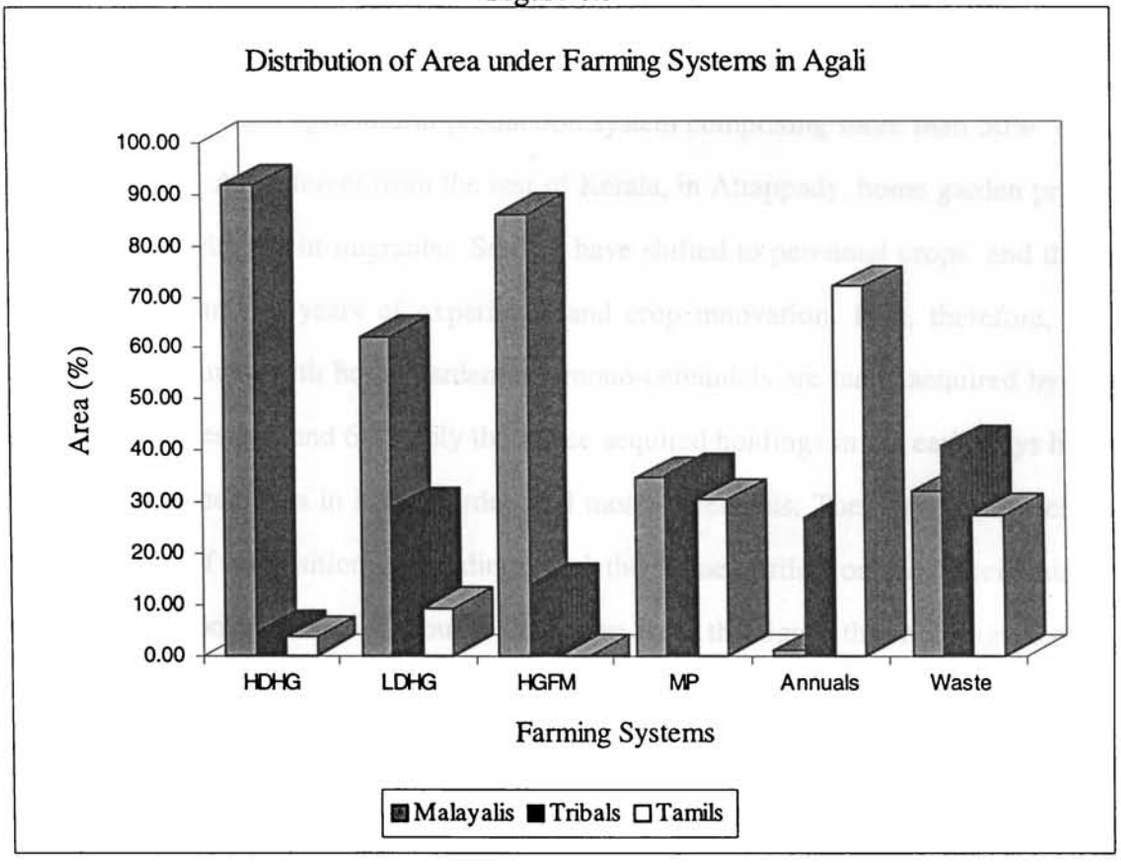
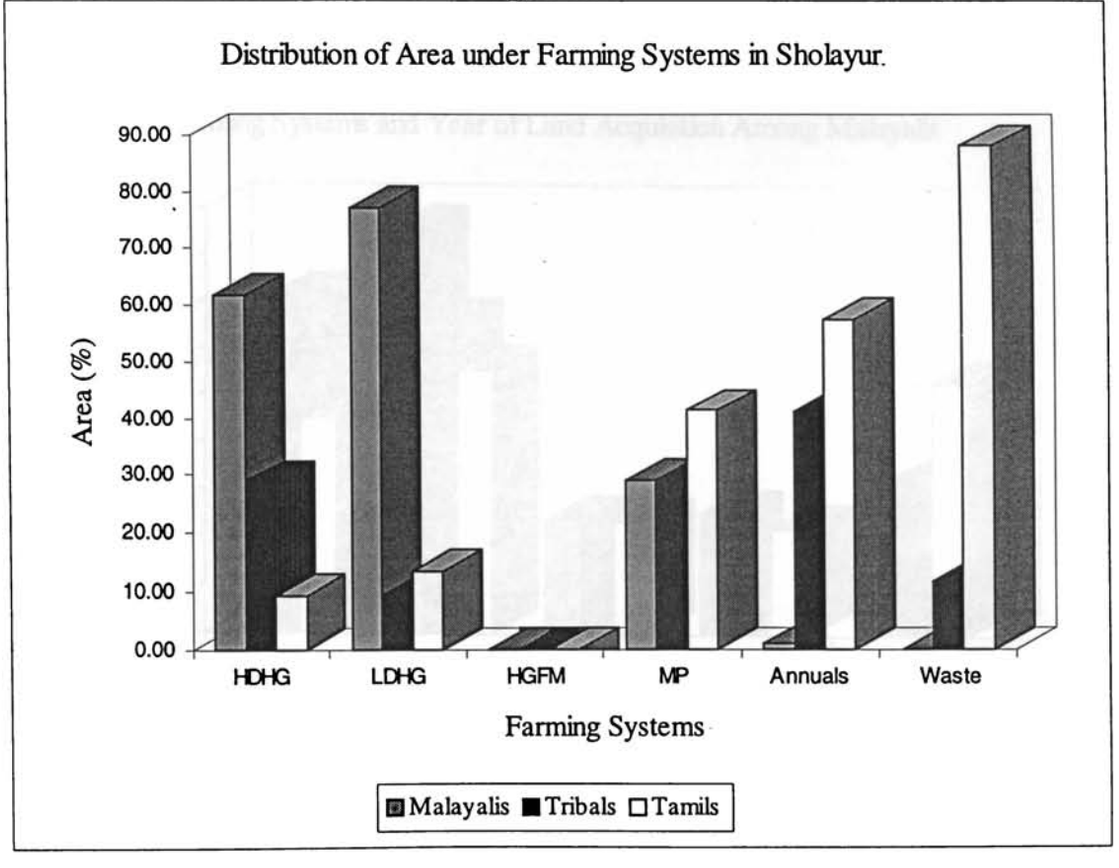


Figure 6. 6



It would be now interesting to examine the association, if any, between the area under farming systems and date of land acquisition. In Kerala, home garden practice is a culture and is a major agricultural production system comprising more than 50% of the cultivated area. As different from the rest of Kerala, in Attappady, home garden practice entered along with the in-migrants. Settlers have shifted to perennial crops, and then to home garden through years of experience and crop innovation. It is, therefore, more likely that holdings, with home garden and mono-perennials are lands acquired by early settlers. Figures 6.7 and 6.8 imply that those acquired holdings in the early days have a large share of their area in home garden and mono-perennials. The negative association between year of acquisition of holding and the home garden or mono-perennials is significant for both the settler groups. It is seen from the figure that holdings acquired up to 1975 are now more with HDHG, LDHG and MP, while the share of these farming systems are low in holding acquired thereafter. However, recent years witnessed a trend towards conversion of area into mono-perennials among both malayalis and tamils.

Figure 6.7

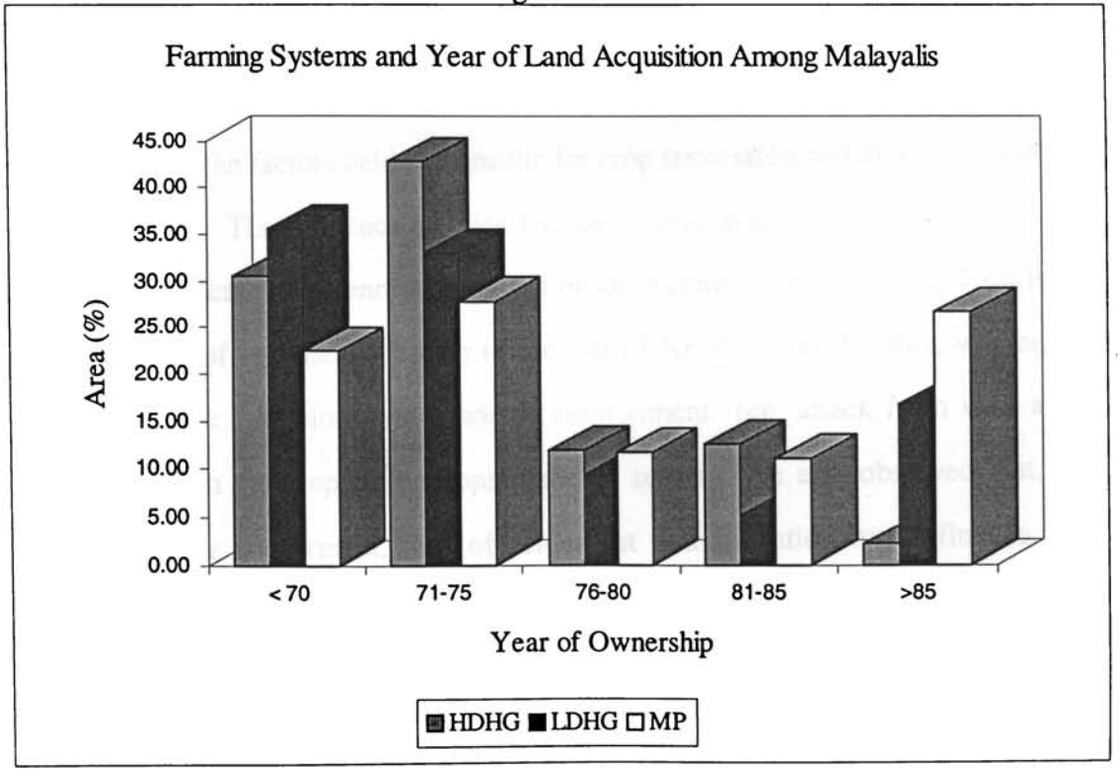
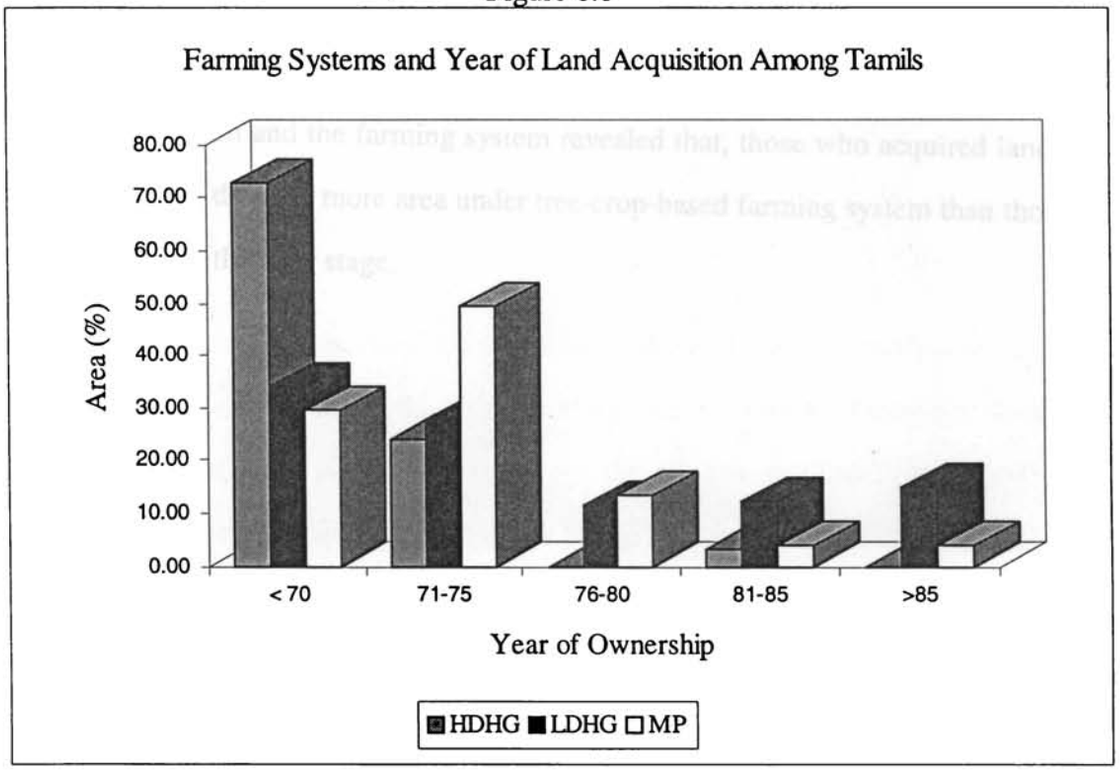


Figure 6.8



6.6 Summary

This chapter examined the factors, both price and non-price, responsible for the change in crop selection and the consequent emergence of farming systems. First, we tried to explore the factors held responsible for crop succession and crop selection among farming groups. The influence of price factors on crop selection and area conversion is observed in the case of perennial crops and in some annual cops. This partly falls in line with the trend of commercialisation in the rest of Kerala. Besides this, we found that adverse climatic conditions and a hostile environment (eg. attack from wild animals) had their role in the crop conversions made by settlers. We also observed that, among settlers, labour endowment, date of settlement and education had influence in crop selection. Secondly, considering the above, cropping intensity, crop combination and cropping systems were considered. An array of crop combinations with varying intensities is found in vogue among the farming groups in this area. Thirdly, we

examined the newly emerged farming systems among the farming groups and found a diversified, but related farming systems in the area. Finally, the association between date of land acquisition and the farming system revealed that, those who acquired land in the early date could develop more area under tree-crop-based farming system than those who acquired land in the later stage.

Chapter VII

COST OF PRODUCTION AND RELATIVE PROFITABILITY

7.1 Introduction

This chapter is concerned with the estimation of cost of production of major crops, which are cultivated by the three farming groups, namely, malayalis, tamils and tribals. Also an attempt is made to work out the relative profitability of these crops. Considering the wide crop diversity in the study area we have limited our analysis to four annual or seasonal crops or crop combinations, (namely, tapioca, cotton, groundnut-with-*thuvara* and *ragi*-with-*chama*) and one major perennial crop of the area, namely, pepper.

The Chapter begins with a discussion of the methods of calculating cost of production of agricultural crops. Followed by this, the various concepts and methods of cost estimation and tools of examining relative profitability are discussed. In the next two sections, estimated costs of production of seasonal and perennial crops are given. The relative profitability of these crops is examined in the third section.

7.2 Cost of Production of Agricultural crops: A Prelude

At the farm level the relative profitability, which is determined by the value of output and cost of cultivation, is one of the important factors influencing the farmers' allocation of resources, including land, among alternative crops (George 1988). Unit cost of production is an important item of information necessary for evolving rational price policies and development strategies of crop production. Such a price policy can influence the acreage allocations at farm level. Even without such estimates, farmers, by their experience, formulate intuitively the relative profitability of various crops they cultivate.

Realising the importance of reliable estimates of cost of production of individual commodities, the Ministry of Agriculture, Government of India through its comprehensive scheme on study of cost of cultivation of principal crops, generates cost estimates of major crops at the state and the national levels. For, Kerala, the scheme covers only two crops, namely, paddy and tapioca. Even in the case of these two crops, the estimates remain unpublished for reasons not so obvious.

The Department of Economics and Statistics, Government of Kerala, conducts cost of cultivation studies annually for selected crops in the State. An obvious limitation of these estimates is that they treat perennial crops like coconut, arecanut, rubber, pepper, etc., almost like annual crops, disregarding their complexities such as gestation lags, age structure and long life span. The estimates made by the Department cannot be made use of in the present study because these estimates seldom include Attappady or other hill slope areas among their sample units. The cropping pattern in Attappady is entirely different from other highland areas because of numerous crops grown by settlers from plain lands of Kerala and from Tamil Nadu. Traditional tribal cultivation is still in practice, though not widely, in some part of Attappady. However, little attempt has gone into examining cost structure of dominant crops in this complex economy.

Annual cost estimates are made by the National Bank for Agriculture and Rural Development (NABARD) for commercial banking operations. These estimates are based on paid-out cost alone. Moreover, the NABARD estimates are based on scanty data collected through sample surveys that are not based on scientific sampling frame work. Hence the statistical validity of these estimates is often suspect. Various Commodity Boards established in the state for specific crops like rubber, coconut, cashew and pepper, are yet to make any serious efforts to generate cost estimates. The estimates made till now are based on samples drawn from the major growing centres. These

estimates do not seems therefore to be applicable to the special agro-climatic situations of an area like Attappady.

7.3 Concepts and Methods of Cost Estimation

There are a number of problems in estimating the cost of cultivation of individual crops. Farm cost includes materials and services of heterogeneous nature and therefore a number of conceptual and methodological issues are involved in estimating the cost of cultivation of individual crops. These issues mainly relate to the treatment of hired and family labour, interest on owned fixed capital, interest on working capital, rental value of owned land, provision for risk and uncertainty, allocation of joint costs, evaluation of farm assets, etc. Before formulating various cost concepts suitable to local situation, it is relevant to discuss some theoretical issues related to cost and income concepts adopted by the Farm Management Studies in India that are generally used for estimating costs and returns from crop production in Indian agriculture. Two pertinent questions used to be hotly debated on cost and income concepts used in the Farm Management Studies. First, is the question of the motivating factor behind farmers' production decisions. Is it profit maximisation or maximisation of gross output or surplus over paid-out cost? Second, is the use of owned inputs on farms determined by market prices or are there other factors that govern their use? These questions remain still unresolved. The controversy over cost and income concepts in the estimation of cost of production of agricultural crops continues.

The cost concept 'C', used in Farm Management Studies, which includes paid out cost and imputed costs of inputs like family labour and owned land have been criticised on various grounds. When profits were calculated at cost 'C' level, Indian farming became unremunerative. The reliability of cost 'C' as an appropriate and valid concept for understanding decision making in a peasant economy has been called into question

(Bharadwaj 1974). The imputation norm for inputs, especially family labour, is justified on the ground of opportunity cost involved in the case of family labour. Generally the prevailing market wage rate is used to impute the value of family labour. This method is questioned on the ground that in Indian agriculture there exist large number of under-employed labour and hence the opportunity cost tends to zero. A similar argument was advanced regarding imputation of rental value of own land, interest on own capital, etc. (Sau 1976).

Realising the seriousness of the problem involved, Government of India appointed two special expert committees to review and revise the methodology of estimating the cost of production of principal crops. In the present study the following cost and income concepts are followed for estimating the cost of production of selected crops in the study area, among the three farming groups. These concepts are slightly different from the concepts developed by Hanumanantha Rao (1990) because wide classifications of costs are not essential for the present exercise.

The items of cost of cultivation cover both paid-out costs and imputed costs. Paid out cost includes (1) hired labour (human + animal + machinery) (2) maintenance expenses on owned animals and machinery (3) expenses on material inputs (4) depreciation on implements, machinery and farm building (5) land revenue, and (6) rent paid for leased-in land. The imputed costs consist of value of family labour, rent of owned land and interest on owned fixed capital for which the farmer does not incur any cash expense (GOI 1990). These Cost items are further classified according to different cost concepts.

In the classification given below Cost A2 represents the net paid out cost, Cost B is the gross paid out cost. Cost C includes imputed family labour in the cost of production and Cost D becomes the comprehensive cost of production.

Cost A1	⇒ Consist of cash and kind expenses (Paid out costs) actually incurred by the cultivators. They include: Value of hired labour and bullock labour + Value of owned bullock labour + Hired machinery charges + Value of purchased seeds, manure, fertiliser and plant protection + Repair and maintenance of implements and machinery + Depreciation on implements and farm buildings + Irrigation charges + Land revenue and land taxes + Interest on working capital + Other unforeseen expenses.
Cost A2	⇒ Cost A1 + Rent paid for leased-in land
Cost B	⇒ Cost A2 + Cost of fixed capital
Cost C	⇒ Cost B + Imputed value of family labour
Cost D	⇒ Cost C + Rental value of owned land

7.3.1 Procedure Adopted for the Valuation of Cost Items

Since farm cost includes many kinds of materials and services of heterogeneous nature, a number of conceptual and measurement issues are involved in estimating the cost of cultivation of individual crops. This is more so in the case of perennial crops. The issues mainly relate to treatment of hired human labour and family labour, cost of fixed capital and working capital, rental value of owned land, managerial cost, allocation of joint costs, transport and marketing charges, etc. The procedure adopted for the evaluation of important cost items is given below.

7.3.1.1 Hired Human Labour Cost

Hired human labour cost is one of the important constituents of the direct costs of crop production. It is evaluated by the actual wages paid by the employer (Farmer).

7.3.1.2 Family Labour Cost

The valuation of family labour is a controversial issue among farm economists. Considering these discussions, it has been decided to evaluate the family labour cost at the market wage rate prevailing in the locality. The managerial functions performed by the family members are evaluated for the time spent at family labour rate and actual expenses incurred for travelling, etc.

7.3.1.3 Cost of Fixed Capital (Excluding Land)

Cost of fixed capital or the interest on fixed capital is evaluated at the rate of ten per cent per annum on the present value of fixed assets. Several methods have been suggested to work out depreciation cost. Generally it is recommended that depreciation be determined on the basis of time or use, whichever results in a higher cost. In the present study depreciation charges of fixed capital are worked out by the Straight Line Method following the formula,

$$\text{Depreciation} = \frac{\text{Original cost} - \text{Junk value}}{\text{Life of the asset}}$$

In case original values of fixed capital are not available, depreciation is estimated on the basis of the present value and the remaining life of the asset.

7.3.1.4 Interest on Working Capital

Two major problems are involved in the valuation of interest on working capital. They are the rate of interest and the period over which interest is charged. In our study working capital is evaluated in terms of (a) owned and (b) borrowed (institutional + non-institutional) capital. While for the borrowed capital the actual interest paid out is

taken into account, the interest on owned capital is evaluated at the rate of 12.5 per cent per annum for half the crop year.

7.3.1.5 Rental Value of Owned Land

A number of alternative procedures to compute rental value for owned land has been suggested. The important among them are (1) an appropriate rate of interest on the value of land (2) market rent, and (3) a fixed proportion of the output. Since renting of land is common in Attappady and further, land values are very high due to pressures external to agriculture, we have resorted to estimate rental value of owned land on the basis of prevailing rents in the village for identical type of land. When such information is not available, especially for perennial crops, $1/5^{th}$ of the value of agricultural produce from the land is considered as rental value.

7.3.1.6 Allocation of Joint Costs

The expenditure incurred on or imputed for some of the cost items relate to the farm as a whole. Such joint costs are allocated to individual enterprises in proportion of the area under each crops. Depreciation on farm buildings and implements, land rents, land revenue, cesses and taxes and interest on owned fixed capital, etc., are such costs, which are allocated to individual crop enterprises in proportion to their areas. For computing the cost share of i^{th} crop, the cost of joint inputs is apportioned in the following manner.

i) Repair and maintenance of implements: In proportion to the time used for the cultivation of i^{th} crop to the total use of these equipments.

ii) Cost of fixed capital (excluding land): In proportion to the time utilised for the cultivation of i^{th} crop to the total use of these equipments.

iii) Manure, fertilisers and pesticides: In proportion to the standard area under the crop to the total cropped area.

iv) Rental value of land: In proportion to the area under the crop to the total area under cultivation.

7.3.2 Cost Estimation for Perennial and Annual or Seasonal crops

In the case of dry annual or seasonal crops we have followed the accounting method. By this method all expenditure made by the farmer during the crop period is collected, starting from the land preparation period to the harvesting period. This method, though sound, cannot be used in the case of perennial crops as their life periods are long and there exists the problem of lack of synchronisation between the expenditure stream and the stream of income accruals.

Estimation of the cost of production of perennial crops is complex due to gestation lags and long life spans involved. No widely accepted methodology is available for estimating the cost of production of such crops. The life cycle approach, though theoretically sound, cannot be employed due to several practical difficulties. The next best alternative is to obtain cross section samples of different age groups from each stratum and organise them in such a way as to represent the life cycle. The cost in terms of unit area or unit produce is estimated for each age group and then the simple or weighed average of the cost of different age groups is worked out to generate the total cost of production during the entire life span. Assuming that the total life span of a perennial crop is 'n' years, then data on quantity and value of inputs and output are obtained for each age group dividing the n^{th} life span into homogeneous periods. Based on these quantities a single value of each parameter under study such as cost, return, profitability, etc., is obtained (Chand 1994). In the present study for obtaining a life-cycle for the perennial crop six age-groups of pepper

vines, namely, (a) 1 year (b) 2 years (c) 3 years (d) 4 to 8 years (e) 9 to 15 years, and (f) above 15 years were prepared. The required data from each farming groups for these six age groups has been obtained for the estimation of cost and return. In the case of annual or seasonal crops this problem will not arise as the life period is shorter and hence the required parameters can be obtained within the time frame.

7.3.3 Method of Cost Estimation

In the present study cost and yield per acre of one perennial crop and four annual or seasonal crops cultivated by three farming groups are estimated. Estimated costs and yields for these crops at farming group level are then used to examine relative profitability. Initially the cost is estimated for each farming group. Simple average of these farming group level estimates is then taken to generate estimates at the village level and then for the whole study area level. At these levels, the sample design itself is a self-weighting one. The procedure for estimating the cost at the farming group level is the following.

Let C_{jk} be the cost incurred by the k^{th} holding in the j^{th} age group and n_j is the number of holdings selected from the j^{th} age group. Then,

$$\bar{C}_j = \frac{\sum_{k=1}^{nj} C_{jk}}{nj}$$

is an unbiased estimate of the cost per holdings in the j^{th} age group. Hence,

$$\hat{C}_j = N_j \bar{C}_j$$

is an unbiased estimate of the total cost incurred by all the farmers in the j^{th} age group where Nj is the number of holdings in the j^{th} age group in the farming stratum.

Similarly, estimate of area and production in the j^{th} age group of each farming groups can be obtained as,

$$\hat{A}j = Nj\ \bar{A}j$$

$$\hat{O}j = Nj\ \bar{O}j$$

Now,

$$\hat{C} = \frac{\sum_{j=1}^{6} Cj}{\sum_{j=1}^{6} Aj}$$

gives the estimate of cost per acre and

$$\hat{Y} = \frac{\sum_{j=1}^{6} Aj}{\sum_{j=1}^{6} Oj}$$

gives the estimate of yield per acre. Dividing $\hat{C}$ by $\hat{Y}$ we get an estimate of cost per unit produce. In the present study cost per acre and cost per unit produce is used for analysis. The procedure given above is adopted for the estimation of per acre cost and yield of annual or seasonal crops with slight difference, avoiding age group category. For annual or seasonal crops the life span is shorter and hence cost and yield will take place during the same year.

7.4 Relative Profitability Analysis

To analyse the relative profitability of the major crops we make use of financial evaluation measure like Net Present Value (NPV), Benefit Cost Ratio (BCR) and Internal

Rate of Return (IRR), (Harberger 1972). An on-farm benefit-cost analysis is the most appropriate analytical tool to measure the overall profitability of farming operation for an individual farmer or a group of farmers. While different parameters may be used for analysis at different levels, a positive NPV provides, a necessary, but insufficient indication of the acceptability of a particular crop or crops. A rational land holder will prefer more satisfaction to less in terms of land uses and NPV. Hence, he prefers the land use with the high NPV at any given level of risk. A land use, which has a higher NPV than another at any given level of risk is said to stochastically dominate the other (Anderson 1977). If a farmer does not receive adequate net income from following a crop practice he will not continue it, while a farmer may solve such problems intuitively or though practical experience. Unfortunately, such an estimate may not properly incorporate all variables from the cost side. To redress this problem one has to scientifically estimate the cost and return with appropriate methods.

For financial evaluation of perennial crops under consideration we require a stream of cost incurred over the years and the returns realised during its life period. As the study is confined to a particular area a life cycle representing the entire life period of the crop is practically difficult. To overcome this, as mentioned earlier, different age groups are classified and costs and return of the crop under different age group obtained through a survey. We used the NPV and IRR investment criteria to measure profitability of perennial crops. This approach gives a deep insight into the reasons behind farming group's decisions on allocation of scarce resources among various crops. It helps also to identify the extent of influence of economic motive behind crop selection. For the preparation of cash flow tables the procedure adopted for cost estimation are used. The computational formulas are given below:

7.4.1 Net Present Value (NPV)

$$NPV = \sum_{t=1}^{n} \frac{B_t}{(1+\delta)^t} - \sum_{t=1}^{n} \frac{C_t}{(1+\delta)^t}$$

7.4.2 Benefit Cost Ratio (BCR)

$$BCR = \sum_{t=1}^{n} \frac{B_t}{(1+\delta)^t} \Big/ \sum_{t=1}^{n} \frac{C_t}{(1+\delta)^t}$$

7.4.3 Internal Rate of Return (IRR)

$$IRR = \sum_{t=1}^{n} \frac{B_t - C_t}{(1+\delta)^t} = 0$$

7.4.4 Annuity Value (AV)

$$AV = NPV \Big/ \sum_{t=1}^{n} \frac{1}{(1+\delta)^t}$$

where, Bt is the benefit obtained in the year 't'
Ct is the cost incurred during the year 't'
δ is the discount rate
t is the age of the crop

The estimates of BCR and NPV are done at Cost C and Cost D levels. The costs and benefits are discounted at 14%, 16% and 18%.

7.5 Cost of Cultivation of Annual or Seasonal Crops

Now we may examine the estimated cost structure of selected annual or seasonal crops and perennial crop among settlers and tribals in the study area. Cost has been

estimated for four seasonal crops and one perennial crop. The seasonal crops include tapioca, cotton, groundnut-with-*thuvara* and *ragi*-with-*chama*. Of these tapioca was practised traditionally by the malayali settlers even before they came to settle in this area. It was tamil settlers who brought cotton and groundnut to this area. *Ragi* and chama are the traditional crops that were practised by tribals even before the entry of settlers to the area. The estimation of cost for perennial crops is limited to pepper only for the following reasons. Firstly, pepper is found to be the only crop cultivated all the three groups - malayalis, tamils and tribals. Secondly, the long life period of arecanut, cashew, etc., make it difficult to prepare their life-cycle for estimation of cost and return. Thirdly, coconut, though widely cultivated in every homestead, is not treated as a source of farm income by many cultivators. Finally, the area under pepper is increasing both in malayali-dominated Agali and tamil-dominated Sholayur, since the 1970s.

For the present analysis cost is examined in two dimensions, viz., cost per unit area and cost per unit produce. Cost per unit area provides a glimpse of the intensity of input use and the technological variation as between new entrants to this area and indigenous people. To assess production efficiency and to provide a guideline for price fixation, cost per unit produce is worked out. Also we can examine cost variation, if any, as between settlers and tribals, and between tamil settlers and malayali settlers in terms of intensity of the use of input. Finally we discuss the relative profitability of various crops using the benefit-cost ratio approach.

7.5.1 Cost per Unit Area

Table 7.1 presents the cost of cultivation of the four major seasonal crops using the cost concepts Cost A1, A2, B, C and D. Cost D is considered the comprehensive cost of production concept as it includes the rental value of land. Considering the high opportunity cost of land in the state and increasing demand for land in Attappady, rental

value has to be considered in any exercise related to cost estimation. Taking tapioca, the per acre cost in terms of Cost C is the highest for malayalis (Rs. 4556); and the lowest for tribals (Rs. 3534). The low cost per acre among tribal farmers is reflected in Cost A1 itself owing to low use of fertiliser and other plant protection measures. The use of labour, fertilisers and other plant protection measures are widespread among malayalis. This may be a reason for high per acre cost of cultivation among them.

However, it is interesting that in the case of cotton, which is basically a crop cultivated by tamils, cost of cultivation is highest for tamil settlers, tribals come next in the order. It is estimated that Cost C for the production of cotton is Rs. 7382 for tamils, Rs. 6459 for tribals and Rs. 5890 for malayalis. As far as tamils are concerned Cost A1 itself shows a high amount (Rs. 6111) which is much larger than that of tribals and malayalis. This is mainly due to application of high doses of inputs, namely, hired labour, bullock labour and materials.

The cost scenario of groundnut-with-*thuvara* also resembles almost similar to that of cotton. When, on an average, a tamil farmer spends Rs 3432 per acre for the cultivation of groundnut-with-*thuvara* a tribal spends Rs. 3223 and a malayali Rs. 3211.

The cost per acre of *ragi*-with-chama is the highest for tribals and the lowest for malayalis. When a tribal household spends, on average, Rs 2239, a malayali settler spends Rs. 1472 and a tamil settler Rs. 1930. High per-acre-cost for *ragi*-with-chama cultivation among tribals is due to intensive application of family labour and paid-out rent on leased-in land. Cost A1 for both settlers and tribals is found to be almost same; but at the A2 level, cost for tribals moves to a higher level due mainly to rent payment for leased-in land. Again at Cost B level, the increase from A2 is marginal. A sudden rise is observed however in Cost C due to prominence of family labour. Cost A1 constitutes only 46.69% of the total cost for tribals but it remained more than 50% for both the

settler groups. Again it shows that the intensity of use of material inputs is less in *ragi*-with-chama cultivation of tribals.

Table 7.1

Cost of Production per Acre of Annual or Seasonal Crops

(in Rs.)

Cost components	Tapioca				Cotton			
	Malayalis	Tribals	Tamils	Total	Malayalis	Tribals	Tamils	Total
Cost A1	3278.15	2440.65	2124.06	2690.68	4955.77	4955.85	6110.44	4951.59
	(62.16)	(58.81)	(47.12)	(56.88)	(65.40)	(58.39)	(58.39)	(59.75)
Cost A2	3690.65	2440.65	2124.06	2862.55	5330.77	5039.19	6522.94	5177.59
	(69.98)	(58.81)	(47.12)	(60.52)	(70.35)	(59.38)	(62.33)	(62.47)
Cost B	3869.40	2609.88	2215.73	3011.51	5434.99	5185.81	6682.16	5300.35
	(73.37)	(62.89)	(49.15)	(63.67)	(71.73)	(61.10)	(63.85)	(63.95)
Cost C	4556.40	3534.50	3699.06	4011.72	5889.99	6459.68	7382.41	6148.83
	(86.40)	(85.17)	(82.06)	(84.81)	(77.73)	(76.11)	(70.54)	(74.19)
Cost D	5273.90	4149.88	4507.73	4730.05	7577.49	8486.80	10464.91	8287.65
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
Cost components	Groundnut+Thuvara				Ragi+Chama			
	Malayalis	Tribals	Tamils	Total	Malayalis	Tribals	Tamils	Total
Cost A1	2288.27	2656.49	2887.88	2537.60	1169.29	1177.45	1209.28	1194.92
	(62.33)	(63.17)	(65.10)	(62.78)	(62.24)	(46.69)	(52.30)	(52.70)
Cost A2	2696.60	2656.49	3062.63	2697.94	1169.29	1601.45	1209.28	1279.72
	(73.46)	(63.17)	(69.04)	(66.74)	(62.24)	(63.51)	(52.30)	(56.44)
Cost B	2766.64	2737.03	3144.85	2767.33	1282.58	1789.55	1346.42	1422.28
	(75.37)	(65.08)	(70.89)	(68.46)	(68.27)	(70.97)	(58.23)	(62.73)
Cost C	3211.64	3223.70	3432.35	3174.83	1472.06	2239.55	1929.92	1900.27
	(87.49)	(76.66)	(77.37)	(78.54)	(78.35)	(88.81)	(83.47)	(83.81)
Cost D	3670.97	4205.36	4436.08	4042.24	1878.76	2521.65	2312.12	2267.35
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Figures in parentheses are percentages

7.5.2 Break-up of Cost of Cultivation

To examine the relative importance of different factors in the input structure of these farming groups a further break-up of cost components is made for each crop separately. A detailed break-up of cost is given in Table 7.2. In the case of tapioca, it is seen that capital investment for hired labour, seedlings, manure and fertilisers, etc.,

account for the major share of cost incurred by all the farming groups. Hired labour constitutes a major item in the total cost of production (37.59% for malayalis and 48.1% for tribals). Hiring of malayalis as casual labours for tapioca cultivation is quite common among tribals because they are unfamiliar with most of the land preparation activities for tapioca cultivation. However, for tamils, hired labour cost constitutes only 18.86%. Malayalis and tribals, as different from tamils, do not use bullock labour for preparing land for tapioca cultivation. Use of bullock labour, constituting 6.39% of total cost, may be presumably the reason for the lower cost for hired labour observed among tamils. Further, application of family labour is much higher among tamil cultivators. For material inputs, including manure, fertilisers and other plant protection measure, malayalis and tamils incur 11.97% and 15.77% of the total cost respectively, whereas it is only 2.28% for tribals. It is also seen that, while examining Cost A2 which includes rent on leased-in land, malayalis lease-in land for the cultivation of tapioca. Interestingly, neither tribals nor tamils cultivate tapioca in leased-in land. While examining Cost B it becomes clear that capital investment is comparatively low in tapioca cultivation and that it is the lowest among tribals. Depreciation of fixed capital of tribals remained at 1.85% of the total cost, much lower than among both the settler groups. It is estimated that, on an average, rental value of owned land in the cultivation of tapioca in Attappady forms 15% of the total cost of production.

Cotton is a dry crop cultivated from the early days of settlement only by tamils; but now it is widely practised in every part of Attappady and by all the farming groups. Besides labour, this crop requires material inputs for plant protection in large quantities. It is seen in the table that in the region as a whole hired labour cost constitutes 17.57% of the total cost of production and that it is the highest among tribal farmers (20.72%). Just in the case of tapioca cultivation, lack of adequate skill and proficiency in the various farm operations of cotton, is the major reason for hiring of labour by tribals. Though tribal workers are widely used by settlers, it is not uncommon among tribals for

employing settler workers in their farms for cultivation of tapioca, cotton, ginger and pepper. Next to hired labour the most important input component for cotton cultivation is bullock labour. In this cost component also, it is the highest for tribals (9.22%) and constitutes almost twice that of malayali settlers in percentage terms. Most of the owners of bullocks are tamils and hence both malayali and tribal farmers depend on them for bullock labour. However, application of manure and chemicals is comparatively very low among tribals and constitutes only 3.26% of the total cost; as against 34.6% for malayalis and 23.53% for tamils. In cotton cultivation leasing in of land is lower among tribals than among settlers. Cotton is a high value commercial crop for which setters do not lease out their land to tribals. As tribals found cultivation of cotton profitable they leased-in land from their fellow tribals. In spite of the fact that hired labour cost is high for tribals, Cost A1 remains high for settlers because of their practice of incurring high material costs.

Groundnut, like cotton, is a high value seasonal crop which was cultivated in the beginning only by tamils but has become quite common among both settlers and tribals. It is cultivated as a main crop supplemented by *thuvara* cultivated on the borders of the fields. Groundnut is seldom cultivated singly. Interestingly, hired labour cost is found to be the lowest (6%) share of total cost in the cultivation groundnut-with-*thuvara*. At the same time application of family labour is not found very high either, only 10.08%. However, bullock labour expenses and cost of manure, fertilisers and seeds constitute 48.23% for all farmers taken together. The cost structure is more or less similar both for tribals and tamils indicating greater monetisation of inputs in groundnut cultivation. As different from cotton cultivation, plant protection expense is less for groundnut-with-*thuvara*.

In *ragi*-with-*chama*, traditionally cultivated by tribals, hired labour cost accounts for 15% for all groups; and it is the lowest among tribals (9.74%). The low hired labour cost component is due to the substitution of bullock labour for human labour. It is quite

common especially among tamils farmers in land preparation activities. When a malayali cultivator spends 21.32% for bullock labour, tribals and tamils spent 15.86% and 14.42% respectively. On an average, expense on account of bullock labour (15.88%) is larger than that of hired labour (12.08%). Other material costs are more or less uniform for both settlers and tribals. One interesting observation is that neither the malayali nor the tamil settlers cultivate *ragi* and *chama* in leased-in land, a fact evident from Cost A2 component, whereas tribals are found to cultivate them on a large scale on leased-in land. This indicates that tribals are now depending on settlers for land for producing their means of subsistence. This sort of leasing was not prevalent in the early days of settlement. Now settlers do so with a selfish end. They lease out lands with a view to get uncleared and uncultivated bushy mountain slope land, cleared by tribals for cultivation. Besides, they also levy exorbitant rental charges on tribals, realised either in cash in advance or in kind after the harvest. Use of family labour is the highest among the tamils (25.24%) followed by tribals (17.85%) and malayalis (10.09%). One of the reasons for the extensive use of family labour by tamils and tribals is the availability of surplus labour time at their disposal. Among malayali families, though the percentage of time devoted to agriculture is large, the number of members of the households who have selected agriculture as their main occupation, is smaller than among tamils and tribals.

7.5.3 Land Lease

Various types of leases are in vogue in the study area. Good quality lands are leased-in on rent by settlers for cultivation of high value annual crops and uncleared bushy lands are leased out to tribals for cultivation of subsistence crops. Paid-out cost of cultivation is found to be zero or insignificant for tapioca, cotton and groundnut with *thuvara* on lands leased-in by tribals. However, cost is high in the *ragi*-with-*chama* cultivation on which tribals traditionally subsisted. They now have to resort to leased- in land for its cultivation. At the same time neither malayalis nor tamils are found cultivating *ragi* on rented land as they consider *ragi* and *chama* as inferior grain.

Table 7.2

Break-up Cost of Cultivation of Annual or Seasonal Crops

(Percent)

Crops / Cost components	Farming groups			Total
	Malayalis	Tribals	Tamils	
Tapioca				
Hired human labour	37.59	48.10	18.86	34.51
Bullock labour	0.00	0.00	6.39	1.90
Seed or seedlings	1.67	3.71	0.74	1.88
Manure and chemicals	10.90	2.28	13.90	9.75
Plant protection	1.07	0.00	1.87	1.05
Repairs and maintenance	2.59	1.28	1.85	2.06
Miscellaneous expenses	2.56	1.20	1.97	2.06
Interest on working capital	5.78	2.24	1.55	3.68
Cost A1	62.16	58.81	47.12	56.88
Rent for leased-in land	7.82	0.00	0.00	3.63
Cost A2	69.98	58.81	47.12	60.52
Depreciation of fixed capital	3.08	3.71	1.85	2.86
Interest on fixed capital	0.31	0.37	0.18	0.29
Cost B	73.37	62.89	49.15	63.67
Imputed value of family labour	13.03	22.28	32.91	21.15
Cost C	86.40	85.17	82.06	84.81
Rental value of owned land	13.60	14.83	17.94	15.19
Cost D	100.00	100.00	100.00	100.00
Cotton				
Hired human labour	13.36	20.72	18.08	17.57
Bullock labour	5.11	9.22	6.88	7.29
Seed	7.42	5.01	3.73	5.17
Manure and chemicals	18.10	3.26	11.63	9.63
Plant protection	16.50	15.42	11.90	14.99
Repairs and maintenance	0.48	0.16	0.71	0.38
Miscellaneous expenses	0.57	1.18	2.02	1.20
Interest on working capital	3.85	3.43	3.43	3.51
Cost A1	65.40	58.39	58.39	59.75
Rent for leased-in land	4.95	0.98	3.94	2.73
Cost A2	70.35	59.38	62.33	62.47
Depreciation of fixed capital	1.25	1.57	1.38	1.35
Interest on fixed capital	0.13	0.16	0.14	0.13
Cost B	71.73	61.10	63.85	63.95
Imputed value of family labour	6.00	15.01	6.69	10.24
Cost C	77.73	76.11	70.54	74.19
Rental value of owned land	22.27	23.89	29.46	25.81
Cost D	100.00	100.00	100.00	100.00

Contd.

(Percent)

Crops / Cost components	Farming groups			Total
	Malayalis	Tribals	Tamils	
Groundnut+Thuvara				
Hired human labour	6.08	5.40	7.89	6.09
Bullock labour	13.08	18.76	22.15	18.23
Seed	14.98	15.59	13.86	14.58
Manure and chemicals	20.16	13.91	13.53	15.42
Plant protection	1.10	1.94	0.92	1.35
Repairs and maintenance	1.23	2.18	0.77	1.64
Miscellaneous expenses	2.04	1.68	2.15	1.76
Interest on working capital	3.67	3.72	3.83	3.69
Cost A1	62.33	63.17	65.10	62.78
Rent for leased-in land	11.12	0.00	3.94	3.97
Cost A2	73.46	63.17	69.04	66.74
Depreciation of fixed capital	1.73	1.74	1.69	1.56
Interest on fixed capital	0.17	0.17	0.17	0.16
Cost B	75.37	65.08	70.89	68.46
Imputed value of family labour	12.12	11.57	6.48	10.08
Cost C	87.49	76.66	77.37	78.54
Rental value of owned land	12.51	23.34	22.63	21.46
Cost D	100.00	100.00	100.00	100.00
Ragi+Chama				
Hired human labour	15.96	9.74	11.89	12.08
Bullock labour	21.32	15.86	14.42	15.88
Seed	1.36	0.84	1.31	1.22
Manure and chemicals	13.24	14.04	13.99	13.88
Plant protection	1.94	0.00	2.02	1.56
Repairs and maintenance	1.91	1.76	1.51	1.63
Miscellaneous expenses	2.84	1.70	4.09	3.35
Interest on working capital	3.66	2.75	3.08	3.10
Cost A1	62.24	46.69	52.30	52.70
Rent for leased-in land	0.00	16.81	0.00	3.74
Cost A2	62.24	63.51	52.30	56.44
Depreciation of fixed capital	5.48	6.78	5.39	5.72
Interest on fixed capital	0.55	0.68	0.54	0.57
Cost B	68.27	70.97	58.23	62.73
Imputed value of family labour	10.09	17.85	25.24	21.08
Cost C	78.35	88.81	83.47	83.81
Rental value of owned land	21.65	11.19	16.53	16.19
Cost D	100.00	100.00	100.00	100.00

7.5.3 Unit Cost of Production

Cost, per unit of output is to be calculated for finding out the relative profitability of cultivation of the various crops. Also for policy decisions on prices per unit cost is to be calculated. Estimation of cost per unit of output is difficult in the case of two crops, namely groundnut and *ragi*, because they are cultivated with a supplementary crop, *thuvara* and *chama*, respectively. To overcome this difficulty cost incurred is allocated to each crop in proportion to the area used. Since all farmers are not following the same spacing and crop mix pattern the problem of allocation of cost between the crops is complex. In the case of Groundnut with *thuvara*, the supplementary crop is sown in the borders of the field and it is found that the area proportion between the main and the supplementary crop is 4:1. Therefore, for estimating cost per unit of these crops, we approximately allocated the cost in the proportion of 80:20 for major crop and inter-crop respectively.

Ragi and *chama* sown together in the entire area cultivated. However, the proportion of seed used per unit area is 3:1. Therefore we use this proportion for allocation of cost, that is, 70% for *ragi* and 30% for *chama*. This sort of problem is not encountered in the calculation of unit cost in the case of cultivation of cotton and tapioca; their costs are estimated independently. Cost per kilogram is calculated in terms of the different cost concepts - A_1, A_2, B, C and D. Considering the high opportunity cost of land, Cost D happens to be the comprehensive cost concept to be used for price policy decision.

The estimated cost per kilogram of tapioca for settlers and for tribals and for the study area as a whole, is given in Table 7.3. Taking the study area as a whole, the Cost C

for producing a kilogram of tapioca is worked out to be Rs. 0.90. Cost per kilogram is the highest for tribals (Rs. 1.15) and the lowest among malayalis (Rs. 0.81). The per acre production of tapioca among tribal farmers is 3076 kilogram, which is much lower than that of either malayali or tamil farmers and than the area average. At the same time Cost C does not vary among the farming groups. Hence the observed low yield per acre accounts for the high cost per unit produce. The low yield for tribal farmers may be partly due to their poor skill in the various farm operations, inappropriate plant protection measures and ignorance about scientific cultivation practices. Cotton also presents a clear picture of high unit cost for tribals when Cost C or Cost D is considered. Cost of producing one kilogram of cotton in the region, on an average, is Rs. 12.76 at Cost C level, which is tantamount to that of tamil farmers. Both for tribals and malayalis cost per unit produce is higher. Yield per acre for a tamil farmer is more than 150 kilograms. High yield is a reason for low cost per unit of output among tamils. At the same time the average cost of production of tribals is Rs. 6459.68 per acre, which is higher than that of malayalis. Thus, high cost and low yield characterise tribal cultivation of tapioca and cotton. As far as tamils are concerned though cost per acre is high, yields are also high. Cost D for tamils in producing cotton is worked out to be Rs. 17.09 per kilogram, which is larger than that of malayalis though at Cost C level tamils' unit cost stands less than that of malayalis. This phenomenon is due to the fact that rental value is high due to the differences in imputed rent calculated at $1/5^{th}$ of the produce of the land.

In groundnut production tribals receive high yield rates, of 388 kilogram per acre, substantially larger than those of malayali farmers. As a result, unit cost of production of tribals is found to be lower, at all cost levels, than that of malayalis; and it is about equal to that of the tamils. It is the significant yield achievement which push down the unit cost below that of the malayalis. But for *thuvara*, unit cost remains lower for malayalis and tamils than for tribals.

Even though tribals were practising *ragi* cultivation from times immemorial the average yield of *ragi* per acre of tribal cultivation is half of that of settlers. Low yield is the prime factor for high cost per unit produce of *ragi*. *Ragi* cultivation, even at Cost A1 level is seen uneconomical for tribals. Still they are practising it as it is a traditional and routine farm activity for them and also it is their staple food. *Ragi* cultivation is not economical even for tamil and malayali farmers even though they produce higher yield per acre at low cost per unit produce. The next and most important subsistence crop after *ragi* for tribal is *chama*, the cultivation of which also is seen to be uneconomical both for settlers and tribals. However, cost per kilogram is higher for tamils than for tribals and malayalis. High unit cost for *chama* cultivation for tribals is more due to high cost of production than to low yield.

The preceding analysis clearly shows that tribal cultivation is on the ruin and other dry crops, brought to this area by settlers, are thriving. Low yield due to lack of scientific method of cultivation, inappropriate information, subsistence nature, etc., has compelled the tribals to take to crops which are more accessible, give good yield and provide an immediate source of income.

Table 7.3

Cost per Kilogram of Annual or Seasonal Crops

(in Rs.)

Cost components	Tapioca				Cotton			
	Malayalis	Tribals	Tamils	Totals	Malayalis	Tribals	Tamils	Total
	1	2	3	4	1	2	3	4
Cost A1	0.58	0.79	0.53	0.60	11.01	10.87	9.98	10.27
Cost A2	0.65	0.79	0.53	0.64	11.85	11.05	10.65	10.74
Cost B	0.68	0.85	0.55	0.68	12.08	11.37	10.91	11.00
Cost C	0.81	1.15	0.91	0.90	13.09	14.16	12.05	12.76
Cost D	0.93	1.35	1.11	1.06	16.84	18.61	17.09	17.20
Yield* (in kg.)	5650	3076	4043	4451	450	456	612	482

contd.

(in Rs.)

Cost components	Groundnut				Thuvara			
	Malayalis	Tribals	Tamils	Totals	Malayalis	Tribals	Tamils	Total
Cost A1	5.78	5.47	4.86	4.99	3.27	4.14	3.98	3.78
Cost A2	6.81	5.47	5.16	5.31	3.85	4.14	4.22	4.02
Cost B	6.99	5.64	5.30	5.44	3.95	4.27	4.33	4.12
Cost C	8.11	6.64	5.78	6.25	4.59	5.02	4.73	4.73
Cost D	9.27	8.66	7.47	7.95	5.24	6.55	6.11	6.02
Yield* (in kg.)	317	388	475	407	140	128	145	134
Cost Components	Ragi				Chama			
Cost A1	2.22	4.82	2.41	2.63	1.65	1.52	1.86	1.74
Cost A2	2.22	6.56	2.41	2.81	1.65	2.07	1.86	1.87
Cost B	2.44	7.33	2.68	3.12	1.81	2.31	2.07	2.07
Cost C	2.80	9.17	3.85	4.18	2.07	2.90	2.97	2.77
Cost D	3.57	10.32	4.61	4.98	2.65	3.26	3.56	3.31
Yield* (in kg.)	368	171	351	319	213	232	195	206

* Yield per acre is estimated for the sample used for estimating cost, hence may be variant from the yield for the total sample.

7.6 Cost of Cultivation of Perennial Crops: The Case of Pepper

Pepper is one of the most important and the earliest known spice crops of India. It is indigenous to the natural evergreen forests of the Western Ghats of South India. The major pepper-producing centres in Kerala are Thaliparamba, Idukki and Wayanad. Pepper cultivation begun in the Western Ghat region of Attappady along with the in-migration of malayalis from the Erstwhile Travancore region. However, it became widespread only after the 1970s. Pepper is generally cultivated either as a mono crop or inter-cropped with other tree crops. Inter-cropping is of various types, namely, (a) Pepper in an inter-cropping system with primary importance to pepper (b) Pepper in an inter cropping-system with equal importance to other crops (c) Pepper in an inter-cropping system with secondary importance and (d) Pepper in homesteads interspersed with several other crops but practically left uncared (Radhakrishan 1992).

Mono crop pepper cultivation, though widely practised in the rest of Kerala, is not found in the hill ranges of Attappady. Inter-cropping widely practised in this area is different from that in the other major pepper-producing centres of Kerala. The areas under pepper in an inter-cropping system with primary importance is rarely found among tamils and tribals but is common among malayalis. The other three inter- cropping systems are widely in operation throughout the study area.

7.6.1 Per Acre Cost of Cultivation

Per acre cost is estimated for settlers and tribals and for the study area as a whole. As different from the case of seasonal crops, we have not worked out Cost A2 for pepper as leasing of land for pepper cultivation is not in practice in this area. Cost per acre of pepper is given in Table 7.4. Taking Attappady as a whole, we find that cost of production of pepper per acre works out to be Rs. 7744 at Cost D level. Among the farming groups cost of production is the highest for malayalis and the lowest among tribals. This difference can best be explained in terms of input variation and farm operational differences. Cost for tribals is nearly one-half of that for settlers in respect of all the cost concepts reflecting the fact that the intensity of the use of labour and material inputs is much lower among the former. However, a sharp sweep from Cost B to Cost C among tribals displays the higher application of family labour.

Break-up of average cost per acre is presented in Table 7.5. It is seen that in the case of settlers more than 25% of the net paid out cost is incurred on hired labours; whereas it is below 10% for tribals. Cost of manure and chemicals accounts for 17.53% for all farmers taken together and it is found the highest for tribals. The bulk of the expenditure under this item is incurred by tribals on manure rather than on fertilisers and that too on pepper than on other crops. Very meagre expenditure is incurred on plant protection by the farming groups though the menace of pests and diseases attack. Though

the cost incurred on hired labour is less for tribals, the imputed value of family labour is found higher for them, at about 30.08%, almost twice as much as that of the family labour incurred by tamils.

Table 7.4

Cost per Acre of Pepper Based on Cost Concepts

(in Rs.)

Cost components	Farming groups			Total
	Malayalis	Tribals	Tamils	
COST A	4003.24 (47.03)	2326.95 (35.37)	4599.44 (56.49)	3643.21 (47.04)
COST B	4490.35 (52.75)	2445.62 (37.17)	4768.41 (58.57)	3901.46 (50.38)
COST C	6190.01 (72.72)	4424.45 (67.25)	5761.00 (70.76)	5458.49 (70.48)
COST D	8512.70 (100.00)	6579.12 (100.00)	8141.40 (100.00)	7744.41 (100.00)

Figures in parentheses are percentages

Tribals follow a low-input approach to raise pepper stands and seedlings. They do not use pesticides, fertilisers or other plant protection measures like mulching, tying of vines, etc., in the early stages of pepper planting. However, they use larger quantities of manure than what settler farmers use being unaware of the importance of using a package of farm practices. In spite of the high use of manure, the total net paid- out cost of raising pepper remains lower for tribals (see Appendix A: Table A.8). At the same time, the imputed value of family labour is more than 25% for tribals, much higher than settlers.

Table 7.5

Break-up Cost of Cultivation of Pepper

(Percent)

Cost components	Farming groups			Total
	Malayalis	Tribals	Tamils	
Hired human labour	26.04	8.59	33.14	23.59
Seedlings and standard	0.44	0.45	0.28	0.39
Manure and chemicals	14.44	21.95	17.18	17.53
Plant protection	0.50	0.10	0.81	0.50
Repairs and maintenance	2.42	1.29	0.45	1.41
Miscellaneous expenditure	0.52	0.98	1.44	0.97
Interest on working capital	2.66	2.00	3.20	2.66
COST A	47.03	35.37	56.49	47.04
Depreciation of fixed capital	5.20	1.64	1.89	3.03
Interest (10%)	0.52	0.16	0.19	0.30
COST B	52.75	37.17	58.57	50.38
Imputed value of family labour	19.97	30.08	12.19	20.11
COST C	72.72	67.25	70.76	70.48
Rental value of land	27.28	32.75	29.24	29.52
COST D	100.00	100.00	100.00	100.00

7.6.2 Cost per Kilogram of Pepper

The estimated cost per kilogram of pepper for malayalis, tribals and tamils is presented in Table 7.6. Taking Attappady as a whole, Cost C works out to be Rs. 23.43. Among the farming groups the cost of production is the highest for tribals (Rs. 26.88) and the lowest for malayalis (Rs. 19.87). The difference is due to difference in yield and use of family labour and application of manure. Yield per acre for a tribal, on an average, is 165 kilograms, which is half the yield of a malayali. The relatively high estimate of Cost D in the case of tribals is due to high rental value of land, which is estimated at $1/5^{th}$ of the value of agricultural produce. Tribals started cultivation of pepper since the 1970s and it became widespread among them after the 1980s. The major incentive for them to cultivate pepper is the free supply of pepper vines by various Governmental agencies. In most cases, they planted the vines in whatever land they had regardless of the standard

specifications and irrespective of the intensity of other crops in the lands. As a result pepper became a secondary crop in their lands. In the calculation of land value, it is possible that the income accruing from other crops has entered into the calculation of rental value.

Table 7.6

Unit Cost of Production of Pepper

(in Rs.)

Cost components	Farming groups			Total
	Malayalis	Tribals	Tamils	
Hired human labour	7.12	3.43	11.50	7.84
Seedlings and standard	0.12	0.18	0.10	0.13
Manure and chemicals	3.95	8.77	5.96	5.83
Plant protection	0.14	0.04	0.28	0.17
Repairs and maintenance	0.66	0.52	0.15	0.47
Miscellaneous expenditure	0.14	0.39	0.50	0.32
Interest on working capital	0.73	0.80	1.11	0.89
COST A	12.85	14.14	19.60	15.64
Depreciation of fixed capital	1.42	0.66	0.65	1.01
Interest (10%)	0.14	0.07	0.07	0.10
COST B	14.41	14.86	20.32	16.75
Imputed value of family labour	5.46	12.02	4.23	6.68
COST C	19.87	26.88	24.55	23.43
Rental value of land	7.45	13.09	10.15	9.81
COST D	27.32	39.97	34.70	33.25
Yield (kg.)	311.37	164.62	234.63	232.93

7.7 Profitability

To estimate the profitability of major crops we conducted a benefit-cost ratio (BCR) analysis. As costs and returns pertain to the same year, discounting of time is not needed for seasonal crops. BC ratio has been estimated for four annual crops and one perennial crop. The pepper crop starts bearing, on an average, at the age of three. The yield remains almost stable from the 7^{th} to 15^{th} year, but declines gradually thereafter.

Although there are instances of some pepper vines giving economic yields for longer periods, for the purpose of the present analysis, we assume that the economic life as 20 years.

7.7.1 Profitability of Annual or Seasonal Crops

In the calculation of benefit-cost ratio of annual crops, a distinction is made between tapioca and cotton which are cultivated as mono crops, on the one hand and groundnut and *ragi* which are cultivated (as primary crop) along with *thuvara* and *chama* (as secondary crop), on the other. Return in value terms for all these crops is estimated using the prevailing market price during the period of study. Cotton and Groundnut-with-*thuvara* are the two crops found profitable at all levels of cost, for both settlers and tribals. As for cotton BC ratio is 1.67 at Cost D level and 2.36 at Cost C level for tamils indicating that for every one rupee spent for cotton cultivation tamils earn Rs. 1.67 at the D and Rs. 2.36 at the C levels of cost. In the case of groundnut-with-*thuvara* also, the BC ratio is high for tamils. It stands at Rs. 1.72 at Cost C level. BC ratio is found to be positive for these two crops, for all farming groups. The massive shift in area from *ragi* and other traditional crops to cotton and groundnut in recent years may be partly explained - therefore in terms of profitability. A casual look at the BC ratio of cotton and groundnut-with-*thuvara* at Cost D levels indicate that tamils and malayalis could earn relatively more income per rupee spends than tribal. However profitability differs among the groups, the tribals remaining at the lowest ring of the ladder.

Cultivation of tapioca and *ragi* along with *chama* presents an entirely different picture. Tapioca cultivation is found unprofitable for tribals even at Cost C level (0.87) though it is advantageous for settlers at that cost level. However, BC ratio turns unfavourable to tamils and marginally so to malayalis at Cost D level indicating that tapioca cultivation is, in general, uneconomical to all the three farming groups. However,

a major proportion of the farmers still cultivates this crop for reasons not very obvious. *Ragi*-with-*chama*, like tapioca, is also found economically unviable among tribals. From *ragi* cultivation tribals could not even get the paid-out cost as is evident from the BC ratio of 0.88 at Cost A2 level; showing that they are incurring a loss of twelve *paise* for every one rupee spent even at Cost A2 level. As for tamils it is a profitable venture only up to Cost B level. Among the farming groups only malayalis are found to make a profit. The inexplicably low BC ratio for *ragi*-with-*chama* for tribals is due to low yield of *ragi*, which is estimated to be 171 kilograms per acre when it is 368 and 351 kilograms per acre respectively for malayalis and tamils. Only for malayalis yield of *ragi* and *chama* is found high and profitable (Table 7.7).

Table 7.7

Benefit-Cost Ratio of the Cultivation of Annual or Seasonal Crops

Cost components	Tapioca				Cotton			
	Malayalis	Tribals	Tamils	Total	Malayalis	Tribals	Tamils	Total
Cost A1	1.72	1.26	1.90	1.65	2.09	2.12	2.86	2.39
Cost A2	1.53	1.26	1.90	1.55	1.94	2.08	2.68	2.29
Cost B	1.46	1.18	1.82	1.48	1.90	2.02	2.61	2.23
Cost C	1.24	0.87	1.09	1.11	1.76	1.62	2.36	1.93
Cost D	1.07	0.74	0.90	0.94	1.37	1.24	1.67	1.43
Cost components	Groundnut+Thuvara				Ragi+Chama			
	Malayalis	Tribals	Tamils	Total	Malayalis	Tribals	Tamils	Total
Cost A1	1.90	1.85	2.04	2.03	1.74	1.20	1.58	1.54
Cost A2	1.61	1.85	1.92	1.90	1.74	0.88	1.58	1.43
Cost B	1.57	1.79	1.87	1.86	1.59	0.79	1.42	1.29
Cost C	1.35	1.52	1.72	1.62	1.38	0.63	0.99	0.97
Cost D	1.18	1.17	1.33	1.27	1.08	0.56	0.83	0.81

7.7.2 Cash Flows of Pepper Cultivation

The discounted cash flows in pepper cultivation during a life period of 20 years, are estimated at two levels of cost, say Cost C and Cost D (Table 7.8). It may be seen that the discounted cash flows are negative in the first three years at the two cost levels

both for settlers and tribals owing to zero yield and huge initial investment. However, cash flow becomes positive by the age of four and the general trend thereafter is continuous decline over the years, but giving positive net incomes year by year. At Cost C level, the discounted benefits, taking into consideration the time value of money, increases up to the fourth year only, and then it starts to decline, whereas discounted cost shows a continuously decreasing trend right from the first year onwards (see Appendix A: Table A.11).

It is seen that the total net benefit at Cost C level at the end of 20 years is more than Rs. 37000 for malayalis, about Rs. 12000 for tribals and Rs. 23000 for tamils. At cost level D also, the net benefit is positive, but for tribals, it is as low as Rs. 886. Thus we find that without assigning any rental value, pepper cultivation brings an aggregate net benefit of more than Rs. 24000 in the study area as a whole and that with assigning rental value also, it is profitable.

7.7.3 Relative Profitability of Pepper Cultivation

In order to make a comparison of the profitability of annual crops and perennial crops, we have estimated the BC ratio of a perennial crop also. NPV, BC ratio at various discount rates for settlers and tribals at two cost levels, Cost C and Cost D, are presented in Table 7.9. NPV and BC at 14% discount rate are Rs. 30180 and 1.84 respectively at Cost C level for the study area. While examining the same among farming groups, NPV is the highest for malayalis and the lowest for tribals. BC ratio is also the highest for malayalis (2.08). At Cost C level, while discounting at 16% or 18%, pepper cultivation provides a fairly high NPV and BC ratio for all farming groups. The internal rate of return - the discount rate at which the project worth of incremental net benefit stream is equal to zero - is 41.66% of Attappady. The estimated IRR at Cost C level is the highest for malayalis and the lowest for tribals.

Table 7.8

Discounted Cash Flow for Pepper at Cost C and Cost D Level

Year	Disc. factor 16%	At Cost C level				At Cost D level			
		Malayalis	Tribals	Tamils	Total	Malayalis	Tribals	Tamils	Total
1	0.862	-6506.80	-4392.07	-5121.32	-5340.07	-8471.90	-5085.92	-6346.25	-6634.70
2	0.743	-3438.21	-2830.52	-2446.91	-3160.57	-4530.61	-3636.99	-3395.41	-4109.70
3	0.641	-1946.78	-1753.84	376.04	-1404.68	-3080.58	-2602.22	-478.96	-2350.41
4	0.552	6856.28	2300.98	3727.07	4457.78	5629.99	909.05	2928.77	3318.94
5	0.476	5910.58	1983.61	3212.99	3842.91	4853.44	783.67	2524.80	2861.16
6	0.410	5095.33	1710.01	2769.82	3312.86	4184.00	675.58	2176.55	2466.52
7	0.354	4392.53	1474.14	2387.78	2855.91	3606.89	582.39	1876.34	2126.31
8	0.305	3786.66	1270.81	2058.43	2461.99	3109.39	502.06	1617.53	1833.02
9	0.263	3924.24	2245.83	2703.89	3001.33	3268.26	1702.13	1977.86	2359.42
10	0.227	3382.97	1936.06	2330.94	2587.35	2817.47	1467.35	1705.06	2033.99
11	0.195	2916.35	1669.01	2009.43	2230.48	2428.85	1264.96	1469.88	1753.44
12	0.168	2514.10	1438.81	1732.27	1922.82	2093.84	1090.48	1267.13	1511.58
13	0.145	2167.33	1240.35	1493.34	1657.61	1805.03	940.07	1092.36	1303.09
14	0.125	1868.38	1069.27	1287.36	1428.97	1556.06	810.40	941.69	1123.35
15	0.108	1610.68	921.78	1109.79	1231.87	1341.43	698.62	811.80	968.41
16	0.093	1267.80	439.41	891.60	871.39	1037.61	201.16	574.85	609.66
17	0.080	1092.93	378.80	768.62	751.19	894.50	173.41	495.56	525.57
18	0.069	942.18	326.56	662.60	647.58	771.12	149.49	427.21	453.07
19	0.060	812.23	281.51	571.21	558.26	664.76	128.87	368.29	390.58
20	0.051	700.19	242.68	492.42	481.26	573.07	111.10	317.49	336.71
Total	5.93	37348.97	11953.19	23017.37	24396.25	24552.61	865.6497	12352.56	12880.01

When we examine NPV, BC and IRR at Cost D level it is seen that at 14% discount rate NPV is Rs. 17083. Only at 18% discount rate did the NPV turn out to be negative and BC became less than one for tribals; for all other rates of discount, NPV and BC remained positive and more than one respectively. At Cost D level also IRR is 34.43% for malayalis and 30.12% for tamils. Since pepper cultivation could generate a fairly high NPV of Rs. 17083 even considering the rental value of owned land, pepper cultivation turns out to be profitable farm activity. The BC ratio of 1.84 at Cost C level shows that for a rupee of investment a farmer generates Rs. 1.84 as return. It is also seen that BC was more than one for malayalis and tamils at all cost levels and at all

discounting levels. As for tribals, except for the 8% discount rate at Cost D level, all other estimated BCs are found higher than unity.

The discounted annual net income (annuity) realised at Cost C for pepper was quite high for malayalis (Rs. 6298), which is three times larger than that of tribals (Rs. 2015). Even the annuity of Rs. 2015 of tribals indicates that it is not small in consideration with the terrain condition. At Cost D level also annuity is found not meagre for malayalis and tamils. This indicates that even in the fragile terrain of Attappady pepper yields an unambiguously high net economic benefits to the settlers.

Table 7.9

Economic Appraisal of Perennial Crop at Cost C and Cost D Level

Category	Discount rate						Annuity value @ 16%	IRR
	@14%		@16%		@18%			
	NPV	B/C	NPV	B/C	NPV	B/C		
COST C								
Malayalis	45523	2.08	37349	1.98	30751	1.9	6298.31	48.14
Tribals	15517	1.53	11953	1.45	9104	1.38	2015.72	30.99
Tamils	28356	1.81	23017	1.74	18732	1.67	3881.51	44.16
Total	30180	1.84	24396	1.76	19744	1.68	4114.04	41.66
COST D								
Malayalis	31113	1.55	24553	1.48	19285	1.42	4140.41	34.43
Tribals	2903	1.07	866	1.02	-725	0.98	145.98	17.03
Tamils	16089	1.34	12353	1.3	9359	1.25	2083.06	30.12
Total	17083	1.35	12880	1.29	9521	1.24	2172.01	28.34

Note: NPV is given in Rupees

BC ratio of the four annual crops in comparison with that of the perennial crop (at 16% discount rate) shows that only in the case of cotton it is higher, at Cost C and Cost D levels. Also in groundnut-with-*thuvara* cultivation by tribals, BC ratio stands higher

than the BC ratio of pepper. The difference in BC ratio of cotton and pepper for tribals and tamils is not substantial. This indicates that pepper cultivation, given all it limitations and the gestation period involved, is relatively a profitable crop, both for malayali and tamil settlers.

7.7.4 Comparison of Per Acre Profitability

Per acre profit is obtained, for annual crops, by deducting the cost from the returns and, for perennial crop, from the discounted annual net income. It is seen that profit per acre is negative for tapioca at Cost C level for *ragi* with *chama* at Cost C and D levels. A reasonable high rate of profit per acre is noticed only in the case of cotton; profit is the highest for tamils and the lowest for tribals. On an average, a tribal farmer incurs a loss of Rs. 458 per acre in the cultivation of tapioca at Cost C level and Rs. 1073 at Cost D level. Tamil farmers also incur loss in tapioca cultivation except at Cost C level. In *ragi*-with-*chama* cultivation, tribals incur a loss of Rs. 1111 per acre at Cost D level. Only malayalis could earn a marginal profit from *ragi*-with-*chama* cultivation. Even though tribals continue to cultivate *ragi* and *chama*, they are doing so at a loss because they are their staple food. Groundnut-with-*thuvara* cultivation is seen profitable only up to Cost C level, at Cost D level profit almost disappear. Only in cotton cultivation both settlers and tribals make reasonable profit. The magnitude of profit earned by the tamils is Rs. 10074 per acre, by tribals , Rs. 4030.

Table 7.10

Per acre Net Income from Annual or Seasonal Crops at Various Cost Levels

Cost components	Tapioca				Cotton			
	Malayalis	Tribals	Tamils	Total	Malayalis	Tribals	Tamils	Total
Cost A1	2372	636	1919	1760	5394	5534	11346	6890
Cost A2	1959	636	1919	1588	5019	5451	10933	6664
Cost B	1781	467	1828	1440	4915	5304	10774	6541
Cost C	1094	-458	344	439	4460	4030	10074	5693
Cost D	376	-1073	-464	-279	2773	2003	6991	3554
Cost components	Groundnut+Thuvara				Ragi+Chama			
	Malayalis	Tribals	Tamils	Total	Malayalis	Tribals	Tamils	Total
Cost A1	2050	2252	3005	2601	864	233	702	640
Cost A2	1642	2252	2830	2441	864	-191	702	556
Cost B	1572	2171	2748	2371	751	-379	565	413
Cost C	1127	1685	2460	1964	561	-829	-19	-65
Cost D	667	703	1456	1096	155	-1111	-401	-432

Note: Profit = Returns in money term minus cost

Table 7.11

Net Annual Income from Perennial Crops and Annual or Seasonal Crops

(at Cost D Level)

Crops	Farming groups			Total	Main physical constraints
	Malayalis	Tribals	Tamils		
Tapioca	376	-1073	-464	-279	Drizzling rain, Rodent animals
Cotton	2773	2003	**6991**	3554	Attack from pests
G+T	667	703	1456	1096	Attack from pests
R+C	155	-1111	-401	-432	Attack from pests
Pepper*	**4140**	145	2083	2172	Quick wilt, pests

G+T = Groundnut-with-*thuvara*; R+C = *Ragi*-with-*chama*

* Annuity is used for pepper

Annual net incomes accruing from cotton cultivation for tamils and from pepper cultivation for malayalis, are significantly high amounts even after making allowance for

the rental value of land. Three crops, namely, cotton, groundnut-with-*thuvara*, and pepper give farmers a net positive return. Tapioca, though widely cultivated in Agali, gives negative net profit to both tribals and tamils; and some profit accrues only to malayalis. In all crops, malayalis earns net positive incomes. Pepper is about two times more profitable to them than to tamils and 28 times more profitable than to tribals. Only in groundnut-with-*thuvara* is the profit of malayalis lower than that of tribals and tamils. Cotton is the most lucrative crop cultivated by tamils. Cotton is about two times more profitable for tamils than for malayalis and three times more profitable than for tribals. Similarly, groundnut-with-*thuvara* is substantially profitable to tamils. Tapioca and *ragi*-with-*chama* are uneconomic at Cost D level for tribals and tamils.

7.8 Summary

In this chapter we estimated the per unit and per acre cost of production of major crops in the study area among in-migrant farmers and tribals. Also we worked out the relative profitability of these crops using benefit-cost techniques. To begin with, we reviewed the cost estimation methods both for seasonal and perennial crops to show how per unit and per acre cost can be estimated. We have used life cycle approach and accounting approach for perennial and annual or seasonal crops respectively.

The cost estimation of seasonal crops showed that in the case all the crops tamil and malayali settlers are able, in general, to produce them at unit costs lower than those of tribals. High per acre cost of production and low yield are found to be the main causes of high unit cost of production. In general, technological backwardness in the cultivation practice, tends, *ceteris paribus*, to reduce yield among tribal cultivators. On the other hand, intensive use of modern inputs and technical know-how, *ceteris paribus*, tend to augment yield and reduce per unit cost of cultivation by settlers.

As for perennial crops also cost per acre and cost per unit of production were estimated. Unit cost of pepper worked out for farming groups showed that it is the highest for the tribals. Even though per acre cost is lower for them, cost per unit output is the highest due to very low yield. Among settlers, the unit cost is the lowest for the malayalis.

The investigation of relative profitability using benefit-cost technique pointed out that dry crops, cotton and groundnut-with-*thuvara* are economically profitable both for settlers and tribals. However, tapioca and *ragi*-with-*chama* are unprofitable for all cultivators, except malayalis at Cost C level. A comparison of perennial crops with annual crops, in terms of BC ratios and net yearly incomes, shows that, pepper cultivation is profitable to all the cultivating groups.

Chapter VIII

SUMMARY AND CONCLUSIONS

In spite of the several favourable measures taken by the Government through various development activities, the economic condition of tribals in the mountain lands is still deplorable. There are many factors identified for this poor plight. One of them is the massive in-migration of people from thickly populated plain land to this thinly populated mountain slope and the changes in land use pattern which ensued. The immediate consequence of such migration was large scale deforestation; it was followed by the introduction of different land use activities, quite different from the traditional ways of land use in this region. In the course of events, tribals lost their land; the demographic structure of Attappady changed; the cropping pattern got diversified; traditional techniques of production were ruined; new crops and new techniques of cultivation came to stay; and the entire cost and return structure of production underwent radical change. Though several studies attempted to explore the impact of such settlement on tribal economy, much attempt has not gone into the investigation of the process of in-migrant settlement and the resultant dynamics of land use. The present study, is an attempt to understand the changes in land use and the factors held responsible for such changes, on the basis of a micro level enquiry.

For the purpose of detailed field investigation, we have chosen two villages of Attappady block, one of the tribal concentration centres of the State. Till the second quarter of this century, the area was inhabited only by tribals. However, since then it witnessed massive influx of people from the plain land and the entire demographic profile of the region changed. Uncontrolled deforestation, over-grazing of cattle and introduction of agricultural practices inappropriate to the ecological and agro-climatic conditions of the region, have changed the entire land use pattern of Attappady. The area

is now characterised by wide crop diversity handed down by the history of crop succession among both the settlers and the indigenous people.

After a detailed statement of the problem in global and local context, we discussed the specific objectives of this enquiry, namely, the dynamics of land use in a new forest settlement. It encompassed a discussion of the process of settlement and land acquisition; and review of the course of land degradation, crop successions, the development of farming systems and the factors which influenced it. We have also analysed the structure of costs and returns and the relative profitability of cultivation of the different crops and crop combinations practised by the settlers and the tribals.

Though both primary and secondary data have been used in the analysis, we have relied more on primary data collected from a sample of 367 cultivators in two selected villages of Attappady. Proportionate random stratified sampling was used to draw the sample from the sample villages and from among the three farming groups in the region. Besides, several early settlers and social workers were interviewed for gathering historical information.

After furnishing a detailed account of the study area and its socio-economic set-up of the settlers and tribals in the area, we highlighted the crucial importance of agriculture in this area and examined the types and extent of land dependency of the indigenous people and the in-migrant groups.

8.1 Summary of Findings

8.1.1 Settlement and the Process of Land Acquisition

We have examined the process of settlement and the extent of land alienation in Attappady valley using historical data and oral history accounts collected from old

settlers, tribal moopans and social workers. Land-hungry people from Travancore began migrating to the Malabar region during the first quarter of the present century. Migration to Attappady is essentially a continuation of the Malabar migration process from Travancore, though, some people from Tamil Nadu also had migrated to this region earlier. The cavalier approach of the *jenmis* of the lands and the lack of state control were the major factors which facilitated the massive influx and settlement of in-migrants in the early stages of the process. The early settlers were rich land owners from plain land who had direct influence over *Jenmis*. The main motivating factor for the inflow of these people to the region in the first stage was acquisition of land for extraction of forest timber; cultivation of land became the major motive only in the next stage. Even earlier than the entry of these rich land owners from the plains a few traders from Tamil Nadu and other parts of Kerala had occupied the valley. The process of settlement, turned increasingly exploitative in nature over time, particularly since massive influx of landless and economically backward people to the region began. In their frantic efforts to acquire land, tribals underwent indiscriminate exploitation at the hands of in-migrants from both sides of the valley. As a result, a large number of tribal households lost their land to malayali and tamil settlers. In most cases of land transaction tribals were got cheated, the in-migrants exploiting them of their ignorance and fear. In this process, most of the fertile river beds and other low lands under tribal occupations passed on to settlers, especially to the tamils. Tribals were pushed in the process to the steepest parts of Attappady hills.

The demographic structure, along with land structure, has changed in favour of the settlers within a short span of time. A dualistic society and economy emerged by the mid- 1970s; the tribals constituting the aboriginal and indigenous section (*Adivasi*) and the settlers becoming the new settlers (*Vandavasi*). There is a further division among the settlers themselves - between the tamils and the malayalis. The process of land transfers from the tribals to settlers continued unabated till most tribals were reduced to the status

of landless agricultural labourers. The very few tribals who were left with some bits of land were either located in the remotest parts and the lands they retained were the least fertile type. As a result the agricultural practices of the valley have undergone total change from the unique tribal mode of production to a variety of modern agricultural practices.

There exist many tribal families who lost their lands and many settlers who lost large amount of money in this bid to acquire land in the valley. The issue of restoration of land to tribals has created fear of eviction among settlers. An integrated development strategy in which all the groups - tribals and settlers - participate with equal enthusiasm is yet to evolve.

8.1.2 Factors of Crop Succession and Crop Selection

Since the 1950s remarkable changes have taken place in the farming system of Attappady. A variety of agricultural crops ranging from millet to coconut have come to stay in the region. In this process, the quality of land has degraded thanks to indiscriminate removal of forest trees and wanton misuse of land for a variety of purposes such as by grazing and raising crops on hill slopes without taking measures to prevent soil erosion. This has been further accentuated by inappropriate land conservation activities and attitudinal change among tribals towards traditional cropping technique. In their hurdle to find a livelihood, from the early days onwards, settlers adopted various land use activities, indiscriminate of its consequence, which resulted into erosion and a gradual degradation of_forest cover and land quality. Cultivation of *ramacham* and *theruva* and the use of forest trees as firewood for distilling oil from these crops are cases in point. Tamil cultivators do not allow tree in their land as its shades are not suitable for the crops they practices. Gradually tribals also follow, at least

partially, the mode of operation of settlers, which was a severe setback to soil conservation and sustainable agricultural practice of the area.

The land use practices of both the settlers and the tribals have been undergoing changes continuously over time. Tribal cultivation practices have almost entirely disappeared due to low productivity on the one hand and introduction of non-traditional crops, on the other. Among the factors which have influenced land use and cropping patterns, prices are found to be the most important.

Lack of security of ownership has acted as a strong reason for wanton exploitation of land resources. The major influencing factors on crop choices among settlers were labour endowment, date of settlement and education. Those families endowed with large amounts of labour power and high educational levels followed more diversified cropping patterns with emphasis on cultivation of perennial crops and development of home gardens. The trend of land degradation has lately disappeared and has teemed to adoption of sustainable agricultural practices, by the settler groups. Poverty and lack of adequate resource were the prime factors for the destructive exploitation by the settlers, the precious land in the area during the early periods of their settlement. Accumulation of economic resources, and better understanding of the environmental hazards of indiscriminate land use are showing positive results.

8.1.3 Farming System Development

The existence of three different farming groups - the malayalis, the tamils and the tribals - was the main reason for the emergence of diverse farming systems in the area. Perennial-crops-based farming system is followed by malayalis; dry-crops-based system followed by tamils; and indigenous-crops-based system is followed by tribals. High density home gardens, low density home garden, home garden with forest mix, mono

perennial crops and annual or seasonal crops exist in the area. The growing importance of high density home gardens among malayalis indicates that the resource degradation phase among them has ended and is being reversed. Tamil farmers still adhere to a dry-crops-based farming system due to their preference for quick-income-yielding cultivation and their strong attachment to their own traditional practices. However, in-migrants who acquired more land in the early date could convert larger areas under perennial-crops-based farming system than late comers. The practice of tribals to cultivate perennial crops and dry crops have not only provided them with insufficient income but also resulted in total ruin of their traditional cropping system. The main reason for their failure in the adoption of settlers' crops is their technological backwardness. It is high time that a review of the development of the farming systems of the area is made with particular emphasis on the status of the traditional cultivation practices of the tribals.

8.1.4 Cost of Production and Relative Profitability

We have calculated per acre and per unit cost of important seasonal and perennial crops among the settler groups and the tribals. In general, low yield has a negative influence on unit cost among farmers. In the case of all the crops, both the settler groups are able to produce at lower unit costs than the tribals could. High per acre cost of production and low yield are found to be the main causes of high unit cost of production among tribals. Inadequate knowledge and know-how of modern cultivation techniques and practice, tend to reduce their yields. On the other hand, intensive use of modern inputs and technical know-how, *ceteris paribus*, tend to reduce per unit cost of cultivation among settlers.

Unit cost of pepper is also the highest among tribals. Even though per acre cost is less for them, yield rates are also lower. Among the settlers, unit costs are the lowest among malayalis. The adoption of settler's crops has not benefited tribals either for yield

improvement or in cost reduction. Settlers could manage, however, to produce the crops at low unit costs, due to adoption of modern techniques like application of fertilisers, chemicals and irrigation.

Dry crops, cotton and groundnut, cultivated along with *thuvara,* are profitable both for settlers and tribals. However, tapioca and ragi-with-chama are unprofitable for all cultivators, except malayalis at Cost C level. A comparison of perennial crops with these crops, taking benefit-cost ratio and net yearly income shows that, cotton and pepper cultivation are lucrative, pepper being the more profitable of the two.

Cost factors should obviously receive more attention in planning for the future. Agricultural extension services have to be strengthened to so that cultivators are enabled to bring down cost of production and increase yield rates. Although cotton production is found to be profitable, its cultivation should be expanded only if adequate protective measures are taken to prevent soil erosion and related aspects of land degradation caused by it. The ecological effects of expansion of dry crops and tree crops in Attappady need careful analysis.

8.2 Some Implications to Policy

Attappady is a unique place in the state of Kerala characterised by many inter-connected features. A single measure or a one-shot injection of activity cannot take the region to the path of sustainable development. The area requires a 'big-push' along with a package of programmes. The following policy suggestions can be put on the basis of the present study.

1. As there is chance for further degradation of land, when security of ownership of land is in question, steps should be taken to provide adequate security of ownership not only to tribals but also to settlers to a limited extent.

2. For a full and augmented prosperity of this part of the State, along with the existing Integrated Tribal Development Programme, an Integrated Attappady Development Programme with more emphasis on sustainable development is recommended.

3. The hidden hand of environmental degradation is a grave danger especially on sloppy terrains, which are under cultivation of tapioca and dry annual crops like groundnuts, cotton, grams, etc. Soil erosion as a result of the unplanned cultivation of these crops has resulted in dramatic decline in soil fertility and hence low crop productivity. This calls for a watershed management approach for the sustainable development of the region.

4. For the improvement of traditional cultivation, which are on the verge of ruin, sufficient technological backup should be given through a package of programmes.

5. A progressive agrarian transformation is warranted to maintain the homegarden as a sustainable production system in ecological and socio-economic terms.

6. Degradation as a result of excessive cultivation of dry crops needs to be limited through appropriate measures.

7. For a faster development of the area the link between Attappady and outside world should be improved. This may be made possible through a variety of ways such as tourism development, increased trade, and the like.

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