

INTERNAL RURAL MIGRATION AND ITS IMPACT ON DEFORESTATION AND CROPPING PATTERN IN KERALA

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JEENA T. S.


CENTRE FOR DEVELOPMENT STUDIES

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I hereby affirm that the research for this dissertation titled "Internal Rural Migration and Its Impact on Deforestation and Cropping Pattern in Kerala" being submitted to the Jawaharlal Nehru University for the award of the Degree of Master of Philosophy, was carried out entirely by me at the Centre for Development Studies, Thiruvananthapuram.


Jeena T S.

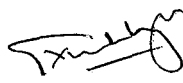
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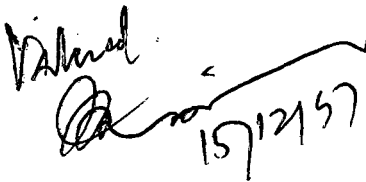

Prof. P S George
Fellow


Dr. K Pushpangadham
Associate Fellow



Supervisors


Chandan Mukherjee
Director
Centre for Development Studies
Thiruvananthapuram


15/12/97

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CHAPTER I

INTRODUCTION

Land, the basic factor of production, being inelastic in supply and immobile in nature, assumes great importance in any society with an ever increasing demand for it. The fixity in supply and the differential quality of land gives rise to competition among various types of its uses. This may lead to the scarcity of land in general and also for a certain category of land use in particular, whose demand is the highest. Among the various uses to which land is put, agriculture is the most important one, since this provides food for the living beings. But the increasing demand arising out of increasing population, leads to a scarcity of land, particularly of agricultural land. As a result of this, the relationship between population growth and food production has been a matter of major concern of researchers all over the world.

In the classical economic tradition much attention was given to population growth, diminishing returns and limits on available land resources. Malthus (1798), even though, did not offer a theory to explain the interaction between population and agricultural resource, postulated a tendency of human beings to grow geometrically while the "means of subsistence" grow only arithmetically, the former thus outstripping the latter. In fact, the 'pessimistic Malthusian' model suggested a long-term absolute natural resource scarcity constraint.¹

On the other hand, the 'optimistic Ricardian' models do not assume any absolute limits but only admit that resources decline in quality and are therefore relatively scarce.² Ricardo further noted that, the application of

¹ *Barnet and Morse (1963)*

² *Barbier, (1989)*

increased quantities of a variable factor of production, namely, labor in combination with a fixed resource land, leads to progressively diminishing returns.³ Therefore, one can conclude that a combination of diminishing returns and population growth can easily lead to massive and accelerating conversions of forest areas to food production to feed a growing population.

Viewed from another angle, scholars like Boserup noted that, population grows relative to land and there is a tendency to use land more intensively, by reducing the time that land is left fallow and increasing labor per unit of time which is nothing but the 'intensification of agriculture'.⁴

Thus, from the above discussion, it appears that the scarcity of agricultural land induces two types of reactions in human beings in order to augment agricultural production. One is to find out new lands and the other is to use the existing land intensively in order to meet the increasing human needs. In short, the scarcity of land necessitates either extensification or intensification of agricultural land use in order to meet the requirements of the growing population.

Though extensification and intensification come under the broad category of agricultural land use they are fundamentally different from one another. Intensification which is the application of more and more inputs in order to maximize the output from the existing plot of land is related to the level of technological advancement of a country. On the other hand extensification depends on the availability of new unused potentially cultivable lands.

land should not be scarce thing. Is it not?

³ *Blaug (1968)*

⁴ *Boserup (1973)*

The scope for either extensification or intensification of agricultural land use is different in different countries. As had been noted above, intensification is a function of technological advancement, and in the developing countries which generally lack this technological advancement, the easy way to meet the demands of the growing population is by way of extensification of agricultural land use.

Thus, taking into account the above cited factors, such as, the scarcity of land arising out of an increasing population, the lack of technological advancement, together with the operation of the law of diminishing returns, emphasizes the importance of extensification of agricultural land use to the natural areas, in order to meet the increased demand, especially in developing countries.

However, the extensification and intensification of agricultural land use cannot be treated in isolation and has been treated in relation to demographic factors. Thus, the response of land use assumes a 'multi-phasic' character⁵ which means that, demographic, land intensification and extensification depends on the other two, and hence on all the factors influencing those other two categories. In addition to this, the intensification or extensification of land use in relation to population, in turn, has consequences on environment. But the severity of such problems depends upon various factors such as density of human habitation, the ecological conditions of the land and the land use practices engaged in by human population etc.⁶

⁵ *The term multi-phasic was used by Kingsley Davis in his "theory of multiphasic responses postulating that families respond by altering their demographic behaviour: postponing marriage, reducing fertility within marriage by whatever means are available at that time, and/or out migration" (Davis 1963). He in fact viewed the responses to population growth as multi-phasic in the sense that several things occur simultaneously.*

⁶ *See Higgins et.al. 1982*

The relationship between demographic and land use variables has been conceptualized at either static or dynamic levels. The static analysis establishes the relationship between, for example, population density and land use, even though many factors may influence land use, including land quality and the general level of non-agricultural development. In other words, the static relationship reflect the cumulative outcome of a long historical process of human habitation and land use in a country, while more recent changes (such as deforestation) ought to be related to other factors (e.g. migration) which have been changing recently is more dynamic and therefore, more complex.⁷

As far as developing countries are concerned the level of technological advancement is generally low and extension of agricultural land use is mainly the result of out-migration to new areas. This type of out-migration is different from other types of migration such as urban migration. Moreover, it is also noted that, there may be little incentive for human ingenuity to become oriented to develop technology to increase land productivity on existing agricultural land, as long as the option exists to appropriate large tracts of 'unoccupied, or un-cultivated communal lands and natural or waste land at low cost.⁸ In such countries extensification was much easier than intensification. This extensification of land use is by way of migration to areas where new unused, potentially productive land is available in plenty. Thus, internal migration, becomes the key link or mechanism between population pressures and agricultural expansion, especially in developing countries.⁹ In this process, several environmental problems are also created. For example, it has been noted that, in highland areas, the increased settlements to the slopes

not entirely at all!

⁷ *Bilsborrow and Geores (1995)*

⁸ *Aart van de Laar (1996)*

⁹ *Bilsborrow and Geores (1995)*

involves a tree clearing process that leads to increase in soil erosion, flooding and downward siltation of rivers and dams, in the Indian sub continent.

In tropical countries, migration in search of new fertile land is mainly to the forest areas and clearing the forest for human settlement and cultivation. The reasons and intensity of such migration may vary, but it has an invariable influence in the destination place. The extension of cultivated land and the resultant deforestation in tropical countries is not a static process that takes place at one point of time. It rather spreads over a period of time. Further the relationship between population and land use is not a straight forward one. Therefore, it would be imperative to look into the extensification of cultivation into forest areas which is mainly by way of migration in search of unused, potentially fertile land.

It has been noted that, Kerala had a large area under tropical forest and is also known for unabated deforestation.¹⁰ It is a fact that forests have been cleared on a large scale both for development activities and also for cultivation of commercial crops. It has been noted that the phenomenon of mass migration from villages to towns seen in other parts of the country particularly in the metropolitan cities is absent in Kerala.¹¹ This is because of the fact that there is no undue concentration of modern amenities in the towns and that the development process is not too heavily weighted in favor of the towns as usual and is not so lopsided as to leave the rural areas. At the same time several studies noted that migration and extensification of cultivation existed side by side.¹² This migration was largely from lowland and midland regions to highland region. Therefore, in this context it is of interest to analyze the

¹⁰ *Chadhoadhyay (1985)*

¹¹ *Census of India (1981) Series 10 Kerala*

¹² *Varghese (1972)*

interaction between migration and deforestation as a part of extensification of agricultural land use in Kerala.

But the analysis of migration which encompasses a wide range of patterns, when viewed from the geographical point of view involves the movement of people from one locality to another within the country or outside the country is complex especially in the context of Kerala. This is because of the different streams of migration taking place from Kerala. It is a fact that Kerala has been experiencing massive migration of its population to the advanced countries of the West and to the newly rich countries of the Middle East. At the same time migration movements are also taking place within the state.

A brief survey of the theoretical approaches to migration has been carried out in an effort to provide an analytical frame work for the study of migration and extensification of cultivation in Kerala. But the survey given below pointed out the inadequacies of any one of the theoretical approaches to explain the situation existing in Kerala.

Ravenstein's theory which explained that migration between two points will be inversely ~~be~~ related to the distance and migrants will move by stages from near by towns to distant lands and the movements is mainly to centres of commerce and trade. This does not fully explain the situation in Kerala where large scale rural migration is also taking place. But his argument that, it is the inherent desire in men "to better themselves in material respects" that drives man from one place to another is true in the case of Kerala. This is very much evident from the large scale migration to the Middle East and the advanced countries of the West.

In Kerala, where there is large scale rural to rural migration, the process of such migration can be understood in a better way using Evert Lee's (1962)

conceptualisation of migration. In fact, he introduced a simple conceptualisation of migration, 'involving a set of factors at origin and destination and a set of intervening obstacles and a series of personal factors'. He categorised the whole factors into two; the push factors and the pull factors which includes, skill, education, age, sex, cost of transport, restrictive immigration laws etc.,

Other theories which linked migration with the process of development (Arthur Lewis 1954, John Fei and Ranis 1961) also do not explain much about the migration in Kerala. According to them migration is as an equilibrating mechanism which, through the transfer of labour from the labour surplus sector to the labour deficit sector brings about an equality between the two sectors. This model based on a concept of dual economy comprising of a subsistence agricultural sector characterised by unemployment and under-employment and a modern industrial sector characterised by full employment where 'capitalist' reinvest the full amount of their profit. But this explanation does not hold good in the case of Kerala, which lacks a modern industrial sector and there is not much difference between rural and urban sectors.

Sjaastad's theory looked upon migration as an activity of resource allocation having implications of costs and returns. Both monetary and non-monetary elements are included as items of costs. He maintains that when value of all future monetary benefits from moving is greater than the monetary costs involved, migration takes place. But Todaro pointed out that predictability about any actual migration process is possible only in the case of professional and educated migrants. Also the historical context under which each pattern of migration originates and the manner in which the urge for migration grows in the minds of only few selected groups of people cannot be explained in terms of costs and returns alone.

Todaro's model of rural urban migration is also not explaining much the situation existing in Kerala. Todaro's model suggests that the decision to migrate includes perception by the potential migrant of an "expected" stream of income and is a function of both the prevailing urban wage structure and a subjective probability of obtaining employment in urban modern sector.

These approaches focus on the individual decision making as the primary concern in any migration process. But this is also influenced by the socio-economic and political conditions under which the individual acts. Although these theories are important in understanding the various dimensions of migration process, the foregoing survey points out the inadequacy of any one of the theoretical approaches alone to provide an analytical frame work for the study of rural migration and extension of cultivation.

Therefore, to analyse the rural migration and extension of cultivation we have to incorporate elements from several of the theories. It is not only the prospects of economic betterment alone that drives the people to migrate but various other factors such as psychic benefit and other personal factors also to a great extent determine one's desire to migrate. Along with this various constraints of the concerned individual like resource constraints, institutional constraints etc influence the individuals choice of the place to migrate. Moreover, the advantage of moving along with family and the prospects of using family labour etc., to a great extent determine the place of migration.

In Kerala, people with less resource endowments and less technical skill, in an effort to better their economic situation migrate to rural areas where the availability of land is in plenty and where there are less constraints operating. It is in this frame work that the migration of people to rural areas and the extension of cultivation which has led to deforestation has been analysed.

Characteristics of Kerala's Agriculture

For a proper understanding of the agricultural land use, it may be useful to provide a brief overview of the unique features of Kerala agriculture. Kerala is situated in the South Western corner of India and can broadly be divided into three physiographic subdivisions, the highland, the midland and the lowland.¹³ Paddy is the most important crop grown on the low lying fields of the lowlands and the terraced slopes of the midlands where water is abundant in the soil throughout the year. On the belt land immediately above the paddy fields on both the lowlands and midlands, and on the lower slopes of the midlands, moisture preferring crops like coconut and arecanut are grown. On the hill slopes of the highland region plantation crops are grown.

Agriculture of the state is characterized by intensive utilization of the land and unique pattern of mixed cropping.¹⁴ Even though the cropping intensity does not adequately capture the intensive use of land made in Kerala due to the widespread practice of mixed cropping involving higher plant density per unit acre, it has been taken as a measure of intensity of land use over the period. In fact, the intensity of land use according to this measure is very high and it increased from 122 in 1960 to 136 during 1993-94.¹⁵ This means that the intensification of land use is very high in Kerala. Moreover, the cropping pattern obtained in different districts show the imprint of specific agronomic environment obtained in these areas. The differences is very sharp between certain districts like Thiruvananthapuram, Kottayam, Alappuzha and Palakkad where these agronomic conditions are relatively homogenous within districts. While the seasonal crops constitute a large proportion in Alappuzha

*This is a traditional
classification!*

¹³ This classification is based on the Report of the Committee on Agro-Climatic Zones and Cropping Patterns (1994), Government of Kerala

¹⁴ Report of One Man Commission (1981)

¹⁵ Computed from the relevant issues of Agricultural Statistics, Government of Kerala.

and Palakkad where the topography is mild with extensive valleys, it is the plantation crops that occupy large area in Thiruvananthapuram and Kottayam.¹⁶

A Brief Review Of Select Literature

Although there exists vast literature dealing with various aspects of Kerala agriculture, as the present study deals with the aspect of extensification of agricultural land use only, here the literature review is mainly confined to this category. The review of literature indicates two types of extension of agricultural land use in Kerala. One type of extension of agricultural land use is in terms of the increase in net sown area with out any crop specificity while the other is in terms of crop specificity. However, since the interest of the present study is on the extensification of agricultural land use as such with out any crop specificity, the literature reviewed falls mainly under this category.

A study carried out by Government of Kerala (1976) indicated that during the period 1950 to 1970, the main factor contributing to the increase in total cropped area was the increase in net sown area by way of bringing under cultivation virgin lands as well as lands hitherto used for non-agricultural purposes, mainly by providing irrigation facilities. Here the increase in total cropped area is confined only to the increase in net sown area which is by way of providing irrigation facilities. *(i.e., extensification.)*

According to the Report of the Committee on Agro-climatic Zones and Cropping Pattern (1974), the percentage of net area sown to total geographical area excluding forests is as high as 75 per cent as against the national average of 56 per cent. This, according to them, is mainly due to the bringing of marginal lands under cultivation due to the high intensity of population. This

¹⁶ Government of Kerala (1974)

study is important in understanding the fact that the high intensity of population necessitates an extensification of cultivation but it failed to explain the dynamics of population in the extensification of agricultural land use.

Kannan and Pushpagadhan (1988) have compared the land use pattern of two periods, such as from 1960 to 1974-75 and 1975-76 to 1985-86, and found out that the net area sown which accounted for about 52 per cent of the total geographical area during the 60's increased to 57 per cent by mid 70's. According to them, this increase has largely been attained by a reduction in land under miscellaneous tree crops and total fallow land. However, in the second period the net area sown has registered a marginal decline to 56 percent. But this marginal decline conceals a much greater increase in total fallow which is compensated by a decrease in land under miscellaneous tree crops. Since, the prime objective of their paper was on agriculture stagnation, the study focused mainly on the growth rates of output and its components, yield and acreage of food and non-food crops. Here, the attention given to land use has been put only as a background for analyzing agriculture stagnation. Therefore, the study explained more on agriculture stagnation rather than on agriculture land use and agriculture extensification.

A similar work at the Center for Management Development (1990) also noted the extensification of agriculture mainly in terms of net sown area. According to them the period 1980-86 registered an annual compound growth of 0.17 percentage in net area sown. Though these studies are important in understanding extensification of agriculture, the perception of extensification was narrow and in fact it was confined to the analysis in terms of net area sown and the relationship between other categories of land use such as fallow land, land under miscellaneous tree crops etc. These studies have not taken into account the extensification of agriculture to forest areas which is also an important aspect in states agriculture.

Is there any other way of extensification?

Does this not include forest area brought under cultivation?

In spite of the studies which have dealt extensification of agricultural land use in terms of net area sown, there are also studies which had a wider perspective regarding land use. These studies have analyzed the changes in land use together with the determinants of such a change.

The role of population in the extensification of agricultural land use was brought about by many studies. Tharakan (1976) pointed out that the population pressure in the midlands of Travancore and the resultant migration to the high ranges of Malabar is a significant aspect in the states agriculture, since the migration brought more land under cultivation.

Further, Panikar et.al (1978) found out that the increase in area is preceded by migration to those regions where land was available in plenty for cultivation. According to them, it was the population pressure in the lowlands and midlands that induced the people to migrate to the highlands and the major zones of migration were Idukki and Wayanad. Though the study found out a close correlation between the expansion of area and the migration intensity, it did not probe further as to how this expansion of area was brought about.

While many studies concentrated only on migration to Malabar, Zachariah (1965) noted that while out-migration to Malabar was going on at an accelerated rate, a new front was opened in Idukki district where plenty of forest and surplus land under the control of the planters were available. According to the study, the migrants seems to have taken advantage of the encouragement given by the government for the cultivation of food crops in the waste lands under '*The Grow More Food Campaign*' during the early 50's. Though the study noted that indiscriminate destruction of forest has been one of the adverse effect of migration the study failed to explain the process of migration and the decline in the forest area.

According to Joseph (1986) peasant migration from Travancore to Malabar has not been an unmixed blessing. The study noted that the migrants from Malabar moved to the sub-mountainous regions and encroached and destroyed the forest wealth leading to the ecological imbalance.

But Kunhaman (1982) viewed the process of migration and extensification from a different angle. According to the study, migration apart from influencing the commercialization of agriculture resulted in drastic changes in the socio-economic life of the native community. The study further noted that, all prime lands were occupied by the migrants and the native tribals were forced to cultivate on the slopes. The cultivation of tapioca on these marginal slopes was unsustainable and increased the susceptibility to erosion. Though a number of studies noted that the extensification of agricultural land use has taken place in Kerala there are not many which have probed the extensification of agricultural land use by way of deforestation. Although there are studies concentrating on migration and extensification of agriculture, there are no studies which have analyzed the role of migration in deforestation thereby bringing about an extensification of agricultural land use.

While many of the above cited studies held the view that migration has led to the extensification of agricultural land use, Government of Kerala (1981) found that migration has indirectly stood in the way of extensification of agricultural land use. According to the study, migration, the recurring increase in population, the break up of the joint family system and the prevailing laws of inheritance, all had resulted in the fragmentation of holdings. These fragmented holdings stood in the way for the extensification of agricultural land use. This is because of the fact that the study mainly concentrated on the extensification of agricultural land use in the urban areas. ?

More studies are there which have analyzed the extensification of agriculture land use from quite different angles. Among such studies Government of Kerala (1973) analyzed the relationship between the size of holding and land use pattern and found out that it is a factor in determining land under cultivation. The study further noted that the area under agricultural use tended to decline with an increase in the size of holding while at the same time uncultivated land, fallow land etc., increased with the size of holding. But a similar study conducted by the State Land Use Board in 1985 to find out the reasons for the land being kept fallow found out that 64 per cent of the fallow land were less than 0.20 hectares, which means that the small holdings are not cultivated and is kept fallow. The major reasons for this phenomena are the lack of irrigation facilities, declining soil quality, poor returns, high cost of cultivation etc. This contradicts the findings of the earlier study of Government of Kerala (1973). While these studies explains the relationship between size of holding and land put under various uses, the scope the study is limited with the analyses of size of holding and land use without directly explaining the relative role of various factors in determining the land use pattern. It fails to explain the increase or decrease in the absolute area under various land uses.

Taking into account the peculiarities of agriculture in Kerala, it is also important to see the extensification of agricultural land use in Kerala in terms of the crop specificity. In fact, this has influenced the extensification of agricultural land use as such. It is to be noted that, in Kerala, extension of the cultivation of certain types of crops like rubber coconut (Jeemol, 1981) etc., are taking place. This is very well reflected in the cropping pattern change, a shift from food crops to commercial crops and the predominance of commercial crops in the states agriculture. But this extensification of the specific crops is taking place mostly on the land already under certain use. Therefore, this type

of extensification is of less importance as far as the present study is concerned and review has not been included here.

Objectives of the Study

It has been observed that the forest lands were one of the avenues for the extensification of agricultural land use in Kerala. One of the important factors in bringing about the deforestation is the migration of the people to these areas in search of potentially fertile cultivable land. In other words, the migration of the people to the rural districts has an important role in deforestation. This aims to study the relationship between migration and deforestation in Kerala, with reference to the following objectives.

- (1) To analyze the changes in the land use pattern in Kerala since 1960.
- (2) To study the interaction between inter-district migration and deforestation in the districts of Kerala.
- (3) To analyze the socio-economic characteristics of the migrant population in an area made up of completely deforested land.
- (4) To analyze the nature of interaction between migration and land use change, especially in terms of cropping pattern in a completely deforested village settled by migrant population in Kerala.

METHODOLOGY: Data Source And Analytical Approach

The present study has made use of secondary data as well as primary data. Secondary data were used to analyze the change in land use pattern in Kerala, and Idukki district in particular over a period of time. Since the analysis of land use change required time series data, the data published by Kerala State Land Use Board, State Planning Board and Directorate of Economics and Statistics were used. Due to certain limitations of this data, unpublished data from Center for Earth Science Studies was also utilized in analyzing forest coverage.

Trend analysis was mainly applied to analyze the change in land use pattern of Kerala as well as Idukki district. This was carried out by breaking into two periods, one from 1960-61 to 1974-75 and the other from 1975-76 to 1992-93. This was due to certain difficulties in comparing the data due to the change in the method of data collection with the introduction of the "Establishment of an Agency for Reporting Agricultural Statistics" (EARAS) in 1975-76. We took the time frame starting from 1960-61 to 1993-94 to analyze the land use change in Kerala and the time frame from 1972-73 to 1993-94 to analyze the land use changes in Idukki district as per the availability of data.

Other main source of secondary data was the Census of India 1981 and Census of 1991. Migration Tables of Census of India 1981 was used to analyze the migration details.

In order to capture the relationship between migration and deforestation descriptive statistics were used. After analyzing the secondary data, on migration and deforestation (forest is a major category of land use) Idukki district which ranked first in deforestation and second in inter-district migration was selected for a detailed study. Since our interest was to analyze the extensification of agricultural land use in terms of forest coverage change by way of migration, a village very near to a forest area was selected. The village (a ward has been defined as a village) therefore selected, Pampavalley settlement area, has a large area under forest, also it is situated on the periphery of the Periyar Wild Life Sanctuary and is a protected area now. This is a completely deforested, settlement area where nobody has title over the land and therefore no connections with the revenue village. Descriptive statistics were used to analyze data collected through the primary survey and to establish the relationship between the important variables .

Field Survey Methods

Field level study had to be undertaken after the analysis of the secondary data, in order to obtain a micro level understanding of the land use pattern change and the influence of migration in determining it. Since from the analysis of secondary data it was found that Idukki district had the highest amount of deforestation with considerable migrants from other places, a place in Idukki was selected for a detailed micro level analysis. From the information gathered it was revealed that Pampavalley had a considerable migrant population occupying completely deforested land.

One of the main objectives of undertaking field survey was to gather information on the migration flow and land use changes from informal interviews. A second objective was to test the validity of the relationships observed between migration and land use patterns on a quantitative basis. For this a detailed interview schedule was prepared (Refer Appendix A). The respondent was the eldest member of the family who could provide valuable information on migration and deforestation.

Selection of sample households

There were two important stages in the selection of sample households. Firstly, we defined a ward as a village and listed all the number of households in terms of the year of migration and the land size. From this listing, we have classified the households into the following strata based on the year of migration: a) people who migrated before 1950, b) between 1950-60; c) between 1960-70; d) between 1970-80; e) between 1980-90; f) after 1990. At the second stage, we randomly selected about 17 per cent of the households from each strata. The number of households selected in each strata is given in the table 1.1. Since we have followed a stratified sampling design, all the tables generated are exhibited in terms of the above strata.

Table 1.1 Sampling Distribution of Households		
Year of Migration	Population	Sample
Before 1950	29	5
1950-1960	60	18
1960-1970	68	11
1970-1980	127	21
1980-1990	52	9
After 1990	23	4
Total	405	68

The results of the study are organized as follows: Following this chapter, the second chapter analyses the trends in land use pattern as well as the inter-district migration in Kerala separately. An analysis of the relationship between migration and deforestation is also carried out in chapter 2. Chapter 3 contains a micro level analysis of migration and deforestation in Pampavalley village in Idukki district. Finally, the fourth chapter gives the summary and conclusions of the study.

Chapter II

PATTERNS OF LAND USE AND INTER-DISTRICT MIGRATION IN KERALA

The pattern of land use of a region has a close relationship with the population of that region. The influence of this population in determining the land use may take the form of land use changes resulting from increased population growth rates, density of population, migration etc. These changes may be in the form of conversion of agricultural land for non-agricultural purposes, reduction of waste lands etc.,. But in tropical countries land use changes are also taking place in the form of deforestation. As we had noted in chapter I, Kerala has a sizable tropical forest land and is known for unabated deforestation. In spite of the fact that the forest area has been declared reserved and encroachment is punishable under law, it is a fact that indiscriminate depletion takes place on a large scale.¹ Forests have been cleared both for development activities and for the cultivation of commercial crops. Though there are many studies which have analyzed the factors leading to land use change there are not many studies dealing with the role of population in bringing about rural land use change, especially forest land use change. The main focus of the present chapter is to analyze the role of migration in influencing rural land use pattern. Due to various constraints of the present study, we are taking into account only the relationship between inter-district migration and deforestation in Kerala.

In order to ascertain the land use change in Kerala and the intensity of change in forest land, we have analyzed the land use change in Kerala over a period starting from 1960 to 1994. With the help of secondary sources of data

¹ *Chadhoadhyay (1984)*

we have also tried to capture the interrelationship between migration and deforestation.

Section I

This section analyses the trends as well as the interrelationships among the various land use categories according to the nine way classification of land use. In order to have a broad idea of the pattern of land use change, the percentage share of each land use category to the total geographic area has been taken into account. For the analysis we have divided the whole period 1960-94 into two, period I from 1960-74 and the period II from 1975-94.² The percentage share of each land use category to the total geographical area of Kerala during 1960-61, 1975-76 and 1993-94 is available in the following table 2.1.

Year	F-A	N-A	B-U	P-G	L-M	C-W	F-C	C-F	N-S
1960-61	27.8	5.28	3.90	1.20	5.30	3.70	1.60	1.70	49.50
1975-76	27.8	6.67	2.01	0.51	2.16	1.05	0.59	0.95	56.33
1993-94	27.8	7.90	1.30	0.05	0.90	2.34	0.70	1.30	57.60

Source: G O K Statistics for Planning (Various Issues)

F-A = Forest Area

C-W = Cultivable Waste

N-A = Land Under Non-agriculture Uses

F-C = Fallow Other Than Current Fallow

B-U = Barren and Uncultivable Land

C-F = Current Fallow

P-G = Permanent Pastures and Grazing Land

N-S = Net Area Sown

L-M = Land Under Miscellaneous Tree Crops

² The period wise break is due to the change in the method of data collection with the introduction of the "Establishment of an Agency for Reporting Agricultural Statistics" (EARAS) in 1975-76 (Sivanandan, 1985).

From table 2.1, it is clear that all categories of land use have changed considerably throughout the period from 1960-61 to 1993-94 except the forest area³. In fact, the only two categories which have increased as a percentage of total area are the land put under non-agricultural uses and the net area sown. Other land use categories such as barren and uncultivable land, permanent pastures and grazing land, current fallow etc., have been declining throughout the periods. In the case of cultivable wastes, while the first period showed a decline, in the second period it has started increasing. These changes are negligible not only when compared to the large variations but also when compared to the relative shares of net area sown and land put under non-agriculture uses to the total geographic area.

Although not much could be concluded by merely looking at the percentage share of each land use category, it is possible to establish that land use has undergone changes during the period 1960-94. Figure 2.1 and 2.2 provides a more vivid picture of the percentage change in various land use categories except the area under forest.

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³ Forests includes only actually forested areas, classed or administered as forests under any legal enactment whether state owned or private owned. According to this the area under forests has remained almost the same over the years. This category of land use has been analyzed with the help of an alternative source of data.

Figure 2.1 Percentage of various land use categories in 1960

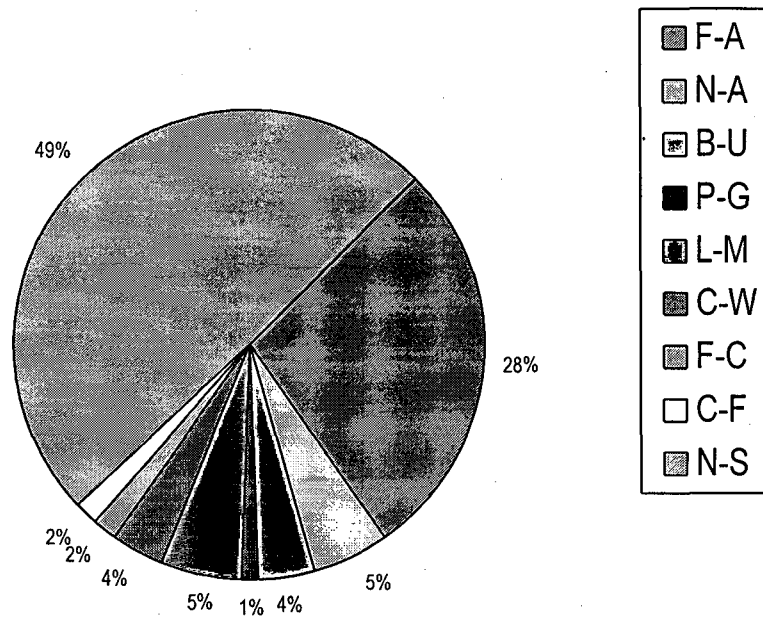
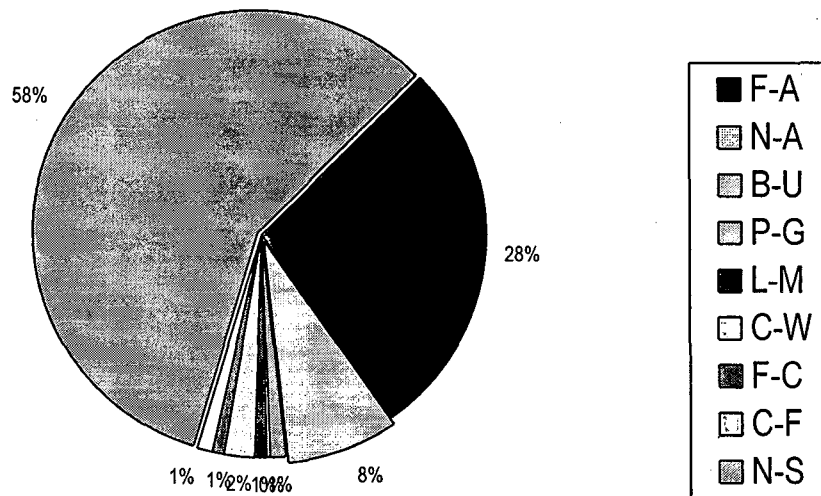


Figure 2.2 Percentage of various land use categories in 1993



To have a very lucid picture of the land use change, a detailed study has been carried out by separately analyzing the growth rates during these two

periods. The method of analysis was to fit trend equations corresponding to these periods. In terms of goodness of fit, and statistical significance, simple semi log equations of the following form were selected for estimating growth rates at the state level⁴.

$$\ln (\text{LUSE}) = \beta_0 + \beta_1 (T) + \varepsilon.$$

Where, LUSE = Area of a particular land use category.

T = Time

ε = Error term

The estimated growth rates for the first and second periods has been given in the table 2.2 (For details refer Table 2.1 and 2.2 of Appendix I) The estimated equation, which shows the rate of growth of 26.8 per cent in the non-agriculture land, during the first period is much higher when compared to the growth rates of other categories. But, it is worth while to note that this trend was not maintained during the second period.

Table 2.2 Growth Rates of land use categories in Kerala during 1960-1994		
Land use category	Period I, 1960-74	Period II, 1975-94
Land under non-agricultural uses	+26.80 *	+0.90*
Barren & Uncultivable	-6.30*	-2.00**
Permanent Pastures & Grazing Land	-3.30*	-12.7*
Land Under Miscellaneous Tree Crops	-5.39*	-5.2*
Cultivable Waste	-5.30*	-1.00
Fallow Other Than Current Fallow	-7.70*	+0.60
Current Fallow	-7.10*	+0.60
Net Area Sown	+2.40	+0.12
* 1% Significant ** 5% Significant Source: Same as Table 2.1		

⁴ In the estimation, the autocorrelation has been tested by using Durbin Watson test and has been corrected it through the iteration procedure as suggested by Cochrane and Orcutt method

During the second period, the growth rate of non-agricultural use is only 0.9 per cent and is negligible when compared to the first period (Refer Table 2.2).

Though, the net area sown show an increase terms of percentage of total area, the growth rates donot show any statistical significance during the two periods. From the table 2.2, it is clear that the growth rate of land under non agriculture uses was very high at 26.80 percent, while the other categories of land except net area sown showed a significant decline. But during the period II, growth rate of land under non agriculture use was only 0.90 percent and the growth rate of cultivable waste , fallow other than current fallow and current fallow and current fallow turned out to be insignificant. It should be noted that, during the second period, though the area under barren and uncultivable, permanent pastures and other grazing land and land under miscellaneous trees continued to decline the sharpest decline was permanent pastures and other grazing land This may mean that during the second period, the increase land under non agriculture use was mainly due to the decline in area under permanent pastures and grazing land.

From the above analysis, it appears that, the most significant changes have taken place in the categories of non-agricultural uses, barren and uncultivable land and also permanent pastures and grazing land. However, among these categories, the non-agricultural use is the most important one, not only in terms of percentage to the total geographical area, but also, in terms of its significant growth rate.

Having identified the categories of land use which has significant growth rates, we now proceed to examine the possible correlation between these categories. Thus, an analysis of the bivariate correlation coefficients among land put under non-agricultural uses, permanent pastures and grazing land and land under miscellaneous tree crops has been carried out because of

their statistically significant rates of growth throughout the periods. The correlation coefficient matrix given in the table 2.3 shows that the non-agricultural land use has a high negative correlation with both permanent pastures and grazing land and also with land under miscellaneous tree crops.

Table 2.3 Correlation Coefficient Matrix of Three Significant Categories of Land Use Change						
	Land put under non-agriculture Uses		And Permanent Pastures Grazing Land		Land Under Miscellaneous Tree Crops	
	1960-1974	1975-1992	1960-1974	1975-1992	1960-1974	1975-1992
Land put under non-agriculture Uses	1.00	1.00	-0.73*	-0.66*	-0.98*	-0.90*
Permanent Pastures And Grazing Land			1.00	1.00	0.63**	0.85*
Land Under Miscellaneous Tree Crops					1.00	1.00
* 1% Significance Level						
** 5% Significance Level						
Source: Source: Same as Table 2.1						

Though it may appear that non-agricultural land has been increasing at the expense of permanent pastures and grazing land, and land under miscellaneous tree crops, this is not a sufficient reason to believe that there is a direct relationship between these two categories. There could be intermediate changes also. However, as far as forests are concerned, the present database is not explaining much, due to its definition rigidity, (Refer footnote 3). Therefore, in order to have proper investigations in the pattern of change of forest land we have used an alternative source of data. This alternative database on forest area used in the study has been compiled by the Centre for Earth Science Studies(CESS) using the satellite imageries. This is an unpublished data. According to this forests includes evergreen forests,

semi evergreen forests, deciduous forests, degraded forests/ scrub land and forest plantations.

Based on this source of data, it is very much evident that the area under forest has declined tremendously over the years. It appears that, of all the categories of land use, it is the forest area that has undergone vast changes during this period. According to the estimates, the area under forest decreased from 36.04 per cent of the total area during 1965 to 11.56 per cent during 1989-90 in Kerala. The change in the percentage area during this period was as high as 24.48. This change was not seen in official statistics due to its definitional problem. Since, the focus of the present study is to see the interaction between migration and deforestation, a detailed district wise analysis has been undertaken. Table 2.4 provides the districtwise information on the extent of deforestation.

District	Natural Vegetation		Deforestation
	1965	1989/90	1965-90
Kasargode	33.13	3.97	29.17
Kannur	30.71	4.38	26.33
Kozhikode	23.75	8.10	15.65
Wayanad	72.70	33.71	38.93
Malappuram	32.54	15.21	17.32
Palakkad	31.47	10.04	21.43
Thrissur	34.79	7.09	27.70
Ernakulam	16.37	1.83	14.54
Kottayam	15.52	0.36	15.16
Idukki	64.59	22.56	42.34
Pathanamthitta	36.34	21.35	14.99
Kollam	38.98	12.48	26.50
Thiruvananthapuram	36.32	5.70	30.61
Kerala	36.04	11.56	24.48

Source: CESS

88.05 (3)
 35.74 (4)
 65.87
 53.53
 53.23
 68.10
 77.62
 88.82 (2)
 97.68 (1)
 65.55
 41.25 (1)
 67.95
 84.28 (5)
 67.72

From the data available, natural vegetation cover is highest in Wayanad district during 1989-90 with about 33.77 per cent followed by Idukki and Pathanamthitta districts with 22.26 per cent and 21.35 per cent of the total

area respectively. The only district which has no natural vegetation cover is Alapuzha. However, for the present study, the extent of forest cover decline is more important than the forest coverage at present. The extent of deforestation is being captured by comparing the area under forest during 1965 and 1989-90.

District wise analysis shows that deforestation in some districts is higher than the state average of 24.48 per cent during the period 1965 to 1989-90. Wayanad district had the largest area, of about 72.70 per cent under forest in 1965 followed by Idukki district with 64.59 per cent of the total area. But when we compare this with the area under forest during 1989-90, Idukki district ranks first in the extent of deforestation with a decline of about 42.34 per cent. The deforestation in Wayanad district is also quite high with about 38.93 per cent, followed by Kasargode and Thrissur districts with about 29.17 per cent and 27.70 per cent respectively.

Thus, from the analysis in this section, it can be concluded that, significant changes in land use have taken place in Kerala. Analysis based on the official sources of data reveals that statistically significant land use changes have taken place only in land under non-agricultural uses, barren and uncultivable land, permanent pastures and grazing land. At the same time, an analysis of the data on forests also establishes that, the area under forests has declined tremendously during the period 1965 to 1989-90. Among the districts, Idukki and Wayanad showed the largest extent of deforestation. Thus, in this section we have identified the districts which topped in the extent of deforestation. Since the focus of the study is to see the interaction between deforestation and inter-district migration, an analysis of inter-district migration is being carried out in the next section. In the following section, the interaction of these two is also analyzed.

Section II

The movement of people, due to whatever reason it may be, has a pronounced influence both on the place of origin as well as the place of destination. Even though there are different streams of migration, the present study examines only the interaction between inter-district migration and the extent of deforestation in the districts of Kerala. As a prelude to that, a detailed analysis of inter-district migration is carried out. Inter-district migration has been analyzed in terms of out migration from each district, in migration to each district and also in terms of the proportion of migrants to total population in each district. This information is presented in table 2.5.

District	Out migrants as a percentage to total migrants	In migrants as a percentage to total migrants	Migrants as a percentage to total population
Kannur	2.79	10.45	7.22
Wayanad	0.78	8.43	29.45
Kozhikode	5.07	7.59	6.49
Malappuram	6.34	6.84	5.51
Palakkad	5.26	7.24	6.85
Thrissur	7.35	6.99	5.55
Ernakulam	12.62	9.31	7.58
Idukki	4.54	13.89	27.66
Kottayam	25.86	7.22	8.24
Alappuzha	14.73	7.91	6.51
Kollam	9.28	8.95	6.16
Thiruvananthapuram	5.38	4.62	3.44
Pathanamthitta	NA	NA	NA
Kasargode	NA	NA	NA

Source: Census of India 1981

Inter-district out-migration⁵ was highest from Kottayam district accounting for about 25.86 per cent of the total migrants, followed by Alapuzha, Ernakulam and Kollam districts accounting for 14.73 per cent, 12.62 and 9.28

⁵ *Out migrants are those who were born in a particular district but migrated to some other district.*

per cent respectively. Districts of Kozhikode, Malappuram, Palakkad, Thrissur and Thiruvananthapuram showed moderate migration ranging between 5 and 7 per cent, whereas it was, as low as, 4.54 per cent from Idukki, 2.79 per cent from Kannur and a mere 0.78 percent from Wayanad. These figures shows that out migration was highest from Kottayam district followed by Alapuzha and Ernakulam districts. The districts with least out migrants were Wayanad, Kannur and Idukki.

Again, out of the total migrants, majority were enumerated in Idukki, Kannur, Ernakulam, and Wayanad districts accounting for 13.86 per cent, 10.45 per cent, 9.93 per cent and 8.42 per cent respectively. Thus, in-migration⁶ was highest in Idukki district. However, to have a clear picture of the intensity of migration, the percentage of migrants to total population in the districts is calculated.

From the analysis of data, it was found that, the districts of Wayanad and Idukki had the highest intensity of in-migration. Out of the total population in Wayanad 29.46 per cent was in migrants and in Idukki it was 27.66 per cent. Although, the percentage of migrants enumerated in Kannur and Ernakulam districts were also very high, their percentages to total population were very low. A comparison of the relationship between migration and deforestation has been made to trace the relationship between the two. In order to make the comparison of deforestation and migration more easy, districtwise details are presented in table 2.6 and the figure 2.3 depicts this relationship clearly.

⁶ *In-migrants are those who were born in some other district but enumerated in a present district.*

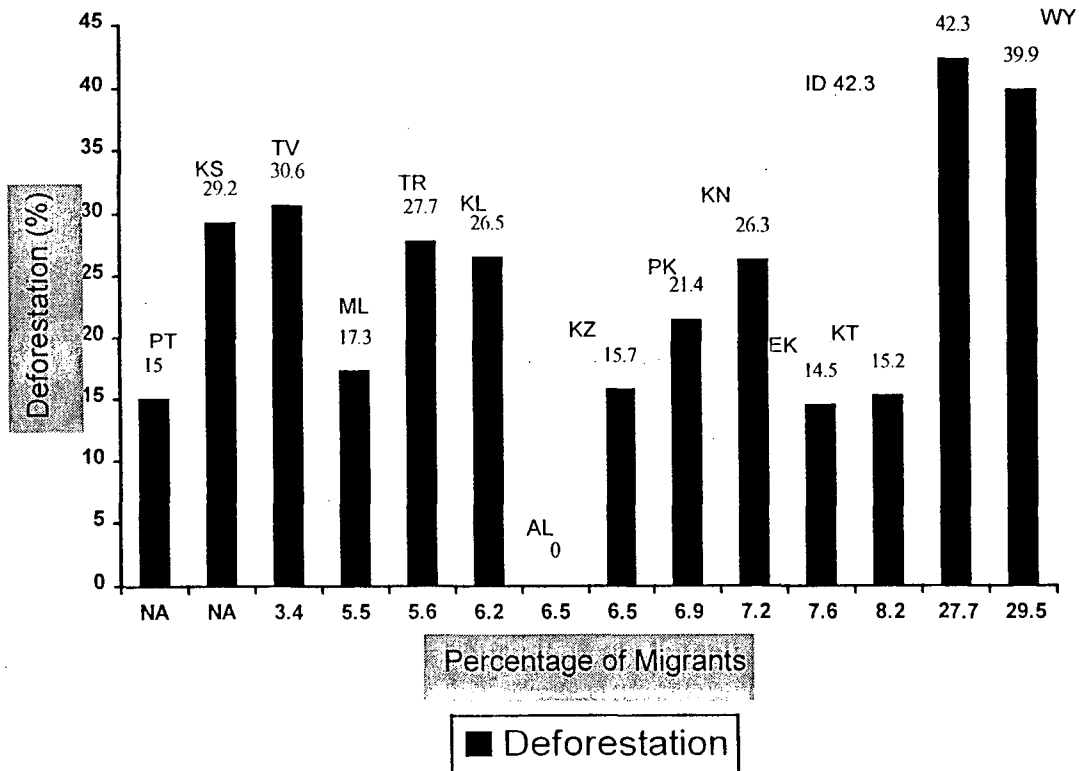
relevance of this comparison is questionable.

In migrants as a % of total pop. is more relevant.

District	Deforestation (percentage decline in forest)	Migrants as a percentage to total population
	Between 1965 & 1989-90	As per 1981 Census
Kasargode	29.17 4	NA
Kannur	26.33 57	7.22 5
Kozhikode	15.65 11	6.49 7
Wayanad	38.93 2	29.45 1
Malappuram	17.32 10	5.51 9
Palakkad	21.43 9	6.85 6
Thrissur	27.70 5	5.55 10
Ernakulam	14.54 13	7.58 4
Kottayam	15.16 12	8.24 3
Idukki	42.34 1	27.66 2
Pathanamthitta	14.99 14	NA
Kollam	26.50 6	6.16 8
Thiruvananthapuram	30.61 3	3.44 11
Kerala	24.48 8	

Source: Reproduced from table 2.4 and 2.5

Figure 2.3 Deforestation and Migration at District level



NA= Data not available

An important point to be noted is that, deforestation is very high in Idukki and Wayanad districts with a decline of 42.34 per cent and 38.93 per cent respectively. Also, these are the very districts which have large proportions of migrants to total population. In Wayanad it was 29.46 per cent and in Idukki it is 27.66 per cent of the total population. But, there are some districts like Thiruvananthapuram and Thrissur where deforestation is very high and the proportion of migrants to total population is very low. In Thiruvananthapuram district the proportion of migrant population is only 3.44 per cent of the total population whereas deforestation is as high as 30.61 per cent. Like wise, in Thrissur the depletion of forest is 27.70 per cent and the percentage of migrants to total population is only about 5.55 per cent. Thus, from the analysis it is possible to categorize these four districts into two categories based on the relationship between migration and deforestation. Idukki and Wayanad comprises one set, showing a positive relationship while Thiruvananthapuram and Thrissur do not show any such relationship comprises the second category. This necessitated an analysis of the nature of these districts. The comparative figures of rural-urban population reveals the nature of these districts. When we take into account the percentage of urban population to total population, Thiruvananthapuram and Thrissur districts shows an urban nature with 25.29 and 21.12 percentages respectively. When compared to other districts the percentage of rural population is very low in Thiruvananthapuram, Thrissur and Kannur districts.(Refer Table 2.7). Also, Thrissur district stands second in the number of towns with 25 towns according to the Census of India 1981. The reason cited for the higher number of towns in this district is the higher concentration of non-agricultural activities. The other two districts Wayanad and Idukki are rural in nature. While the percentage of urban population to total population is 4.60 per cent in Idukki, it is totally absent in Wayanad.⁷ Thus, the comparison of migration and deforestation in the districts indicates that, the extent of deforestation is

⁷ *Census of India (1981) Series 10*

District	Percentage of district rural population to total district population	Percentage of district urban population to total district population
Kannur	76.57	23.43
Wayanad	100.00	0.00
Kozhikode	72.80	27.21
Malappuram	92.60	7.40
Palakkad	89.88	10.12
Thrissur	78.88	21.12
Ernakulam	60.42	39.58
Idukki	95.40	4.60
Kottayam	90.54	9.47
Alapuzha	84.05	15.94
Kollam	86.82	13.12
Thiruvananthapuram	74.70	25.29
Kerala	81.22	18.79

Source: Census of India 1981 Series 10 Kerala

very high in rural districts with considerable number of migrants. From the analysis we conclude that migration to rural districts have close relationship with deforestation. These are the very districts where the percentage of migrants to total population highest. Although it is possible to establish that migration to the rural districts of Kerala has lead to deforestation, the dynamics of both could not be captured using the secondary data. The relationship between migration and deforestation is not a static one and to trace the dynamics, a detailed field investigation was carried out in Idukki district which ranked first in the extent of deforestation. For a better understanding of the phenomena a brief profile of Idukki district is presented below.

it is not done!

A Profile of Idukki District

The high range district of Idukki in Kerala state lies between $9^{\circ} 16'$ and $10^{\circ} 22'$ north latitude and $76^{\circ} 37'$ and $77^{\circ} 25'$ east longitude. This district was formed on 26th January 1972 with the taluks of Devikulam, Udumbanchola and Peerumedu from the then Kottayam district and the greater part of

Thodupuzha taluk of the then Ernakulam district. Except a part of Thodupuzha taluk which lies in the midland region, the district lies entirely in the highland region of the state.⁸

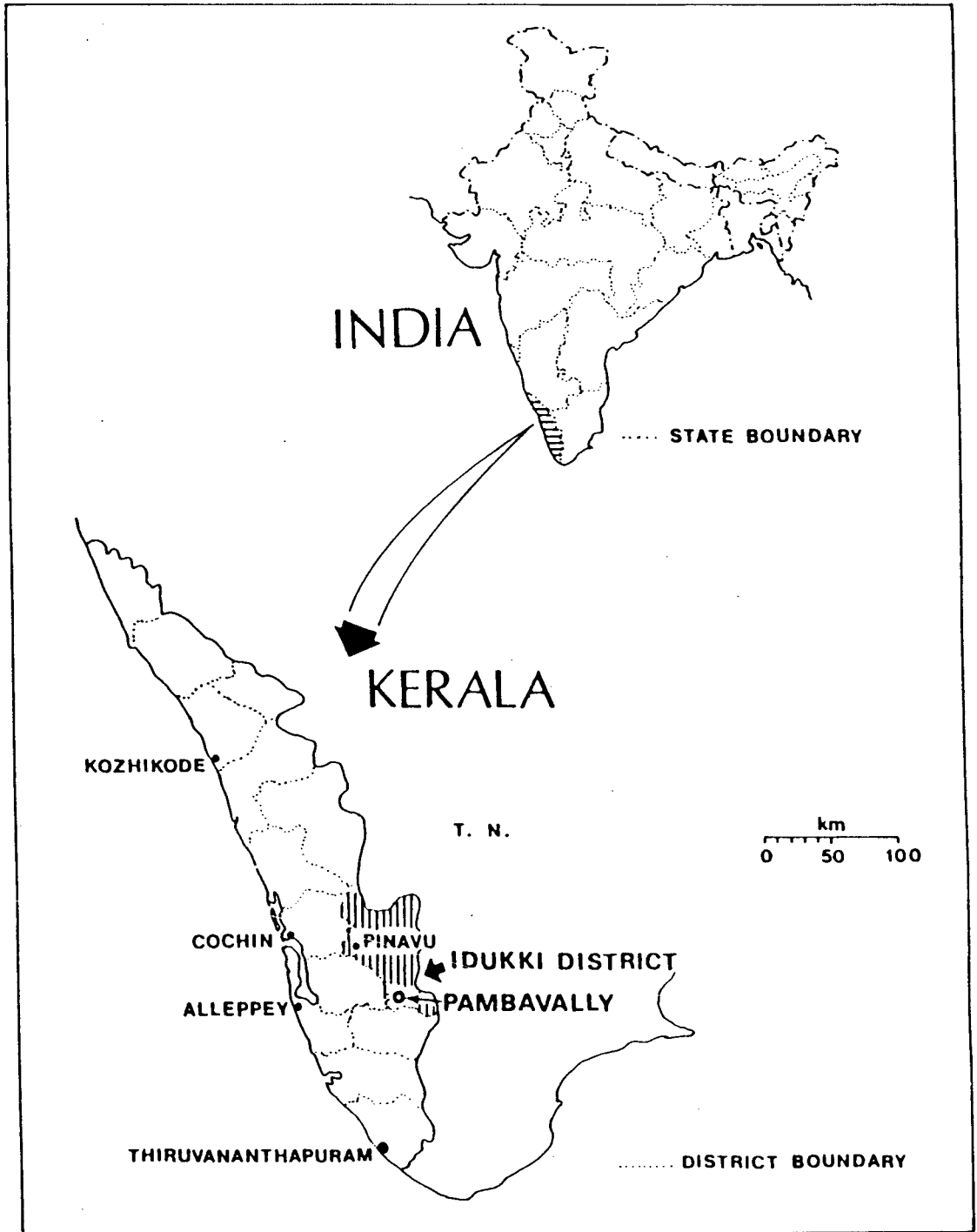
Idukki district is bounded on the north by Mukundapuram taluk of Thrissur district of Kerala state and Pollachi and Udumalpet taluk of Coimbatore District of Tamil Nadu on the east by Kodaikanal and Uthumapalayam taluks of Madurai District and Srivilliputhur taluk of Ramanathapuram District of Tamil Nadu on the South by Pathanamthitta taluk of Kollam district and on the west by Kanjirapally and Meenachil taluks of Kottayam district and, Kothamangalam and Kunnathunadu taluks of Ernakulam districts.⁹

The geographical characteristics of the district are unique and the topography undulating. It has the highest peak south of Himalayas. Above all, a major portion of the district lies in the mountainous tract of western ghats with high hills and deep valleys.

This is the largest district in the state with an area of about 5,061 sq. km constituting 13 per cent of the total area of the state. A demographic profile of the district is drawn from the Census of India 1991. As per the census, the population of the district is 10.78 lakhs and in terms of population it is the third smallest in the state, the other small districts are Wayanad and Kasargode. The exponential growth rate of population is estimated to be 1.06 per cent and is lower than the state growth rate of 1.34 per cent. The density of population contradicts the situation existing in the state. With a low growth rate of population, the density of population is also very low. According to the 1991 census, the density of population is as low as 215 persons per square kilometer and it is the lowest in the state. In contrast to

⁸ *Government of Kerala (1984) Land Use Plan for Idukki District.*

⁹ *Census of India 1981 Idukki District Census Handbook*



this, the density of population of the state is as high as 749 persons per square kilometer.

Moreover, the sex ratio of the district brings out the social backwardness of the district. The sex ratio of the district is 975 females per thousand males and is much lower than the state level of 1034. In fact, Idukki district has the second lowest sex ratio in the state. The proportion of SC and ST population in the district is about 14.3 and 4.7 percentages respectively. The very low percentage of urban population of about 4.7 per cent to total population reveals the rural nature of the district.

However, with regard to literacy rate, the district is not backward. The literacy rate of 86.9 per cent is very near to the state level of 89.8 per cent. Regarding male and female literacy, the district follows the state pattern and there is not much disparity in the literacy rates of males and females. Another important point to be noted is that, the work participation rates in the district are considerably higher than that of the state. The percentage of workers in different sectors indicates that primary sector still dominates the district. The work participation rates and the percentage of workers in different sectors both in the district and the state is given in table 2.8.

District/State	Work participation Rate (main + marginal)			Percentage of workers in different sectors								
				Primary			Secondary			Tertiary		
	M	F	T	M	F	T	M	F	T	M	F	T
Idukki	55.2	23.8	39.7	75.2	82.2	77.1	6.5	2.7	5.5	18.3	15.2	17.5
Kerala	47.6	15.8	31.4	47.8	48.6	48.0	17.1	21.6	18.2	35.0	29.7	33.8

Source: Census of India 1991

The percentage of workers engaged in primary activities is considerably high in Idukki district as compared to the state level. While only 48.0 per cent of

the main workers are in primary sector in the state, in Idukki district it is about 77.1 per cent. Like wise, the percentage of main workers¹⁰ engaged in the secondary sector is as low as 5.5 per cent. The proportion of main workers in tertiary sector is also as low as 17.5 per cent as against 33.8 per cent of the state. Thus, it is all the more evident that Idukki is a backward agricultural district.

Land Use

The data on land use are available for the period beginning with the formation of the district in 1972-73. Data on area under different land use categories at different periods of time are given in table 2.9.

Year	F-A	N-A	B-U	P-G	L-M	C-W	F-C	C-F	N-S
1972-73	59.04	2.70	1.51	0.27	0.38	2.64	0.06	0.69	32.68
1975-76	50.67	2.62	3.30	1.91	3.86	6.56	0.45	0.40	30.32
1993-94	50.67	3.29	2.30	0.12	2.24	4.43	0.16	0.18	36.61

Source: Same as Table 2.1

From the table, we can see that the percentages of various land use categories have changed since the formation of the district. The land under non-agricultural use increased from 2.70 per cent during 1972-73 to 3.29 per cent during 1993-94. The other categories of land use which increased as a percentage of the total area are barren and uncultivable land, land under miscellaneous tree crops, cultivable waste and net area sown. But in terms of growth rates, only cultivable waste and net sown area have shown changes.

¹⁰ Main workers are those who have worked for the major part of the year preceding the census enumeration and the marginal workers are those who have worked any time at all in the year preceding the enumeration but have not worked for the major part of the year (Census of India 1981).

As pointed out earlier, due to the inadequacy of the official sources of data on land under forest, we have examined the forest area using an alternative source of data. The forest area showed a large decline during the period 1965 to 1989-90. Though the extent of deforestation during the period 1975-94 is not captured in the official data, it records a decline of forest area from 59.04 during 1972-73 to 50.67 per cent during 1993-94. This deforestation is mainly due to the development activities that had taken place in the district during this period. According to Menon (1981) deforestation in the state had acquired a new dimension in the sixties and seventies which had largely been cleared for development activities.¹¹ The development activity in Idukki district mainly took the form of construction of a dam which inundated a vast area under forest. Thus, from this it is all the more difficult to reach a definite conclusion regarding the influence of migration on deforestation. As already mentioned, from the migration data also it was not possible to delineate the dynamics of migration on deforestation.

Summary

The analysis of the secondary data in this chapter provides some useful results relevant to the present study. It has been established that the land use in Kerala have undergone tremendous change during the period 1960 to 1994. Though as per the official sources of data on land use, all most all categories has undergone a change, only few categories showed statistically significant growth rates. The correlation coefficients between these land use categories showed that, the non-agriculture land use has an inverse relationship with others, mainly permanent pastures and grazing land, and land under miscellaneous tree crops. The analysis of the alternative data on forest also reveals that, land use has undergone drastic changes. In fact, the extent of deforestation is very high and this has not been captured in the official data. Even though, there are various inadequacies of the data, it is

¹¹ cited in Narayanan (1994) in Pillai P P Ed

possible to establish that, land use changes have undergone changes during the period of our study. But among all the changes, the change in forest area is the most important one, not only in terms of the percentage change, but also, with regard to the percentage share of forest area to total geographic area.

In an effort to capture the dynamics of population change leading to deforestation, we have concentrated on inter-district migration. From this analysis, though it was evident that there is some relationship between inter-district migration and deforestation. At the same time there were some districts where no relation was shown between migration and deforestation. This prompted an investigation regarding certain characteristics such as rural-urban nature of these districts. From the analysis it was seen that districts like Idukki and Wayanad which were rural in nature showed a positive relationship between the two, while the districts which were urban in nature like Thiruvananthapuram and Thrissur did not show any such relationship. This leads us to conclude that migration to the rural districts have a positive relationship on deforestation while there are no such relationship in urban districts. To understand the dynamics of migration and deforestation we have undertaken a field study in a village of Idukki district which has the largest extent of deforestation with fairly high proportion of migrants to total population. The role of migration in deforestation and the subsequent change in land use pattern has been analyzed in chapter 3 using the data collected from field survey.

APENDIX I

Table 2.1 Trends in Various Land use categories from 1960-61 to 1974 -75				
N-A = Land put under non-agriculture use.				
\log_e N-A	=	5.29 (343.51)*	+ 0.268 (t) (16.57)*	+ 0.59p (2.63)** R ² = 0.9884
B-U = Barren and Uncultivable Land				
\log_e B-U	=	5.04 (93.27)*	- 0.063(t) (-11.07)*	+ 0.59p (2.01)*** R ² = 0.9746
P-G = Permanent Pastures and Grazing Land				
\log_e P-G	=	3.73 (32.72)*	- 0.033(t) (-2.82)*	+ 0.73p (3.36)* R ² = 0.8074
L-M = Land under Miscellaneous tree Crops				
\log_e L-M	=	5.44 (56.61)*	- 0.0539 (t) (-6.07)*	+ 0.86p (5.69)* R ² = 0.9741
C-W = Cultivable waste				
\log_e C-W	=	5.01 (135.44)*	- 0.053 (t) (-13.44)*	+ 0.57p (2.00)*** R ² = 0.9820
F-C = Fallow other than Current Fallow				
\log_e F-C	=	4.08 (42.86)*	- 0.077(t) (-7.59)*	+ 0.49p (1.81)*** R ² = 0.9307
C-F = Current Fallow				
\log_e C-F	=	4.10 (17.18)*	- 0.071(t) (-3.11)*	+ 0.81p (4.53)* R ² = 0.8793
N-S = Net area sown				
\log_e N-S	=	7.36 (43.28)*	+ 0.024(t) (1.31)****	+ 0.32p (0.31)**** R ² = 0.30
* 1% Significant				
** 5% Significant				
*** 10 % Significant				
Source: G O K Statistics for Planning (Various issues)				

Table 2.2		Trends in Various Land Use Categories from 1960-61 to 1974 -75	
N-A = Land put under non-agriculture use.			
$\log_e N-A_G$	= 5.38	+ 0.009 (t)	+ e
	(201.68)*	(8.88)*	
			DW = 1.90
			R ² = 0.8314
B-U = Barren and Uncultivable Land			
$\log_e B-U_G$	= 4.74	- 0.02(t)	+ 0.88ρ
	(18.84)*	(-2.10)**	+ (6.80)*
			R ² = 0.8732
P-G = Permanent Pastures and Grazing Land			
$\log_e P-G_G$	= 4.75	- 0.127(t)	+ 0.67ρ
	(10.80)*	(-7.35)*	(3.45)*
			R ² = 0.9452
L-M = Land under Miscellaneous tree Crops			
$\log_e L-M_G$	= 5.21	- 0.052 (t)	+ e
	(106.08)*	(-26.51)*	
			DW = 1.76
			R ² = 0.9777
C-W = Cultivable waste			
$\log_e C-W_G$	= 5.00	- 0.01 (t)	+ 0.88ρ
	(21.54)*	(-1.42)****	(6.25)*
			R ² = 0.8216
F-C = Fallow other than Current Fallow			
$\log_e F-C_G$	= 3.10	+ 0.006(t)	+ 0.57ρ
	(25.31)*	(1.41)****	(2.72)**
			R ² = 0.4314
C-F = Current Fallow			
$\log_e C-F_G$	= 3.60	+ 0.006(t)	+ 0.45ρ
	(33.40)*	(1.46)****	(1.80)***
			R ² = 0.3421
N-S = Net area sown			
$\log_e N-S_G$	= 7.66	+ 0.0012(t)	+ e
	(433.81)*	(1.80)***	
			DW = 1.33
			R ² = 0.1687
* 1% Significant			
** 5% Significant			
*** 10% Significant			
**** Above 10% Significant			
Source: Same as Table 2.1			

CHAPTER III

MIGRATION DYNAMICS AND CHANGE IN LAND USE PATTERN

The size and distribution of human population, population growth and migration are some of the important factors influencing the land use pattern of a region. By his mere presence and the diffusion of his species as well as by his achievements and the changes he has brought on nature, man is a powerful geographic factor¹. While the density of population is an important consideration in the land use pattern, the movement of people from one place to another has impact on both the place of origin as well as the place of destination of the migrants and is important in determining the extensification of land use. However, on account of various constraints of this study, we are confining this analysis to the influence of migration on the land use pattern of an immigrant village where extensification of cultivation has resulted in deforestation. As is indicated earlier, to ascertain the socio-economic characteristics of the migrants and the impact of migration on land use pattern, data on relevant aspects were collected from the Pampavalley village in Idukki district. The rationale for selecting Idukki district and the sampling procedure has been already explained in the previous chapters. It may be recalled that, migrant households in the Pampavalley were classified under five groups according to the period of migration.

Section I: Village Profile

The Pampavalley village, located in Kumily panchayath of Idukki district is located 126 km away from the Kumily Panchayath town in a south west direction. It is bounded on the north-east and north-west by the Periyar Wildlife Sanctuary and south-east by Perunadu panchayath of Ranni taluk of

¹ *Perpillok, (1966)*

Pathanamthitta district and on the south west by Erumely Panchayath of Kanjirapalli taluk of Kottayam district.

The Periyar Wild Life Sanctuary in the vicinity of the village was established in 1934 as Nellikkampetti Reserve, with the proclamation of the Travancore Maharaja². In 1950 the reserve forest was extended to the adjacent forests near Periyar Lake and Sabarimala, and in 1978, the Sanctuary was officially announced as a tiger reserve forest to protect the endangered species of the world. Due to this extension of the Sanctuary, the study area also comes within the boundaries of the forest. Noticeably, the village has no connection with the revenue authorities of the state as none of the villagers have *pattayam*³ over the land. It is an underdeveloped village in terms of infrastructure like roads, schools, banking, electricity and telephone facilities etc. Therefore, the villagers have to depend up on the nearest towns or panchayaths even for schools and hospitals.

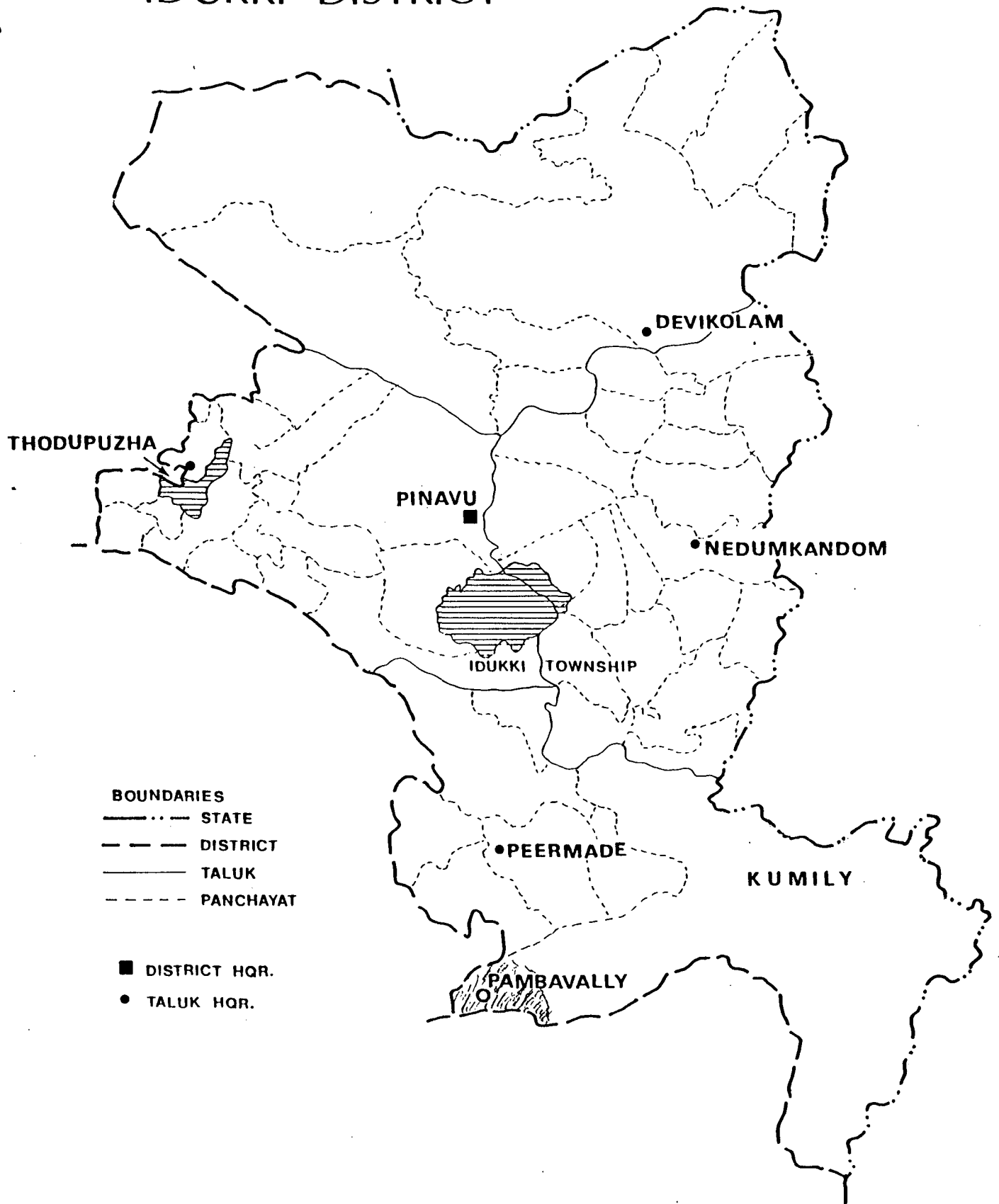
As mentioned earlier Idukki is one of the mountainous districts of the state with considerable number of migrant population from other districts and characterized by unabated deforestation. Pampavalley is a typical migrant village of Idukki district and in order to have a long term perspective of the overall picture of migration and deforestation, a brief history of the village has been traced by conducting informal interviews among the first generation migrants, local leaders and panchayath officials of the village. The history presented here, focuses on the factors underlying migration and the dynamics at different times and how it influenced the land use pattern of the village. A brief account of the findings of the interviews presented below focuses on the period from 1940 to the 1990's.

The first change in land use pattern in the village started in the form of deforestation as a part of extensification of cultivation to the forest area. It has

² *Development Report, Kumily Grama Panchayath 1996*

³ *pattayam is a title over the land*

IDUKKI DISTRICT



been noted that, state policy played a crucial role in the pace and manner of deforestation in Kerala.⁴ This is very much true in the case of the present study village. Deforestation actually started in the study area as a result of certain policies of the government. According to them, the conversion of land from forest to agriculture started, as a part of *Grow More Food Campaign*, to solve the food crisis that emerged soon after the Second World War in the mid 1940's. In the initial stages, through the ex-servicemen rehabilitation scheme, the government allowed those people who had rendered their services in defence forces, to cultivate food grains in the forest land thereby giving them accessibility to forest land. This marked the beginning of the conversion of forest land for agricultural production. But this tempted people from nearby districts to migrate to this area. Thus, it can be seen that, by encroaching on forest land, 'illegal' settlers arrived, along with the 'official' settlers. This is more akin, to the findings of Moench.⁵ The tendency to migrate was further accentuated by the adoption of another policy known as *Kuthakapattam*⁶ by the government in the area during the late 1940's and early 1950's which had actually started in 1941. According to this policy, the government first granted exclusive cultivation rights in state forest areas.⁷ Under these rules up to five acres of land could be distributed to individuals for food cultivation on a short-term lease (*Kuthakapattam*) basis. However, this policy was short lived and there was a fear of expulsion from the land. The policy was suspended in 1953, and finally stopped in 1954 when the government decided not to grant

⁴ Kannan and Pushpangadan (1988)

⁵ Moench (1991)

⁶ *Kuthakapattam is an occupation and not an ownership right. The occupant had to pay rent to the government for the land occupied by them during that period. The occupant paid five para rice as levy. This created a security and a sense of ownership right on the land they occupied. In other words lands held under Kuthakapatam are officially leased by the government at nominal rates and with the clear expectation on the part of the settler that they can be renewed indefinitely. Lease rules do not allow the holders of Kuthakapattam to sell or transfer their occupation and cultivation rights.* (Moench, 1990).

⁷ Chandrasekharan, (1973)

further lands for other purposes.⁸ This acted as a setback and many of the early migrants left their land thereby reducing the intensity of migration in 1960's. Thus, it can be seen that, in the initial stages forest lands were either leased out by the government or encroached by the migrants from nearby districts. This, according to them constitutes the first phase of migration to Pampavalley village. During this period deforestation was mainly by way of extension of food crops.

The second major phase of the migration was strengthened with the introduction of rubber cultivation during the late 1960's and early 1970's. The sole reason reported for the change in cropping pattern from food crops to rubber was that the migrants were attracted by the high profitability of rubber. The stream of migration which regained strength after the introduction of rubber continues at present also. But the pace of migration is different from the earlier one. Thus, it appeared that deforestation in Kerala is rooted in the extension of agriculture for meeting the subsistence need in the initial stages and in the later stages for the commercial purposes in the form of raising plantation crops. The change in cropping pattern with the introduction of rubber seems to have accelerated the process of extensification of agriculture by exploiting natural resources for commercial purposes. Therefore, it is clear from the interviews that the period from 1940's to 1990's can be broadly divided into food crop period (1940 to 1970) and plantation crop period (1970 to 1990). So the developments during these periods have a separable and distinct influence on the land use pattern in terms of change in cropping pattern (A change from food crops to plantation crops).

On the whole, it can be viewed that the extensification of land use to the forest areas was initially for the cultivation of food crops and later on, it was for the cultivation of more profit oriented commercial crops. The main driving force behind deforestation in tropical countries appears to be the demand for

⁸ *Karunakaran (1975)*

agricultural land fueled by the need to feed and employ the growing population as well as the desire to produce highly profitable commercial crops.⁹ This is true in the case of Pampavalley village.

Even though migration played a significant role, the linkage between migration and deforestation does not seem to be a straight forward one. The detailed sample survey carried out in the village depicts clearly the dynamics of migration and deforestation in the village. A profile of the sample village is presented in the following parts of the present chapter.

Socio-economic characteristics of the village

A brief picture of socio-economic conditions prevailing in the village presented here, indicates that Pampavalley is a typical village of Idukki district with considerable migrants from other rural areas of adjacent districts and is made up of a completely deforested area.

Survey results reveal the diverse background of the migrants by year of migration and place of origin. Among the 68 households, 41.18 per cent are early migrants (first generation migrants) and 58.82 per cent are successors of early migrants (second generation migrants). A detailed analysis of the migrants in terms of year and place of migration shows that only 7.35 per cent of the total migrants migrated before 1950. But, later on the flow intensified. The decade of 1950-60 showed a massive flow of 26.47 per cent of the total migrants, comprising 19.12 per cent from the rural areas of Kottayam district like Manimala, Kangirappally etc., and 7.34 per cent from the rural areas of Pathanamthitta district like Ranni, Plachery etc. The flow of migration was reduced during 1960-70 and in fact it declined to 16.17 per cent. This substantiates the earlier argument of reduced flow of migration due to the loss of confidence regarding the right on land during the period which arose from

⁹ Lombardini (1995) in Pearce et.al ed *The causes of tropical deforestation*

the withdrawal of *Kuthakapattam*. But the momentum was regained during the next decade. In 1970-80 the flow of migration increased to 30.88 per cent and encompasses 25 per cent from Kottayam district and 5.88 per cent from Pathanamthitta district. The period 1980-90 and after 1990's shows a tremendous decline of 13.23 per cent and 5.88 per cent respectively in the migration flow.

Table 3.1 : Migrant Status* of the Households in Percentages by Year of Migration.

Year	Kottayam		Pathanamthitta		Idukki		Total		
	Early Migrants	Successor of Migrants	Early Migrants	Successor of Migrants	Early Migrants	Successors of Early Migrant	Early Migrants	Successors of Early Migrant	Total Migrants
Before 1950	0.00	5.88	0.00	0.00	0.00	1.47	0.00	7.35	7.35
1950-60	8.82	10.29	5.88	1.47	0.00	0.00	14.70	11.76	26.46
1960-70	1.47	13.23	0.00	1.47	0.00	0.00	1.47	14.70	14.70
1970-80	11.76	13.23	5.88	0.00	0.00	0.00	17.64	13.23	13.23
1980-90	2.94	7.35	0.00	0.00	1.47	1.47	4.41	8.82	8.82
After 1990	2.94	2.94	0.00	0.00	0.00	0.00	2.94	2.94	5.88
Sub Total	27.94	52.94	11.76	2.94	1.47	2.94	41.18	58.82	100
Total	80.88		14.70		4.41		100		

Source : Computed from primary survey data

* Migrant status of the households is defined in terms of early migrants and successor of migrants. Early migrants, here refer to the first generation of migrants and successor of migrant refers to the second generation of migrants who migrated to Pampavalley.

The above analysis, as is reflected by the flow of migration proves the earlier argument that the initial incentive to take up the cultivation in forest lands on a lease basis was provided by the government and the problem of large scale encroachment, in effect started in the 1940's and was strengthened by the lenient attitude of the government.¹⁰

Composition of religion, of the migrant households reveals that 77.9 per cent are Christians, 17.6 per cent are Hindus, and 4.4 per cent are Muslims. The strata wise analysis also discloses that the proportion of Christians were very high in all strata. In fact, the migration (before 1950's) was also initiated by the Christians.¹¹ In this religious composition, caste and community wise break

¹⁰ Joshi (1987)

¹¹ Tharakan (1978) noted that among the migrants who migrated from Travancore to forest areas in the Western Ghats of Malabar were Syrian Christians from near Kottayam and Thodupuzha.

up reveals that 70.6 per cent of the people are belonging to forward community (FC), 20.6 per cent to other backward communities (OBC), and 8.8 per cent being scheduled castes (SC). It is to be noted that scheduled tribes (ST) are not reported in the sample survey (Refer Appendix II, Table 1).

Year	Hindu	Muslim	Christian	Total
Before 1950	0.00	0.00	7.40	7.40
1950-60	7.35	1.47	17.64	26.50
1960-70	2.94	0.00	13.23	16.20
1970-80	1.47	2.94	26.47	30.90
1980-90	2.94	0.00	10.29	13.20
After 1990	2.94	0.00	2.94	5.90
Total	17.60	4.40	77.9	100

Source : Computed from primary survey data

The evidence of the predominance of Christian community in the area is very much close to the arguments of Jeffrey in 1976, that the Syrian Christian community was concentrated in central Travancore near Kottayam and Chaganachery. By the early 1900 they had occupied many of the lower hills immediately above Kottayam and were planting a wide variety of tree crops. As Plantations grew in the highland regions of Peerumede, Syrian Christian smallholders and estate owners slowly occupied lower areas along the Peerumede-Kottayam Kumily road up towards Mundakkayam.¹² The religious composition of Pampavalley could also be seen as an extension of the earlier phenomena. Moreover, large-scale migration particularly by Syrian Christians occurred in Idukki district due to the opening up of forest lands for cultivation on an emergency basis as a part of food policy during 1940's against the extensive food shortage occurred throughout Travancore.¹³

¹² Jeffrey (1976), p.202

¹³ Shivaswamy, et al, 1945 and Shivaswamy, 1945

The average family size of the household, viz. 4.55 almost reflects the situation existing in the state where the average is 5.3.¹⁴ Among the demographic features, the low sex ratio of the village stands as an indicator of social backwardness of the village. The sex ratio of the village is estimated to be 962 females per 1000 males. This is much lower than the state average ratio of 1034 females per 1000 male as per the 1991 census. But the village follows the same trend of low sex ratio of 975 females per thousand males of Idukki district. A community wise break up explains a high ratio of 1187 females per 1000 males among the scheduled caste (SC) and a low ratio of 875 among the other backward communities (OBC). The sex ratio of forward community stands in between OBC and SC with a ratio of 971 females per 1000 males (Appendix II Table 2).

This high sex ratio among lower classes and low sex ratio among higher classes has some implications on the argument that the sex differential in infant and child mortality is greater among the higher castes and more propertied classes and also in areas where women are less economically active. Moreover, this can also be seen as a reflection of the arguments that the lower groups (whether defined by income or cast) is much fairer in providing medical treatment for the two sexes those who are better -off even though the resources are presumably higher in those groups.¹⁵

However, the village presents a different picture as far as literacy is concerned. Out of the 297 persons in the sample (children below five years of age were not included), only 2.69 per cent reported as illiterates and 12 per cent as functional literates.¹⁶ These functional literates are those who primarily belonged to the older generation and had accrued literacy because of the efforts of various voluntary organizations involved in total literacy

¹⁴ Kerala Statistical Institute (1992).

¹⁵ Basu Alaka Walwade (1989)

¹⁶ Functional Literates are those who could read and write although they did not have any formal education.

campaign four years ago. Not much pronounced difference could be observed between males (50.84 per cent of the total populations) and females (49.16 per cent of the total populations) with regard to educational attainment. It is interesting to note that, there is no gender bias with respect to diffusion and attainment of education in the village. In fact, the percentage of females outstrips the percentage of males in primary as well as secondary education. Moreover, the reported professionals of 0.67 per cent are females. The educational status of the total population is given in table 3.3

Table 3.3, Educational Status of the total population (in percentages) above age five by Sex			
Educational Status	Male	Female	Total
Illiterates	1.35	1.35	2.69
Functional Literates	2.69	1.35	4.04
Lower Primary	8.42	10.44	18.86
Upper Primary	12.12	9.43	21.55
High School	14.14	18.86	33.00
College Education	12.12	7.07	19.19
Professionals	0.00	0.67	0.67
Total	50.84	49.16	100.00
Source : Computed from primary survey data			

Before going into the details of the migrants as they have settled in the village, it would be interesting to have a very brief overview of their history. Out of the total migrants settled in the Pampavalley village, 76.50 per cent own land in their native place and the rest 23.50 did not own any land at all. One important thing that is to be noted is that, the migrants did not own much land in their native place, or it was mostly landless and small farmers who migrated to this area. This is evident from the fact that the average size of land that they owned was as low as 0.19 acres. Moreover, no migrant reported that, neither did they have any job nor did they own land in their native places at present. This may be a sufficient reason for us to conclude that it was the economic pressure which motivated the people to move from their places to a place where land was very cheaply available. Anyhow the later analysis discloses that, the situation of the migrants in terms of land

ownership was much different in the present village than in their native place. It is widely observed that, it is the lack of access to resources that forces the rural poor to migrate to a place where there is increased opportunity for land availability.¹⁷ In short, the analysis of the economic situation of the migrants of Pampavalley village, in their native places, adhere to this general argument.

The size of working population and its distribution in various economic activities provides an understanding of the physical resource base, the system of social organization and the nature of the economy prevailing in the region¹⁸. Of the total sample, nearly 78.47 per cent could be broadly considered as working population, while the dependents (person below 15 years and above 65 years of age) constituted about 21.53 per cent (Refer Appendix II, Table 3). In a predominantly agricultural village like Pampavalley, working population has an important bearing on the economic activity especially land based activities of the households.

Employment and Occupational Structure of the Village.

In an analysis of employment structure and work participation of the people in the village, it was found that the total work participation rate in Pampavalley village was 40.49 per cent which included 24.73 per cent self-employed¹⁹, 2.99 per cent regular employees²⁰ and 12.87 per cent casual labors²¹. A higher percentage of self employment explains how the distribution of working population is related to the physical resource base, land and the nature of the economy prevailing in the village. Moreover, out

¹⁷ See Griffin (1973)

¹⁸ Singh, (1991)

¹⁹ Self employed are defined as those who are working on their own land or land related activities

²⁰ Regular employed are those who are employed in government or similar services on a regular base.

²¹ Casual Labor are defined as those who do not have enough land to live on their own and have to go for wage labor.

of the total population 33.5 per cent were reported as unemployed and 25.48 percent as not in labor force (age group below 15 and above 65). A strata wise analysis shows a decline in the self employment and an increase in the casual labor throughout the migration periods, which stands as indicators of shift in the employment structure due to the non availability of land in the later periods (Refer Table 3.4). In addition to this unemployment is also increasing along with the increase in casual labor. This necessitates a detailed analysis of human pressure on land in order to capture the reason for such a phenomena, which is carried out in the next section of the chapter.

Year	Self Employment	Regular Employment	Casual Labor	Unemployed	Not in labor force
Before 1950	30.67	6.67	0.00	37.33	25.33
1950 - 1960	26.81	4.17	16.02	31.92	21.08
1960 - 1970	28.17	3.03	1.25	35.08	29.24
1970 - 1980	26.79	2.95	12.38	36.00	21.88
1980 - 1990	19.63	0.00	21.67	21.11	37.59
After 1990	0.00	0.00	26.67	46.67	26.67
Entire population	24.73	2.99	12.87	33.5	25.48

Source : Computed from primary survey data

An analysis of occupational structure of a region unfolds its diverse economic, demographic and cultural attributes and provides a background knowledge for formulating plans for its social and economic development²². A disaggregate analysis of the employment status into different occupations, which reflects the occupational structure of the village is given in Table 4 of Appendix II. In the table we have calculated the percentage of each occupational classification to the total population. This table reveals that, around 20.59 percent were engaged in cultivation of crops. The second major category in terms of occupation seems to be the agricultural laborers followed by cattle keepers constituting about 14.65 and 3.13 percentages respectively. In

²² Chandana & Sindu, (1980)

addition to this, quite high percentages (18.74 and 17.51) are engaged in service sector activities like trade, transport and others like hunting, fishing and head load works, etc. It would be appropriate to add at this juncture that, this should not be seen separately because of the linkage of these types of activities with agriculture in the village. This picture of village with regard to the occupational structure as such, leads to the conclusion that Pampavalley can be termed as an agriculture village, where higher proportion of the total population are engaged in agriculture and agriculture related primary activities.

As per the analysis given in this section, the village Pampavalley has an agrarian set up with hundred per cent migrant population. This is an under developed village in terms of infrastructure facilities like roads, schools, banking, telephone, electricity etc. Agriculture is the major economic activity. A noticeable feature in the dynamics of agriculture in the area is the profound change in the cropping pattern that occurred in the 1970's. This aspect has been analyzed at length in the next section of this chapter. There is no industrial activity in the village. The incidence of self-employment and casual labor is very high in the village and still there is an increasing trend in the number of casual laborers. This may be due to the non-availability of more cultivable land and increasing human pressure on the existing cultivable land. This aspect has been analyzed in the next section of this chapter.

Section II

Migration and Change in Land use Pattern.

This section examines how the inter-district, rural migration influenced the changes in the land use pattern as well as the change in cropping pattern of Pampavalley village. In order to explore the relationship between migration and changes in land use pattern, it would be appropriate to start with the distribution of land holdings in the different strata, since the size of land

*What is meant by
land use pattern here?
At the conventional concept is used
and this is
seen in
the section*

holdings is an important factor in the determination of land use. The classification of the land holdings according to the year of migration is given in table 3.5.

The table 3.5 shows five important aspects of land acquisition by the migrants, in different periods of time, such as the averages of land acquired at the time of migration (immediately) and afterwards, as well as the averages of land they acquired totally, the land they lost in course of time and the averages of land they own at present. A strata wise analysis shows the percentage of land owned is very high in the first four strata starting from, before 1950's and extending to 1970-80 while, it is much lower in the later periods. This leads us to the further exploration of some of the dynamics in the acquisition of land. When we take into

Year	Average Land acquired at the time of migration	Average land acquired afterwards	Average land acquired totally	Average land lost	Average land owned presently
Before 1950	1.80 (1.89)	2.10 (0.82)	3.90 (1.38)	1.44 (2.47)	2.46 (1.25)
1950-60	3.59 (3.32)	1.17 (1.89)	5.80 (4.35)	2.43 (1.90)	1.96 (1.83)
1960-70	0.71 (0.69)	2.40 (3.91)	3.10 (4.10)	0.37 (0.65)	2.74 (4.13)
1970-80	0.85 (0.79)	1.70 (1.51)	2.45 (1.78)	0.10 (0.30)	2.39 (1.67)
1980-90	0.40 (0.36)	0.63 (0.61)	1.02 (0.76)	0.06 (0.16)	0.57 (0.59)
After 1990	0.50 (0.24)	0.50 (0.24)	1.00 (0.48)	0.00 (0.00)	0.50 (0.24)
Entire population	1.54 (2.22)	1.75 (2.10)	3.25 (3.36)	0.84 (1.55)	1.99 (2.22)
Figures in the parenthesis shows standard deviation					
Source : Computed from primary survey data					

account the average amount of land the migrants acquired totally, it is highest in the strata 1950-60 at about 5.80 acres, though the average amount of land they own at present is as low as 1.96 acres. This is because the average loss of

land in this strata is very high at 2.43 acres. It was during this period that the government withdrew *Kuthakapattam* and there was fear of eviction from land which also resulted in the reduced flow of migration. Strikingly, the average acquisition of land both at the time of migration and afterwards appears to be much higher in the first three strata, even though the average loss of land is also very high in those strata. Again among these three strata, average land acquired afterwards is very low in the second strata. Though in this strata the average amount of land acquired at the time of migration was very high, since the average amount of land lost was also very high, the average amount of land they own at present is low when compared to the first four strata (Refer Table 3.5). All these indicates the changes in the flow of migration due to the policy changes of the government. This establishes government policy changes was an important factor in determining the acquisition of land. It is also to be noted that among the strata 1960-70 and 1970-80 the acquisition of land at the time of settlement was comparatively low. But the average acquisition of land afterwards was high and as a result they own a considerable amount of land at present. This again reflects the fact that as time passed, the fear of eviction tapered off and the migrants started to acquire as much land as possible. But the later strata could not acquire much land both at the time of migration and sometime after the settlement also. This because of the non-availability of more lands. This is supporting our earlier argument that the increasing incidence of casual labor in the latter periods is due to the non-availability of land. In 1980's and 1990's the average land owned by the migrants in this period is 0.57 acres and 0.50 acres respectively where as it was 2.46, 1.96, 2.74 and 2.39 acres respectively in the first four strata.

A detailed exposition of the strata wise analysis presents, very interesting results which substantiates some of our earlier arguments based on the informal interviews. An important variable, which has a close association with both the migration flow and land use pattern is, the land acquired

immediately at the time of migration. We have already seen that the prospects of acquiring new land was a major driving force of migration. From the table 3.5, it is clearly visible that the average land acquired at the time of migration was highest in the second strata followed by the first strata, that is an average of 3.59 and 1.80 acres respectively. But, a huge decline to an average of 0.71 acres is seen in the strata 1960-70. This again substantiates our earlier argument that the prospect of acquiring land was less during that period, due to the withdrawal of *Kuthakapattam*. The figures of the land additionally acquired by the strata also confirms to this argument. Further, the flow of migration also showed a major setback during the same period as was mentioned in the first section. But it would be misleading to conclude that the migrants who came after 1960's did not acquire any land afterwards. In fact, another interesting point to be noted is that, it was the migrants who came after 1960's who acquired the highest amount of land afterwards, which is also an important aspect in the dynamics of land acquisition. It has to be mentioned, at the outset that the land owned at present can be seen as a totality of the land acquired at the time of migration and the land acquired afterwards after deducting the land lost in due course of time. Though the migrants who came during the period 1950-60 acquired the highest amount of land, it is clear from the table that they could not retain all the acquired land. This may further, substantiate our argument that, because of the policy changes, the people lost the confidence regarding the rights on their land and the fear of expulsion from the land acted as a force drawing them back. But, in the next strata of migrants who migrated during the decade 1960-70, though the average land acquired at the time of migration was very low of 0.71 acres, the average land acquired afterwards was very high and at present also they own the highest amount of land, an average of 2.75 acres. This situation has to be seen as the resultant of a change in the cropping pattern, during that time which has been analyzed in the following section. Even though, the average land acquired immediately by the migrants in the strata 1970-80 was only 0.85 acres, they also acquired a high amount of land

afterwards, that is, about an average of 1.70 acres. Another important thing to be noted is that, they could retain most of the acquired land, the average land lost being 0.95 acres. From the analysis it appeared that the later period migrants could acquire only very little land, which also has resulted in the increased incidence of casual labor.

Leaving aside the amount of land acquired by the migrants, another important variable in the dynamics of land acquisition is the nature of acquisition of land. It can be seen that 45.60 per cent of the households had acquired land and settled immediately, by clearing the forest land themselves. The remaining 54.40 per cent of the households purchased already cleared forest land by others at the time of their settlement. About 94.10 per cent of the total households acquired land afterwards either by clearing forests themselves or by purchasing the forest cleared land from others. Only 5.90 per cent of the households did not add land afterwards. For about 36.80 per cent of the households the nature of acquisition of land both at the time of settlement and afterwards was by way of forest clearance themselves. 4.40 per cent of the households who acquired land at the time of settlement by forest clearance did not acquire land afterwards. But another 4.40 per cent cleared forest themselves at the time of settlement purchased the forest cleared land afterwards. Still another category, comprising of 27.90 percent which purchased the land at the time of settlement additionally acquired land by clearing the forest themselves. The category whose acquisition of land was by way of purchasing forest cleared land, both immediately at the time of settlement and afterwards constitute about 25 percent. Only a meager 1.50 per cent of the households who had purchased the land at the time of settlement did not add to their land afterwards (Refer Table 3.6).

Immediately at the time of migration	Clearing Forest Themselves	Purchase of Forest Cleared Land	Total
Afterwards			
Clearing Forest Themselves	36.80	27.90	64.70
Purchase of Forest Cleared Land	4.40	25.00	29.40
No acquisition	4.40	1.50	5.90
Total	45.60	54.40	100

Source : Computed from primary survey data

A strata wise analysis of the nature of land acquisition confirms the argument that migration to the place has directly resulted in deforestation. This is very much evident from table 3.7.

Year of Migration	Percentage of households who cleared land at the time of settlement	Percentage of households who purchased land at the time of settlement	Percentage of people purchased land in later periods	Percentage of who cleared forest in later periods	Percentage of people sold land after settlement
Before 1950	100.00	0.00	0.00	100.00	40.00
1950-1960	100.00	0.00	5.55	77.78	83.33
1960-1970	36.36	63.63	9.09	90.90	27.27
1970-1980	19.05	80.85	28.27	66.67	9.52
1980-1990	0.00	100.00	100.00	0.00	11.11
After 1990	0.00	100.00	100.00	0.00	0.00

Source: Computed from primary survey data

When we take into account the nature of acquisition of land in each strata to the total number of households in the respective strata, we can see that in the first two strata almost all the households acquired land at the time of settlement by clearing forest themselves. In the first strata the additional acquisition of land was also by way of forest clearance themselves while in the second strata a meager 5.5 per cent of the households purchased land and for another 77.78 additional acquisition was by way of forest clearance, and the rest did not acquire any land afterwards. Again in the third strata out of the

total population in that strata 36.36 per cent of the households acquired land at the time of settlement by forest clearance themselves and the rest 63.63 per cent purchased land from others at the time of their settlement. Additional acquisition by forest clearance was also very high in the strata 1960-70. In the next strata though the acquisition of land at the time of migration was mainly through purchase, 66.67 per cent of the additional acquisition was by way of forest clearance. But in the last two strata acquisition of land both at the time of settlement and afterwards was by way of purchase. It appears that in the later periods, the prospects of land acquisition by way of forest clearance was rather weak. This is also reflected in the reduced flow of migrants in the later periods (Refer Table 3.1). Thus from the analysis it appears that migration to the Pampavalley has resulted in deforestation. The acquisition of land by the first two strata was only by way of forest clearance and the additional acquisition of land in all strata except the last two were by way of forest clearance. In later periods the prospects for forest clearance was low and this is reflected in the nature of land acquisition of the last two strata. The very fact that the nature of acquisition of land by the early migrants was by forest clearance itself shows that migration has resulted in deforestation.

It is also to be noted that out of the total population 30.9 per cent of the people purchased land and another 33.80 per cent of the people sold land in the later periods. This shows that transaction was taking place among the migrants after settlement in the village. From table 3.8 it is clear that the main purchasers of land belonged to the last three strata, while the sellers belonged to the first three strata.

Year of Migration	Percentage of households purchased land after settlement to the total purchasers	Percentage of households sold land after settlement to the total sellers
before 1950	0.00	8.70
1950-1960	4.76	65.21
1960-1970	4.76	13.04
1970-1980	28.57	8.70
1980-1990	42.81	4.34
After 1990	19.47	0.00
Total	100	100

Source: Computed from primary survey data

Human Pressure on land

In order to have an in-depth analysis of the intensity of human pressure on land, we calculated the man-land ratio²³ and the per capita availability of land. The man-land ratio was found to be 0.07 and the per capita availability of land is as high as 0.45 acres which shows that not much pressure on land exists in the village. This is against the situation existing in Kerala.

Year	Average land per person	man - land ratio
Before 1950	0.66	0.04
1950-60	0.45	0.07
1960-70	0.44	0.04
1970-80	0.63	0.05
1980-90	0.13	0.18
After 1990	0.15	0.11
Entire population	0.46	0.07

Source : Computed from primary survey data

When we take into account the per capita availability of land, it is clear from the analysis that, it is highest of about 0.66 acres among the first strata, followed by 1970-80 strata of about 0.63 acres, who had acquired the maximum amount of additional land. In the last two strata, the per capita

²³ man-land ratio is the ratio of population to area.

availability of cultivable land is only 0.13 and 0.15 acres respectively. This can also be considered as an indicator of the inequality in the distribution of land among different strata and the decreasing availability of land during the later periods. For the village as a whole the per capita availability of land is 0.46 acres.

If we take into account the distribution of cultivable land, in terms of the average land owned in acres, it further substantiates the wide disparity in the ownership. For example, it is the spell out two categories who again own the maximum area of cultivable land. In fact, the average area of land owned by the first strata, that is, those who migrated before 1950, is 2.26 acres, whereas it is 2.40 acres in the strata 1960-70. Again it is the last two strata who own the least area of cultivable land, that is, about 0.47 and 0.40 acres respectively. This lack of availability of adequate cultivable land is an important reason for the increasing incidence of casual labor in the later periods. Not many differences among the different strata could be observed, in the allocation of land for miscellaneous purposes, except in the last two strata.

Table 3.10 Distribution of households in percentages by land size (in acres) and by year of migration							
Land size	Before 1950	50-60	60-70	70-80	80-90	After 1990	Total
Marginal <1.00	1.47	7.40	2.90	7.40	10.30	5.90	35.29
Small 1.00-2.50	0.00	10.30	7.40	10.30	2.90	0.00	30.88
Semi-Medium 2.50-5.00	5.88	7.40	4.40	8.80	0.00	0.00	26.47
Medium 5.00-7.50	0.00	1.50	1.50	4.40	0.00	0.00	4.41
large >7.50	0.00	1.47	1.47	0.00	0.00	0.00	2.94
Total	7.35	26.6	16.20	30.90	13.2	5.90	100
Source : Computed from primary survey data							

From the above table 3.10, it is clear that in the village Pampavalley only 7.35 per cent of the households are having medium to large size of holding. The majority of the households, that is 92.64 per cent are having less than 5 acres

of land. As a matter of fact, among these 92.64 per cent, 35.29 per cent are having less than one acre.

Cropping Pattern of the Village

This seems you haven't discussed pattern!

Having analyzed the details about the land acquisition and the pressure on land, we now analyze the cropping pattern of the village. We have already seen, in the earlier sections that the change in cropping pattern was a major factor in influencing the flow of migration. In order to analyze the change in cropping pattern it is very essential to look into the present cropping pattern in relation to the past. For the sake of a better understanding of it, let us begin with the present cropping pattern and compare it with the past cropping pattern.

what is this!

Present cropping pattern

Presently, both mono cropping and mixed cropping is prevailing in the village. Out of the reported households 48.51 per cent of the households were cultivating any of the single crop comprising of tapioca, coconut and rubber. Another 47.04 per cent of the households were doing mixed cropping, one combination being, rubber and coconut and the other combination includes a wide variety of crops like rubber, coconut, arecanut and other perennial trees.

Rubber is the major mono crop being cultivated irrespectively in all the strata. About 42.63 per cent of the sample households are cultivating rubber alone. A strata wise analysis shows that, it is highest of about 11.76 per cent in the strata 1970-80 which is followed by the second strata at about 10.29 per cent. Rubber mono cropping is least in the first strata followed by the last strata.

The second major mono crop is coconut, which is being cultivated by 4.41 per cent of the sample households. Coconut as a mono crop is cultivated only by the first two strata, that is 1.47 per cent and 2.94 per cent respectively. The

third mono crop, tapioca which comprise of only 1.47 per cent is cultivated only by the second strata.

Out of the 47.04 per cent of the households who have mixed cropping only 2.94 per cent are having the combination of rubber and coconut, and the rest 44.10 per cent are having the combination of rubber, coconut, arecanut, and other perennial crops. There are 4.41 per cent of the households who do not have any crop at all.

Cropping pattern change

It is of interest to note that out of the total sample households 44.1 per cent reported a change in their cropping pattern, while for the rest 55.9 per cent the cropping pattern has not changed. As we have noted earlier the change in cropping pattern has a close link with the migration flow to the village. In this section, we shall analyze separately the cropping pattern change and the cropping pattern of the households who have not gone for such a change. First, let us analyze the change in cropping pattern by year of change.

Change in cropping pattern has been analyzed in terms of the crops discontinued and the crops added at different time points. The crops discontinued include rice, tapioca and both. Out of the total households who changed their cropping pattern, 19.98 per cent discontinued rice alone, 36.65 per cent tapioca alone and another 43.33 per cent discontinued cultivation of both rice and tapioca. The crops added are rubber, coconut and both. It is important to note that 98.80 per cent of the households who changed their cropping pattern shifted to rubber alone and a meager 3.20 per cent to both rubber and coconut.

Since the change in cropping pattern has an important bearing on the flow of migration, it is important to note the period of change. The change in cropping pattern began to take place after 1960's (Refer Table 3.11). why?

Crops Year of Change	Crop discontinued			Crop added	
	Rice	Tapioca	Rice and Tapioca	Rubber	Rubber and Coconut
Before 1950	0.00	0.00	0.00	0.00	0.00
50 - 60	0.00	0.00	0.00	0.00	0.00
60 - 70	3.33	6.66	0.00	9.70	0.00
70 - 80	6.66	20.00	33.33	59.00	3.20
80 - 90	6.66	6.66	10.00	21.60	0.00
After 1990	3.33	3.33	0.00	6.50	0.00
Entire Population	19.98	36.65	43.33	96.80	3.20

Source : Computed from primary survey data

Before 1960's the major crops cultivated were rice and tapioca. The period 1960-70 saw the discontinuation of the food crops, rice and tapioca and also the introduction of a major commercial crop, rubber. As had been noted the cropping pattern change began to take place, as early as 1960's and during 1960-70, 3.33 per cent of the households who had changed their cropping pattern discontinued rice cultivation and 6.66 per cent of the households discontinued tapioca cultivation. Rubber was introduced by 9.70 per cent of the households. But the most important period in terms of cropping pattern change was during 1970-80. During this period 6.66, 20.00, 33.33 percentages of the households discontinued rice, tapioca, and both respectively. The reason for such a shift was reported to be the high profitability of rubber when compared to the food crops. Again it was in this period that 59.00 per cent of the households went for rubber cultivation and another 3.20 per cent for mixed cropping of both rubber and coconut. Thus, it is obvious that, this period is very important in terms of cropping pattern change.

The process of crop conversion did not stop at that period, it continued in the later periods also. During 1980-90 about 6.66 per cent each discontinued rice and tapioca and another 10.00 per cent discontinued both rice and tapioca, also at the same time 21.60 per cent of the households added the rubber crop. The intensity of conversion was reduced after 1990. After 1990 also 3.33 per

cent each of the households discontinued rice and tapioca and only 6.50 per cent added rubber. Thus, the period before 1970 can be termed as 'food crop' period and the period after 1970 can be termed as 'commercialized agriculture' or 'plantation' period.

After having analyzed the change in cropping pattern of those households who have changed, it would be of interest to analyze the present cropping pattern of those households who have not changed their crop pattern. It is a noteworthy feature that only 2.60 per cent of such households, belonging to the second strata is cultivating food crop, namely tapioca. Almost 31.57 per cent of the households had cultivated rubber mono-crop followed 7.89 per cent cultivating coconut mono crop. Excluding another 7.89 per cent of the households who do not have any crops, the rest, 47.35 per cent are having mixed crops. Among the mixed cropping households 44.70 per cent are having the combination of rubber, coconut, arecanut and other perennial crops. Here also the rubber cultivation was initiated by the 1960-70 strata which means that rubber was introduced during this period. In addition to 5.26 per cent of the households cultivating rubber, 13.15 per cent of the households are seen to cultivate the second crop mix. In the next strata also 7.89 per cent are cultivating rubber mono-crop and 5.26 per cent rubber and coconut and 15.78 per cent the second crop mix. The rubber mono-crop cultivation is highest in the strata 1980-90. (Refer Table 3.12). Thus from the analysis of the cropping pattern of the village, it appears that there was a major shift in the cropping pattern. The shift was from food crops like rice and tapioca to a more profit oriented commercial crop, namely, rubber. The main shift was during 1970-80, though it started from late 1960's. About 59.00 per cent of the crop shift took place

Table 3.12 Present Cropping pattern of those households who have not changed their cropping pattern by Year of migration.						
Crops	Tapioca (Mono)	Coconut (Mono)	Rubber (Mono)	Rubber and coconut (Mixed)	Rubber, coconut Arecanut and other perennial trees (Mixed)	No Crops
Year of migration						
Before 1950	0.00	2.63	0.00	0.00	0.00	0.00
50 - 60	2.60	5.26	0.00	0.00	5.26	0.00
60 - 70	0.00	0.00	5.26	0.00	13.15	0.00
70 - 80	0.00	0.00	7.89	5.26	15.78	7.89
80 - 90	0.00	0.00	10.52	0.00	10.52	0.00
After 1990	0.00	0.00	7.89	0.00	0.00	0.00
Total	2.60	7.89	31.57	5.26	44.70	7.89
Source : Computed from primary survey data						

during 1970-80. Another interesting result that emerges from the analysis of the cropping pattern is that, mono crop rubber dominates the cropping pattern of the households who had undergone a crop shift, while it is the mixed cropping of rubber coconut, arecanut and other perennial crops that dominates the cropping pattern of the households who had not undergone a crop shift. Thus it appears that the shift in cropping pattern was from food crops to commercial crops and there was no shift from one commercial crop to another.

Summary

The village Pampavalley, presents clearly the interaction of population dynamics, in terms of migration, in the determination of the land use pattern. Analysis of quantitative data proves the information gathered through interviews. Since our focus was on migration to rural areas and the influence of it on land use pattern, we first tried to capture the cause of deforestation in

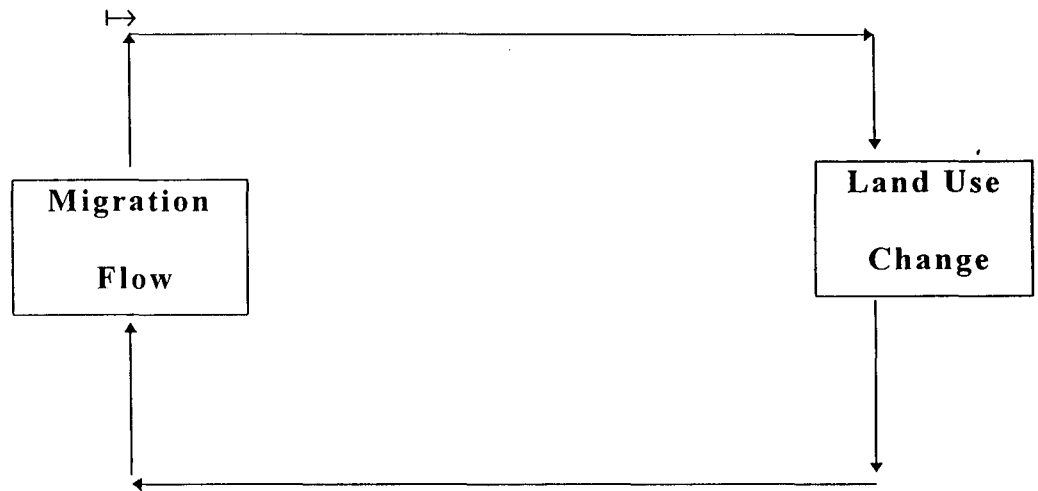
Pampavalley. As presented above, it is the government policy that initiated deforestation. Deforestation started when the government allowed the people who had rendered services in the army to cultivate food grains in the area by clearing the forests, following the scarcity of food immediately after the second world war. Once the forest land was cleared for this purpose, people from far away places were tempted to migrate to this area. Thus what happened is that 'illegal' settlers also arrived with the 'official' settlers. The announcement of *Kuthakapattam* boosted the tendency of the people to migrate to this area. But, as it was the government policy which activated the deforestation in this area, the reversal of the policy also had some distinct impact on migration and thereby deforestation. This is very much evident from the flow of migration streams. In the initial phase, the period before 1950, the migration flow was very slow. But during the next decade there was a massive flow of migrants. It should be remembered that this was a period where a major policy of the government was announced. But during the following period we saw a reversal of the trend which arose from the fear of eviction mainly due to the withdrawal of *Kuthakapattam*. But as time passed confidence was regained and migration once again strengthened. This was coupled with the introduction of rubber as a major commercial crop. These two factors acted as driving force for further migration.

From the analysis of the migrant population it was found that most of the people were from the rural areas of Kottayam district and their religious composition revealed that majority were Christians followed by backward Hindus. The sex ratio of the village is very low, which could be taken as an indicator of the backwardness of the village.

From the analysis, it was clear that, once deforested, that land has undergone further change in terms of the uses to which it is put to. The change was in terms of cropping pattern, the change from food crops to commercial crops. At the same time it should also to be mentioned that there was no change

from one commercial crop to another. More specifically, rubber dominates the cropping pattern of the village.

Another interesting thing to be noted is that, it is difficult to separate the influence of migration in determining land use and the influence of land use, mainly in terms of land availability and cropping pattern in determining the flow of migration. It appears to be a circular flow.



Migration to the place initiated deforestation. Later on, land use change acted as a motivating factor in determining the flow of migration. Thus, one can conclude that once a major change has taken place due to population factor, it is not necessary that this factor alone determines its later uses. This is very much evident from our analysis that, as a reaction to certain government policy measure migration was initiated to the place. In the initial periods, it is the migration which led to the conversion of forest land into agricultural uses. But later on the resultant land use itself came to determined the flow of migration. In other words the migration flow itself came to be determined by the land use or cropping pattern of the area. Thus it is difficult to say that this is a one way interaction process. The interaction between these factors can rather be explained in terms of the aforesaid circular flow.

APPENDIX II

Year	FC	OBC	SC	ST	Total
<50	7.35	0.00	0.00	0.00	7.35
1950-60	16.17	7.35	2.94	0.00	24.50
1960-70	13.32	2.94	0	0.00	16.17
1970-80	22.05	4.41	4.41	0.00	30.90
1980-90	8.82	2.94	1.47	0.00	13.20
>90	2.94	2.94	0.00	0.00	5.90
Total	70.6	20.60	8.82	0.00	100

Source : Computed from primary survey data

Communities	Sex-Ratio
FC	971
OBC	875
SC	1187
Entire population	962

Source : Computed from primary survey data

Age group	Male	Female	Total
0 - 5	1.95	1.29	3.35
5 - 15	7.14	7.46	14.61
15 - 45	32.14	30.19	62.34
45 - 65	8.44	7.79	16.63
>65	1.62	1.94	3.57
Total	51.29	48.7	100

Source : Computed from primary survey data

Year	Cultiva tors	Agricult ural Labors	Cattle keeps	Trade & Commerc e	Service	Domestic	Students	Others
<1950	31.67	0.00	0.00	0.00	6.67	38.33	23.33	0.00
50-60	24.62	2.22	1.11	5.28	3.61	31.01	17.12	15.00
60-70	24.34	1.82	0.00	3.79	3.33	34.88	29.24	2.59
70-80	26.98	0.00	0.00	1.19	4.12	35.01	21.42	11.19
80-90	7.78	22.22	1.85	0.00	5.56	25.55	34.81	2.22
>1990	0	29.16	0.00	0.00	0.00	41.67	29.16	0.00
Entire popula tion	22.15 (20.59)	5.54 (14.65)	0.53 (3.13)	2.37 (8.34)	4.00(10. 40)	33.33 (19.36)	23.92 (21.21)	8.14 (17.51)

Figures in parenthesis are standard deviations

Source : Computed from primary survey data

CHAPTER IV

SUMMARY AND CONCLUSIONS

The fixity in supply and the differential quality of land gives rise to competition among various types of land usage. The strain on the existing agricultural land due to increasing population necessitates either extensification or intensification of agricultural land use in order to meet the demands of the growing population. In developing countries which generally lack technological advancement the major means of augmenting agricultural production is by way of extensification of agricultural land use. In tropical countries this extensification often takes the form internal migration to scarcely populated areas or encroachment to forest areas. It is in this context that the role of internal migration leading to deforestation had been analyzed in the case of Kerala which had a large area under forest subject to unabated deforestation.

In order to understand this relationship the existing land use pattern in Kerala and the changes over the years were analyzed. From the analysis it appears that the land use in Kerala have undergone considerable changes during the period 1960 to 1994. While two categories, namely the land under non-agricultural uses and net area sown have increased their percentage share of the total area. the other categories have registered a decline in their percentage share. To capture the magnitude of change during this period we analyzed the growth rates of the different categories of land use by dividing the whole period into two periods - 1960 to 1974 and the other from 1975 to 1994. The categories which showed significant rates of growth in both periods were land under non-agricultural uses, permanent pastures and grazing land, barren and uncultivable land, and land under miscellaneous tree crops. It should be kept in mind that among these categories only land under non-

agricultural uses showed a significant positive growth rate in both periods. The others were showing declining growth rates. The growth rates of cultivable waste, fallow other than current fallow and current fallow were significant during the first period but turned out to be insignificant during the second period. However, the growth rates of net area sown was insignificant in both the periods. This leads us to the conclusion that there has been great instability in the net area sown. The possible correlation among significant land use categories showed that land under non-agriculture uses had negative correlation between the other categories such as permanent pastures and grazing land and also with land under miscellaneous tree crops.

Since the official estimates of forest area did not capture deforestation, the analysis of forest area was carried out using an alternative source of data which indicated that the area under forest has declined tremendously from 36.04 per cent of the total geographical area in 1965 to 11.56 per cent during 1989-90. But a district wise analysis revealed that there was no uniformity in the rate of deforestation. In fact, some districts like Idukki and Wayanad stood first in the extent of deforestation with a decline of 42.34 per cent and 38.93 per cent respectively, which is much higher than the state average of 24.48 per cent.

The inter-district migration data had been analyzed in terms of the percentage of out migrants from each district, percentage of in-migrants to each district and the percentage of migrants to total population of the district. While out migrants was highest from Kottayam, it was least from Wayanad. On the other hand in-migration was highest to Idukki district. However, for the present study, the percentage of migrants to total population was more important. From the analysis it was found that Wayanad and Idukki district stood first in the percentage of migrants to total population.

A comparison of the migration and deforestation figures brings forth some interesting results. While some districts like Idukki and Wayanad showed a positive relationship between migration and deforestation, there were some districts like Trivandrum, Thrissur and Kollam which did not show any such relationship. The main reason for such phenomena was the differences in the nature of these districts. Idukki and Wayanad were rural districts while the districts which did not show any relationship between migration and deforestation had a much higher ratio of urban population. Thus, it was possible to establish that migration to rural districts has led to deforestation.

As already noted Idukki is the biggest district in the state and the major portion of the district lies in the mountainous tract of western ghats region with deep hills and valleys. As per the Census of India 1991, the population of the district is only 10.78 lakh which is the third lowest in the state. When compared to the state, both the exponential growth rates and the density of population is very low. The sex ratio of the district also contrasts the situation existing in the state. However, regarding literacy the district follows a similar pattern of the state and also, there is no pronounced difference between the literacy rates of males and females. The work participation rates are much higher than the state average, but majority of the main workers are in primary sector which again is a reflection of the rural nature of the district.

An analysis of the land use pattern in Idukki based on official sources of data, revealed that a considerable proportion of land was under forests. The district follows the state pattern of land use in the sense that, only net area sown and land under non-agricultural uses have increased as a percentage to total area over the years. From the analysis of alternative source of forest data, it appeared that the extent of deforestation is the highest in the district with a decline of 42.34 per cent as a percentage to total area during the period 1965 to 1989-90. This deforestation may be also due to various development

activities that was undertaken by the government at different times. A comparison of the migration data showed that the percentage of migrants to total population is the second highest in the state. Therefore, in order to capture the dynamics of migration in deforestation a field study was undertaken in Pampavalley village in Idukki district.

The Pampavalley village had certain peculiar characteristics. It was made up of a completely deforested area and comprised hundred per cent migrant population. The villagers do not own *pattayam* over the land and as a result have no connection with the revenue village. The village is located in Kumily panchayath of Idukki district and falls within the boundaries of the Periyar Wild Life Sanctuary. Pampavalley is an underdeveloped village in terms of infrastructure.

In order to have a long term perspective of the dynamics of migration and deforestation, interviews were conducted among the first generation migrants, local leaders and panchayath officials. From the interviews it was evident that the first land use change in the village took the form of conversion of forest. This was actually a part of extensification of agricultural land use in Kerala. The government had granted cultivation rights to the persons who had rendered their services in defence forces. This was actually a part of government's effort to solve the food crisis that emerged soon after the second world war. But this policy of the government had serious repercussions as far as the forest land was concerned. This resulted in encroachment of forest area by the people from nearby places. Thus what happened was a sort of 'illegal' settlement along with 'official' settlement. It should also be remembered that the tendency to migrate was accelerated by the adoption of another government policy known as *Kuthakapattam* by which the government granted exclusive cultivation rights for individuals to cultivate up to five acres of forest land on short term lease. However, with the withdrawal of this policy in 1954 the tendency to migrate received a set back.

This was due to the fear of expulsion from the land and there was reduced intensity of migration during the 1960's because of this reason. Thus, on the whole we can see that in the initial stages, forest land was either leased out by the government or encroached by the migrants.

From the interviews it was also revealed that there was a second major phase as far as migration to the area is concerned. This was with the change in cropping pattern. Rubber as a commercial crop was introduced during late 1960's and this boosted up the flow of migration again during the 1970's.

Analysis of the data generated by field study revealed that there were two major phases of migration flow, one during 1950-60 and the other during 1970-80. While the migration flow during 1950-60 was in a way related to changes in government policies, the strengthening of migration flow during 1970-80 was mainly due to the change in cropping pattern.

An analysis of the socio-economic characteristics revealed that the majority of the in-migrants to Pamapavalley village were Christians, mainly from Kottayam and Pathanamthitta districts of Kerala state. The economic background of the migrants in their native places indicated that they had only very small landholdings. It was mostly small farmers and landless laborers who migrated to this area. Thus it was the economic pressure that motivated the migrants to migrate to Pampavalley where land was available in plenty.

The Pampavalley village is backward both in terms of infrastructure and social amenities. The low sex ratio of 962 females per thousand males can be considered as an indicator of the social backwardness of the village. It should also be noted that the sex ratio low among the higher castes and high among the lower castes. This is a reflection of the argument that sex difference is

greater among the higher castes and more propertied classes. But with regard to literacy, the village is not backward and follows the state pattern.

An analysis of the employment structure shows that the majority were self-employed and were in land related activities. But a strata wise analysis revealed that self employed were less in the lower strata and there was an increase in the casual laborers. This brings out the shift in the employment structure and non-availability of land in the later period. With regard to occupational structure, about 20.59 per cent were engaged in cultivation of crops followed by another 14.65 per cent agricultural laborers. This in fact reflects the backward agrarian nature of the Pampavalley village.

In an effort to capture the dynamics of migration and deforestation the acquisition of land by the migrants was taken into account. The analysis indicated that most of the migrants acquired land both at the time of migration and also afterwards. The mode of acquisition was either by clearing the forest land themselves or by purchasing the forest cleared land. The average area of land acquired both at the time of migration and afterwards was highest in the first three strata. But the lower strata did not acquire much land and this is reflected in the high incidence of casual laborers in this strata.

The analysis of the dynamics of the acquisition of land, substantiated the information gathered through the interviews. In reality, the prospects of acquiring more land acted as a driving force for migration. It was the migrants of the second strata who acquired the largest amount of land at the time of migration, but it was reverse in the following strata. Even though people who migrated during the period 1950-60 acquired the maximum amount of the land at the time of migration, they could not retain it because of the loss of confidence that arised due to the withdrawal of Kuthakapattam.

Thus, it is possible to conclude that government policy changes was a major factor in influencing the acquisition of land and the flow of migration.

Only 45.60 per cent of the households themselves cleared the forest land, while rest of the settlers at present purchased the forest cleared land. It is also to be noted that about 94.10 per cent of the migrants acquired land additionally afterwards.

9 An analysis of the human pressure on land revealed that the pressure on land in the Pampavalley village is relatively low as compared to the state average. It is also revealed that the per capita availability is comparatively low in the lowest strata. The man-land ratio is also very high in the lower strata, which could also be seen as a cause for the high incidence of casual laborers in the lower strata. The analysis of the data on land ownership revealed that there is great inequality in the distribution of land. It is the migrants of the first three strata who own the majority of the land in the village. It was during this period 1950 to 1970 that land was available in plenty and acquisition was more easy.

The cropping pattern of the village showed that both mono cropping and mixed cropping prevailed in the village. The major crops cultivated in the village were tapioca, rubber, arecanut and coconut. The major mono crop cultivated in all the strata was rubber, followed by coconut. It is interesting to note that the cropping pattern of the village had undergone a change. About 44.1 per cent of the households had shifted from the cultivation of food crops to commercial crops. The change occurred mainly during 1960-70. Actually this change in cropping pattern was a factor that determined the flow of migration during the later periods. This is very well documented in the flow of migration during these periods. The households where cropping pattern remained unchanged were mostly the migrants who migrated after the introduction of the cultivation of rubber. The majority in this group were

cultivating mixed crops including rubber, coconut, arecanut and other perennial crops.

On the whole it was possible to trace the dynamics of migration in deforestation as a part of extensification of cultivation in rural areas. While it was the migration that actually led to the deforestation in the village, the migration into this area was a result of certain policy changes of the government. These various policy changes of the government influenced the flow of migration. The migrants settled in this village, had acquired land either by clearing forests themselves or by purchasing the forest cleared land. The deforested land was used for the cultivation of food crops in the initial period and later on for the cultivation of more profit oriented commercial crops. Thus the migration flow in the later periods came to be determined by the cropping pattern.

It is clear from the present study that the inter-district migration to the rural districts of Kerala had resulted in the deforestation. Here, the extensification of cultivation is synonymous with deforestation. In the initial period migration was the major factor leading to deforestation, but in the later periods migration flow itself came to be determined by the use of this forest converted agricultural land. Thus, it is possible to conclude that the interaction between migration and deforestation is a continuous process and therefore is dynamic.

APPENDIX A
MIGRATION AND LAND USE CHANGE IN IDUKKI DISTRICT
INTERVIEW SCHEDULE

I. IDENTIFICATION OF SAMPLE HOUSEHOLD

Sample No:	Ward No:	House No:
Name of the HF:		
Religion:	Caste/Community:	Settlement Status:

HF: Head of the family. Religion: (1) Hindu (2) Christian (3) Muslim (4) Others. Settlement Status: (1) Original Settler, (2) Successor of original settler, (3) Migrant, (4) Successor of migrant.

II. DETAILS ABOUT FAMILY

SIN	Name	Age	Sex	Ms	Rh	Emp	Occupation	
							Main	Seco
1								
2								
3								
4								
5								
6								
7								
8								
9								

Rh: Relation with head of household (1) Wife, (2) Husband, (3) Son, (4) Daughter, (5) Brother, (6) Sister, (7) Son in law, (8) Daughter in law, (8) Grand son, (9) Grand daughter (10) Others.

Emp: Employment (1) Self-employment, (2) Regular, (3) Casual. (4) Unemployed (5) Not in labour force

Occupation: Main, Seco= Secondary (1) Cultivator (2) Agr. labour, (3) Cattle keep, (4) Trade & Com, (5) Transport, (6) Services, (7) Student, (8) Domestic Work, (9) Others.

ES: (1) illiterate (2) literate (3) Lower Primary (4) Upper Primary (5) High School (6) P D C and D C (7) Professional

III. (1) IF FAMILY STATUS' 3 OR 4 GIVE, THE FOLLOWING DETAILS.

Place of migration	Year of migration	How migrated	Reason for migration

How migrated: (1) alone (2) with friends (3) with family

(Reason for migration: (1) Desire for more land, (2) Pressure on cultivable land in the native place, (3) Availability of cultivable land in plenty in the region, (4) Attracted by the profitability of cash crops, (5) High price of land at native place, (6) Lack of jobs in native place (7) Cheap land in Idukki, (8) Following others or relatives, (6) other reasons.)

(2) Did you settle down immediately after arriving here:

Yes/No

If No, Give the following details

When Settled	Land acquired immediately	Acquired by

Acquired by (1) clearing the forest, (2) purchasing the forest cleared land (3) Free land (govt) (4) Other means (specify)

(3) Did you lost land afterwards. Yes/No

If Yes give the information

Land lost	How lost	Reason for loss	Land additionally acquired	Acquired by	When acquired

Reason for loss (1) sold (2) encroached by others (3) gift to relatives and friends (4) dowry

Acquired by: (1) Clearing the forest, (2) Purchasing forest cleared land, (3) Free land (govt) (4) By other means (specify).

(4) Did any family member own land in the native place: Yes/No

If yes _____ Acres

(5) Do they still own the land: Yes/No

(6) Did any of the migrants have jobs in the native place:

Yes/No. If yes describe jobs

(7) If family status 4, give the following details

Do you know who your ancestor migrant was: Yes/No

If yes, give the following details

Ancestor migrant	Sex	Relation	Year of migration	Place of migration

IV. INFORMATION ON OPERATED LAND

Land Particulars		Irrigated	Unirrigated	Total
A	1. Owned			
	2. Leased In			
	3. Other Possession			
	1. Leased Out			
	2. Alienated			
C	Total Operated Area			

V. LAND UTILIZATION CATEGORY

Category of land use		Specify the previous period	Reason for change, if any
Present	Previous		

(Category of land use: (1) Forest Area, (2) Nonagr. land, (3) Permanent pastures and grazing land, (4) Barren & Uncultivable land Current fallow, (5) Fallow other than current fallow, (6) Cultivable waste, (7) Agricultural land)

(3) Details of land cultivated and cropping pattern

Size of land cultivated by self	Irrigated/ Unirrigated	Crops Grown	Nature of crops

(Nature of crops: (1) Seasonal (2) Annual (3) Perennial (4) Plantation)

(4) Have you converted area from on seasonal/annual crop to

(a) Plantation crops Yes/No

(b) Perennial crops Yes/No

If yes give the following details

Crop discontinued	Crop added	Year of Conversion	Reason for conversion

(5) Have you converted land from one plantation/Perennial crop to another:
Yes/No

If yes give the following details

Crop discontinued	Crop added	Year of conversion	Reason for conversion

(Reasons: (1) Low productivity, (2) Low profitability, (3) High cost of production, (4) High input prices, (5) Lack of irrigation, (6) Following others, (7) Disease of plants, (8) Nonavailability of labour, (9) Others (specify).

VI (1) DETAILS ABOUT NUMBER OF LABOURERS EMPLOYED

No. of labourers hired				No. of family labour employed			
Present		Previous		Present		Previous	
M	F	M	F	M	F	M	F

(Previous means before crop shift)

(2) Is there any family labour surplus as a result of

change in cropping pattern: Yes/No

If, Yes give the following details

(2.1) What is their present status:

(2.2) Does any family member work outside Idukki

Yes/No. If yes,

(2.3) Do they send money on a regular basis: Yes/No

If yes describe frequency and amount.

VII. HOUSEHOLD INDEBTEDNESS.

*(a) Total amount outstanding (Principal + Interest) on the date
of survey Rs.*

*(b) Loans contracted during the half year preceding the date
of survey*

Sl.No.	Source of Borrowing	Date of Borrowing	Amount	Interest Rate p.a.	Purpose of Loan

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