Shijitha M. "Land use pattern in Kerala." Thesis. Research and Post Graduate Department of Economics, St. Thomas' College (Autonomous), Thrissur, University of Calicut, 2021.

CHAPTER V
LAND USE, OWNERSHIP AND CROPPING PATTERN IN PHYSIOLOGICAL ZONES

5.1. Introduction

Land, the fixed factor is a scarce limited resource which has to be properly utilised by the people in order to attain the needs properly. The Utilisation of Land is to be efficiently done by each and every person as it is the responsibility of people to behold a resource which is the basic factor of production upon which everything is built. Since a physical platform is necessary for every economic activity, the Land always plays a vital role in the whole economy. For all the sectors, a common base is land itself upon which the Human beings can build their skyscrapers, make a provision for attaining the necessity of food availability and provide a better environment for the sustainable development of economy. Thus Land is a necessity for every economic activity. The Land is used for a number of purposes which varies according to the person who is utilizing as well as owning the land as a factor of production. The land utilisation depends on the current economic and development situations in the economy – if the economy is moving towards development, it is reflected in the urbanization and a transformation from the agricultural land to land used for non- agricultural purposes. While if it is in the hands of the people who are keeping a deep intimate relation with nature and who acquired the land from their forefathers, they will be utilising it with a due respect to them and to the nature, the mother Earth. The land which is used by the nature loving persons with a respect to forefathers will be intimately attached to the Mother Nature.

5.2. Land Use Pattern

The Land Use Pattern of farmers who possess certain land and engaged in agricultural activities in the Study Area is relevant to know about the categories under which land owned is utilised, to know about whether land is kept as fallow or whether it is properly utilised or not. The main purposes for which the land is utilised by the farmers are for Built-up or Residential Area(BA), Land used for Government Infrastructure(GI), Net Area Sown or the Cultivated land(NAS), Area Sown More than Once(ASMO), Current Fallow(CF)- the land which is kept fallow during the current year, Fallows other than Current Fallow(FOCF) – the land which is kept fallow for more than one year and less than five years, Water Bodies(WB) which is used for irrigation purposes, Utilised Agricultural Area (UAA), Unutilised Agricultural Area(UnAA) and Gross Cropped Area(GCA), which is the summation of NAS and ASMO. The classification of Land Use

Pattern based on the purposes for which Land is used is taken into consideration for the study area which is based on the Physiological Zones and is represented in Table 5.1.

Table 5.1.

Spatial Land Use Pattern in Physiological Zones (Ha)

Physiological-Zones	Lowland		Midland		Highland		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BA	0.015	0.007	0.016	0.006	0.019	0.009	0.017	0.008
GI	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000
NAS	1.883	1.043	1.292	0.475	2.283	1.204	1.807	1.039
ASMO	0.000	0.000	0.356	0.469	0.001	0.146	0.143	0.343
CF	0.000	0.000	0.004	0.026	0.000	0.000	0.002	0.016
FOCF	0.000	0.000	0.002	0.018	0.015	0.073	0.007	0.048
WB	0.000	0.000	0.001	0.003	0.012	0.112	0.005	0.071
UAA	1.50	1.407	1.077	0.737	2.201	1.947	1.612	1.540
UNAA	0.000	0.000	0.006	0.031	0.015	0.073	0.008	0.051
GCA	1.502	1.407	1.077	0.737	2.201	1.947	1.612	1.540

Source – Primary Field Survey

The mean size of land owned as Built-up area in Lowland is 0.015 Hectares while the Net Area Sown is the highest with average size of 1.583 Hectares. In Lowlands, no area is kept as Area Sown More than Once because only mono-crop cultivation can only be preferred after the rainy season with the draining out of excess water from the land. The average size of utilised agricultural area is 1.50 Hectares and the Gross Cropped Area is 1.502 Hectares. While in Midland, Average Built-Up Area is around 0.016 Hectares, Average Net Area Sown is highest with 1.292 Hectares while Area Sown More than Once is 0.356 as the paddy is cultivated twice in an agricultural year. In Highlands, the maximum average size of land owned in Net Area Sown is the highest with 2.283 Hectares. The Utilised and Unutilised Agricultural Area as well as the Gross Cropped Area is High in Highlands. Among the different categories, the Land Owned by farmers is mainly used as Net Area Sown in the Physiological Zones. The standard Deviation measures the variability of Land Use Pattern, greater the variability, greater the Standard Deviation, that is, greater is the magnitude of variability of deviations from the mean size of the land. A small standard deviation, which is a representation of high degree of uniformity as well as homogeneity of the landsize is reflected in Built-up Area in all the three Physiological Zones since the land used for residential purposes in the rural areas is almost similar in size. While considering the Total land owned, land area is almost

uniform in Current Fallows, Fallows other than current fallows, Water Bodies and Unutilised Agricultural Area with a less deviation from Mean size of land. Deviations from Mean land size is very high in Highlands while it is low in Midlands. Net Area Sown is the most important determinant of Land Use Pattern as it is the main purpose for which the rural land owned is utilised.

5.3 Ownership Pattern of farmer households

The best economic benefit for all can usually be accomplished when individuals act in their own self interest – which refers to individual actions and behaviours that provoke positive personal benefits.Individuals own most of the resources available (e.g., labor, land, and capital) and use voluntary decisions, made in their own self-interest, to achieve the greatest personal benefit from marketplace activities and transactions..(Adam Smith, 1776). Ownership of the Land is essential for the utilisation of land resources as owning land creates an inspiration for further economic activities and self interest. A Plot of land was considered as owned by the Household if, permanent heritable possession, with or without the right to transfer the title was vested in the member or members of the Household (NSSO, 70th Round). The Ownership of Land is derived through Mode of Acquisition of Land - Self Acquisition by farmers themselves and Hereditary Acquisition through forefathers as hereditary Property.

Table 5.2

Mode of Land Acquisition by farmers

Type of Land	Self-Acquired Land		Hereditary Property	
	Mean(Hectares)	SD(%)	Mean(Hectares)	SD(%)
Lowland	0.034	0.261	0.963	0.960
Midland	0.031	0.091	0.732	0.394
Highland	0.013	0.060	2.204	1.959
Total	0.025	0.135	1.367	1.49

Source : Primary Field Survey

The study reveals that only 0.034 Average Hectares of Land is owned by self-acquisition while 0.963 Hectares is owned Hereditarily in the Lowlands and the deviation from Mean is high in Lowlands. The Mean size of Self Acquired Land is 0.031 Hectares and 0.732 is Hereditarily acquired while the deviations from Mean reflects a uniformity in the land size in the Self Acquired Land but a little more variation is seen in Hereditary

Land when compared with Self- Acquired land. The Average Self Acquired Land is very low in size in Highlands but the average size as well as variations is too high for hereditarily acquired land in Highlands. Thus in Highlands, the land owned hereditarily is very high comparing to Self- acquired land. But the ownership of land is mainly vested in Male respondents in the selected area creating a gender disparity.

5.3.1 Preferences of Farmers in further utilisation of Land

The study relating to farmers is more relevant by knowing the preferences regarding further investment in land, interest in investment in agriculture and creation of interest by parents. Investment in land by farmers is dependent on the preferences for investment in agriculture and how the interest for agriculture is created in them. Preference of agriculture for land as per the interest created by parents is relevant as majority of the farmers are utilizing the hereditary land provided to them by parents or grandparents. The relationship between the Total Area Owned and preferences for further investment is depicted in Table 5.3.

Table 5.3

Preference of Farmers in further utilisation of Land

Area owned	Interest in further investment in land	Interest in investment in agriculture	Interest created by parents in agriculture
Marginal	56.1	55.5.	74.6
Small	66.1	66.1	92.9
Semi-Medium	92.9	92.9	95.2
Medium	96.6	100	100
Total	67.0	67	83.3

Source: Primary Field Survey

Among the respondents, 67.0 percent interested in further investment in land, 67.0 percent interested to invest in agriculture while 83.3 percent were interested by the influence of creation of interest in agriculture by parents. Majority were interested in agriculture due to the influence of parents. Though only 56.1 percent farmers who hold Marginal land and 66.1 percent who owned Small sized lands are interested in further investment in land, 55.5 and 66.1 percent are interested in further investment in agriculture, 74.6 and 92.9 percent are highly influenced by their parents in involving in agriculture. Among the respondents, 96.6 percent farmers owning Medium sized land in

Highlands are highly interested in further investment in land with, 100 percent interested in further investment in agriculture and 100 percent is influenced by parents in preferring agriculture. The relationship between preferences of farmers in different land sizes owned by farmers is analysed with Chi-Square test and the Hypothesis is given by

H_0: Perception of farmers for further investment in land and Area Owned is independent.

H_1: Perception of farmers for further investment in land and Area Owned is dependent.

The existence of relationship between attributes and Area owned is analysed with the help of statistical method - Chi-square test and testing significance level by comparing the estimated value with the critical value. The relationship between Perception of farmers preferring the attributes in total land owned is given in Table 5.4.

Table 5.4

Perception of farmers preferring the attributes

Attributes	Chi-Square	df	Significance level
Interest in further investment in land	33.525	3	0.000
Creation of interest by parents in agriculture	37.369	3	0.000
Interest for investment in agriculture	23.316	3	0.000

Source : Computed from Primary Field Survey data

The computed Chi-Square value is highly significant with 3 degrees of freedom at the significance level of 5 percent as the p-value is below 0.05, the assumed level of significance. Since the Chi-Square value is significant, the null hypothesis is rejected which gives the clear evidence to conclude that the three attributes such as interest in further investment in land, Creation of interest by parents in agriculture and the interest for investment in agriculture are dependent upon the area owned by farmers. Interest created by parents is an attribute which is relevant in the whole life of a farmer in utilizing the land owned.

5.3.2. Distribution of Land Owned

The land owned may be distributed as fragmented, subdivided or consolidated and Subdivided land refers to the distributed land of an ancestor among his successors, Fragmented land refers to the scattered land owned by an individual in different places while Consolidated land creates an opportunity for efficiency and economy in the agricultural sector by consolidating the scattered land into one compact block in order to

get the benefits of large scale farming. The reason for Subdivision and Fragmentation is also relevant in the study to know about how the land is distributed by farmers in the study area and is represented in Table 5.5.

Table 5.5

Distribution of Land

Area owned	Fragmented	Subdivided	Consolidated	Reason for Sub-division and fragmentation	
				Inheritance	Other Reasons
Marginal	37.0	10.4	52.6	44.5	55.5
Small	46.4	12.5	41.1	53.6	46.4
Semi-Medium	23.8	33.3	42.9	57.1	42.9
Medium	34.5	55.2	10.3	89.7	10.3
Total	36.7	18.3	45.0	52.3	47.7

Source : Primary Field Survey

Among the respondents, 45.0 percent used consolidated land, 36.7 percent used fragmented land while 18.3 percent used subdivided land for cultivation. The Marginal sized land is mainly used as a Compound Block as major portion of the Marginal Land is Lowland and the cultivated area is consolidated by the farmers themselves as an initiative for creating efficient and cost effective agriculture. The agricultural area is cultivated as consolidated farm by Padasekharasamiti in Lowlands and the people are satisfied with the work effort of Padasekharasamiti in Venkitangu Panchayat. Among the respondents, 52.6 percent have consolidated land, while only 10.4 percent have subdivided land and 37.0 percent have fragmented land. While in Medium sized lands, only 10.3 percent of respondents have consolidated land, while 55.2 percent have subdivided land, 34.5 percent have Fragmented land and 89.7 percent of the respondents have subdivided and fragmented land due to inheritance while 55.5 percent of the respondents have the subdivided and fragmented land due to some other reasons like debts, loss or sale of owned plots.

5.4. Regional Differences in Net Area Sown

The physical features such as topography, soil and climates of land may be varying in creating regional differences in land use pattern, especially Net Area Sown which is an important purpose for which land is used by the farmers in selected area. The Socio-Demographic factors such as Age, Social Group, marital status, Gender, Education and

Socio- Economic factors such as Poverty level, Type of family, Years of Experience as farmers, Occupation of Parents, Family Size, Number of Dependents, Earning Members, Number of Farmers within the family are considered as the variables which will have an influence on the land utilised as Net Area Sown and owned by the farmers in the study area. Since a major proportion of Total land owned is utilised as Net Area Sown, Net Area Sown is the most important land use in Land Use Pattern in the study Area.

Table 5.6.

Regional differences in Net Area Sown

Net Area Sown	Lowland		Midland		Highland		Total	
Marginal	30	(50.0)	86	(71.7)	48	(40.0)	164	(54.7)
Small	13	(21.7)	33	(27.5)	16	(13.3)	62	(20.7)
Semi-Medium	11	(18.3)	1	(0.8)	30	(25.0)	42	(14.0)
Medium	6	(10.0)	0	(0.0)	26	(21.7)	32	(10.7)
Total	60	(100)	120	(100)	120	(100)	300	(100)

Source: Primary Field Survey

Among the respondents, 54.7 percent have Marginal Net Area Sown with less than 1 Hectare, 20.7 percent have Small Net Area Sown within 1 to 2 Hectares, 14.0 percent have Semi-Medium Net Area Sown within 2 to 4 Hectares, 10.7 percent owned Medium Net Area Sown with more than 4 Hectares. In Lowlands and Highlands, Medium-sized Net Area Sown is very less compared to Highland while Highlands have a proportional distribution of different land sizes.

Figure 5.1

Regional differences in Net Area Sown
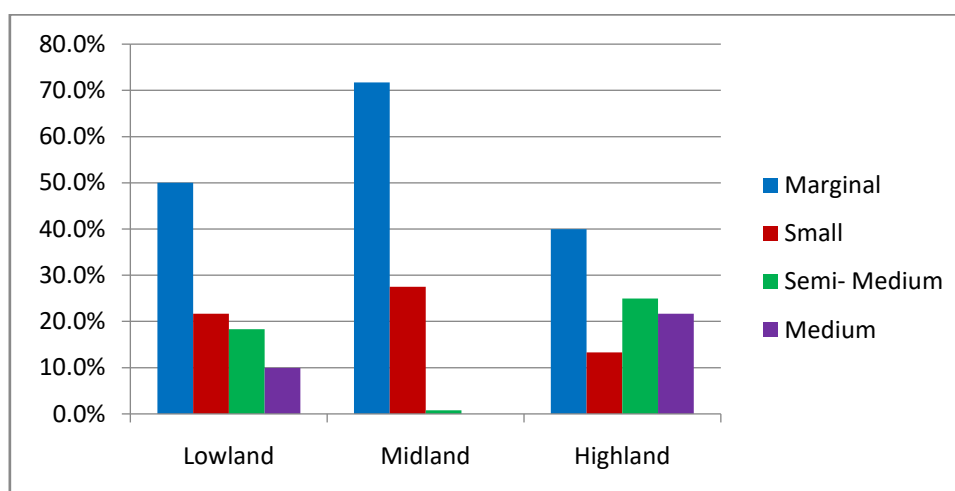
The Medium Net Area Sown which includes the land size with greater than 4 Hectares is cultivated mainly by 21.7 percent respondents from Highlands. In Lowlands, only 10 percent of respondents cultivated in Medium Sized Land while no respondents have Net Area Sown cultivated in Medium Sized Land in Midlands. In Lowlands, 50.0 percent occupied Marginal lands, 21.7 percent occupied Small lands, 18.3 percent cultivated in Semi-Medium lands, 10 percent cultivated in Medium lands, Within Midlands, 71.7 percent cultivated in Marginal lands, 27.5 percent in Small lands, 0.8 percent in Semi-Medium lands and within Highlands, 40.0 percent cultivated in Marginal lands, 13.3 percent in Small lands, 25 percent in Semi-Medium lands and 21.7 percent in Medium lands. From the data, it is evident that in all the Physiological Zones, the size of Net Area Sown is in the descending order from Marginal, Small, Semi-medium, Medium while no farmer owned large sized Net Area Sown in the study area. The benefits of large sized lands may not be available to the farmers in the selected area

5.5. Distribution of Land Possessed

The Land possessed is considered as the summation of Land leased in, Land leased out, Land held by household as encroached land but neither owned or leased in. The 'Leased in' land is the land taken by household on rent or free without any right of permanent or heritable possession. The 'Leased out' land is the land given to others on rent or free by owner of land without surrendering the right of permanent heritable title (NSSO 70th Round, Report on Household Ownership and Operational Holdings in India). The distribution of Land Possessed by the farmers in the study area is represented in Table 5.7.

Table 5.7.

Distribution of Land possessed

Net Area Sown	Area leased in		Area leased out		Area Possessed	
	Mean	SD	Mean	SD	Mean	SD
Marginal	0.037	0.197	0.001	0.016	0.587	0.369
Small	0.143	0.389	0.000	0.000	1.299	0.384
Semi-Medium	0.236	0.689	0.000	0.000	2.729	0.581
Medium	0.329	1.269	0.000	0.000	5.039	1.339
Total	0.118	0.543	0.001	0.012	1.509	1.535

Source: Primary Field Survey

The land is possessed by respondents as a summation of Area leased in and Area leased out as the encroachments do not exist in their opinion. The average size of land held by farmers as Area Leased inand Standard Deviation reflecting deviations from Mean is high compared to the Area leased out. The Mean size of land owned and possessed in the study area is 0.587 Hectares in Marginal lands, 1.299 Hectares in Small lands, 2.729 Hectares in Semi-Medium lands and 5.039 Hectares in Medium lands. But Average land size as well as Standard Deviation of Total land possessed is very high when compared with Land leased in and Land leased out. Area leased in as well as area possessed is high in Medium lands than in other categories of land

5.6. Factors influencing Net Area Sown

The study focuses on identifying the important variables which influence the Net Area Sown of farmers. The important factors influencing the Net Area Sown of farmers are considered as Type of Family (TF), Area of Self-Acquired Land (SAL), Area of Hereditary Property (HP)and Agricultural Income (AI). Net Area Sown is the Dependent variable which has relation with the the other variables. Agricultural income is defined under section 2(1A) of the Income Tax Act, 1961 as "Any rent or revenue derived from land which is situated in India and is used for agricultural purposes". Testing the significance of the regression coefficients with the help of t statistic in the Multiple Regression Analysis will help to identify the dependence between the dependent and the causal variables and decide whether the Hypothesis will be accepted or not. The Hypothesis related to the variables is given as

H_1 :There exists significant relationship between the variables such as Type of Family (TF), Area of Self-Acquired Land (SAL), Area of Hereditary Property (HP),Agricultural Income (AI) and Net Area Sown (NAS) by farmers .

Table 5.8
Significance level of Net Area Sown and Causal Variables

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.	R Square	F
	B	S.Error	Beta				
(Constant)	- 0.096	0.092	---	- 1.046	0.297		
Type of Family	0.182	0.085	0.058	2.144	0.033		
Area of Self Acquired Land	0.790	0.260	0.069	3.040	0.003	0.851	420.915 (0.00)
Area of Hereditary Property	0.864	0.035	0.836	24.503	0.000		
Agricultural Income	0.001	0.000	0.149	4.290	0.000		

a. Dependent Variable : Net Area Sown (Hectares)
b. Predictors: (Constant), Creation of Interest by Parents, Total Area Owned, Agricultural Income

90

The value of R^2 equals 0.851 indicating that 85.1 percent of the variations in Net Area Sown are explained by the causal variables -Type of Family (TF), Area of Self-Acquired Land (SAL), Area of Hereditary Property (HP)and Agricultural Income (AI). Multiple Regression Analysis shows that variables such as Type of Family, Area of Self-Acquired Land, Area of Hereditary Property and Agricultural Income have influenced the Net Area Sown. The Model can be represented as

$$NAS_i = -0.096 + 0.182\ TF + 0.790\ SAL + 0.864\ HP + 0.001\ AI$$

t value = (-1.046)   (2.144)**   (3.040)** (24.503)*   (4.290)*

* Significant at 1 percent
** Significant at 5 percent

The results indicate that the variables - Type of Family, Area of Self-Acquired Land, Area of Hereditary Property,and Agricultural Income positively influence the Net Area Sown. This is evident from the positive signs of the estimated coefficients of the corresponding variables. This means that if Type of Family (TF), Area of Self-Acquired Land (SAL), Area of Hereditary Property (HP)and Agricultural Income (AI) increase, there exists an increase in Net Area Sown. Area of Hereditary Property is found to be most important variable in influencing Net Area Sown followed by Self-Acquired Land, Type of Family and Agricultural Income.The significance of R^2 as tested by F statistic indicates that the regression equation is significant 1 percent level (0.000). The results indicate that Hypothesis of existence of significant relationship between the variables such as Type of Family (TF), Area of Self-Acquired Land (SAL), Area of Hereditary Property (HP)and Agricultural Income (AI) and Net Area Sown (NAS) by farmers holds true.

5.7. Risk adaptation strategies - Cropping Pattern and Crop Combinations in Physiological Zones

Cropping Pattern refers to proportion of area under different crops at a point of time. Cropping Pattern varies in the three Physiological zones such as Lowlands, Midlands and Highlands. The Crop Categories are classified by including Paddy in Cereals, Arecanut, Pepper, Vanilla, Nutmeg in Spices and Condiments, Plantain (Chengalikkodan) in Fresh Fruits, Tapioca in tubers, Cowpea, Bitter Guard, Snake Guard, Ash Guard, Pumpkin in Vegetables, Cholam, Ragi, Gram, Kadala, Vanpayar, Tur, Thina, Chama, Amara, Red Gram, Bajra, Veragu, Muthira, Groundnut, Green Beans in Pulses, Sugarcane in Sugar crops, Coconut and Groundnut in Oilseed and Cocoa, Rubber in

Plantation Crops. Lowlands are very fertile lands bestowed with a network of lagoons, natural lakes, rivers and canals in which paddy and coconut is preferred for cultivation by farmers. Due to the deposits of sediments as a result of natural drainage system, not much expenses is required for adding fertilisers in order to increase the yield. Midlands are irrigated with numerous streams which will help for further production and Highlands slope down from Western Ghats and are used for cultivation of plantation crops.The crop categories cultivated in physiological zones is given in Table 5.9.

Table 5.9

Crop Categories in Physiological Zones (percentage)

| Crop Categories	Lowlands	Midlands	Highlands	Total
Cereals	100	31.0	0	20.6
Spices and Condiments	0	20.5	12.3	14.4
Fresh Fruits	0	15.3	18.3	15.6
Tubers	0	0	2.7	1.4
Vegetables	0	13.4	0.8	5.6
Pulses	0	0	47.5	25.1
Sugar Crops	0	0	0.5	0.3
Oilseeds	0	19.0	15.0	15.3
Plantation Crops	0	0.7	2.7	1.7

Source : Primary Field Survey

The table 5.9 interprets that among the total agricultural production, the proportion of specific agricultural products in ascending order is 25.1 percent is pulses, 20.6 percent is cereals 15.6 percent is Fresh Fruits, 15.3 percent is Oilseeds and 14.4 percent is pepper. It is evident that in the study area, the farmers are mainly concentrating upon the food crops rather than non-food crops and it is an indicator of food security to the whole state. Within Lowlands, 100 percent cultivation is cereals with exclusive paddy cultivation, within Midlands, maximum proportion of Net Area Sown is used for Paddy Cultivation with 31.0 percent , along with Spices and Condiments which occupy 20.5 percent, Oilseeds especially Coconut, Fresh Fruits and Vegetables, while in Highlands, Pulses occupies the first position followed by Fresh Fruits especially plantain, Oilseeds and Spices and Condiments. Plantation crops donot exist in Agali panchayat in Highlands while Kodassery in Highlands concentrates on Pepper and Plantain crops. Land in each and every zone is utilised in the way it is suitable for by preferring paddy cultivation only

in Lowlands, preferring a variety of crops in Midlands and Highlands. In Highlands, farmers adopt different crop diversification strategies by cultivating a large number of crops which vary according to price, yield, cost and profit. The Regional differences in Cropping Pattern and agricultural crops cultivated is given in Figure 5.2

Figure 5.2

Regional Differences in Cropping Pattern
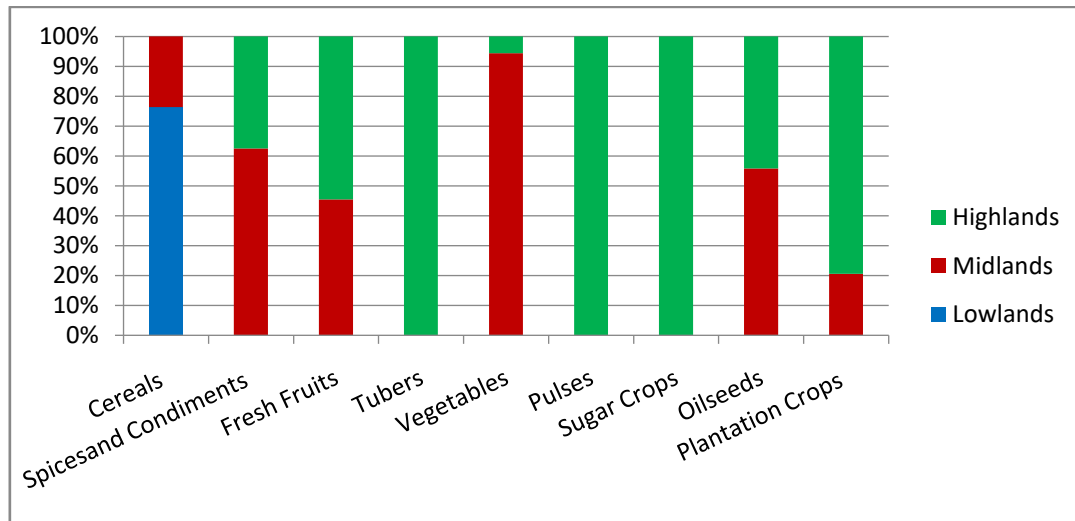
The Figure gives the clear explanation of cultivation of cereals in Lowlands and Midlands, the uniqueness of Sugarcrops, Pulses and Tubers in Highlands, Vegetables, Oilseeds and Spices in Midlands. The Highlands is enriched with the cultivation of different varieties of crops except cereals. About 90 percent of vegetables is produced in Midlands especially Pazhayannur.

Crop Combinations provide a basis for agricultural regionalization as crops are generally grown in Combinations. It is very rare to see a monocrop in isolation in a given areal unit at a given point of time as the farmers in the region may be interested in cultivating more than one crop and most probably the existence of monocrop cultivation may be due to the physiological factors rather than the interest of farmers. In Lowlands of Venkitangu and Kuzhalmannam, Paddy – a Monocrop is preferred for cultivation as the watershed land can be used only for the cultivation of rice as rice requires more wetland for cultivation. The availability of water is necessary for paddy which is naturally available in Lowlands with a natural water drainage and irrigation faciltites with natural manmade canals. The Midlands prefer paddy, vegetables, oilseeds, arecanut, pepper with a combination of about eight varieties of crops while Highlands with Kodassery and Agali

together contribute 25 varieties of agricultural crops which is an agricultural asset to Kerala. Agali has a uniqueness in the production of Pulses and can be called as the Pulse Bowl of Kerala. People of Agali considered Pulses as the staple food which provides sufficient Nutrients and Proteins to the inhabitants especially Tribal people. Crop Combinations provides the information related to the number of crops cultivated in the selected area and reveal whether the crop combinations vary in the physiological zones which is given in Table 5.10.

Table 5.10

Crop Combinations in Study Area

Physio-Zones	Selected Panchayats	All Phases		No:of Crops	Total No:of Crops
		Type	Crops		
Lowland	Venkitangu	S	Paddy (Monocrop)	1	1
Midland	Kuzhalmannam	S	Paddy (Monocrop)	1	1
	Pazhayannur	S	Paddy+Vegetables	2	8
		A	Plantain	1	
		P	Coconut+Arecanut+Pepper, Rubber+Nutmeg	5	
Highland	Kodassery	S	Paddy+Tapioca+Vegetables	3	7
		A	Plantain	1	
		P	Coconut+Rubber+Nutmeg	3	
	Agali	S	Cholam+Ragi+Gram+Kadala+Vanpayar+Tur + Thina+Chama+Amara+Red Gram+ Bajra+Veragu+Muthira+Groundnut +Green Beans	15	20
		A	Plantain+Sugarcane	2	
		P	Coconut+Rubber+ Nutmeg	3	

Source: Primary Field Survey

S – Seasonal Crops, A – Annual Crops, P – Perennial Crops

The Highlands in Physiological Zones takes a very remarkable position in the production of Pulses such as Kodomillets(Veragu), Foxtail Millets (Thina), Amaranthus, Sorghum which are protein rich, nutritious, superfoods, minerals like iron, magnesium, phosphorous and potassium, Eleusine coracana(Ragi),Chama(Panicum Miliaceum). Rice (Summer Rice) is cultivated during Rabi Season , sown in months of September / October and harvested during to January / February. In Venkitangu, only two High Yielding Hybrid Dwarf Varieties of rice – Jyothi and Uma is cultivated which are Hybrid seeds

developed by transferring dwarf genes to high yielding indigeneous varieties of Kerala. In Kuzhalmannam, Paddy – a monocrop with different varieties are cultivated as represented in Table 5.11

Table 5.11.

Varieties of Paddy cultivated in Venkitangu and Kuzhalmannam

Varieties of Paddy	Variety	Duration	Time period
Jyothi	HYV	Short	85-105
Uma	HYV	Medium	115-120
Rohini	HYV	Short	85-105
Ponni	HYV	Medium	140-145
Swetha	HYV	Short	85-105
Matta Thriveni	HYV	Short	85-105
Ponni IR-8	HYV	Medium	115-120

Source : Primary Field Survey

A number of paddy varieties are cultivated in Venkitangu and Kuzhalmannam such as Jyothi, Uma, Rohini, Ponni, Swetha, Matta Thriveni, Ponni IR-8 of which HYV seeds are water and insect resistant, tolerant to salinity are used to attain more productivity. The water and saline resistant High Yielding Dwarf Varieties with Short and Medium Duration for harvesting is used for cultivation in the two panchayats- Venkitangu and Kuzhalmannam. The varieties of paddy cultivation reflects the important role played by farmers in creating food security through availability of cereals for the entire population.

Conclusion :

The Land Use Pattern in the Physiological Zones reflects the relevance of Net Area Sown which is the major purpose for which land is used. The study reveals that the Land is Utilised properly as the Agrcultural Area, the main component is utilised properly without Current Fallows and Uncultivable wastelands. The farmers are playing an important role in the utilisation of land due to their personal interest and interest created by Parents in agricultural activities. The Ownership and Cropping Pattern is also important in the Land Use Pattern. Though a gender disparity exists in the Ownership Pattern, the farmers are utilizing the Agricultural Area as Risk Averters by choosing Crop Combinations which are suitable to the topography of the Physiological Zones.