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CHAPTER II
THEORETICAL FOUNDATION
AND
REVIEW OF LITERATURE

2.1. Introduction

Theories related to Land Use creates a base upon which the particular study can proceed and gives an idea about the thoughts of traditional and modern economists. It provides valid information about the past as well as present circumstances upon which the theory is built.

2.2.Theoretical Foundation

The theories related to the land use will help to identify how the land is utilized in the most appropriate way, how rent arises, the determinants of rent for land and all the issues related to land use. The theories create a specific base for the study as it provides an accurate information about the ideas of prominent economists who focused their studies on land which concentrated mainly on the quality of land and the effort taken by man on it in order to make it more and more productive.

2.2.1. Theories Related to Land Use:

The organisation of farms varies because of differences in physical, economic and cultural factors though they have something in common as well (Mellor, J.W, 1966). The two prominent factor inputs for agricultural production are land and labour and the farmers have an inclination to increase the size of their farm because they can add to their income more than what they will get by applying more labour to the existing farm and the productivity of labour increases.

Rent not only varies with its fertility, whatever its produce, but with its situation, whatever be its fertility and it is a residually determined distributive share in terms of most common agricultural produce of the country and levels of rent vary with intensities of Land Use and that both rent and land use varied with distance. (Adam Smith, 1776).

Rent is “that portion of the produce of the earth which is paid to the Landlord for the use of the original or indestructible powers of the soil”. The definition clarifies that land possesses original permanent powers which are related to the natural ecosystem with a protection of environment. Rent arises from the extensive, intensive cultivation as well as the regionalisation of the existing land. Each increase in population results in increasing demand for land and necessitates cultivation of progressively inferior quality lands (Ricardo, 1817).

2.2.2. Schultz' Theory of Traditional Agriculture:

Traditional agriculture occurs if and only if, the state of art of cultivation remains constant and where the farmers use the same factors of production and same procedure of production that their forefathers were doing. Considering the new factors as well as extended factors as constant or given, the farmers, by their experience, can expect an unchanging pattern of net returns which will encourage production and can attain equilibrium where cost of each factor is equal to marginal returns from each factor. If the art of cultivation and motives and preferences to hold the productive assets remain static, then the disequilibrium, if occurred is only temporary. Any permanent deviation towards disequilibrium cannot make agriculture traditional. If equilibrium is disturbed due to price changes, cost reductions, making changes in the costs or the marginal returns, the particular temporary disequilibrium can be restored after sometime at some other level. With the static art of agriculture, there exists neither misallocation of resources nor the existence of unused resources, especially in agriculture. Since they are utilizing the resources in the proper manner without any misallocation, the farmers can earn their maximum income, but may be a lower or equivalent income when compared with other agriculture progressing countries. The particular concept is called as "Efficient but Poor Hypothesis" by Schultz (Schultz, 1964).

2.2.3. Regional Differences and Impact of Population on Land

The model of agricultural land use zones arranged concentrically around a central city on the basis of certain assumptions such as the existence of Isolated State, which is dominated by a single city which provides the sole market for agricultural commodities, an established system of exchange of agricultural for industrial commodities between rural and urban dwellers, location on an isotropic plain, farmers transport their own goods to market on a dense system of routes which converge on the central city (Von Thunen, 1826). Farmers act so as to maximize profit, automatically adjusting output to fluctuations in market demand which is perfectly competitive. The key concept of land use is economic rent and the basis of marginal productivity theory was explained mathematically by giving rent as $R = Y (P - C) - Y \cdot F \cdot m$; R represents Land rent, Y – Yield per unit of land, C- production expenses per unit of commodity, P- Market price per unit of commodity, F – Freight rate (per agricultural unit, per mile), m – Distance to market.

Society is constantly facing a potential land crisis which arises out of the ability and propensity of the human species to reproduce itself rapidly, and to grow at a geometric rate, while the output of agricultural products can only increase at best, arithmetically (Malthus, 1798). The Malthusian Catastrophe is also relevant as it is a prediction that growing population will soon outpace the planet's production capacity of food.

The area of land which is suitable for cultivation will soon be inadequate to feed the increasing population and if the productivity of land (i.e. intensive cultivation) is doubled, the food crisis could be postponed to 15 years further and if it is quadrupled, the food crisis could be postponed to 20 years further. Thus the crisis can be delayed with the application of High Yielding variety of seeds, chemical fertilisers and pesticides. But population will increase swiftly by exhausting the earth's resources and Malthusian checks will come into operation(Club of Rome,1972).

2.3.Review of Literature

The viewpoints of economist and researchers are categorised on the basis of the themes under which the research study proceeds. The categorisation of literature review is based on the topic of research and the particular objectives on which the study concentrates. Review of Literature is categorized into three as

- Land Use Pattern in Kerala
- Land use and its determinants
- Land Use Dynamics
- Role of Farmers in Agriculture

2.3.1. Land Use Pattern in Kerala

The thoughts of Economists on Land Use is vast and elaborate as the Land is fixed in nature and number of uses for which land is used is more. People demand more and more of the commodity if it is scarce in availability(Alfred Marshall, 1890). Since supply is fixed, higher demand arises and the demand will directly influence price of the commodity. Land has the specific features such as scarcity, high demand, different qualities and so the price of land is also varying due to the factors influencing it. The thoughts and research of economists on Land Use especially the agricultural land use will help to identify the ways and means of utilizing the agricultural land by traditional farmers

and how the farmers at that time cultivated their own land by creating sufficient foodgrains for the existing generation. So the self-sufficiency in food grains production through proper land utilisation without an agricultural crisis is an important objective behind the research activities of the famous economists who studied about the agricultural land use pattern. Not only the food production but also the Non- food production is relevant as substitution is taking place between low valued food crops and high valued non-food crops. Land Utilisation by farmers is dependent upon a number of factors such as Price of the commodity, price of related commodities, income of the farmer, topography of land and irrigation facilities.

Priya et.al (2018) opined that changing land use pattern in Kerala resulted in an increase of area under cultivable waste and a reduction in Net Area Sown as farmers are losing their interest in existing cropping pattern and significant changes occurred in diversification and topographically since coconut and rice can be grown in same condition, the substitutability of coconut for rice is taking place in lowlands.

Deepak Johnson (2018) states that the initial years (1956-75) after formation of Kerala, saw an increase in Net Area Sown and area sown more than once, a reduction in fallow lands and an expansion in cultivation but later it slightly declined as a substitution is taking place from low value crops to high value crops and Kerala attained the first position as the state with the highest per hectare crop income in the country.

Fox A Thomas et.al (2017) analyses that Kerala has a bio- diversity hotspot with a high population density and a long history of complex agricultural land use patterns. The changing land use pattern is mainly due to declining profitability of agriculture in Kerala, labour shortages, unreliable weather, unfamiliar pests and diseases and the Government policies. Agriculture in Kerala is showing a declining trend, other land covers being cleared for roads and new buildings, less diverse agro- forests into paddy wetlands and a reported decrease in the cultivation of 80 percent of Kerala's primary crop species during 2003-2013.

Karunakaran (2013) analyses the trend in growth rates over the period 1960-61 to 2009-10 and the decadal growth rates of area, production and productivity of principal crops of Kerala. A heavy concentration of non – food crops reflects a changing cropping pattern in the agricultural scenario. The predominance of crops which are dependent on world

market conditions and the dominance of perennial crops against annual or seasonal crops are the two main driving forces of changing cropping pattern.

Ahuja, Astha (2006) reveals that agriculture is a state subject according to the entry 14 in List II(State List)of the Seventh Schedule to the Constitution and public investment in agriculture takes place at the level of states and the central government supports the states as catalysts. The Land ownership is a main determinant of Land Use Pattern in Kerala. Before independence, the Zamindari system introduced by Lord Cornwallis exploited the cultivators and land owners lived a luxurious life which led to negative growth in productivity during the British Period.

Kumar B.M. (2005) reveals that agricultural land use changes in Kerala during the past half century were marked by initial increase in total cropped area (26 per cent between 1960 and 1969) followed by dramatic shifts in the coverage of individual crops. Area under Rice production dropped by 6 per cent between 1975 and 2003, while cultivation of coconut, rubber, arecanut and banana plantains increased spectacularly (106, 627, 41 and 96 per cent respectively) between 1955 and 2000. Agricultural expansion coupled with over exploitation of forests has affected the state's forest eco- systems and the primary forests dropped substantially between 1940 and 1970- the average loss of publicly managed forests being 5000 hectares per year.

OmanaCheriyann (2004) opined that area put to non- agricultural purposes increased due to population pressures, area under forest dwindled due to plantation and expansion and rise in cost of cultivation of traditional crops. More land left fallow and used for less labour absorbing crops and overall effect of reduction in wetlands was the reduction of area under paddy.

George et.al (2001) reveals that the location and altitudinal variations in Kerala is endowed with specific and exclusive agro- ecological conditions which distinguishes the state into three distinct elevation zones – lowland, midland and highland regions in which lowland is well known for rice and cocconut cultivation, midland with seasonal, annual and perennial crops and highland with perennial crops.

Sivanandanet.al (1985) investigates the human intervention in the evergreen forests in the high ranges of Kerala, particularly in the Cardomom Hill Reserves. 87% of the region

(Idukki) was covered by forests in 1905, by 1965, the proportion came down to 65% and it again declined to 33.4% by 1973. The large-scale conversion of forest land has affected the micro environment for the agriculture.

Giri (1966) reveals the identification of the variability in land use categories is helpful to create policy measures which will help to recorrect the imbalances and to stimulate changes to the directions which will be effective for the economy. The intense demand for land created a hindrance in the development of land for agricultural purposes and also the extension of land used, towards the forest through direct encroachments. The large increase in net sown area is contributed from utilisation of old fallows and cultivable waste lands which is a direct benefit to the agricultural income of the economy.

2.3.2. Land Use and its Determinants

Anjana et.al (2018) reveals that the share of agricultural income to the state income has been declining and the growth rate in current prices was obviously high due to the price factors and its inflationary trends. The districts in Kerala showed positive growth in agricultural income at current prices but recorded a negative growth at constant prices.

Mugula et.al (2018) depicts that the Adopters of Sustainable Agricultural Practices are found to be better off in terms of profit and yield compared to partial / non – adopters suggesting that the farmers should adopt all the principles of SAPs along with the conventional use of fertilisers and inputs if they are to reap all the benefits to their farms regarding output and price. To make it more profitable, Government should intervene in areas of production such as infrastructures, inputs and extension services to make them accessible to smallholder farmers at affordable price.

Adifya et.al (2018) states that land used for agricultural purposes have to be utilised properly and for that the dubbling technique is introduced currently in Karnataka which represents the sowing of seeds of semi- determinant variety with wider spacing, followed by ripping after 40 to 50 days. The correlation of the dependent variable with the independent variables – yield and farm income is analysed with econometric models and the disembodied techniques are low cost techniques in production.

Udemezue et.al (2018) annotates that The Frontier Model, Conservation Model, Urban Industrial Impact Model, Diffusion Model and High Pay-off Input Model is used to

explain the land use intensification, crops and livestock husbandry, labour intensive cropping system, the production and use of organic manures and labour intensive capital formation, geographic variations, empirical observation of substantial differences in land and labour productivity among farmers and regions and application of modern, high pay off inputs.

Priscilla et.al (2017) compiles that with a surplus production in food availability especially in foodgrains, milk, vegetables and fruits, raises the question of why still there exists poverty and hungry though there existed increasing trend in area, production and productivity in India. The yield effect was higher than area effect in case of foodgrains due to increased use of high yielding varieties, but, in case of vegetables and fruits, the yield effect is higher than area effect.

Misra K Ashok et.al(2016) investigates the factors which will affect an individual's decision to enter farming after and / or while participating in an off-farm employment activity. The farmers in older generation find successors to take over their agricultural operations and it's a long standing traditional practice. The operator's age and educational attainment were significant factors in the decision whether they have to work off-farm prior to enter into farming. But the households including an elder member were more likely to enter farming rather than off- farming work to increase the household income.

Rahman, Sanzidur(2016) revealed that increase in rainfall increased the agricultural land use diversity (ALUD). The equivalent wealth or income from the expected utility is composed of net farm earnings from crop production and initial wealth that is exogenous to the crop choices such as farm capital assets and livestock resources carried over from the earlier periods.

Laxmi et.al(2015) revealed that the main determinants of Land use are land availability, type of land and soil type. In case of agriculture, regional specific cropping patterns are followed by farmers. Agricultural land in Dharwad District is declining due to more exhaustive cultivation of land by using excessive chemical fertilizers. To meet food security, forest land has been converted to agricultural land but the exploitation of forest land is dangerous and Farmers should use organic components in agriculture and can bring back their own land to its original status. Cropping intensity, can be increased by growing two or more crops in the particular area.

Bryngelsson et.al (2014) introduced a Conceptual Partial Equilibrium Model of Global Agricultural Land Use based on Heterogeneous Land Quality and Maximisation of land rent at each parcel through choice of crop and input intensity. Two types of costs – cost per unit area of land used (area dependent cost) which is considered as constant and Cost per unit produced of crop (Harvest Dependent Cost) which is a determinant of Profit Maximisation is considered for the analysis. The paper concludes that the crop with the highest area dependent cost is placed as the most productive land.

Shuhaibu et.al (2014) reveals that the land use pattern is also dependent upon the strategies adopted by farmer households such as adjustment in crop varieties, use of resistant crop varieties, diversification of crops, mixed cropping, off-farm activities to cop up with the climate as well as price induced shocks.

Mohammed et.al(2014) reveals the relationship between land use, land price and land value and the variables which affect them are geographical, environmental, social, urban, demographic and political variables. The variables which are affecting the land use may be soil and subsoil condition, groundwater level, freedom from surface floods, freedom from topographic accident hazards, flat land and neighbouring land use.

Chakir Raja (2013) analyses how the introduction of special effects and individual heterogeneity in an aggregated land use share model affects the predictive accuracy of land use models. The net return to each land use and the distribution of land quality were used as explanatory variables in literature based on land use theory. A land quality index acts as a measure of average quality of land while Density of population is considered as another proxy for urban land use.

Kumar Parveen et.al (2013) analyses the strengths- the largest cultivable land with record foodgrains production, weaknesses with low yields, less value addition and food processing and large amount of post-harvest losses. The opportunities can be strengthened further to augment yield and income of the farming community. The rain-fed agriculture, diversification, organic farming, food processing sectors, agri-clinics and agri-business schemes are the choices which can provide further opportunities for the development of agriculture.

Leonard (2013) reveals that the supply of natural resource is scarce in relation to the demand for them and they can be put to several uses. As the time goes on, the area under forest becomes small and shrinks due to large- scale encroachment on land. Large tracts of forest lands are converted into arable land with a view to feed the multitude of population. The supply of natural resources is small and scanty and their quantum starts shrinking, swiftly or slowly.

Narayanamoorthy(2013) reveals that the survival of farmers and further investment in agriculture is the result of the returns which farmers avail from the crop cultivation. The farmers cannot repay their debts if the flow of income from agriculture is irregular and inadequate. The use of spurious inputs which include seeds, fertilizers and pesticide in cultivation, existence of middlemen, inadequate irrigation facilities and lack of institutional credit are some of the major reasons for the crop failure which leads to agrarian crisis in India.

Pratap Singh Amarandraet.al (2013) investigates on Environmental Kuznets Curve(EKC Hypothesis) to state that the technical intervention in agriculture combined with overall economic development should eventually help to spare land from agriculture. The land allocation remains biased in favour of agriculture at lower levels of Per Capita Income, while the allocation of land towards agriculture decreases with increase in Per Capita Income. The study analysed a 'N'shape relationship between agricultural expansion and Net State Domestic Product(NSDP). The technology remained responsible for inducing farmers to bring additional land under agriculture instead of sparing land from agriculture.

Liu Y L et.al (2012) studies the index system of land parcel generalization which is crucial in land use data generalization. Macro indices for land use data generalization include map load, area proportion of different land use types and semantic characteristics. Micro thresholds include minimum parcel area, minimum distance between parcels and minimum bend diameter. Higher land use fragmentation increases the land use area proportion change in generalization and map load at the same scale.

Feichtinger et.al(2011) interprets that the variables which are used to explain the land values are classified as Agricultural Returns- Monetary Variables, Non-Monetary Variables, Government payments, Variables describing the market, Macro economic factors and the Pressure indicators.

Jelili. Olaide Saka (2011) examines the structure of land use intensification in food crop production in Southern Nigeria towards determining its drivers and its relationship with the intensification. Land use intensity will result in continuous depletion of soil fertility, decline in productivity, loss of soil structure, soil erosion and land degradation.

RobertzBednarz (2011) reveals that decision makers always choose to do what is best for them economically. If there exists a number of alternatives, the farmers will be choosing the optimum strategy which will be economically best for them or which provides the best economic return. The farmer's net returns is the difference between the price at which he sells in the market and the costs which they incur to grow the harvest and gets the crops to the market. Economic geographers called the concept as location rent.

ThirapongSantipop (2011) revealed that agricultural land use patterns are affected by farm household characteristics and exogenous factors such as economic, demographic and physical characteristics and the farmer households are shifting from traditional crops to cash crops due to changed in farmer livelihood strategies. Agricultural land use strategies are influenced by distance towards the markets, soil structure, off – farm income possibilities, irrigation facilities and price of the cultivated crops as well as crop substitutes.

Prakasan(2010) provides the theoretical explanation of how Land Use and Land Cover(LULC) is main determinant for changes in Global Environment. Land Use refers to uses which are carried over on Land and Land Cover refers to Natural Vegetation, rock, soil and artificial cover. Due to extension of human activities, land used for forest as well as cultivation is decreasing and that of built up area is increasing in Kodaikanal. Any process of transformation in agriculture is not due to temperature , but due to heavy dependency on Tourism and reveals the three different transformations: from land used for cultivation of food crops to cash crops and spices, from agriculture to built up land and from forest to agricultural land.

Zhiu, Zhanqianget.al (2010) concentrates upon the Land Use Change Models which interprets the land use changes and the main driving forces for land use change. The logistic regression is designed to estimate the parameters of a multi-variate explanatory model in situations where dependent variable is dichotomous and independent variables are continuous or categorical.

Huang Wenti et.al (2008) analysed land use/ land cover change by remote sensing using multi- temporal images and explains that the population pressure on land would further grow and the farm land areas, open grounds and regions around the highways are likely to become prime targets for urban expansion and the reduction in area used for agriculture.

Liu Yansui et al (2008) states that the arable land has been continuously decreasing with a loss and average decrement per year, land for construction increased, total area of encroachment on arable land for construction created arable land loss by using land for industrial, transportation, rural construction, town construction and influence of Nation's macroscopic land use policies on the fluctuation of the increase of construction land and encroachment on arable land.

Pender John et.al (2008) investigates the land management practices in Highlands of Tigray and identified the factors which have influence on land as population pressure, small landholdings, access to roads, irrigation and extension and credit programmes. Improvements can be made by low external-input investments and practices such as stone terraces, reduced tillage and reduced burnings and these profitable opportunities can increase agricultural production and sustainable land management.

Oyekala(2007) interprets that the Error Correction Model The parameters of the constant term, growth rate of permanent cropland, index of agricultural production, livestock population, human population were used as the factors influencing agricultural land expansion in Nigeria.

Hanumantha Rao, C (2004) reveals that the fuller exploitation of water resources, both surface and ground water will bring half the cultivated area of India under irrigation. The Land Reforms which is a major landmark of economic development after independence helped the cultivators to utilise the resources in the proper manner by the feeling of their own land.

Eun So et.al (2002) investigates the relationship between the areas of land in alternative uses and economic and demographic factors influencing land use decisions using econometric land use models. Determinants of land use included in the model are net returns from different uses, land quality and demographic variables such as population density.

Hess, Paul Mitchell et.al (2001) reveals that density and land use are two dominant factors determining land use in transportation research. The measures developed by landscape ecologists to model patterns of land cover provide detailed and spatially explicit ways of measuring land use mix. The use of these techniques requires the researchers to be clear about the resolution of data, the scale of analysis and the extent of area across which analyses are conducted. The paper also discussed how common measures of density and land use mix suffer substantial distortions.

Adesina et.al (2000) interprets that Alley farming was adopted and supported by people as an alternative to slash- burn agriculture which will destroy the soil carbon organic matter. Adoption of the method is lower in areas with high population pressure as farmers have high labour productivity and labour intensive techniques are applied more than capital intensive techniques. The economic, social, institutional, household and village characteristics were used as variables which determine the adoption of alley farming.

Helen Briassoulis (2000), examines that the bio-physical factors which influence the land use are climate and weather, topography, bedrock and soil type, surface water hydrology and groundwater, site specific conditions such as accessibility, landscape capital, regional land use structure as well as by transportation cost, profits, parcel size, competition, costs of production, product prices, public and private financial support, land management practices, land tenure and ownership, societal factors relating to population structure and dynamics, income and affluence, technology, socio- economic organizations, culture, institutions and political system, demand for land, land use patterns and land use change. Considering the demographic traits like age, the old male heads of households exhibit a greater inertia to change, in general than the youngers and single female households have different outlooks and life expectations than the married.

Bishop et.al (1958) examines the alternative uses of resources which will be owned by each owner. He will be deciding which crop he have to cultivate, how he can apply the inputs for the production process in his farm, how much he have to produce, the time of buying and selling and finally, finding a market for buying and selling the product. The producers must produce the commodities which are wanted by the customers. They choose the products on the basis of the expected returns from the products.

Many economists focused on key drivers for conversion of land from agricultural to non- agricultural use as age, gender, education, farm assets, distance to town, tenure system soil fertility(Muluke 2018), (Chandan Kumar et.al, 2012), (Roder, Norbert et.al, 2009), (Helen Briassoulis, 2000), income per month and household size(Mohsin Muhammed et al,2017), (KassaGutahun, 2015),(Lubovski, Ruben N et.al,2006), labour force and climate/ rainfall (MurayaWenjiru et.al, 2017), volatility in agricultural output prices(Boere Esther, 2015), slope and elevation(Jeuck et.al,2014) and profitability analysis by fixed, variable costs and returns over expenses(Deepak Shah, 2017).

2.3.3. Land Use Dynamics

The changes occurring in the land use may be due to reasons which will have direct or indirect impact on the land use as well as the returns from land use for the farmers. The literature review related to land use dynamics provides the information from studies conducted previously on how the changes are occurring on the land use especially the agricultural land use.

Ustaoglu (2017) examines the key drivers of land use change as economic factors in which land rent, the main determinant is determined by the distance from city centre, bio-physical factors which is determined by local climate and weather conditions which is further measured by temperature, rainfall, wind, moisture, topological conditions such as slope and aspect, drainage conditions, soil type, bedrock type and water resources, demographic and social factors which is measured by size of the family, age and education , urbanization, technological factors and spatial policies. The combinations of different drivers are significant with estimated coefficients across different regions in Europe and the regression results for Eastern Europe highlight the strong influence of location based characteristics and climatic factors.

Rahman (2016) examines the determinants of land use diversity or area associated to different crops in which wealth or income is composed of net farm earnings from crop production and initial wealth which is exogenous to the crop choices such as farm capital assets and livestock resources. Increase in Rainfall, increasing prices, development of crop varieties and Price Policies will also influence the agricultural land use pattern.

Butt et.al(2015) reveals that the hydrological and eco-processes in the Simly Watershed is determined mainly by the Land Use Change from Watersheds and its proper management. Since water is essential for cultivation, watersheds are also necessary for proper vegetation. But the land used for Water Cover and Vegetation is being transformed to settlements and Agriculture in the area. The detection of LULC is analysed using Maximum Likelihood Algorithm and these transformations created an adverse impact on the Watershed Resources and it shrank by 74.3 percent and 38.2 percent respectively. Proper Management of Watershed Resources is the only solution to bring back the vegetation existed to the initial position.

Jose Monish et al(2015) identifies the causes of changes in land use and cropping patterns with a special focus on paddy and identifies the economic, ecological and social factors aggregating up to 70 percent reduction in the area of paddy. The main drivers for the transformation of paddy fields to other land uses were economic viability, labour shortages and population pressure on land. Changes in land use and agrarian structure reflects the livelihood strategies as well as the unintended policy initiatives. The agricultural system of Wayanad reflects the land transformation from indigenous subsistence farming to a market oriented system.

Lambert et.al(2015) suggests a spatial temporal robust co-variance estimator for a model depicting land use as a first order Markov Process. Land use j shifts to k according to a matrix of Markov Transition probabilities. The parameters determining the transition probabilities are estimated using a system of fractional multinomial logit regressions. The difference between the expected stream of Net Present Returns from different activities is considered for land use allocations. In period $t=1, 2, \dots, T$ and spatial unit $i=1, 2, \dots, N$, agent $g=1, 2, \dots, G$, converts land from use j to k , when the expected net returns (v_k) from use k exceed net returns from j , less the discounted cost of converting from use j to k (C_{jk}).

Justus E Raja and et.al (2013) reveals that commercialization of agriculture is the intention of farmers and it will lead to increased agricultural productivity and marketable surplus. The lack of soil ph value measurement, non- availability of quality seeds, increasing debt, lack of storage facilities are the other factors which will lead to improper utilization of land. The adverse impact of droughts and floods can be controlled by proper irrigation facilities as well as canaling system. Creating awareness about crop rotation and multiple

cropping will lead to proper use of agricultural land, through which food security can be attained.

Premakumaret.al (2013) makes an attempt to analyses the reasons for declining trend of agricultural land use pattern in India and increasing trend in Karnataka. The reason for increasing trend of Net Area Sown in Karnataka is the focus of state on development of horticulture. While in India, the impact of population pressure which reflected in fragmentation of land, industrialization, energy production, urban development, minings, residential and commercial as well as supporting infrastructure are forcing the conversion of agricultural land use to various non- agricultural purposes.

Man Li and et.al (2013) represents the empirical analysis of major drivers of land use change in China from 1988 to 2005 for which he created an econometric land use model taking into account the spatial interactions between land use decisions and identified the land value and rural income as the main determinants of conversion of farmland to other purposes which are profit oriented.

Rupali P Zope (2013) reveals that the radial growing pattern of land use of the city and the supporting transport systems raises the problem of “ineffective land use pattern” for the sustainable development of the Pune city. The satellite images of the city reflects the increase in built up area and decrease in the agricultural area. Most of the agricultural area at the outer periphery of the city has been converted into the non- agricultural area by real estate developers.

Bhardhan D and Tewari S.K.(2010), focuses on the rapid pace of economic development along with population growth , urbanisation and industrialization exert tremendous pressure on the limited natural resource base of a country. The pressure exerted by India’s growing economy on Land and other natural resources has intensified in the post-liberalisation period and will further intensify in the future in the face of the burgeoning population and the demand for the conversion of agricultural lands to non- agricultural uses. Under – utilisation of land in the form of cultivable wastes is mostly concentrated in Gujarat and Rajasthan.

Diago Vasco et.al(2010) learnt about the processes(Urbanisation, Land Abandonment, conversion from nature to agriculture, agricultural intensification and extensification) and

driving forces (explanatory variables were collected to determine the influence of political, economical, social and natural) of land use change in Portugal between 1990 and 2000. Land use change dynamics were analysed by identifying the substitution patterns, while increasing demand for high valued products is the main reason for conversion of open arable land and pastures into intensive permanent crops such as vineyards and irrigated olive orchards.

Diogo and Koomen (2010) studied the processes of land use change in Portugal from 1990-2000 and analyses which driving forces were responsible for these changes. Land use change patterns are the result of complex interactions between numerous factors operating at different spatial scales. Five driving forces especially, natural, socio-cultural, economic, political and technological forces influence the landscape development. While urbanisation occurred mainly next to urban centres in coastal areas, agriculture abandonment took place in marginal areas with scarce water resources.

Ebanyat(2010) interprets that increase in cultivated area and disappearance of other land use reflects the pressure of population on land. Population density correlated negatively with all other land uses and positively with rice cultivation. Cultivated land negatively correlated with grassland and bushlands. The country was affected by political instability and economic decline, still the model farmers were promoted and agricultural implements and fertilisers were subsidized through agricultural policy measures by Government. The large farmers were benefitted more than the small farmers. The fertility management practices such as organic matter cycling, crop rotation and nutrient conservation were declining in the country for many years, a proper policy management of the land is necessary for a better agriculture and food productivity.

Palyakov Maksym et.al (2010) focuses on the Modelling of Land Use Dynamics as an important component of landscape level analysis of socio- ecological drivers at the urban-rural interface. Land use changes driven by land owners produce negative externalities such as air and water pollution, loss of bio- diversity, increased habit fragmentation and increased flooding. The Model's parameters measure a combination of spatial and temporal effects and cannot be used for interferences regarding land use change or land change predictions.

Zhu et. al (2009) focus on the evaluation of land- use change and its relationship with its driving factors in the loess hilly region. Two land-use demand scenarios for 1993-2000 and 2001-2005 were studied and two simulated land use patterns were achieved accordingly by the use of conversion of land use which was driven by multiple factors such as slope, elevation, distance to road, soil types, population density etc. The results indicate that the associated Kappa values were decreased from 0.83 in 1993-2000 to 0.27 in the first scenario and 0.23 in second scenario and that the forest land and grassland are the land-use types with highest commission errors, which implies that the conversion of both land use types is the main determinant of change of Kappa values.

XieYichun et.al(2007) examines the temporal and spatial changes in land use as a consequence of rapid urban economic development in the city of Beijing. The study identifies a substantial loss of plain dryland and a phenomenal expansion of urban construction land over the recent decade. A shifting of the urban construction land from the inner city to the outskirts is reflected as a consequence of suburbanization. The uneven distribution of population stands as another factor with significant correlation with the land use change.

Lubowski, Ruben N et.al (2006) examines the relationship between agricultural land use changes, soil productivity and environmental sensitivity. The agricultural programmes such as Federal Crop Insurance subsidies and Conservation Reserve Programmes also help to increase agricultural productivity. Maximisation of Returns depends on the selection of commodities to be cultivated in agricultural land and will lead to proper utilisation of land. Land use change is also due to specific policy initiatives and the policy initiatives could help to improve the effectiveness of future farm programmes.

Lekhi et.al (2004) realizes that Land Utilisation occupies a special attention as it is determined by temperate moisture, topography, soil and physical structure. Land has the characteristics of fixity in supply and scarcity. The Land Classification is a process which assigns each tract of land in an area to its proper class in a system of classes. The classes in the system are defined in terms of qualities or characteristics with which the classification is concerned.

Olson M, Jennifer et.al (2004) explicates that knowing the main causes for land use change is necessary for the policy initiatives to be taken by authorities. Due to lower

productivity, the farmers are keeping their land uncultivable.. The LULCC literature was evolved out of efforts to understand, predict and manage ecologically damaging Land use changes such as deforestation because of their global impact on bio-diversity, carbon storage, atmospheric fluxes and other changes to ecological services and environment resources.

Sen et.al (2002) analyses the implications of land use/ cover changes during 1963-1993 in Pranmati Watershed of Himalayas. Land rights are granted to farmers on cultivated terrace slopes where as all uncultivated land were registered as Government Reserve and protected forests. Area under cash crops, potato and amaranth increased and accompanied by a sharp increase the mean monetary value of crop produce but at the cost of abandoning the traditional crops. Not many encroachments are reported in Reserve forests due to frequent inspection of Government Forest Officials, but encroachments are reported in community and protected forests. The farmers switched from monocropping of traditional crops with poor economic potential to mixed cropping on small plots rather than abandoning the crops altogether.

Elumalai Kannan et.al analysed that the growth performance of crop sector is influenced by use of physical input by farmers, markets, irrigation, credit availability, weather conditions and Government policies. The determinants of aggregate growth of crop output as the National level through Neo- Classical Growth Model can be represented as fertilisers, capital, rainfall as the ratio of actual rainfall to long period average rainfall, ratio of Grossed Cropped Area(GCA) to Net Sown Area(NSA) and Cropping intensity. The area under coarse cereals and pulses were showing a declining trend and intensive cultivation has resulted in salinity and water logging, groundwater depletion, loss of soil nutrients and building up of pests and diseases.

Chetan Agarwal et.al focuses on identifying appropriate models or proposing new modeling requirements and directions for estimating spatial and temporal variations in land cover and forest management practices. Land use is determined by the interaction of space and time of bio- physical factors which include soil, climate and topography as well as the human factors which include population, technology and economic conditions.

2.3.4. Role of Farmer in agriculture

Suhasilawane (2019) reveals that the concept of gender is the differentiator of role, responsibilities and traits between men and women since humans exist in earth. The social change can make change in agriculture influenced by region, status, age, education and habits. The role of women as equal partners of men should pay attention to dignity and nature. Women should be given the broadest opportunity to develop themselves and the role of women farmers such as planting, maintaining, harvesting is considered small as compared to role of men. The ownership of land is also a concept which will reduce the gender disparity.

Ranganathan Thiagu(2018) analyses incomes of farmer households in India based on the data taken from 70th Round of NSSO and interprets that the main source of farmers as the primary occupation by considering agriculture is agricultural income itself, next preference to off-farm income and next preference is given to livestock cultivation and found that the largest land class has high income than lowest land class with less than 0.01 Hectares and inequalities existed in the size of land also

Ravikumar R and et.al (2013) explored that Rice Production stagnated around 10 to 11 lakh tones as Paddy cultivators have been facing various problems as their paddy cultivation did not fetch the reasonable price all over the country. The fall in price will lead to increase in cost of cultivation leading farmers to commit suicide. The study concentrated on the socio- eco background of paddy cultivators in selected villages of Palakkad due to shortage of labour and low prices of paddy and emphasizes group management for improving the economies of paddy cultivation through better management based on low cost technology, improvement in productivity, selective mechanization and cost reduction.

Shoba Arun (2012) explores the gender dimensions of the changing nature of agricultural households in Northern Kerala. Rural households are constructed through differences of gender and class riddled with complex and multiple negotiations and processes increased volatility in crop prices, shortage of rainfall and increased incidence of drought affected crop yields.

Thomas (1994) explores the changes in ownership of land is influenced by land reforms, land market transfers and partitioning. The study focuses on the relative role of social, demographic and economic factors in influencing land transfers among peasant

households through land reforms -conferment of ownership on tenant cultivators and kudikidappukaran to permit their entry in land market and growing commercialization of agriculture led to increased volume of land market transfers and partitioning.

2.4.CONCLUSION :

The pattern of land use of a country at any particular time is determined by the combination of economic, institutional, social and environmental frameworks. The land use of any region expresses the interaction of the whole range of environment factors along with a modification by the socio- economic, cultural, climatic and historical elements which will lead to sustainable development with a nature friendly ecosystem. The literature review and theoretical background gives the information related to land use from the earlier studies such as how it is utilised, identification of the main determinants of changing land use, the influencing factors of crop selection and how the regional differences influence the land use. It also gives an idea about the important factors influencing farmers in determining the agricultural land use and the risk adaptation strategies adopted by farmers to face the risk arising from agriculture. The acquired knowledge will be helpful and can be used as a guideline for further analysis as well as for interpretations in the particular study.