DEVELOPMENT, ECOLOGY AND TRADITIONAL AGRICULTURAL PRACTICES: A study of Puthukary village in Kuttanad region of Kerala

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By
T. SEKHAR BABU
12SAPH03

Department of Anthropology
School of social Sciences
University of Hyderabad
(P.O.) Central
University,
Gachibowli,
Hyderabad –500046
Telangana
India

CERTIFICATE

This is to certify that the thesis entitled **"DEVELOPMENT, ECOLOGY AND TRADITIONAL AGRICULTURAL PRACTICES: A study of Puthukary village in Kuttanad region of Kerala"** submitted by **T. SEKHAR BABU** bearing Registration Number **12SAPH03** in partial fulfillment of the requirements for award of Doctor of Philosophy in Anthropology, Department of Anthropology, the School of Social Sciences is a bonafide work carried out by him under my supervision and guidance.

This thesis is free from Plagiarism and has not been submitted previously in part or in full to this or any other University or Institution for award of any degree or diploma.

Further, the student has the following publication:

1) Sekhar Babu T. (Oct-Dec, 2017). 'Marriage and Alliance among Agnikula Kshatriyas: An anthropological study of a fishing community in coastal Andhra Pradesh' in *Kaav International Journal of Economics, Commerce and Business management* (KIJECBM). Volume 4, Issue 4, page no:523-532 (ISSN:2348-4969).

and

He has made presentations in the following conferences:

1) Presented a paper titled "Development and Traditional Agricultural Practice: An overview of Below Sea-level Farming in the Kuttanad region of Kerala", in National Seminar on Rural Development in India: Major Issues, Challenges and Alternative Approaches on 30th & 31st March, 2015 organized by the Department of Sociology, Osmania University, Hyderabad.

Further, the student has passed the following courses towards fulfillment of coursework requirement for Ph.D. / was exempted from doing coursework (recommended by Doctoral Committee) on the basis of the following courses passed during his M.Phil. Program and the M.Phil. Degree was awarded:

Course Code	Name	Credits	Pass/Fail
1. SA 600	Advanced Anthropological Theories	4	Pass
2. SA 601	Advance Research Methods	4	Pass
3. SA606	Kinship and Marriage	4	Pass

Supervisor
Department of Anthropology

Head
Department of Anthropology

Dean
School of Social Sciences

DECLARATION

I, **T. SEKHAR BABU** hereby declare that this thesis entitled "**DEVELOPMENT, ECOLOGY AND TRADITIONAL AGRICULTURAL PRACTICES: A study of Puthukary village in Kuttanad region of Kerala**" Submitted by me under the guidance and supervision of Dr. GEORGE THARAKAN C is a bonafide research work. I also declare that it has not been submitted previously in part or in full to this University or any other University or Institution for the award of any degree or diploma.

Date: Name: **T. SEKHAR BABU**

Signature of the Student
Reg.No. 12SAPH03

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CHAPTER – ONE
INTRODUCTION

Since the inception of human civilization, society has continuously struggled to develop required skills to exploit the resources that nature has bestowed upon them. During the Neolithic Age, there had been a shift from hunting and food gathering practices to a more settled form of agricultural practices (Gary, 2005). This age was also symbolizing a cultural stage where humans have started inventing the techniques of pottery and other varied polished tools. There is a general understanding among academic circles that 'Neolithic' indicates the presence of domesticated plants and animals (Raymond and Christopher, 2005). There are evidences of people turning from hunter-gatherer societies, which existed for a long time by collecting plants and tubers, hunting, fishing to farming communities that reared animals and also cultivated crops (Carol, 2007). However, it is obvious that agriculture as a traditional practice was one of the most valuable discoveries of the Neolithic people. They noticed that the sustainable food crops grew more abundantly in some places than in others. Thus, human imagination and understanding proceeded to experiment with the actual planting of seeds, leading to the origin of agriculture (Max, 1957). Humankind began the perpetual process of upsetting its environment, rather than submitting blindly to the pressures of nature.

Numerous developmental activities have taken place all through the history. Whether it is setting up of new towns, construction of roads and buildings, exploiting forest resources, use of land for various activities including agriculture, exploitation of water resources for irrigation and house-hold purposes etc., and all such human activities have impacted the earth in one way or the other. The human societies have

started depending on agriculture to cultivate the domestication of plants and also the animals for their consumption and societal progress (Krishnadas, 2009:25). The practice of agriculture as a traditional mode of sustenance facilitated the social process of setting the people in one place, and establishing the permanent villages and towns (MacDonald, 2003). Without the understanding of the formation and development of traditional agricultural practices, one cannot even imagine or study the formation of complex societies such as industrialized and modern societies (Pal, 1980; Anil, 2004).

Peter Lowrie (1995) argues that the people who plan and grow the crops each season are just as important to agriculture as seeds, soil, sunlight, and rain. In this sense, farming is really a cultural activity, and every farmer is impacted by the cultural practices and norms that direct their agricultural activities, regardless of the level of land ownership. The physiocrats argue that the agriculture is the only source for the entire social product in any society. The agrarian question continues to dominate economic and political discourse in the nations of Africa, Asia, and Latin America that have not yet fully made the transition from an agrarian to an industrial society. Ever since the attainment of independence in India, there has been a progress in agricultural production and output to address the food security issues and challenges. Agriculture is a vital component of Indian policymaking, not just because it makes a contribution to GDP, but also because a lot of people rely on it for their livelihoods. As of 2011, the Indian agricultural sector was large and diverse, making up about 16% of the country's GDP on average. According to Census of India (2011), over 70% of Indians still reside in rural areas, and 60% of the labour force works in agriculture, despite the country's economy still growing. The

promotion of agricultural growth is seen as an essential requirement for achieving national economic development.

The revolution in economic development is brought by globalization, with which all the nations across the globe are interconnected and the barriers for the free flow of goods and services are removed. The globalization is mainly marked dominated and is imposed or indirectly supported by the policies of U.N. agencies and international foundations like IMF, WTO and World Bank (Venkata Rao, 2002). Globalization is also eliminating the boundaries of different cultures of the globe, thereby causing a threat to the local traditions, ecology and social relations. Farmers in India were directly affected by the implications of the policies of the globalization. On the other hand, the government of India has been designing and implementing various schemes and development measures to address the unrest and food insecurity among the farmers, however, many landless farmers were unable to meet their basic needs.

Globalization and impact of global policies on Indian Agriculture

Even though India is a developing nation, it still plays a much more significant role in international organisations than any other developing nation. Both the well-known General Agreement on Trade and Tariffs (GATT) and the well-known World Trade Organisation (WTO) feature India as a founding member. These bodies play a significant role in all of the organisation's negotiations, and making policies for the developed and developing nations. Due to the fact that almost 60% of India's population lives in rural areas and depends on agriculture for a living, these industries continue to be the backbone of the country.

The World Trade Organisation (WTO) is a renowned world organization that handles matters relating to international trade. It offers a regulatory framework for cross-

border trade in goods and services. The World Trade Organisation's legal framework supports member nations in cases of trade dispute resolution and also promotes a healthy environment for international trade. However, there are still a number of issues that underdeveloped member nations have with the WTO's negotiations, despite the fact that they are cooperating to reach their shared objectives and advance for development. The primary impact on negotiations, policy packages, and other issues that are amended by the World Trade Organisation has affected the agricultural sector.

India signed the World Trade Agreement (WTA) with 122 other countries during the Uruguay Round of negotiations in 1994. The WTA includes focuses on 29 legislative instruments and includes agriculture for the first time. The World Trade Organisation (WTO) was founded in 1947 to create a fair international trading system among member states. The WTO Agriculture Agreement (AoA) liberalized agricultural commerce by bringing agricultural items under international regulations. The AoA reduced agricultural trade inefficiencies, allowing developing countries better access to markets. The establishment of GATT and WTO provided opportunities for least-developed, undeveloped, and developed countries to make their presence on the world stage. Herberger (1959), Patel (1984), Rostow (1960), Maizel (1961), Hultman (1967) and Samuel and Mote (1970) studied about the price factors, export industry and various provisions of the World Trade Organization and came to conclusion that the developed countries are benefited much and favoured by WTO than developing nations.

Bhagwati (1975) and Srinivasan (1975) evaluated the effectiveness and expansion of India’s international commerce between 1951 and 1970, with an emphasis on

government policy for domestic support. Nayyar (1976) examined the effectiveness and implications of the Indian government policies in external trade particularly between 1951 and 1960. Panchmukhi (1978) and Sainy (1979) studied about Indian trade policies and their importance for economic development of the nation. The impact of agricultural industry on GDP and economic growth was investigated by Raju (2005). Chakraborty and Singh (2006) states that, a major driver in the growth and decline of farm trade is agricultural subsidies. Economic liberalization, it was noted, had altered the conditions of trade in favour of tradable agriculture and created fresh chances for attaining significant increases in export. According to 1994 research by Gulati and Sharma (1997), India would considerably profit from free trade in wheat, rice, cotton and soybeans. Additionally, mentioned as having comparative advantages are fish products, cashew kernels, oil cakes, fruits and processed foods.

According to Bhalla (1995), the expansion of agricultural exports, particularly those of high value, labour-intensive allied agricultural items, became possible as a result of the globalisation of Indian agriculture. However, India's agriculture should only diversify for both internal and export markets after reaching self-sufficiency in the production of food grains and making a significant investment in infrastructural development. Gulati (1998) makes the remark that if supply-side barriers are removed and the poor are given protection, agriculture might move on to a higher development trajectory.

It is anticipated that in the longer term, liberalising trade will improve the allocation of resources both within the broad spectrum of agrarian networks, and also between the agrarian and non-agrarian industries. The growth in agricultural sectors in India is

anticipated to be the key in reducing poverty. Agricultural trade challenges for developing countries are influenced by their economic and social situations as well as their needs for rural development, food security, and livelihood security (Bhalla, 1994). Studies such as Gulati et al. (1999), Vaidyanathan (2000) have assessed the effects of globalization and the liberalization on the Indian agriculture. It is argued that the Indian government's policies on industrialization and globalization are oriented with bias against agricultural sector (Bhalla, 1995).

Implications of Globalization on Agriculture in Kerala

Kerala's agriculture faces significant challenges due to its trade dependence on agricultural goods and its cash crop-focused cropping pattern. The state's agricultural sector, which holds a major share of Kerala's GDP, is most vulnerable to WTO regulations. Kerala's export industry contributed to India's foreign exchange gains from agricultural and agro-based exports, with major exports including coffee, tea, cashew nuts, coir goods, spices, and marine products. In the first half of the 1990s, Kerala's agricultural sector saw growth due to improved productivity and favourable pricing conditions. However, the collapse in commodity prices in the last quarter of the 1990s put the agriculture-dependent commodity market in a precarious position. Kerala's agricultural situation is different from many other Indian states, with a more strongly weighted stance towards WTO issues, due to the state's strong trade dependency on agricultural goods and its major cash crop-focused cropping pattern, which is practiced by many small and marginal farmers.

Impact of Green Revolution on Ecology and Agriculture

Revolution is a phenomenon of awakening process from old, conservative and superstitious outlook to progressive, enterprising change for betterment of things. In

other words, it is a march from traditional to modernity in every walk of life. Since time immemorial, farmers are altering the genetic makeup of cultivated species through selection and breeding. All these advancements have resulted in superior-crop varieties and thus are very different from their wild ancestors (Vibha Dhawan, 2008). The "Green Revolution" is a revolutionary change in agricultural productivity and production that was brought about by the adoption of contemporary agricultural technologies in a very short amount of time.

William S. Gaud first used the phrase "green revolution" in 1968 to explain how quickly agriculture was changing in nations like India, Pakistan, Turkey, and others. Due to this phenomena, a class of highly developed exotic seed varieties known as high yield varieties emerged (Bernhard, 1987). The country gradually transitioned from extensive to intensive agriculture with the advent of the third five-year plan, opening the door for the adoption of new agricultural practices in the farming sector. Modern agriculture, with its focus to enhancing agricultural output, had become necessary because farmers were struggling to expand cultivable lands in a manner consistent with the rise in demand for food grains (Mahesh, 1999). As a result of the implementation of a new agricultural policy in 1966 to address the nation's ongoing food grain shortages, the mid-1960s marked a turning point in Indian agriculture history. The HYV program was initially introduced in a few carefully chosen areas across the nation. Two major crops in the food basket, wheat, and paddy, were the focus of the HYV effort. Since the new agricultural plan required guaranteed irrigation facilities, the HYV initiative was mostly limited to large farms. However, the cost of the new technology is out of reach for small and marginal farmers.

The introduction of green revolution which assisted the large scale farmers who are economically sound enough to improve food grain output was so pressing. The introduction of the HYV scheme led to the production of large amounts of food grains quickly (Nagarajan, 2004). It brought remarkable difference in the lives of millions through increasing food productivity many folds and helped in boosting the overall rural economy. For over two decades, increase in land productivity surpassed the population growth, thus ensuring that food was made available to a larger section of the society (Sury, 2004). The pioneers and founders of the idea of green revolution such as Dr. M.S. Swaminathan have cautioned the farmers and policy makers against using excessive amounts of groundwater and fertilizer. They attempted to draw attention to the risks associated with exploitative agriculture that is driven solely by output or short-term profit goals (Robert, 1984).

Green Revolution in Kerala and its implications

It was due to the shortage of rice production, the primary focus of agricultural development strategies during 1960s was to achieve self-reliance in food by increasing rice production. In the State's overall plan expenditure between 1951 and 1980, the agricultural sector, including irrigation, accounted for 31% of the total plan expenditure. By investing in irrigation, agricultural research, and several unique programs meant to boost paddy cultivation (Damayanthi, 2006). The quantity and ferocity of the new seed varieties and the onslaught of pests and diseases have been made worse with the introduction of concomitant changes in the cropping season and cultivation techniques. The yield does not respond well to fertilizer. They have drastically and systematically affected the traditional agrarian practices, and caused a major threat to the ecological balance. Green Revolution received harsh criticism in

the 1970s, even though the Green Revolution has had a significant and long-lasting impact on the welfare measures for the downtrodden groups and communities in India. Along with social and economic issues, the green revolution has brought the numerous health issues and impacted the environment and ecology (Jeromi, 2007; Paul Khurana and Chakrabarti, 2008).

Hybrid varieties of the green revolution are water and chemical-hungry. Agrarian practices dominated by the knowledge of the green revolution have the soils alkaline or saline. Pesticides and harmful chemicals found in grains and other edible portions contributed to an upsurge in chronic health issues in rural India. Nitrates and pesticides poisoned the water supply, endangering both human and animal health. Water Tables were depleted as a result of excessive groundwater extraction brought on by rising water demand which have created issues with agricultural water accessibility. Some areas have become unproductive soils as a result of water depletion, while other areas are experiencing significant waterlogging. (Mathew Kurian, 2009). Rural class divisions have been intensified by the green revolution, and they have created regional imbalances between and within the states. In other words, the new agricultural approach is a blessing in disguise (Mohandas, 2009). New agricultural technique was primarily limited to large farms since it required reliable irrigation facilities. The cost of the new technology is out of reach for small and marginal farmers. So-called progressive farmers with huge landholdings were benefited from the green revolution. Small landowners did not receive any subsidies and usually abandoned their fields. The extended family, for instance, was no longer able to fulfil its role of catering social solidarity, and also caring for senior family members since traditional social structures had crumbled.

The effects of climate change and global warming are particularly dangerous for the agricultural industry. This poses a substantial risk to both food security and the Indian economy. With 60% of India's population relying on the paddy sector and it contributing 15.7% to the country's GDP, the possible consequences of climate change on this sector might result in major food insecurity (Anish Kumar P T and Suresh M V, 2022).

In spite of many global forces, traditional farmers in India have managed to come up with agricultural techniques that effectively cultivate crops and rear animals in diverse agro-ecological environments, utilising the indigenous materials. Traditional agricultural is an enduring indigenous farming method that arises from the mutual development of local social and environments. It demonstrates a significant ecological rationale through the extensive utilisation of local knowledge and natural resources, encompassing the preservation of agro-biodiversity through diversified agricultural systems. The Food and Agricultural Organisation (FAO) of the United Nations has designated regions that are actively working towards the preservation and sustainable use of traditional agriculture, culture, and landscapes as having a globally important agricultural heritage system. These regions are facing challenges such as globalisation, environmental degradation, and population growth, which have led to a decline in these valuable aspects. The purpose of this programme, which was started in 2002, is to protect agricultural regions that are significant on a worldwide scale for future generations. There are 31 certified GIAHS in the world (as of August, 2014) and three sites in India are declared as GIAHS by FAO. They are saffron heritage of Kashmir, traditional agricultural System of Koraput in Orissa and Kuttanad below sea-level farming system in Kerala. United Nations recognized

Kuttanad as the world's largest below sea area under cultivation. According to the FAO, Kuttanad is the only system in India that has been cultivating rice below sea level for the past 200 years.

Traditional Agricultural Practices of Kuttanad region

In this context, the study focussed on the agrarian communities of Kuttanad region of Kerala. Kuttanad, a delta region covering roughly nine hundred square kilometres, is situated on Kerala's west coast. The region encompasses a diverse array of fragmented landscape regions and ecosystems, including coastal backwaters, rivers, expansive paddy fields, marshes, ponds, garden areas, hedges, corridors, and intricately interconnected waterways. The region under consideration serves as the primary rice-producing area in the state of Kerala, characterized by extensive expanses of lush paddy fields intricately intertwined with captivating backwater networks.

The United Nations Food and Agricultural Organisation has recognized and given the tag Kuttanad as a globally important agricultural heritage system, which is otherwise called as GIAHS. It is the second farming system in India to be given heritage designation by the FAO, following the traditional agriculture system of Koraput in Odisha. Unnikrishnan Nair G.S. (2013) states that the Kuttanad Below Sea Level Farming System is unique in its nature as it is one of the only two systems worldwide where farming is done below sea level. Here, farming is done at 4 to 10 feet below the mean sea level. Netherlands is the only other place, where farming is practiced below the sea level. The Indian government is gearing up to formulate an action plan based on the decision by the United Nation's Food and Agricultural Organization (FAO) to grant heritage status for the below sea level farming system in

Kuttanad. The region represents highest density of population in Kerala. The technology of below-sea level farming was devised and perfected by farmers in Kuttanad more than 150 years ago. The uniqueness of this system lies in its significant contribution to the preservation of biodiversity and ecosystem services, which encompasses several livelihood benefits for local residents.

The Alleppey, Kottayam, and Pathanamthitta districts make up the geographical extent of the Kuttanad region. A total of 337.4 square miles of land make up the Kuttanad region, of which 189.2 square miles are classed as wetlands and 117.2 square miles as drylands. The remaining 31 square miles consist of lake regions. The overall extent of paddy cultivation encompasses 1,23,612 acres, or approximately 66% of the total land area (Pillai V. R. and Panikar P.C. 1965).

The major income of the people here is still from agriculture and fishing despite tourism. Two ground-breaking reclamations of Venadu *kayal* and Madathil *kayal* in the Vembanad Lake near Kainakary village ushered a new era in Kerala agriculture. Anthropogenic activities like construction of roads and bunds in unscientific manner, chemical run-off from paddy fields, wastes from houseboats, over-fishing and sand-mining etc., are all making the area vulnerable, resulting in regular flooding, lack of drinking water, extinction of some species of flora and fauna and thus contribute to a spiralling agrarian distress in the region. The research area exhibits a significant extent and severity of agricultural distress, wherein farming serves as the sole means of livelihood for over 80% of the local population. Among this demographic, over 95% are classified as small-scale farmers, possessing less than 0.4 hectares of land. The Kuttanad environment has been subjected to prolonged periods of exploitation

and neglect, resulting in a state of severe exhaustion. This phenomenon strongly impacts the farming sector, a primary economic activity within the region.

The Kuttanad region and its population have been experiencing significant agrarian distress over the past five decades due to a variety of issues (Sreejith K.A., 2013). The Union Government has tasked the Dr. M.S. Swaminathan Research Foundation in Chennai with the duty of carrying out an extensive scientific research of the area in response to the request made by the Government of Kerala to solve the current difficulties in the region of Kuttanad. The objective of this study is to provide appropriate solutions that can effectively alleviate the agricultural difficulties experienced in Kuttanad.

Development and Ecology

Development and ecology are two interconnected aspects of human existence. While development focuses on economic growth and improving living standards, ecology emphasises the preservation and conservation of the natural environment. Balancing these two aspects is crucial for sustainable development, as it ensures that progress is achieved without causing irreparable harm to the planet and its ecosystems. Additionally, integrating ecological principles into development practices can lead to innovative solutions that benefit both humans and the environment. However, the developmental initiatives implemented in the Kuttanad region by both governmental entities and the local populace have resulted in the degradation of the ecological and social aspects of the area. States frequently failed in the course of the twentieth century in their attempts to construct society or regulate the environment in order to ameliorate the lot of the populace. These attempts frequently produced unproductive, and in some cases, devastating, results (Scott, 1998).

According to Wilhite (2008), with the support of the government, capitalist market economy penetrated Kerala and changed the architectural styles. The traditional builders, whose architectural creations usually fit with the surroundings and the landscapes, vanished as the capitalists later took control of the state's building and consumer industries. The new contractors constructed the buildings unsuited to the local environment and necessitated the purchase of air conditioners.

The Kuttanad region's changing housing stock reflects the shifting attitudes of its residents. The new buildings though look modern, they never fit into the local landscape (Nilayangod, 2007).

Biminith (2008) through his study states that modernity has impacted the social life of Kuttanad and the demand for roads increased in the region to fulfil their socio-economic and political needs. However, the roads were constructed without considering the geography and environment of the region. These changes have increased the intensity of floods in the region. The development patterns for dwellings and roads in Kuttanad that have been seen are the result of modernist social and cultural conceptions. These trends have permeated the whole engineering and construction sector in the State, thereby exerting detrimental effects on the environment. Abraham's (2015) narrative of the depletion of wetlands in Kerala, resulting from the practise of filling them with soil brought from the hilly areas for the purpose of new constructions and developments. According to Abraham (2015), the study further argues that this phenomenon reveals the proliferation of private corporate interests in the development of consumer centres and business and commercial hubs, which are facilitated by government policies. These development moves have created life chances for few sectional groups to avail the options for

upward social mobility. On the other hand, these measures have impacted negatively for the poorer sections among the lower caste groups, and they are becoming preys of capitalist developments (Osella and Osella, 2000).

Though the socio-political and economic factors are driving the developments in the Kuttanad region, according to Pfaffenberger (1988), technology is a result of human decision-making and social interactions that create social and economic alliances, legal norms, and cultural myths. Moreover, he contended that technology is not an independent variable but rather a collection of social behaviours and meanings that influence society development and decision-making.

In his scholarly work, Chatterjee (2007) analysed electoral democracy in relation to the changing post-colonial capitalist manifestations in India. Chatterjee concentrated on the position and function of the peasantry in the Indian environment. According to his claim, peasant communities will not disintegrate as a result of India's capitalist industrial boom but will instead be preserved despite dramatically altered conditions.

Development Model: The Case of Kerala

Kerala's development model was assessed in 1975 by the centre for development studies in Thiruvananthapuram, which noted the state's high level of human development and quality of life despite its low per capita income and consumer spending. The Kerala model disproves the conventional wisdom that development comes after growth by demonstrating that improving people's lot doesn't require them to wait for growth to take hold (Patnaik, 1995). The Kerala Government's poverty eradication programs, such as the *kudumbashree* project, have enhanced women's participation in decision-making and poverty eradication (Pat, 2005).

However, Kerala Model of Development has faced criticism from many scholars. According to Kannan and Pushpangathan (1988), the decline in the environment, which has worsened the bad planning and implementation of crucial elements like water management and land development, was blamed for the decline in agriculture.

Jeromi (2003) drew attention to the agricultural challenges faced by Kerala, including cultivation cost, low productivity, inflated land costs, emphasis on cash crops, diminishing farm sizes, and declining pricing of agricultural goods. According to Kurian (1994), leading to a substantial reduction in agricultural employment. He also highlighted that agriculture in Kerala is not considered a subsistence activity nor a financially sustainable enterprise, with the exception of a few plantation crops, most notably rubber. Industrial stagnation in the state in 1990's also raised the criticism of scholars like Pillai (1990) and George (1994) against the Kerala model of Development.

Roopa and Vijayan (2017) undertook a study on the shift in the Kuttanad region's land use pattern. Their findings revealed significant changes in prime agricultural lands over a span of 46 years, primarily attributed to the encroachment of illegal settlements and the increasing urbanisation trends. The size of the wetlands and the Vembanad Lake's spatial coverage were both significantly reduced, the researchers found. They specifically found a 5% loss in the Vembanad Lake region of Kuttanad between 1967 and 2001, then a 2% decline from that year to 2014 in that region. Swaminathan (2007), Jayan and Sathyanathan (2010) have also highlighted the effects that the tourism and real estate sectors have posed threat to the landscape and topography of the Kuttanad region.

Giddens (2009) contends that immediate action is required to minimise the effects of climate change, which is a genuine threat brought on by human activity. He claims that in order to address this issue, political creativity is required at all levels, from local communities to international organisations. In his critique of modernity, Giddens (1996) claims that we are entering a time of worst kind modernity that has negative effects with escalating in severity. According to him, modernity has both beneficial and terrible features, including industrial deterioration, tyranny, military might, and environmental catastrophe.

Chakrabarty (2009) emphasized the importance of planetary and human existence, stating that globalization is a recent phenomenon and should not destroy human species and the planet. He emphasized the need for understanding that humans depend on other species for their existence and emphasized the need for a solution to global warming. The detrimental impacts of chemicals like pesticides on the environment are shown in Rachel Carson's 1962 study, which also shows their indiscriminate use, ecosystem devastation, and disruption of natural processes. She urges responsible behaviour from people and holds governments accounTable for contributing to the issue. According to Carson, the cause of environmental problems lies in human arrogance and financial self-interest.

In the Kuttanad wetlands, integrated farming should be developed and biodiversity should be preserved, according to Padma Kumar (2013). He emphasised the necessity to bring back the once-common model of rice-fish farming. With this strategy, rice cultivation can become more organic and lucrative by increasing farmers' revenue by 40% and lowering production expenses. He also emphasised the

need to encourage ecologically sound farming methods and to create wetlands as natural habitats for wildlife.

The importance of an integrated planning strategy is highlighted by Kumar and Devadas (2016) for sustainable development in eco-sensitive regions like Kuttanad. They emphasise the need for consultants, urban planners, and environmental engineers to include local knowledge as well as the current difficulties, preventing possible catastrophes. Abraham (2015) emphasised the significance of protecting wetlands in Kerala, claiming that only limited human involvement can maintain the ecosystem's balance. She warned against indiscriminate activities of reclaiming wetlands. She emphasized that protection of these wetlands could protect against water scarcity, floods, and environmental pollution. The above studies emphasize the need for change in the developmental policies, considering the importance of the environment.

K.C. Alexander (1973) asserts that fundamental changes in Kerala's social structure are the cause of the communist party's rise to prominence as a major political force. He says that rice cultivation is the main agricultural activity which brings labourers and farmers together in Kuttanad. Agricultural labourers are strongly organised in Kuttanad and the credit for organising them goes to the Communist Party of India. Soon, workers' union under the leadership of CPI was formed and later farmers also formed an organization called '*Kuttanad Karshaka Sangham*' (Kuttanad Farmers' Association).

As a result, the inter-caste relationship norms-based cooperative and dispersed interaction between farmers and workers in Kuttanad have been transformed into a specialised contractual relationship within the context of class conflict and rivalry.

Bharat Dogra (1985) argues that the emphasis on the wisdom of traditional agricultural practices should be welcomed for at least two reasons. Firstly, an alternative, successfully practised in earlier years, to the green revolution technology brought from Western countries, and to establish that green revolution technology is not only the way for agricultural development. Secondly, instead of emphasising merely the wisdom of specific farming practices, the concept of the traditional farming system as a harmonious system in which agriculture, animal husbandry, tree growth, etc., are very well integrated, avoiding all waste and in fact feeding on each other's waste. But then he says that the relationship of various agricultural practices with the land and labour relations within which these will be implemented has to be kept in mind.

R. Mahesh (1999) researched Kerala's wet lands to determine the reasons behind the conversion of the area into non-agricultural uses and the alteration of crop patterns, as well as the negative effects these changes have had on the local population. He found that perennial cash crops dominated the farm sector. The factors leading to these changes are demand for land for non-agricultural purposes, state intervention, technology changes, increase in pressure on land, and finally neighbourhood aspects.

B.M. Kumar (2005) claims that over the past 50 years, Kerala has experienced unheard-of changes in land use. He believes that agro-forestry shows potential in view of the severe environmental degradation, the need to mitigate climate change, and the increased demand for fuel wood, fodder, and lumber. On integrated tree-crop production systems, however, not a lot of in-depth research has been done in the state.

S. Mohanakumar and R. Vipinkumar (2010) argues that the intervention by local governments under decentralised planning could be successful in those commodities for which the market is not integrated with the international one. It is the limit imposed on local level development under decentralised planning process in a globalised market regime.

Santhosh Simon and K. Paulose Jacob (2012) outlines the use of a wireless sensor network for crop monitoring in Kuttanad's rice fields. They claim that we can gather and monitor information on the climate, irrigation, and fertiliser delivery in agriculture through the use of wireless sensor networks. Consequently, production costs will go down and production efficiency will rise.

G.S. Unnikrishnan Nair (2013) has given a detailed account of the origin of Kuttanad, its history, the bio-diversity of the region, cultivation and about its global recognition. He says that the human influence and phenomenon like climate change has made drastic change in Kuttanad. Immediate action is needed to regain the lost glory of this exceptional ecosystem; otherwise, it will be ingratitude against the martyrs who transformed these vast stretches *kayal*s into food bowl of the state and an injustice against future generations.

Significance, Importance and relevance of the study

Despite the rising awareness among scholars about the importance of the traditional knowledge, there has been a lack of substantial measures to find, document, validate, and safeguard this knowledge. There exists a significant concern around the potential loss or misappropriation of this knowledge prior to attaining a comprehensive understanding of its intrinsic value. There is an expectation that the traditional knowledge of indigenous peoples could serve as valuable reservoirs of emerging

technologies in forthcoming times. Andre Beteille (1974) says that the subject of agrarian social structure is vast and has been left almost completely unexplored by sociologists and social anthropologists in India. According to Kendall Thu (2006), the anthropological inquiry into agriculture has been widely prevalent throughout the history of our discipline. Additionally, Thu asserts that Agricultural Anthropologists place emphasis on examining the social, economic, and ecological dimensions of food production. However, he observes a decline in the interest in the investigation of the impact of a dynamic agricultural environment on various civilizations, especially in relation to contemporary complex societies. Ben J. Wallace (2006) cites Micheal Cernea's (2005:74) opinion that the current state of the human capacity for social research inside the system appears to be either in a state of prolonged stagnation or has seen significant depletion. Kendall Thu (2006:26) contends that agricultural reform needs to be better positioned within an anthropologically defined understanding of regional, state, and global cultural transitions in addition to reintroducing culture to communities and their agricultural practises. According to Micheal M. Cernea (2005), there is a notable disparity in the allocation of resources within the research portfolio of the CGIAR (The Consultative Group for International Agricultural Research), with social research being comparatively limited in scope and funding. This paradoxical situation is particularly noteworthy considering the significant strategic importance of social research in the context of CGIAR's broader research agenda aimed at addressing food security and poverty reduction. Hence, the observed inverse relationship is considered abnormal. Similar to any internal abnormality, the consequences are detrimental to the functioning and efficiency of the system. According to Ben J. Wallace (2006), the majority of

Agricultural and Forestry Research Development Centres continue to be primarily staffed by individuals with backgrounds in biology and economics. The researchers possess extensive expertise in several biotechnical areas; yet, their training does not encompass the study of human behaviour. All the above notable studies emphasize that much scientific research was done in the direction of increasing yield and better varieties of crops, but, not enough research was done to understand the socio-cultural milieu of agriculture and agriculturalists.

On one hand, Kuttanad region is declared as GIAHS by FAO, United Nations, to protect the traditional agricultural practice of the people and to pass the knowledge to future generations. International Research Centre for Below Sea Level Farming is opened recently in this region. On the other hand, the developmental activities in the region, due to globalization, are deteriorating the biodiversity of the region and thereby affecting the socio-cultural milieu of the traditional agriculture. So, the clash between the traditional knowledge and development paves the way to academic inquiry to understand the current situation of agrarian communities and the socio-cultural change process taking place in the region. In view of the above ideas, the study went in the direction of understanding the life ways of Kuttanad agrarian societies with more emphasis on their agricultural practices in the changing ecological scenario (due to the destruction of ecology in the name of development), and the implications of changing ecology on their social lives. Thus, the study also helps in adding knowledge to our understanding of the agrarian cultures which comes under the branch of 'Agricultural Anthropology'.

Objectives of the study

To comprehend the social and cultural setting of the Kuttanad farming community. This study aims to examine the various factors that influence the social and cultural aspects of the farming community in the Kuttanad region. By exploring their traditions, customs, and beliefs, the study has captured a comprehensive understanding of how these cultural factors and social conditions influence the daily lives and social interactions of the respondents in the study area.

To study and document the traditional agricultural practice of Below Sea-level farming of Kuttanad region. This study aims to explore the unique techniques and strategies employed by farmers in the Kuttanad region to sustain agriculture in areas below sea level. By examining their methods, we can uncover valuable knowledge that may contribute to the development of innovative and sustainable farming practices in similar geographical settings. Furthermore, understanding the socio-cultural significance of Below Sea-level farming in Kuttanad will shed light on the deep-rooted traditions and customs that have shaped this community's relationship with their environment.

To understand the effects of globalization (developmental activities) on Kuttanad ecology and on their traditional farming system. It is crucial to examine how globalization has impacted the delicate ecological balance in Kuttanad and the sustainability of their traditional farming practices. This analysis will provide insights into potential challenges and opportunities for adapting and preserving their unique agricultural heritage in the face of rapid global changes. Additionally, understanding these effects can inform policymakers and stakeholders in

implementing strategies that promote both economic development and environmental conservation in Kuttanad.

Tools and Techniques of Data Collection

After conducting a pilot study, Puthukary village in the Kuttanad taluk of Alappuzha district has been identified and selected as an ideal site for conducting field study and to collect demographic details from the selected sample of residents in the village. There have been several phases of the field study such April, 2014 to July, 2014; August, 2015 to December, 2015; and November, 2016 to January, 2017.

It is only after spending considerable amounts of time in the village, the researcher could be able to gather the required data from the residents. This speaks about the challenges of the social settings in the field area in establishing rapport with the residents and winning their confidence and trust with the researcher.

The study's comprehension and analysis of the research objectives relied on both primary and secondary data. The study has used the compilation of qualitative and quantitative tools for gathering information from the targeted sections such as case studies, in-depth interviews and focused group discussions (FGDs) with the farmers, government officials, activists and other potential key informants during the study. A structured interview schedule was used for conducting household surveys and collected the primary data regarding social, economic and demographic profile among the sample of households in the study area. One of the prime reasons for the selection of this village is to unravel and understand the issues and challenges associated with the traditional agrarian practices of farming at below sea level in the region. And this village is ideally suitable for investigating the research objectives. The researcher has conducted an intensive field study and collected the data to meet

the research objectives of the research. The study has also collected varied secondary data and reviewed an extensive literature to understand the issues and challenges of traditional agrarian practices of farming at below sea level in the region.

Thus, the overall design of the study is qualitative as well as quantitative in nature. The purposive sampling and simple random sampling techniques are employed in drawing a sample of 100 households from the Puthukary village in the Kuttanad taluk of Alappuzha district. Qualitative methods such as participant observation, case-studies, in-depth interviews and focused group discussions are used to collect the data. With the help of questionnaire and Interview schedules, socio-demographic profile among 100 households has been collected. Ethnographic notes are maintained during the course of survey administration, wherever it is deemed necessary. The study is essentially situated in a participatory framework and guided ethnographically. The present research has adhered to this principle and this dictum is well practiced during fieldwork, and it is evident in the notes and findings that have been documented and analysed in the proceeding chapters.

Chapterization of the Thesis

The present work has been divided into six broad chapters. The first chapter *Introduction* explains the research topic, research methodology, review of literature, significance and relevance of the research, and also highlights the objectives of the study. The second chapter *Puthukary and its People* introduce and describe the demographics of the chosen Puthukary hamlet as well as the socioeconomic profile of the Kuttanad region. The third chapter *Below Sea Level Farming: History of the Traditional Agricultural Practice in the Kuttanad Region* explains about the traditional practices of doing below sea level farming and its indigenous techniques.

This chapter also provides a detailed account of the history of the traditional practices of farming. The fourth chapter *Current Practices of the Below Sea-level Farming in the Kuttanad Region* elucidates about the current practices of Below Sea-level Farming in the Puthukary village and other below sea level regions of Kuttanad, Kaipad, *Kole* and *Pokkali*. It also critically discusses the issues and challenges associated with the onset of the implication of policies of globalization on the ecology of the region. The fifth Chapter *Impact of developmental activities on the Ecology and Agricultural Practices* explains how development has affected the nature and the village of Puthukary's traditional agricultural methods. The sixth chapter *Summary and conclusion* sums up the research study, and also provides policy recommendations for designing and implementing an effective and efficient sustainable development model in the region.

CHAPTER –TWO
PUTHUKARY AND ITS PEOPLE
(Ethnographic profile of a village in the Kuttanad region)

The Kuttanad region is known for its unique ecosystem, being a low-lying area surrounded by backwaters and paddy fields. This geographical setting greatly influences the livelihoods and agricultural practices of the people in Puthukary village. To fully comprehend Puthukary village's ethnographic profile, it is important to first acquire knowledge about the Kuttanad region. This contextual information will facilitate a more thorough understanding of the village's socio-economic and cultural dimensions. Kuttanad Wetland Ecosystem, located in the state of Kerala, is a highly intricate, vibrant and unique rice growing agro-climatic region lying half metre to two and half metres below mean sea level. Kuttanad is widely recognised as a highly fertile area covering throughout the districts of Alappuzha, Kottayam, and Pattanamthitta. This region is characterised by an intricate network of rivers, canals, and waterways[1]. The Kuttanad region encompasses ten taluks and fifty four revenue villages, which are distributed over the three districts of Alappuzha, Kottayam, and Pattanamthitta. The total geographical area of this region measures approximately 1100 square kilometres. Alappuzha district contains almost 57 percent of the Kuttanad Wetland System, while Kottayam and Pattanamthitta districts each have 30 and 13 percent of the remaining area. The geographical boundaries of the Kuttanad region are delineated by the following features: the Kaduthuruthy-Kottayam-Mavelikara railway line to the east, the Thottappally-Alappuzha-Thanneermukkom

[1] http://kuttanadan.com/agriculture

road to the west, the Kaduthuruthy-Vaikom road to the north and the Mavelikkara-Haripad-Thottappally road to the south.

The rivers which originate in the high ranges of Kerala like Pamba, Meenachil, Manimala and Achankovil flow through the Kuttanad region and join the Vembanad Lake in this region before discharging into the Arabian Sea. The network of canals and rivers in the Kuttanad region are mainly used for transportation and livelihood means as well as for recreation. A number of places in this Kuttanad region undergo floods during the monsoon season and are waterlogged more or less all year long. The entire region becomes inundated by a substantial expanse of water during the monsoon floods, when the aforementioned rivers branch out into several watercourses and interconnect with each other. Residential areas[2] as well as paddy fields get submerged for few days to few weeks resulting in considerable loss. Communication and accessibility to the area becomes worse. Due to the poor drainage facilities and the submerged wetlands throughout the year, annual and perennial crops are not successful in this region. Hence paddy cultivation became the primary occupation of the local people. Kuttanad farmers are well-known for their traditional bio-saline farming.

Classification of Kuttanad region

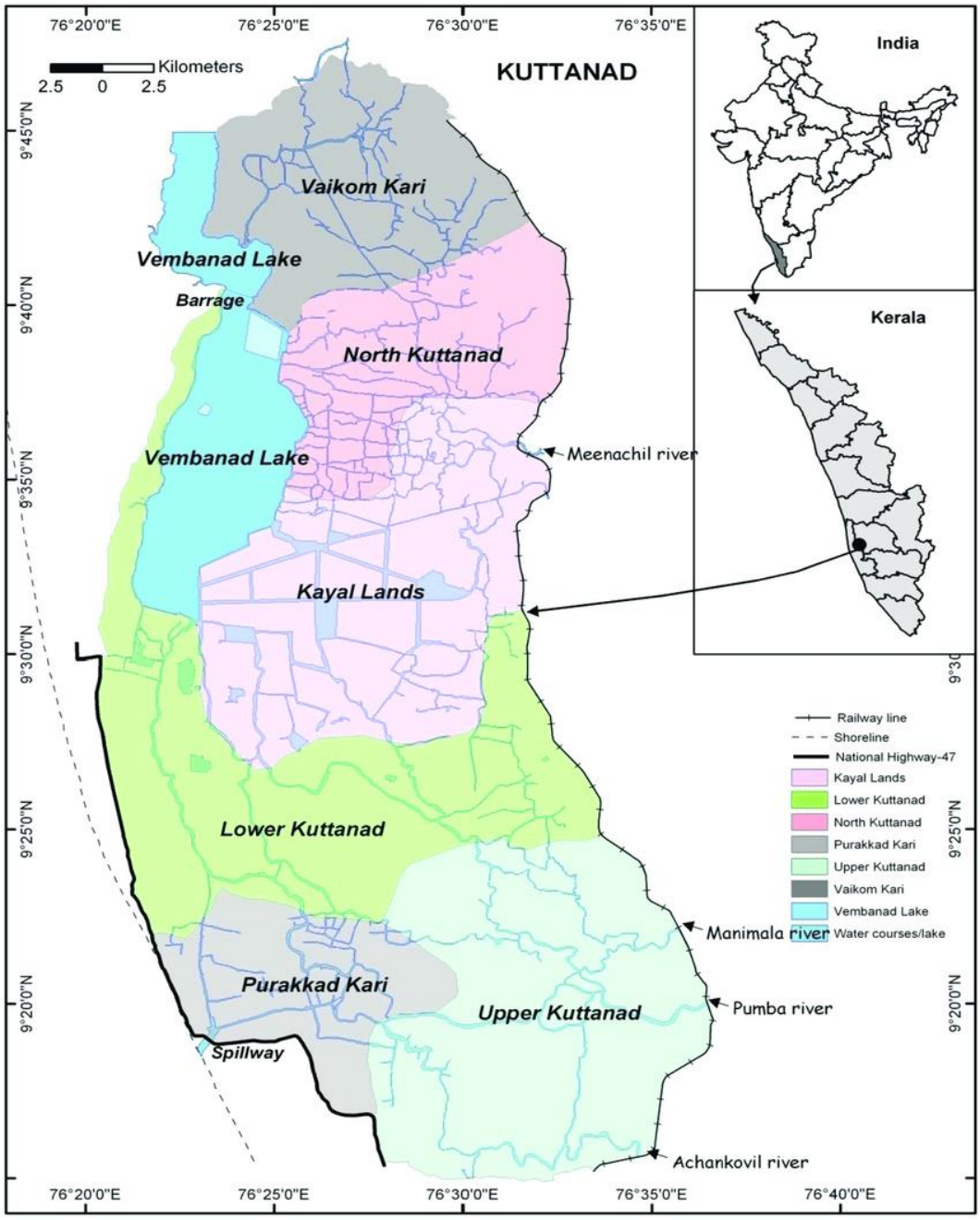
Lower Kuttanad, Upper Kuttanad, and North Kuttanad are the three main divisions of the Kuttanad region. Ambalappuzha taluk, Kuttanad taluk are all included in Lower Kuttanad. Different taluks and districts of Kerala's Upper Kuttanad contain a number of villages. These include Veeyapuram village in Karthikapally taluk, Edathua, Thalavady, Kidangara, and Muttar in Kuttanad taluk, Chennithala village in

[2] Residential areas refer to the bunds constructed for the reclaimed *kayal* lands.

Mavelikkara, Mannar, Kuruttissery, Budhanur, and Ennakkad villages in Chengannur taluk of Alappuzha district, as well as Parumala, Kadapra, Niranam, Pulikeezhu, Peringara, Chathenkeri, and Nedumpuram villages in Thiruvalla of Pathanamthitta district. The following areas are included in North Kuttanad: Vaikom Taluk, Western Kottayam Taluk, and Western Changanassery Taluk in Kottayam District.

Upper Kuttanad which lies on the south-easterly side of Kuttanad, has rather steep terrain, with elevations ranging from 0.5 to 6 metres above mean sea level. Saline water intrusion and floods does not affect this zone much, when compared to the other parts of the Kuttanad. In this region, the rivers Manimala, Pampa, and Achankovil enter Kuttanad. In the western portion of the Upper Kuttanad region, close to the Arabian Sea, is a place called Purakkad Kari. Lower Kuttanad lies north of the Upper Kuttanad. This zone lies one to two metres below the mean sea level. Saline water intrusion and floods affect this zone severely. Numerous small islands with human habitation are a special feature of this zone. The northern portion of this zone is where the reclaimed *kayal* lands are located. Due to the sediment carried by the Meenachil River and its tributaries, the North Kuttanad zone is a result of Vembanad Lake's natural reclamation. This zone lies north to the *kayal* lands of the lower Kuttanad. In this zone, the western parts lie 0.5 metres below the mean sea level and the eastern parts lie one metre below the mean sea level. This area is extremely susceptible to saline water incursion because of its proximity to the estuary. This area also has a significant danger of flooding.

Map 1: Kuttanad



Origin of Kuttanad

Two major hypotheses are prevalent in the area about the origin of Kuttanad. But the majority of the local people believe strongly that, thousands of years ago the entire region was forest and later due to some geological event, the Arabian Sea submerged the entire region up to the foot of Western Ghats. In subsequent years, there occurred

a phenomenon characterised by the rising and falling of sea levels. This event led to the displacement and subsequent burial of the forest's trees, which were previously submerged. The burial process occurred in situ, with the trees being covered by variable degrees of silt. As a result, the low-lying marshy saline plains of Kuttanad emerged. The regions in question exhibit extensive organic layers inside their soils, with different depths containing fossils of timber and shellfish (MSSRF, 2007). The current coastline region was created as a result of the deposition of silt carried by the rivers Periyar, Muvattupuzha, Meenachil, Manimala, Pampa, and Achenkovil, changing the former shallow bay into a large expanse of backwaters. Over time, the lagoon experienced a steady accumulation of sediment, resulting in the formation of the shallow wet paddy fields that currently define the Kuttanad region.

The historical documentation about the origins of this region is absent. However, the local inhabitants have preserved an oral tradition that has been passed down through generations, consisting of a mixture of mythical narratives and stories. According to a popular mythology, Kuttanad was reputed to have been a region characterised by an abundant growth of trees in a dense forested area. The forest was subsequently devastated by a wildfire. The region known as Chuttanad, originally named for its charred woodland, came to be known as Kuttanad through time. Until recent times, it was widely acknowledged that charred black timber logs, known as "*karineelam*," were extracted from rice fields. This observation sheds light on the notion of Chuttanad's evolution into Kuttanad. The majority of the place names within the Kuttanad region are suffixed with "*kari*," such as Chethurthiakary, Mithrakary, Mampuzhakary, Oorukary, Kainakary, Ramankary, and Puthukary.

Climate

The climatic features of Kuttanad are typical of a humid and uniform temperature throughout the year, which ranges from 21^{o} C to 36^{o} C. The southwest and north-east monsoons both contribute 80% of the rainfall to this region. The driest months are from February to May. During these months, the region experiences a decrease in rainfall and higher temperatures, resulting in a drier climate. However, despite the dry spell, Kuttanad still maintains its humid conditions due to its proximity to water bodies like rivers and backwaters. With the monsoon's departure, the humidity falls and the valleys turn lush green. The winter season in Kerala spans from October to February, which is considered by many as the ideal period for exploring the region.

Tourism and Boat culture

Kuttanad is unique in its diversity of landscape and climate. From the lush greenery to the serene backwaters and stunning coastline, Kuttanad offers a breath-taking range of natural beauty. Its tropical climate adds to the charm, making it a perfect destination for nature lovers and adventure enthusiasts. Kerala is renowned all over the state for it paddy production. Therefore, it is sometimes referred to as "Rice bowl of Kerala." In addition to its natural beauty, Kuttanad is also known for its rich cultural heritage and traditions. Moreover, Kuttanad cuisine is a delightful blend of flavours, with dishes like *appam*, *puttu*, and fish curry being popular among locals and tourists alike. Each year, a substantial number of tourists from various parts of the globe travel to Kuttanad. They are drawn to its serene backwaters and lush green landscapes. The region’s Ayurvedic treatments and wellness retreats also attract visitors seeking relaxation and rejuvenation. Kuttanad warm hospitality and friendly locals further enhance the overall experience, making it a must-visit destination for

travellers seeking a unique cultural and natural escape. Landscape is the prime factor that enables the growth of spices, besides the tourist attraction to the region. Kuttanad landscape, with its abundant backwaters and lush greenery, creates the perfect environment for the cultivation of spices. This not only adds to Kuttanad allure as a tourist destination but also makes it a hub for spice enthusiasts and culinary explorers from around the world. Houseboats attract tourists from all over the world. Every day, hundreds of tourists visit the Kuttanad region to travel and spend their time on houseboats. Many hotels and resorts are sprouting around the Vembanad Lake to make profits by attracting tourists. They are providing facilities like food, shelter, and travel on houseboats as a package. Houseboats are attracting the corporate world too. Many houseboats have convention centres, and the corporate companies are organising their meetings in houseboats to attract their clients. This trend has not only boosted the local economy but also created job opportunities for the residents of Kuttanad. Additionally, the serene and picturesque surroundings of Vembanad Lake make it an ideal destination for weddings and other special events, further contributing to the popularity of houseboats in the region. Boat races are also organised by government officials for the local people, which also attract tourists. Several trophies of boat races will be held throughout the year, and it is prestigious for a village to win the trophy. These boat races not only serve as a source of entertainment and pride for the local people, but also attract tourists from all over the world, boosting the tourism industry in Kuttanad. The participation and victory in these races have become a matter of great prestige for the villages, fostering a sense of unity and competition among them. Information regarding the different trophies is explained in the later part of this chapter.

Picture 2.1: A Houseboat

Inland transport

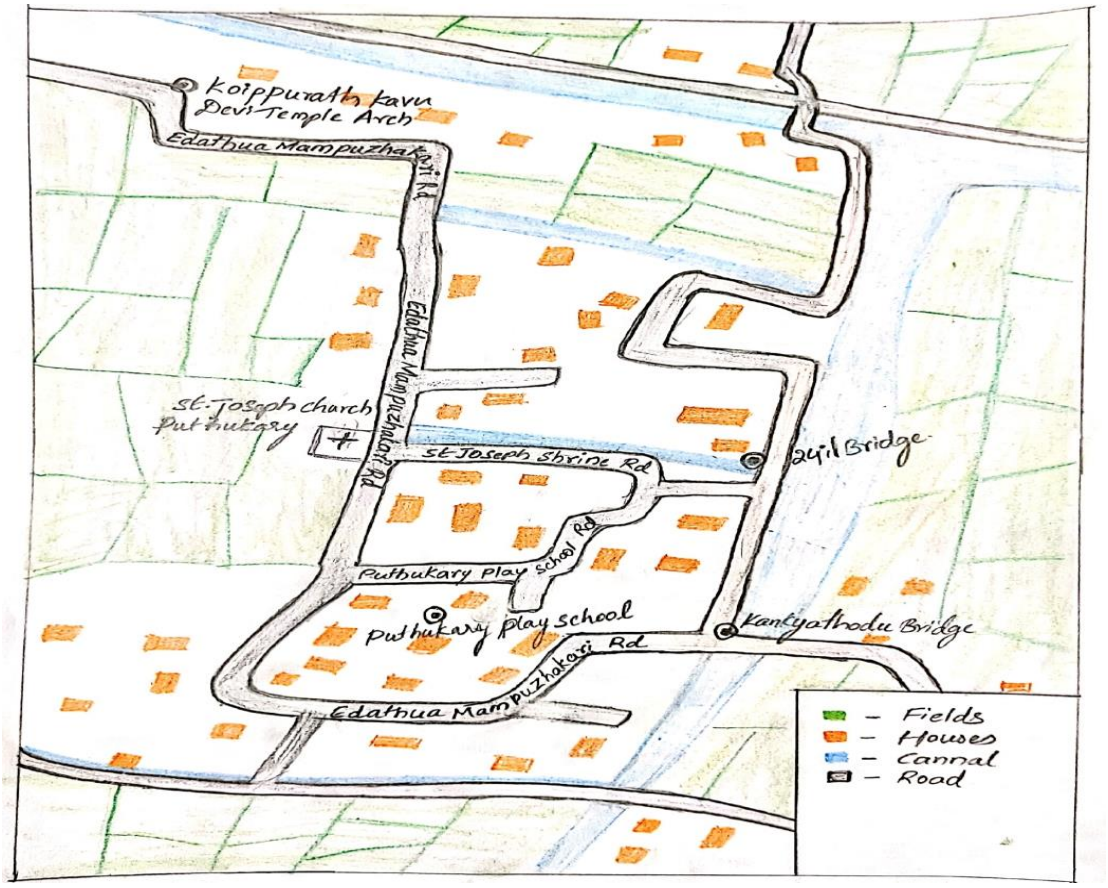
Aproximate distances in both the north-south and east-west directions are 196 and 29 km respectively, the Kuttanad Wetland System is a large network of canals, estuaries, and lagoons. This intricate system plays a crucial role in facilitating traffic. The Kuttanad Wetland System is not only important for transportation but also serves as a vital habitat for various species of flora and fauna. Its rich biodiversity attracts tourists and researchers alike, making it a significant ecological hotspot in the region. The majority of settlements in these regions are accessible through water-based transportation. The waterways in the Kuttanad Wetland System provide a convenient and efficient mode of transportation for the local communities. Boats and

ferries are commonly used to navigate through the interconnected canals, allowing residents to easily access markets, schools, and healthcare facilities. Additionally, the water-based transportation system also supports the livelihoods of many fishermen and farmers in the area, who rely on these waterways for their daily activities. Within the tidal reach, the Muvattupuzha, Meenachil, Pamba, and Achenkovil rivers are navigable for around 30 km upstream. The west coast canal system's Kottappuram-Kollam segment, which spans a distance of 209 km, passes through a sizeable chunk of the Vembanad Lake. The designation of National Waterway has been officially conferred on it. This designation recognises the importance of these waterways for transportation and trade in the region. It also opens up opportunities for further development and investment in infrastructure along the waterways, benefiting not only the local communities but also the overall economy of the area. A significant number of individuals possess their own boat for personal use. Having their own boat allows these individuals to enjoy recreational activities such as fishing and boating on the waterway. Additionally, it promotes tourism in the region as visitors can explore the scenic beauty and cultural heritage along the waterway, further contributing to the local economy.

Location of the study area

The village Puthukary is located three kilometres away (towards Mampuzhakari-Edathua road) from Ramankary. All the villagers here depend on the nearby towns of Alappuzha and Changanassery for their daily needs. These towns provide essential amenities such as groceries, healthcare facilities, and educational institutions. The villagers often commute to these towns to fulfill their requirements and access better opportunities for employment and education.

Picture 2.2 – Puthukary village map



Puthukary and its demographic profile

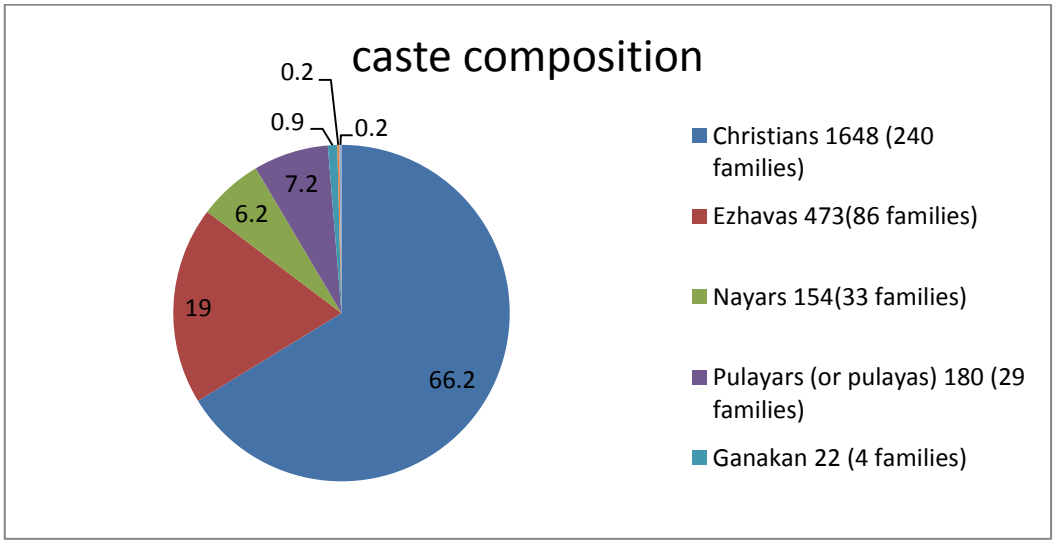
Puthukary village is a ward which comes under Edathua village but for administrative purpose, it comes under Ramankary Panchayat. Puthukary is surrounded by the communities of Kalangara (Thalavady village), Oorukary (Edathua village), Mithrakari (Muttar village), Chengamkari (Edathua village), and Oorukary (Edathua village) on both sides. These are all included in Kuttanad Taluk. The town has 394 homes and a total population of 2488 people. The dominant caste in the village is the Christian community, 1648 in number, with 66.2% of the total population of the village. The Ezhavas are next with 19 percent, then the Pulayas and Nayars with 7.2% and 6.2%, respectively. Ganakan constitutes 0.9 percent, followed by the Barber family (0.2%) and the Velan family (0.2%). Except for the Christian

community, all the other castes mentioned in the Table belong to the Hindu religion. Details about the inhabitants of Puthukary's various classes and religions are provided in Table 2.1. The village's religious variety is obvious, with the Christian caste predominating. It is interesting to note that all the other castes mentioned in the Table belong to the Hindu religion. People belonging to any other religions are not found in Puthukary village.

Table 2.1: Caste composition of people in Puthukary

Caste	Number of people	Percentage
Christians	1648 (240 families)	66.2
Ezhavas	473(86 families)	19.0
Nayars	154(33 families)	6.2
Pulayars (or pulayas)	180 (29 families)	7.2
Ganakan	22 (4 families)	0.9
Kshavarakar (Barber)	6 (1family)	0.2
Velan	5 (1 family)	0.2
Total	**2488 (394 families)**	**100.0**

Chart 2.1: Caste composition of people in Puthukary village



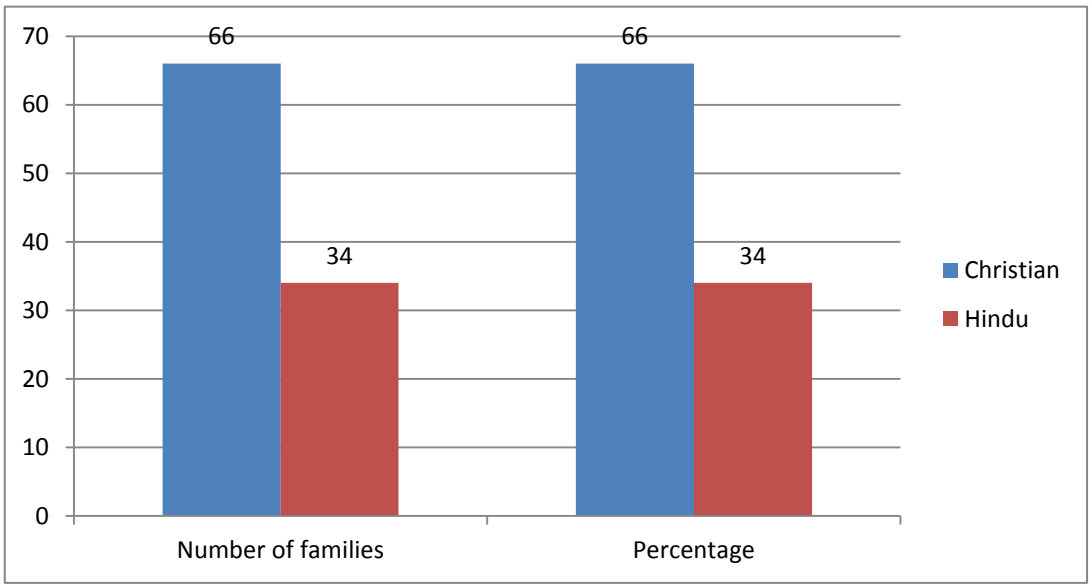
Religion and Caste in Puthukary

The religious composition of Puthukary village is predominantly Christian and Hindu, with no presence of other religious groups. However, it is important to note that the focus of this thesis is mainly on the Christian community, as they form the majority in the field area. This choice allows for a more in-depth analysis of their lifestyle and practices within the context of this study. There is not much difference in the lifestyle of the people of the other religions when compared to the Christians, except in a few aspects like the dress pattern of women and life cycle rituals and ceremonies. It is worth mentioning that the decision to focus mainly on the Christian community does not diminish the significance of other religious groups in the field area. These groups contribute to the cultural diversity and overall religious landscape, which add depth and richness to the community as a whole. By narrowing the scope, this study aims to provide a comprehensive understanding of the specific dynamics within the Christian community while acknowledging the broader religious tapestry in which they exist. Among the selected households, 66 percent belong to the Christian community, and the other 34 percent belong to the Hindu community. The presence of both Christian and Hindu communities within the selected households highlights the religious pluralism within the field area. This diversity allows for interfaith interactions and opportunities for mutual understanding, fostering a sense of tolerance and respect among community members.

Table 2.2: Religion wise division of the people in Puthukary

Religion	Number of families	Percentage
Christian	66	66.0
Hindu	34	34.0
Total	**100**	**100.0**

Chart 2.2: Religion wise distribution of people in Puthukary



Category-wise division of people in Puthukary

Christians and Nayars come under general category, whereas Ezhavas, Ganakan (astrology tellers) and Kshavarakar (barber, also called as Velikathala) come under OBC (Other backward Classes). Ezhavas also come under OEC (Other Eligible Communities[3]). Pulayar and Velan (tree cutting, only in private temples) communities come under scheduled castes. Demographic profile of 492 people

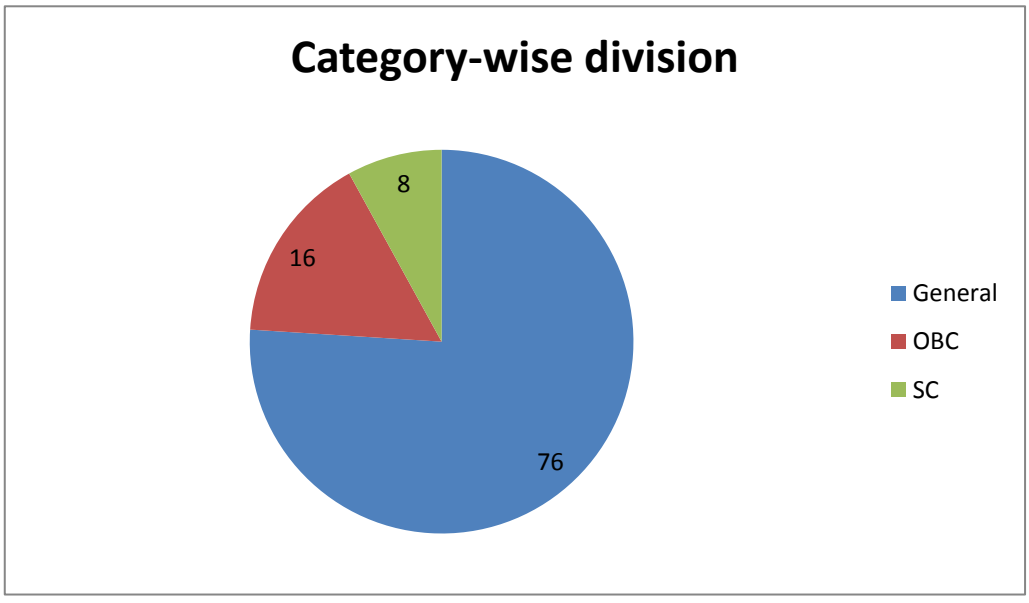
[3] Kerala state government has brought certain castes under Other Eligible Communities and providing them with certain welfare schemes for the upliftment of the communities. Ezhavas are one among those communities.

spread over 100 households was collected for the purpose of the research[4]. Among them 250 are male with 50.8 percent and 242 are female with 49.2 percent. They are patrilineal society with patrilocal residence and patriarchal. Seventy six percent of the selected households come under General Category and sixteen percent under Other Backward Classes and eight percent under Scheduled Castes category.

Table 2.3: Category wise division of the people in Puthukary

Religion	Number of families	Percentage
General	76	76.0
OBC	16	16.0
SC	8	8.0
Total	**100**	**100.0**

Chart 2.3: Category wise distribution of people in Puthukary



[4] For the purpose of statistical data, information was collected from the hundred households of the Puthukary village. But for collecting the other qualitative data, the researcher has travelled almost the entire Kuttanad wetland region, covering many villages, *Kayal* lands and the Vembanad Lake.

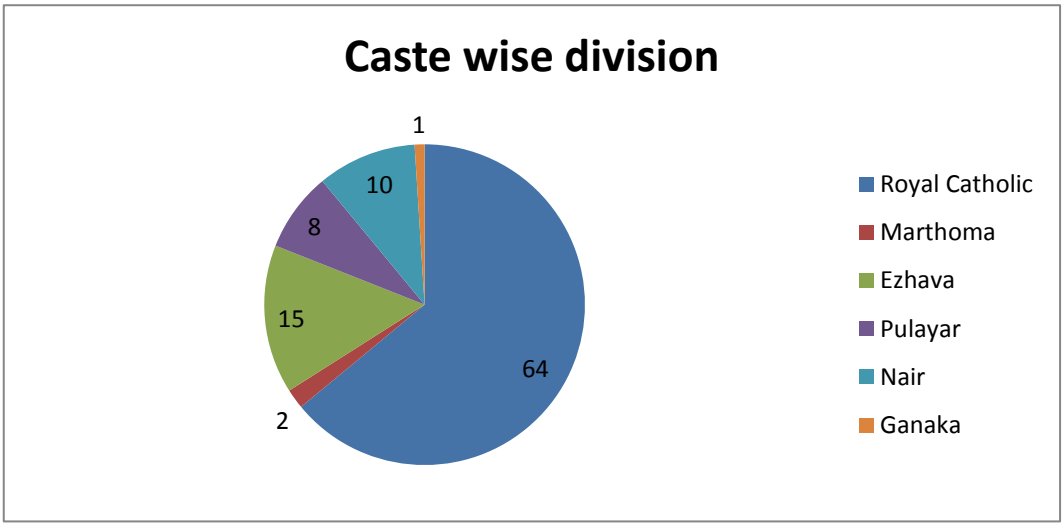
Caste-wise distribution of the selected households in Puthukary

The following Table 2.4 gives the caste wise distribution of the selected families in the field area. Among them, Roman Catholics are dominant with 64 percent; followed by Ezhavas with 15 percent and Nairs with 10 percent. Eight percent of the families belong to Pulayar community. One family belong to the Ganaka Caste and two families belong to the Marthoma[5] caste of the Christian community. So, in overall, in the selected field area, Christians are dominant with 66 percent and the remaining 34 percent are Hindus.

Table 2.4: Caste-wise distribution of the families in Puthukary village

Caste	Frequency	Percentage
Roman Catholic	64	64.0
Marthoma	2	2.0
Ezhava	15	15.0
Pulayar	8	8.0
Nair	10	10.0
Ganaka	1	1.0
Total	**100**	**100.0**

Chart 2.4: Caste wise distribution of selected households



[5] Marthoma refers to one of the denominations among the Christian communities of the Kerala.

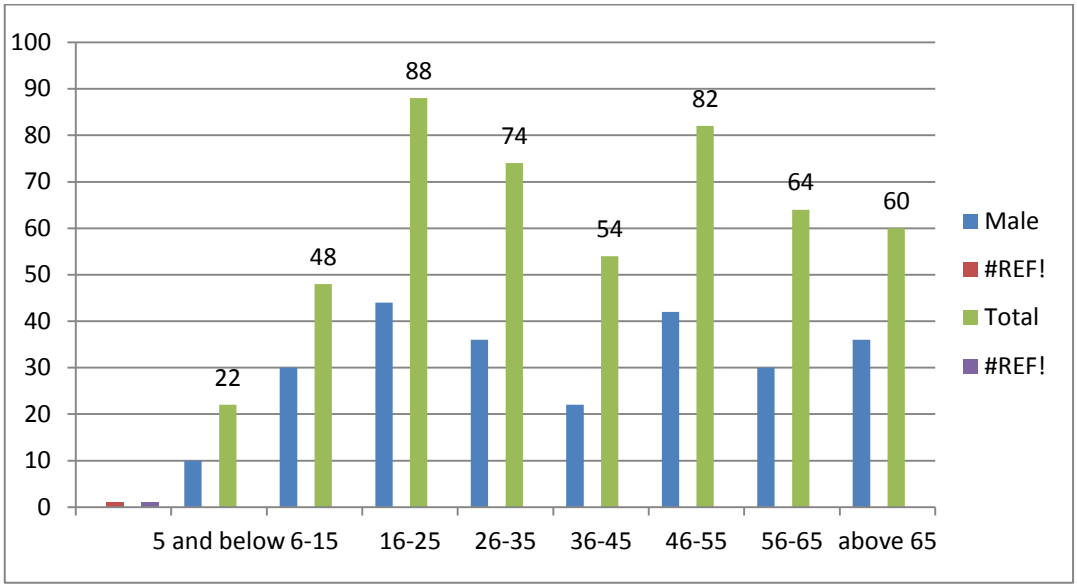
Age-wise distribution

Table 2.5 shows the age-wise distribution of the population in Puthukary village. Out of four hundred and ninety-two, majority are from the age group of 16-25 with 17.9 percent, and next comes the age group of 46-55 with 16.7 percent. Notably, there are sixty people above the age of 65 with 12.2 percent. The least number are below the age of five with 4.5 percent. There are six persons above the age of 80 and two women above the age of 90 still leading a healthy life.

Table 2.5: Age wise distribution of the people in Puthukary village

Age group	Male		Female		Total	Percentage
	Number of persons	Percentage	Number of persons	Percentage		
5 and below	10	4.0	12	5.0	22	4.5
6-15	30	12.0	18	7.4	48	9.7
16-25	44	17.6	44	18.2	88	17.9
26-35	36	14.4	38	15.7	74	15.0
36-45	22	8.8	32	13.2	54	11.0
46-55	42	16.8	40	16.5	82	16.7
56-65	30	12.0	34	14.0	64	13.0
above 65	36	14.4	24	9.9	60	12.2
Total	**250**	**100.0**	**242**	**100.0**	**492**	**100.0**

Chart 2.5: Age-wise distribution of the people of selected households



The data reveals that the population in the selected field area is predominantly composed of individuals between the ages of 16 and 55, accounting for a significant portion of the population. However, there are a small but notable number of individuals above the age of 65, indicating a presence of elderly individuals in the community.

Marital Status

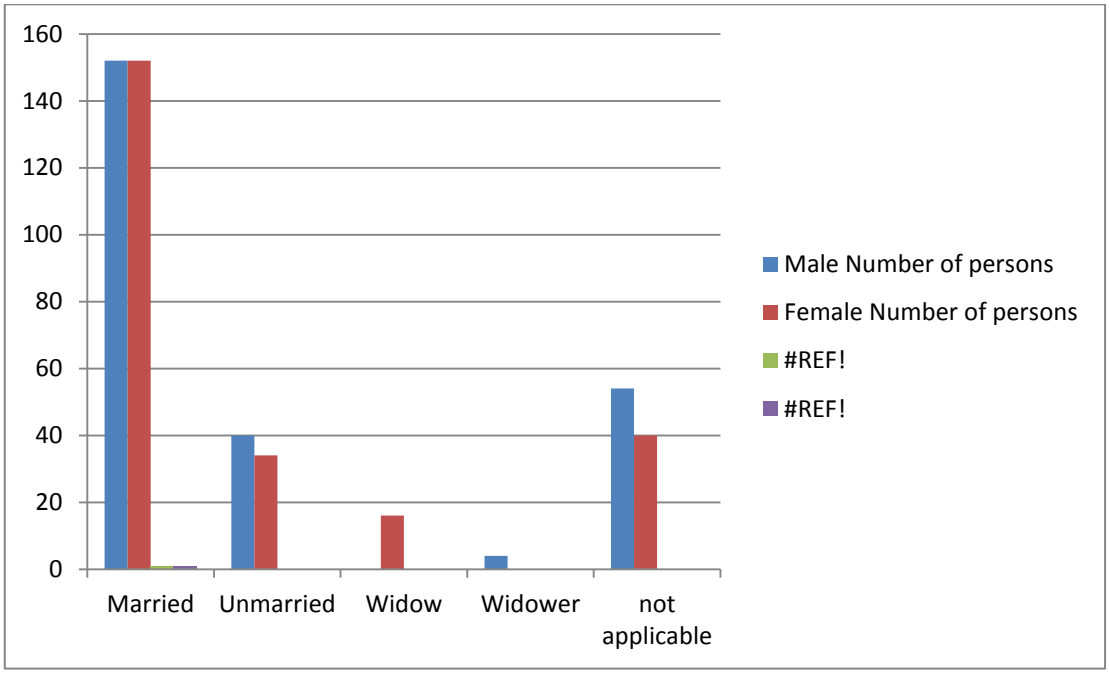
Marital status of the selected population in the field area is shown in the following Table 2.6. Among them, 61.8 percent are married[6] and 15 percent are unmarried. There are 3.3 percent of widows and 0.8 percent of widowers. From the survey, it is understood that 19.1 percent of the people have not attained the legal age for marriage.

[6] Among all the married people, the spouses were selected from the Kuttanad region only; mostly from the nearby villages, except one from Thiruvananthapuram and the other from Cochin.

Table 2.6: Marital Status of the people in Puthukary village

Marital Status	Male		Female		Total	Total Percentage
	Number of persons	Percentage	Number of persons	Percentage		
Married	152	60.8	152	62.8	304	61.8
Unmarried	40	16.0	34	14.0	74	15.0
Widow	0	0.0	16	6.6	16	3.3
Widower	4	1.6	0	0.0	4	0.8
Not Applicable	54	21.6	40	16.5	94	19.1
Total	**250**	**100.0**	**242**	**100.0**	**492**	**100.0**

Chart 2.6: Marital status of the selected people in Puthukary village



Educational Status

The level of education of the population in the chosen field is shown in Table 2.7. With the exception of one person who is mentally challenged, it is discovered that every person in the chosen sample is literate. The study shows that 21.5 percent of the people in the field area are with the highest qualification of tenth standard. Next are the people, possessing a highest qualification of Intermediate (plus two) with 14.2 percent, followed by the people with upper primary (6^{th} to 9^{th} class) as highest qualification with 13.4 percent. There are also 8.9 percent of graduates and 5.3 percent of postgraduates. Majority of the youth are joining professional courses like B.Tech, Diploma and Nursing. So, there are 12.2 percent of the people with diploma and 11.0 percent of the people who got certified in the professional courses. There are 8.1 percent of the people who quit their education at the primary level itself (1^{st} to 5^{th} class).

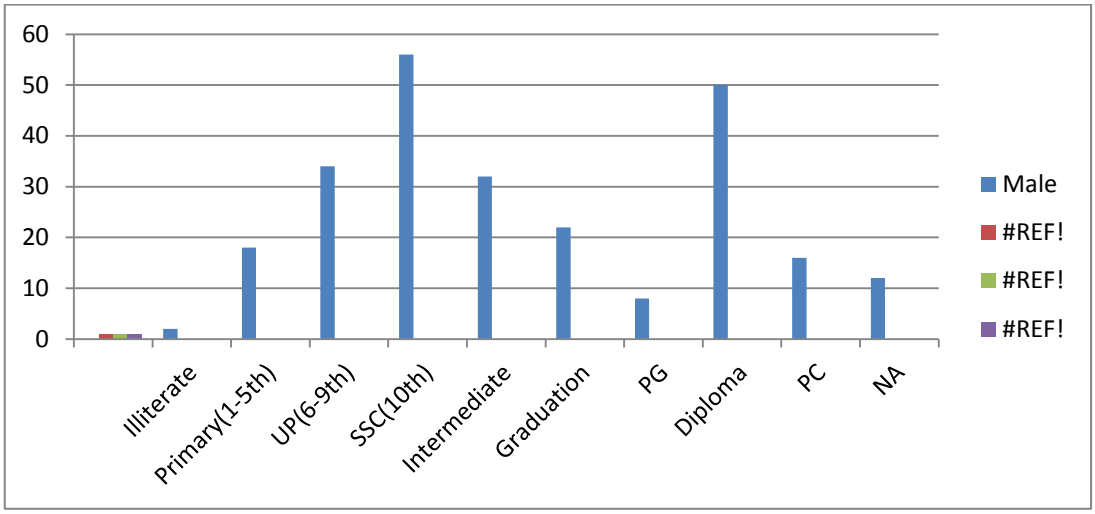
Table 2.7: Educational Status of the people in Puthukary village

Education level	Male		Female		Total	Total Percentage
	Number of persons	Percentage	Number of persons	Percentage		
Illiterate	2	0.8	0	0.0	2	0.4
Primary(1-5^{th})	18	7.2	22	9.1	40	8.1
UP(6-9^{th})	34	13.6	32	13.2	6	13.4
SSC(10^{th})	56	22.4	50	20.7	106	21.5
Intermediate	32	12.8	38	15.7	70	14.2
Graduation	22	8.8	22	9.1	44	8.9
PG	8	3.2	18	7.4	26	5.3

Diploma	50	20.0	10	4.1	60	12.2
PC	16	6.4	38	15.7	54	11.0
NA	12	4.8	12	5.0	24	4.9
Total	**250**	**100.0**	**242**	**100**	**492**	**100.0**

*UP- Upper Primary; PG- Post Graduation; PC- Professional courses; NA- not applicable

Chart 2.7: Educational status of the selected people in Puthukary village



Political organisation

The study area has the predominance presence of traditional authority that arose from the priests and elders of the Church community itself. Most of the village conflicts handled by the village elders, and they have a huge respect from the members in the village. However, as the severity of the conflictual cases increases, they are eventually registered in the police station.

Puthukary is a ward in Edathua village but comes under Ramankary Panchayat. Elected ward member is the head of the village in all administrative and legal matters. The leader will be elected through democratic general elections. But to resolve any issue, collective decision of the community will be considered rather

than the autocratic decision of the elected ward member. This approach ensures that the opinions and concerns of the entire community are taken into account, promoting inclusivity and preventing any abuse of power. Additionally, it fosters a sense of unity and cooperation among the residents of Puthukary, allowing for a more harmonious and equiTable society. Women were also given equal chance to participate in political activities.

There are no specific responsibilities for individuals towards their community development as everyone thinks of their personal benefits and to increase their living conditions. There is no hierarchy in the society with respect to one's political, social or economic status. This equality in society has allowed individuals to freely pursue their aspirations and goals without any discrimination. It has fostered a sense of unity and collaboration among community members, leading to a collective effort towards overall progress and development. All are treated equally except for those who have criminal record. *Kudiyan-Adiyan* (master – servant) relation had existed in the society till few decades ago. But, it no more exists now. *Kudiyan* also called as *notakaari* (a big landowner) and *adiyan* is a supervisor who controls and monitors the workers for his *notakaari.* This relationship was based on a hierarchical system where the *adiyan* manage his *kudiyan* and often exploited their labour. However, with the progress of time and societal changes, this exploitative relationship has been eradicated, and all individuals are now treated with fairness and equality regardless of their background or occupation.

Economy

The primary livelihood of the people is the paddy cultivation followed by coconut and plantain cultivation. Coconut and plantains are cultivated on the bunds of the

fields and also in the backyards of the houses. Besides this, Kuttanad is the home ground of many important species of fishes, birds, prawns, clams and cattle, which bring certain income to the people. Fish and clam (*kakka* in local language) capture, clay mining, duck rearing, shell mining and toddy tapping (mainly people from Ezhava community) are other important economic activities by the local people to earn their livelihood. House boats are providing lot of employment for the local people. Drivers, cooks and cleaners are needed for each boat, and they also pay good amount like 15000 rupees per month. People who were involved in *karapani* (‘*kara*’ means land and ‘*pani*’ means work, like agricultural labour) are now shifting to work in houseboats, where they earn more when compared to *karapani*.

Primary and Secondary Occupation of the people:

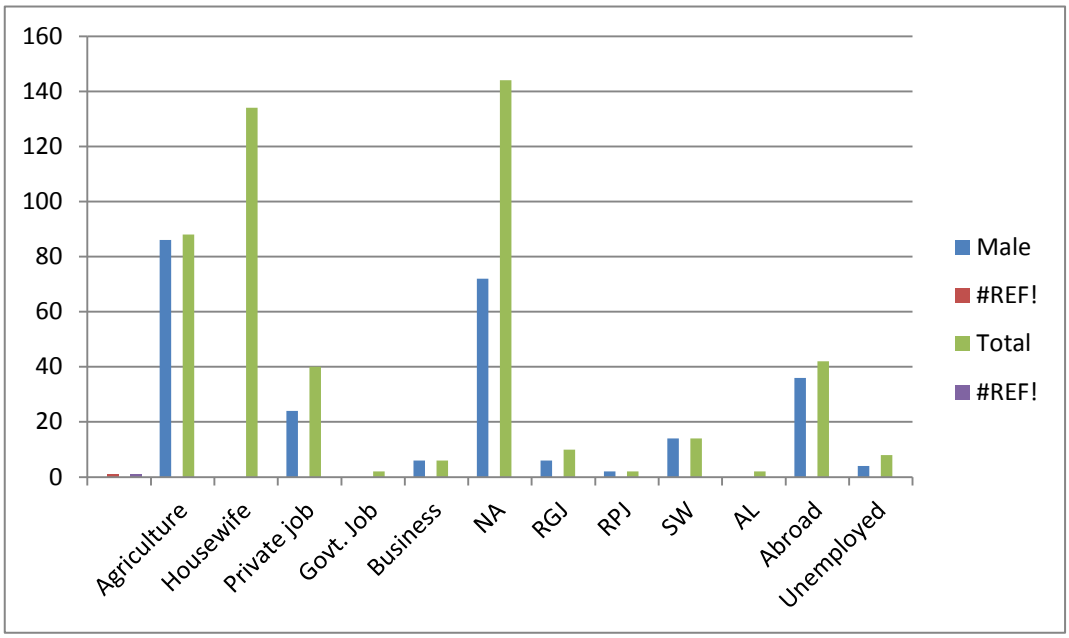
The primary and secondary occupations of the people and their income levels are mentioned clearly in the following Tables. From Table 2.8, we can notice that agriculture is the primary occupation for 17.9 percent of the people and 27.2 of the total population (55.3 percent of the women) are house makers. Among them, 8.5 percent of the people went abroad for livelihood and 8.1 percent of the people opted private jobs. It is noted that 2.8 percent of the people are skilled workers and for 2.4 percent of the people (retired government and private job holders), pension is their primary source of income. It is also noticed that 1.6 percent of the people are unemployed and 1.2 percent of the people are involved in business. The Table also reveals that 0.4 of the people are government job holders and 0.4 of the people are agricultural labourers.

Table 2.8: Primary Occupation of the people in Puthukary village

Occupation	Male		Female		Total	Total Percentage
	Number of persons	Percentage	Number of persons	Percentage		
Agriculture	86	34.4	2	0.8	88	17.9
Housewife	0	0.0	134	55.4	134	27.2
Private job	24	9.6	16	6.6	40	8.1
Govt. Job	0	0.0	2	0.8	2	0.4
Business	6	2.4	0	0.0	6	1.2
NA	72	28.8	72	29.8	144	29.3
RGJ	6	2.4	4	1.7	10	2.0
RPJ	2	0.8	0	0.0	2	0.4
SW	14	5.6	0	0.0	14	2.8
AL	0	0.0	2	0.8	2	0.4
Abroad	36	14.4	6	2.5	42	8.5
Unemployed	4	1.6	4	1.7	8	1.6
Total	**250**	**100.0**	**242**	**100.0**	**492**	**100.0**

*Govt- government; NA- not applicable; RGJ- retired government job; RPJ- retired private job; SW- skilled worker; AL- agricultural labour

Chart 2.8: The primary occupational status of the people in Puthukary village



From the Table 2.9, we can understand that very few percent of the people in Puthukary village are earning extra income through secondary occupation. Among the people, 2.8 of the people are considering agriculture as their part time job since they consider it as less profitable. It is also known that 2.4 percent of the people are drawing pension besides other ways of earning and two percent of the people are earning extra money by doing business. Two percent of the people are working as agricultural labourers to earn extra money and 1.6 percent of the people are earning money by doing supplementary farming.

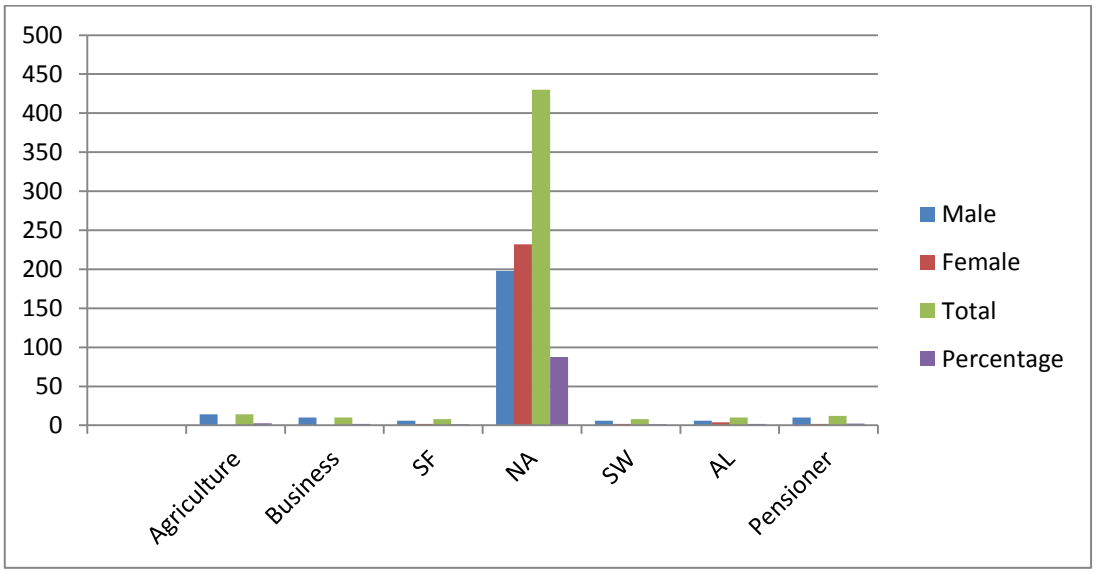
Table 2.9: Secondary occupation of the people in Puthukary village

Occupation	Male		Female		Total	Percentage
	Number of persons	Percentage	Number of persons	Percentage		
Agriculture	14	5.6	0	0.0	14	2.8
Business	10	4.0	0	0.0	10	2.0
SF	6	2.4	2	0.8	8	1.6
NA	198	79.2	232	95.9	430	87.4
SW	6	2.4	2	0.8	8	1.6
AL	6	2.4	4	1.7	10	2.0
Pensioner	10	4.0	2	0.8	12	2.4
Total	**250**	**100.0**	**242**	**100.0**	**492**	**100.0**

*SF- supplementary farming; NA- not applicable; SW- skilled worker;

AL- agricultural labour.

Chart 2.9: Secondary occupational status of the people in Puthukary village



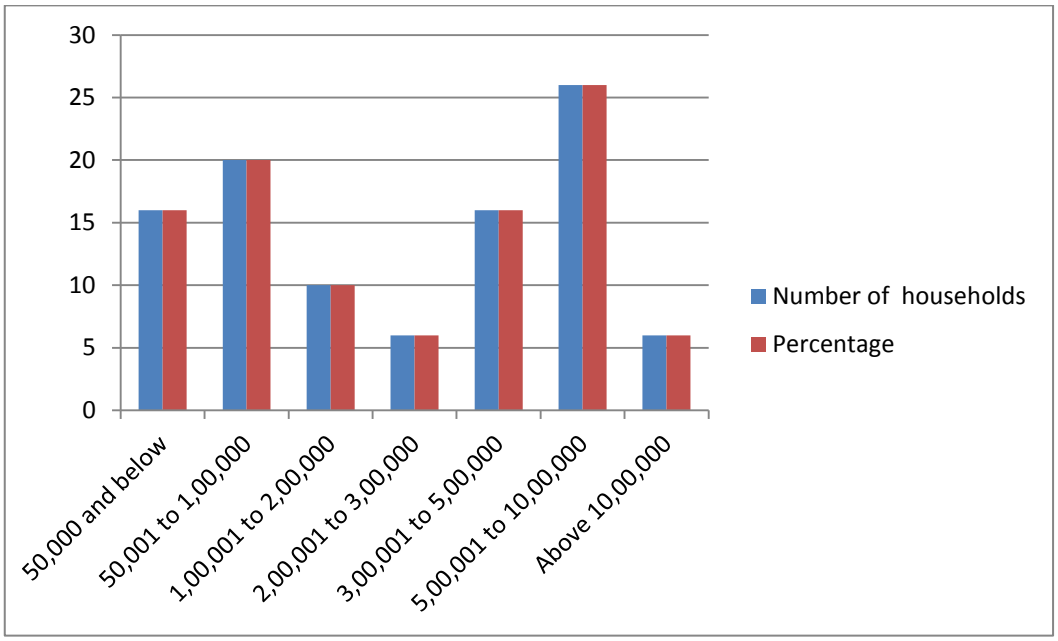
Income Levels:

The income levels of the households in the selected field area are given in the Table 2.10. The income levels are really low for the small and medium land holding farmers and for those who only depended on agriculture. There are 36 percent of the households with an annual income of 1 lakh or less and 10 percent of the households are earning up to 2 lakh per annum. But majority (26 percent) of the households is earning an annual income of 5 to 10 lakh rupees. Among the selected sample, 16 percent of the households are earning between 3 to 5 lakh rupees per annum and Six percent of the selected households are earning more than 10 lakh rupees per annum.

Table 2.10: Income wise division of the households in Puthukary village

Income levels per annum (In Indian Rupees)	**Number of households**	**Percentage**
50,000 and below	16	16
50,001 to 1,00,000	20	20
1,00,001 to 2,00,000	10	10
2,00,001 to 3,00,000	6	6
3,00,001 to 5,00,000	16	16
5,00,001 to 10,00,000	26	26
Above 10,00,000	6	6
Total	**100**	**100.0**

Chart 2.10: Income level division of families in Puthukary village



Fish and duck farming:

Fish has become a part of the regular diet for Kuttanad people. Mainly the villages around the Vembanad Lake and the villages on either side of the Pamba River and Manimala River involves in regular fishing activities. They also catch *kakka* (clams) and prawns. Some farmers divide their fields for fish cultivation besides paddy cultivation. Some other farmers leave their fields to the people who want to catch fish during rainy reasons.

Supplementary farming like coconuts, banana, spices and other fruits:

Banana and coconut trees (thengu and vazha, respectively) are grown on the fields' outer bunds. Coconuts are harvested from the trees and sold every 45 days. For coconuts, January is the season with the highest yield. Many varieties of vegetable plants and trees are grown in the front and backyards of the houses. No house is seen without plants. So, the spices and fruits grown in the house bring some additional income to the people.

Lime production from shells:

The people who reside in the villages close to the Vembanad Lake involve in shell mining from the Vembanad Lake and they make lime out of those shells. It is then sold to the farmers of the Kuttanad. Kuttanad fields are very acidic and the farmers use that lime to neutralise the acidic nature of their fields.

Making and selling of earthen ware:

Some of the inhabitants of the region are also involved in the business of selling of the earthen ware like utensils, lids, pots, storage jars and flower pots etc. People of Kuttanad cook certain dishes, especially fish curry in earthen utensils (*man-chatti*) only and they also use the earthen ware for various household purposes. So, the demand for the earthen ware is bringing livelihood for some families.

Migration:

Majority of the youth particularly males from Kuttanad region are going to Gulf countries for livelihood. They are not satisfied with the income earned by doing agriculture. They want to uplift themselves and their families economically and get rid of the economic burdens. So it is common among youth here to go abroad and stay there for a decade or more and return to their home land with some money. Some of the older people among the villagers migrated to gulf countries in their young age and worked there for a decade or more. After returning from the gulf, they started practising agriculture. So it is a common practice among the Kuttanad people to migrate to gulf countries to earn higher levels of income and to secure their future.

Housing Pattern

Residential areas in the Kuttanad region are nothing but the bunds constructed around the backwaters and *kayal* lands. Houses are constructed on the bunds around

the reclaimed agricultural fields. Unlike in villages of other states of South India, villages in Kerala are unique with spacious and huge residential buildings with latest designs. A general notion among Indians, that, 'villages are poorer than towns and cities', is false in the case of Kerala villages[7]. Each house is different from another in design and it is the status of one to have a huge bungalow with new design. The richness of the villages in the field area left the researcher with astonishment. The houses are constructed leaving the place for front yard and backyard as well. Many plants and trees like spices[8], fruits and vegetables are grown in these yards. Each house has a 'sit-out' area near the entrance of the house. Since, it rains almost throughout the year, many houses are covered by iron sheets on the top and they pour stone chips around the house to avoid dampness.

Ninety-four percent of the homes in the field area are pucca homes, and the remaining six percent are semi-pucca homes. Not even a single *kutcha* house was seen. Each and every house have facilities like toilet, electricity, cooking gas and electronic and electrical items like television[9], mobile phones, mixer-grinders and refrigerators. No house is seen without furniture. Sixty percent of the houses have well, but water drawn from them cannot be used for drinking. Each and every house has a front yard as well as backyard.

[7] During the fieldwork, the researcher visited almost all the villages in the Kuttanad region and it is found that majority of the people in the villages are rich except few in every village. It is also found that the source of income for them is the money earned by working in Gulf countries by them or by their family members.

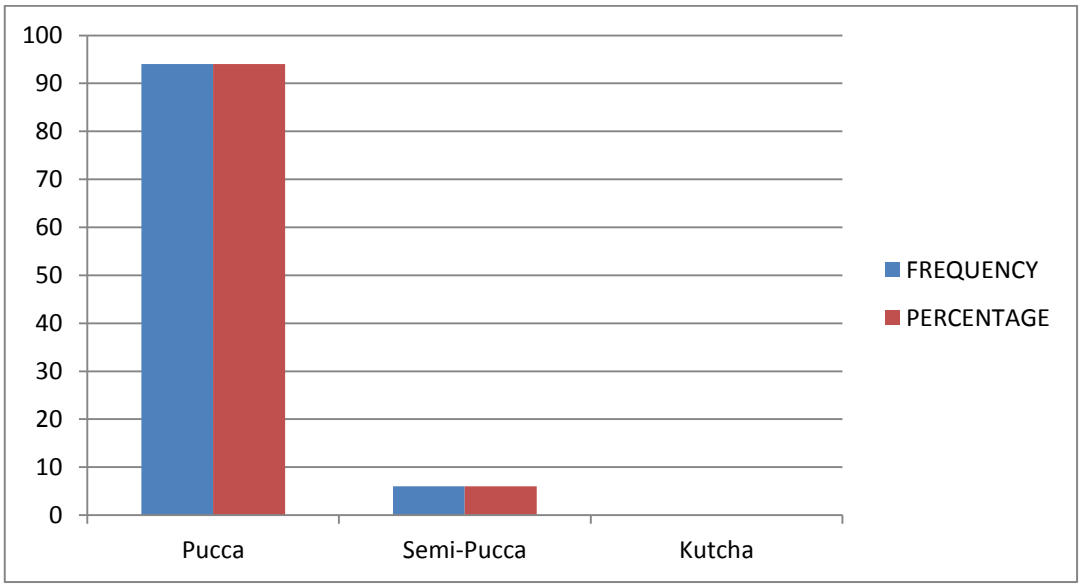
[8] Spices trees black pepper, cloves, cardamom are commonly found in the backyards of every house in the field area.

[9] Only one Nair house has no television. Head of the household is more concerned about his children's education, and so he did not buy a television, to not disturb his children.

Table 2.11: Types of houses in Puthukary village

Type of house	Frequency	Percentage
Pucca	94	94.0
Semi-Pucca	6	6.0
Kutcha	0	0.0
Total	100	100.0

Chart 2.11: Types of houses in Puthukary village

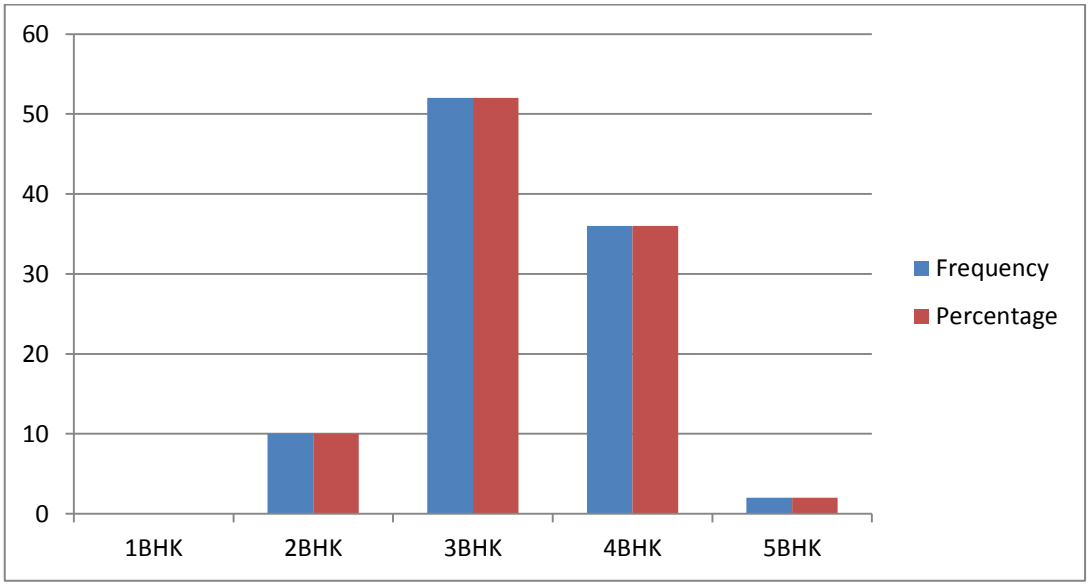


Of those, 52% of the homes have three bedrooms, a hallway, and a kitchen. 36 percent of homes have four bedrooms, a hall, and a kitchen, 10 percent have two bedrooms, a hall, and a kitchen, and 2 percent have five bedrooms, a hall, and a kitchen. There was no house with single bedroom. Whatever small the area of the residence may be, the houses were constructed with at least two bedrooms.

Table 2.12: Number of rooms in the selected households of Puthukary village

No. of rooms in the house	Frequency	Percentage
1BHK	0	0.0
2BHK	10	10.0
3BHK	52	52.0
4BHK	36	36.0
5BHK	2	2.0
TOTAL	**100**	**100.0**

Chart 2.12: Size of the selected houses in Puthukary village



Possession of vehicles:

From the survey, it is found that fifty-eight percent of the households have motor bikes and twenty-six percent of them have cycles and twenty-two percent have cars as well. Only twenty-two percent of the households own boats. According to key

informants, in earlier days, i.e. nearly 17-18 years ago, before the construction of roads in Puthukary, each and every house had at least a *kochuvallam* (a small and narrow wooden canoe). Now, seventy-eight percent of the households do not have boats.

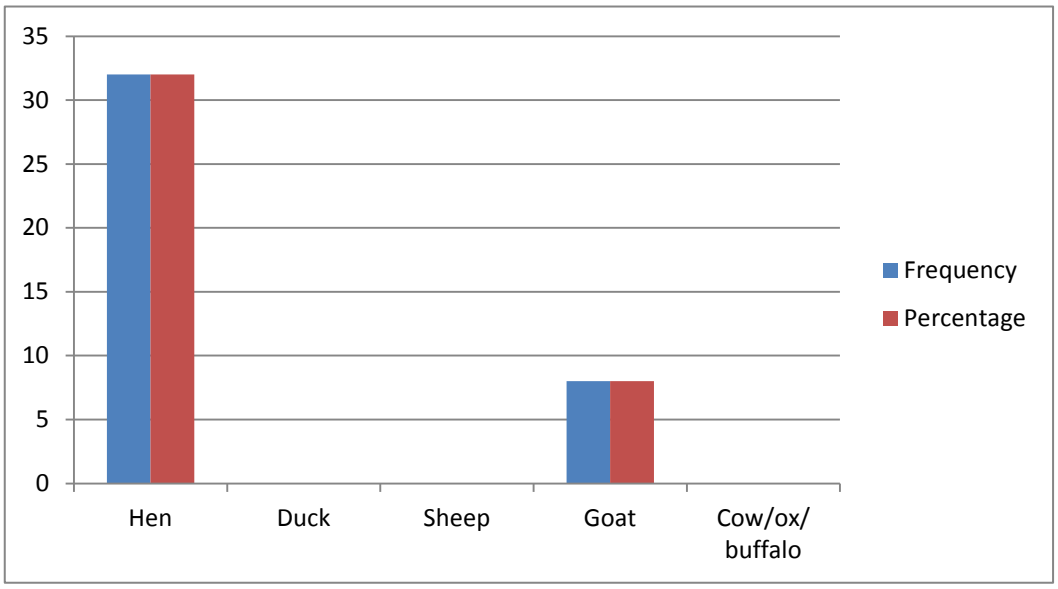
Domestication of birds and animals:

Duck rearing is not found in Puthukary village. According to the key informants, the duck rearing has decreased much in the recent years due to the risk of flu among birds and there will be huge loss of investment occurs when the birds fall sick. Residents of the villages surrounding Vembanad Lake and the *kayal* lands are found rearing ducks. However, it was discovered that 32% of the homes were keeping hens, and 8% of the homes had goats for personal use.

Table 2.13: Number of houses possessing animals/poultry

Type of the animal/bird	**Frequency**	**Percentage**
Hen	32	32.0
Duck	0	0.0
Sheep	0	0.0
Goat	8	8.0
Cow/ox/ buffalo	0	0.0

Chart 2.13: Frequency of houses with domestication of animals/birds



Clothing pattern

The term "costume" pertains to the manner in which a specific group of individuals attire themselves. The variation of this pattern is contingent upon the cultural, customary, and lifestyle disparities among many communities and nations. Each community possesses its own distinctiveness, primarily attributed to the customs and attire of its male and female members. India is home to various communities and sub-divisions, each characterised by distinct styles of attire. The distinct regional wearing patterns in southern and northern India contribute to the distinctive visual identities of individuals from these respective regions. In a similar vein, those inhabiting the eastern and western regions of India adhere to distinct and distinctive modes of attire.

Kuttanad is commonly associated with the qualities of simplicity and elegance. The inhabitants of the region possess an inherent inclination for purity, as is readily apparent in their attire. In the realm of traditional attire in Puthukary, both men and women exhibit a marked preference for the colours of white and off-white. The

predominant attire worn by males in Puthukary is the "*mundu*," a traditional garment typically characterised by its predominantly white colour. The garment is fastened securely around the waist using a knot and extends downward to the level of the feet. In the context of Hinduism, it is customary for women to attire themselves in a traditional outfit consisting of a blouse and *mundu*, which is commonly referred to as "*mundu neriyathu*". In the context of Christianity, women commonly wear a garment referred to as a "*chatta*" together with a *mundu* that is skilfully folded in a fan-like manner at the back. Shirts and trousers are commonly regarded as the preferred attire for men in terms of comfort. Recently, there has been an increasing trend among the youth in Kerala to adopt Western clothing styles.

The attire worn by Christian women, consisting of a two-piece blouse and *mundu*, exhibits notable distinctions from the manner in which Hindu ladies wear it. Christian women often choose to wear a pleated variation of the *mundu*, a traditional garment, which is skilfully folded in a fan-like manner at the back. Nevertheless, there exists a striking resemblance in the kind of clothes donned by Christian and Hindu men.

Bridal Costumes:

Bridal attire holds a significant cultural significance in the state of Kerala. The variation in colours, fabric, texture, and manner of wearing garments in Kerala is reliant upon the religious and cultural practises observed in different regions. In accordance with Hindu norms, the bride adorns herself with either a *mundu* or a saree. The bridal attire is meticulously crafted with bright colours and beautiful embroidery. A significant majority of women exhibit a preference for dressing themselves with ‘Kanchipuram silk’ sarees on their auspicious occasions. The

colours that are predominantly sought for include red, maroon, orange, and deep purple. The white and black shades are typically avoided in the context of weddings; however, women commonly incorporate these colours into their everyday attire. Traditionally, men opt to wear a mundu, a garment often made of cotton, along with a silk *jubba* as their attire of choice for wedding ceremonies.

White is widely regarded as the predominant colour of choice among Christian ladies. During their wedding ceremony, individuals adorn themselves with a white saree and veil. Certain women opt to wear white gowns instead of traditional sarees. The colour white is selected because of its association with purity. Men typically choose to wear a combination of a shirt and trousers, a complete suit with a jacket, or simply a plain shirt along with a *mundu*.

Traditional sarees:

Similar to other states in South India, the saree holds notable cultural significance as traditional attire for women in Puthukary. Kanchipuram Silk and Benares Silk sarees are widely favoured among women for adorning themselves during significant events such as festivals and weddings. The half-saree is a garment that is commonly worn by the adolescent females in Puthukary. It is a combination of three outfits; a shirt, a voluminous skirt, and a shawl referred to as a *davani,* which is gracefully arranged over the chest like a saree. The ‘set-saree’ alternatively referred to as the Kerala saree, shares similarities with the *mundu* neriyathu, representing another variant of the traditional saree. The aforementioned attire is a singular garment that is traditionally worn during the primary festivities in the Puthukary village, namely *Onam* and *Vishu*.

Food habits

The main food consumed by the inhabitants of Puthukary is rice. Comparing South India to other South Indian states, rice grains appear differently. In daily meals, fish is more prevalent than veggies. For breakfast items like *iddaly(idly), appam, puttu* (with banana or some curry), *parata* are consumed. Lunch will be with *choru* (rice), *meen* (fish) fry or curry, pickle are mostly consumed; and for dinner, earlier most of them used to consume tubers like *kappa* (tapioca), *chembu* (taro), served with *ulli kaaram* (chutney made with onions) and *pazham* (bananas). But, these days most of them are having *choru* (rice). *Kudumpuli*, a kind of tamarind grow only once in a year, is stored and used specially in making fish curry.

Family

The institution of family is of utmost importance in upholding the societal framework and possesses a multitude of functions. It satisfies the physiological requirements of an individual from a biological perspective. The process of socialisation is significantly influenced by it, as it establishes a vital connection between an individual and society. Each individual experiences their life within the context of their family and is responsible for fulfilling their responsibility towards their family members. The individual's conduct towards others will be influenced by the roles they have been assigned based on the nature of their familial relationships. The notion and organisation of the family exhibit variations across different societies. Therefore, by understanding the dynamics of familial relationships, one can gain insights on the structure and organisation of the society. According to Goode (1975:1), society may be conceptualised as a framework composed of families, and the distinct characteristics of a particular society can be elucidated by examining its

familial relationships. The social framework of the Kuttanad community can be effectively achieved by an in-depth look of their familial institution.

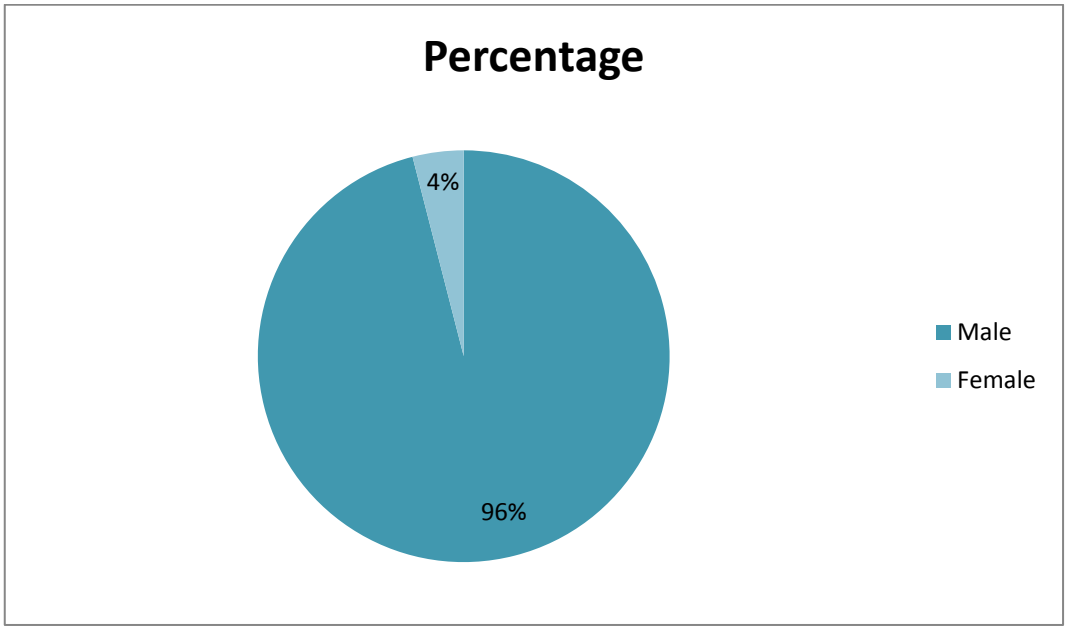
The family serves as the fundamental entity for social interactions within the Puthukary community. '*Kutumbam*' is the term used in Malayalam, which denotes family. Except the Nayar, who are matrilineal, most caste groups in the Kuttanad region follow a patrilineal kinship system, whereby descent is traced through the male line. Additionally, they practise virilocal post-marital residence pattern, whereby married couples dwell with or near the husband's family. Furthermore, this society adheres to a patriarchal social structure, wherein authority and power are predominantly held by men. The lineage is traced patrilineal through the family. In many traditional family structures, the father assumes the role as the family's head. Additionally, in cases where the father reaches old age, the responsibility of assuming this role of head often falls onto the eldest son. In situations where male children are absent, girls assume the obligation. The head of the family will be responsible for making decisions. In instances where women/girls express a correct decision, men tend to agree. Individuals often experience a sense of obligation to generate income to support their families. Individuals who assume responsibility within their family unit and demonstrate diligent work ethic are more likely to attain higher social standing, particularly in cases when other family members are not actively contributing to the household. If all individuals are engaged in productive labour, then it follows that they should be granted equal social standing. There is an absence of discrimination observed. Currently, individuals are actively seeking partners that possess a higher earning capacity. Based on the data presented in the Table, it is evident that out of a total of one hundred households selected, ninety-six

households are headed by males, while the remaining four households are headed by females.

Table 2.14: Heads of the households based on gender in Puthukary village

Gender	Frequency	Percentage
Male	96	96.0
Female	4	4.0
Total	**100**	**100.0**

Chart 2.14: Gender wise representation of head of the households in Puthukary village



The organisation of family structures among the Kuttanad people is well-established and involves active participation from both men and women. While it is commonly believed that male members typically possess authority within a family structure, it is important to acknowledge that women can also wield power and make decisions that contribute to the effective organisation of the household, especially among the Nayar

families. Children also contribute to the well-being of the family. The genealogical mix of families residing in the field region has a spectrum that spans from individual households to extended joint family structures. The existence of joint families can be attributed to the presence of mutual understanding and cooperation among the members of the family. All members will adhere to the instructions provided by the head. If the coordination proves inadequate, individuals will disband and establish nuclear family units. Old aged persons will reside in the same household with younger son.

Disputes and co-operation in the family:

Any dispute in the family is solved within the family itself. If it is not solved then relatives will involve; and in further stage if it is still not resolved, they will approach the priest of the Church. Unity among the family members is strong when compared to the relatives. The cooperation is not only between the family members but also extended to the neighbouring families as and when required. They often exchange goods between families. And if they are relatives, there is always a strong degree of solidarity among them.

The Kuttanad community places great value on familial bonds, which foster a sense of unity and provide support to individuals throughout their lifetimes. The familial context is intricately intertwined with every facet of an individual's life. Rituals and ceremonies serve as unifying mechanisms for the members. The family functions as a self-sustaining economic entity inside its own framework. The family serves as the central focal point around which other social institutions are organised. While the family operates as an autonomous economic organisation, its affiliation with a specific descent group confers a unique identity onto it. The growth of the family is

contingent upon the cooperation of the agnatic kinship group. The enduring nature of the family is attributed to the duties, obligations, and cooperative efforts of its members towards one another and their kin. The family remains a persistent corporate entity over time, notwithstanding the regular changes in its people brought about by birth, adoption, marriage, and death (see Freeman, 1962).

Division of work:

The Kuttanad region has a strong division of labour roles based on gender. According to local societal norms, there exists a prevailing belief that males are expected to engage in gainful employment to provide financial support for their families, while women are typically assigned the responsibility of managing household tasks and nurturing the children. However, there are no limitations on the ability of individuals, regardless of gender, to engage in role exchanges. Observing a male individual engaging in household chores is not an infrequent occurrence, particularly when such tasks are necessitated by the illness of his spouse. In a similar vein, it is customary for women to work outside the home in order to support their families financially. In the agricultural sector, men typically do physically demanding tasks such as irrigating fields, extracting water, ploughing, and applying pesticides. Conversely, women are typically engaged in activities such as sowing, transplanting, removing weeds, and harvesting crops.

While there are no formal limitations on women's employment, it is observed that they predominantly engage in domestic responsibilities. A considerable number of young women are now a day actively contributing to their families' financial well-being through their engagement in professional occupations such as nursing, software engineering, and teaching. Children are prohibited from engaging in

employment activities until they have fulfilled the requirements of their education, which applies to children of labourers as well. Education is prioritised over work. Once individuals have obtained specific educational qualifications, they are permitted to engage in agricultural activities provided they express interest in doing so. Parents have a sense of shame or dishonour when their children are not educated. Parents tend to prioritise enrolling their children in educational institutions rather than engaging them in agricultural activities. In the household, both boys and girls receive equal treatment.

Property Inheritance:

Inheritance of property entails the equiTable division among children. In the event that a dowry is provided for the purpose of a daughter's marriage, it results in the exclusion of her entitlement to any portion of the property. In the event that a dowry is not provided, the woman will be entitled to an equiTable portion of the property, equal with that of her siblings. However, within Hindu communities, it is customary for property to be dispersed equally among all children, regardless of whether a dowry is offered for a daughter's marriage. The significance of a brother's children in relation to the masculine ego is greater than that of a sister's children. In the realm of inheritance, it is often understood that children do not possess the legal right to claim their father's property, whereas they do possess the legal right to claim their mother's property. The act of giving by a father is contingent upon the condition of sharing. The ownership of a father's property is determined by his own testament. According to prevailing legal norms, it is often not permissible for brothers to engage in disputes over the inheritance of their father's property. However, it is commonly

advocated that the distribution of their mother's property should be conducted in a fair manner, ensuring equal sharing among all children.

Marriage

Marriage holds a significant place in the lives of individuals residing in Kuttanad, as it bestows upon them a position of esteem within the societal framework. This allows individuals to engage in the socio-political and religious affairs of the community. Following the union of marriage, there is a noticeable shift in the individual's rights and responsibilities towards their family of origin. It has been understood that a man's financial support is typically provided by his parents until the point of marriage, at which time this dynamic undergoes a shift. The individual's obligations towards their family members become more pronounced, as they are anticipated to generate income to provide for their parents, dependent siblings, spouse, and for the development of their own family. The individual is now anticipated to fulfil his responsibilities, which are guided by moral and cultural norms known as "codes of conduct." These codes establish obligations that connect him to his parents, siblings, ancestors, and deities. During the pre-marital phase, a woman typically receives protection and guidance from her parents. Following marriage, the responsibility of caring for her, shifts to her husband. It is expected that she fulfils her obligations towards her in-laws by actively participating in household duties with her mother-in-law. In the context of rites and ceremonies, it is observed that a married lady holds a higher social position compared to an unmarried girl.

Socialization

Parents send their children to traditional teaching point called *aashankalari* for education, where they are taught by *Aashan* (male teacher) and *Aashatti* (female teacher). The local people says that around fifty years ago they used to write and read from *panayola* (palm leaves) and now they are replaced with slate and pencil. Children will be taught to swim around the age of five years. In earlier years there were no bathrooms and everyone in the family should take bath in the canal (*thodu*) only. So everyone knows how to swim. But these days, bathrooms are constructed for women and so some of the girls and women are less associated with water canal and they cannot swim.

Children are taught to behave in the right path by the parents. Every evening a prayer is conducted in the house, where all the family members attend. Christians call it as *prarthana,* whereas Nayars call it as *sandhyanamam japikal*. In some Hindu families, ancestral remains will be placed in front of the entrance door of their house and then plant like *tulsi*, *mulla* (jasmine) or *ilanji* are planted above the area, so that the flowers will fall on that place and the area is considered holy by them. Elder people in the house like grandfather/grandmother will always monitor the children to keep them in discipline.

Role of Church:

Church plays a crucial role in socialization by teaching all the rules and regulations of how to lead a good and disciplined life. Every child should compulsorily attend the Church. Parents take their children of below five years of age with them to church and after five years of age, they are allowed to go themselves with their siblings or other companions. Hindu families will not compel their children to visit

the temple. They may or may not visit the temple. No parent will compel their children to help in their agricultural fields or to go for any work for at least till the child completes (plus two). But children voluntarily help their parents. They are encouraged to study. Pressure will be on the children in matters of going to school and church, but not for work. Sunday school is compulsory to all the Christian children. Bible classes will be taught there. There is no gender discrimination regarding provision of facilities to the children in the village. They are also guided by parents in all aspects of their life. Discipline is very important. Even neighbours will object children with *mosha pravarthigal* (bad behaviour or criminal behaviour).

Extra-marital relations: Pre-marital relations are not at all encouraged. There is no specific punishment for extra-marital relations, but that depends on the situation. Community has no right on the family. Family members should take care of their children. An educated person or a reputed leader warns the person not to indulge in extra-marital relation and then if it still continues, his/her spouse will approach the church for justice or may go for divorce.

Impotency: normally *shannan* (people with impotency) possess low social status. No one with such disability is found in the field area. *Machi* (barren woman) or *machan* (barren men) are treated normally in the society but with less status. But this barrenness is not a ground for divorce. They think that it is god's decision. When the couple approach the doctor, he counsels them and gives medicine to both, so that no one will know the other's fault.

Daily life

A day starts with breakfast like *puttu* along with banana and some curry, *pal-appam* (a kind of *dosa*) or *iddaly* and while some families consume *choru*[10] (rice), fish-curry (compulsory), along with some chutney made with coconut powder. The young girls in the house clean the front-yard and backyard and that depends on the people available in the house. In general, cooking, cleaning and washing clothes are treated as tasks of women but in some cases, men also do participate. Farmers after breakfast, visits their field once and check the water levels in the field, and whether any insects or weeds present, whether fertilizer is required, and will discuss with the neighbouring farmers and finally reach their home by lunch time. After having a small nap in the afternoon after lunch, they visit the field in the evening if required or else they will go to a nearby *chaaya* (tea) shop and chit chat with the people assembled there.

Recreation:

Children of both sexes were found fishing in their leisure time. Boys also play football and *kabaddi* if they find dry fields, whereas girls play disc throw, skipping, *saatt* and (hide and seek) *thumbivallal*. Men will gather in the nearby shops and chit chat. They also play cards and sometimes watch television. Women will watch daily serials in the television and sometimes gather in the neighbouring houses and chit chat. No agriculture related games are found since most of them consider agriculture as a part-time work. Hereditary or traditional recreation in the area is conducting boat

[10] They buy rice from the shop and they do not store the grains which they grow in their fields, as the yield is sold to the State Co-operative society (civil supply) and also they do not like to eat the rice which they grow in their fields as it does not taste good.

races (*vallam kali*) seasonally and the people consider it as prestigious to win the trophy. The team for the race will be formed much before the trophy commences and training will be given to the team.

*Village Boat Clubs***:** The club members will be selected to participate in the trophies. They will be enthusiastic in representing their village and are well trained in the boat racing. The experienced and mostly the youngsters will be preferred. Types of boats which participate in the races are *snake boat*, *odi*, *vep*, *churulan* and *chundan*. Bonus (an amount from the government) is given to each village club to meet the expenses for training the team and also to encourage them to participate in the race. Snake boats are famous and people come to see the snake boat race. A normal 'snake boat' costs around Rs.45-50 lakhs in Kuttanad area. For construction, roughly 650 cubic feet of wood is needed, i.e. approximately three *aanjili* (*Artocarpus hirsutus*) trees, commonly called as wild jack, are needed to make a 'snake boat'. Annually there are around two dozen plus trophies organized in Kerala. But 'snake boat' cannot participate in all the trophies. It is a huge boat, and it cannot enter all the streams and water bodies.

The following are some trophies organized in the Kuttanad region by the government.

August 2nd Saturday – Nehru trophy: It is a very famous trophy and only snake boats should participate in the race. People from all over the world visit Kuttanad region to watch this boat race. Each team will receive a bonus of between one lakh to three lakhs rupees in order to compete in the race. Galleries are built on either sides of the river to watch the race. Only *Chundan* boats should participate in St. Joseph trophy.

Moolam trophy is conducted every year in the month of July. For this six snake boats will participate and all varieties of boats will join the race. One lakh rupees bonus to every team from the committee and thousand rupees is the registration fees. RDO (Rural Development Officer) will organize the race. It is so expensive for a team to participate in this race. Each person requires at least seven hundred rupees for food and so, a bonus of one lakh is given by the government (committee) to each team who participates in the race.

Presidency Trophy is organized in Kollam. More than 16 snake boats will participate in this trophy. Eleven lakh rupees' bonus will be given to each team. *Kallada trophy* is also organized in Kollam and gives a good amount of prize money to the winners.

Life cycle rituals

The people of Puthukary, especially Christians believe that children are god's gift. But the non-believer will not think so. It is happy news in the family. Conception is not affiliated to any spiritual power except god. In the earlier period, a pregnant woman works till the date of delivery without any health hazards. So, most of the deliveries were normal deliveries. But, these days no work is being done by pregnant women, so facing severe problems in deliveries. Everyone will take care of the pregnant woman carefully but asks her to do some physical work for better delivery of the baby. Pregnancy is considered as a matter of pride for both men and women. Whatever the pregnant woman prefers to eat, that will be provided by the family members with some restrictions. For example, raw papaya is not provided to the woman in earlier two months of the pregnancy. But later she can eat. All the family members and even neighbours will take care of a pregnant woman. Even though they

treat either a baby boy or baby girl equally, in general they expect for a baby boy. Because, they think that he will take care of them in their old age.

Rituals/festivals/supernatural powers:

The people of Puthukary village believe in soul and they think that a good person's soul will go to *swargam* (heaven) and bad people's soul will go to *narakam* (hell), according to the Bible. But some progressive persons like Joseph Job (key informant) opine that hell and heaven exists here on the earth only. So, if parents are good, then children live happily (heaven), if they are not good, then children live with difficulties (hell).

Life cycle ceremonies of Christian community in the Puthukary village:

Maamodeesha (baptism): new born baby will be taken to the church (*palli)* 56 days after birth and *'snanam'* (bath) will be given to the baby. The child's father will take the baby along with his sister and brother-in-law along with some close relatives to the church and new clothes will be offered to the baby. Only married members among the relatives will accompany them. Naming ceremony will be done. It is the obligation of the maternal aunt and uncle (with respect to the new born baby) to organize and make arrangements for the first baby in the house. From the second delivery onwards anyone may come and there are no specific obligations.

Kumbasaaram, is revealing all the mistakes or crimes done by himself/herself to the priest. After that, the priest will advise to recite certain specific prayers to pacify the evil effects of the act done by him/her. *Kurbana sweekaranam* (Holy Communion) is receiving Christ onto them. When children are mentally matured i.e. around the age of 10-12 years, he/she will be taken to church and *Kurbana sweekaranam* is done in the presence of priest. It is celebrated like a festival. New clothes will be worn by the

child with *japamala* (a chain of beads) and candle in the hands. Lunch will be provided to all the villagers according to the financial capacity of the family. *Sthyrilevanam*: it is a kind of oil bath. Small amount of oil is applied on the forehead of the child to purify him. *Kalyanam* (marriage): either arranged or love marriage. *Ammavan* (maternal uncle) should take charge to find the spouse for the niece/nephew.

Thirupattam, is becoming priest. Only few are allowed and only few will decide to become the priest. *Rogilevanam,* is for those who are about to die. The priest will come to home and do prayer to pacify the sins done by that person. *Marana Chadangu* (Death Ceremony): White clothes will be put in the coffin. In earlier days, they used to carry the dead person in *pallaki*, but these days using vehicles to carry to the church and bury the body in the slot which they buy in the church graveyard. No low status for widow/widower. They are invited for all functions (except when a pregnant woman goes to her house for first delivery). If a married man dies, her wife will keep the *minnu* (pendent) [11] with her till she dies and later it will be dropped in the box in the church.

Festivals: *Onam* is common to all religions in Kerala. Christmas and Easter is celebrated by Christians. Along with these, in the field area, annual celebrations of Saint Joseph and Saint Xavier will be celebrated on March, 31st and April, 12th respectively. *Kavadi* is a ritual performance among Hindus. Ancestral worship is done on the date of their expiry. People will go to *palli* (church) and pray (usually they do not visit other sacred places). The villages do not believe in magical power. These days, after the purchase of new vehicles, they will be taken to the

[11] Hindus call it as *thaali.*

church/temple and prayer will be done. In general, one will not participate in other religion's festivals, but some people may be invited to have food.

Thus, this chapter elucidated the socio-cultural and economic profile of the study area and also briefly discussed the about the Kuttanad region. The socio-cultural and economic profile of the study area provides valuable insights into the local community's way of life, traditions, and economic activities. Additionally, the chapter sheds light on the unique characteristics and significance of the Kuttanad region, highlighting its geographical features and its role in the larger context of the study.

CHAPTER – THREE
BELOW SEA LEVEL FARMING: HISTORY OF THE TRADITIONAL AGRICULTURAL PRACTICE IN KUTTANAD REGION

This chapter will try to document the history of the below sea level farming in the Kuttanad region and the traditional practice of doing agriculture. In the Kuttanad region of Kerala, farming has developed and is currently practised below sea level. Huge water bodies were converted into the paddy fields. Farming is the primary and major occupation for the Kuttanad people, with rice as their primary agricultural product. As a result, the Kuttanad region is referred to as the rice generator for Kerala state. The origin of paddy agriculture in this region can be dated back to several decades ago. Vembanad Lake, the largest lake in India, holds significant cultural and ecological importance as it is widely regarded as the essence of the Kuttanad region. The area harbours a diverse array of plant and animal species. The livelihoods of numerous individuals rely on this lake. The Lake serves as a fundamental basis for various economic activities, encompassing sectors such as agriculture, fishing, transportation, and recreation. Numerous rural communities rely on it as a means of sustenance. In addition to being a crucial resource for the locals, the Vembanad Lake also contributes significantly to maintaining the ecological balance of the region. A suitable dwelling environment for avian species that migrate seasonally can be provided because to the vast extent of this area. Consequently, this location holds significant value in terms of initiatives aimed at preserving and protecting wildlife.

History of the below sea level farming of Kuttanad[12]

In the last two centuries, the changes in the governmental structure as well as advances in technology are significant, both of which were intimately related to the development of paddy agriculture. In the past, reclamation work (referred to as "veendedukkal" in Malayalam) was mainly done around the Pamba River's bank or in the shallow regions of the Vembanad Lake. The aforementioned reclamations included *padasekharam*, which are little patches of rice fields. To manually remove the water from the fields, a water wheel known as a *chakram* is employed. Later, the manual method (*chakram*) for water bailing out was replaced with kerosene engines.

Reclaiming *kayal* (lake) lands from Vembanad Lake is done in three stages. The main stage was done by private business people with no monetary help from the administration. In 1865, the Travancore Kingdom has made a 'Pattom Proclamation[13]', which boosted the reclamation activities from 1865 to 1888. Since there was no other option except to de-water the polders manually, using *chakram*, reclamation could not be done in large proportions and so, only 250 hectares of land was reclaimed from the lake for cultivation. Thus, the Madathil and Venadu *kayal*s, which are promoted as the first restored rivers *'kayal* nilam[14]*'* in the Vembanad Lake, were formed during this period. Mathai Luka Pallithanam and Ouseph Luka Pallithanam, two siblings from Kainady town in Kuttanad, took the lead on the *kayal* reclamation projects.

[12] The researcher has conducted several interviews with the informants including the staff and officials of the Krishi Bhavan, Ramankary and Rice Research Station, Mancompu. The data collected thus helped the researcher in documenting some sections of this chapter.

[13] The Pattam Proclamation, sometimes referred to as "the Magna Carta of the Travancore ryots (farmers)," granted ownership rights of Sarkar Pattam lands to the proprietors. (Varghese, 1970:65).

[14] *Kayal nilam* means reclaimed paddy field.

The second phase commenced in 1888 when Panicker made an endeavour to restore the Vembanad *kayal,* situated at the confluence of the Chennamkari River and the backwaters. The recovered *kayal* was referred locally as "*Attumuttu kayal*". Kottayam Orthodox Seminary made another significant reclamation in the same year, and it was known as the '*Seminary kayal*'.

With the introduction of the kerosene engines for de-watering, extensive area of the lake was brought under cultivation. This encouraged farmers to explore the more profound parts of the lake. Pallithanam Luka Mathai, also known as Pallithanathu Mathaichen, spearheaded the reclamation activities that resulted in the successful reclamation of the *Cherukara kayal* and *Pallithanam Moovayiram kayal* between 1898 and 1903. Due to limitations placed on *kayal* reclamations by the Madras Government in 1903, the second stage of reclamation works carried out between 1890 and 1903 came to an end. During this particular period, several significant *kayal* were reclaimed, namely the *Aarupanku kayal, Cherukali kayal, Maththi kayal, Pantharndu Panku kayal*, and *Rajapuram kayal.*

In 1912, the government of Travancore submitted a proposal to the government of Madras for further reclamations. Subsequently, the Madras government accepted the plan and granted permission to the Travancore government to proceed with reclamations in three distinct phases. According to this proposed strategy, the *kayal* land ought to be reclaimed in distinct blocks, with each block being designated. A sizable chunk of 12,000 acres of the 19,500 acres of *kayal* land underwent reclaimed between the years 1913 and 1920. Following the relaxation of the restriction in 1913, Pallithanam Luca Mathai and a number of other well-known families in Kuttanad started the reclamation of E-Block *Kayal*, which is thought to have a total area of

about 2400 acres. This particular *kayal nilam* in Kuttanad is widely regarded as exceptional. C.J. Kurian, a former member of the legislative council, and Mr. John Illikalam were key collaborators in this undertaking.

The reclamation works conducted between 1913 and 1920, often referred to as the new reclamations, were executed in three distinct phases. During the initial era, an approximate land area of 6300 acres underwent reclamation. During this period, the blocks labelled A to G were successfully reclaimed. In the later phases of this new reclamation drive, a land area measuring 1,400 acres known as R- Block *kayal* was successfully reclaimed. The individuals who assisted him in the retrieval process were Vachaparampil Mathen, Meledom, Pazhayaparmpil Chacko, Pattassery P.P. Mathai, Paruthickal, Ettuparayil Xavier and Kandakudy.

Reclamation activities during the period 1920 to 1940 were stopped considering a precarious drop in the cost of rice. Luca Matthai[15] is widely acknowledged as a pioneering figure in the cooperative agriculture movement that emerged in the region of Kuttanad. His was the pioneer for the emergence of early *Kayal* Rajas[16] of Kuttanad. He established *Kuttanadu Karshaka Sangham* (Kuttanadu Agricultural Association) in 1931 with the end goal to fortify the cultivating network in Kuttanad. He started his farming career (reclaimed *Cherukara kayal*) at the age of eighteen and gathered for reclamation during the years 1898 and 1940.

With the expansion of farming in the region, agricultural practitioners found themselves compelled to adhere to the need of conducting two cycles of rice cultivation per year. The fundamental goal relates to the limited supply of drinkable

[15] He was a part of the Praja Sabha, popularly known as the People's Assembly, of Maharaja Moolam Thirunal.).

[16] In the Kuttanad region, the prominent *Kayal* cultivators were popularly called as the *Kayal* rajas.

water in the Kuttanad region. The water that comes from the mountains during the monsoon season travels down the river systems until it reaches the coast, where it becomes a source of potable water for the Kuttanad region. However, during the summer season, the sea water infiltrates the Kuttanad region as a result of its low elevation. This intrusion leads to a notable rise in the saline levels of the water, rendering it unsuitable for drinking purposes.

Agricultural zones of Kuttanad

Kuttanad region is broadly classified into three segments. They are: a) wetlands, which hold an area of 66,000 hectares, b) dry lands, an area of nearly 31000 hectares and c) water areas, an area of about 13,000 hectares. Of the wetlands, 55,000 hectares are used for paddy cultivation and 11,000 hectares for coconut and other crops. There are 1192 *padasekharam* varying from 2 to 1000 hectares (Kuttanad Sasthra Sahithya Parishath, 1992:52) as shown in Table 3.1

Table: 3.1: Size Distribution of *Padasekharam* in Kuttanad region

Area of Paddy fields (in hectares)	**Number of *Padasekharam***
2-5	104
5-10	155
10-20	248
20-50	375
50-100	165
100-200	107
200-500	33
More than 500	5
Total	1192

Source: Kuttanad Sasthra Sahithya Parishath (1992:75)

Another classification of Kuttanad region that prevailed is mainly based on the agronomy. It is classified as six zones namely, North Kuttanad, Purakkadu, Vaikom Kari, *Kayal* Lands, Upper Kuttanad, and Lower Kuttanad. The six zones and their characteristics are as follows:

- Upper Kuttanad - They are closer to uplands.
  Impact of flood is high in this region and in the monsoon season, most part of this region will be submerged.
- Lower Kuttanad - The southern part of the Kuttanad region is known as the lower Kuttanad.
  Flood impact is moderate in this region when compared to the upper Kuttanad.
  The construction of the *Thanneermukkom* bund protected the area from the saline water intrusion during summer.
- *Kayal* Lands - The area in the vicinity of the Vembanad Lake is called as *Kayal* Lands.
  This zone is highly vulnerable to the passage of saline water.
  Very least impact of flood to this zone.
- North Kuttanad - The deltaic formation of the Meenachil River mainly under the Kottayam taluk.
  This zone is prone to both floods, and the saline water.

- Purakkadu - *Kari* lands on the south-western side of the deltaic formation of the Meenachil River are known as Purakkadu.
  They come mostly under the Ambalappuzha taluk.
  They are highly acidic in nature.
- Vaikom or Vechoor *Kari* - *Kari* lands which are on the northern side of the deltaic formation of Meenachil River are called as Vaikom *Kari*.
  They are also highly acidic in nature.

In an unpublished note on 'Kuttanad Rice Culture', prepared by the Operational Research Project, a joint project of the Kerala University of Agriculture and the Department of Agriculture, Mancompu in 2001, Alappuzha, the area of each agricultural zone is clearly mentioned as follows:

Table 3.2: Agricultural zones in Kuttanad

Agricultural zones in Kuttunad	**Area in Hectares**
Upper Kuttanad	10576
Lower Kuttanad	16280
North Kuttanad	6556
Kayal lands	9464
Vaikom Kari	7748
Purakkadu	4313
Total	**54935**

According to the type and lieu of the soil, Kuttanad has been classified under three broad categories, namely *kayal* lands, *karappadam* and *kari* lands[17]. The recently reclaimed lands from the Vembanad Lake are called as *kayal* lands. They comprise of nearly 20,000 acres of land with 33 blocks. These blocks of agricultural lands are located within the revenue villages of Aymanam, Kumarakom, and Thiruvarppu in Kottayam District, as well as Kainakary, Kunnummal, Kavalam, and Pulincunnoo in Alleppey District.

Table 3.3: Distribution of *kayal* lands across villages and Blocks

District	Villages	Number of Blocks
Kottayam	Aymanam	3
	Kumarakom	4
	Thiruvarppu	4
Alleppey	Kainakary	6
	Kunnummal	3
	Kavalam	4
	Pulincunnoo	9
Total		**33**

Karappadam comprises about one lakh sixty eight thousand acres of agricultural land in smaller blocks called *padasekharam*. This region lies in the interior of the villages of the eastern and southern parts of the Kuttanad region. *Kari* lands constitute approximately twelve thousand acres of area. Their primary locations are in the

[17] Kerala Enquiry commission, 1971:p4

taluks of Purakkadu in Ambalapuzha, Cherthala in Alleppey, and Vaikom in Kottayam.

Traditional farming:

Due to its stunning natural setting and dedicated locals, Kuttanad is a special place. It is always a ‘man versus nature’ situation in the Kuttanad region. It is a test for the human potential to do agriculture in this region. Since generations, people stood against the nature to practice agriculture and became masters in the cultivation by following some traditional practices. This traditional practice of below-sea level farming evolved and developed with the keen understanding of the environmental features of the area by the farmers. Tools and implements required for farming were also developed accordingly, and the knowledge is being passed down through the generations. The paddy cultivation that has thus evolved in the Kuttanad region is unique.

The farmers in the Kuttanad region have adapted to the challenges posed by farming below sea level, such as water management and soil fertility. They have devised innovative methods, such as constructing bunds and canals, to control water levels and ensure proper drainage. Additionally, they have developed specific varieties of rice that are well-suited to the unique conditions of the region, resulting in high-quality paddy cultivation. The paddy fields in the entire Kuttanad region are situated below the mean sea level of varying depths. Reclamation of land had been a regular feature of the Kuttanad agriculture. Most of the year, these agricultural fields were submerged with saline water or brackish water. Traditionally paddy cultivation in this region is known as *punja krishi*, which has been appreciated as "singular struggle of human industry against the forces of nature" (Nagam Aiya, 1906:6).

Cropping Pattern:

Land was comparatively abundant in the earlier days than the labour force (Kamalasanan, 1993:39). In other words, very less labour force was available to work in vast stretches of fields. Then, farmers used to practice agriculture, keeping some portion of their field fallow. After some succession of the crops, the fertility of the soil diminishes and so, to regain the fertility of the soil, the farmers used to keep their fields fallow and water will be released into their fields. So, the two factors, scarcity of labour and the diminishing fertility of the soil influenced the farmers to practice the cropping pattern of 'rice-fallow-rice' or at times 'rice-fallow-fallow'. Better yields were possible with this pattern without using any manure. Till the period of the First World War, farmers of Kuttanad cultivated their lands once in two or three years. 'As a result of the trials conducted on an experimental station started in 1916 at Kuppapuram near Alappuzha, it was possible to demonstrate the feasibility of cropping the area every year' (Velupillai, 1940:291; Sahadevan, 1966:63-64).

By 1940, with the intention to produce more yields, the above said practice of farming, rice-fallow-rice was banned. The main reason for that was the severe fall of rice import from Burma due to the onslaught of the Second World War. To face the shortage of food, farmers were compelled to cultivate more. Hence the yearly cultivation of paddy was initiated in the Kuttanad region instead of one crop in two or three years. The practice of allowing *kayal* lands to lie fallow continued even after annual cropping became popular in other areas of Kuttanad (Aravindakshan and Joseph, 1990:4). The cultivators could reap the benefits of the silt deposited in the

fields by the fresh water from time to time. Such fields were referred to as *Palanilam.* (Nagam Aiya, 1906, Vellupillai, 1940:291-313).

Preparation for the punja crop:

Huge labour was involved in preparing the fields for cultivation. It was a herculean task where a large number of labourers were involved in preparing the fields for cultivation. It was for the repairing of bunds where huge labour was involved. The bunds, which were opened to let water in after the harvest of the previous crop, should be repaired. It was not just repairing the ring bunds, but replenishing them. The process of replenishing the bunds required a significant amount of labour, as it involved reinforcing the structures and ensuring their durability for the upcoming cultivation season. Additionally, this task was crucial to maintaining proper irrigation and water management throughout the fields.

Repairing of bunds (puravarampu pani):

Even if water was allowed to enter via one or two cuts to safeguard the bunds surrounding the paddy fields from total ruin, the monsoon nonetheless causes some real harm to the bunds. So, for the cultivation to be started, the bunds should be replenished. The locals were masters in constructing these bunds. The bunds were totally eco-friendly bunds built with the material like coconut tree trunks, twigs of trees, straw, shrubs, clay and bamboo mats. Small canoes were employed in bringing the material (see photo 3.1).

The restoration of these bunds required a lot of time and energy. To prevent the clay-built barrier from being washed away, the coconut tree trunks were embedded deeply into the canal on either side of the damaged section of the bund. They were then covered with bamboo mats. Further strengthening of the damaged portions of the

bund will be done by packing clay. The activity of repairing of the bunds was called as *puravarampu pani*. Very large collection of clay, deep from the rivers and canals was involved in this activity. Hence, huge labour force was required for this activity. Male labourers usually of low castes such as *Pulaya* and *Paraya* and sometimes *Ezhavas* were involved in this task. By the end of October, farmers had to finish the bund repairs, since the cultivation in the Kuttanad region was a time bound activity. A small damage to the bund turns the field into a lake (see photo 3.2).

Draining/de-watering of the fields:

After the bund repairs were complete, the fields were drained using *chakram*, huge water wheels. A *chakram* looks like a windmill with wooden planks as its spokes. *Chakram* of the varying sizes were used depending on the depth of the water. It is said that there were big *chakram* even with 36 spokes[18]. The de-watering of fields was an uninterrupted activity, because of the fear that a small break to the process would bring back the water into the fields. So, the people work for day and night on a shift basis to dewater the fields completely. The water wheels according to the need were fitted in *pathayam* (a wooden carrier) to fix on the bunds. Then the *chakram* was operated with the legs by sitting on bamboo scaffolding which was erected over the *chakram*[19]. This activity of operating *chakram* was known as *chakram chavittu.* Since it was the uninterrupted process, large work force was needed and people used to operate the *chakram* on shift basis.

[18] Alex George (1987) says the size of the *Chakram* varies with the number of spokes it contains. There were *Chakram* with 36 spokes, 28 spokes and 24 spokes and also of different sizes. The researcher has seen a *Chakram* even with 8 spokes during his fieldwork which was displayed in a house as an antique piece.

[19] Depending on the size of the *Chakram*, the number of people who operates it increases. For example, to operate a *Chakram* with 28 or32 spokes, three persons are needed to rotate the wheel.

Large *chakram* cannot be operated at all the times. It can be operated only where the water levels were high. Gradually with the decrease of the water level in the fields, small *chakram* were needed in place of the big *chakram*. Water from the inner fields was drawn with the small *chakram* and there by the level of the water near the big *chakram* increases and hence it was also operated simultaneously to de-water the fields. Hence a set of water wheels were required to de-water a *padasekharam*. Several of these sets of water wheels were needed to dewater a large *padasekharam*, which covered hundreds of acres (Alex George, 1987). Since this process of de-watering was a continuous and tiresome task, rhythmic folk songs were sung to avoid monotony and to lighten and intensity the operations. Nagam Aiya (1906), Pillai and Pannikar (1965) says that those folk songs were called as *chavittu pattu* or *chakrappattu.*

Application of Lime: It was the next step involved after the dewatering process was done. Since the nature of the soil in the Kuttanad region is mostly acidic, the fields were sprayed with the burnt lime shell (*kakka*) for neutralising the acidity of the soil and the land was prepared for sowing. It was followed by levelling the fields and sowing.

Levelling the fields and sowing:

Levelling the field was carried out with the levelling boards. Those levelling boards were called as *pally* and *palaka* and this task of levelling were called as *pallikkadi or palakakkadi*. The fields were made ready for sowing by removing the aquatic weeds and the grass. Women labourers were engaged to end the levelling process with hands. This task was called as *thappel*[20]. Since the cultivation in the Kuttanad region is a time bound activity, the sowing operations were to be completed before the

[20] From an anonymous source

Malayalam month of *'makaram'*[21], because the harvesting was to be completed by the end of the April month. Saline water inflows into rivers and backwaters in the summer, endangering the crops in the fields.

Fresh water was released into the fields up to a level of few centimetres before sowing. Then sprouted seeds were taken in small baskets by a team of labourers and broadcast the seeds in the field. First the seeds are broadcasted length-wise and to avoid the gaps, they also broadcast the seeds in breadth-wise. This activity was called as *vithamirukku*. Sowing was being done by transplantation method in garden lands, i.e., *karappadam* region and in some parts of the upper Kuttanad. In this method, seeds were grown in a small area for nearly twenty to thirty days and then, the *njar* (seedlings) were transplanted into the fields. Though this method of sowing was expensive because of the requirement of much labour force than the broadcasting method, it eliminates the need of further transplantation which has to be done in the broadcasting method. Seeds of variety like *Attikarai, Champavu,* and *Karuthachara,* were used since they are taller variety and have a longer gestation period of about four to five months[22].

Supervising the field:

Once the sowing activities are complete, the crop has to be protected very carefully till the yield comes. The sprouted seeds were protected from the birds by making sound, burning crackers or by clapping. Farmers used to monitor the field till the sprouted seeds grow to certain height. Farmers inspect their fields daily to check for illnesses and pests while also keeping an eye on the water level, crop growth, and crop health.

[21] Makaram is a month in the Malayalam calendar. (mid-January) There was fear among the people that *makarakul* (diety) would destroy the entire sprouted plant.
[22] Information gathered from Krishi bhavan, Ramankary.

Manuring and pest control:

The next operation after sowing was the manuring of the crop. Within a week or ten days of sowing, the first manure was applied. Cow dung, twigs of plants and wood ash constituted the important items of plant nutrients. No chemicals were used in the traditional farming in those days. Pests were controlled very effectively by using the simple techniques in an eco-friendly manner. In this technique, water was released into the field up to the ear head of the plant. Then the pests climb to the top of the grown plant. By employing the basket sweep approach, all of these pests that had reached the top were captured, and the captured pests were then eliminated. This activity was called as *puzhukkotta.* Water was drawn out of the field after this activity. Later, the practice of collecting pests with brooms came into existence and the task was performed by women workers (Kamalasanan, 1993:41). For the crop which was attacked commonly in the region by an insect called '*chazhi'* (rice sucker or rice bug), neem cake or neem oil was used and sometimes kerosene was also used to keep the insect away from the field.

Weeding out and gap filling:

Weeds cause real damage to the yield. So, the weeding out operation was another important activity. Female labourers bend in a line forward to the field and remove the weeds. Throughout the process of removing weeds, they would be in bending position only. It was really a hard task and back-breaking and so, to keep the uniformity in the operation and to lighten the strain, rhythmic folk songs[23] were sung. Another round of manure will be applied followed by another round of weeding out.

[23] There were lead singers among the labourers and they were paid extra to sing. The activity of singing folk songs during this process of removing weeds was called as '*nadeel pattu'*.

Harvesting:

The last important activity in the cultivation was the harvesting. A large number of labour forces were required for this activity. Both male and female labourers were to be involved in harvesting. The stages involved in the harvesting process were cutting of the sheaves, tying them in bundles, carrying the bundles on head to the *kalam* (threshing place), threshing, sharing of product, winnowing. The paddy and hay had to be dried, followed by the transporting of the grains. The grains were transported to *kalappura* (granaries) and *pathayam* (wooden chambers). After the transport of the grains, the hay which was left in the field was piled to feed the cattle.

Preparations for harvesting were made much before the activity starts. Fresh brooms, *kotta* (bamboo baskets) and *payya* or *parambu* (big mats) were made to use exclusively for this occasion. Harvesting was done in several ways. But in general, the practice was to cut the plants close to the ground. In some cases where the field was swampy and if the stalks were not useful, the ears of corn were separated and the stubble was left to rot in the soil. A small area was prepared in the outer bund for threshing[24]. Scaffolding with bamboo was erected in that place. Male and female workers hold on to the scaffolding and threshing was done by using their feet. The grains were dealt very carefully.

Flooding (allowing water into the fields):

Once the harvest is finished, water will be released into the fields. Many farmers plough the field two to three times before the field was flooded. Many benefits are associated with the letting of water into the fields. The outer bund was cut in large breaches of two to three metres in length. They were called *mada*. Letting in water

[24] Outer bund was called as '*chira'* and '*methikalam'* was the place on the outer bund where threshing was done.

through these slashes will protect the total bund from collapse due to the pressure caused by the tide of the rivers and backwaters. If the bunds were provided with *thoompu*, a sluice fixed permanently on the bund, then the sluices were opened to let the water into the field. The saline water which enters the paddy field during summer washes away the acidity of the soil besides checking the growth of weeds. The remnants of hay in the fields after harvesting will be decayed due to this water let in and will act as natural manure for the next crop. And the other reason to let water into the fields after harvesting was that during monsoon season, the silt will be deposited in the fields and the soil thus becomes much fertile.

Second Round of Ploughing:

During the monsoon season many farmers plough their field for the second time. The purpose of this ploughing was to uproot the weeds. This activity was called as *karkidakam*[25]. Buffaloes were used for ploughing and the farmers could not think of ploughing without buffaloes. Almost half immersed in water, buffaloes and the men plough the field for three to four times. Thus the preparations for the next season of cultivation would be carried and when the next season starts, the cycle repeats. A second crop was rarely attempted in addition to the *punja* crop. It was called as *randan krishi*, which means second crop[26].

Rice-shrimp farming:

As the *randan krishi* was always an impossible affair in the Kuttanad region due to the monsoon floods and also the returns are low in paddy cultivation when compared to the investment. So the majority of the farmers of Kuttanad were in favour of

[25] Weeds like *Chelly* and *Uzhama* were uprooted through this ploughing.

[26] Fields were shallow in the upper parts of the Kuttanad region and so there existed *Kulappala* cultivation, a deep water crop of paddy cultivation. Seasonal conditions influenced the size of the area under which the cultivation of this crop was carried.

cultivating fish or prawns or both during the monsoon season rather than paddy cultivation to reap the maximum returns. Thus the paddy fields were converted into ponds during the months of March to October.

Wages:

Wages for all the farming related activities were paid in kind. It was a system of product sharing. The share of the workers for which the farming activities were carried was called as *patham*. Like any other place in India, harvesting was a festive season for the people in the region. Workers from even distant places were called for the harvesting activities. People work for day and night. The workers who come from the distant places stay in *pandhas*, the temporary huts built on the outer bunds of the *padasekharam* to accommodate the workers throughout the period of harvesting activities.

***Pokkali* paddy fields and cultivation**

In Alappuzha, Ernakulam, and Thrissur districts' waterlogged coastal areas, the remarkable rice variety *pokkali* is grown. The areas designated for *Pokkali* farming are characterized by their low elevation and consist of marshes and swamps located in close proximity to estuaries of streams and rivers, in relatively close proximity to the ocean. According to Jayan P.R. and Nithya Sathyanathan (2010), the area experiences high water content due to inadequate drainage system, resulting in frequent exposure to tidal forces throughout the year. *Pokkali* rice plants grow up to two meters to survive in the water-logged fields and the best period to cultivate the *pokkali* rice is during the months from June to October/ November. During this period, the salinity in the fields will be low and thus suitable to grow the *pokkali* rice. Only the panicles of the plants were removed during the *pokkali* rice harvest, leaving

the stalks behind to be fed to the prawns that will be grown in the next season. Because there are relatively few pest infestations in the *pokkali* paddy fields, there is no need to use manures, fertilisers, or pesticides because the soil is so rich. Thus the *Pokkali* rice is grown naturally. *Pokkali* rice was registered with GI in the years 2008–2009.

Agrarian Relations in Kuttanad

The agricultural relations across the caste groups or communities in the Kuttanad were organised in a manner that aligned with the agricultural practises prevalent in the region. In this social structure, the ownership rights over land, known as *janmom* rights, were predominantly owned by three entities: the devaswoms, the brahmswoms of the Brahmin communities, and the chiefs of the Nair tribe. The *janmies* allocated land to tenants in substantial portions through leasing arrangements. The majority of these tenants, primarily hailing from the Nair or Syrian Christian populations in Kuttanad, were predominantly engaged in owner cultivation. The Table 3.4 illustrates the Caste and Agrarian Hierarchy within the Traditional Travancore Society.

Table 3.4: Agrarian hierarchy and caste relations in Travancore society

Caste	Land Rights	Occupation
Rajas, Brahmins and Aristocrat Nairs	Ownership (*Jenmom*) rights.	Rulers, Priests and Administrative officials
Nairs and Nambiars	*Kanom* (superior lease) rights	Incharge of Law and Order and Petty officials,
Non-Aristocrat Nairs, Christians, Ezhavas and Muslims	inferior lease (*Verumpattom*) rights	Small producers, Artisans, Traders and dry land labour
Ezhavas, Cherumas and Pulayas	Agricultural labour	Wet land labour

Source: Isaac and Tharakan, (1987)

Landlord- labourer relation:

The Kuttanad landlord-laborer relationship was a component of the Jenmi system. Land ownership during the kingship era belonged to the king, who distributed lands to those who paid taxes. The system grew to be dominant on the social, economic, and political levels thanks to these landlords, known as Jenmikal. The Jenmi system, however, began to crumble as the state expanded in size and influence. The Namboodiris, Tamil Brahmans, Nayars, and Syrian Christians all owned land prior to the implementation of land reforms for agricultural reforms in the Kuttanad region.

Folklore in Kuttanad includes landowners keeping multiple *kudikidappukar*[27]. Due to Kuttanad's unique geography, labourers from low castes and the community were unable to leave the area., making Kuttanad their only home. The agricultural workers developed a strong sense of devotion to the landlords and the area as a result, which had a tremendous impact on the system as a whole.

After slavery was abolished in 1855 with the "Slavery Abolition Proclamation," the P ulaya and Paraya people who had been slaves up to that point were freed. The trade of slaves and the practice of slavery came to an end. But the freed slaves were not provided with any job by the state. And in search of job for their sustenance, the labourers who were slaves till then approached their former owners for the job. Thus a new system of 'attached labour' was emerged. Since the landlords cannot buy or sell the labourers, they asked the labourers to work permanently with them and their families'. In return, the labourers were paid in kind. This continued for generations. Land ownership or leasing was forbidden to members of the lower caste pulayas and parayas. Additionally, the pollution rules had forbidden the Pulayas, Parayas, and

[27] They are lower caste people who work for the lord and are allowed to stay in the land.

other slave castes from engaging in any craft or trade that required having relations with the upper castes (Alex George, 1987). Thus they remained as landless agricultural labourers for generations.

Towards the end of the 19th century, Kuttanad experienced a dynamic shift in land relations and production mode due to large-scale land reclamations and agricultural commercialization. This led to the expansion of agriculture, necessitating the employment of *purathalukal*, who were paid daily wages. These workers, who were mainly Latin Catholics and Ezhavas, migrated between *padasekharam* and were paid at a rate set by the landlord in cash or in kind. As the use of *purathalukal* grew, landlords understood that the influx of migrant workers each year might offset the shortage of local labourers. The growth of unionism among agricultural labourers accelerated this shift from linked labour to casual labour (Thomas, 2002). The growth of the Communist Party in Kuttanad, which changed the dynamic between landlords and workers, was intimately related to the shift. Missionaries' roles, education of various castes and communities, employment in government, movements for socio-religious reform, land reforms, and immigration to foreign countries are only a few examples of additional social, economic, and political changes that have taken place.

Pre-modern developments in traditional agriculture:

The pre-modern phase of traditional agriculture saw significant changes, including reforms like the Pattom Proclamation, abolition of slavery, introduction of money wages, and demand for marketable surplus, mechanization of farming operations, trade union formation, and government interventions. These developments led to the change towards the Green Revolution agriculture and the monetization of the

economy. Cultivators began to produce more than their family and labourers' subsistence, focusing on generating a marketable surplus. The motivation to enhance productivity, driven by improved farm prices, facilitated the reclamation of the shallow regions inside the Vembanad *Kayal*.

Capitalist farming in kayal reclamations:

Land reclamation, specifically referring to the act of acquiring land from water bodies, has a lengthy historical presence in all ancient human settlements. However, the motivating reasons exhibited distinct variations. Various factors, including as hygienic concerns, economic policies, population pressures, and social purposes, have individually or collectively played a significant role in shaping the process of land reclamation (Pillai & Panikar, 1965). The process of reclamation holds significant importance in the historical context and distinctive characteristics of Kuttanad, hence necessitating its inclusion in any scholarly examination of the region. The act of reclaiming land from water has been regarded as a notable illustration of human achievement throughout history, sometimes described as a remarkable triumph of human effort (Varghese, 1974).

The reclamation, encompasses both the Old and the New, and the old reclamation was primarily limited to the upper regions of Kuttanad, characterised by their shallow nature (Pillai and Panikar, 1965). The pressure that population growth was putting on land use, the historically high paddy price in the years after World War II, and a lack of shallow backwaters for reclamation were some of the factors that led to the new reclamations. These reclamations were carried in the profound depths of the Vembanad Lake. The government facilitated the restoration operations through the provision of interest-free loans (K.S.S.P, 1992:102), as well as giving tax exemptions

for a specified duration (K.E.C, 1971:5) The Kuttanadan punja, a region in India, has a rich history of reclamation, dating back to the year 1834, and was particularly prevalent during the second half of the 19th century (see Velu Pillai, 1940). This practice, known as reclamation-cum-farming, was more economically viable than purchasing cultivable rice fields and could be fully reimbursed from crop income.

After the invention of a pumping engine with tiny and para in 1912, a de-watering method in *kayal* reclamations allowed for the reclamation of large areas of land (Aravindakshan and Joseph, 1990). During World War I, the petty and para, a locally created axial flow pump, was employed with steam engines at first and later with oil and kerosene. The introduction of the mechanical pump, and electricity in due course, facilitated the second phase of reclamation, allowing for the extension of paddy cultivation due to socio-economic pressures. Kamalasanan (1993) has given a detailed list of the *kayal* land reclamations in the villages of Kuttanad. Pillai and Panicker (1965) opine that these reclamations are a classic example of entrepreneurial innovation. The initiative to reclaim land from backwaters in the *kayal* areas of Kuttanad attracted capitalist agriculturists due to its unique nature and large holding size. The capital intensity per holding in the *kayal* area was 74 times higher than the Indian average (Pillai and Panicker, 1965). Later developments in agriculture were both prompted by the newfound interest in punja agriculture and the need for superior varieties suitable for Kuttanad (Joseph et al, 1960). The marketable surplus generated by the New Reclamation was 89.86% of the net yield, making it incomparable to traditional farming in other areas. As a result, Kuttanad adopted the Green Revolution plan. Changes in agrarian relations were sparked by the advent of

capitalist farming in Kuttanad, which was aided by the growth of trade unions and peasant groups.

Communism in Kuttanad region:

Within a few years of its founding, the trade union reached every village in Kuttanad. According to Tharamangalam (1981), eviction was a common punishment meted out to labourers by their landlords after 1940s for participating in the labour movement. Since the 1950s, there have been regular and violent incidents in Kuttanad due to the mutual mistrust and hate between landlords and labourers. In 1957, when the Communist Party seized power in Kerala, India's first democratically elected Communist government was founded. Early Communist leaders came from wealthy families and upper castes/communities, and they organised the farm labourers as part of their wider political plan. The majority of the population, especially low caste/community labourers, share this sentiment and view employment in government services as a major accomplishment compared to many high caste/community informants. The divide between the previous landowners and the labourers in Kuttanad grew even wider after the Communist Government was established in 1957 as a result of a number of circumstances. These developments included the implementation of land reforms in the 1960s, migration to the Gulf and elsewhere, remittances, higher education, employment in the government, and new economic policies.

Impact of Green revolution on Agrarian practices and relations in Kuttanad

Paddy cultivation in Kuttanad was advanced before the Green Revolution programme, with farmers using improved strains like Pattambi variety (PTB) and Coimbatore variety (C.0.25). Green Revolution strategy in the 1960s has encouraged

the use of chemical inputs and seed selection practises have changed. New types of rice were released after the Rice Research Station at Moncompu was established in 1940. The new types of rice such as MO.l and M0.2[28]. The most important change in Green Revolution agriculture was the widespread use of High Yielding Varieties (HYVs), which were central to the strategy. The first introduced variety was Tinan 3, which did not cover much due to poor cooking quality. The adoption of new seed varieties began on a notable scale with the widespread use of IR8[29] in 1967-68.

Chemical Inputs:

In Kuttanad, the Green Revolution increased the use of inorganic fertilisers and plant protection chemicals (PPCs), which were heavily promoted through subsidies. This promoted the intensive use of chemical fertilisers and pesticides, leading to an imbalance in soil nutrients and an unscientific application of these chemicals by farmers. Farmers competed in hastening the use of fertilizers, manipulating dosage prescriptions for greater yields (Tharamangalam, 1981).

Studies have shown that indiscriminate application of PPCs increased the resistance of pests to chemicals and reduced the resistance of plants to pests. In a study by Rice Research Station, Mancompu observed that during the period 1980-1990, 58 to 63% of farmers used more than the recommended dosage of nitrogen, phosphorus, and potassium fertilisers, with fungicides far exceeding the wanted limit. The general attitude of farmers in plant protection chemical application has been prophylactic rather than need-based, with the recommended dose being 500 litres spray solution per hectare (Kannan, 1979).

[28] Later eighteen varieties were developed by research station from M0.3 to M0.20

[29] A variety developed in International Rice Research Institute, Phillipines.

Farmers often availed of chemical input loans from dealers to pay the bill at the time of harvest, leading to accumulated debt and bankruptcy. Rice prices fell and rice cultivation became more and more unprofitable, notably in Kuttanad, the rice producer for Kerala state, which is due to the Public Distribution System, which was implemented by the government of India in the 1970s (Narayanan, 2003).

Mechanization of Ploughing:

The Green Revolution in Kuttanad led to significant changes in agricultural practices, including the mechanisation of ploughing etc. The ploughmen[30] who is part of trade union have opposed the introduction of tractors, causing tension in the fields. After prolonged strikes and negotiations, farmers were allowed to use tractors for the first ploughing of dry soil, but the union continued to oppose the introduction of tractors. This intensification of capitalist farming led to significant changes in agrarian relations in Kuttanad (Oommen, 1974). Traditional cooperation and the need for reciprocal exchange of labour were overthrown, and farmers became fully dependent on external sources of input. Political parties organized various trade unions, and by 1974, there were fourteen registered trade unions, forming about 40% of the total number of agricultural labourers' organizations in the state (Jose, 1979). Post-war developments deteriorated the existence of agricultural workers, leading to increased tension and conflict between farmers and labourers. The Green Revolution impacted the traditional web of relations in Kuttanad, affecting employment, input structure, and the environment.

[30] The Kuttanad Uzhavu Thozhilai Union, which is affiliated to CPI (M) political party.

Thottappally spillway and Thanneermukkom bund

To utilize the water resources to the utmost level and to minimize the damage causing by the water flow in this below sea-level region of Kuttanad, two projects were initiated. They are Thottappally Spillway and the Thanneermukkom Bund. The construction of the spillway project at Thottappally, which was intended as a long-term remedy to control the flooding in the Kuttanad region, was finished in 1959. Before the flood waters from the rivers Achankovil, Manimala, and Pamba reach the Vembanad Lake, this project was intended to reroute them to the ocean.

In order to stop seawater from entering the Kuttanad region during the summer, the Government of India recommended building a bund (Thanneermukkom bund) over a stream. By enabling farmers to produce an additional crop each year, this project attempted to streamline agricultural operations. The southern segment, the northern section, and a third phase that connected the two sections made up the project's organisational structure. The project had a delay, resulting in the depletion of granted funds after the completion of the initial two stages, leaving the last stage in a state of uncertainty. In 1972, a significant number of agriculturists, anticipating substantial financial gains following the completion of the bund, took matters into their own hands. Together, they piled dirt and clay into the space between the north and south walls. The crest that separates the two pieces of the bund is still present today. With this, the shutters of the bund were regulated during December– June, the period in which the saline water enters, and after that the shutters of the bund will be open during monsoon. Two crops were possible in the Kuttanad region after the completion of these projects. Though the spillway at Thottappally and the Thanneermukkom bund are constructed for the progress of the farming activities,

they are also causing some damage to the region, which is discussed in the later chapter of this thesis. Thus, this chapter expounded about the history of the traditional agricultural practice and the struggle faced by the inhabitants in creating and developing this practice and the agrarian relations among various caste groups of the region.

CHAPTER - FOUR
CURRENT PRACTICE OF BELOW SEA LEVEL FARMING IN THE KUTTANAD REGION

This chapter discusses the ongoing practise of submerged farming in the Kuttanad region's Puthukary village. It also elucidates the current farming conditions in the below sea level regions of Kuttanad, Kaipad, *Kole* and *Pokkali*. The chapter also discusses the land holding pattern and the agricultural calendar followed by the farmers in the Puthukary village and their socio-economic conditions. The village, Puthukary comes under the jurisdiction of Ramankary Krishi Bhavan, and Ramankary panchayat is one among the six panchayats of Veliyanad Block in the Kuttanad region. According to the data given by the Assistant Director, Krishi Bhavan, Ramankary, there are 182 *padasekharam* spread over in six panchayats of this Veliyanad block with 55000 farmers. Krishi Bhavan guides the farmers under its jurisdiction in practicing agriculture and provides the solutions for the crop related problems. They also prepare the agricultural calendar for the farmers. (The duties of the Krishi Bhavan and the programmes/facilities provided to the farmers are discussed in the later part of this chapter).

Padasekharam **in Puthukary**

There are seven *Padasekharam* in Puthukary. They are:

1. *Puthukary thollayiram* (900) – 51 acres (22 farmers)
2. *Karekadu Block* – 30 acres (7 farmers)
3. *Kiccherinaanoore* (400) – 41 acres (40 farmers)
4. *Puzhakary*– 320 acres (100+ farmers)

5. *Panayappalli 700 East Block*[31] – 36 acres (26 farmers).
6. *Panayappalli 700 West Block*[32] – 35 acres.
7. *Puthukary Pudayakary* – 65 acres (30 farmers)

All the selected households in Puthukary practice only *punjakrishi*, i.e. only one crop annually, except Mr. Ouseph Varghese (57), who goes for *rendankrishi* also. No other farmer in the village dare for the second crop because of the fear of loss due to monsoon floods. All the villagers praise him that he is the real farmer, since he does farming in his fields by himself and does not involve any labour.

Agricultural land owned individually

All the agricultural land in the village is irrigated land only and there is no chance for the land to be left un-irrigated for any reasons in the village, in fact, in the entire region of Kuttanad because of the low lying nature of the land. However, certain fields are left fallow by the farmers, which are discussed in the later part of this chapter. Table 4.1 shows the individually owned agricultural land among the selected households.

[31] Joseph Job (one of the key informants) is the Secretary of this *padasekharam*. In 1991 he bought three acres of land in this *padasekharam*. Since people believe that the job of secretary is so hectic in maintaining all the records relating to the *padasekharam* and heavy clerical job involved, no other farmer is competing for the post and so Mr. Joseph Job took the responsibility and continuing since eighteen years as the secretary to this *padasekharam*.

[32] Four families are holding this block now. They disagreed with the researcher to mention their names in any of the notes. Earlier both these Panayappalli blocks were of a single block and belong to one family. Later, brothers shared the property among them and thus divided the single Panayappalli block into two blocks- Panayappalli East block and Panayappalli West block.

Table 4.1: Individually owned agricultural land among the selected households

Owned Agricultural Land (in acres)	Frequency (number of households)	Percent
0.5	2	2.0
0.7	4	4.0
0.9	2	2.0
1.0	14	14.0
1.2	2	2.0
1.3	2	2.0
1.5	6	6.0
1.7	2	2.0
1.8	2	2.0
2.0	18	18.0
2.5	6	6.0
3.0	8	8.0
3.5	4	4.0
4.5	6	6.0
5.0	4	4.0
5.5	2	2.0
7.0	2	2.0
8.0	2	2.0
10.0	2	2.0
22.0	2	2.0
No own agricultural land	8	8.0
Total	**100**	**100.0**

From the Table 4.1, it is known that 92 percent among the selected households possess own agricultural land (of 280.2 acres added together) and 8 percent of them do not possess any agricultural land by own.

Leased- in (*paatam*) agricultural land

Among the selected households, 48 percent of the households (i.e. 48 households) took the land for lease (of 276 acres added together) ranging from 0.5 acre to 30 acres and are practicing farming and the remaining 52 percent of the households are least interested to go for *paatam.*

Table 4.2: Households practicing farming by taking the fields for lease (*paatam*)

Leased-in Agricultural land (in acres)	Frequency (number of households)	Percent
0.5	2	2.0
1.0	4	4.0
1.5	8	8.0
2.0	8	8.0
3.0	2	2.0
3.5	2	2.0
5.0	4	4.0
6.0	2	2.0
7.0	2	2.0
8.0	6	6.0
10.0	2	2.0
13.0	2	2.0
15.0	2	2.0
30.0	2	2.0
Not leased-in	52	52.0
Total	**100**	**100.0**

Leased-out agricultural land

Only four households among the selected households have given their farms to others for lease as they could not spend their time and money with that small holding of land. The main reason is that, as there are no male persons in their families, the remaining women and girls in these families are not interested towards farming.

Table 4.3: Number of households leased-out their agricultural land

Leased-out Agricultural land (in acres)	Frequency (number of households)	Percent
0.7	2	2.0
2.0	2	2.0
Not leased-out	96	96.0
Total	**100**	**100.0**

Agricultural land under cultivation

The total agricultural land under cultivation, which is owned by the people as well as taken for *paatam* which is being listed in the following Table 4.4.

Table 4.4: Total agricultural land under cultivation by the selected households.

Total Agricultural Land (own+paatam)in acres	Frequency (number of households)	Percentage
0.7	4	4.0
0.9	2	2.0
1.0	12	12.0
1.2	2	2.0
1.3	2	2.0
1.5	6	6.0
1.8	2	2.0
2.0	8	8.0

2.5	6	6.0
3.0	4	4.0
3.5	4	4.0
3.7	2	2.0
4.0	6	6.0
4.5	4	4.0
5.0	4	4.0
6.0	2	2.0
6.5	2	2.0
7.0	6	6.0
7.5	2	2.0
8.0	2	2.0
9.0	4	4.0
10.0	4	4.0
12.0	2	2.0
13.0	2	2.0
23.0	2	2.0
30.5	2	2.0
35.0	2	2.0
Total	**100**	**100.0**

The selected households together cultivate an area of 561.6 acres of their own, including *paatam*. According to the government statistics in 2013, the size class definition of land holdings is as follows (GoK, 2016):

1. Marginal : less than 1 hectare
2. Small : 1 to 2 hectares
3. Semi-Medium : 2 to 4 hectares
4. Medium : 4 to 10 hectares
5. Large : 10 hectares and above

If we categorize the selected farmers based on the size of their land holdings in which the farming is carried (includes their own land and also the leased-in farming land), Only 4% of farmers are large, compared to 40% of marginal farmers who own less than one hectare, 28% of small farmers, 22% of semi-medium farmers, and 6% of medium farmers. Majority of the marginal and small farmers are the new middle class landlords, who bought the paddy fields in recent years, after coming back from the gulf countries with considerable earnings.

Farming Rules and Behaviour

There are no specific rules for farming among kinfolks, neighbours, strangers or even enemies, except that the water flow should not be blocked from one farm to the other. Here comes the rules and the farming groups plays a crucial role in water management for the *padasekharam.* Everyone has the equal rights in farming. There are no permanent or hereditary farming rights between social groups or persons related by blood, clan or other ties. But within the group, if any disputes occur among farmers, then all the members in the group will be assembled and the decision of the majority is considered. Farming rights are not suspended for anyone. It is his wish to cultivate or not in his field.

Fallow lands:

Fallow lands (*tharishubhoomi*) are also seen to exist in Puthukary village. They are small bit of lands. In earlier days, the farms were kept fallow to increase the quality of the soil. The rivers during monsoon carry the silt from the uplands to the fields. As a result, if the fields are left fallow for a while, the silt deposits carried by the flood water improve the soil's condition. But in the present days, the intension of the farmers to leave their lands fallow is not to increase the soil quality. Because of the

unfavourable conditions of the soil to carry out farming and also to avoid huge expenditure for a tiny bit of farm land presently, farmers are leaving their fields fallow. Photos 4.1 and 4.2 show the fallow lands left by the farmers intentionally without carrying cultivation. The fallow land seen on the photo 4.1 is due to the uncontrollable growth of the weeds on that tiny part of the field and the soil on that part is not suitable to cultivate. The fallow land in photo 4.2 is due to the lack of interest of the farmer to cultivate in that tiny part of land.

Agricultural Groups

In Puthukary village, agricultural groups are formed according to the situation of the land holding. If a person buys a land, he then becomes the member of that group automatically. *'Paatam'* (fields taken on lease) farmers are not the members of that 'group farming' but only the landlords. He can bring a written permission from his landlord in support of him, if there is any clash between '*paatam*' farmer and other farmers (owners). A committee will be formed and secretary and president will be selected and the secretary should take care and lead the group. Secretary will make the work done whichever the group decides. Normal tenure of the secretary is one year, but people will continue for years as farmers do not come forward to take the responsibility. For example, Mr. Joseph Job is continuing as secretary for his group since 18 years. Funds for the group farming activities are collected from the farmers. A farmer should pay according to the number of acres of land he possess. These groups play very important role in farming because, without forming the groups, agricultural activities cannot be carried forward. For example, water pumping is the primary and crucial step for farming. Since all the paddy fields are interlocked, dewatering the fields in the middle of a *padasekharam* cannot be done without the

cooperation of farmers whose farm lands are in the periphery. All the farmers in the group contribute the money and participate in any farming activity. Their group name will be referred with the name of their *padasekharam*. All the farmers in a group (*padasekharam*) start the farming activities simultaneously.

Agricultural Calendar

Farmers follow the agricultural calendar prepared by the Krishi Bhavan to perform agricultural activities. September last week/first week of October is the starting month of the agricultural calendar and it lasts till the month of April/May. Removal of *kakkapola* (water-weeds) present in the field is the first step of the agricultural activity. Almost one month is needed to clean all this.

*De-watering the fields***:**

Removal of weeds is followed by the pumping of water from the fields to the canals. Drawing of water from the fields is the huge and most important task. Permission will be taken from the government to draw water from the fields, because, government will pay some amount to the contractors for whom the contract is given to draw water from the fields. In the upper Kuttanad area, government pays 1800 rupees per acre and in the lower Kuttanad; government pays 2500 acres per acre, since it is very deep and need to draw much water from the fields when compared to the upper Kuttanad.

Group farming committees will decide whom to give the contract of drawing water from the fields. Committee will organize an auction and one will be selected among them who quotes the least and the same will be intimated to the government. Government will pay the amount (1800 or 2500 depending on the area) to the contractor and the remaining amount if any is paid by the committee. Only

committee decided person will get the contract and it is not given to anyone else. He may be a farmer in that group or sometimes not. He will then take the pumping motors for rent from outside and starts pumping of water from the fields to the canals (backwaters). All the pumping will be finished by November first week.

*Petty-Paara**:***

Petty-paara is the mechanical equipment which is used to draw water from the field. It is fixed on the outer bund of the field covered by a shed built with iron sheets. It is run by the electricity. It has replaced the kerosene engines in the region which were used to draw water. In the traditional phase of doing agriculture, *chakram* were used to draw water. *Petty-paara* consists of mainly an electric motor, a turbine (*paara*) and a wooden box (*petty*). The turbine is connected to the motor by a conveyor belt. A cylindrical iron box with an aperture at the bottom surrounds the turbine. The turbine is subsequently secured to the inner (field side) of the bund, near to the water. A long wooden box is fixed horizontally cutting the bund, with one end placing above the turbine and the other end opening to the canal. A strong iron lid is used to close the open end on the canal side. The turbine draws the water from the field and sends them through the wooden box to the outer canal. The lid is opened when the dewatering activity is under process and it is closed when the equipment is not in use (see photos 4.3 and 4.4)

*Ploughing and levelling the fields***:**

Ploughing will be done for two to three days depending on the availability of the machinery. And then levelling will be done for another four to five days. Land will be dried for ten to fifteen days to remove the weeds. Again the fields are filled with water and they are left for twenty days with full of water so that the weeds which are

present will be decayed. Later, water will be pumped out from the fields. All this process will be finished by mid-November or before the end of November.

*Sowing, Transplantation and Manuring***:**

After the initial preparations, seeds are thrown in the field. Earlier, they used the technique of transplantation, in which all the grains (seeds) will be soaked in a place and when they sprouted and become small plants, they will be planted in the field evenly by the labour. But now, they changed from plantation to direct sowing (throwing seeds in the field directly), which was the practice few decades back all over the country. Fields will be filled with water of at least one feet depth and seeds will be broadcasted. On the third day, water will be drawn from the fields and allows the field to dry for nearly ten days. And later, manure and water will be supplied to the field according to the requirement. After fifteen days, Nominee gold, a chemical will be sprayed to kill the weeds. Watering the fields will be done again within two to three days. The weeds which are present will be decayed, and then water will be drawn out from the field. Manure/fertilizer will be sprayed according to the requirement. Again water will be released to the field. Now the transplantation of the plants will be done in the gaps present in the field. During this '*kavda'*, a weed in the paddy field which looks similar to paddy will be removed by the women labour. *'Vaeri'*, another weed which looks similar to paddy will be removed in the later stage after flowering because it cannot be identified in the earlier stage. *Kavda* can be identified even in the earlier stage (see photo 4.5) Later fields will be dried once again and water will be supplied again. Thus the process is repeated three times before mid-January. Water and manure are supplied according to the requirement and insecticides are also sprayed if needed.

*Supervision and Harvesting***:**

Farmers visit and supervise their fields regularly and watch the growth of the yield in every stage. Insects during night time are enemies to the farmers and insects during daytime are helpful and considered as friends (even birds in the daytime). *Marapatti*[33] is considered as major enemy to the farmers. Rats (*eli*) also damage the crop to a maximum extent. So to kill them, tapioca is cut into pieces and rat poison is sprinkled on them and they are placed in various location of the field.

By end of the second week of March, the whole of the harvesting activities will be almost completed in Puthukary. This process may vary with the villages of lower Kuttanad. The Civil Supply Corporation will conduct an assessment of the agricultural output and thereafter engage in the procurement of said output from the farmers. The funds will be deposited into the individual bank accounts of the farmers within a period of two months.

*Allowing water into the fields***:**

From the month of April, water will be released into the fields and the people can relax. Earlier, they used to rear ducks during this period, but now, they are giving their fields to lease if someone wants to rear ducks or will be left till the next agricultural activity. There are some families, who depend on fishing in these fields, for their subsistence, and no farmer will object them. Mostly, fertilizers and chemicals will be flushed away by the floods during the months of June and July. People in the village will be free from major activities during this period and it is also the time for medication and rejuvenation. This period is called as

[33] *Marapatti*, also called as toddy cat. It is also translated as a 'tree-dog' or a 'wood-dog'. '*Maram'* means wood or tree, '*Patti*' means dog. *Marapatti* attacks the hens during nights and also eats some fruits like pine apples. So it is a huge loss for pineapple farmers due to this *Marapatti***.**

panchamaasam. Monsoon time is the good time for the local people. Though it may be tough for non-locals, it is the relaxing period for the farming families. Auction dates are announced in the month of August and again the agricultural cycle repeats.

Number of Crops and selection of seeds

Unlike in villages of lower Kuttanad, only one crop (*punja krishi*) is possible in the study village, Puthukary. *Punja krishi* starts in the month of November/December and continues till February/March. Water from the canals is used for this purpose. The *rendaan krishi* starts in the month of June and continues till September. Rain water is used for this cultivation. Puthukary village is not favoured for *rendaan krishi*, for the fear of floods. As per the data given by the officials of the Krishi Bhavan, Ramankary, the villages located on the eastern side of the river Pamba (Thalavady, Muttar, veliyanad, Kavalam, Edathua, Ramankary and Pullunkunnoo) are very risky for second crop and the villages (Nedumudy, Chambakolam and Kainakary) on the western side of the river Pamba are favourable for second crop, as the flood water easily escapes into the sea. *Pokkali, ayyaratta, thayechage, jaya* and *njavari* (used in ayurvedic medicine) are the old varieties of rice cultivated in earlier years, but all these varieties are replaced now by the new variety, *Uma*.

Pumping in and out of water should be done to eradicate the weed from the fields. Such pumping was carried five times per crop in the earlier days, but it is restricted to three times per crop now, because of the usage of pesticides. All the farmers in the village are now following the calendar prepared by the agricultural department. They are cultivating D1 variety of rice now which comes to hand in 140 days. They also cultivate the variety, Jyothi (also called as 1285), which comes to yield in 110 days. Jyothi variety is tastier than D1 but the output is less. So, they cultivate it for their

personal use. Not all the farmers cultivate Jyothi variety. D1 (or Uma) is the most popular variety of paddy which farmers cultivate in Puthukary. Agricultural Seed Research Institute in Mancombu, after conducting the research decides the variety of seed to be sown and will be supplied to the government. D1 variety of paddy is resistible to *gaalicha* (pests) and also the yield will be ready within 120 days after sowing.

Cattle

Among the selected households in Puthukary, only two houses (only 2 percent) possess oxen and eight households (only 8 percent) possess buffaloes. No other households have cattle. Cattle, especially buffaloes were considered as one of the greatest wealth of the farm households till recent years. Farmers could not think of farming, unless they plough their fields with the help of buffaloes. Farmers think that buffaloes are the best suited animals to plough the land lying under the water. They can plough the land being almost immersed in water. Hence, male buffaloes were exclusively used for the agricultural activities, whereas the she-buffaloes were used for agricultural purposes till they begin to bear. Cattle were such an immense importance to the farmers then and there exists an inseparable bonding between the farmers and the buffaloes. But since recent years, the introduction of the machinery into the farming activities has replaced the labour (especially women in a large extent) as well as cattle. The usage of cattle in the farming activities almost disappeared in the Kuttanad region except a very few farmers possess them.

Income and Expenditure:

Farmer gets the yield of around 25 to 30 quintals of paddy per acre and each quintal costs around Rs.2200. So the farmer gets approximately Rs.60000 per acre.

Investment per acre is around Rs.30000. If the farm is taken for lease, one has to pay Rs.20,000 per acre to the land owner. So, at the end of the day the farmer gets the profit of Rs.10,000 to Rs.20,000 per acre. Other than the traditional occupation of paddy cultivation, they also do coconut farming, fish farming, banana, vegetables to supplement their income, whereas the majority of the youngsters are moving to gulf countries to earn much.

Support from the Government Agencies

To get the support from the government, the farmers need to register the details of their farm before every farming season begins in the website (supplycopaddy.in) of the state civil supplies department. Then, based on the details registered, the government gives subsidies to the farmers to buy seeds and handling charges while loading the grains and also the government buys the yield from the farmers. The farmers send the yield to the civil supplies department after the harvesting.

Krishi Bhavan (Village Agricultural Office):

In the words of Madhu George Mathai, assistant director of agriculture, Veliyanad block, Krishi bhavan plays a crucial role in supporting and uplifting the farming community. Krishi bhavans are established in 1987 in the state of Kerala at gram panchayat level. The Department of agriculture approaches the farmers in all villages through Krishi bhavans. Only through these Krishi bhavans are the government's and the department of agriculture's schemes made available to farmers. Well trained and qualified agricultural officers and agricultural assistants will manage the Krishi bhavan at panchayat level and assistant director at the block level. The study area comes under the Krishi bhavan of Ramankary panchayat, Veliyanad block.

Mr. Madhu explained about the functions and schemes implemented by the Krishi bhavan in Ramankary panchayat to which the study area, Puthukary, belongs to. He says there are two schemes for the paddy cultivators under which a subsidy is provided by the Krishi Bhavans to the farmers. One, a subsidy for cultivation expenses, through which, an amount of Rs.1500 per hectare is given by the government to the farmers to meet the cultivation expenses and the second scheme of *Rashtriya Krishi Vignana yojana* (RKVY), under which a subsidy of Rs.4500 per hectare is given by the government to aid the farmers and also a productive bonus of Rs.1000 per hectare is given to the farmer who produces more.

Puthukary soil is mostly acidic in nature. So to neutralize it lime/gypsum should be added. For this Rs.5600 or 50 percent subsidy will be given by the government. Village Panchayat also provides seed subsidy depending on the available funds. In general it is fixed as Rs.800 per hectare. Soil sampling is also done by the Krishi Bhavan and the results and the measures/precautions need be taken will be explained by the Krishi Bhavan to the farmers. Pre-season training will also be given to the farmers. Two Plant health clinics are also established by this Krishi Bhavan under its jurisdiction. They will check the sample of all soils or infected crops and guide the farmers for better solution.

Besides giving fixed price to the yield, government is also providing insurance to the crops if any damage occurred. An amount of Rs.12,500 per acre is given by the Krishi Bhavan if any damage occurs to the crop and during calamities; government calamity fund of Rs.20,000 per hectare is given to the farmers by the government. All funds are credited directly in the personal bank accounts of the farmers. In addition to the above duties, Krishi Bhavan also organizes some farmer oriented

programs to educate the farmers technologically and thus motivate the famers of Puthukary to produce maximum.

FFS (farmer field school) is organized for 6 weeks. Farmers will be taught the new techniques of farming, new chemicals/fertilizers to be used, new variety of seeds and other farm related techniques by the Krishi bhavan. All the farmers in the area are assembled in a field and classes will be given to them for six weeks. *Chaya* (tea) and biscuits are also provided to the farmers.

ATMA (*Agricultural Technology Management Scheme*): Krishi bhavan officers will take the selected farmers to field trips to places across the country once in two years where new farming techniques are used and will expose the farmers to the new technology. Krishi bhavan bears the entire expenses of the trip.

Developmental activities in Puthukary

Puthukary region once traversed with the rivers and canals, water bodies, thick green fields and garden lands are now seen with connecting roads to most of the villages and other development activities like construction of concrete bunds, bridges, hotels, resorts, and research institutions. And by these developmental activities, the livelihood patterns and the physical features of the region are being changed. Many developmental activities initiated by government as well as non-governmental organizations for the upliftment of the living standards of the people of this region are proved as disasters. The green paddy fields of the region are gradually shrinking. The young generation, who are well educated, are moving out of the region for better livelihoods, as they have no interest towards the low profit farming in the region.

Land, water and life in Puthukary

The people of Puthukary are very much attached to the water and the soil. Because, they were born there, earn their livelihood from water and soil and live there, facing all the odd climatic conditions and fight against the disasters and stand firm to live again. This fight over the nature made them courageous, facing the risks, and also augmented their attachment towards the land and the soil. Many times, breaches of bunds happen inundating the paddy fields, but the people never stop cultivation with disappointment, rather they fight back collectively in constructing the bunds and start cultivating again. These breaches of bunds are more in lower Kuttanad region when compared to upper Kuttanad. Appachchan (73) from Puthukary says emotionally, 'there is no life for us without agriculture. We created these fields, struggling day and night for years and started cultivating. Since generations, we lived here, we cultivated here and we die here'. This shows their emotional bonding and attachment towards the place.

Thampurakkal (landlords) financed for the reclamation activities and the low caste labourers worked hard for days to draw water from the huge water bodies and constructed bunds, utilising the local resources and created the *kayal* lands. Due to its geographical isolation and being surrounded by water, this particular place in Kerala has historically been considered one of the most inaccessible areas. Until recently, access to this region was limited to the use of *vallam*, a traditional local boat. Hence, it is justifiable to posit that the isolation and distinctive geographical location compelled the residents to rely exclusively on the local resources for sustenance. According to Joseph, a marginal landlord from Puthukary, "the earth bestowed upon us a multitude of resources and opportunities. Fish were provided by water, while

grains and coconuts were provided by land. The soil has consistently ensured our sustenance without causing hunger". This engendered a feeling of emotional connection to their locality and a deep affection for it. The residents were recipients of a nurturing affection from the natural resources in their vicinity. The inhabitants of Puthukary are perpetually engaged in a symbiotic relationship with the dynamic interplay between the terrestrial and aquatic elements. The manner in which the inhabitants of Puthukary perceive and understand their surroundings can be attributed to their extensive and enduring connection with the local landscape and aquatic environment. The level of inhabitants' attachment towards the resources (land and water) increased in proportion to their degree of physical interaction with them.

Both the landlords and labourers are attached to the region; landlords, for their ownership and financing the cultivation, and the labourers, for their dependency on land and water and their hardship. Both faced the timely challenges imposed by the nature and overcome the situation. Considerable energy of all the people is needed either to gain profit or loss; or to save their lives or to surrender to death during the calamities. The collective efforts of the individuals developed a profound sense of solidarity and closeness within the community; particularly among the labour class.

Floods:

Puthukary experiences significant floods during the monsoon season, turning green paddy fields into turbid water. This makes transportation and movement difficult, with roads submerged under water. Wealthy individuals raise their properties with clay or gravel, but many believe this practice is harmful as it decreases water-area and increases flood tendency. The residence areas of the village are extremely pathetic, with their houses filled with water, increasing their chances of water-related

illnesses and limiting their freedom. Despite these hardships, the people of Puthukary believe their land is a gift from God and are happy to live there. Floods have become a part of their life, and they know how to take precautions during floods to reduce damages.

Besides damage, the floods also bring some benefits to the region. Floods clean the rivers polluted with water weeds (*pola*) and also deposits fertile silt into the fields. Although Puthukary is frequently depicted as a natural paradise, the truth is very different. *Pola*, a water weed, spreads water-bodies and stops river flow, leading to stagnation and allowing harmful insects, pests, and snakes to grow. People are forced to utilise the dirty, polluted water due to this pollution since they have no other choice. The deteriorated weeds are thought to be the cause of the water bodies' vivid green colour. In aquatic bodies, pola is a barrier to movement and transportation. The locals rely on women labourers to perform manual clearing work and on salinity or floods to purify the environment naturally. The influx of salt water into the water bodies throughout the summer might be used to check it. However, the Thanneermukkom regulator, a government initiative to boost rice production by regulating the inflow of seawater into the lake, resulted in an increase in weed growth. The women of *Thozhilurappu*, a government programme for women, claim that pola offers an alternative source of income to paddy farming despite the difficulties it presents.

Intrusion of saline water into the water bodies

The intrusion of salt water commences in the summer season, originating from the Arabian Sea and extending towards the Vembanad *kayal*. Subsequently, it swiftly disseminates to the southern regions, encompassing nearly all the villages within the

Kuttanad region. Therefore, the study area is equally confronted with a shortage of freshwater resources for the purpose of irrigation. The Thanneermukkom regulator was built to keep saltwater from getting into the rice fields, but it broke down, stagnating the local waterways and causing further pollution and sicknesses. The regulator increased grain production but prevented fish from growing, which caused fish prices to skyrocket and deprive the poor of their customary source of protein and employment prospects. While the poor rely on rain, the privileged have access to private ponds with less salty water. Floods, salinity, and pola are considered to be the three main problems that the resources present to the locals.

Degradation of the quality of the land and the water

Puthukary is a community with plenty of water and fertile land, and it provides work opportunities, but the absence of pure drinking water makes it a curse. In rice fields, the use of chemicals, fertilisers, and pesticides pollutes the water, endangering the health and existence of locals as well as other plant and animal species. Garbage dumping in bodies of water has become widespread as a result of growing populations and easy access to piped water. Additionally, waste from hotels, resorts, and hospitals is dumped in the water bodies, damaging the resources. Due to a scarcity of clean water and improper implementation of water plans by the authorities, the poor residents are compelled to utilise water. For many low-income and middle-class households, who collect and use rainwater for domestic purposes, rain is their only chance. Locals of all professions must be made aware of the harmful effects of pollution, and rigorous regulations must be put in place, in order to prevent pollution.

Developmental activities and their damage to the village

Puthukary has experienced some development activities in the areas of rice production and in improving life conditions. However, these positive aspects are only marginal. The main complaint against these policies is that they were not planned considering the opinions and needs of local inhabitants, leading to crop failures and bankruptcies. The natural balance between people and resources in Puthukary has been disrupted by changes in cultivation methods, leading to pollution and land fragmentation. In addition to impeding the village's natural development, roads and structures construction also altered the village's scenery, occupational patterns, and way of life. Artificial chemicals are polluting the region, negatively affecting local health and animals. Despite the failures in development activities, the inhabitants of the village still accept and cooperate with these activities. This is in the hopes that the government would solve their issues and turn the land and its riches back into a blessing. The "curses" of the hamlet remain unsolved despite multiple studies and investigations carried out by governmental and private organisations because authorities take advantage of these chances to collect vast sums of money.

Inhabitants of the study area have become accustomed to the region's challenges, such as crop failures, saline water, and pests, which have become part of their sense of place. Despite these hardships, the inhabitants have managed to overcome these challenges through generations of experience and knowledge. However, the rapid urbanization and development have led to a decrease in dependency on resources and increased contact with the outside world. There are now more diseases of plants, animals, and fish, as well as issues with sanitation and environmental degradation. Environmental degradation, sanitary issues, and a decline in the number of fish,

animal, and plant illnesses are just a few of the new issues that have surfaced. The ancient people of Puthukary still believed that God would bless them when they worked hard and took risks, but this is quickly changing. The younger generation aspires to settle outside of the community in search of quick money. Old regional beliefs are vanishing as the views of the locals change. The locals today see their quality of life as a combination of resources like money, food, health, social standing, land, and hardworking relatives and employers. The residents are still tied to the location and its history by their recollections of past tribulations and victories.

Vanishing nature and changing lifestyles

Drastic changes have swept Puthukary in the recent decades. The water-logged village which were remote and without proper transportation are now interconnected with tarred roads. These connections made the inhabitants easy to contact with the near urban centres, and the outsiders to enter and exploit this region. The community has seen substantial changes as a result of regular interactions with the urban environment. The older generation finds it difficult to adjust to the changing circumstances, whilst the younger generation does it with ease. The majority of the population is content with the advancements, but the closeness they formerly had to their land and water is vanishing. There is now a brand-new, vibrant civilization with little connections to resources on a personal level.

Many parents in the village felt that education of their children brought money to their families. Educated people from the village are now migrating to gulf countries to earn more money and the family members are equally encouraging them. Money has become a significant factor in the lives of inhabitants of Puthukary, as the younger generation, who once faced social discrimination due to illiteracy and lack

of money, has utilized educational opportunities, secured jobs, and acquired wealth, leading to a shift in the agricultural population.

Emergence of new middleclass landlords

Puthukary hamlet is going through a considerable shift, although the old agrarian generation is still working at their customary jobs. Due to their solid financial situation and educated offspring who live outside of the village or abroad, the new middle class landlords have abandoned or downgraded their traditional jobs. In order to retain their social standing, this newly wealthy segment of society is living a relatively comfortable lifestyle and increasing their land size. The last of the old Thampurakkal (landlords), whose living conditions worsened following the communist dictatorship, surrendered their properties, and the so-called new middleclass landlords purchased them. The majority of these older Thampurakkal (landlords) are poor and financially disadvantaged, however many still rely on traditional professions.

Relations in Agriculture sector

Different social groupings and changing conditions have an impact on the paddy cultivation in Puthukary. Traditional ties to land and water, as well as traditional jobs, are now entwined with caste attitudes, education, relationships in cities, and wealth. A more prevalent arrangement than the landlord-labourer one is an employer-employee one without any distinction of caste. It is still disgusting to the core how people who own fields interact with those who labour in them. Many labourers believe that new landlords behave in the same way as ancient landlords from past, simply wanting the bare minimum of hands to cultivate their land. The paddy fields' and traditional agriculture's futures appear uncertain.

Paddy cultivation

The old agrarian population in the village is grappling with the uncertainty of the new age and the loss of their traditional occupations. Their future is still in doubt as the paddy fields where they live are being destroyed. Some people continue working in traditional occupations because moving is expensive or because staying there is relatively safe. Others resist change and stick with their inherited jobs because of ingrained habits. The strong bond between the people and the land has been broken by the shifting land use patterns in the community, which has decreased interest in paddy cultivation. With paddy lands being distributed on a whim to individuals who still find farming fascinating, absentee landlordism has proliferated. Some farmers have changed to other forms of employment like construction, tourism, and cash crops as a result of this. Those who have lost interest in the occupation view the Land Utilisation Act, which forbids residents from using paddy fields for anything other than agriculture, as a curse. Opportunities for work for the traditional agricultural people are being negatively impacted by the declining area for rice cultivation and production. The fields' shrinkage is a silent warning that the area will continue to vanish and be occupied in the near future.

Labour shortage

The village, Puthukary is facing a crisis of labour shortage due to the increasing number of people moving out of traditional occupations. Factors contributing to this shortage include the spread of education, urbanization, and social transformation among inhabitants. Numerous people have left the occupation and now view paddy cultivation as a secondary one due to its seasonal character, the unpredictable nature of harvest in the delicate ecosystem, and the considerable hazards involved. People

who fall into the APL (Above Poverty Line) and BPL (Below Poverty Line) categories have been encouraged to leave their customary jobs or to view them as a secondary occupation by the government's strategy. The number of individuals engaged in agriculture is declining as more youngsters leave the village for school and jobs, leaving only the parents.

The unemployment among current labourers is exacerbated by the new landlords, who were once labourers but now know cultivation and work in their own fields rather than employing labourers to cut costs. Women are the main sufferers as a result of the increase in female participation in paddy farming operations. Now when landowners are compelled to use machinery and other non-manual techniques to maintain cultivation in their fields, current labourers are put in further danger and unemployment results. The frail older age predicts that if the industry persists, automation will eventually supplant workers. Rice production is still poor despite mechanisation and the efforts of the remaining labourers, and the region is rapidly losing importance.

The old traditional experts of cultivation

Puthukary has a rich history of hardworking people who have created resources and livelihoods through paddy cultivation. These workers, who have passed down their knowledge and skills from generation to generation, form the backbone of the labour force. The unique geography and resources of the village demanded unity and cooperation. However, the traditional skills and work culture of these workers have declined over time. The pride and affection for their homeland are absent among the older generation, which fought against nature's obstacles. It results in a loss of love, friendship, trust, dependency, and cooperation since the younger generation,

landowners, and labourers are not prepared to maintain old activities and accept risks. As the region becomes more connected to the outside world, the resources, land, and water that once bound the locals are vanishing.

Development storms did not leave the Kuttanad region either. The various global policies of WTO and various governmental and non-governmental boards have influenced the farmers of Puthukary to shift from their low returns paddy cultivation to profitable cash crop cultivation. Kannan (2011) opines that Kerala's farmers are very efficient in utilizing the limited available resources and reap maximum benefits by crop selection and the application of latest technology.

Shift towards the commercial crops from paddy cultivation

The paddy cultivators of Puthukary are shifting towards the commercial crops as they bring good economic returns. The agricultural industry has seen major change since the mid-1970s, with the rise of commercial crops at the expense of food crops. Despite efforts to revive the food production sector, the agricultural development and growth scenario has been distinguished by stagnation since the mid-1970s and a rebound since the mid-1980s. The distinctive paddy fields are currently being changed into the fields of commercial crops. The study region was also impacted by the economic reforms of 1990, which increased market uncertainty and posed difficulties to the sector's sustainability. The agrarian society has been disrupted and a significant portion of traditional food crop producers and farm workers have seen their livelihoods destabilised as a result of contradictions resulting from the agriculture development model guided by peasant rationality alone, which is the root of the emerging crisis in the agricultural sector in Puthukary. The green revolution's

institutions, technologies, and policies had a significant impact on how agriculture developed in Puthukary.

It is possible that increasing technology adoption or irrigation infrastructure aren't the cause of the paradoxical positive growth in productivity and reduction in agricultural yield and area. The higher rate of adoption of the native, high-yielding clone RRII 105, particularly by small rubber growers, is the main cause of the increase in rubber production and productivity, though. Farmers have become attracted to these crops because to the relative price advantage and little input requirements, which has resulted in a sharp expansion in their area at the expense of food crops.

The rational behaviour of farmers in Puthukary has also been greatly influenced by specific crop development and promotional programs promulgated by commodity boards in the state of Kerala. Agro-ecosystem integrity, environmental balance, and the sustainability of small and marginal farmers' and landless labourers' livelihoods have always been at odds with the paradigm of agriculture development in the studied area. The village's agriculture sector faces technological limitations primarily as a result of the difficulties presented by the infrastructure facilities that are accessible and the levels of technology adoption across crops and areas. The labour market issue is one significant socioeconomic barrier that negatively affects the village's farming population. Due to the severe labour market situation, a sizable portion of the village's rice-growing land has already been switched to less labour-intensive crops including coconut, plantations, and rubber or abandoned permanently. The state as a whole is struggling with the agricultural labour market challenge. For the majority of crops, new models and incentive systems must be created to handle this. The engagement of younger generations should be increased,

and there should be incentives for social security, gender equality, and resource access. The region's expanding trade also requires stricter adherence to labour and environmental regulations. The state's governance crisis in the management of sustainable land and water resources is also reflected in the agrarian transition.

Home gardens:

Home gardens or homesteads are growing in the recent years with the influence of the crop specific boards like spices board, coconut board etc., which are motivating the people to grow almost all varieties of garden crops in their front and backyards, by which, people can earn secondary income. These farms generate cash income and employment, with coconut being an integral component. The family consumes more than 80% of the product, with the remaining 20% being sold for additional money. Multipurpose trees, shaded crops, and living fences are some more tree-based land use strategies.

The wetlands in the Kuttanad region contribute a major production of rice in Kerala. Out of the total paddy lands in Kerala; about twenty-five percent are water-logged (Jayan P R, Nithya Sathyanathan, 2010). The water logged areas in the Kerala, where the major portion of paddy cultivation required for the state is carried are Kuttanad, Kaipad, *Kole* and *Pokkali*. A brief explanation of the current practice of cultivation in these wetlands is elucidated in this section.

Kuttanad Wetlands

With 42,000 hectares of agricultural land, the Kuttanad area includes parts of the districts of Alappuzha, Kottayam, and Pathanamthitta. It is the delta region with four major rivers confluence into the Vembanad Lake in this region. This region is connected to the Arabian Sea. To mitigate the problems of floods and salt water

intrusion into the region, the state government of Kerala has sanctioned to construct a spillway at Thottappally, a salt water barrier at Thanneermukham and a road and canal between Alleppey and Changanassery. The spillway regulated floods to some extent and also brought nearly twenty thousand hectares of land under cultivation (Jayan P R, Nithya Sathyanathan, 2010). Thanneermukham bund was also successful in controlling the saline water intrusion into the region during summer.

The majority of the farmers of Kuttanad are not daring enough to go for the second crop of paddy cultivation for such reasons like fear of monsoon floods, high cost of tenancy, huge labour costs and low returns in final. However, with a motive to make utilise the circumstances, they have started cultivating fish and prawn in their fields and are reaping better economic benefits.

Kaipad wetlands

The 2,500-hectare Kaipad region of North Kerala is a saline-prone natural organic rice growing tract. In coastal brackish-water marshes that are abound in organic matter, it is an integrated organic farming technique that combines aquaculture and rice growing. A system of backwaters and estuaries has an impact on the region, which has saline hydromorphic soil types. With a 400 hectare spread close to the Pazhayangadi River, the Kaipad lands are an essential wetland environment for managing flooding, sedimentation, and pollution. Due to its proximity to where a river merges with the sea, the area is swampy and overflows with water, which results in flooding during monsoon season and salinity throughout summer. Kaipad fields receive tidal currents from the neighbouring sea at high tide and low tide, which keeps the soil moist even in the summer. Since the fields are submerged in

river water, there are abundant amounts of very productive organic materials that can be used as food for fish species without the need for artificial manuring.

Farming in Kaipad region:

The farming of rice cultivation in Kaipad is a unique and eco-friendly method that relies on monsoon and sea tides. The cultivation process begins in mid-April and involves drying the fields, creating small mounds (*potta*) and waiting for monsoon rains. Rainwater is used to wash away the mounds' salinity before the germinated seeds of a unique kind known as *kuthir* are planted. End of September to mid-October is when the crop is harvested. High-yielding rice varieties' potential hasn't been fully utilised, which is why Kaipad's rice fields are becoming smaller and less productive. Due to their weak culm strength and inferior grain characteristics, traditional cultivars are prone to lodging. In order to meet the rising demand for organic rice, sustained research efforts have resulted in the development of high-yielding rice cultures. Farmers have abandoned rice farming, however, due to the undesirable traits of the cultivators that are readily available locally.

Prawn filtration:

After the harvest of the paddy, prawns are filtered in kaipad fields. Following the North-East monsoon's departure, bunds around the fields are strengthened by adding mud to the sides and installing wooden sluice gates. Prawns and fish can penetrate the fields because tidal water rushes in with the greatest velocity. Prawns cannot exit the sluice gate valves because a net is installed inside of them. Rice stubble is utilised as fertiliser and water is allowed in at two tides. Beginning in the summer and continuing through mid-April, fish filtration. Before the middle of April, fishing is

permitted with open access, and the owner receives half of the catch. *Varsha kettu*, or fish filtration, takes place during the monsoon although catches are limited.

Kole wetlands

One of the biggest and most significant wetland habitats is the *kole* wet lands in Kerala. Beginning in the 18th century, rice was first cultivated in *Kole*, which at the time included the districts of Thrissur and Malappuram. The region is low-lying and flat, with the South West monsoon causing water levels to rise up to 5.5 metres. One of Kerala's most fertile soils, the *kole* lands produces four to five tonnes of rice per hectare. With a total flow of 2,388 cubic millimetres, the drainage area of the Keechri and Karuvanuur Rivers combined is 1,685 square kilometres. The region contains a system of main and cross canals that aid in efficient drainage. The Karuvannur and Keechery rivers carried alluvium down to the drowned plains known as the *kole* lands, where it accumulated. A variety of soil types are distinguished, including clay, sandy loam, clay loam, and sandy clay loam. The South-West and North-West monsoons bring two clearly defined rainy seasons to the *kole* lands, which have a temperate climate with temperatures between 21 and 38 °C. During the months of October and November, depression rains also fall on the *kole* plains.

Cultivation practices in kole:

Inundated paddy fields, coconut garden-lined flood protection bunds, and a central water feed canal that controls incoming water flow through sluice gates are all found in the *kole* lands. Axial flow pump sets are used to drain the water, and the peripheral bunds are high and durable enough to endure floods. The 55,000 hectare *padasekharam*, also known as polders, are essential for fishing and farming. The primary rice crop, punja, is grown during the early dry season and employs about

40% of the people directly. Rains have an impact on irrigation, yet group farming enables for efficient use of agricultural equipment. Dewatering into nearby water canals using 'petty and para' pumps is a common practise that prevents fields from becoming flooded.

***Pokkali* Wetlands**

In Kerala's waterlogged coastal regions, 6,274 acres of the rice variety *Pokkali* are organically farmed. The areas have impenetrable clay soil that is rich in organic matter and are low-lying marshes and swamps that are close to rivers and streams. Through backwaters and canals, the *pokkali* field is connected to the Arabian Sea, providing a distinctive eco-system for the cultivation of organic paddy and prawns.

Rice Cultivation in pokkali wet land:

In a method known as *pokkali* farming, prawn growing replaces rice production from the middle of November to the middle of April. The rice plants in these areas grow up to two meters, to survive in the water-logged fields. The total *pokkali* lands were originally 25,000 ha, but the area is declining due to factors such as lodging, damage from fish, tortoise, and rats, and field clearing. *Pokkali* rice is a natural organic rice variety, with fertile fields and low pest and disease incidence. The *Pokkali* Land Development Agency (PLDA) was established in 1996 to promote paddy cultivation in wetlands. The entire area devoted to *pokkali*, however, has decreased from 25,000 ha to 8,500 ha, with only 5,500 ha dedicated to rice farming. In these *pokkali* lands, coconut farming is becoming more and more common, and many *pokkali* lands have been converted. The main reason for the fall is the shortage of farm labourers, especially during harvesting.

Agriculture and Fish culture in Pokkali wetlands:

Fish farming takes place on *pokkali* fields, preserving the ecological balance and bringing in money for the farmers. Saline backwaters and canals draw young fish and prawns during the monsoon, which are then directed to the fields by trap sluices. Waste products from the growth of *pokkali* rice serve as natural food for the fish crop. Prawn filtration, intensive prawn culture, and modified semi-intensive culture practises are used in *pokkali* fields. By gathering seedlings during high tides, prawn filtering maximises the use of coastal wetlands. All year long, there are several activities related to prawn culture.

Wetland conversions

Wetland agro-ecosystems offer valuable goods and services, yet Kerala state policies frequently ignore them. In the past 30 years, the area of wetlands has decreased by 65% as a result of the conversion of paddy fields, which has irreparably harmed the environment. In order to increase their financial gains, farmers frequently convert paddy fields into garden produce farms or real estate developments. Environmental issues including deforestation and the alteration of backwater ecosystems have resulted from this, posing a threat to the livelihood security of economically underprivileged groups in rural areas. Rice fields are to be protected from unauthorised reclamation thanks to the Kerala Conservation of Paddy Land and Wetland Bill of 2007. But it has already been irrevocably transformed for a number of purposes. Wetland conservation legislation ought to be more farmer-friendly, guaranteeing a secure return on investment for farmers and weighing the advantages of preserving habitats and natural processes.

This chapter thus elucidated the transformations in agrarian relations caused by developmental activities as well as the challenges encountered by the agrarian community. It delved into the causes underlying the scarcity of agricultural labour and examined the changing perspectives of the farming community.

CHAPTER – FIVE
IMPACT OF DEVELOPMENTAL ACTIVITIES ON THE ECOLOGY AND AGRICULTURAL PRACTICES

The developmental initiatives in the village of Puthukary are not only endangering the local ecosystem, but also introducing significant changes to traditional agricultural practises through the adoption of new technologies. It is observed that the new land reclamations for non-agricultural purposes and tourism development policies by the state government of Kerala have brought changes in trade policies for farmers in the study area. There are instances that modern developments have also resulted in increasing floods in the region. These issues have a major bearing on the socio-cultural milieu of the people in Puthukary village.

New land reclamations

The land reclaimed in the recent years for non-agricultural purposes is carried out by both government and non-government agencies and local people as well for various developments in the Puthukary village. Government initiatives to provide infrastructure as part of the development of the village are like construction of roads for connecting the villages and nearby towns. In the recent years, other developments such as bus shelters, petrol stations, hospitals, schools and government offices etc. were built on the reclaimed lands. There were incidents in the village that the locals have protested against developments as the state government of Kerala acquired and reclaimed lands of paddy fields. Apart from the infrastructure facilities, commercial spaces like provisional stores, vegetable shops, hotels, toddy (*kallu)* shops, petrol bunks and big resorts are popping up in and around Puthukary village.

People from across the caste groups like Nayars, Ezhavas, Syrian Christians and Pulayas are all involved in this reclamation of land for commercial usage. It is noted

by the researcher that reclamations for commercial usage are mainly carried by the people who do not depend on agriculture. Thus, landscapes of the Puthukary village are rapidly transforming by these reclamations. These business oriented reclamations are also bringing stratification in the social structure of the village as few castes are claiming higher position in the ladder of social mobility.

Tourism industry and the real estate companies are playing a major role in commercial exploitation of the region. The development of the road in the Puthukary village resulted in an enhanced level of mobility for the local population. The provision enabled the inhabitants of the village to commute and engage in employment opportunities in the neighbouring urban areas. Before the construction of this roadway, a significant number of individuals residing in the Puthukary village were compelled to engage in temporary migration to surrounding towns in order to search of employment opportunities. The AC road has significantly checked the temporary migration to the nearby towns.

According to a respondent named Varghese Job (aged 53 years) who is a shop keeper in Puthukary village stated that the construction of roads has made their life easy in terms of bringing provision items for his store from the nearby towns of Alappuzha or Changanassery. Earlier, he had to travel in canoes *(vallam)*. Knowing the tourism potential of the region and with the establishment of network of roads to the region, the investors and traders from other towns such as Alappuzha, Changanassery, Kottayam and even from Thiruvananthapuram are now entering the region to establish their business enterprises. In this connection, Vallikappen (2020) supports the Harvey's (2003) argument that capitalists acquire the land and use spatial tactics and finally establish and retain their monopolistic dominance over the place.

Similarly, the traders and investors have established their monopolistic dominance over the Puthukary village.

Reclamations to build habitations:

The local populace engages in land reclamation primarily for the purpose of constructing residential and commercial dwellings. According to legal provisions and land reforms of the Kerala state, each household is granted the right to claim a plot of land which is measuring 0.04 hectares (equivalent to ten cents). Therefore, a family consisting of five children has the provision to reclaim 0.20 hectares, which is equivalent to half acre or fifty cents of land. With the conversion of wetlands into residential places, the value of the plot is being multiplied. Thus, many paddy cultivators, realising the complexities involved in the farming sector are leaving their paddy fields fallow with a motto of converting them to non-agricultural purposes. The study area experienced a significant acceleration in land reclamation and invasion of water bodies. It is noteworthy that the amount of land being utilised for agricultural activities has been reducing. According to Varghese (1995) the realtors who invested money in the Kuttanad region are not agriculturalists, but businessmen. Similarly, Menon (1987) highlighted that the farmers across Kerala have got benefitted not by cultivation but by the implications of converting lands to commercial purposes.

Impact of developmental activities on the socio-cultural life of Puthukary village

Impact of Alappuzha-Changanassery Highway (AC Road):

It is due to the uneven construction of AC roads in and around Puthukary village region have resulted in changing course of waters which impacted in reduction in the size of the backwaters, and also the increase of floods in the region. Construction of

the AC road and its subsequent connection to surrounding villages has resulted in numerous environmental repercussions. Prior to the establishment of these road networks, alternative transport options were limited to the usage of waterways. In each dwelling, residents depended on the *kochuvallam* (small canoe) for transportation. Consequently, the canals remained unpolluted due to the prevalent use of these canoes. Similar to bicycles and cars in other geographical areas, individuals residing in the region utilised canoes and boats as means of personal transportation. However, with the establishment of these roadways, there has been a significant drop in the utilisation of *kochuvallam*. Consequently, numerous households no longer possess canoes, resulting in the canals becoming clogged with water weeds (especially Hyacinth, *kula-vazha*) and silt, rendering them worthless and impeding movement. The process of cleaning and removing weeds from the canal incurs significant costs, necessitating regular and periodic maintenance. Given that canals are no longer the exclusive mode of transportation, the government exhibits minimal interest over the care and maintenance of these waterways. With the changing land use patterns and with the development of roads and communication, the areas in and around Puthukary village, transformed into sub-urban and urban centres.

Blockage of canals:

Many areas within the Puthukary region have been linked by tarred roads, rendering the canals which formerly served as the sole mode of transportation, and they have now remained underutilised. Individuals began purchasing bicycles and automobiles, resulting in a significant portion of the population divesting their personal boats (*kochuvallam*). The canals are no longer used by many villages, and thus resulted in

numerous waterways remaining uncleaned, and became polluted. Earlier, the farmers and residents of the Puthukary village used to collect clay from river beds for agricultural purposes such as cultivating farmland and establishing banana plantations within the vicinity of their residences and farm lands. However, the acquisition of clay necessitates the payment of elevated prices due to a scarcity of canoes and an increase in manpower costs. In the words of Joseph Job (aged 45 years), a key informant, the quality of water has drastically changed in the Puthukary village. He says,

'In earlier years, the availability of clean running water in the nearby canals facilitated the utilisation of this resource for a range of domestic activities, including drinking, cooking, and washing. Now the situation has worsened. Due to concerns regarding potential skin irritations and waterborne infections, we are unable to enter the canal'.

Reduction in paddy fields and paddy production:

According to the Kerala government's 2009–10 report, fewer paddies is being grown in the state since agricultural areas are being used for commercial and non-agricultural purposes. The state's area under paddy cultivation was reported to be 0.735 million hectares in 1961–1962, 0.876 million hectares in 1975–1976, and 0.234 million hectares in 2009–2010, a loss of 73.28 percent over just 30–35 years. The area in Kerala used for paddy cultivation expanded from the 1950s to the 1970s, then decreased from the 1980s to the 2010s, according to Nair and Dhanuraj (2016). Majority of Kuttanad region, including village of Puthukary, exhibits the same phenomenon. In his study, M.S. Swaminathan (2007) emphasised that by 2003, only 37,624 hectares of the 60,921 hectares of land in Kuttanad that were under paddy cultivation had remained so. The transfer of paddy lands for non-agricultural uses, he claims, is mostly to blame for this decline. Additionally, he was concerned that, if

this decline keeps going in the same direction, paddy cultivation would soon become some annals of Kuttanad people's history. In the Kuttanad region, there has been an increase in the area used for paddy cultivation. According to the study, this area increased from 0.044 million hectares to 0.056 million hectares between the years 2008-09 and 2011-12. This increase is the result of the efforts made by the local farmers out of a love and devotion for the industry (Government of Kerala, 2016).

Reduction in the rice production:

The primary food consumed by the people of Kerala is rice.

Rice production decreased as a result of the fall in wetlands, waterbodies, and paddy farming areas. Kerala, a state with a low base for food production, finds it challenging to maintain the tiny area dedicated to agriculture. Kerala's agricultural sector has experienced a change in its agrarian structure since the middle of the 1970s as a sizeable portion of its traditional crop area, which was previously used for less profitable commodities like rice and tapioca, has been changed to more profitable crops like plantations and bananas (GoK, 2018).

Even after the Kerala Paddy Land and Wetland Conservation Act of 2008 was formed and the procurement price raised, the area where paddy was grown declined. All districts are now qualified to buy paddy as of 2012 onward. Following a protracted period of continuous decline, the area planted with paddy grew from 171398 hectares in 2016–17 to 198026 hectares in 2018–19 (GoK, 2018). Kerala's paddy yield, acreage, and productivity all need to be carefully examined. The acreage, output, and productivity of paddy crops in Kerala for the previous ten years are shown in the following Table.

Table 5.1: Paddy production in Kerala (2009-2019)

Year	Area (Million Hectares)	Area Growth	Production (Million Tonnes)	Production Growth	Productivity/ Yield (Quintal/Hectare)	Productivity Growth
2009-10	234.013	-0.11	598.337	1.37	2557	1.47
2010-11	231.187	-8.90	522.738	-12.63	2452	-4.11
2011-12	208.187	-8.90	568.993	8.85	2733	11.46
2012-13	197.277	-5.23	508.299	-10.68	2577	-5.71
2013-14	199.611	1.18	564.325	11.02	2827	9.70
2014-15	198.159	-0.73	562.092	-0.40	2827	0.35
2015-16	196.870	-0.65	549.275	-2.28	2790	-1.66
2016-17	171.398	-12.94	436.483	-20.53	2547	-8.71
2017-18	189.086	10.32	521.310	19.43	2757	8.24
2018-19	198.026	4.73	578.256	10.92	2920	5.91

(Source: Compiled from Economic Review of various years, Government of Kerala)

According to the information in the Table 5.1, Kerala's paddy crop area declined from 234013 hectares in 2009–10 to 198026 hectares in 2018–19. The area under paddy cultivation recorded for 2016–17 decreased annually by 12.94 percent over 2015–16, which is the greatest decrease since 2009–10. Paddy saw positive annual growth rates in the next two years, 2017–18 and 2018–19, with 10.32% and 4.73%, respectively. Despite a decline in the absolute value during the last ten years, the average decadal growth trend has been somewhat increasing.

Paddy crop production in Kerala has decreased from 598337 MT in 2009–10 to 578256 MT in 2018–19. The yearly growth in paddy output was reported to have fallen in the years 2010–11, 2012–13, 2014–15, 2015–16, and 2016–17 with -12.63%, -10.68%, -0.40%, -2.28% and -20.53%, respectively. The two years that followed, 2017–18 and 2018–19, saw a noticeable improvement, with annual growth

rates of 19.43 and 10.92, respectively, despite a considerable reduction in the annual increase in paddy yield in the year 2016–17.

The productivity of Kerala's paddy has increased over the previous ten years, going from 2557 kg/ha in 2009–10 to 2920 kg/ha in 2018–19. Since 2009–10, there has been a general upward trend in the alternative years of productivity. With 8.24 percent in 2017–18 and 5.91 percent in 2018–19, the past two years have seen a noticeable rise in production. Kuttanad produces a significant portion of the state's overall rice production. However, between 1970 and 2003, its contribution decreased from 37% to 18% (Swaminathan, 2007). According to a different analysis, from 1990 to 2000, Kuttanad's rice production fell from 0.227 million tonnes to 0.152 million tonnes (Thomas, 2000). The disparity between rice output and demand is widening, making it nearly difficult to feed the entire state's population (Government of Kerala, 2002). Government is trying to fill the gap to some extent by procuring rice from other states and distributing to the poor through 'public distribution system'. The interests of entrepreneurs and the global trade policies brought many changes in the food habits of the Kuttanad people (state as well). Many processed and ready to eat (instant) food packets[34] (not made of rice) like *parota*, *poori*, bread, cakes and cornflakes and many other are now seen in the shops of Kuttanad villages. In Kerala, the use of rice has been decreasing since the 1990s (Nirmala, 2015).

Wetland Act in Kerala:

In contrast to conservation or protection, the Kerala Land usage and Water Conservation Order (KLUO) of 1967 placed more emphasis on land usage. Despite government directives banning the filling up of paddy fields, unregulated land

[34] The researcher depended on these instant parota and poori packets for many days during the field work in the Kuttanad villages.

reclamation activities persisted until 2008. To protect paddy land and limit land conversion, the Kerala Conservation of Paddy Land and Wetland Act (2008) was created. This regulation mandates that the paddy land must only be used for paddy production, even if it is sold. Locals claim that, however ineffective the Act may be, conversions are nevertheless taking place, often with the help of officials or politicians. Three instances of unlawful land reclamations in Kuttanad, which the government and lawmakers have backed, show how supportive of non-agricultural developments the government is, as well as how unconcerned it is with the environment. Thomas Chandy's case, the Methran *Kayal* case, the Aranmula case, and the Methran *Kayal* case all highlight the system's corruption and the lack of recognition for the Kuttanad wetlands. Gopan, a Ramankary farmer and landowner, claims that corruption and bribes continue to play a role in many crimes going unreported or being arrested or walking free.

Conservation of Paddy land and wetland Act in 2018:

The state of Kerala's legislature passed the Conservation of Paddy Land and Wetlands (Amendment) Act of 2018. With certain regularisation requirements based on the size of the land, the amendment also permits small landowners to construct homes or businesses on 5 to 10 cents of unnotified land. The agricultural community and others who supported paddy agriculture and environmental preservation in Kuttanad were disappointed that the amendment had little effect.

Floods

Nair (1980) explained the benefits of inundation from the floods and seen floods as the normal occurrence in the region. However, the people of the Puthukary village never see floods as a pleasant happening. They learned to tackle and live and

cultivate under the tenuous circumstances. To stop and manage floods, boost paddy profits, and draw in investors, the government has deployed technological and infrastructure advancements. However, residents of the area have experienced persistent flood risk throughout their lives. The Government of Kerala (1963, 1989), Pillai and Pannikar (1965), and Balachandran (2004) are recent studies that provide insight into the challenging living conditions brought on by floods in the area. Puthukary hamlet is highly vulnerable to flooding during the monsoon season as a result of the area's clogged drainage systems and canals, which obstruct the water's natural flow. Each monsoon season, residents of Puthukary hamlet face substantial flood-related issues due to the stagnant flood water in the area brought on by insufficient drainage infrastructure.

The negative consequences of floods were exacerbated by the reclamation of paddy fields and waterbodies, which decreased floodwater flow. Ecological imbalance in the area is caused by land reclamation activities by the government, tourism, real estate, and locals. The area below sea level's delicate ecology is currently a cause for concern. The Puthukary farming community cautions people to avoid engaging in unlawful reclamations since they upset the harmony and balance of nature.

Bunds and dykes:

A traditional paddy cultivation system was established by constructing mud bunds (*mada*) and dykes to protect fields from floods in Puthukary village. However, these bunds often breached during rainy seasons (*mada veezcha*), causing desolation and loss for farmers, leading to the need of constant monitoring of their fields. The government officials in Kuttanad has been constructing concrete bunds to prevent breaching of paddy fields. The Swaminathan Commission's recommendations, which

call for environmentally suitable bunds throughout the rest of the region, are not being followed by this practise. Because of the locals' claims that the development of concrete bunds endangers the ecological balance, there has been environmental harm and poor management. Mud bunds are seen to be more appropriate for the location because they are a natural soil binder that grows there. Concrete bunds are less effective in preventing breaches due to faulty construction, though. The government has built unsuitable developments while ignoring local knowledge, needs, ecology, and the residents in its eagerness to make money and appease the populace. The problem has been made worse by corruption.

'The Kuttanad Development Scheme' by the Kerala government has been a failed development initiative, according to locals of the Puthukary village. The state government of Kerala have constructed few spillways and bunds to address these issues. The following sections devote to present such developments in the region. However, those developments have brought more environmental damage than addressing the needs of conservation issues and challenges.

Thanneermukkom bund:

The primary objective of the Thanneermukkom Bund's construction was to safeguard the Puthukary village and also major areas of Kuttanad region from the detrimental effects of saltwater incursion. It fulfilled its intended objective to a certain degree. The construction of the bund has impeded the natural influx of saline water from the Arabian Sea into Vembanad Lake, leading to the initiation of environmental degradation in the region.

Thothapally Spillway:

The Thottappally Spillway has not fulfilled its intended purpose to the anticipated extent. The shutters exhibit functional deficiencies and the lack of adequate maintenance have resulted in the absence of effective flood control devices. Consequently, the presence of the spillway, in conjunction with the Thanneermukkom bund, is giving rise to environmental concerns. These concerns encompass the pollution of water resources, proliferation of aquatic vegetation, escalation of flood occurrences, and spreading of waterborne illnesses.

Impact of Developments:

The construction of the bund and spillway in Kuttanad has led to a shift in agricultural seasons, causing increased demand for labour and machines which are leading to wage increase and crop failures. These changes have a huge impact in Puthukary village. Despite past constraints, the agricultural community used saline water to prevent weed growth and increase productivity. The usage of chemical weedicides, which increases pollution, is now required because there is no longer any salinity and no weed growth. The marshlands and high carbonaceous wood make soil acidity a major constraint for paddy cultivation. In order to counteract the acidic nature of the soil, farmers in the Puthukary village employ the application of lime to the soil promptly following the harvest, and subsequently allow water to permeate the fields until the next cultivation period. The ebb and flow of oceanic tides serves to mitigate the acidity of terrestrial surfaces, effectively eroding and clearing it from the soil.

The major environmental issues evolved in Puthukary village are:

a. Contamination and stagnation of water bodies:

The annual closing of the Bund, often occurring in December, serves to prevent the ingress of saltwater into the paddy fields, resulting in the stagnation of water bodies. The act of closing up this area disrupts the inherent drainage system, hence leading to stagnation of the entire body of water. The construction of dams in the upstream regions of rivers with the purpose of flood control has the unintended consequence of impeding the natural flow of water, resulting in stagnant conditions and hindering the ecosystem's ability to undergo natural flushing. The stagnant water bodies of Puthukary village in Kuttanad suffer from neglect by both residents and the government, and the act of disposing rubbish exacerbates the pollution issue.

b. Increase in pollution:

Puthukary village in Kuttanad is facing significant pollution due to various factors such as effluents from factories and medical colleges[35], sewage from municipalities[36], and poultry sellers. The Thanneermukkom Bund and Thottappally Spillway, which limit the Thanneermukkom River's ability to flow into the sea, as well as the four rivers from the Western Ghats also contribute to pollution. Additionally, sewage from restrooms and rubbish from hotels and business establish ments pollute rivers flowing into Kuttanad during the Sabarimala pilgrimage season (George and John, 2015). Despite various initiatives taken by the government, there are no adequate measures to handle waste in Puthukary village of Kuttanad, as there are no special places reserved to dump waste. Politicians from various parties,

[35] Locals informed that the solid wastes from the nearby institutions like Kottayam medical college and Alappuzha medical college and many households as well are released into the waterbodies.

[36] Times of India in 2013 reported that the municipalities of Alappuzha, Changanassery, Kottayam and Thiruvalla are releasing the wastes collected into the waterbodies of Kuttanad.

including the Indian National Congress, Kerala Congress, Nationalist Congress Party, and Communist Party of India, have expressed concerns over the issue. However, no efforts have been taken to address the issues of environmental degradation and sustainable development in Puthukary village.

c. Proliferation of water weeds:

An unusual growth of water weeds in Kuttanad's Puthukary village has become a nuisance and a threat to the development of a commercial inland fishing business. The weeds exacerbate waste in waterbodies, harm motorboat engines, restrict the movement of boats and canoes, and serve as a mosquito breeding ground and preferred habitat. These mosquitoes can spread serious diseases like typhoid, japan fever, chikungunya, dengue fever, dermatitis, jaundice, colitis, amoebic dysentery, and worm infections (Prasad, 2006). According to information obtained from residents of different castes and communities in Puthukary village, the Thanneermukkom Bund is in charge of fostering conditions that are favourable for the water weed's luxuriant growth. The aquatic environment has changed as a result of the usage of chemical fertilisers, making it ideal for the rapid growth of water weed. Before the Thanneermukkom Bund was built, the weed problem was minimal since, during the majority of the year when there was no agriculture, the area was submerged under water and there was enough water flow to carry the weeds to the sea.

Additionally, the flow of water weeds into the sea is being impeded by the construction of roadways that crisscross the area without respect for the movement of rivers and canals. Few people in Puthukary village are developing new techniques to

turn weeds into money.[37] Uses for it include mulching cocoa and coconut gardens, utilising it as organic manure, and using it as a raw material for the paper and cardboard industries. The cases below show how a farmer used the weed invasion to his advantage while also showing the negative consequences it had on him.

Case 1:

P.G. Varghese, an 83-year-old individual in Puthukary village who previously worked as a PWD irrigation employee, currently operates a nursery. The individual possessed a total of eight acres of land. Out of it, only 2.5 acres of land have been utilised for cultivation. He engages in the cultivation of paddy, vegetables, coconut, banana, and yam (*kaachil)* on a land area measuring two and a half acres. The remaining six acres of land was left uncultivated due to the existence of hyacinth, an aquatic weed. The presence of African, German, and Kerala varieties of hyacinth in his six-acre area poses significant challenges to cultivation. Over the course of the past five years, he ceased engaging in agricultural practises. However, Mr. Varghese overcomes the situation, and for his sustenance, he started utilising the hyacinth in producing bio-manure and started selling it in his nursery. There was a lack of cooperation exhibited by both the neighbours and relatives of the individual. Mr. Varghese asserts that there are no regulations prohibiting him from allowing his land to remain uncultivated, emphasising his ownership rights and rejecting any external authority to exercise control over his actions. Mr. Varghese have two sons and a daughter. His elder son is employed as an engineer in a foreign country, whereas his second child practises dentistry in Trichur and simultaneously engages in the cultivation of plantains.

[37] Some women organizations like *Kudumbasree* and *Tholizhurappu* are encouraging women to clear the weeds from the water bodies; thereby providing them with employment and income.

Mr. Varghese engages in the production of bio-manure, operates a nursery, practises aquaculture, and expresses an interest in commencing chicken farming. His father had possessed dual expertise as a teacher and a pharmaceutical doctor. However, driven by personal inclination towards agricultural activities, he has been actively engaged in farming for the past five decades. Mr. Varghese asserts that due to his birth in a region mostly engaged in agricultural practises, he perceives it as his responsibility to partake in agricultural activities. For the past two years, he has been operating the nursery without receiving any formal training. He manages the nursery by the knowledge gained from reading books. Despite experiencing financial losses in operating the nursery, he continues to run it driven by his enthusiasm.

- Shortage of drinking water:

The issue of limited availability of potable water in the Puthukary village has emerged as a significant concern in light of its developmental activities. The utilisation of chemical fertilisers, pesticides, and the disposal of garbage into stagnant waterbodies contribute to a hazardous state of contamination, particularly when the bund and spillway are kept closed. The process of groundwater recharge involves the downward movement of water from a wetland into an underlying subsurface aquifer. Nevertheless, the reduction in the quantum of rainwater seeping down is a consequence of the over utilisation of land through new land reclamations. Sand miners, often known as 'sand mafia' in the region of Puthukary village in Kuttanad, engage in the ongoing extraction of sand from riverbeds. This activity has detrimental consequences, as it leads to the subsidence of the riverbed and subsequently results in a decline in the groundwater level. Consequently, the local community has a scarcity of potable water, particularly during the summer season.

Political parties strategically leverage the diminishing accessibility of potable water as a potent instrument during electoral campaigns. There exists a competitive environment among political parties vying to claim credit for the provision of pipeline water in various regions of Kuttanad. Given the prevailing condition of limited availability, the residents have initiated efforts to explore potential resolutions for the issue pertaining to access to potable water. Some affordable families have resorted to purchasing cans of mineral water to fulfil their drinking and culinary needs. Due to financial constraints, a significant portion of the population resorts to collecting rainwater as an alternative to purchasing mineral water containers throughout the year. The rainwater that has been collected is next subjected to a purification process, rendering it suitable for both cooking and drinking purposes. The photo 5.1 depicts the arrangement for the collection and storage of rainwater. A synthetic water tank is positioned within the premises of the residential property, with a plastic covering affixed above it at an inclined angle. This arrangement facilitates the collection of rainwater, as it is directed towards the opening of the tank by the flow of water on the plastic sheet. In order to prevent the passage of leaves, twigs, and dust particles into the tank, a cotton cloth is affixed to the tank's aperture. Water is obtained as needed from the tap connected to this tank, and is collected in tiny cans or buckets.

Photo 5.1: Rain water harvesting in the Puthukary village

- Impact on Coconut farming and fish culture:

A sizable coconut industry exists in Puthukary village and also in considerable portions of Kuttanad, which has been essential for small and marginal agricultural holdings. Coconut trees may thrive since there is plenty of water nearby, and the coir industry is mostly found in the areas near Alappuzha town. Coconuts are a valuable crop that significantly boosts household income because many people profit from selling them in their groves and gardens after using them for domestic purposes. The region's distinctive topographical characteristics and public hostility, however, have prevented attempts to turn rice fields into coconut groves. Due to the labour-saving benefits of coconut agriculture over paddy cultivation, several residents of the Puthukary village favoured the conversion of paddy fields to coconut groves. Water seepage and stagnant water levels have negatively impacted coconut production as a result of regional developments like the Thanneermukkom Bund (Swaminathan, 2007). The Kuttanad Development Scheme has also had a negative impact on the coconut sector, harming people that grow paddy, fish, and other occupations. If local

expertise of the residents had been explored by development planners, negative effects of regional developments, changing living conditions, and landscape modification could have been averted.

The fish bowl of Kerala is a common description of Kuttanad. Puthukary hamlet is bordered by estuaries, floodplains, lakes, ponds, canal networks, and lagoons that are home to a large variety of fish that have adapted to the varying freshwater and salinity conditions in the wetland. Grey mullets, milk fish, marine catfish, pearl spot, freshwater prawns, edible crab, and black clam are a few examples of species that are crucial for commerce. During the breeding season, rice fields that have been flooded and canals are used extensively for fishing. But lately, these activities have decreased as a result of local changes. Some local species have become extinct as a result of the construction of the Thanneermukkom Bund, while others have become rare (Padmakumar, 2013). Several fish species have been exterminated as a result of the excessive use of chemicals and pesticides in rice fields. Many regional fishermen oppose the unsustainable fishing practises of dwindling fish stocks for sale to foreign markets. The livelihood of the fishing community is being threatened by the bund as well as significant sediment deposition by rivers entering the area and land reclamation for development.

Another respondent, David aged 32, a young man from Puthukary village reveals that on the subject of opening and closing the shutters of the Thanneermukkom Bund, disputes between paddy farmers and fishermen frequently occur. Due to the detrimental effects on agriculture and the greater wetland system, some paddy farmers and fishermen request that the bund remain open all year.

Government Interventions and global policies

The Puthukary village in Kuttanad region, renowned for its traditional agricultural practises, is currently undergoing a rapid transformation due to global influences. The region is currently witnessing the introduction of new technology across several sectors. Numerous alterations have occurred in the below sea level farming practices, and these modifications have had a profound impact on both the natural surroundings and the agricultural populace. The changes occurred are as follows:

*Vanishing Organic farming**:***

In traditional agricultural practises, which encompassed several stages such as field preparation, seed sowing, weed control, fertilisation, and ultimately harvesting, the absence of chemical substances was a characteristic feature. Local procedures were devised by farmers to carry out the various stages of the traditional practice, from dewatering to grain separation. These processes were tailored to suit the local environmental conditions, and relied on the utilisation of naturally available materials. Currently, agricultural areas are utilising imported materials, which includes approximately eighteen fertilisers and pesticides, with the aim of eliminating pests and weeds and enhancing crop productivity. Access to the canals is restricted during the months of February and March as a precautionary measure against potential skin sensitivities. During this particular time period, the application of fertilisers is carried out by the process of spraying in agricultural fields, while the technique of irrigation involves the discharge of water into the fields two or three times, followed by its subsequent withdrawal into the canals. Consequently, the waterways have become contaminated with various chemical substances.

Introduction of machinery:

Machines are implemented at various stages of agricultural practises in Puthukary village. Electric motors are employed for the purpose of dewatering agricultural lands. During the conventional era of agricultural practises, individuals would employ *chakram,* also known as water wheels, to extract water over extended periods of time. The substitution of *chakram* with electric motors has significantly facilitated in carrying out of tasks. Consequently, numerous labourers experienced job displacement. In the past, farmers employed buffaloes as a means to plough their fields, however in contemporary times, tractors have superseded the employment of buffaloes for this purpose. The advent of tractors in the region has resulted in a significant decline in the population of cattle. In the past, water was filled multiple times in agricultural fields to mitigate the presence of pests and weeds. This process often entailed laborious weeding, which was not limited to male labourers, as women also participated in this activity. However, contemporary agricultural practises have shifted towards the use of concentrated chemicals to effectively eradicate weeds and pests.

During an interview with another respondent named Joseph (48) from Mithrakari, he expressed that during the olden period of agricultural practises, the period of harvesting was akin to a celebratory occasion. Historically, it was common for labourers to engage in seasonal migration from nearby regions and reside in agricultural fields until the completion of the harvesting process. However, the introduction of machinery has facilitated the process of harvesting the crop and has even enabled the separation of grains. Many farmers within the selected study area

expressed to the researcher that the lack of available female labour is compelling them to opt for mechanised harvesting methods as opposed to manual labour.

Decrease in the labour:

As a result of the ongoing developmental initiatives in the Puthukary village of Kuttanad region, individuals who were formerly engaged in agricultural labour have transitioned to alternative occupations. Currently, individuals are employed in various occupations such as construction labourers, sales personnel, houseboat workers, and women are engaged in prawn processing, working as saleswomen in surrounding cities, as well as serving as cooks on houseboats. These occupations require minimal physical exertion and offer higher income compared to agricultural labour. In the field of agriculture, it is important to put in more efforts and dedicate extended periods of time. In return, they receive a meagre income that is sufficient for mere subsistence but inadequate for meeting their demands. The labourers have opted to enrol their children in educational institutions rather than assigning them to work in agricultural sectors. The parents aspire for their offspring to receive a formal education and pursue employment opportunities that surpass those available in the agricultural sector. The migration of labour from agricultural occupations has resulted in a dearth of available labourers in the Puthukary village of Kuttanad region. The *pokkali padasekharam*, which previously covered an area of 25000 hectares, have significantly diminished to a mere 1000 hectares due to the scarcity of agricultural employees (Jayan P.R., Nithya Sathyanathan, 2010). The cultivation of *pokkali* rice necessitates significant manpower, however due to the changing occupational preferences of labourers' families, a substantial portion of *pokkali* fields have been transformed into coconut and aqua farms.

Changes in agricultural practices from food crops to cash crops:

The focus has shifted away from food crops like rice and towards cash crops like rubber, tea, coconut, cashew, cardamom, coffee, arecanut, and pepper in the Kuttanad region's Puthukary hamlet. This change started in the 1960s and grew until the middle of the 1970s, negatively hurting the State's food output. Rubber production has increased significantly as a result of the Rubber Board in Kerala's role in turning paddy areas into rubber plantations. The greater political economics of development in Kerala is strongly tied to the political economy of the reduction in rice agriculture (Kannan, 2000). Liberalisation, privatisation, globalisation, and the general opening up of the Indian economy have all posed challenges to the state's sustainable performance and conventional cropping pattern (Cheriyan, 2004). Imports and intense competition on the global market have an impact on commercial crops like coconut, rubber, tea, coffee, and spices. Since the price of these cash crops is set by the global market, which causes unsTable markets for their produce, the economic change has not totally benefited cash crop producers. Due to the effects of globalisation and trade policies that prioritised cash crops above food crops, the landscape in and around Puthukary village has changed, and this process is becoming more pronounced every day.

Effects of Tourism

Kuttanad is renowned for its prominent features, including the expansive Vembanad Lake, its adjacent little islands, and the intricate network of backwaters, rivers, lagoons, and the reclaimed agricultural areas. These elements collectively serve as the primary allure of the region. There has been a tremendous effect of the tourism developmental policies in the Puthukary village as well. The houseboats in the

region have garnered attention from travellers worldwide. The Kerala government is actively endorsing the development of ecotourism as a means of augmenting its revenue streams. The continuous growth of tourism is attracting real estate developers, resulting in the conversion of several paddy fields and fish ponds into resort and hotel establishments. The houseboats are significantly contributing to the pollution of water resources. The discharge of garbage from houseboats and residual fuel into the Vembanad Lake and backwaters has detrimental effects on aquatic life and diminishes water quality.

The development poses a significant challenge to the preservation of the local ethnic culture in Puthukary village. The advent of tarred roads in numerous villages has significantly contributed to the decline in the utilisation of canoes, which previously served as the sole mode of transportation. The developmental initiatives in the Kuttanad region have contributed to the introduction of new material culture, while simultaneously posing a threat to the preservation of the region's unique ethnic identity, which has been a major draw for international tourists. This phenomenon raises concerns about the potential disappearance of this distinct ethnic heritage within a very short time frame. The gradual disappearance of the picturesque landscape in the Puthukary village of Kuttanad region is a consequence of the continuous multiplication of concrete structures in the vicinity. The phenomenon of tourism is also contributing to the pollution of aquatic ecosystems. The discharge originating from houseboats is leading to the enrichment of nutrients, hence promoting the growth of weeds. The discharge of garbage and kerosene from houseboats into water bodies is further leading to the pollution of these aquatic resources in Puthukary village.

Changes in the life-ways:

Over the past few decades, the food consumption patterns of people in the Puthukary village have undergone significant transformations due to the adoption of commercial crops and the cultivation of high yielding varieties. While rice has been a prevalent dietary staple for many decades, it is important to note that not all individuals have historically incorporated it into their consumption patterns. For dinner, the poor would typically eat tapioca, along with other tubers like *chembu* (colocasia), *kaachil* (yam), *ulli* chutney (an onion pickle), and other available fruits because rice was not readily available to them. Together with *meen* (fish), rice has now become a staple diet for every family in the region, regardless of caste or class, as a result of the enormous rise in production. Tubers are often regarded as a staple food source for families with limited financial resources. A limited number of households are concerned regarding the nutritional content of tubers and fruits, and consume them for dinner. The establishment of road networks in the Puthukary village of Kuttanad region facilitated the entry of several fast food centres, biryani hotels, places of business, and a wide range of grocery stores.

The Puthukary village in Kuttanad region is not immune to the effects of globalisation. The residents of the village exhibit a strong connectivity to the global community through the utilisation of televisions, smartphones, and internet access. This connectivity has facilitated an improvement in their overall quality of life, as seen by their efforts to create trade relations with external markets, enhance productivity through the adoption of innovative technologies, and generate cash by promoting eco-tourism. Individuals in this region are engaging in temporary migration to various nations, predominantly to the Gulf countries, with the primary

objective of augmenting their income. The individuals are enhancing their quality of life using the financial resources acquired from overseas nations. The region is now experiencing developmental activities that are leading to advancements in transportation, telecommunication systems, and infrastructure. Simultaneously, both the environment and the quality of life in the region are undergoing degradation.

It is learnt during field work that the health conditions of individuals have been seen to decline over the years due to alterations in dietary patterns, lifestyle choices, and exposure to environmental pollution. Heart blockages, kidney dysfunction, diabetes mellitus, varicose veins, and ocular disorders are frequently observed throughout the population residing in Puthukary village.

High investment and low returns:

Farmers of Puthukary village expressed that the current practise of agriculture has become more expensive as it is heavily depended on modern technology, and fertilizer oriented. In the village, there is a growing scarcity of labourers, resulting in an escalating demand for their services. Consequently, farmers in the area are offering elevated daily rates to attract labourers for agricultural work in their fields. The state government of Kerala has provided subsidies to farmers at different stages of the farming process, such as irrigation, fertiliser procurement etc. However, it is perceived to be of minimal value resulting in limited benefits for the farmers engaged in agricultural activities.

According to a respondent named Appacchan aged 70 from Puthukary village serves as the secretary for a *padasekharam* known as the 'Puthirakary group farming'. This *padasekharam* consists of a group of 30 farmers. According to his statement, the government provides only twelve rupees per quintal of rice as handling charges for

loading paddy onto trucks. However, the actual expense incurred by any farmer for employing labour to load one quintal of grains onto the truck amounts to one hundred and fifty rupees. He also felt that the agricultural industry has experienced a significant increase in costs as a result of a pronounced manpower shortage within the region.

Similarly, another respondent named P.G. Ashok Kumar aged 45 from the same village holds a Bachelor of Arts degree. He engages in agricultural activities on a total land area of 20 acres, consisting of 5 acres that are privately owned and an additional 15 acres that have been acquired through *paatam* (leased-in). He practises *punja krishi*. His father was engaged in agricultural occupation, and he started his carrier in agriculture at the age of 15. He made the decision to pursue a career in agriculture. He now holds the position of president at the Service Co-operative Bank in addition to being a member of the Puthukary village Panchayat. According to his statement, the government does not provide adequate subsidies for the purchase of seeds and fertilisers.

Smash up of social relations

The changes happening in economic spheres and the booming infrastructure in the Kuttanad region are also affecting the social relations drastically.

Dreadful Farmer-Labour relations:

The Puthukary village of Kuttanad region is currently experiencing a shortage of labour force due to the allure of developmental activities and higher-paying employment opportunities compared to the farming sector. As a result, individuals who were previously engaged in farming activities are now opting for alternative forms of employment. Currently, there exists a substantial demand for labourers in

the Kuttanad region. In the present circumstance, it has become necessary for farmers or landlords to secure the services of labourers by providing prior payment for their work in the fields. This stands in contrast to previous times when labourers would actively seek employment by approaching farms.

The integration of new technologies in agricultural practises has had a significant impact on the farmer-labourer relation in the village. However, this statement is true solely within the context of large-scale agricultural operations. The small-scale agricultural producer is reliant solely on manual labour for their operations. A significant proportion of the agricultural practitioners in the study area conveyed that the farmer-labourer dynamic has deteriorated. Additionally, it has been stated that due to the significant demand for labourers in the region, the labourers are displaying a lack of respect for the farmers. Consequently, a significant number of farmers have become disinterested in engaging in agricultural practises. Furthermore, it is noteworthy that individuals engaged in manual labour are increasingly prioritising the education of their children, facilitating their enrolment in educational institutions such as schools and colleges. Subsequently, once these young individuals have acquired the minimum educational qualifications, they are opting to migrate to Gulf countries in pursuit of higher earnings.

People moving away from agriculture:

The decline in agricultural activity in the Puthukary village of Kuttanad region can be attributed to the dissatisfaction arising from insufficient financial gains. The unavailability of labourers can be linked to their engagement in alternative employment opportunities, such as working at retail establishments, restaurants located in neighbouring cities, and houseboats. Farmers are not granted exemption.

The individuals are engaging in the practise of leasing their fields and thereafter seeking employment opportunities in neighbouring towns. Even young females exhibit a lack of desire for their future partners to engage in agricultural occupations. Additionally, it is argued that farmers are perceived to hold a lower social status within society. Consequently, some women expressed the reluctance of their husbands to engage in agricultural pursuits. Instead, they opt to migrate overseas to seek employment opportunities that offer higher earning potential. The people in the region do not exhibit a significant level of worry for their conventional agricultural practises. A negligible proportion of individuals have knowledge of the "heritage status" associated with their traditional farming practises conducted below sea level.

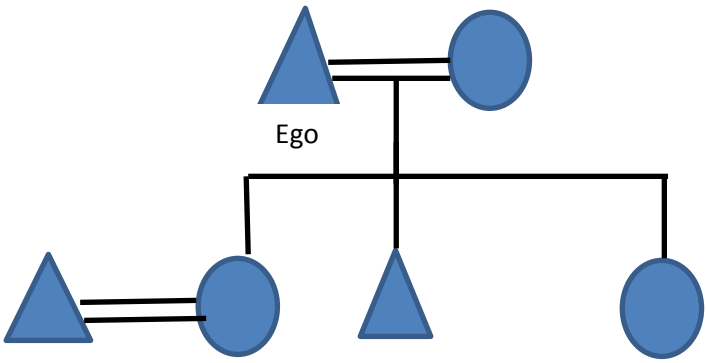
Within the study area, a notable proportion of individuals, specifically 72 percent of the households are engaged in international migration as a means of seeking employment opportunities. Individuals with exceptional qualifications are choosing to migrate to London and Australia, while those possessing qualifications such as I.T.I., Diploma (polytechnic), and nursing are opting to go to Middle Eastern nations such as Oman, Abu Dhabi, Qatar, Saudi Arabia, Dubai, and Kuwait. The elders express concern on the potential loss of their agricultural traditions, frightened that such knowledge may not be passed down to future generations.

Young generation from the families, which depend on agriculture for generations, are also moving away from agricultural activities. This shift can be attributed to various factors, such as the allure of urbanization and the availability of alterative career opportunities. As technology continues to advance and urban areas offer more promising prospects young individuals are increasingly drawn towards non-

agricultural sectors for employment and livelihood. The following case gives an example.

Case 2:

Joseph Joseph, a 68-year-old individual hailing from Puthukary village belongs to a lineage of farmers spanning four generations within his family. The individual possesses a total of three acres of land. Previously, he owned a total of seven acres of land. His family consists of three children, two daughters and a son. The eldest daughter got married and left to her husband's house. His son is currently employed in the navy, while his youngest daughter is engaged in her educational pursuits. Joseph Joseph asserts that agriculture lacks profitability, and he is the sole individual within his family engaged in farming activities. In addition, he also does aquaculture on a small plot of land, while simultaneously maintaining two hundred coconut trees. In a depressed tone, he identifies himself as the final descendant of a long line of farmers within his family. He anticipates that upon his demise, his children will proceed to sell the land he currently possesses.



Case 3:

In another case, Joseph Job aged 51, after returning from Muscat started engaging in agricultural activities. Due to his limited financial resources, he was only able to

acquire land, as it was being offered at a relatively low cost during that period. Subsequently, he embarked upon engaging in agricultural activities, so discarding any idea of returning to Muscat. His father was engaged in a petty business. Joseph Job was the first agricultural farmer in his lineage. His nineteen year old son, Varghese Joseph, studies Bachelor of technology in Coimbatore, and aspires to pursue a career as a navy officer. Additionally, he devotes a significant portion of his time to the church, providing assistance to the pastor.

Breaking families:

A significant proportion of residences within the Puthukary village of Kuttanad region are occupied by elderly individuals. Their children and grandchildren have migrated to other countries and other major towns in India, and they have established their permanent residences. They exhibit a lack of interest in participating in agricultural activities. However, elderly individuals possess a deep emotional attachment to their place of birth and a great affinity towards agriculture. Consequently, they exhibit a reluctance to relocate and accompany their children elsewhere. The family unit has also been greatly impacted by these social and economic changes.

Case 4:

Another respondent Joseph Apram, a 64-year-old farmer resides in the locality of Puthukary village. He engages in the cultivation of paddy on a land area measuring 7.5 acres. Out of which he possesses a mere 4 acres, while the remaining 3.5 acres are acquired through a lease arrangement known as *paatam*. He exclusively practises subsistence farming. He generates an annual income of rupees 150,000 from agricultural activities, which is supplemented by a little revenue from the cultivation

of coconuts and bananas. Additionally, his brother is also engaged in farming activities. Following the completion of his pre-degree studies, Apram refrained from looking for employment due to his strong inclination towards farming, since his grandfathers have been engaged in agricultural activities. However, the respondent expressed concern regarding the potential disruption of this long standing custom due to his son not having any inclination towards farming. Apram is having two sons, the elder one having pursued a Master of Business Administration (M.B.A.) degree, while the younger one has obtained a Master of Science (M.Sc.) degree. According to his statement, both his sons are married and they have never visited his paddy fields, not even to deliver him lunch. One migrated to Dubai four years ago for employment purposes, while the other son is currently employed by a private company in a neighbouring city. Mr Apram expresses concern on the potential discontinuation of their family's involvement in agricultural practises following his demise, which could result in the loss of a long standing agrarian tradition.

However, there are very few instances where a single farmer cultivates hundreds of acres of land while making a sizable profit. This phenomenon can be attributed to the numerous small-scale farmers who are no longer satisfied with agriculture, leading them to either to lease out their farmland or leave it to remain uncultivated. This shows a declining pattern in agricultural activities. In order to mitigate such circumstances and enhance the overall grain production within the state, the government of Kerala is assuming an intermediary role by leasing the afore-mentioned fields and extending invitations to farmers who are interested in cultivating these lands, while paying a nominal lease charge to the government. Subsidies are being provided by the state government during all stages of agriculture

to support them. The farmers who cultivate these fields have the belief that significant benefits can be obtained by the implementation of organised strategies in agricultural practises.

Case 5:

Sunny Chacho, aged 48, is a resident of Puthukary village engages in the cultivation of a land area of 140 acres. He possesses a total of five acres of agricultural land in his native place. However, he possesses a significant agricultural enterprise. The individual engages in the cultivation of a combined area of 140 acres of land. Out of which, 40 acres are distributed among three *padasekharam* located in lower Kuttanad, while the remaining 100 acres are divided between two *padasekharam* situated in upper Kuttanad and in Thiruvalla and Pattanamthitta. The individual acquired an area of 100 acres of agricultural land through a lease-in arrangement, commonly known as *paatam*, from the government. The transaction involved a payment of Rs. 3500 per acre. In reciprocation, the government assists the individual by offering complimentary seeds, as well as a fifty percent discount for the purchase of fertilisers. Additionally, a financial aid of Rs.3000 per hectare is provided to facilitate the eradication of weeds and the levelling off the field. He exclusively practises *punja krishi*. However, he experiences challenges related to labour. The individual expends a sum of Rs.750 per individual per day for the purpose of administering fertilisers on his agricultural plots. He seeks assistance from his relatives to engage in agricultural activities on his land. The individual engages in the cultivation of the ‘Jyothi’ variety of rice and Uma variety of rice.

Case 6:

Mr. Sunny commenced agricultural activities 16 years ago in Puthukary village who initially was cultivating an area of 10 acres. Over time, the agricultural enterprise has expanded and it reached 140 acres now. His father was engaged in the process of extracting lime from *kakka*, a type of clam. The collection and excavation of *kakka* from the Vembanad Lake include the retrieval of these specimens from significant depths. Subsequently, the shells of these *kakka* are meticulously separated and subjected to a controlled combustion process. Thus, lime is prepared from those shells. Sunny Chacho sells the lime prepared by his father which brings an additional income. Sunny Chacho is survived by three sons. His elder son is an electrician (ITI), second and third sons are pursuing diploma in civil engineering and 9th class respectively. His elder son earns five hundred rupees per repair, however Chacho feels happy in paying more to his son helping him in his agricultural activities. Chacho's wife also helps him in agriculture sometimes, only in operating the motor pump to dewater the fields.

Case 7:

Alex Pallithan, a 50-year-old individual from Puthukary village who holds a Bachelor of Arts and a Bachelor of Laws degree. He exhibits a strong enthusiasm for the field of agriculture. According to his assertion, the implementation of strategic planning in farming operations can lead to significant financial gains. The individual engages in paddy cultivation on a land area spanning eight acres while also undertaking fish farming on a separate land area measuring four acres. Alex concurrently engages in the cultivation of fish and vegetables within his eight acre paddy field. On one side of the paddy fields, the individual constructed small ponds

by solely erecting borders for the purpose of cultivating fish. Additionally, a gap was maintained between these ponds and the main bund area to facilitate the growth of vegetables. This strategic arrangement was implemented to prevent the fish from being caught and escaping. In the remaining four acres, the individual is engaged in the cultivation of fish, allocating three acres for this purpose. Fish cultivation does not involve the construction of specialised ponds. The paddy fields are often subjected to dewatering processes and are utilised for fish cultivation. On the remaining one acre of land, the individual is engaged in the cultivation of a distinct variety of rice known as *njavari* rice. This particular variety of rice possesses therapeutic characteristics and is commonly employed in the practise of Ayurveda medicine. The oil derived from this variety of rice is utilised for the purpose of massage therapy. During the month of *karkatakam* (Malayalam calendar), which falls in July or August, those residing in the Kuttanad region strictly partake in the consumption of *karkataka-kanji*, a type of porridge prepared from rice. This traditional practise is said to have rejuvenating effects on the human body. There is a prevailing belief among the local population that the use of *kanji* for a consecutive period of 21 days in the *karkataka maasam* can lead to the complete alleviation of various ailments.

In certain instances, the growth of paddy yields substantial income for Alex, and sometimes, fish culture proves to be lucrative. In areas like Puthukary, the abundance of water in the fields facilitates the fish to readily escape into adjacent canals and rivers. The lack of fish protection measures discourages individuals from engaging in fish cultivation in some parts of upper Kuttanad. According to Alex statement, there has been a recent implementation of a rule in the Gulf countries that, foreign

individuals should be subjected to taxation by the Saudi government on the funds they repatriate to their respective home countries. He also opines that there exists a possibility for people who have travelled from Kerala to other nations to return. Subsequently, individuals could switch back to agricultural practises.

Expectations of farmers from the government

The farmers residing in the Puthukary village of Kuttanad region are advocating for the implementation of a comprehensive flood control mechanism by the government. This initiative is aimed at enabling them to engage in *rendan krishi*, a farming technique that has the potential to enhance their income levels. Additionally, it is suggested that the implementation of concrete outer bunds by the government for their *padasekharam* could effectively protect their fields from the inundation caused by monsoon floods, so enabling them to produce a second crop with contentment. Additionally, they asked the Kerala state government for the water pumping equipment so they could cut costs. The Swaminathan committee has recommended the provision of water pumping motors to farmers as an agricultural component. However, it has been reported that no farmers residing in the Puthukary village have received these motor pumps. Furthermore, the farmers in Puthukary village are advocating for an increase in the subsidies for agricultural cultivation.

Thus, the intervention of the state government of Kerala in the Puthukary village of Kuttanad region has elicited mixed responses from respondents. The developmental polices and initiatives have inadvertently resulted in detrimental effects on the environment and they have been adversely impacted the agricultural community in Puthukary village.

CHAPTER SIX
SUMMARY AND CONCLUSION

The previous chapters have provided an analysis of the impact of developmental activities on the below sea level farming practices of Kuttanad region. The study was carried out in Puthukary village of Kuttanad region during the period 2014 to 2017. The study went in the direction of understanding the life ways of Kuttanad agrarian societies, particularly focusing on Puthukary village, with more emphasis on their agricultural practices in the changing ecological scenario, due to developmental policies of the government in the study area, and the study has made an attempt to its implications on the social lives of the farmers in the region.

Nearly two centuries ago, to address the scarcity of food, the inhabitants of Kuttanad ingeniously transformed huge water bodies into arable land and succeeded in cultivating paddy in those lands. Subsequently, thousands of hectares of arable land were reclaimed with the introduction of machinery. Consequently, the reclaimed lands in the region became a vital agricultural resource, serving as the primary source of rice cultivation and making a substantial contribution to the overall rice production within the state. However, the escalating anthropogenic activities in the area are detrimentally impacting the region, resulting in the degradation of environmental sustainability and socio-economic well-being. The region is also experiencing transformation as a result of global policies. The study entails an examination of the changes occurring in the region. A summary of the thesis helps in understanding the circumstances clearly. The first chapter will help us to understand the importance of the study. The literature review highlights that the topic of agrarian social structure in India has received limited attention from scholars in the fields of sociology and social anthropology. Hence the study was carried in the village,

Puthukary with an aim of understanding the clash between the traditional agricultural practice and development and the impact of the developmental activities on ecology, agriculture practices and socio-cultural life of the people. To achieve this understanding, three objectives were formulated for the study: a) to understand the socio-cultural milieu of the farming community of the Kuttanad region, b) to study and document the traditional agricultural practice of Below Sea-level farming of the Kuttanad region and c) to understand the effects of developmental activities on Kuttanad ecology and on their traditional farming system. The second chapter depicts the demographic profile of the study area. The third chapter elucidates the history of the below sea level farming in the Kuttanad region and make us understand about the reclamations carried out in different phases. It also provides knowledge about the agricultural zones in Kuttanad and the practice of traditional agriculture, with the use of locally made technology. This chapter also documented the agricultural relations based on the caste hierarchy and the role of labourers in practicing agriculture and the region's experience of pre-modern developments and subsequently the introduction of Green Revolution strategy. It also explains about the entry of Communist Party in the Kuttanad region and how the labourers were influenced by the Party, forming trade unions and moving away from their landlords. The fourth chapter enlightens us about the current practice of below sea level farming in Puthukary village, details of the *padasekharam* in the village and the land holdings of the respondents. Farming rules in practicing agriculture and the importance of the agricultural groups and the agricultural calendar followed by the farmers are also mentioned in this chapter.

This chapter gives an idea that, though the current process of practicing agriculture does not differ much with the traditional practice, change in the technology of practicing agriculture in the agrarian relations. Socio-cultural and physical changes brought in the region by the developmental activities carried by various agencies can be understood through this chapter. The farmers have changed their options in selecting crops and land use pattern, with the influence of the market dominated government policies and finally the existing cultivation practices happening in the other wetlands of *Kole,* Kaipad and *Pokkali* are discussed in detail in this chapter.

The fifth chapter elucidates the impact of development policies and measures on the agricultural practices in Puthukary village. New land reclamations happening for various purposes in the study area and their impact on the environment and everyday life of the inhabitants can be understood through this chapter. It also gives an idea that the reduction in the production of rice occurred with the transformation of the paddy fields for other non-agricultural purposes. Various laws enacted by the state government to check the conversions of paddy fields to other non-agricultural purposes can be known through this chapter. It also discussed the impact of the constructions of bunds and spillways on the tourism and socio-economic and cultural life of the Puthukary village in this chapter.

Recommendations to protect the traditional agricultural practice

The significance of imparting knowledge about the traditional practise of below sea-level farming to the younger generation cannot be overstated. Given the pressing issue of global warming, numerous regions worldwide may soon find themselves compelled to embrace this method as their sole means of agricultural sustenance. Every natural calamity presents lessons of human progress and remedies to prevent

its recurrence. Kuttanad regeneration plan may strengthen the quality of life of the people on the one hand and may enhance the economic and environmental inputs on the other. Food security has been identified as a major thrust in the priorities of India. With the advent of a New Food Security Policy, there has been a growing awareness among all stakeholders in agriculture. Farmers need to enhance their agricultural output. The governmental machineries and financial institutions may strengthen the support mechanisms. The agriculture of the Kuttanad wetlands is unique because of its mass appeal and prevalence of large area of cultivable land. Even the barren lands of Kuttanad may be revived through geopolitical interventions and economic reforms. Government and non-governmental organisations may be entrusted with soil conservation and the protection of backwaters.

The MP, MLA Local Area Development Funds have the potential to be utilised for various productive activities, such as group farming, weed management, collective harvesting, procurement of machinery, establishment of agri-clinics, and information dissemination cells, among others. Paddy procurement should be carried on time by the government agencies and minimum support price should be given and directly credited to the accounts of the farmers.

The natural recharge of pure water, rain etc. may be strengthened through policies of water harvesting and schemes for effective water management. Water treatment plants and adequate storage tanks may be provided in the villages of the Kuttanad region at appropriate places after consulting the inhabitants. Desalination plants may be erected in appropriate regions, after scientific study. The primary objective facing the Kuttanad society is the preservation of its cultural and agricultural traditions. In order to safeguard this heritage against the influence of capitalist forces, it is

imperative to undertake a series of measures. The exploration of backwater resources is to be conducted through four key areas, namely Agriculture, Fisheries, Tourism, and Transportation.

Paddy Cultivation Board may be set up to strengthen the different stages of cultivation like sowing, manuring, transplanting, pest and weed control, harvesting , marketing and early realisation of proceeds. Excess use of pesticides creates catastrophic trends in the agricultural sector. Bio-controlling mechanisms, rice–fish rotation, organic cultivation are to be pursued. Early intervention and careful monitoring are essential in promoting scientific and systematic agricultural habits among farmers. Seed banks and seed vending machines needs to be set up.

Fishermen in the Kuttanad region play a crucial role in sustaining the backwater resources by practicing sustainable fishing methods. Their knowledge and expertise in preserving water bodies contribute to the overall health of the ecosystem. Recognizing their efforts, the government should provide support and incentives to ensure their continued involvement in maintaining the region's fisheries.

The implementation of ‘zero pollution’ tourism can be facilitated through the use of alternative technologies for houseboats, such as the integration of solar panels and battery-operated systems as substitutes for fossil fuel-based mechanisms. It is recommended that the installation of single valve toilets be considered for houseboats, accompanied by the implementation of measures to prevent the discharge of waste into water bodies. Waste treatment plant should be established so as to collect the bio-wastes from the houseboats.

The development potential of backwater resources is manifold with regard to agriculture, health, fishing, livelihoods, tourism, social development, transport and

social dynamics. Thanneermukkom Bund inhibits the natural regeneration process and disrupts the eco-constructivism. Multiple layers of bunds may be established in order to cure the illness with regard to salinity of water versus pure water.

Thottappally Spillway was designed as a flood controlling device. But the flood plains absorb little water during the time of rainy season. Pollution of lake is a serious water pollution problem because lake is less self-assimilating than a flowing river. The anthropogenic activities in the lake have resulted in the deterioration of water quality. The use of pesticides in agriculture, the discharge of agricultural wastewater, and the sewage system must all be subject to stringent regulations in order to preserve a healthy marine environment. All the chemical inputs of farming should be replaced with bio-manure and bio-pesticides.

Concluding remarks

The Kuttanad region is experiencing a significant increase in land demand as a result of regional development. There is an increase in tourism in the area, which is being accompanied by the construction of hotels, resorts, and spas as well as highways and cutting-edge technology. These various developmental endeavours are exerting additional stress on the wetlands. Consequently, numerous agricultural lands have been converted for alternative uses. The wetlands, previously seen as a valuable source for grain production, have now transformed into an asset. However, farming has become an unprofitable occupation for numerous farmers in the Kuttanad area.

The agricultural community expresses dissatisfaction with the financial outcomes of paddy production. A considerable number of farmers are opting to leave their land uncultivated or offering it for lease. Agriculture has transitioned into a secondary occupation for most farmers in the Kuttanad region, who are actively seeking a

primary source of income. In their words 'through engaging in agricultural activities, we allocate funds periodically, and upon harvesting, we receive the entirety of our investment. Thus we see it as a money saving scheme'. A small proportion of farmers who cultivate hundreds of acres are experiencing favourable outcomes, whereas the majority of farmers with little agricultural land holdings are encountering significant economic challenges in practicing agriculture.

The Kuttanad region's natural resources are being exploited by the government and the populace for their own personal gain in prestige, power, and wealth under the guise of development. Construction of concrete bunds, roads, the Thanneermukkom bund, the Thottappally spillway, and other development projects in the Kuttanad region all perfectly suit Scott's (1998) definition of modernists. Businesspeople, government officials, and heads of state are among them. They cause failures in implementing projects, with an aim for human development, ignoring local knowledge. Government with its personal motto of impressing locals to gain vote bank, or to acquire capital, development activities are being initiated and carried, ignoring the actual implications of the projects. People across all castes in the region are deteriorating the resources to meet their socio-political and economic demands. It is observed that, to escape from the status of ‘impurity’, low caste communities from the Kuttanad region are making utilization of the market driven opportunities of modern development. Mohan (2015) exposed this in case of Pulayas and Osello and Osello (2000) in case of the Ezhavas. Even the high caste communities like the Namboodiris, the Nayars and the Roman Catholics, also utilizing the consumerism to retain their social status and power, which is exposed by Osello and Osello. As a result, during the entire development process, the government, the locals, the

agricultural and non-agricultural communities, the capitalists, and the entrepreneurs all assumed the roles of participants in the drama while ignoring the environment. Pat (2005) opined that Kerala is no longer a 'God's own country', pressing the detrimental impacts of the developmental activities like farm productivity, environmental degradation, life style diseases and unemployment, in spite of its economic growth and remittances. The human species and our planet have a long history, and the contemporary phenomenon of globalisation shouldn't be permitted to wipe out both the human species and the ecosystem, according to Chakrabarty (2009). M.S. Swaminathan (2007) in his report anticipated that the paddy fields of the Kuttanad will become a history by 2020, considering the infrastructural developments and the land reclamations happening in the region. Thanks to the agriculturalists like Appachchan, from Puthukary, who strongly expressed during an interview with him that, 'we may live or not, but our culture of practicing agriculture continues.' It is only because of the many cultivators like Appachchan, still the knowledge of practicing traditional agriculture exists in the Kuttanad region. It is not that they deny technology or development, but not, at the cost of ecology and priceless tradition knowledge. It is the responsibility of the people across all the communities of the Kuttanad region, especially the younger generation should take initiatives to protect this valuable traditional agricultural practice to forward it for future generations.

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Annexure-1

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MARRIAGE AND ALLIANCE AMONG AGNIKULA KSHATRIYAS

(An Anthropological study of a fishing community in coastal Andhra Pradesh)

[1]T. SEKHAR BABU
[1]Ph.D. Scholar, Department of Anthropology,
University of Hyderabad, Gachibowli, Hyderabad-500046

In almost all societies marriage is an institutionalized social relationship of crucial significance. Functionalists say that it fulfils an individual's sexual desires. But, it is more than simply a legalized sexual union between a man and a woman. It is socially acknowledged and approved. It is generally associated with a number of social relationships, roles and obligations of kins etc. In India, generally it is believed that marriage is not between two individuals, but between two families, in terms of bonds it creates between them. It confers acknowledged social status on the off springs, and this is important in terms of inheritance and succession. A marriage mobilizes the family's social sources. Through marriage the members renew kin ties or establish new bonds of kinship[1]. The type of marriage, and the procedure of marriage and the transactions involved differ from one society to another. In this article, the marriage system and process of Agnikulakshatriyas of Pallepalem village, East Godavari district of Andhra Pradesh is elucidated clearly. This article is based on the in-depth fieldwork carried out in the area in 2010 as part of my Master of Philosophy programme and revisited in 2016.

Agnikula Kshatriyas:

Etymologically 'Agnikulakshatriyas' means, '*agni*' means fire or sun, *kula* means caste and *kshatriyas* means warriors or kings. That means they were Kshatriyas and the descents of 'Suryavamsam[2]'. They claim that they belong to 'Suryavamsam' and all the Agnikula Kshatriyas those who are living all over the country have single gotra i.e. 'Ravikula'. It is said that Lord Rama also belongs to the same gotra and vamsham (*ravikula gotra and suryavamsa*). According to one of my key informants (Mr. Jaya Krishna), they are the descents of Lord Rama Vamsham and they were originally *Pallavas*, who ruled the country making Kanchipuram as their capital. He also said their ancestors were not fishermen earlier. Vadabalija, Jalari, Vaddi, Bestha are the traditional fishermen communities. During the 8th Century A.D., to survive and to escape from the foreign invaders, most of the Pallavas (now Agnikulakshatriyas) migrated to different places of the country and in this process, they were migrated to the sea coast and they adopted fishing as their occupation. They are also called as Vannekula Kshatriyas in Ongole and Nellore regions, Nayakars in Tamilnadu. Slowly, the term 'Pallavas' was corrupted to 'Palles'. He said that *Palle*

[1] Mandelbaum, David G. 1970. *Society in India.* Bombay: Popular Prakashan
[2] Descents of Sun God.

Annexure-2

National Seminar
On
Rural Development in India :
Major Issues, Challenges and Alternative Approaches
On 30th & 31st March 2015

(Sponsored by UGC, New Delhi & ICSSR (SRC) Hyderabad)
Department of Sociology, Osmania University, Hyderabad - 500 007, (T.S.)

Certificate

This is to certify that ~~Prof./Dr.~~/Mr./~~Ms.~~ T. Sekhar Babu

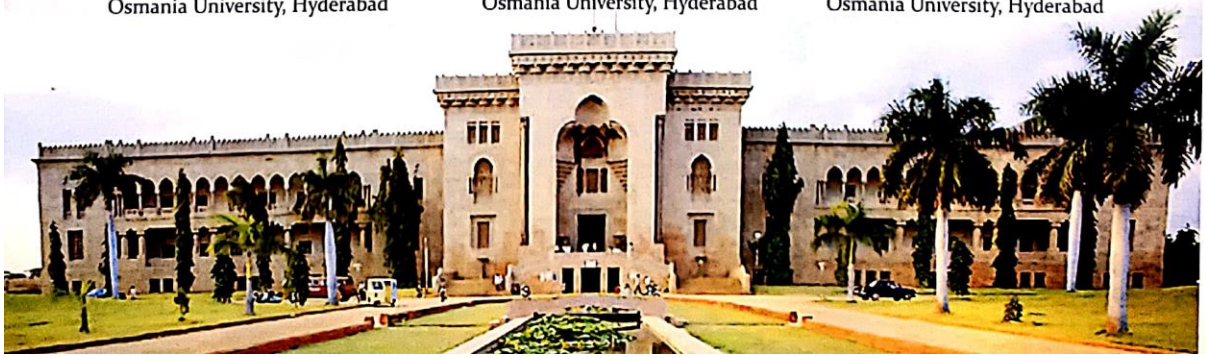
has participated / presented a paper entitled 'Development and Traditional Agricultural Practices An overview of Below Sea-level farming in the Kuttanad region of Kerala'.

at the National Seminar on "Rural Development in India : Major Issues, Challanges and Alternative Approaches" organized by the Department of Sociology (Under UGC-SAP (DRS-II) Programme), Osmania University, Hyderabad (T.S.) on 30th & 31st March, 2015.

Prof. Pushpa Mary Rani
Head & Seminar Director
Department of Sociology
Osmania University, Hyderabad

Dr. P. Vishnu Dev
Asst. Professor & Seminar Director
Department of Sociology
Osmania University, Hyderabad

Prof. C. Ganesh
Coordinator, UGC-SAP (DRS-II),
Department of Sociology
Osmania University, Hyderabad



PHOTOGRAPHS

Photo 3.1: Construction of Bunds with natural material

Photo 3.2: Damage to the bund in a *kayal* land

Photo 4.1: Fallow land due to uncontrollable growth of weeds

Photo 4.2: Fallow land due to lack of interest

Photo 4.3: Water drawing out from field to the canal through Iron sluice of *pette-paara*

Photo 4.4: *Pette-paara* equipment

Photo 4.5*:Kavda*, a weed in paddy field

Thanneerumukkom bund

Thottappally spillway

Sand depostit on the sea side of Thottappally spillway

Concrete bunds in Kuttanad region

Vembanad Lake

New constructions on a bund in near Vembanad Lake

A Spa in the Kuttanad region

Houseboats in the Kuttanad region

A traditional dinner in the study area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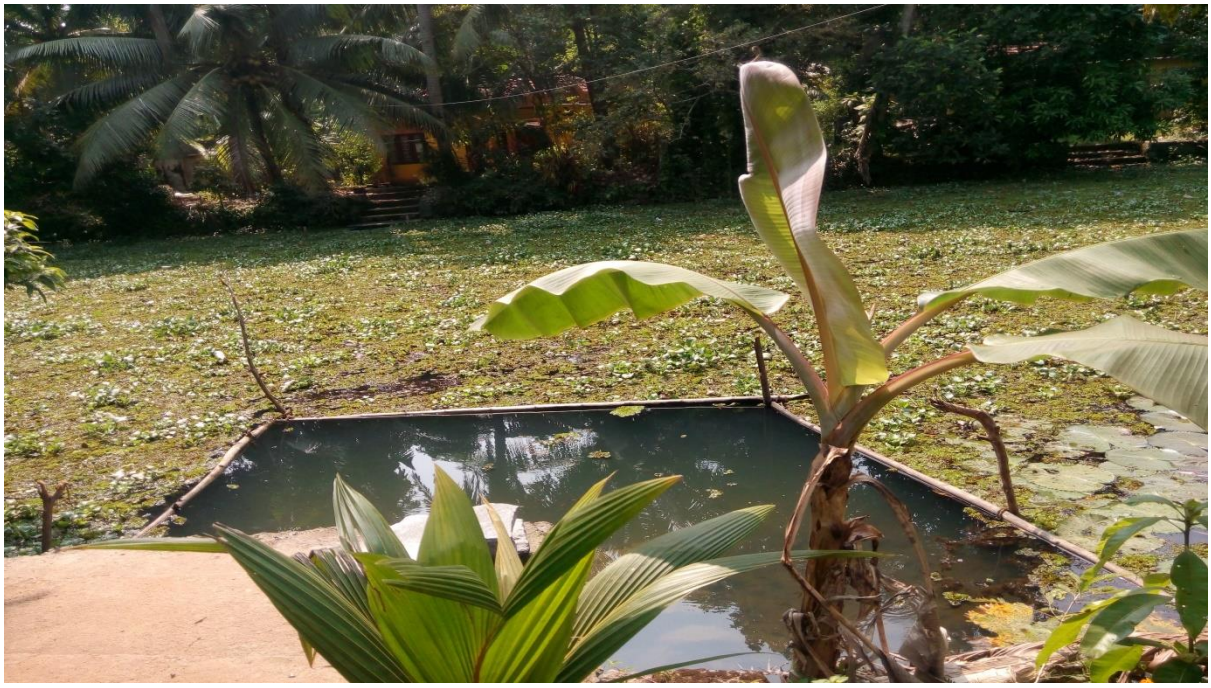
***Kochuvallam*, a small canoe of a family in Puthukary village**

Sit-out in a house in the Puthukary village

A paddy field converted into a homegarden

A *Chakram*, which was used to de-water the fields in earlier years.



A canal in Puthukary village filled with water weeds

Rice Research Station, Moncompu

Development, Ecology and Traditional Agricultural Practices: A Study of Puthukary Village in Kuttanad Region of Kerala

by T Sekhar Babu

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